



UCL

The Impact of Occupational Trauma on Family Members and Close Friends of
High-Risk Occupational Group Workers: A mixed-method thesis

Sahra Tekin

A thesis for the degree of Doctor of Philosophy (PhD)

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Secondary Supervisor: Dr Naomi Glover (UCL)

University College London, UK

July 2024

Sponsored by the Turkish Ministry of Education

Declaration

I, Sahra Tekin, confirm that the work presented in my thesis is my own. Where information has been derived from other sources, I confirm that this has been indicated in the thesis.

Name:

Date:

Sahra Tekin

27th of July 2024

Abstract

Background: The American Psychological Association (APA) has described high-risk occupational groups as those working in hazardous work environments and worker populations that may be exposed to such precarious environments. Due to long working hours, shift work, poor working conditions, and the risk of exposure to potentially traumatic incidents, high-risk occupational group workers are at risk of developing mental health and well-being issues. Social support is one of the key protective factors against mental health issues for high-risk workers, and family members and close friends of high-risk workers are frequently the primary source of support for such workers. However, while they are supporting their high-risk worker loved ones, they are also at risk of developing mental health and wellbeing issues.

Aims: During my PhD programme of research, I aimed to understand the experiences, views, needs, and mental health and wellbeing issues of family members and close friends of high-risk workers.

Methods: In my qualitative study, I conducted in-depth interviews with family members and close friends of healthcare workers (HCWs) who worked during the COVID-19 pandemic in the UK and analysed the data via thematic analysis. In my first systematic review, I used best evidence synthesis to understand the experiences of high-risk workers across a range of occupational groups. In my second systematic review, I used narrative synthesis to explore the experiences of the HCWs' family members and close friends before and during the COVID-19 pandemic. Finally, in my mixed-method survey study, I quantitatively examined the degree of secondary traumatic stress (STS) and associated factors amongst household members of HCWs, and I used content analysis to explore their experiences in detail.

Results: In my qualitative study, family members and close friends of HCWs reported that due to the long working hours and shifts, they had to take more domestic responsibilities such as cleaning, shopping, and childcare and that they experienced emotional burden due to anxiety about the HCW's work. They reported that the sacrifices made by family members and close friends were not recognised by society and that the

needs of HCWs and their families were not met by healthcare organisations, which impacted their mental health and wellbeing.

According to the findings of my two systematic reviews, family members and close friends of high-risk workers are at risk of developing mental health and well-being issues in addition to relationship problems within the family. Social support was one of the most important coping strategies for family members and friends of high-risk workers. While there were similar experiences before and during the COVID-19 pandemic amongst the family members and friends of the HCWs (i.e. experiencing anxiety and worry due to the healthcare work and taking more domestic responsibilities at home due to the demanding nature of the healthcare work), there were also different experiences. For example, due to the COVID-19 pandemic, HCWs' working hours and shifts were increased and this impacted their family lives negatively. Additionally, due to the risk of transmission of COVID-19, family members were not only worried about the health of HCW loved ones, but also the rest of the household's health.

In my mixed method survey study, 33.8% of household members reported STS within the severe range. Female spouses and partners of HCWs with clinical roles showed higher STS compared to male and other household members of the HCWs with non-clinical roles. Being a spouse/partner of a HCW and having a HCW with a clinical role were significant predictors for high STS. Additionally, based on the findings of the content analysis, household members reported that HCWs tended to be irritated, quieter/distant, anxious/stressed, in low moods, and exhausted after having a difficult day at work. These feelings and behaviours impacted the rest of the household members negatively.

Conclusion: High-risk workers are at risk of developing mental health and wellbeing issues due to the nature of their jobs, and it can be challenging being a family member and close friend of a high-risk worker. Due to the potentially traumatic nature of high-risk work, workers' family members and close friends may experience negative impacts on their own mental health by hearing about traumatic incidents, or they could be affected by the long hours, shift work, and compassion fatigue of their high-risk worker. Organisations have legal and moral responsibilities to protect workers and their loved

ones. In order to provide better support, it is important to conduct further research to expand and address gaps identified in the literature. Additionally, it is necessary to increase awareness amongst organisations of the potential impact of occupational stress on family members of HCWs.

Impact Statement

The studies that I have conducted for my thesis promote researchers' and stakeholders' understanding of the experiences, views, needs, and potential mental health and well-being issues of family members of high-risk occupational group workers, specifically healthcare workers (HCWs).

1. Research Impact

My qualitative study related to family members and close friends of HCWs who worked during the COVID-19 pandemic in the UK (Section III, Chapter 5; also Tekin et al., 2022) has been published in the European Journal of Psychotraumatology as part of their special issue on "Stress, Trauma, and Related Conditions in Military, First Responders, Healthcare professionals, and Their Families" and cited eighteen times to date (Tekin et al., 2022). This study was the first qualitative study in the UK to explore the experiences of family members and close friends of HCWs during the COVID-19 pandemic.

My initial systematic review study identified a broad and heterogenous body of literature and in this review study, I aimed to explore the experiences, views, needs, and mental health and wellbeing of family members and close friends of a broad range of high-risk occupational group workers (See Section III, Chapter 6). Due to the breadth and heterogeneity of this literature, I subsequently decided to narrow down the focus of this review for the purposes of publication and to complete different systematic reviews for specific high-risk occupational group populations. A more focused systematic review included in this thesis aimed to explore the experiences, views, and mental health and wellbeing of family members and close friends of HCWs before, during, and after the COVID-19 pandemic (See Section III, Chapter 7). A manuscript based on this review has been accepted for publication in PLOS ONE. I am the primary supervisor of the MSc student in the Division of Psychiatry on a systematic review exploring the mental health and wellbeing of family members of first responders including police officers and firefighters. We aim to submit a manuscript based on the student's MSc dissertation to a high-impact peer-review journal by the end of this year. A further two projects (experiences and views of i) family members of

explorers and ii) family members of farmers and farm workers) will be prepared for publication after my PhD.

My final mixed-method survey study which aimed to examine the secondary traumatic stress experiences amongst the household members of HCWs is currently under review with BMC Psychology. To date, this is the first mixed-method study globally that has focused on the secondary traumatic stress experiences of household members of HCWs.

2. Other Academic Impact

Firstly, in order for the findings of my studies to reach larger audiences, I have presented the findings of my research at different congresses and seminars throughout the course of my PhD, including both academic and general audiences. I have presented the findings of my studies at the UK Trauma Research Group meeting (2022), the Trauma Seminar organised by the Social Sciences University of Ankara (2022), NHS CHECK Conference (2022), Ibn Haldun University International Mass Trauma Conference (2023), and AHBAP Association Turkey-Syria Earthquake Seminar (2023).

Secondly, my PhD provided me the opportunity to join different research groups as a visiting researcher. I was successful in being awarded a place on the Yale-UCL funded collaborative exchange programme which I undertook between 18 February 2022 to 18 May 2022. Thanks to this opportunity, I worked as a visiting researcher at Yale University, in the Trauma and Mental Health Lab under Dr Sarah Lowe's supervision. At Yale University, I worked on a dataset that was collected after Hurricane Katrina and a paper arising from this collaboration was published in the European Journal of Psychotraumatology (See Section VI; also, Tekin et al., 2023 for more details).

Finally, working in the Division of Psychiatry with my team of supervisors and thesis committee members has provided me with opportunities to collaborate and contribute to wider related research. For example, I was one of the co-authors of a paper related to the experiences of partners of individuals with PTSD, and this was published in PLOS ONE (Powling et al., 2024). Additionally, I have contributed

to different publications related to occupational mental health and wellbeing (See Section VI for more details of the other published manuscripts)

3. Clinical and Organisational Impact

In terms of clinical impact, with the help of what I learned as a result of my PhD studies and the support from my primary supervisor Professor Jo Billings, I prepared a psychosocial support program for first responders and their families who responded to the 6th of February Turkey-Syria earthquake. Under my leadership, along with approximately 20 mental health professionals, we provided psychosocial support to dozens of frontline workers and their families during the aftermath of the earthquake throughout 2023.

In terms of organisational impact, the findings of my PhD studies highlight that the mental health and wellbeing of high-risk workers need to be prioritised and that the support they receive should be extended to their family members and close friends as well. I hope during my post-doctoral work to be able to continue to disseminate this key message.

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Naomi Glover: conceptualised the study, supervised every stage of the study, contributed to the data analysis plan, and reviewed & edited the manuscript.

Talya Greene: independently analysed two transcripts to increase the trustworthiness of the study and reviewed & edited the manuscript.

Danielle Lamb: independently analysed two transcripts to increase the trustworthiness of the study and reviewed & edited the manuscript.

Dominic Murphy: independently analysed two transcripts to increase the trustworthiness of the study and reviewed & edited the manuscript.

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Danielle Lamb: contributed to the visualisation of the findings and reviewed & edited the manuscript.

Helen Nicholls: completed title/abstract and full-text screening of the 20% of the papers independently

Naomi Glover: conceptualised the study, supervised the study, contributed to determining the key search terms, and reviewed & edited the manuscript.

Jo Billings: conceptualised the study, contributed to the interpretation of the data, supervised every stage of the study, and reviewed & edited the manuscript.

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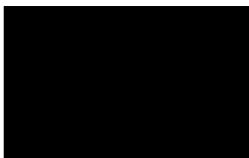
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Danielle Lamb: contributed to the data analysis plan and reviewed & edited the manuscript.

Talya Greene: contributed to the data analysis plan and reviewed & edited the manuscript.

Millie Tamworth: independently analysed a proportion of the qualitative data.

Dominic Murphy: reviewed and edited the final draft of the manuscript.

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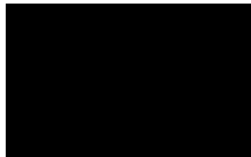
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Section I: Foundation of My Thesis Projects

For centuries, we thought that psychological disorders and mental health issues were not contagious. But is that really true?

In this section, I first explain why I chose to work on the impact of occupational trauma on family members and friends of high-risk occupational group workers and then I provide an outline for my PhD thesis chapters.

Chapter 1. Overview of My PhD

Before I was awarded the scholarship that allowed me to pursue my master's and PhD, I was working as an assistant psychologist in the inpatient psychiatry service of Gulhane Military Hospital in Ankara, Turkey. During my time there, I worked with high-risk occupational group workers such as military personnel, veterans, firefighters, military doctors and nurses, and police officers with many different mental health and wellbeing issues, including PTSD. While I was working with these service users, I often met with their family members, and I witnessed their struggles as well. At that time, whilst looking for resources to support family members, I started to realise how little work there was in this field. For this reason, before I started to apply for PhD positions, I knew that I wanted to work on occupational trauma and its extended impacts.

After I graduated from my MSc programme in Clinical Psychology in 2020, I started to apply for PhD positions related to psychological trauma. I knew that I wanted to work on occupational trauma and its impact, but I was not sure about the population. Then, I had an interview with my primary supervisor, Professor Jo Billings, to be able to start my PhD in the Division of Psychiatry at UCL, and she drew my attention to the potential impact of COVID-19 on healthcare workers (HCWs) and their family members. As a result of the COVID-19 pandemic's impact on the mental health and wellbeing of HCWs and potentially their family members, and the significant gap in the literature about the family members of high-risk workers (specifically HCWs' family members) I decided to focus for my PhD on the impact of occupational trauma on family members and close friends of high-risk workers, specifically HCWs. Additionally, my thesis has been conducted through the peak of the COVID-19 pandemic from January 2020 until 2024, which has inevitably shaped its focus and impact.

The overall purpose of my PhD was to explore the experiences, views, needs, and potential mental health and wellbeing issues of family members and close friends of high-risk occupational group workers. My PhD has four different components: i) a qualitative study that explored the experiences and needs of HCWs' families and friends ii) a systematic review to understand similar and different experiences between different high-risk occupational group workers' family members and close friends, iii) a

systematic review to understand the experiences and views of family members of HCWs before, during, and after the COVID-19 pandemic, and iv) a mixed-method survey study to extend the findings of preceding studies in a larger sample of healthcare workers family members.

Chapter 2. Outline of the Thesis Sections

In Section II, I provide introductory information about my thesis. Firstly, in Chapter 3, I explain the background for a better understanding of my research. Then, in Chapter 4, I describe my aims, objectives, and research questions for each project.

In Section III, I explain my PhD projects in detail. Chapter 5 includes information about my first project “Experiences and views of frontline healthcare workers’ family members in the UK during the COVID-19 pandemic: a qualitative study” (Tekin et al., 2022). Chapter 6 outlines my second project: “The Impact of Occupational Traumatic Stress on Family Members of High-risk Occupational Group Workers” which is a systematic review study with the aim of exploring the similar and different experiences of different high-risk workers’ family members. In Chapter 7, I present a subsequent systematic review exploring “The Impact of Occupational Stress on Family Members of Healthcare Workers Before and During the COVID-19 Pandemic: A systematic review”(Tekin et al., 2024). Finally, in Chapter 8, I report on a mixed methods survey study that explored “Secondary Traumatic Stress Experiences of Household Members of HCWs”.

Section IV includes four chapters. In Chapter 9, I provide a brief summary of the findings of my PhD projects. In Chapter 10, I report a synthesis discussing the implications of all my PhD studies in a theoretical context. Chapter 11 discusses the strengths and limitations of this programme of research and in Chapter 12, I present the implications of my PhD projects including theoretical, clinical, organisational, and research recommendations.

In Section V, I summarise the conclusions of my PhD projects and in Section VI I provide information about my other academic achievements during the PhD.

Section II: Introduction

In this introductory chapter, I provide background information relevant to my PhD projects and then outline the aims and objectives of my PhD projects, including my specific research questions.

Chapter 3. Background

In this section, I define key terms and set out key research relevant to understanding the potential impact on family members and close friends of workers in high-risk occupational groups. I start by defining high-risk occupational groups and then describe common mental health issues amongst high-risk occupational group workers. Then, I discuss the importance of social support, before presenting research related to the mental health and wellbeing of family members.

1. Definition of High-risk Occupational Group Workers

Occupational risks are defined as the possibility of injury or illness occurring as a result of hazards in the work environment, and these risks can be biological, chemical, physical, and psychosocial (Belin, Dupont, Oules & Kuipers, 2016). The American Psychological Association (APA) (2011) has described high-risk occupational groups as those working in hazardous work environments and worker populations that may be exposed to such environments in a dangerous way which may cause psychological and/or physical harm. The APA (2011) exemplified hazardous work environments as:

- Agriculture (such as farming) and forestry (such as logging and fishing)
- Construction work (including re-building after a disaster)
- First (emergency) response (such as firefighters, police officers, and paramedics)
- Healthcare work (additional to doctors, nurses, and other healthcare workers; pre-pandemic preparation staff who monitor and evaluate the risks before the pandemic such as public health researchers (NHS-Emergency Preparedness, Resilience and Response (2024))
- Manufacturing (such as workers, refining, and sawmill operations)
- Military
- Mining
- Service sector jobs where the workers may face criminal behaviour and violence.
- Transportation via air, water, and land.

However, hazardous work environments are not limited to those. According to APA (2011), they may also cover other characteristics such as;

- Workplaces with a risk of violence,

- Intense work schedules and inflexible working hours
- Work design and worker health and safety
- Working conditions
- Exposure to stressful events
- Exposure to chemicals, diseases, and/or hazardous waste
- Lack of sleep and increased fatigue related to the work
- Discrimination at work (APA, 2011)

Based on this definition, high-risk jobs include military personnel, healthcare workers (HCWs), first responders, construction workers, seafarers, explorers, and farmers. In the UK, there are 152,400 armed personnel (UK Parliament-Defence Personnel Statistics, 2023), 1.3 million HCWs (NHS Workforce Statistics, 2023), 140,228 police officers (Police Workforce, England, and Wales, 2022), 31,064 firefighters (Fire and Rescue Workforce and Pensions Statistics, 2023), over 3.1 million construction workers (Construction Sector Deal, 2019), and around 301,000 people working in the agricultural sector (Agricultural Workforce, 2022). Due to their risky work environments (because of the heat, noise, hazardous chemicals, and/or psychological distress), high-risk occupational group workers are at increased risk of experiencing occupational diseases, mental health issues, and existing health problems may also be aggravated due to their work (World Health Organisation -WHO-, 2017).

In the International Labour Organisation (2023), some high-risk occupational groups were defined as ‘key workers’, because they risked their lives to serve society during extreme situations, such as the COVID-19 pandemic. Key workers were categorised under eight occupational groups: food system workers, healthcare workers, retail workers, security workers, manual workers, cleaning and sanitation workers, transport workers and technicians, and clerical workers. Based on data collected from 90 countries, the authors of the report stated that a significant proportion (52%) of the workforce employed in these 90 countries are classified as key workers (see Figure 1 for the distribution of occupations amongst key workers based on the countries’ income group).

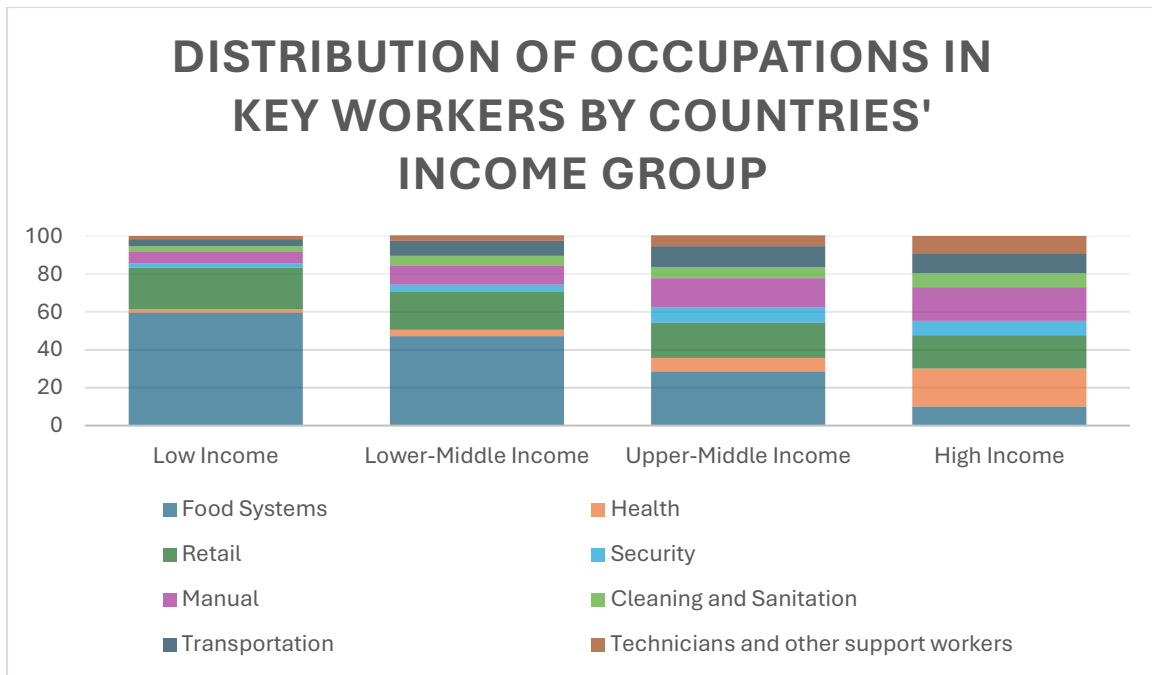


Figure 1. Distribution of Occupations of Key Workers by Countries' Income Group (World Employment and Social Outlook Report (2023))

2. Mental Health and Wellbeing

2.1. Description of Common Mental Health Issues

Under this subtitle, I briefly outline what common mental health issues (specifically psychological distress and trauma-related mental health issues) may be experienced by high-risk occupational group workers and their family members.

2.1.1. Psychological Distress

The Oxford English Dictionary reported that distress has a Latin origin derived from the 'distingere' which is the combination of 'dis' (meaning apart) and 'stringere' (meaning "feeling nervous") (Ridner 2004). Although the term psychological distress is frequently used in both clinical and non-clinical fields (Carolan et al., 2015; Ridner 2004), its definition has not been clarified. Individuals sometimes use the terms 'anxiety' and 'depression' interchangeably with psychological distress (Phillips, 2009) and stress (Carrozzino et al., 2023) inconsistently. Ridner (2004) defined stress, distress, and psychological distress with the intention to eliminate this confusion following: *Stress* is a biological response to a trigger or stressor that is not always deleterious to the person.

Distress is a biological, emotional, or social response to a trigger or stressor that is deleterious to the person. *Psychological distress* is 'a unique discomforting, emotional state experienced by an individual in response to a specific stressor or trigger that results in harm to the person' (p.536-545).

To further explain the meaning of psychological distress and to create a preliminary list of the distress symptoms in non-clinical populations, Masse (2000) conducted in-depth interviews with 179 participants in France. Based on the ethnosemantic analysis, he identified six main sources of distress among the participants:

- *Demoralisation and pessimism toward the future*: This manifests as a deep feeling that 'everything is going to only get worse'. Due to demoralisation and pessimism toward the future, individuals tended to be demotivated, disengaged, and less interested, socially and professionally (p. 413).
- *Anguish and stress*: Distress may be experienced as anxiety, preoccupation, and tension. Individuals experience anxiety and fear as internal pain, and this internal pain brings about a sense of lack of power.
- *Self-depreciation*: This is characterised by 'doubting one's own social, affective, and/or professional abilities and self-worth'. Individuals tend to be highly critical of themselves and inculcate themselves about their lives when things start to be challenging.
- *Social withdrawal and social isolation*: Individuals withdraw themselves from social interactions and reject social life.
- *Somatisation*: Somatisation is characterised by exhaustion, lack of physical energy, and fatigue. In his paper which focused on psychological distress qualitatively and quantitatively, Masse (2000) pointed out that there is a positive correlation between somatisation and social withdrawal/social isolation.
- *Withdrawal into oneself*: According to Masse (2000), withdrawal into oneself was the essential expression of distress among the participants. According to him, distress can be described as a 'crisis of the self' (p. 414). The reason for this crisis is that the individuals' perceived incapacities to control their own

lives and to adapt themselves to social life. Because of the crises in the self, which is characterised by inner pain and undesirable self, individuals may experience unwanted life situations, and they tend to demoralise, socially withdraw, anguish, and stress.

Masse (2000)'s definition has been supported by other previous and current definitions in the literature: Firstly, Bech (1990) and de Figueiredo and Frank (1982) defined psychological distress as "*feeling a lack of hope about the future*" (p. 77-89) and "*demoralisation about the future and person's perception about his/her inability to complete tasks*" (p. 353-363). These definitions support Masse's first conceptualisation of psychological distress: *Demoralisation and pessimism toward the future*. Secondly, Parloff et al., (1954), Ridner (2004), Rhodes & Watson (1978), Ilfeld (1976), and Wheaton (2007) all reported that psychological distress is an emotional discomfort and sense of psychological pain, anguish, and irritability. This definition is similar to Masse's second description of psychological distress: *Anguish and stress*. Thirdly, psychological distress was defined as an individual's doubt about coping with the stressors (Ridner, 2004) and doubt about social abilities (Lazarus & Folkman, 1966), which is a similar definition to Masse's third distress expression: *Self-depreciation*. Fourthly, McCorkle & Young (1978) conducted research with 53 cancer patients in the US, and they reported that due to the symptoms of the illness, patients tended to experience psychological discomfort which they called "symptom distress". They also measured, apathy and fatigue, which was pointed out Masse's (2000) fifth distress expression: *Somatization*. Finally, according to Orbach et al., (2003), mental pain is characterised by negative alterations in the self and negative feelings about individuals themselves. Fava et al., (2019) reported that mental pain can be a predictor of "clinically significant distress." In other words, psychological distress can be described as "inner pain" and "undesirable self", which is similar to Masse (2000)'s sixth distress expression: *Withdrawal into oneself*. In recent studies, psychological distress is described as 'the challenging mental and physical symptoms, that are related to the normal alterations in mood of the individuals' (American Psychological Association (APA) Dictionary of Psychology, 2020). There are number of measures which have been devised to measure psychological distress which will be discussed in the systematic review chapters of this thesis. See Appendix 1 for some of

the questionnaires that measure psychological distress such as the Distress Questionnaire (Batterham et al., 2016), K10 and K6 (Kessler et al., 2002); and the Perceived Stress Scale (Cohen et al., 1983).

2.1.2. Trauma and Post-Traumatic Stress Disorder (PTSD):

The American Psychiatric Association Dictionary of Psychology (2022) defines ‘trauma’ as follows: ‘any disturbing experience that results in significant fear, helplessness, dissociation, confusion, or other disruptive feelings intense enough to have a long-lasting negative effect on a person’s attitudes, behaviour, and other aspects of functioning. Traumatic events include those caused by human behaviour (e.g., rape, war, industrial accidents) as well as by nature (e.g., earthquakes) and often challenge an individual’s view of the world as a just, safe, and predictable place’ (APA, 2022). While categorising different forms of trauma, researchers have used different perspectives. For example, Giller (1999) reported that trauma can occur in different forms such as ‘single vs multiple trauma’, ‘natural vs human-made’, and ‘varieties of man-made violence’ and Muller et al., (2016) argue that trauma can be categorised based on its length or repetition (see Table 1 below for my conceptualisation of the different types of trauma as originally presented by Giller (1999), Harris & Murray, (2017), International Society for Traumatic Stress Studies (2016), and Muller et al., (2016).

Table 1. Categorisation of Different Forms of Trauma

The source of the traumatic event	Frequency of the traumatic event	Length or Repetition of the traumatic event
<p>Disaster-related trauma*</p> <p>-Disaster-related trauma can occur due to earthquakes, hurricanes, wildfires, etc, and affects mostly many people (International Society</p>	<p>Single incident</p> <p>-When individuals experience physical or emotional violence which possibly includes a life threat or serious harm to them, or they may be the witness of a serious</p>	<p>Repetitive incident</p> <p>-When individuals experience physical or emotional violence repetitively in a short period of time, it can be described as a repetitive incident.</p>

for Traumatic Stress Studies, 2016).	incident that includes life-threatening (Giller, 1999).	
Human-made trauma -Human-made trauma was used to describe cruel human behaviours which may cause trauma such as war, torture, kidnapping, etc.	Multiple incidents -When individuals experience (or directly witness) more than one life-threatening (or serious harm) incident. Multiple incidents may include a combination of abuse such as physical, verbal, sexual, and psychological (Harris & Murray, 2017)	Prolonged incident -According to Muller et al., (2016), when individuals have faced multiple traumatic experiences for a long time (such as for years), it can be defined as ‘prolonged traumatisation’.

*Note: Disaster-related trauma was previously known as ‘natural disaster-related trauma’. However, currently, instead of natural disaster-related trauma, researchers, politicians, and media have used “disaster-related trauma” or “weather-related trauma” due to the hazardous impact of climate change (Colombia Climate School: Climate, Earth, and Society, 2023)

PTSD is a specific psychiatric diagnosis that may be given following exposure to a traumatic event. According to the DSM-5 (2013), the diagnostic criteria for PTSD are:

- A. exposure to one or more life-threatening traumatic events which can involve
 - a) directly experiencing the event, b) being a bystander to the event, c) being exposed to details of the event (such as collecting the human remains as a first responder or regularly being exposed to the details of child abuse as a police officer, etc.)
- B. experiencing intrusive symptoms such as flashbacks, nightmares, or intrusive and involuntary memories about the traumatic event
- C. avoiding reminders of traumatic event
- D. negative changes in mood and cognitions such as negative beliefs about the self, others, and the world, dissociative amnesia (struggling to remember the details of the traumatic event), negative emotions such as blaming

themselves, guilt, anger, horror, anhedonia, struggling to feel positive emotions such as happiness.

- E. changed current threat perceptions such as irritability, hypervigilance, risky behaviours, sleeping problems, and struggling to concentrate.

In an epidemiological survey study, which was conducted with 68,894 participants from 24 countries, 70% of participants reported that they had been exposed to a traumatic event, and 30.5% reported exposure to four or more traumatic incidents (Benjet et al., 2016). However, although the majority of individuals may experience exposure to traumatic incidents in their lifetime, most will not meet the criteria for trauma-related psychological disorders (Center for Substance Abuse Treatment, 2014). According to findings of Kessler et al., (2017)'s epidemiological study which included 68,894 individuals, the risk of developing PTSD after experiencing a traumatic incident was 4%. In their study which was conducted during the COVID-19 pandemic, Shevlin et al., (2021) reported that the rate of post-traumatic stress disorder (PTSD) was 16.79% in the UK. However, according to findings of studies which were conducted prior to the COVID-19 pandemic, the PTSD rate was around 5% in the UK (Karatzias et al., 2019). For this reason, the significant difference between the rates may be related to COVID-19's traumatic impact on individuals (Shevlin et al., 2022). A number of measures have been developed which have been used to measure PTSD, which are discussed in my systematic review chapter. A list of commonly used measures (such as the Clinician-Administered PTSD Scale for DSM-5 (CAPS-5) (Weathers et al., 2013); Impact of Events Scale (Weiss & Marmar, 1996); and PTSD Checklist for DSM-5 (Weathers et al., 2013) is provided in Appendix 2.

2.1.3. Vicarious Trauma and Secondary Traumatic Stress:

As explained above, exposure to a traumatic incident may lead to mental health issues in the individuals exposed. However, individuals who are close to the trauma survivor may also be at risk of developing mental health issues (McCann & Pearlman, 1990). For example, mental health professionals are frequently exposed to the unpleasant details of their clients' traumatic experiences (Sutton, Rowe, Hammerton & Billings, 2022).

Mental health professionals, even though they have completed advanced training and usually receive regular clinical supervision, can be affected by their clients' traumatic experiences, and they may experience changes in their perception of self (being doubtful about their professional skills), others (developing a strong belief about the capacity of human's cruelty), and the world (perceiving the world as an unsafe place) (McNeillie & Rose 2020). McCann and Pearlman (1990) defined these cognitive changes in professionals who work closely with trauma victims as vicarious trauma.

Secondary traumatic stress is characterised by symptoms that imitate post-traumatic stress disorder, due to learning the details of a traumatic incident that was experienced by a significant other (Figley 1995). Although vicarious trauma and secondary trauma are sometimes used interchangeably in the literature, there are significant differences between them (Sutton et al., 2022). For example, while cognitive changes in self, others, and the world are the main focus of vicarious trauma, in secondary traumatic stress the main focus is on the symptoms that professionals or family members of trauma victims experience such as intrusive thoughts, vivid nightmares, avoidance behaviours, and hypervigilance (Baird & Kracen, 2006; Sutton et al., 2022).

While explaining the conceptual model of secondary traumatic stress, Bride and Figley (2004) highlighted the following elements: "exposure, empathic engagement, risk factors, compassion satisfaction, and support" (Bride & Figley, 2004, p.318-321) (see Figure 2 below for my conceptualisation of the STS model as originally presented by Bride & Figley (2004)).

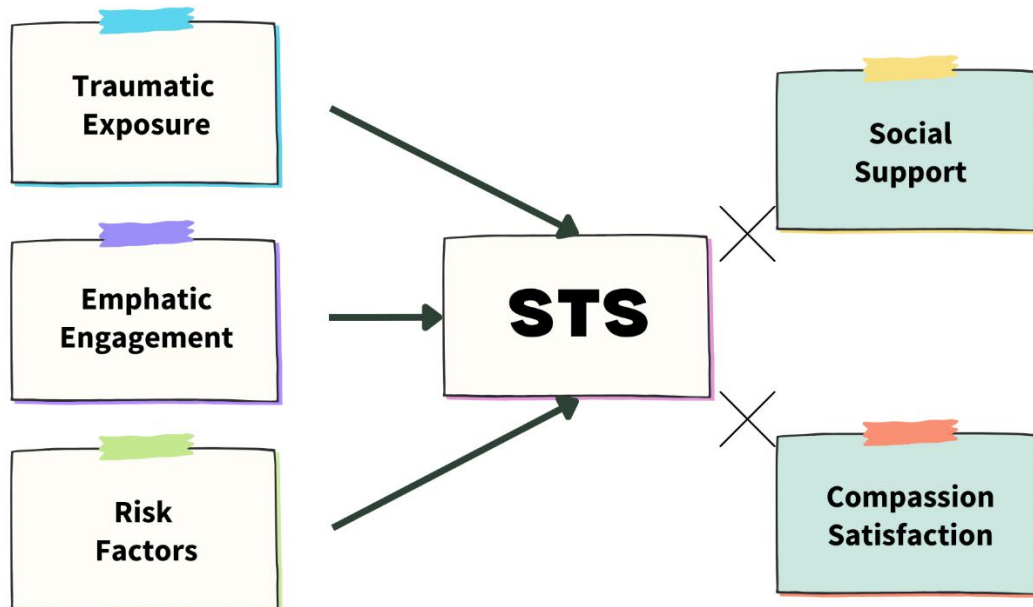


Figure 2. Conceptual Model of the Secondary Traumatic Stress (Bride & Figley, 2004).

In this model, **traumatic exposure** refers to the secondary exposure to others' traumatic experiences (Bride & Figley, 2004). Secondarily traumatised individuals hear the details of someone else's traumatic experiences and while they are trying to support the traumatised person, they may re-live that person's traumatic experience vividly (Sutton et al., 2022). In their model, Bride and Figley (2004) reported that social workers connecting with their clients naturally become more **empathic**, and this may be a risk factor for developing secondary traumatic stress. Similarly, current literature findings with nurses (Mottaghi et al., 2020), with social workers (Rayner et al., 2020; Wagaman et al., 2015), with healthcare workers (Crumpei & Dafinoiu, 2012; Moreno-Jimenez et al., 2023), and with mental health professionals (Lai et al., 2021) show that empathy is one of the contributing factors to secondary traumatic stress experiences. Similarly, lack of **social support** (Rzeszutek et al., 2015) and using negative coping strategies such as using alcohol or drugs, withdrawal from social activities, and showing aggression (Follette et al., 1994) were reported as factors increasing the risk of developing secondary traumatic stress. In their model, Bride and Figley (2004) reported the following **risk factors** for developing secondary traumatic stress: being young and having less experience (Ghahramanlou & Brodbeck, 2000), length of the traumatic exposure (Schauben & Frazier, 1995), and having previous childhood trauma (Pearlman & Mac Ian,

1995). Current literature also supports their model in terms of these risk factors. For example, in a meta-analysis that included 38 studies with different populations including public safety personnel and mental healthcare workers, Hensel et al., (2015) pointed out that spending more time with the traumatised person and having a personal (including childhood) trauma are risk factors for developing secondary traumatic stress. Additionally, in a cross-sectional study which was conducted with 506 child protection workers, Baugerud et al., (2018) reported that work-family conflict and increased working hours were risk factors for secondary traumatic stress. Finally, in their model, Bride and Figley (2004) reported that while working with traumatised individuals, professionals reported not only experiencing compassion fatigue but also experiencing ***compassion satisfaction***. Compassion satisfaction is defined as the satisfaction of helping individuals who are traumatised and in difficult situations (Stamm 2002). Bride and Figley (2004) pointed out that while working with traumatised individuals, professionals can experience both compassion fatigue and compassion satisfaction, and this may impact their secondary traumatic stress experiences. Similarly, in a survey study which was conducted with 253 psychotherapists, Sodeke-Gregson et al., (2013) reported that 70% of psychotherapists recorded high STS scores but 39% of them also recorded high compassion satisfaction. Commonly used measures of vicarious trauma and secondary traumatic stress (such as the Secondary Traumatic Stress Scale (Bride et al., 2004) are included in Appendix 3.

2.1.4. Burnout:

Burnout was first defined by Freudenberg in 1974 as *'to fail, wear out, or become exhausted by making excessive demands on energy, strength, or resource'*. In a systematic review and semantic analysis of burnout which included research from 29 countries, Canu et al., (2021) reported that the definition of burnout was not clear and argued that it is important to clarify the definition of burnout to increase the quality of research related to it. For this reason, Canu and colleagues (2021) conducted a comparative analysis and semantic analysis for thirteen articles which defined burnout (Canu et al., 2021). Based on their analysis, they defined burnout as *'in a worker,*

occupational burnout or occupational physical and emotional exhaustion state is an exhaustion due to prolonged exposure to work-related problems' (p. 104).

In a systematic review of risk factors for burnout amongst nurses, which included fifteen studies from nine different countries, Ramírez-Elvira et al., (2021) reported that being older, caring for children, high workload, lack work-life quality, and limited time for self-care were related to burnout experiences. However, a supportive work environment, support from managers, peers, and family members, adequate payment, and using positive coping strategies could be protective against burnout among nurses (Gimenez Lozano et al., 2021). Commonly used measures of burnout (such as The Maslach Burnout Inventory (MBI) (Maslach et al., 1997)) are included in Appendix 4.

2.1.5. Moral Injury:

In the last couple of decades, moral injury has been increasingly studied by researchers from different fields such as psychiatry, psychology, social work, and philosophy (Griffin et al., 2019). In 2014, Shay reported that when individuals experience '*a betrayal of what's right by someone who holds legitimate authority (e.g., in the military—a leader) in a high-stakes situation*', this experience can be defined as moral injury (p. 183). Mostly, when individuals experience a conflict between their values and actions, they tend to resolve this conflict in terms of their values, and this is mostly protective against developing moral injury (Haidt, 2013). High-risk occupational group workers may not be able to work in accordance with their values in every circumstance. For example, healthcare workers do their jobs with the motivation of saving human lives, and their first principle is "do no harm" (Inman, 1860). This is mostly in their moral codes and their values. However, in some cases, especially during the COVID-19 pandemic, while they were trying to save people's lives, healthcare workers had to make difficult life-and-death decisions due to the lack of resources (Chakma et al., 2021). Some of these difficult decisions will have run contrary to their values and caused moral injury (Choudhary et al., 2022; Singhal et al., 2023). In a qualitative study which was conducted with HCWs before the COVID-19 vaccinations, researchers reported that HCWs were at high risk of experiencing moral injury (Song et al., 2021).

Similarly, military personnel may experience discrepancies between their actions and values, even if they know that they are acting in that way because they are under command (Drescher et al., 2011). If this discrepancy can be solved, military personnel may continue their job without harm. However, if a moral injury develops, they may experience guilt, shame, interpersonal problems, and inefficiency at work (Nash & Litz, 2013; Vargas et al., 2013). In an article that aimed to describe moral injury, Jinkerson (2016) reported that individuals with moral injury may experience shame, guilt, mistrust of others, mental health issues such as depression, anxiety, intrusive memories, losing or questioning the meaning/purpose of life, withdrawal from social life, alcohol, and substance abuse.

In terms of assessing moral injury, researchers assume that individuals experience moral injury as a result of experiencing potentially morally injurious events (PMIEs) including “perpetrating, failing to prevent, or bearing witness to acts that transgress deeply held one’s moral beliefs and expectations” (Litz et al., 2009, p. 697) or “feeling betrayed by an authority figure” (Shay, 2014, p. 183). Due to this assumption, some of the commonly used measures actually measure potentially moral injury events (PMIEs) rather than the distress associated with them (Nash et al., 2013). In an integrative review study, which included 116 quantitative and qualitative studies, Griffin et al., (2019) reported that these events should have been interpreted as PMIE because these exposures do not guarantee permanent adverse consequences. Additionally, Jinkerson (2016) pointed out that while assessing moral injury, it is also important to examine the core feelings and thoughts (such as guilt, shame, existential questionings about life, untrust to others) and secondary features (such as depression, anxiety, intrusive symptoms, temper, relational issues) characteristics. See Appendix 5 for some of the commonly used questionnaires that measure moral injury such as The Moral Injury Event Scale (Nash et al., 2013) and Moral Injury Questionnaire (Currier et al., 2015)).

2.2. Mental Health and Wellbeing of High-risk Occupational Group Workers

The work environment and an individual’s job can have an important impact on mental health and well-being. For example, while a meaningful job can be protective for workers’ mental health and well-being; unmet requirements, long working hours, intense

workloads and work pace, and unsafe and/or poor working conditions may significantly worsen the mental health and well-being of workers (WHO Guidelines on Mental Health at Work, 2022). There may be other individual risk factors that may increase mental health and well-being issues at work such as gender (being female) (Sachdeva et al., 2022), employment status such as being self-employed (World Employment and Social Outlook, 2023), and major conflicts in society (such as war and pandemic).

Under this subtitle, firstly, I briefly summarise key findings from current literature about the mental health and well-being of specific high-risk worker groups such as military personnel, police officers, firefighters, and healthcare workers. Then, I will focus on the risk factors at work for high-risk workers' mental health and well-being such as workload, long working hours, shifts, work environment, and work-home conflicts. These occupations have the largest amount of published literature about them, hence my focus on them.

2.2.1. Mental health and wellbeing of high-risk workers

a) Military personnel

Most research on occupational distress and trauma has historically been conducted with military personnel and veterans. According to the UK Ministry of Defence (2022), 12.5% of military personnel have presented to military hospitals with mental health-related issues, and female military personnel tended to seek mental health support more compared to male personnel. In a qualitative study which was conducted with 22 female veterans (Brown et al., 2021), female veterans reported that they experienced significant discrimination due to being female and their skills were mostly underestimated by their superiors. Additionally, female veterans were at significant risk of rape and/or sexual harassment. One of the woman veterans in the Brown et al., (2021) study was quoted: *“It seemed like every woman I talked to was raped or could have been raped or went through rape. . . . I literally felt like the only woman on [Military Base] that hadn’t been raped.”* (p.208). Lastly, female veterans reported how psychologically overwhelming it was to be superior or subordinate in a man’s

world. These were all significant risk factors for developing mental health and wellbeing issues for both military populations (Brown et al., 2021).

Moral injury and psychological distress are common amongst military and veteran populations. It is well documented that experiencing a potential moral injury event is a significant risk factor for developing mental health issues such as psychological distress (Williamson et al., 2023), PTSD (Norman et al., 2022), depression (Maguen et al., 2022), substance use disorders (Maguen et al., 2021; Maguen et al., 2023), suicidal ideation, lifetime suicide plans, and suicide attempts (Nichter et al., 2021). In a quantitative study which was conducted with U.S. Air Force (USAF) Distributed Common Ground System (DCGS) intelligence exploitation ($n=1091$) and support personnel ($n=447$), researchers found that 14.35% of personnel reported high psychological distress due to shift working, poor leadership, lack of manpower, and high workload (Prince et al., 2015). In another qualitative study which was conducted with fifteen military personnel in Iran, researchers pointed out that due to military culture (psychologically difficult, sometimes emotionally and physically exhausting), job demands, and feeling limited by military rules and military lifestyle (such as deployments, etc.) which impacted not only themselves but also their family members, that military personnel and their families were at risk of experiencing psychological distress (Alizadeh et al., 2023). In terms of moral injury, 36.3% of US combat veterans reported that they experienced at least one potentially morally injurious event (Nichter et al., 2021).

Military personnel and veterans are also at high risk of developing post-traumatic stress disorder, depression, and anxiety. For example, in a systematic review that included thirteen studies, the prevalence of PTSD was reported as 27.8% among military personnel and veterans who were deployed in the Iran-Iraq war (Shahmiri Barzoki et al., 2023). In a cross-sectional study, which was conducted with 12,5708 military personnel in the US, the PTSD rate was 8.2%, the depression rate was 9.2%, and the generalised anxiety disorder rate was 13.9% (Hruby et al., 2021). However, in this study, questionnaires relied on self-report, and this can

be counted as a limitation due to individuals' bias about examining their own experiences/symptoms (Wang & Cheng, 2020). In a systematic review study, Moradi et al., (2021) reported that the depression rate was 23% for military personnel who are on active duty and 20% for veterans. Additionally, they reported that suicidal ideation and attempts were 11% for both military personnel and veterans (Moradi, Dowran & Sepandi, 2021).

Substance abuse, extreme alcohol consumption (Inoue et al., 2022), and gambling (Stefanovics et al., 2023) have also been cited as significant problems among military personnel and veterans. In a cross-sectional study, it was reported that 423 (17.3%) of 2,449 military personnel in the UK were struggling due to alcohol misuse (Finnegan et al., 2021). In a survey study conducted with 16,699 military personnel in the US, Meadows et al., (2018) reported that 0.7% of military personnel used illegal drugs, 0.9% of military personnel overused prescription drugs, and 4.1% misused prescription drugs. Additionally, in a study which was conducted with 4079 US veterans, Stefanovics et al., (2023) found that gambling rate was 27.3% and 4.9% of the veterans were at high risk of gambling.

b) First responders

First responders (including paramedics, police officers and firefighters) are emergency service professionals who are usually first on the scene when an incident happens (Cambridge Dictionary, 2023). In a survey study (Carleton et al., 2019) conducted with 4,441 public safety personnel (including firefighters and police officers) in Canada, 93.8% reported that they had been exposed to sudden violence at work, 93.2% serious transportation accidents, and 90.6% physical assault. Public safety personnel pointed out that they were faced with a variety of violence and events which resulted in the deaths of the general population more than 11 times in a day. The researchers pointed out that emergency responders are at high risk of developing emotional stress due to working in environments that are mostly unpredictable and difficult to control and facing dangerous situations daily such as being exposed to violence and abuse of others and being subjects of violence themselves (Birch et al., 2017; Jones et al., 2022).

In terms of the police officers' mental health and wellbeing, in a systematic review and meta-analysis study which included 67 studies from 24 countries with a total of 272,463 police personnel, Syed et al., (2020) reported the prevalence of depression, PTSD, generalised anxiety disorder, and suicidal ideation were 14.6%, 14.2%, 9.6%, and 8.5%, respectively. They also highlighted that social support was correlated with lower PTSD rates in police personnel (Syed et al., 2020). According to the findings of a survey study conducted with 1,542 police officers, paramedics, rural nurses, and child protection workers in Australia after COVID-19, 56.1% of the first responders reported significant symptoms of burnout (Roberts et al., 2021). Similarly, in a systematic review and meta-analysis study, Berger et al., (2012) reported that the global prevalence of PTSD amongst the rescue workers including firefighters, police officers, and other rescue teams was 10%. In a scoping review study, Obuodi-Donker et al., (2022) found that PTSD rate for firefighters was 57%). In a survey study conducted with 250 firefighters in Turkey, Çelebi & Gökkaya (2023) reported that anxiety and depression rates of firefighters were 10.8% and 9.6%, respectively.

In a systematic review study, Wagner et al., (2021) reported that the prevalence of PTSD in police officers has been increasing over the years compared to the general population and police officers with a lack of social support were at greater risk of developing PTSD. Interestingly, in their systematic review study, Regehr et al., (2021) reported that while some of the included studies comparing the stress levels of police officers on duty during the World Trade Centre (WTC) attack and the general population found higher distress in police officers, some of the included studies found higher distress in the general population. However, findings were consistent between the studies which reported that police officers' rates of PTSD were lower compared to individuals who experienced the WTC attack. The reason for lower PTSD rates in police officers compared to individuals who experienced terrorist attacks may be attributed to the strict selection process of the officers (van der Velden et al., 2013) and training (Gabriel et al., 2007).

c) Healthcare workers (HCWs)

Due to potentially stressful working environments, working closely with patients, long and unpredictable working hours, hazardous and demanding work environments, and often poor working conditions, healthcare workers are significantly at risk of developing mental health and well-being issues (CDC, 2023). In a qualitative study, which was conducted during the COVID-19 pandemic with 28 mental health professionals who worked with health and social care workers in the UK, even though they were motivated to help others, and found opportunities to grow, develop and learn, mental health professionals felt overwhelmed due to the uncertainty of the situation, increased working hours and additional responsibilities (Billings et al., 2021a). Similarly, in another qualitative study, healthcare workers in the UK reported that they had to suppress their feelings even though they '*felt like rubbish because of going to work*' (p.7). In the same study, HCWs also reported that they had to be separated from their loved ones due to the pandemic and this was overwhelming for them (Billings et al., 2021b).

Psychological distress, vicarious trauma, secondary traumatic stress, compassion fatigue, burnout, and moral injury are common among HCWs. However, most of the studies that are related to HCWs' experiences were conducted during and after the COVID-19 pandemic, and there were very few studies prior to the COVID-19 pandemic. For this reason, it is difficult to compare HCWs' mental health and wellbeing before the pandemic and during/after the pandemic, as well as compare findings with other high-risk workers. For example, in a cross-sectional study which was conducted with 282 nurses in Ethiopia, researchers reported that 27.7% of nurses were suffering from psychological distress. In the same study, researchers pointed out that the nurses who had intermediate social/family support experienced psychological distress 18.9 times less compared to nurses with poor social support (Belay et al., 2021). In a cross-sectional study, which was conducted with 48 healthcare providers in the US, it was found that HCWs tended to experience vicarious trauma due to their job and

they tended to experience significantly high stress at work (Jimenez et al., (2021). In terms of secondary traumatic stress (STS) amongst healthcare workers, in a systematic review which aimed to explore secondary traumatic stress, compassion fatigue and vicarious trauma in medical doctors, researchers reported that similar to the rest of the healthcare workers, physicians also tend to vicarious trauma and compassion fatigue (Huggard & Unit, 2013). Additionally, moral distress and moral injury were found to be common among healthcare workers during the COVID-19 pandemic (Čartolovni et al., 2021; Litam & Balkin, 2021; Riedel et al., 2022)

HCWs are also at high risk of developing post-traumatic stress disorder, depression, and anxiety. In a systematic review which included eleven studies conducted during the COVID-19 pandemic, the prevalence of anxiety, depression, and stress among healthcare workers were 24.1%, 12.1, and 29.8%, respectively (Vizheh et al., 2020). In a cross-sectional study which was conducted with 1194 health and social care workers in the UK, Greene et al., (2021) reported that while 47% of the health and social care workers met the criteria of depression, 47% of them met the anxiety criteria, and 22% of them met the PTSD criteria. Similarly, in a current cross-sectional study which was conducted with healthcare workers in the UK, 14.3% of the HCWs showed generalised anxiety disorder, 13.7% showed depression, 21.5% showed generalised anxiety and depression comorbidity, and 25.4% showed PTSD (Scott et al., 2023). Greene et al., (2023)'s cross-sectional study which was conducted with 1056 health and social care workers, reported that the rate of probably Complex PTSD amongst HCWs was 14.2%. Interestingly, in a cross-sectional study, which compared anxiety, depression, and PTSD amongst HCWs ($n=1453$) and non-HCWs ($n=3074$) in Norway, Schou-Bredal et al., (2022) reported that depression, anxiety, and PTSD frequencies were lower in HCWs population compared to non-HCWs. However, it is important to highlight that Schou-Bredal et al.'s, (2022) findings are not consistent with current literature. This inconsistency may be explained as follows: a) researchers pointed out that younger adults and lower level of

education predicted poorer mental health and their non-HCW population was younger and had a lower education level compared to HCWs (Schou-Bredal et al., 2022), and b) cross-sectional studies usually rely on convenience samples and self-report measures, which is likely to inflate true prevalence rates (Wang & Cheng, 2020). It is important to acknowledge these limitations in this type of literature. For example, in their two-phase cross-sectional study which aimed to investigate PTSD and other mental health issues amongst the HCWs in England, during the COVID-19 pandemic, Scott et al., (2023) pointed out that HCWs reported higher rates of PTSD (25.4%) and common mental health issues (52.8%) in self-report screening tools compared to diagnostic interviews (7.9% for PTSD and 14.3 for combined generalised anxiety disorder and depression).

In summary, even though there is mixed data about the prevalence of PTSD amongst high-risk workers, it is clear that PTSD impacts these groups in a significant way. These differences in the prevalence of PTSD amongst high-risk workers may be due to the following reasons; a) methodological issues (such as cross-sectional studies with purposive sampling (due to potential risk of bias and lack of representativeness of the sample (Rai & Thapa, 2015) and self-reported measurements (Wang & Cheng, 2020)), b) cultural differences (due to the impact of culture on mental health and wellbeing (Section III, Chapter 7; also see Tekin et al., 2024), c) differences in organisational culture (for example, supportive work environment may be protective against the mental health issues for high-risk workers (Billings et al., (2021b)). This needs to be examined with further research.

2.2.2. Risk factors at work for high-risk workers' mental health and wellbeing

Poor working conditions and environment may have a negative impact on the mental health and wellbeing of workers in high-risk roles. For example, in a systematic review study that included 25 articles from Europe, North America, Australia and New Zealand, Aronsson et al., (2017) reported that high job demands, decreased job control, increased workload, and job insecurity enhanced the risk of experiencing emotional exhaustion.

Similarly, according to the findings of another systematic review which included seventeen studies from seven different countries with a total of 73,874 workers, when workers experience effort-reward imbalance, high job demands, decreased support from colleagues and supervisors, and high emotional demands, there is an increased risk of developing stress-related mental disorders for workers (van der Molen et al., 2020). Additionally, in a systematic review and meta-analysis which included 22 studies from ten countries conducted with doctors, sawmill workers, police officers, firefighters, nurses, medical students, textile workers, industrial workers, and subway drivers, Milner et al., (2018) reported that there was a positive correlation between job stressors and increased suicidal ideation and behaviours. Other systematic reviews have focused on the positive association between depression and work-related exposure to violence (Regehr et al., 2021), high-risk workers' perceived job insecurity (Kim & von dem Knesebeck, 2016), and the imbalance between the workers' effort and reward (such as low payment) (Rugulies et al., 2017). In terms of the effort-reward imbalance, in a cohort study with 4963 workers from ten countries, Zhuo et al., (2020) reported that there was a significant correlation between suicidal ideation and high effort and low reward; and depressive symptoms were mediators of the relationship between the effort-reward imbalance and suicidal ideation. According to the findings of Lee et al.'s, (2022) longitudinal study conducted with 208 first responders in the US, when first responders were experiencing low-medium levels of emotional exhaustion, safety climate (actions to protect workers' health and keep them safe) was correlated with degree of depression. The authors concluded that a lower safety climate is a risk for first responders' mental health and wellbeing addition to their safety behaviours at work.

Long working hours may have a negative impact on high-risk workers' mental health and well-being. In a systematic review which included 28 studies conducted with approximately 190,000 participants from 35 countries, Virtanen and colleagues (2018) reported a significant correlation between long working hours and depression symptoms in Asian countries. However, they did not report any significant relationship between long working hours and depression symptoms in North America and Australia and they reported a small relationship in European studies. This regional difference in workers' mental health may be as attributable to better working conditions in North America and

Australia (Virtanen et al., 2018). In another systematic review, Rugulies et al., (2021) compared levels of depression of workers who worked 35-40 hours a week; 41-48 hours a week; and ≥ 50 hours a week, and found that there was no relationship between the depression prevalence, incidence, and mortality rate in these groups. However, the authors highlighted that more research is required to address the direct relationship between long working hours and the risk of depression (Rugulies et al., 2021). Research has demonstrated a significant relationship between long working hours and increased alcohol consumption (Virtanen et al., 2015). For example, in a systematic review and meta-analysis which included 61 cross-sectional studies from 14 countries, researchers found a significant positive association between long working hours and alcohol consumption, and this relationship was not dependent on the age, socioeconomic group, or region (Virtanen et al., 2015).

It is well-documented that ***shift work*** can also have a negative impact on the mental health and well-being of high-risk workers. For example, shift workers reported that their work-sleep cycle was broken, which could lead to negative mental health consequences (Boivin and Boudreau, 2014). In a systematic review that included nurses, emergency physicians, and industrial workers, Richter et al., (2021) pointed out that due to the effect of shift work leading to sleep disorders (Richter et al., 2016), fatigue at work (Gifkins et al., 2020) and psychological distress, workers may tend to consume alcohol in higher rates (Richter et al., 2021).

3. Social Support

Humans are not unique among mammals who have evolved to live in social groups as a form of protection (Caporael & Bron, 1997). Realising that it was difficult to hunt (Alexander, 1974), protect the food that they found (Wrangham, 1980), and defend themselves against predators (Van Shaick 1983) alone, primates discovered the advantages of living in a group and supporting each other. Similarly, social support has a variety of advantages for humans. Under this subtitle, firstly, I briefly define social support and explain the importance of social support.

3.1. Definitions of Social Support

Social support is defined slightly differently by researchers. For example, while Cobb (1979) and Shumaker & Brownell (1984) defined social support as an exchange of resources between two individuals to increase the well-being of at least one of them; Cobb (1976), Cassel (1976), and Sarason & Sarason (1985) argued that social support is a form of information which helps individuals to understand that he/she is loved, valued, and cared by others in his/her own network, and he/she is part of his/her community. However, one of the most accepted definitions of social support is that talking about themselves with others in the community and having feedback from others about themselves, feeling loved, and valued, being part of the community, and also receiving support from others (Caplan, 1974; House, 1981).

According to researchers, social support systems can be categorised into five different domains: informational, tangible, esteem, emotional, and social network support (Cobb 1976; Schaefer, Coyne & Lazarus, 1981). Informational support includes providing suggestions and advice in stressful situations. Tangible support is providing products and services that a person needs. Esteem support is complementing and validating someone. Emotional support includes listening, showing empathy, and encouraging. Finally, social network support is being there for a person as community, introducing other people who have similar hobbies or experiences (Cutrona & Suhr, 1992). In their research, which aimed to find the most helpful social support type in different stressful situations among married couples, Cutrona and Suhr (1992) reported that informational and emotional support were helpful in coping with different kinds of stressful situations such as job loss among the married couples.

3.2. Importance of Social Support

It has been well-documented that social support is a significant protective factor against mental distress (Brewin et al., 2000; Ozer et al., 2003). In their meta-analysis, Brewin et al., (2000) reported that after traumatic incidents, civilians, and military personnel who lacked social support were at the highest risk of developing PTSD. Similarly, in their meta-analysis, Ozer et al., (2003) reported that, regardless of the type of traumatic event

(accident, violence, abuse, or military-based trauma), individuals with higher perceived social support after the incident showed lower PTSD symptoms.

In a systematic review study, Wang et al., (2018) reported that individuals with depression who had lower perceived social support demonstrated higher symptoms, lower recovery, and lower social functioning. In another meta-analysis which included 64 studies with a total of 23,762 participants, Haranti et al., (2017) highlighted that there was a high correlation between social support and wellbeing for parents with disabled children, immigrants, students, and workers.

Li et al., (2021) reported that during and after disasters and pandemics, social support was protective for individuals against mental health issues. For example, in a survey study conducted with 23,192 participants in China during the COVID-19 pandemic, findings showed that there was a positive relationship between resilience and mental health and that social support had a buffering role in the negative effect of low resilience on mental health (Li et al., 2021). In another COVID-19-related study, Szkody et al., (2021) reported that when the length of time in self-isolation was considered, the relationship between worry about COVID-19 and psychological health was buffered by perceived social support. In a longitudinal study which was conducted with Hurricane Ike survivors, researchers found that individuals who received more emotional support showed lower levels of post-traumatic stress symptoms (Plat et al., 2016). Similarly, survivors of Katrina Hurricane who received higher social support handled the consequences of the hurricane better compared to survivors who could not receive social support (Tekin et al., 2023).

Social support is also important for high-risk occupational group workers in terms of their mental health and wellbeing. The following section focuses on the importance of social support specifically for different high-risk occupational group workers.

a) *Military personnel and first responders :*

Historically most research related to social support has been conducted with military samples. In their qualitative study which was conducted with 25 British World War II veterans, Hunt and Robins (2001) found that social support was a significant coping strategy for veterans. In different studies, researchers have

reported a correlation between lower social support and higher PTSD symptoms for veterans (Blais et al., 2020; Brewin et al., 2000; Zalta et al., 2021). In a cross-sectional study of 191 Israeli veterans, a negative relationship between 'suicidal ideation and behaviours' and 'social support' was found (Levi-Belz et al., 2022). In a survey study of 1,882 Canadian police officers, participants with lower perceived social support showed increased mental disorder symptoms such as PTSD and generalised anxiety disorder (Angehrn et al., 2022). According to findings of Njiro et al., (2021)'s study which included 497 police officers in Tanzania, police officers who perceived lower social support were at higher risk of developing depression and suicidality, compared to police officers with higher perceived social support. In another survey study of 431 firefighters from China, researchers reported that there was a negative relationship between social support and avoidant coping, burnout, and post-traumatic stress symptoms (Chen et al., 2021).

b) *Healthcare workers (HCWs)*

In a longitudinal survey study, which was conducted with 293 mental healthcare workers in the US, Shoji et al., (2014) measured the level of secondary traumatic stress among mental health professionals while they were working with military personnel who experienced a traumatic incident (T1). After 6 months, they measured the secondary traumatic growth of the mental health professionals (T2). According to their findings, perceived social support for mental health professionals in T2 mediated the relationship between secondary traumatic stress and higher secondary traumatic growth (Shoji et al., 2014). Findings of another survey study which was conducted with 303 nurses, found that perceived social support from colleagues increased job performance and reduced levels of stress amongst nurses (AbuAlRub, 2004). Research which was conducted during/after the COVID-19 pandemic highlighted the importance of social support for HCWs as well. For instance, in a systematic review, Labrague (2021) reported that when healthcare workers who worked on COVID-19 during the pandemic received social support from managers, peers, family, and friends, there was a significant decrease in their level of traumatic stress, psychological distress,

burnout, and anxiety. Similarly, all around the world, researchers reported that social support was protective against mental health issues among healthcare workers during the COVID-19 pandemic. For example, in a survey study which was conducted with 45 healthcare workers in Turkey, researchers reported that receiving social support reduced burnout symptoms among HCWs. They also pointed out that family support was the only factor that protected HCWs from burnout and hopelessness (Karagöl & Kaya, 2022).

Furthermore, findings of a systematic review and meta-synthesis which included 46 qualitative research related to the experiences of HCWs in COVID-19 and prior pandemics and epidemics (Billings et al., 2021c), and findings of studies conducted with 7765 HCW in Germany (Schug et al., 2022), 2372 HCWs in Spain (Ortiz-Calvo et al., 2022), 1101 HCWs in Saudi Arabia (Al-Mansour, 2021), and 1064 HCWs in China (Zhang et al., 2022) also supported the findings that social support was protective for mental health of HCWs during the COVID-19 pandemic.

4. Mental Health and Wellbeing of Family Members

Social support can be provided by friends, colleagues, family members, and pets (Siegel, 1993). During physical (Lee et al., 2016; Romito et al., 2013) and/or mental stress (Gharavi et al., 2018), individuals are likely to seek help and support from their family members. This may impose a new role on family members: the role of caregiver. There is an established body of literature about the impact on family members and partners of taking on a caregiving role for a loved one with a physical or mental illness. There is, however, a notable gap in the literature about family members' experiences of providing support more broadly outside of a formal caregiving role. I have briefly summarised below some of the key literature related to the impact of caregiving, before returning to what we know about the experience of providing broader support amongst families of high-risk workers.

According to Adashek et al., (2021) during the caregiver role, family members may have increased responsibilities in four areas: medical responsibilities (monitoring medication

usage and symptom changes), domestic responsibilities (having more domestic responsibilities such as childcare, paying bills, cleaning, cooking, etc.), personal responsibilities (making arrangements in her/his own jobs such as quitting the job, being in touch with healthcare services), and social/emotional responsibilities (providing emotional support to the physically or mentally ill family member, trying to protect previous social network such as arranging meetings and activities). When individuals lack enough time and resources to meet the requirements of their caregiving role, it is described as role overload (Goode, 1960). Role conflict can also occur when expectations regarding the various roles an individual holds become discordant (Biddle 1986).

Bastawrous (2013) indicated that family members who feel role overload and role conflict are at increased risk of experiencing burden. In their concept analysis of caregiver burden, Liu et al., (2020) pointed out that while family members are providing care to their chronically ill loved ones, due to the sacrifices in their own careers, their responsibilities as caregivers and meeting the loved one's needs first, they experience increased levels of burden. In a meta-analysis study, (which included family members of individuals with dementia and cancer, stroke survivors, and elderly individuals) researchers reported that there was a strong correlation between caregiver burden and clinically significant anxiety (del-Pino-Casado et al., 2023).

Individuals tend to turn to their family members for support and this may increase the risk of developing mental health and wellbeing issues for those family members. For this reason, in 4.1., I provide more detail about the experiences of family members who take care of their physically or mentally ill family members, and then in 4.2., I focus on the small body of literature describing the experiences of family members of high-risk occupational group workers.

4.1. Family Members of Individuals with Physical and Mental Illnesses

Family members who provide care and support to their loved ones with physical and mental illness are at increased risk of developing mental health and well-being issues. For example, in a survey study conducted with 191 caregivers of cancer patients, family members who spent more time caregiving to their loved one with cancer reported lower

quality of life scores (Wadhwa et al., 2011). Kent and Dionne-Odom (2018) reported that when family members cared for and supported their loved one going through cancer for 20 or more hours in a week over 2 or more years, they reported feeling mentally unwell for an average 11.4 days in a month. However, when family members provided care and support for less than 20 hours per week for less than 2 years, they reported feeling mentally unwell for 4.8 days per month. In a cross-sectional study which was conducted with 150 spouses, parents, siblings, and children of patients with cancer in Saudi Arabia, researchers pointed out that 53% of the family members showed moderate or high levels of caregiving stress due to time demand, emotional tension, changed role in family, and social demands (Saimaldaher & Yazgar, 2020). Similarly, family members who provided care to a family member who had experienced a stroke reported high levels of burden when the time that they spent on caregiving increased (Kavga et al., 2021). According to the findings of a study conducted in Turkey, there was a positive correlation between caregivers' burden and caregivers' anxiety and depression levels (Unsar et al., 2021). In the current literature, researchers have indicated that while family members are providing care for their loved ones with serious physical or mental illness, their contact with other family members and friends tends to decrease (Lynn, 2014; Soylyu et al., 2016), and this increases the loneliness of caregivers (Segrin et al., 2019). In another cross-sectional study which was conducted with 800 family members who provided care to a family member with cancer, family members reported that in addition to feeling anxious, worried, and sad, they were overwhelmed in terms of social roles because most of them had to take on the previous social responsibilities of the family member themselves, such as supporting other family members and arranging daily activities in the family (Lewandowska et al., 2021).

These findings are similar for family members of individuals with mental illness. For example, in a cross-sectional study which was conducted with 67 mentally ill individuals in Germany (Wiegand-Grefe et al., 2019), 43% of the participants reported that they observed emotional and behavioural problems in their children, and researchers reported that the severity of these issues had a positive correlation with the family dysfunctionality. Even though this study has significant limitations (for example, the emotional and behavioural issues were reported by the mentally ill parents instead of the

children's themselves), the findings are consistent with the current literature findings (Wiegand-Grefe et al., 2019). In a meta-synthesis study, Alyafei et al., (2021) reported that family members of seriously mentally ill patients take a lot of responsibility to help their family members with mental illness, and they mostly had to sacrifice their own lives and careers to support the individuals with severe mental illness. In a cross-sectional study conducted with 415 family members of mentally ill individuals in Nigeria, 49% of family members showed psychological distress and 34% of family members reported high or severe burden (Udoh et al., 2021). Similarly, 63% of 66 family members of individuals with schizophrenia in Tanzania experienced a high level of burden (Clari et al., 2022). Additionally, family members of individuals with alcohol use disorder and schizophrenia had high scores on depression and anxiety scales (Vadher et al., 2020) and low scores on quality of life (Hsiao et al., 2020). Studies conducted with family members of individuals with dementia also indicated that family members experienced caregiver burden (Connors et al., 2019; Tulek et al., 2020), low quality of life (Tulek et al., 2020), emotional pain due to their loved one's illness (Malhotra et al., 2021; Lindeza et al., 2020), social isolation (Lindeza et al., 2020), and psychological distress (Cohen et al., 2020). Similarly, family members who provide care and support to their family members with Parkinson's disease reported a significantly high burden due to their sacrifices from their social life and career and lack of sleep (Geerlings et al., 2023; Ransmayr, 2020). In a qualitative study, family members of individuals with Parkinson's indicated that they were not spending time on themselves because they felt high responsibility for their loved ones. For this reason, sometimes they were experiencing overburden (Lennaerts-Kats et al., 2020).

4.2. Family Members of Military Personnel and Veterans

To date, there is a comprehensive body of literature that has looked at the impact on families of having a military personnel/veteran in the family. In this section, I summarise key research about the mental health and well-being of family members of military personnel and veterans. This body of literature suggests that being the partner or family member of someone who is or has been, in the military can have a significant impact on family members.

Ribeiro et al., (2023) found that spouses and partners of military personnel were a key source of support for military personnel. However, this may have a negative impact on family members' mental health and wellbeing. In a qualitative study of 22 spouses of military personnel, six of the spouses identified themselves as caregivers as they were providing care for their partners' physical and mental requirements (Borah & Fina, 2017). One of the spouses shared her experiences with those words:

'...after being accepted into the caregiver program, I made them [healthcare team] talk to me because my husband didn't make appts [appointments], show up for appts, or do anything they told him to. I am the only one they have really talked to in the past 3 years.'

In the same study, spouses also stated that they were feeling depressed and isolated when their partner/spouse was deployed (Borah & Fina, 2017). When military personnel are deployed their family members also reported a great concern about uncertainty related to whether they were dead or alive (Faber et al., 2008). Additionally, they reported that they had to take on more domestic responsibilities at home and had to make critical decisions about their families while their military partner was away on duty. As a result of these experiences, family members felt fear, concern, and worry (Faber et al., 2008). A mother stated that,

'The fear of the unknown . . . that you have no control over the situation, number one, and then you're kept in the dark by not knowing what's going on. It's far away, and there isn't constant communication, so you just simply don't know what's going on.'

In their study, Hrynzovskyi et al., (2022) reported that family members of military personnel who deployed overseas, experienced conflict in the family due to the military work. Additionally, family functionality (specifically raising children and joint activities as a family) was disrupted due to one of the parents being deployed for a long time. Similarly, Bogdan Savych (2008) pointed out that spouses of deployed military personnel may experience burden due to increased domestic responsibilities such as childcare, cleaning, shopping, and other domestic obligations that previously were taken care of by both parents (i.e., repairing the house broken devices at the house). Family members also reported significant levels of distress and anxiety due to the life-threatening nature

of military work. Some of the family members experienced domestic violence and aggression after military personnel came back home from conflicts.

De Burgh et al., (2011) reported that spouses of deployed military personnel were at high risk of developing mental health issues such as depression, anxiety, and sleep problems compared to spouses of non-deployed personnel. Due to long-term duties and deployment, spouses tended to experience reduced relationship satisfaction. For instance, in a longitudinal study of 153 spouses of Dutch military personnel, the relationship satisfaction of spouses decreased over time (Andres, 2014). Similarly, Thandi et al., (2017) conducted a survey study which included 4,265 military personnel in the UK and a third to half of military personnel indicated that deployment had a negative impact on their intimate relationship. They also reported that deployment had a negative impact on their children's wellbeing.

Regardless of deployment, being a family member of a military person or veteran has been shown to have an impact on family members. In a survey study conducted with 9,039 spouses of US military personnel, 4.9% of the spouses ($n=441$) showed signs of major depression symptoms (Donoho et al., 2018). In a cross-sectional study, which included 9,341 spouses of US military personnel, spouses reported that they experienced financial strain, caregiver burden, and reduced social support. Additionally, 21.8% of the spouses ($n=1,788$) described their marital quality as low (Pflieger et al., 2018).

Family members of other high-risk occupational group workers such as first responders (police officers, firefighters, law enforcement officers, etc.), healthcare workers, construction workers, farmers, explorers, etc., are also at high risk of developing mental health and wellbeing issues. Whilst there is a growing evidence base about the impact of military work on military families, there is only recently a small, but growing, body of literature about the potential impact on family members in other high-risk roles. I have systematically reviewed this literature, and this is presented in Section III (Chapter 6 and Chapter 7)

5. Gaps in the Literature

As discussed above, due to the nature of their work, high-risk workers are at increased risk of developing mental health and wellbeing issues, and when they experience such issues, they are likely to turn to family members to seek help and support. Whilst to date, there is a comprehensive body of literature looking at the impact on families of having a military personnel/veteran in the family, there has been much less consideration of families of other high-risk workers.

HCWs were performing their roles under risky working conditions preceding the pandemic (Huggard & Unit, 2013). Like military personnel, HCWs tended to turn to their family members and close friends during those stressful times (Roth & Moore, 2009). However, there are a very limited number of studies in the literature focusing on the experiences, views, and needs of family members of HCWs both before as well as during and after the COVID-19 pandemic. During the pandemic, HCWs worked long hours and shifts, potentially developing mental health and wellbeing issues, they were reported to appreciate the support that they received from family members and friends (Billings et al., 2021b; 2021c), and researchers have pointed out that HCWs receiving support from families and friends is an important element of continuity of healthcare (Tekin et al., 2022). However, there was a significant gap in the literature about what kinds of mental health and wellbeing issues family members of HCWs experience and what kinds of support they need.

My PhD started in 2021. At that time there were emerging reports regarding the potentially detrimental impact of the pandemic on the mental health and wellbeing of HCWs. Similarly to family members of military personnel, and based on limited literature about families of HCWs, we hypothesised family members and close friends of HCWs may experience mental health and wellbeing issues. However, this issue had not yet been addressed in any research. Due to these gaps in the literature and the timing of my PhD, I decided to focus my research on the families of high-risk occupational group workers (with a specific focus on healthcare workers) to explore their experiences, views, and needs, addition to their mental health and wellbeing issues (See Chapter 4 for overall aims, objectives, and research questions of my PhD projects).

6. Summary

High-risk occupational group workers are at an increased risk of developing mental health and wellbeing issues due to the nature of their jobs. Social support is a well-documented protective factor against mental distress. When individuals are in stressful situations or when they experience physical or mental issues, they often tend to turn to their family members and close friends. However, the social support that family members provide to high-risk workers may increase the risk of them developing mental health and wellbeing issues.

In this chapter, I have firstly defined high-risk occupational groups; secondly what the common mental health and wellbeing issues are for high-risk workers; thirdly, I have defined and outlined the importance of social support; fourthly, I have summarised key research related to the mental health and wellbeing of family members in other high-risk occupations (specifically drawing on research which has mostly been conducted with military families) and finally, I have highlighted gaps in the literature and how my PhD projects will contribute to redressing these.

In the next chapter, I discuss the overall aims and objectives of my PhD projects including the research questions.

Chapter 4. Aims and Research Questions of My PhD Projects

Overall, I aimed to explore the experiences, views, mental health and wellbeing issues, and needs of family members and close friends of HCWs in the UK.

1. Qualitative Study

At the outset of my PhD (2021), there was very little information in the literature about family members and close friends of HCWs and there was no research that focused on the experiences of family members of HCWs who worked during the COVID-19 pandemic in the UK.

The objectives of my first study were;

- a) To explore the experiences and views of family members and close friends of HCWs who worked during the COVID-19 pandemic in the UK.
- b) To explore the perceived needs of family members and close friends of HCWs who worked on the COVID-19 pandemic in the UK.
- c) To use the findings of this initial explorative study to design a quantitative survey study that would examine the mental health and well-being issues amongst family members and close friends of HCWs and associated predictors. (See Section III, Chapter 5; also, Tekin et al., 2022 for more details)

2. Systematic Review 1

After conducting an initial qualitative study to explore the experiences of family members and close friends of HCWs, in my second study, I aimed to conduct a systematic review to understand similar and different experiences, views, mental health and wellbeing issues, and needs of family members and close friends of different high-risk occupational group workers.

The research questions of this study were:

Main research question:

- a) What is the impact of occupational trauma experienced by high-risk occupational groups on their family members' mental health and wellbeing?

Secondary questions:

- b) What are the experiences, views, and needs of family members as supporters of high-risk occupational group workers?
- c) Are there signs of vicarious/secondary trauma in family members?
- d) What are the similar and different experiences, views, needs, and mental health and wellbeing issues of family members of different high-risk workers?
- e) How can the needs of family members be met to enhance the mental health and wellbeing of families? (See Section III, Chapter 7 for more details.)

3. Systematic Review 2

In this second systematic review, I focused specifically on the experiences of family members of HCWs. This time, my main aim was to establish what was known about the experiences of family members of HCWs globally before and during the COVID-19 pandemic.

Main research question:

- a) What is the impact of occupational stress experienced by HCWs on their family members' mental health and wellbeing before and during the COVID-19 pandemic?

Sub-research questions:

- b) What are the experiences, views, and needs of family members as supporters of HCWs?
- c) Are there signs of vicarious/secondary trauma in family members?
- d) What are the similar and different experiences, views, needs, and mental health and wellbeing issues of family members of HCWs, before and during the COVID-19 pandemic?
- e) How the needs of family members can be met to enhance their mental health and wellbeing?

I pre-registered my review studies on PROSPERO. (see the PROSPERO protocol (CRD42022310729) or Appendix 6 for more detail). (See Section III, Chapter 7; also, Tekin et al., 2024 for more details.)

4. Mixed-Method Survey Study

In my initial qualitative study, I discovered that families and close friends of healthcare workers described experiences similar to secondary traumatic stress symptoms. According to the findings of the systematic review studies that I subsequently conducted I found only one other qualitative study (Mohammadi et al., 2022) in addition to my own published study (Tekin et al., 2022) which identified the experiences of family members of HCWs which were similar to secondary traumatic stress (STS) symptoms. There was no quantitative research that focused on STS in family and household members of HCWs.

In this mixed-method survey study, I aimed to

- a) examine the degree of STS experienced by household members of HCWs in the UK after the COVID-19 pandemic and identify associated predictors quantitatively.
- b) explore the impact of healthcare work on household members and what support they thought would be helpful to improve their mental health and wellbeing.

Main research question:

- a) What is the degree of secondary traumatic stress reported by household members of HCWs?

Secondary research questions:

- b) What demographic factors (such as age, sex, ethnicity, HCW job role, and relationship of household members with the HCW) are related to secondary traumatic stress in household members? (See Section III, Chapter 8 for more details -including hypotheses-.)



Important Note: The rationale behind including friends and household members and not just families is that during the COVID-19 pandemic friends and household members were often part of the same support bubble as family members (UK Government, 2020).

Section III: My PhD Projects

In this section, I present my four PhD projects, including their Introductions, Methods, Results, Discussions, and Conclusions. Chapter 5 includes my first project: “Experiences and Views of Frontline Healthcare Workers’ Family Members in the UK during the COVID-19 Pandemic: A Qualitative Study” (Tekin et al., 2022). Chapter 6 includes my first systematic review: “Impact of Occupational Stress on Family Members of High-risk Occupational Group Workers: A systematic review”. Chapter 7 presents the second systematic review “Impact of Occupational Stress on Family Members of Healthcare Workers Before and During the COVID-19 Pandemic: A Systematic Review” (accepted for publication by PLOS ONE). Finally, Chapter 8 reports my final mixed-method survey study: “Secondary Traumatic Stress Experiences of Household Members of Healthcare Workers in the UK: A Mixed-method Survey study” (currently under review with BMC Psychology).

Chapter 5. Qualitative Study: Experiences and Views of Frontline Healthcare Workers' Family Members in the UK during the COVID-19 Pandemic:

A qualitative study

A paper based on the content of this chapter was published in the European Journal of Psychotraumatology for the Special issue on “Stress, Trauma, and Related Conditions in Military, First Responders, Healthcare professionals and their Families” on 11.04.2022 (see Appendix 7 for the published paper)

Full reference: Tekin, S., Glover, N., Greene, T., Lamb, D., Murphy, D., & Billings, J. (2022). Experiences and views of frontline healthcare workers' family members in the UK during the COVID-19 pandemic: a qualitative study. *European Journal of Psychotraumatology*, 13(1), 2057 166.

1. Introduction

The COVID-19 pandemic has had a well-documented negative impact on the mental health and wellbeing of frontline healthcare workers (HCWs). Recent research has shown that nearly 60% of a sample of health and social care workers in the UK met criteria for depression, anxiety, and PTSD symptoms following the first wave of the pandemic (Greene, Harju-Seppänen, Adeniji, Steel, Grey, Brewin et al., 2021). Additionally, frontline workers may experience burnout, moral injury, and secondary trauma (Billings, Biggs, Ching, Gkofa, Singleton, Bloomfield & Greene, 2021; Greenberg, Docherty, Gnanapragasam & Wessely, 2020).

Social support is a well-established protective factor against mental distress (Brewin, Andrews & Valentine, 2000) and frontline workers often depend on family support as a key factor to help them to cope with this work (Ozer, Best, Lipsey & Weiss, 2003). In turn, families are likely to be significantly affected by their family member(s) working in a high-risk frontline occupation during the pandemic. However, at the time of writing, there is no published research, within or beyond a pandemic context, which has examined the

impact of frontline workers' occupation on their families and what the family's support needs might be.

Whilst I am not aware of any research to date exploring the challenges experienced by the families of HCWs, some previous research has been conducted with military families, demonstrating that family members of military personnel may also be affected seriously and negatively (Davidson, Smith & Kudler, 1989). For example, children and adolescents of veterans with PTSD have been shown to experience more behavioural and emotional difficulties, and developmental problems (Selimbasic, Sinanovic, Avdilbegovic & Hamidovic, 2016). Spouses of veterans tend to experience distress (Toomey, Alpern, Reda, Baker, Vasterling, Blanchard & Eisen, 2019; Arzi, Solomon & Dekel, 2000) and spouses of military service members are at increased risk of mental disorders such as depression and anxiety (Eaton, Hoge, Messer, Whitt, Cabrera, Mcgurk et al., 2008), and alcohol and drug use (Booth, Segal, Bell, Martin, Ender & Rohall, 2007). Wives of veterans with PTSD have been shown to have more severe depression, anxiety and OCD symptoms compared to wives of veterans without PTSD (Galovski & Lyons, 2004).

In addition to literature on military families, there is also a small body of literature on families of first responders. According to the results of Alrutz, Buetow, Cameron and Huggard (2020) with 664 partners of emergency responders, 20% of partners struggled with intrusive thoughts about the trauma experienced by their emergency responder family member. Friese (2020) also found that spouses of law enforcement officers tended to experience high levels of stress in addition to sleep deprivation, emotional exhaustion, and relational strain. Some other studies have examined the impact on first responder families of specific crises. Studies conducted after the 11 September, 2001 terrorist attack on the World Trade Centre show that rates of probable PTSD were found to be high among children with emergency medical technician family members (Duarte et al., 2006), and children of first responders were at heightened risk of behavioural problems (Uchida et al., 2018). Spouses of firefighters also reported insomnia and anxiety after 9/11 due to worries about their partners' health and safety (Menendez, Molloy, & Magaldi, 2006).

This literature demonstrates that the families of workers in high-risk occupational roles may also be negatively affected by their loved one's work. Family members of healthcare workers may experience similar stressors to military families and family members of first responders. They too are likely to be worried about the health and safety of their HCW family member. They may also be indirectly exposed to hearing about death and trauma. However, HCW family members may also have unique experiences. Unlike military families, their family member is not deployed overseas for time-limited periods. HCWs continue to live with their families alongside their work and nor are they allocated any dedicated time to decompress and reconnect with their families (Billings et al., 2021a). Unlike the family members of first responders in previous research, the nature of healthcare work during COVID-19 has placed HCWs' families' own health and safety directly at risk. Given the likely impact on HCWs' families and support systems, but as yet unknown nature of this impact, it is imperative to conduct good quality explorative research with this group, to better understand their experiences, views and needs.

Supporting family members who are frontline HCWs' key supporters is critically important. If the impact on HCW family members' is not considered, potentially significant mental health problems and needs could go undetected. Further, their ability to support HCWs may be compromised, removing a potentially protective factor for the HCWs' own mental health and wellbeing. To address this gap, I aimed to explore the experiences, views, and mental health impact on frontline HCWs' families during the COVID-19 pandemic in the UK and what support the families of frontline HCWs may need.

2. Method

2.1. Participants and Procedures

The study was approved by the University College London Research Ethics Committee, reference number 20221/001.

Family members and supporters of frontline HCWs (spouse, parent, sibling, or friend) were reached via social media (Twitter and Facebook) and by snowball sampling through healthcare contacts. I asked the participants to share my email address with other family

members and close friends of HCWs who may consider joining this study. Additionally, members of the research team shared the Participant Information Form with their healthcare contacts to invite their family members and close friends to take part in this study. To increase diversity of perspectives, I included parents, siblings, and friends, as well as spouses. Also, there is very little literature on family impact outside of partners, and to a lesser extent children. The other main reason is that during the COVID-19 pandemic in the UK, people formed ‘bubbles’ with wider family and friends whilst social restrictions were in place, so often wider family members, friends, or household members were a crucial source of social support. All supporters were considered eligible for the study if they were a key source of support for a HCW who had been working directly in a frontline role treating patients affected by COVID-19 during the pandemic in the UK. Participants either needed to reside in the same household as the HCW family member, be in close contact with them throughout the pandemic, and/or be in their ‘support bubble’, defined as a support network to link two households’ during the pandemic by the UK Government (UK Government, 2020). A Consent Form and Participant Information Sheet were sent by email to potential participants who expressed interest in the study. All participants provided informed consent prior to taking part in the interview. Interviews were completed by me.

Interviews took place remotely via MS Teams and were digitally audio-recorded and then transcribed by me. The interview guide was prepared in cooperation with the Expert Reference Group comprising experts in psychological trauma.

2.2. Analysis

Interview transcripts were analysed following the principles of reflexive thematic analysis (TA). TA is a method for “identifying, analysing, and reporting patterns (themes) within data” (Braun & Clarke, 2006, p. 4). There are many reasons behind my choice to use reflexive thematic analysis in this study. For example,

- ***Flexibility***: TA is a flexible and useful research tool that can provide a rich and detailed yet complex account of qualitative data (Braun & Clarke, 2019). Clarke and Braun (2017) reported that this flexibility is not only related to theory but also related to “research questions, sampling size and constitution and data

collection method” (p. 2). This qualitative study was the first study that aimed to explore the experiences, views, needs, mental health, and wellbeing issues of family members and close friends of HCWs who worked during the COVID-19 pandemic in the UK. For this reason, even though I had predictions about their experiences, needs, and mental health and wellbeing issues based on the current literature findings conducted with family members of other high-risk workers, it was a significantly new topic to explore. For this reason, rather than setting precise research questions or grounding the study in theory, I needed to design this study in a more exploratory way, and reflexive TA allows researchers to do that thanks to its flexible nature (Clarke & Braun, 2017)

- ***Reflexivity***: The reflexive approach includes themes that are developed from codes that are related to the research question and present a patterned response or meaning within the data set (Braun, Clarke & Rance, 2014). In TA, themes cannot be independent of the researcher. In the theme formation process, researchers incorporate their own experiences, education, research values, and skills into the study (Braun & Clarke, 2020). As a result, the researcher has an active role during the analysis, and the subjectivity brought by the researcher to the study is not seen as a “problem” or “bias” but rather a strength of the analysis that is made transparent to the readers (Braun & Clarke, 2013). For this reason, on page 86, I have provided information about some of the characteristics of the researchers such as their experiences, education levels, and genders.
- ***Application***: Before I started my PhD, I had no training and experience in qualitative research, but it was particularly timely to conduct this first qualitative study into family members and friends’ experiences, in the early stages of the COVID-19 pandemic (see page 86 for more detail). For this reason, I needed a qualitative analysis that was relatively easy and quick to learn and had structured guidance that explained how to conduct it from data collection to reporting the findings. Reflexive TA has a structured guideline that explains each step of the analysis and “*it is a relatively easy and quick method to learn and do*” (Braun & Clarke, 2006, p. 21).

- ***Findings:*** Braun and Clarke (2006) reported that reflexive TA is helpful in summarising key elements of a large dataset and in underlining the similarities and differences across the data set. Additionally, by using reflexive TA, researchers may reach unexpected insights (Braun & Clarke, 2006) related to participants' live experiences and views (Clarke & Braun, 2017). In this study, I included different family members and friends of HCWs from different settings, and I needed to understand differences and similarities in their experiences. For this reason, reflexive thematic analysis was suitable for understanding their different and similar experiences, needs, and mental health and wellbeing issues.

Since using a qualitative analysis that provides flexibility regarding the theory, research questions and sample size would be more suitable for this study, grounded theory (Glaser & Strauss, 1965) and discourse analysis (Wiggins, 2016) were not appropriate. Additionally, if a researcher has relatively less experience in qualitative analysis, due to the lack of practical guidance, thematic analysis is recommended instead of grounded theory and discourse analysis (Braun & Clarke, 2021). Another reason for not using discourse analysis was that in the discourse analysis, the main focus is on the small details in language (Madill et al., 2001) and how participants talk about a certain topic (Gavey, 1989). However, in this study, I focused on participants' experiences, views, needs, and mental health and wellbeing in general and I did not commit to a discourse orientation in my analysis. In these circumstances, Braun and Clarke (2021) suggest using TA instead of discourse analysis.

Interpretative phenomenological analysis (IPA) is also a frequently used methodology in psychology research. For example, IPA helps to understand how individuals experience and make sense of the environment that they live in (Smith et al., 2009). IPA is a suggested methodology when the research question aims to understand an individual's personal experiences as well as how they attribute meaning to a certain topic (Smith et al., 2009). In this regard, IPA may look like a suitable analysis for this study as well. However, Braun and Clarke (2021) underline a significant difference between IPA and TA: IPA focuses on the details of the experiences of each participant separately before "*developing themes across cases*", in the TA, "*themes are developed across the*

codes, following the coding of the entire data set” (p. 41). If the sample size is larger than ten, if the sample is heterogeneous, “the analytic focus is solely on identifying themes across the data set, rather than also on the unique features of individual cases”, and if the researcher aims to understand how an individual’s experiences fit in broader socio-cultural contexts, Braun and Clarke (2021) suggested TA rather than IPA (p. 42).

To sum up, due to the reasons outlined above, I decided to use reflexive thematic analysis in this study.

Thematic Analysis Steps and My Responsibilities in Each Step

The analysis of this study was completed in six steps based on Braun and Clarke's TA guidelines (2006): familiarisation; coding; searching for the themes; reviewing and developing themes; defining and naming themes; and writing up.

- **In the first step**, familiarization of the data set, I listened to the interview audio recordings and re-read the transcripts in a curious and questioning way. I took notes about my observations and insights about the data set. My primary supervisor (Professor Jo Billings) also read all the transcripts and took notes of her ideas, observations, and insights about the data independently of me. Afterwards, I shared the first eight transcripts with three other researchers (Dr Naomi Glover: transcript 5 and 7, Dr Danielle Lamb: transcript 1 and 3, Dr Talya Greene; transcript 6 and 8, and Prof Dominic Murphy: transcript 2 and 4).
- **In the second step**, coding, I labelled/identified all phrases related to the research question. According to Braun and Clarke (2020), codes designate an observation and demonstrate usually just one aspect of the data. During the coding, I tried to reduce the blind spots in the analysis by using different techniques. Firstly, I printed some transcripts and coded similar observations with the same colour. For other transcripts, I coded by taking notes electronically on the Word document on which the transcript was written. Each researcher except me and Dr Jo Billings who analysed all the transcripts, (Dr Naomi Glover, Dr Talya Greene, Dr Danielle Lamb, and Prof Dominic Murphy) initially analysed two transcripts independently and generated a list of potential codes. At research meetings, all the researchers explained to other researchers the codes that they

thought were important and interesting in the transcripts with their reasons. Then, the generated list of potential codes was reviewed by all researchers and agreed upon. All transcripts were then imported to NVivo Pro V12 (QSR International Pty Ltd. Version 12, 2018) and coded according to the provisional coding frame. All codes were inductive and generated from the data.

- ***In the third step***, searching for themes, I aimed to create a logical and consistent thematic mapping of my data. Unlike codes, themes include multiple aspects of the data (Braun & Clarke, 2006) and rich and complex codes with multiple facets may be upgraded to “themes” (Charmaz 2006). In this study, similar codes related to the research question were collated and the first themes were created (see Figure 3).
- ***In the fourth step***, reviewing themes, I re-read all the encoded transcripts to check that the codes and themes matched correctly and made some minor revisions to my developing list of themes. The final version of the themes was improved with feedback from the wider research team.
- ***In the fifth step***, I shared the names I determined for the themes with the rest of the team who helped to refine them further and ensure all had good face validity and explanatory value.
- Finally, ***in the sixth step***, the themes were written up, with supporting quotes in the article and thesis (Braun & Clarke, 2006).

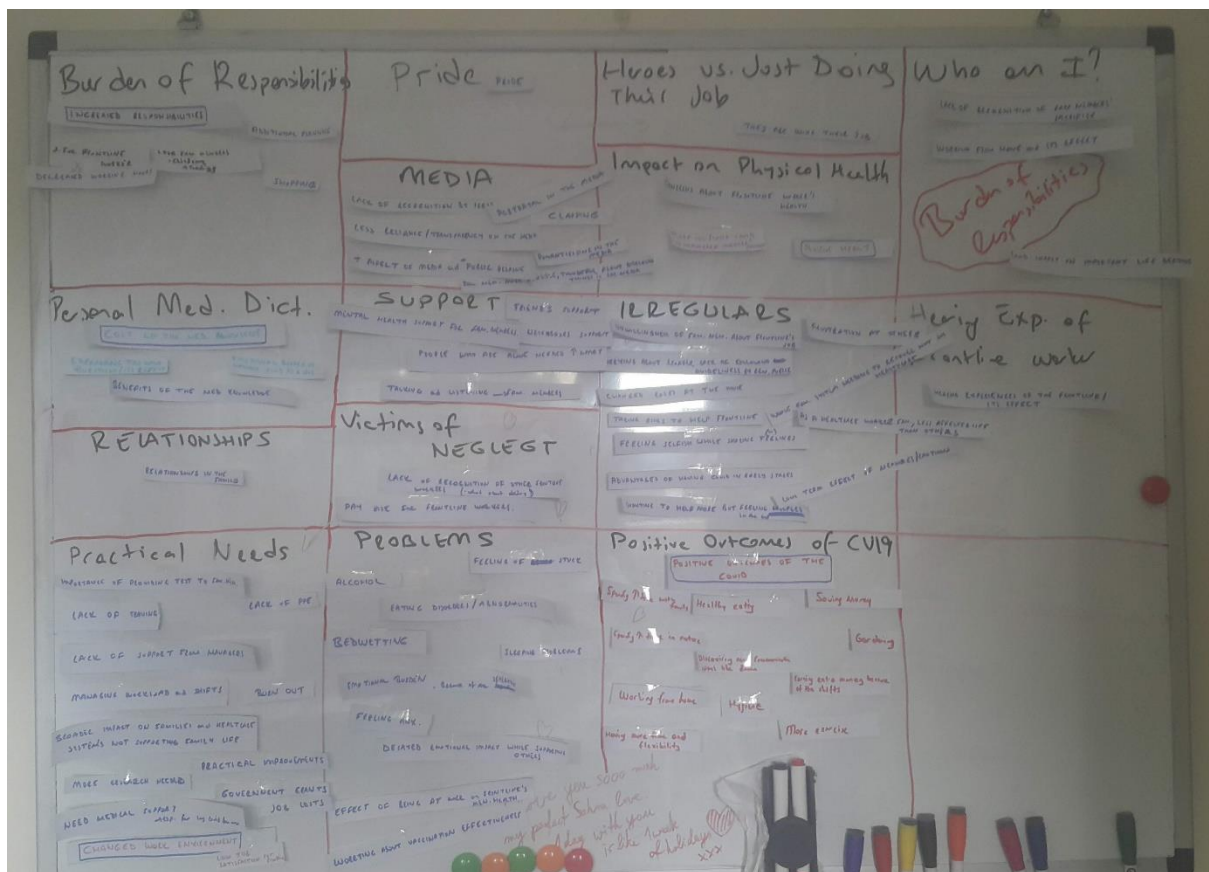


Figure 3. Creation Process of the First Themes (Third step)

This research involved participants potentially talking about distressing personal experiences. Participants were fully informed of the nature of the study in advance of taking part and participation was entirely voluntary. Participants were reminded of their right to pause, postpone, or terminate the interview at the beginning of the meeting. Information was given signposting to psychological support services. I also reminded participants that they could contact their GP for support and access local Psychological Therapy Services. They are also informed that they can contact Samaritans by calling 116 123 day or night. We sought to protect the research team from potential emotional distress by listening to the experiences of the family members with training and regular supervision. We also took precautions to protect participants' anonymity. Any identifying information about the participants, their frontline worker family member, or their place of work was omitted from the transcript of the interview to protect anonymity. After interviews were conducted, participants' email addresses were deleted as well.

All procedures were completed according to the ethical standards as agreed in the UCL ethical approval (see Appendix 8).

2.4. Quality

Qualitative research is increasingly popular and considered important for clinical and health services research (Malterud 2001; Renjith, Yesodharan, Noronha, Ladd & Georger, 2021). However, due to under-reporting of the key elements of qualitative studies, it can often be challenging to examine those studies' quality (Dunt & McKenzie 2012). According to Tracy (2010), although quality has different dimensions, a qualitative study can be defined as a high-quality study if it addresses a) the significance of the research question(s), b) the rigor of the research methods, c) congruity and salience of the findings, and d) the transparency and completeness of the reporting. To address all of these dimensions, I conducted this study according to the Standards for Reporting Qualitative Research Framework (O'Brien, Harris, Beckman & Cook, 2014) and specific guidance for quality practice in thematic analysis (Braun & Clarke 2020).

In their synthesis, O'Brien et al., (2014) worked on 40 previously published recommendations for identifying reporting standards in qualitative studies, which led to a 21-item checklist for quality in qualitative research, corresponding to each section of a qualitative paper (Also see Table 2 for how these items were addressed in this study):

1. **Title, Abstract, and Introduction (Item 1 to Item 4):** According to O'Brien et al., (2014), reporting title, abstract, and introduction in a qualitative study is similar to a quantitative study. Firstly, the title should provide insight to readers and reviewers about the topic and the method of the study. Secondly, the abstract should include brief information about the background, aims, methods, findings, and implications of the study. Finally, the introduction should involve a) the previous findings related to the topic, b) gaps in the literature, c) research questions and aims of the reported study, and d) how this study will contribute to the current literature.
2. **Methods (Item 5 to Item 15):** While reporting the methods section, study design, data collection, analysing the data, ethical considerations, reflexivity, and quality should be addressed. One of the key points here is while providing information

about the method section descriptively (such as what the thematic analysis is), it is also significant to explain the rationale of each choice such as “why this analysis was chosen”.

3. **Results (Item 16 to Item 17):** In the Results section, researchers should provide information about the main findings objectively. Then for each finding, quotes or/and illustrations should be displayed as evidence (Duran et al., 2006)
4. **Discussion (Item 18 to Item 19):** This should involve a) a summary of the main findings, b) how this study supports the findings of other studies in the literature, c) what is this study’s contribution to the current literature, d) potential clinic/organisational/ research implications, and e) strengths and limitations of the study.
5. **Other (Item 20 to Item 21):** This should include the conclusion and the funding information of the study. Additionally, if there are any conflicts of interest, it should be reported here as well (Pangora & McGaghie, 2001).

Table 2. The items pointed out by O’Brien et al., (2014) and how they were addressed in this study.

Item Number	Topic covered by the item	How it is addressed in this research
Title, Abstract and Introduction		
1	Title	The title addresses the topic and the method of the study: “Experiences and views...” and the method of the study: “... A qualitative study”
2	Abstract	The article’s abstract included a brief background, objectives, method, results, and conclusion.
3	Introduction (Importance of the problem and the gaps in the literature)	In the last paragraph of the Introduction, the importance of the problem, gaps in the literature, aims, and the contribution of this study to the current literature were reported.
4	Introduction (Research questions and aims)	
Methods		

5	Qualitative approach	I explained the Thematic analysis in detail in the Methods section (see 2.2 for details)
6	Reflexivity	Researchers' characteristics and their potential impacts on the research were explained in 2.4 and 2.6.
7	Context (Rationale)	This study was conducted just after the second wave and the start of the first dose of vaccinations in the UK. These dates are provided to the readers to provide better understanding the external factors which may affect the study. However, I preferred to provide information about the context in the results part (see Table 4) for the coherence of the manuscript.
8	Sampling strategy	I explained how and why participants were selected for this study in 2.1.
9	Ethical issues	Potential ethical considerations and possible solutions for them were discussed in the Ethical Issues section. Additionally, confidentiality and anonymity were detailed in 2.3.
10	Data collection	See 2.1.
11	Data collection instruments and technologies	Data collection instruments and technologies such as MS Teams for the meetings and digital audio-record for transcriptions were explained in 2.1.
12	Characteristics of the participants	I prefer to provide information about participants' characteristics such as age, gender, ethnicity, relation with the HCW, etc., in the Results section in order to coherence.
13	Data processing	Data processing and analysis were reported in 2.2.
14	Data analysing	
15	Techniques to increase trustworthiness	During the Trustworthiness section, I reported the details about the trustworthiness and how this study's trustworthiness was ensured.
Results		
16	Main findings	Main themes were provided.
17	Evidence	Quotes were provided.

Discussion		
18	Brief summary of the main findings, interpretation of main findings, and potential implications	The main findings of this study were summarised briefly in the first paragraph of the Discussion. Then, the main findings were interpreted based on the current literature, and critically analysed. Finally, the implications and strengths/limitations of the study were reported.
19	Strengths and limitations	
Other		
20	Conclusion	The study's main aim, findings, and potential impacts were summarised.
21	Funding	Not applicable to this study. For this reason, it was not reported.

2.5. Trustworthiness

In quantitative research, researchers seek to generalise the results of their studies on a representative sample to a wider population or different settings, and this is mostly accepted as a strength for a quantitative study (Smith 2018). In qualitative studies, rather than generalising the findings, the researchers' purpose is to explore participants' experiences and interpret what participants said about their experience and why (Austin & Sutton, 2014). For this reason, in this study, we did not aim to generalise the findings of this study to the families and supporters of all frontline HCWs in the UK. Since the nature of the qualitative and quantitative studies are different, the quality of the qualitative studies' findings cannot (and should not) be examined based on the quantitative research concepts such as reliability, and generalisability (Pope & Mays, 2020, p. 222). According to Lincoln and Guba (1985), the scientific quality of qualitative research can be examined via trustworthiness. Basically, trustworthiness refers to explaining the rationale behind the data collection, analysis, and reporting process (Pratt, Sonenshein & Feldman, 2022). Lincoln and Guba (1985) described four criteria to fulfill the requirements of trustworthiness: a) credibility, b) transferability, c) dependability, d) confirmability. Even though those criteria resemble the concepts for quantitative research such as internal validity and reliability, they are beyond these concepts. In this

study, I aimed to increase the trustworthiness by following Nowell et al., (2017)'s study which accepted and improved the trustworthiness criteria of Lincoln and Guba (1985).

a) Credibility

For credibility, researchers should clarify whether there is a fit between experiences and views that were described by participants and the researchers' interpretation and presentation of them (Schwandt 2001). Additionally, whether those interpretation and presentation is credible or not, should be addressed as well (Janesick 2000). Lincoln and Guba (1985) recommended a number of strategies also highlighted by other researchers to report credibility such as prolonged engagement, triangulation (Nowell, Norris, White & Mousles, 2017), audit trail (O'Brien et al., 2014), and diary (Korstjems & Moser, 2018).

Korstjems and Moser (2018) defined *prolonged engagement* as investing enough time to build trust and increase the engagement of participants during the interviews; *triangulation* as involving a number of researchers in the analysis and the interpretation of the data; *audit trial* as documentation about the study's steps from data collection to the reporting; and *diary* as reporting the researchers impact on the study's all steps day by day.

b) Transferability

Transferability is related to whether the findings of the qualitative study can be transferred to other contexts, settings, or other samples (Korstjems & Moser 2018). Essentially, it is about applicability (Lincoln & Guba, 1985). While reporting their studies, researchers may not know the settings that may be considered to transfer their findings, however, they should provide thick descriptions to increase the transferability (Nowell et al., 2017). In other words, researchers should not describe only the experiences and views of their participants, but also the circumstances that led to participants responding in that way (Korstjems & Moser 2018).

c) Dependability

Dependability is the constancy of the findings over time (Lincoln & Guba, 1985; Korstjems & Moser 2018). To increase dependability, the research should be well documented, and the research process should be trackable (Tobin & Begley, 2004).

d) Confirmability

Confirmability is about whether the findings of a qualitative study could be endorsed by other researchers (Korstjems & Moser 2018). A qualitative study with high confirmability provides information about how the findings were derived from the data and how researchers interpreted those findings, distinctly (Tobin & Begley, 2004). According to Guba and Lincoln (1989), confirmability will be achieved when dependability, transferability, and credibility are clearly provided. Additionally, Koch (1994) suggested that researchers should provide information about the rationales for their decisions including theoretical and methodological choices. Thereby, other researchers and the readers can develop insight into how and why those choices were made.

Trustworthiness of this study

In this study, in order to increase trustworthiness, I used the following strategies:

- Firstly, I have clearly described all the procedures (***audit trial***). For example, I have provided detailed information about the preparation of the interview questions, decisions about sample size, data collection, data analysis (including the six steps of the thematic analysis and how all the researchers were involved in each step), reporting findings with quotes, and detailed information about the interpretation of the findings.
- Secondly, to increase the transferability of the study findings, we included a diverse range of participants and explored a variety of experiences and views amongst HCW's families and supporters.
- Finally, six researchers were involved in the coding and analysis part of the study. Following coding and analyses, the researchers discussed their suppositions and "blind spots" to improve the validity of the analyses (***triangulation***).

2.6. Reflexivity

In qualitative research, the researchers' characteristics including experience, skills, personal attributes, assumptions, and relationships with participants may affect the research (O'Brien et al., 2014). Reflexivity means systematically considering the potential or actual effects of the researcher(s) on all aspects of the research including research questions, approach, and transferability (Malterud, 2001). Objectivity is a key concept in approaches such as positivism and the effect of the researcher on the research is seen as bias (Park, Konge & Artino, 2020). In constructivist and interpretive paradigms, however, the characteristics of researchers are considered important contextual factors for study design, data collection, and data analysis (O'Brien et al., 2014). In this study, the experiences, genders, and cultural backgrounds of the researchers are presented in order to demonstrate reflexivity, below.

There was diversity among the researchers who conducted the study including different career stages, genders (1 male, 5 female), and cultural groups. I am a PhD student at University College London (UCL), UK. I conducted all the interviews for the research and did not know any of the participants before the study. NG is a Principal Clinical Psychologist in the NHS (National Health Service) and Clinical Lecturer in Clinical Mental Health Sciences at UCL. TG is an Associate Professor and Head of the Department of Community Mental Health at the University of Haifa and has expertise in psychological trauma research. DL is a Senior Research Fellow at UCL with over 10 years of experience in conducting mental health research in occupational settings. DM is a Consultant Clinical Psychologist and Professor in psychological trauma and current President of the UK Psychological Trauma Society, with nearly 20 years working within this field. JB is a Consultant Clinical Psychologist and Clinical Professor with over 20 years of experience working in the NHS and has specialist expertise in trauma, mental health, and well-being in high-risk occupational groups.

3. Results

Fourteen family members and supporters of frontline HCWs were recruited for the study. Most participants were spouses of HCWs, although I also spoke to three siblings, one

parent, and one friend. Even though I only managed to reach one friend through my sampling approach, I decided to include them in the analysis as they could still provide some novel insight into the impact of being a close friend of a healthcare worker during this time. The gender, age-range and locations of the participants, and HCW family member’s role and setting are shown in Table 3.

The sample size is significant for increasing the quality and trustworthiness of a qualitative study (Spencer, Ritchie, Lewis & Dillon, 2018). Although there is no certain agreement between researchers about sample size in qualitative studies (Vasileiou, Barnett, Thorpe & Young, 2018), according to Sandelowski (1995), sample sizes of qualitative studies should be large enough to provide ‘new and rich understanding’ and can be small enough to provide ‘deep and case-oriented analyses. Additionally, Morse (2000) recommended that while determining the qualitative sample size, researchers should consider different factors such as the complexity of the topic, accessibility of the data, and the scope of the study. In light of these perspectives, we decided to stop data collection when we reached fourteen participants. Firstly, after fourteen participants, I felt I had reached a new, deep, and rich understanding of the topic. Secondly, this study was run during the COVID-19 pandemic when circumstances were changing quickly. I stopped data collection in September 2021, when healthcare workers and their families were getting their booster doses of the COVID-19 vaccine, and I thought that this may change the results.

Table 3: Participants Characteristics (*n*=14)

Characteristics	<i>n</i> (%)
Gender	
Female	8 (57)
Male	6 (43)
Ethnic Group	
Asian or Asian British	1 (7)
Black African, Black British, or Caribbean	1 (7)

Oriental	1 (7)
White	11 (79)
Age Range	
18-24	1 (14)
25-34	3 (21)
35-44	5 (36)
45-54	4 (29)
65+	1 (14)
HCW family member's role	
Ambulance Driver	1 (7)
Doctor-Consultant	6 (43)
Doctor-Junior	4 (29)
Physiotherapist	3 (21)
HCW family member's setting^a	
Accident & Emergency (A&E) Department	2
Acute ward	2
Ambulance service	1
General Hospital/COVID wards	7
ICU	7
Older adults ward	1
Hospice	1
Palliative care	1
Geographical Location	
England-Southeast	2 (14)
England-London	5 (36)
England- South Central	1 (7)
England-Southwest	2 (14)

England- Midlands	1 (7)
England-Northeast	3 (22)

a. Several participants' HCW family member worked across more than one setting in response to the pandemic.

Interviews were conducted between 24 May and 24 September 2021, which followed the third wave of COVID-19 in the UK. This wave peaked between January and April 2021, and the lifting of most social restrictions across the UK occurred between June and July 2021 (see Table 4 for detailed COVID-19 timeline in the UK). Interviews ranged from 26 to 60 minutes, although most took between 40-45 minutes. From the analysis of the data, I derived eight inductive themes (see Table 5)

Table 4. COVID-19 Pandemic Timeline in the UK

Important Dates	What Happened
30 January 2020	First two cases in the UK (Wright, Oliver (29 January 2021). "Coronavirus: How the UK dealt with its first Covid case". BBC News. Retrieved 15 August 2023)
23 March 2020	First lockdown in the UK (Institute for Government, 2021)
March-April 2020	Peak for the first wave
23 June 2020	Relaxing the restrictions and 2m social distancing (Institute for Government, 2021)
31 October 2020	Second lockdown in the UK (Institute for Government, 2021)
Mid November 2020	Peak for the second wave
2 December 2020	End of the second lockdown
8 December 2020	Starting to the first dose of the vaccination
6 January 2021	Third lockdown in the UK
January-April 2021	Peak for the third wave
February 2021	Starting to the second dose of the vaccination
July 2021	End of the third lockdown
September 2021	Booster dose for the vaccination

Table 5. Themes

Themes
1. Burden of responsibilities <ul style="list-style-type: none"> Increased domestic responsibilities such as cleaning and cooking

<ul style="list-style-type: none"> • Extra responsibility to take care of the HCWs • Childcare and homeschooling • Exception: spending more time as a family
<p>2. Emotional burden</p> <ul style="list-style-type: none"> • Anxiety, fear, worry • Separation of nuclear family members • Separation of wider family members and friends
<p>3. What about me?</p> <ul style="list-style-type: none"> • Lack of recognition by others • Increased responsibilities' impact on their own career • Impacted identity
<p>4. Pride vs Just doing their job</p> <ul style="list-style-type: none"> • Sense of pride • Just doing their job
<p>5. Victims of neglect</p> <ul style="list-style-type: none"> • Lack of training • Lack of support from managers • Lack of PPE (personal protective equipment) • Increased workload and shifts • Low payments and weak working conditions
<p>6. Impact on physical health</p> <ul style="list-style-type: none"> • Physical condition • Requirement for ongoing medical support • Lack of COVID-19 tests for families of HCWs
<p>7. Personal medical dictionary</p> <ul style="list-style-type: none"> • Source of information • Feeling secure • Cost of the knowledge
<p>8. Hearing about traumatic experiences of frontline worker</p> <ul style="list-style-type: none"> • Risk of secondary trauma

3.1. Burden of responsibilities

For most participants, alongside the increase in the workload of frontline professionals during the pandemic, the balance of at-home responsibilities also shifted. Many family

members stated that domestic responsibilities that were previously shared, such as cleaning and cooking, were mostly taken on by them during the pandemic.

“I do everything to keep it going... we both like cooking, but I suppose I did more cooking during the pandemic. And we've also got a dog. So, I take our dog out all the time because I'm always at home. I do a lot more housework than she does... I definitely do more stuff” (Male fiancée of a doctor)

Family members also took on extra responsibilities and did more to take care of the HCW family member.

“I've been able to help in terms of doing a little bit more housework, an awful lot more, to be honest. I've helped out making a packed lunch and when she came home from work every day, we got into a sort of routine where I would close all the curtains so she could strip off in front of the washing machine and put [her clothes] in the washing machine, put the washing machine on enroute to the shower upstairs. She got to the shower and would be able to dive straight in the shower without touching too many doors or anything. So, I was helping out in that way” (Male partner of a physiotherapist)

The closure of the nurseries and schools due to the pandemic and the inability to meet other family members who might usually help with childcare also led to an increase in responsibilities regarding childcare and home schooling.

“I have felt frustrated sometimes that the shifts and the kind of expectations on him and also then the knock-on effect on me. We have kids so that, you know, the kids need picking up from nursery. And if he's being put on additional shifts, that was very frustrating for me” (Wife of a doctor)

Where families of HCWs were still able to access nursery or school care due to having key worker status, this was very much appreciated. However, the reality of school closures and ongoing social restrictions continued to impact on HCW families with children.

“I think because our children's nursery stayed open that was the thing that made the single biggest difference to it being OK or making it manageable because those periods where I did have the kids home either when my partner was ill or when there was a

contact at nursery that tested positive. Those were the hardest periods to manage and... if that had been the norm, I would really have struggled. But because we kept the kids in nursery, we retained a bit of normality.” (Wife of a doctor)

There were, however, also exceptions. A few participants described their HCW family member having more time for family during the pandemic. In other instances, the HCW might be relied on more to undertake tasks such as shopping, or if the family fell ill (often with COVID in the early stages of the pandemic, see theme 6) family members might not be able to take responsibility for housework and their domestic responsibilities had to be undertaken by the healthcare professional during this period.

“She would go shopping because we could not go shopping. She felt safe to go shopping and things like that” (Husband of a consultant doctor)

“She was the only one in the house who could safely go out. She took the responsibility, and it became an extra work for her. She felt that shopping was her job to do. I suppose we have become more dependent on her.” (Husband of a speciality doctor whose wife got COVID-19 in the first wave and survived)

“My focus has had to be to trust that my husband will be coping with my children. So that I can focus on recovering here. I've had to kind of trust my husband and let go a little bit and some of the things I would normally be in control of. They might not be eating vegetables every night like they would be if I was at home cooking. But he's feeding them” (Wife of an ambulance driver who was in rehabilitation after contracting COVID)

3.2. Emotional Burden

Whilst practical burden was experienced most greatly by family members living with HCWs, all of the participants stated that they experienced increased anxiety, fear, and worry. Participants described concerns about risk to their frontline worker family members' lives, worrying about their working conditions (see theme 5), and the health of the whole family.

“The main thing was the worry, just not knowing if he would be OK, if he would die, not knowing if he did die on his own and how that would be.” (Wife of a doctor)

“It's scary because like what if she gets it? What if something happens to her? It's kind of like you just have to wait and see, you cannot do anything, but you always worry about that.” (Sister of a junior doctor)

One of the biggest problems faced by the family members of HCWs was the separation of family members from each other due to the pandemic. Family members talked about the particular impact on children and how they were affected by being away from their healthcare family member.

“Particularly the older one had lots of sleep disturbances in those two weeks because my husband was away from us for maybe three weeks because he was isolating and then he got worse and worse then in the hospital.” (Wife of a consultant doctor)

“I think it affected my son, who is more emotional and more responsive to tension in family environments. He had expressed an interest in being a doctor when he's making some university choices. But he's chosen not to be a doctor, and one of the reasons he cited was that he didn't like to have seen what the pandemic had done to his mum”
(Husband of a consultant doctor)

Where the physical health of family members was also affected by COVID (see theme 6), children could also be separated from wider family members who were ill, hospitalised or required to isolate.

“I think, in terms of my own family, the children, I think it has been quite difficult, particularly for my 14-year-old, because I've never really been away and left them before. Last weekend was the first time I'd seen them since April” (Ambulance driver's wife who was in rehabilitation after contracting COVID)

The stress of the healthcare work and pandemic may lead to relationship breakdowns in healthcare worker families and caused concerns for families. For example, the partner of a physiotherapist reported that his partner worked in a stressful environment and because she sees him as a source of support, she tended to share her experiences with him. However, bringing this work stress home caused some tension in their relationship.

“She comes in from work and noticeably has more things to mention or talk about or complain about. It is not like “I do not want to hear”, but it became almost every day that she has problems at work. I have got no clue what she is talking about most of the

time, but still sit and listen and say “Oh, that’s bad”. However, sometimes I do not remember the details of those, and it causes huge issues between us. I guess I am a little concerned that it will strain our relationship because we’re not seen to be spending every moment paying attention to one another anymore”.

Additionally, the fiancée of a junior doctor pointed out that during the pandemic, he felt frustrated because of the increased number of arguments with his fiancée.

“In Central London, we had a very different lock down compared to my friends and family members. They all had gone out of London, but we stuck here because of her job. There were chances that she could take some days off but she’s incredibly moral and did not leave her colleagues alone while they were fighting with COVID. Even for Christmas time... We ended up didn’t go home for Christmas while I desperately needed it. That was very tough for me. Obviously, this is only one thing but with all the other stressors, there were lots of arguments.”

3.3. What about me?

The family members we spoke to had been involved in the pandemic as a second line, supporting their frontline family members both practically and emotionally. However, most of the family members felt like there was a lack of recognition by others of family members’ sacrifices.

“I can be like really triggered because people, like, come up: “It’s so hard. Isn’t he just an angel?” And I’m just like, “I am the angel. I am the one at home with the kids!” That was my feeling, I found it a bit like it’s not just him.... It’s so many others. Look at me. I’m in front of my laptop for 12 hours. I’m going crazy.” (Wife of a doctor)

“Sometimes I look at our friends and their husbands work in offices so they can all be together, and I know that everybody’s together, and it’s awful because they’re all on top of each other in the house but I’m often alone.... For example, my youngest child at the time was like 19 days old, and he had to do night shifts. And you’re alone. You’re like “I’m alone!”.” (Wife of a consultant doctor)

Increased domestic responsibilities and childcare had a negative impact on the lives and

careers of several family members, who felt that they, and their work, had to be sacrificed for their family members' health care work.

"I had to stop some elements of my work so that I could look after the kids. When her shifts had to change, I could no longer work on one of the evenings a week. I've had to stop other elements of my work even after we were allowed to reopen because I've had to look after the kids more because we did not have the grandparents looking after them and because she has been working longer hours" (Husband of a junior doctor)

"I feel very proud, but the practicalities of the time were often frustrating... all of the childcare pressure was coming to me, and it meant our kids didn't get to see as much of their dad and they missed him as well. And my work is very demanding... When the kids are sick, we had one of our kids in isolation because there was a contact at nursery. So then I'm doing all of that, being with him at home. And my partner was not doing any of it because he had to study or work. What about my work?" (Female partner of a doctor)

Extended family members were also affected by being less involved in childcare. One mother of a physiotherapist told me how her identity as a grandmother was affected. She felt helpless and frustrated because of not being able to help her daughter and grandchildren. She subsequently took more risks and sacrificed her own health to help.

"I felt absolutely helpless initially that I couldn't do anything to help her. Normally I would have gone and helped her, I wasn't allowed to. You know, in fact, we did change that when we did do some childcare for her because it got so difficult, and her children were feeling the effects. So, I felt helpless... I felt cross with the whole pandemic, very cross with it, because as you get older, you realize your life expectancy is limited. You don't know how long you're going to be fit. Therefore, you want to spend as much time with your grandchildren, with your family doing things you want to do. And the pandemic took that away from everyone" (Mother of a physiotherapist)

3.4. Pride vs Just doing their job

Participants for the most part described a strong feeling of pride in their family member and the work they were doing during the pandemic.

“I think the main thing is just a sense of pride because of the work that he does...”

(Brother of a doctor)

“The work itself I always feel proud of. I kind of had an understanding of the importance of the work and what it's like to be supporting people going through important transitions. And so, for the most part, I feel very proud.” (Wife of a doctor)

However, in addition to this sense of pride, several participants also stated that the HCWs were just doing their job as usual and were uncomfortable with the media romanticizing the situation. They also noted that while they appreciated the positive portrayal of healthcare workers in the media and wider society, they were concerned that it might be forgotten too quickly and overshadow real problems (see theme 5).

“I think it's their job. The fact it's a pandemic changes nothing. They do their job. That's what they are paid to do. It's a bit like being in the forces and sent to war. You're paid to do that... The media always romanticises these things. It always picks up on the worst aspects and sometimes I don't think that's right, but, you know, people needed to know, but then a lot of people jump on the bandwagon of it. They build things. You do your job in my world...” (Mother of a physiotherapist)

“I think on the whole, the media portrayal's been fairly positive, may be quite short lived. Maybe it was quickly forgotten, all the work that they put in and then, you know, we all kind of appreciated it. Well, it was the peak, and everyone thought how hard they were working and how grateful they were. And then, you know, everyone kind of moves on, perhaps very quickly and forgotten, you know, they are still working incredibly hard and always do” (Sister of a physiotherapist)

3.5. Victims of neglect

Family members of healthcare workers drew attention to ways in which they felt that the needs of their HCW loved ones had been neglected during the pandemic. For example,

a wife of an ambulance driver told me that training was a significant requirement that was neglected.

“I do feel that my husband didn't have proper training, they did the two weeks preparation course, which did not include anything specific about infection control and COVID.”

She also mentioned that lack of support from managers caused stress in the family as well.

“There's not even been a consideration from my husband's employer at all in it. And they don't seem to understand the impact on him of me being very ill and in hospital and him trying to cope or the fact that we have two or three sort of growing children, those three young people at home. I don't think at any point have they asked if there's any support that he thinks he would need. I don't think so at all. It's just been “When are you coming back to work?” and “If you don't come back soon, then we're going to have to terminate your contract.” I don't think his managers have thought about that at all.”

Almost all the participants pointed to personal protective equipment (PPE) as one of the most neglected needs. The husband of a doctor shared his views:

“I was concerned for her safety because I didn't feel that they were being adequately protected to the point where I actually went online and bought her a full-face respirator because I was saying, “Well, if they're not protecting you properly, then you just need to take it into your own hands because you've got a family that you want to come home to”. But then as it turned out, it wasn't suitable because it wasn't easy enough to clean. But I was concerned, and I was frustrated with the whole PPE thing.”

Family members drew attention to the workload and shifts of HCWs and the negative impact this had on families. Participants talked about this as a longstanding issue, which was highlighted by, but not unique to, the COVID context.

“I think we need the shifts to be reduced. I think we need study days to be respected...I think we need health care professionals to have a manageable workload that recognizes family life... That's the biggest issue... Officially they are entitled to a certain number of study days and that these exams are compulsory, but then they're not able to

take their study days because the rota is short. So, it doesn't matter what you say they're entitled to. If they're not actually able to make use of the provision, then it just means that studying still needs to happen. So, it's not like "OK, you can't take the study days."

(Wife of a doctor)

Participants emphasised problems in healthcare workers pay and working conditions.

"They're not superhuman. Somebody should take care of them... If they're heroes, that's great for everybody to see. But they're not always treated like that, even by the NHS. They're not getting more money when he goes, and he has to do a night shift. And the rooms that they stayed are really dirty, disgusting... People smoke in the room. The locks don't work. I'm sorry, yes, we're all here clapping but he's not really looked after... Like the canteen, the food... He's trying to be healthy. The food was just disgusting. It's

like chips every day. Really unhealthy food.?" (Wife of a doctor)

"Clapping for carers was cute for the first time. Not cute after that. It was too shallow... If we actually cared about what they've actually done, give them the more pay!" (Female

friend of a doctor)

3.6. Impact on physical health

In addition to having a serious impact on the physical health of HCWs, there was also a significant risk that HCWs could transmit COVID to their families. This made family members very anxious and often led to them isolating themselves from the healthcare family member or wider family and friendship groups.

"I was worried selfishly that she was going to catch it, bring it home and I was going to catch it. So, I felt exposed..." (Husband of a consultant doctor)

"We couldn't see her for four or five months because my parents were at risk, there was nothing else we could do. She could spread it. They were worried for their daughter's life, and they're worried for their own life too." (Sister of a junior doctor)

Many of the family members I spoke to told me that they, and other family members, had caught COVID in the first wave in the UK, before vaccinations were available. Several had been very seriously ill. Some of the family members experienced long COVID symptoms

and challenging recoveries. The husband of a physiotherapist, who had been struggling with long COVID, shared his experiences and his need for ongoing medical support:

“Because of my personal symptoms of COVID, I've slept less... I've had long COVID, I found myself with low energy after having it. And it's taken a long time to recover from it. I know I'm going to need increased medical support, definitely because of the long COVID symptoms.”

He also mentioned how difficult it had been to get COVID tests as a family member of a healthcare worker in the early phases of the pandemic, and as a result, how he felt that family members were not supported by the NHS.

“COVID testing... We were not actively provided with support is something as a member of a health care workers family. You have to actually go and seek out to get that support and that testing, which obviously gives that level of reassurance.”

3.7. Personal medical dictionary

The medical knowledge that healthcare professionals have often led to them being seen as a source of information during the pandemic. It was emphasized by many participants that having medical knowledge had advantages as well as disadvantages. For example, the brother of a doctor told me the advantages of his brother's medical knowledge:

“I also really like asking questions to him because you learn things. So, I learn about the medical profession and get a bit of insight into what they do. Learn some technical terms, which is quite cool. It's exciting to hear about the things they do as well. And I think, yeah, it gives you a bit of a fly on the wall experience or kind of a bit of insight into the truth of COVID and the pandemic.”

I also noticed in the analysis that having someone in their family with medical knowledge made the family members feel more secure. A husband of a consultant doctor mentioned that:

“But at least she had the equipment. She could take our blood. She knew the situation. She knew the language to use when she was speaking to professionals about our situation. So, I suppose in that way, I was less stressed than some other people because the patient has knowledge.”

However, medical knowledge also brought some costs. For instance, the wife of a doctor, whose husband was seriously ill with COVID and had to stay in the COVID ward for 9 days, touched on the emotional burden of contracting COVID as a doctor with all the medical knowledge:

“I think that shook him for a while because he was hit. He was on a ward with four other guys. And he said, every day one of the guys would get transferred to intensive care and he wouldn't know if they recovered, if they died. He didn't know what happened to them. And then somebody else would come and then they would go to intensive care. And he didn't have to go to intensive care, which was very lucky. But still, the experience of being confined to one room where every day somebody else gets taken away to intensive care as a doctor. He also understands how serious that is. So, he knew how ill he was and how serious it was. I think that was a real shock”

The other cost of the medical knowledge was that HCWs were exposed to much more questions than usual.

“I think people are obviously just very curious and interested and want to know what's been going on, and not so much now, but back in the time, lots of people asking questions and sort of wanting to know how serious it was. And I think people saw her as a source of information that they could sort of find out stuff from.” (Fiancée of a doctor)

3.8. Hearing about the traumatic experiences of frontline workers

HCWs often shared stories about their traumatic experiences with their family members, whom they saw as a source of support and an opportunity to offload. However, the effect of hearing about HCWs' experiences could be very distressing for family members.

“It was very surreal to go into... He mentioned one person actually was a pregnant woman who was intubated, and they had to take the baby out when she was asleep, but the family couldn't come and see the baby and the family couldn't come and see her. And that was quite a strange thing for a baby to be in like a box by itself. It was very strange... And to call people up to say that this has happened when they can't come to be with their daughter, or the grandchild was very strange...” (Wife of a doctor)

Hearing about these experiences could have serious negative effects on family members.

“I think secondary trauma and vicarious trauma would likely be a thing in families, I don't even think it's in [other people's] mind. But I think I have heard that some family members have had that where they've kind of almost like imagined scenarios and having quite vivid images...” (Brother of a doctor)

“She mentioned at the second peak... There were a lot more people in their 50s and 60s who were quite conscious and well, and in the next couple of days, they might be dead. I think that would be much harder to deal with because these people shouldn't really be dying. So, I just felt very sorry, it must be very tough to have to go through that.” (Partner of a doctor)

4. Discussion

In this study I aimed to explore the experiences, views, and needs of family members and friends of HCWs who have been working on the frontline during the COVID19 pandemic in the UK. I found that family members and friends were proud of the work their healthcare worker loved ones did, were willing to provide additional support and took on more responsibilities at home. However, they also reported potentially negative impacts of providing this support and unmet support needs which need to be addressed.

While spouses living in the same house with HCWs experienced an increased burden of responsibilities like cleaning and childcare, the emotional burden of anxiety, fear and worry was experienced by all family members and supporters. Supporting HCWs also negatively affected the careers of many family members due to increased domestic responsibilities and made them feel that their sacrifices were being ignored by society. Although they were proud of their HCW family member, family members and supporters often felt that the HCWs' needs at work were not adequately met which led to frustration. The fact that family members are healthcare workers and have medical knowledge made them feel safer. However, hearing the traumatic experiences of HCWs could cause emotional distress for family members. High infection risk caused family members to

feel intense anxiety about their health and many fell ill with COVID in the first wave of the pandemic.

Additionally, the friend who was included in this study was living in the same house with the HCW and she provided significant insight into the experiences of not only the family members of HCWs, but also the household members of HCWs. For example, like family members of HCWs, the friend reported that she was worried about the mental and physical health of the HCW as well as the work and pay conditions of the HCWs. Additionally, she raised concerns about the contamination risk for the rest of the household and she reported increased responsibilities at home such as shopping and cleaning which were increased when the HCW friend caught COVID-19.

The reason for including the friend was the friend was living in the same house with the HCW and she provided insight into the experiences of not only the family members of HCWs, but also the household members of HCWs. For example, she reported emotional burdens and practical burdens at the house like family members of HCWs. This helped me to build up my mixed-method survey study by focusing on the housemates of HCWs because in light of this information, I hypothesised that not only family members were impacted by healthcare work, but also, their housemates were also potentially impacted as well. The reason for including the parent was that even though she was not living in the same house with the HCWs, she provided insight into how extended family members of HCWs may be impacted. For example, she was the only participant who reported that her identity as a grandmother was impacted in a negative way. Because of those reasons, I decided to include the friend and the parent of HCWs even though there was only one participant for those groups.

The findings of this study show that families and close supporters of HCWs experienced a similar negative impact to families of military personnel, including experiencing distress (Selimbasic et al., 2016; Toomey et al., 2019), high anxiety and depression (Eaton et al., 2008), and secondary trauma (Yager, Gerszberg, & Dohrenwend, 2016). There were also similar experiences among families of HCWs and families of first responders such as the family member sacrificing their own career for the frontline

worker's work (Regehr, Dimitropoulos, Bright, George, & Henderson, 2005), worrying about the danger of the frontline workers' job (Regehr, 2005), and experiencing high levels of anxiety (Alexander & Walker, 1996). However, unlike military and first responder families, there were some experiences which were specific to the families of HCWs. In addition to worrying about the health of the HCW, family members also worried intensely about their own health. Furthermore, whereas military family members do not live in the same traumatic environment as serving military personnel and hear about their experiences from a relatively safe/far distance or often after the military personnel had returned home from deployment, family members of HCWs were living in the same traumatic environment and were directly, as well as indirectly, affected by the pandemic. When the HCWs were exposed to traumatic experiences they often shared this with their families and friends, often just a few hours after the experience with associated intense emotion. This makes family members and supporters of HCWs more open to vicarious and secondary trauma. Almost all of the participants emphasised that healthcare work in the UK is not family friendly, and that this experience pre-dated COVID. According to a 2018 NHS Staff Survey, 39.8% of HCWs across the UK reported feeling unwell due to work-related stress (National Health Service, 2021), and the main reasons for not feeling well were related to burnout and dissatisfaction due to the increased workload because of the lack of sufficient staffing and resources (Carrieri et al., 2018). My findings support the results of this study. Long working hours, shortening of exam study times, determining the hospital that the HCW will work in regardless of spouses' status or residence were very stressful for frontline workers and their families. COVID-19 has exacerbated an already difficult situation for HCWs and their families, but attention urgently needs to be paid to supporting the family life of HCWs beyond COVID.

4.1. Limitations and Strengths

This study has a number of strengths. I reached participants with diverse relationships with HCWs including spouses, a parent, siblings, and a friend. This gave me the opportunity to explore different perspectives of those supporting HCWs. Our research team was also diverse, consisting of scientists from different backgrounds and clinical experience and including different genders, cultural groups, and career stages. This enabled me to consider findings from multiple perspectives and build a rich and in-depth

analysis. All analysis steps were meticulously applied by the team to increase the validity and trustworthiness of the findings.

This study still has some limitations. Firstly, whilst I sought to gather a variety of family members and supporters' views, I was only able to hear the experiences of one mother, three siblings and one friend, alongside the voices of several spouses in heterosexual relationships. It would be important to hear from other parents, siblings and friends, partners in same-sex relationships as well as children of HCWs, to more fully explore the variety of family members and supporters' experiences. Secondly, the participants were mostly families of doctors (71%), and I could not reach the families of nurses who are a key group of HCWs notably very impacted by the COVID pandemic. Thirdly, sample was also limited by a small number of participants from ethnic minority backgrounds. The families and supporters of these workers may have had other views and experiences to add to this study. Further research paying attention to these groups will help more family members' voices be heard. Finally, in order to increase the trustworthiness of the study, I could send the findings to the participants to receive their feedback and it could strengthen the results because the researchers and participants look at the data from different perspectives. However, because of limited time, I was not able to do that at the time of the study.

4.2. Implications

Supporting healthcare workers' families is important not only to support them, but also to support the work that HCWs do and the sustainability of the health services they provide. We have an ethical, legal, and financial obligation to support HCWs and their families. One of the most important needs of family members was to know that their HCW family members work in a safe environment. For this, it is crucial to make sure that the needs of frontline workers are fully met, such as ensuring that healthcare workers are adequately protected and trained, supported by managers, have manageable workloads and shifts, and see practical improvements (i.e., being provided with healthy food, and comfortable/clean resting areas).

The results of this study also support previous research that healthcare services are not

a family-friendly place to work. More family-friendly policies and practices must be considered in order to support the longevity of this workforce. The results also highlight that family members have their own specific needs. Firstly, many family members reported that they needed long-term medical support after contracting COVID. Whilst social restrictions in the UK and in many places across the world are being lifted thanks to vaccination, COVID still threatens lives, and the families of frontline workers continue to be at great risk in this. Therefore, the families of frontline workers require adequate testing and long-term medical follow-up and support. Secondly, one of the most difficult issues for HCW families was childcare. HCW family members really valued being able to access ongoing childcare during the pandemic, although this was not accessible to all families. Therefore, it is important to enable access to childcare support for HCW families, regardless of whether both parents are frontline workers or not. Not doing this places a significant burden on HCW's family members at significant detriment to their own wellbeing and careers.

The results of this study also suggest that there may be a significant impact on the mental health of family members of healthcare workers. Family members of HCWs were often anxious and worried about their family members' safety and wellbeing. Family members who hear the traumatic experiences of HCWs are also at significant risk of vicarious trauma. This warrants further research as well as consideration in the training of HCWs and managers of HCWs in order to increase awareness about the potential wide-reaching impact that healthcare work can have on others.

Finally, new support services have been made available for HCWs in many settings across the UK and we urge that these be extended to their families. This would provide more equitable support to similar services currently available to military families. Therapists in such support services should consider the family context of the healthcare workers they are supporting and whether additional information, signposting or support may be beneficial to them.

5. Conclusion

In this study, I aimed to explore the experiences, views, and needs of the family members of healthcare professionals, who are an important source of support for HCWs. Family

members who are exposed to traumatic experiences of HCWs while living in the same traumatic pandemic environment with them may have a high risk of secondary trauma, anxiety, and depression. In order to help family members, it is crucial to improve the negative work environment of HCWs and to ensure their workloads and shifts are more family-friendly. Families of HCWs place their physical health at significant risk so it is essential to ensure adequate access to PPE, testing, and follow-up medical support for HCWs and their families. Supporting the mental health and wellbeing of HCWs families is essential not only for their own wellbeing, but also to support the work that HCWs do and the sustainability of the health services they provide.

Chapter 6. Systematic Review 1: Impact of Occupational Traumatic Stress on the Family Members of High-risk Occupational Group Workers:

A systematic review and narrative synthesis

In this systematic review study, I aimed to explore the experiences, needs, and mental health impact of family members of different high-risk workers including healthcare workers, first responders, construction workers, seafarers, farmers, and explorers. 31 quantitative, 16 qualitative, and three mixed-method studies were included in this review. Based on the narrative synthesis, I identified six outcomes: 'Mental health outcomes', 'Aggression, hostility, intimate partner violence', 'All about family', 'Coping skills and resilience', 'Quality of life and social life', and 'Practical outcomes'. Primary findings indicate that there is potentially a high risk to the mental health and well-being of families of workers in high-risk jobs. There was evidence of a positive correlation between partners' secondary trauma score and relationship violence. There was a negative association between working long hours/shift work and family relationships/communication, family social life, and joint activities, and families taking on more domestic responsibilities. Families tended to use both positive and negative coping strategies to deal with their loved one's job stress. Organisations and support services working with people in high-risk roles should consider working with their workers and consider offering support to families where possible. With this understanding, high-risk workers and their families could be supported more effectively in clinical and organisational settings.

1. Introduction

The American Psychological Association (2011) has described high-risk occupational groups as those working in hazardous work environments and worker populations that may be exposed to such environments dangerously. Based on this definition, high-risk jobs include healthcare workers (HCWs), first responders, construction workers, seafarers, explorers, and farmers. There are 1.3 million HCWs (NHS Workforce Statistics, 2023), 140,228 police officers (Police Workforce, 1 England, and Wales, 2022), 31,064 firefighters (Fire and Rescue Workforce and Pensions Statistics, 2023), over 3.1

million construction workers (Construction Sector Deal, 2019), and around 301,000 people working in the agricultural sector (Agricultural Workforce, 2022) in the UK.

Because of the nature of high-risk occupations and the associated risk of exposure to traumatic stress, such workers are at risk of developing mental health issues such as depression, anxiety, and PTSD. For example, according to findings of a recent systematic review that focused on the prevalence and risk factors of mental health issues in police officers, 14.6% of police officers reported depression, 14.2% of them Post-Traumatic Stress Disorder (PTSD), and 9.6% of them generalised anxiety disorder (Syed, Ashwick, Schlosser, Jones, Rowe & Billings, 2020). Similarly, in a systematic review of experiences of HCWs during the COVID-19 and previous pandemics, long working hours, limited resources and unsocial shifts were significantly challenging for HCWs' psychosocial wellbeing (Billings, Ching, Gkofa, Greene & Bloomfield, 2021). Long and inflexible working hours, unsafe or poor working conditions, low pay, and limited support from colleagues and supervisors have been shown to increase the risk of mental health issues at work (World Health Organisation, 2022). Based on recent literature, the prevalence of occupational PTSD among high-risk workers, who were working in emergency services, and who have experienced work-related trauma, is estimated to be 8.4-41.1%, although estimates vary due to differences in the description of PTSD, type of traumatic event, exposure period, and differences in occupation (Lee, Lee, Yoon, Lee & Kang, 2020). For police officers, it has been found that exposure to critical incidents, workplace discrimination, lack of support from co-workers, and job dissatisfaction are significantly associated with perceived job stress which in turn has been associated with depression and intimate partner violence (Gershon, Barocas, Canton, Li & Vlahov, 2009). High-risk workers perform some of the most important duties for society, and it is vital to understand and reduce the risks they face, and identify the ways in which they can be better supported.

Research has consistently shown that social support is one of the key protective factors against the development of PTSD (Brewin, Andrews & Valentine, 2000; Ozer, Best, Lipsey & Weiss, 2003). Workers from high-risk jobs often tend to seek support from their families. However, this support can come at a cost. Exposure to trauma at work and

PTSD impact not only the mental health and well-being of individuals exposed, but when those individuals come back home and share their traumatic work experiences with their family members, this may also affect their families negatively (Monson, Taft & Fredman, 2009)

As yet there has been relatively little research into the impact of occupational trauma on workers' families and no previous synthesis of what literature is available. Wider literature, however, highlights the difficulties that can be experienced by families who care for relatives with mental health difficulties. Findings of a recent systematic review of the mental health of the caregivers and families of patients with severe mental illness (Fekadu, Mihiretu, Craig & Fekadu, 2019) highlight that carers are at increased risk of mental health issues themselves such as sleep problems and higher depression scores, compared to family members of people who do not have severe mental health issues. Additionally, according to Cassie and Sanders (2008), caregivers of the people with dementia tend to experience burden, depression, stress, and variety of other physical conditions. Similarly, families of patients with psychosis stated that they often feel socially isolated (Harvey & O'Hanlon, 2013), have chaotic lifestyles and experience poor quality of life (Kate, Grover, Kulhara & Nehra, 2013), worry, anxiety, stress, shock, and fear (Ferriter & Huband, 2003), as well as diagnosable mental health issues (Saunders, 2013).

There is, to date, little research on workers at high-risk of being exposed to trauma at work, and very little consideration of their families, despite the consistently demonstrated benefit of familial social support, and potentially detrimental impact of occupational trauma on families. In this study, I aimed to explore the impact of occupational stress on a variety of high-risk workers' family members by systematically reviewing existing primary research and synthesising findings across the literature.

2. Method

The systematic review protocol was registered on the NIHR's International Prospective Register of Systematic Reviews (PROSPERO) with the registration number "CRD42022310729" (See Appendix 9 for the registered protocol). PROSPERO is an international database that researchers can register their systematic reviews (Centre for

Reviews and Dissemination (CRD), University of York, 2009). Aims of the PROSPERO are to provide detailed list of systematic reviews to avoid repetition and decrease reporting bias (Stewart, Moher & Shekelle, 2012). For this reason, to avoid undesired duplications, to increase transparency, and to reduce bias, I completed the registration of the PROSPERO.

I adhered to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) (Moher et al., 2009) guidance throughout this review. Additionally, an updated version of the PRISMA guideline (Page et al., 2020) has been taken into account during reporting.

2.1. Search Strategy

I conducted a systematic literature search using the following electronic databases: Medline (Ovid), PTSDpubs, PsychINFO (Ovid), EMBASE (Ovid), and Scopus.

While designing a search strategy, a search tool is used to determine the key words to address the research questions (Methley, Campbell, Chew-Graham, McNally & Cheraghi-Sohi, 2014). There are different search tools that are used by researchers such as:

- a) **PICOS**: focuses on the **P**opulation, **I**ntervention, **C**omparison, **O**utcome, and **S**tudy type in quantitative studies (Methley et al., 2014).
- b) **PICO**: focuses on the **P**opulation, **I**ntervention, **C**omparison, and **O**utcome in qualitative studies (Higgins 2013).
- c) **SPIDER**: focuses on the **S**ample, **P**henomenon of Interest, **D**esign, **E**valuation, and **R**esearch type in qualitative studies (Cooke, Smith & Booth, 2012)

This systematic review study includes quantitative, qualitative, and mixed-method papers. For this reason, I could use either PICO or SPIDER while determining the keywords for the search. However, I decided to use the SPIDER tool to determine the keywords to address my research questions based on Cooke, Smith, and Booth (2012)' elaboration about the SPIDER and the PICO (See Table 6 below).

Table 6. SPIDER vs PICO and Rationale of Choosing the SPIDER

PICO	SPIDER	Comparison (Rationale of choosing SPIDER)
P: Population/Problem	S: Sample	The population represents individuals who are grouped by common traits. However, a sample is a specific group of people which represents the population. In other words, the population includes more individuals than a sample (Armitage & Berry, 1994). In qualitative studies, researchers tend to use less participants compared to quantitative studies. For this reason, the sample is a better description for qualitative studies.
I: Intervention	PI: Phenomenon of Interest	In quantitative studies, the main aim is to examine a research question via an experiment or survey design. During these experiments and/or surveys, mostly researchers test an intervention’s effect while controlling other confounder variables (Cresswell, 2003). However, in qualitative studies, the aim of the researchers is to explore the experiences, thoughts, views, and behaviours of the participants (Jackson, Drummond & Camara, 2007). For this reason, instead of using “intervention”, phenomenon of interest had a better fit for this research.
C: Comparison	D: Design	Comparison (control group) and outcome are mostly used in quantitative studies (Methley et al., 2014). However, in qualitative studies, researcher tend to use different terminology to describe their results such as findings. For
O: Outcomes	E: Evaluation	

		this reason, “evaluation” was a better fit for me to design my keywords. Additionally, in the qualitative studies, it is highly significant to know the study design to determine the robustness of the study (Cooke et al., 2012). Hence, “design” was more preferable for me.
	R: Research type	In this review, I included qualitative, quantitative, and mixed method studies. For this reason, adding “research type” helped me to reach specific articles related to my research questions.



Important Note: I am aware that the SPIDER tool is not highly recommended due to the risk of lack of sensitivity (Methley et al., 2014). However, when I started to design the key words with PICO on April 2022 and run a search with those key words, I reached more than one million papers. Since it is not realistic for a researcher to complete a review with that many papers, after conversations with my primary and secondary supervisors (Prof Jo Billings and Dr Naomi Glover, respectively), a UCL librarian, and a YALE University librarian, we decided to use SPIDER because it provides higher specificity.

Literature searches were completed between July 2022 and August 2022. Alternative terms were detailed to include database-specific topic titles and Medical Subject Headings. The key search terms are listed in Table 7. (For the full list see Appendix 10). The results from the database searches were imported to reference management software EndNoteX9, and duplicates were removed. Backward and forward citation searching of included papers was also conducted to identify other potentially relevant papers.

Table 7. Key Search Terms

Sample	Phenomenon of Interest	Design	Evaluation	Research type
-High-risk occupational groups -Family members -Family relationships	-Occupational trauma -Occupational stress	-Qualitative -Quantitative -Mixed method	-Vicarious trauma -Experiences -Views -Family satisfaction -Interpersonal relationships	Original empirical peer-reviewed published research, including quantitative, qualitative, and mixed methods studies.

2.2. Eligibility Criteria

Articles were included based on following criteria: a) peer-reviewed published qualitative, quantitative, or mixed method studies written in English or Turkish, b) either comprised of a sample which identified its population as high-risk workers who talk about their family members' experiences, needs, mental health, wellbeing, and/or their family life, or comprised of a sample which identified its population as families of high-risk workers c) research that focused sufficiently on the impact of occupational trauma on families of high-risk workers in terms of family life (family relationship, family cohesion, interpersonal relationships, family and social support), mental health (vicarious trauma, secondary trauma, post-traumatic stress disorder, stress-related disorders, compassion fatigue, burnout) and/or wellbeing of family members (coping, happiness, marriage satisfaction, domestic responsibilities, impact of work schedule and shifts), and their needs and experiences as family members of those in high-risk jobs.

Articles were excluded if a) they did not focus sufficiently on the high-risk occupational groups' family members' mental health, well-being and/or experiences, b) they did not focus mainly on the impact of occupational trauma experienced by high-risk occupational groups on their families, c) studies were related to veteran and military families, d) they were written before 1980.

I excluded studies related to veteran and military families as they are the only population which has currently been studied, and I wished to synthesise literature about the families of other high-risk occupations, without being dominated by research on military and veteran families. I also excluded studies prior to 1980 due to PTSD only being recognised as a diagnosis in the DSM III in 1980 and to capture more relevant research on the nature of modern working across the last 40 years.

Grey literature was not searched as part of the systematic review. According to the Grey Literature Network Service (2013), grey literature is *“a field in library and information science that deals with the production, distribution, and access to multiple document types produced on all levels of government, academics, business, and organization in electronic and print formats not controlled by commercial publishing i.e. where publishing is not the primary activity of the producing body”* (p. 1). Tillett and Newbold (2006) reported that grey literature has some characteristics such as not being peer-reviewed and not being produced for commercial publication.

There are advantages and disadvantages of including grey literature in review studies. For example, on the one hand, in their study which aimed to explore the challenges and benefits of including grey literature in review studies, Mahood et al., (2014) raised their concerns about the repeatability of some of the grey literature findings due to the lack of scientific quality of the sources. They also reported that the reviewer team may have to spend a significant amount of time while reviewing and formatting the documents (such as arranging the bibliography, missing citations, etc.) due to the lack of a common format among the grey literature sources.

On the other hand, Hopewell et al., (2007) reported that including the grey literature in review studies may decrease publication bias. Mahood et al., (2014) underlined that in peer-reviewed studies, mostly, significant results tend to be published. However, in grey

literature, readers may reach more neutral or negative results which may be helpful to understand a phenomenon from a more balanced view (Mahood et al., 2014).

In light of this, since peer review has a significant role in providing valid and accurate information in scientific journals (Steer & Ernst, 2021) and grey literature findings are not peer-reviewed, in this study, I only aimed to synthesis the findings of published studies that passed the peer review process to increase the quality of my review.

2.3. Data Extraction and Quality Appraisal

The following information was extracted where available: Authors, date of publication, country, study design, type of qualitative/quantitative analyses used, sample size, high-risk workers' jobs, relationship with high-risk workers, and main findings, including themes identified in the qualitative and mixed methods research.

In systematic review studies, researcher teams seek to design and run their study to address their research questions as rigorously as possible. In order to achieve this purpose, they critically appraise their own systematic review and the included papers (Zawacki-Richter, Kerres, Bedenlier, Bond & Buntins, 2020, p. 12-14). Gough (2007) reported that, there are three significant dimensions that needs to be considered by researchers during critical appraisals: a) the relevance of the study design in the context of the review questions (for example, some of the study designs may address the systematic review's research questions more than other study designs), b) quality of the application of included study's method (the level of the included study's trustworthiness and rigor, and c) whether the included study is related to the research questions (whether the included study met the inclusion criteria of the systematic review). However, assessing a systematic review's quality requires a more detailed examination. For this reason, in this review, I appraised the quality of studies using the Critical Appraisal Skills Programme (CASP) checklist (CASP, 2017) for qualitative studies, Appraisal tool for Cross-Sectional Studies (AXIS) (Downes, Brennan, Williams & Dean, 2016) for cross-sectional studies, and CASP and AXIS together for mixed method studies (see Quality Appraisal for more detail).

2.4. Synthesis

The synthesis is not simply a combination of the findings of the included studies. With synthesis, researchers integrate and/or compare the findings from different studies to advance understanding of the specific phenomenon and the review question (Zawacki-Richter et al., 2020, p. 14). Although there are different types of synthesis, all of them highlight the data transformation process which involves exploring patterns in the data, examining the quality of the analysis, and combining data to address the review's research questions (Thomas, Harden & Newman, 2012). For example, meta-analysis is a research process that statistically examines the former findings to draw conclusion about a research question (Haidich, 2010). However, meta-analysis was not applicable to this study because of the wide variability of studies in relation to study design, high-risk occupational group populations, types of relationships between family members and high-risk workers, outcome measures, and findings. In this review, the existing outcomes were synthesised by following Slavin's best evidence synthesis approach (Slavin, 1986). This approach helps to compare the findings of different sources and bases the robustness of a relationship between the variables on the quality, quantity, and consistency of previous literature findings (Slavin 1986; Slavin 1995). I evaluated the findings of the studies according to a four-level scale: strong evidence (when three or more studies' findings are consistent), moderate evidence (when two studies' findings are consistent), limited evidence (when the findings are from just one study), and mixed evidence (when the findings are inconsistent in different studies) (de Oliveira, Cho, Kavelaars, Jamieson, Bao &Rehm, 2020).

3. Results

3.1. Study Selection

I identified 16,984 articles from database searches on Medline, Embase, PsychINFO, PTSDpubs, and Scopus. After deduplication, the abstracts, and titles of 13,089 articles were screened by ME, and a subset (N=700) was independently screened by Dr Helen Nicholls (HN). I excluded 12,898 articles that were not relevant to the research questions. Based on the eligibility criteria, I completed a full-text screening of 191 articles and HN independently reviewed 40 articles. At this stage, 166 articles were excluded for the following reasons “not related to high-risk occupational groups ($n=7$)”, “not focusing on the family members ($n=61$)”, “not focusing on the impact of

occupational trauma on family members ($n=42$)”, “not peer-reviewed ($n=40$)”, “ related to veteran/military families ($n=3$)”, “written before 1980 ($n=4$)”, and “review studies ($n=8$)”. An additional 24 records were identified through backward and forward citation tracking. I included 50 studies in total in this review (See Figure 4 for PRISMA checklist).

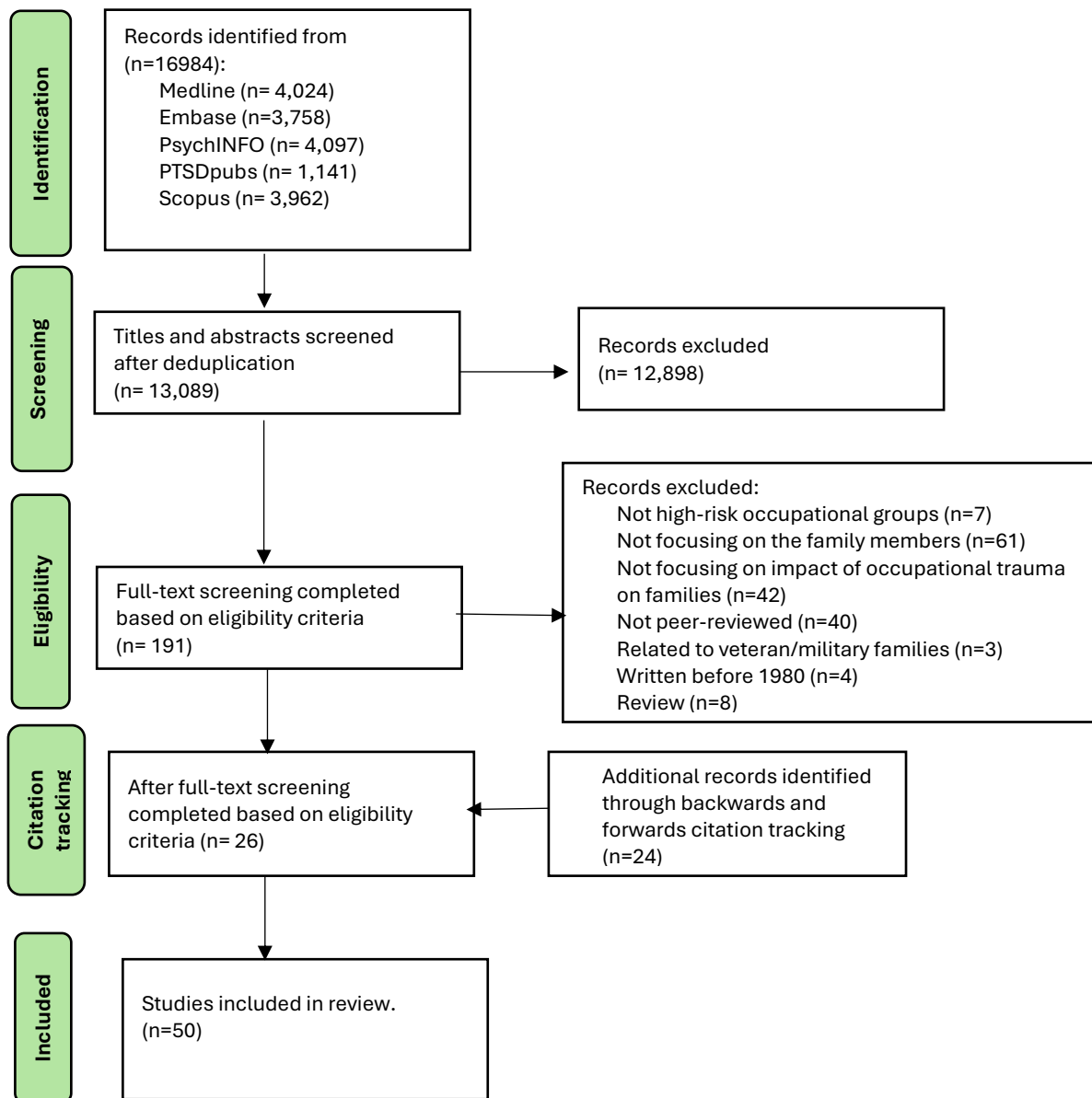


Figure 4. PRISMA Flow chart of study selection

3.2. Study Characteristics

Study and sample characteristics of the 50 included studies are shown in Table 8. Study designs included quantitative studies ($n=31$), qualitative studies ($n=16$), and mixed method studies ($n=3$). Of the 50 papers, 31 studies were based on participants in North America (USA and Canada), seven in Europe (UK, Portugal, Sweden, Croatia, Norway, Italy, and Turkey), seven in Asia (Iran, Hong Kong, China, India, Israel), five in Australia and New Zealand. Nine studies focused on the experiences of HCWs (nurses, doctors, and medical technicians), 27 on first responders (law enforcement officers, police officers, firefighters, emergency medical technicians, and paramedics), four on uranium workers and construction workers, four on seafarers, two on explorers, three on farmers, and one on clergy. Thirty-three studies were related to experiences of high-risk workers' spouses, partners and/or wives, 12 were related to family members (such as spouses/partners, parents, and siblings,) and family relationships, two were related to closely connected people and friends of high-risk workers, and finally, three studies focused on the children of high-risk workers. All studies were published between 1987 and 2022. The data collection methods used included surveys with/without open-ended questions ($n=34$) and interviews ($n=19$). Further information about the characteristic of the included studies is described in Table 8.

Table 8. Characteristics of the Included Studies and Main Findings

First Author (Year)	Location	Study Design	High-Risk Occupational Group	Study Population	Research question	Main Findings
Alexander (1996)	Scotland	Cross-Sectional Study	Police officers	Family members and spouses (n=400)	Measuring the impact of police work (especially shift work, long working hours, and dangerous nature of the work) on wellbeing and functioning of family members and spouses in terms of marriage, spouses' health, social life, and family relationships)	-Negative impact of police work on family relationships and social life -High anxiety and depression levels of officers' spouses
Alrutz (2020)	New Zealand	Mixed-Method	Emergency Responders	Partners (n=646)	Exploring the risk factors of the	-Partners tend to experience intrusive thoughts, arousal, and

			(Defence, police officers, firefighters, ambulance personnel)		secondary traumatic stress of emergency responders' partners and what partners think they need to reduce the impact of their responder partners' job stress on themselves	avoidance thoughts about the trauma experienced by the emergency responder -Importance of providing social support for partners to manage the stressful events experienced by responders
Ames (2013)	US	Mixed-Method	Construction workers	Workers and partners (n=502)	Identifying the impact of work stressors on couple relationships and the risk of intimate partner violence	-Construction work's physical demand, workers' exhaustion, and their impact on couple relationships and intimate partner violence
Banitalebi (2021)	Iran	Cross-Sectional	Nurses	Family members (n=208)	Assessing the impact of the COVID-19 pandemic on the mental health	-High prevalence of depression symptoms experienced by family members

					of family members of nurses	-Potential risk factors for the family members of nurses such as age, gender, marriage status
Banitalebi (2022)	Iran	Cross-Sectional	Nurses	Family members (n=220)	Exploring the relationship between coping skills with mental health and quality of life of family members of nurses during the COVID-19 pandemic	-Direct impact of coping skills on psychological health and quality of life
Beard (2013)	US	Cross-Sectional	Farmers	Wives (n=16893)	Identifying the depression risk among farmers' wives	-High depression risk of the wives
Beehr (1995)	US	Cross-Sectional	Police officers	Police officers and wives (n=354 (177 Police officers, 177 wives))	-Exploring the coping strategies of police officers and their wives to cope with police work	-Problem-focused coping of spouses of the police officers was negatively associated with the divorce risk. However, problem-focused coping had no advantage in coping with assignment satisfaction, drinking, or experienced stress in both officers and wives.

						-Emotion-focused coping for wives was also negatively correlated with divorce potential. -Religiosity of the wives was negatively associated with wives' drinking and stress that they experienced because of the officer's job.
Bochantin (2016)	US	Cross-Sectional	Public Safety Employee (PSE) (Police officers, fire fighters)	PSEs and families (n=95 (36 PSEs, 59 family members))	Exploring how PSEs and their family members describe the impact of PSEs' work on family	-Negative impact of the shift work on family relationships, social life
Brimhall (2019)	US	Cross-Sectional	Law Enforcement Officers (LEO)	LEOs and partners (n=108 (54 LEOs, 54 partners))	Investigating the relationship between communication and relationship satisfaction for LEOs and their partners	-LEOs and their partners' relationships and importance of the constructive and positive communication for functional and satisfactory couple relationship
Brodie (2012)	US	Qualitative	Law Enforcement Officers (LEO)	LEOs and partners (n=14 (7	Exploring how partners of LEOs develop	-Using gallows humour, physical exercise, faith, and religion was

				LEOs,7 partners))	resilience with LEOs job stress and its impact on them, and couples' communication styles about these stressful issues	helpful to cope with LEOs stressful work for partners. -Importance of open and honest communication between LEOs and their partners for strong couple relationship.
Campbell (2022)	US	Qualitative	Law Enforcement Officers (LEO)	LEOs and partners (n=14 (7 LEOs,7 partners))	Investigating the impact of work-related traumatic stress on partners of LEOs	-Negative impact of work-related traumatic stress on the partners such as lack of communication, decreased social life as a couple, and increased domestic labour. -Protective factors for healthy relationships and resilience such as spending time with partners of other LEOs, seeking therapy, and quality time that they spent together as a couple
Chua (2021)	Hong Kong	Cross-Sectional	Healthcare Workers (HCW)	HCWs and families (n=993 (747 HCWs/ 245 Families))	Assessing the HCWs perceived stress and its impact on family members and	-Higher perceived stress of HCWs was related to negative changes in family relationships. However, there was a positive association between the perceived stress of HCWs

					family relationships	and family cohesion and family members' stress level.
Costa (2019)	Portugal	Cross-Sectional	Police officers	Partners (n=515)	Exploring the shift work's effect on family life and joint social activities as families	-Negative impact of shift work on family organisations and joint social life activities
Cunradi (2009)	US	Cross-Sectional	Construction Industry Workers	Workers and S/Ps (n=848 workers, 848 S/Ps)	Identifying the risk factors of intimate partner violence	-Intimate partner violence among the construction workers and their partners (20% of couples described male-to-female partner violence, and 24% reported female-to-male partner violence) -Risk factors for intimate partner violence such as drinking problems and being currently unemployed
Cunradi (2009)	US	Cross-Sectional	Construction Industry Workers	Workers and S/Ps (n=897 workers, 897 S/Ps)	Identifying the types of intimate partner violence	-Types of intimate partner violence (from male to female (MFPV) and female to male (FMPV)) and their prevalence. For example, for MFPV, pushing or shoving, and grabbing were most commonly reported.

Davidson (2006)	Australia	Cross-Sectional	Police officers	Officers and partners (n=103 officers, 103 partners)	Exploring the effect of work-related trauma of police officers on partners' psychological adjustment	-Officers' avoidance symptoms and their negative impact on partners' mental health and social functionality -Negative relationship between officers' hyperarousal and partners' somatic symptoms, anxiety and sleeping problems
Dawson (2011)	US	Qualitative	Uranium workers	Workers and families (n=55)	Exploring how uranium mining work impacts the workers and their families	-Increased anxiety among the workers' families
Duarte (2006)	US	Cross-Sectional	First Responders (Police officers, firefighters, emergency medical technicians)	Children and Adolescents (n=8236)	Assessing the mental health issues of children of World Trade Attack's first responders	The probable PTSD rate among the children and adolescents of the emergency medical technicians was the highest (18.9%) - Children of firefighters had the lowest potential PTSD rate.
Emmett (2013)	New Zealand	Qualitative	Paediatricians	Spouses (n=10)	Identifying the positive and negative effects of paediatric work on family members and	-Spouses' sacrifices such as while choosing the living location because of a paediatrician family member's work, -Challenges in communication

					spouses of paediatricians	-Lack of quality time as a family because of the long working hours and “after-hours on-call”
Ericson-Lidman (2010)	Sweden	Qualitative	HCWs	Family members and friends (n=5)	Investigation the family members and friends of healthcare workers who experience burnout	-Having so many responsibilities as a family member of a frontline rescue worker such as domestic responsibilities, supporting the worker emotionally
Feng (2020)	Chine	Cross-Sectional	Frontline rescue workers (93 front-line doctors, 179 nurses, 31 medical technicians, 82 rear-service personnel, 99 community street inspection personnel, 20 cleaning staff, 78 volunteers,	Family members (n=671)	Exploring the psychological distress of family members of frontline rescue workers	-Mental health outcomes of the frontline work for family members such as sleep problems, anxiety, depression, PTSD. -Increased domestic responsibilities at the home such as childcare, elderly care, dealing with the daily life issues

			30 police, and 59 managers			
Friese (2020)	US	Mixed Method	LEOs	LEOs (<i>n</i> =171)	Discovering how occupational stress affects LEOs and their families and positive and negative coping strategies which were used by spouses to cope with LEOs job stress.	-Mental health outcomes of occupational stress for spouses -Positive and negative coping mechanisms that are used by spouses such as (self-care and exercise as positive; being self-critical and using coffee or energy drinks as negative)
Goud (2021)	India	Cross-Sectional	Doctors	Spouses (<i>n</i> =120)	Investigating the level of psychological distress which was experienced by spouses of doctors, and factors which contribute to enhancement of this stress level.	-High psychological distress was reported by spouses -Financial insecurity as a risk factor for psychological distress

Horan (2012)	US	Cross-Sectional	Police officers	Partners (n=117)	Discovering whether the sense of humour has contributed to the relational communication between police officers and their partners	-Humour is used by both officers and partners as a coping skill -Partners with using humour reported less stress and conflicts in their relationship with officers
Hoven (2009)	US/Israel	Longitudinal Study	First Responders	First responders (n=1050 (New York:900, Israel:350))	Assessing the impact of work-related stress which was experienced by first responders on their children over time	- Prevalence of PTSD amongst the children of first responders. For example, children with EMT family members who were not exposed to the WTC attack showed the highest rate of potential PTSD (15.1%). 8.1% of children with the police officer in the family had potential PTSD, and children with firefighter family members showed the lowest rate of possible PTSD (2.9%)
Karaffa (2015)	US	Cross-Sectional	Police officers	Officers and partners (n=171 (82	Exploring the difficulties which were experienced	- Sense of pride by spouses for the officer -Work-family conflicts

				officers, 89 partner))	by police officers and their partners in their marriages	-Importance of family and friends support
Landers (2020)	US	Qualitative	LEOs	Spouses (n=8)	Investigation of secondary trauma among the spouses of the LEOs	-Spouses reported that they experienced nausea, intrusive thoughts, anxiety, shaking, mood changes, fear, and worry after they listened to what LEO experienced after a traumatic event at work
Leon (2003)	US	Cross-Sectional	Antarctic /Greenland/High Arctic Explorers	Explorers and partners (n=2 Antarctic/4 Greenland/3 High Arctic couples respectively)	Exploring the explorers' and partners' experiences after a long-term mission in extreme environments	-Mental health outcomes of the explorers' job for their partners -They reported relatively stronger bonds in their relationship after the mission
Meffert (2014)	US	Cross-Sectional	Police officers	S/Ps (n=71)	Identifying the relationship between officers' PTSD with S/Ps emotional distress and relationship violence	-S/P stated a mean secondary trauma score and it was associated with S/P's baseline depression -A significant correlation between officers' reports of PTSD symptoms and S/P's secondary trauma was not found.

						-There was a correlation between S/P's secondary trauma and couple violence.
Menendez (2006)	US	Qualitative	Firefighters	Spouses (n=21)	Exploring the experiences of firefighters, spouses, and children of firefighters after the 9/11 terrorist attack	-Uncertainty of the situation and its negative impact on spouses' mental health and well-being such as insomnia and anxiety -Many spouses described their marital relationship as "strained" after 9/11. - Children of firefighters were more anxious because of their dad's security at work.
Morris (1998)	US	Cross-Sectional	Clergies	Clergies and spouses (n=136)	Determination of the impact of clergy's occupational stress and contextual variables (such as social support and sociability) on spouses of clergies	-Low family sociability -Lack of social support and its negative impact on family cohesion -Low family functioning

Pfefferbaum (2002)	US	Cross-Sectional	Firefighters	Partners (n=27)	Examining the effect of 1995 Oklahoma City bombing on the partners of volunteer firefighters who were responders of rescue after the bombing	-Mental health outcomes of the firefighting for partners such as depression, panic disorders, and anxiety -Negatively impacted couple communication
Pfefferbaum (2006)	US	Cross-Sectional	Firefighters	Partners (n=24)	43-44 months after the bombing, examining the partners' disasters experiences, post-traumatic stress symptoms	-Experiences of the partners of firefighters who were first responders of the 9/11 terrorist attack such as describing it as a "shocking" and "terrible" experience -Four women did not state direct or indirect impact of the bombing on them. For two of them, pre-bombing PTSD signs was found. One of women showed pre-bombing generalised anxiety disorder and major depression, and post-bombing major depression. And one woman had

						no diagnosis before or after the bombing.
Porter (2016)	US	Qualitative	First Responders	Spouses (n=6)	Exploring the experiences of spouses of the first responders	<ul style="list-style-type: none"> -Sense of pride for first responder family members -Increased psychological distress because of the safety of first responder family member -As a spouse of a first responder, felt like they were a team with other spouses of first responders because they understood each other and some part of their loved one's work's impact on their family such as "weird shifts" and "weird workdays".
Regehr (2005)	Canada	Qualitative	Firefighters	Spouses (n=14)	Identifying the impact of emergency service work of spouses of firefighters	<ul style="list-style-type: none"> -Feeling pride for firefighter family member -Lack of social support for families -Shift work and its negative impact on family such as feeling like a single mom and increased responsibilities at the home. -Trying to support the firefighter psychologically but it has a

						negative impact on the spouses wellbeing
Regehr (2005)	Canada	Qualitative	Paramedics	Spouses (n=14)	Exploring the effect of trauma exposure on paramedics' spouses	-Worrying about the firefighters because of the risks of the job -Negative impact of occupational trauma on family relationships -Using humour as a positive coping strategy
Roberts (2013)	US	Cross-Sectional	Police officers	Police officers and wives (n=17 Police officers, 17 wives)	Exploring the relationship between police officers' job-related stress and hostile and affection behaviours against wives	-Potentially, to protect their marriage from their job stress, the higher job-related stress of the officers was related to less behavioural negativity and hostile behaviour and higher attunement to the affection of wives.
Roberts (2001)	US	Cross-Sectional	Police officers	Police officers and wives (n=19 Police officers, 19 wives)	Exploring the emotional state and physical energy of wives of police officers after officer had a stressful day at work	-The negative impact of police officers' stressful working days on wives' emotional states and its short and long-term impacts on couple relationships

Roth (2009)	US	Qualitative	Emergency Medical Service workers	Family members (n=12)	Identifying the factors which may impact the family system of the emergency medical service families	<ul style="list-style-type: none"> -Negative impact of shift work on family social lives, drops from the joint social activities as family because of the shift works -Changes in marital and parental roles and having more domestic responsibilities as a family member of emergency service workers -Family members reported that they concern about their EMS worker family member's safety. -Family members pointed out that they developed some strategies to cope their EMS worker family member's job stress such as seeking social support, thinking positive, negotiating family responsibilities
Sachdeva (2022)	India	Cross-Sectional	HCWs	Family members (n=150)	Identifying the perceived stress, resilience and coping tendencies of family members	<ul style="list-style-type: none"> -High level of perceived for family members -23% and 17% had clinically significant anxiety and depression symptoms, respectively.

					of HCWs who had been working on COVID-19 during the pandemic in India	-More than 50% of the family members had low resilience and coping scores.
Sheen (2022)	Australia	Qualitative	Frontline HCWs	Frontline HCWs (<i>n</i> =39)	Discovering the effect of COVID-19 pandemic on families of frontline HCWs in Australia	-Changed roles and increased responsibilities at the home for families -Concerns about HCWs lives and family members' lives because of the risk of contamination -either spending more time as a family or having more personal time
Slišković (2019)	Croatia	Cross-Sectional	Seafarers	Partners (<i>n</i> =539)	Exploring the impact of seafarer's stressful jobs on their partners' mental health and wellbeing	-There was a correlation between having children, having long relationship, and being unemployed and low mental health - Mental health of the partners and individual predictors such as relationship satisfaction, resilience, social support, emotion-focused coping and dysfunctional coping were statistically significant

Sprung (2016)	US	Cross-Sectional	Farmers	Farmers and S/Ps (<i>n</i> =217 Farmers, 217 S/Ps)	Identifying the safety motivation and safety behaviour of farmers and their impact on the life satisfaction of spouses and partners of farmers	-There was a positive correlation between farmer's safety behaviour at work and spouses/partners' life satisfaction
Taylor (1987)	New Zealand	Cross-Sectional	Expeditioners	Expeditioners and wives (<i>n</i> =24 (12 Expeditioner, 12 wives))	Determination of the experiences of Antarctic expeditioners' wives	-Wives stated that they have confidence that their relationship will stand the strain of the separation -Sixteen months after the expedition, it is recorded that there was distress in the family relationships.
Tekin (2022)	UK	Qualitative	HCWs	Family members and friends (<i>n</i> =14)	Exploring the experiences, views, needs, and mental health issues of family members and close friends of HCWs who were	-There was an increased domestic responsibility for family members such as childcare and cleaning because of HCWs long working hours - Family members were worried about HCW's life and safety, but also they were worried about

					working on COVID-19 during the pandemic in the UK	<p>whole families' health because of the high risk of contamination</p> <ul style="list-style-type: none"> -Family members felt pride about what HCWs did during the pandemic -Families also stated that there is a lack of recognition by the rest of the society about families sacrifices. For example, some of them mentioned that they had to give up on some elements of their job because their responsibilities at home increased. -Potential vicarious trauma for family members
Trussell (2007)	Canada	Qualitative	Farmers	Family members (n=7)	Exploring the meaning of family vacation times for family members of farmers	<ul style="list-style-type: none"> -Increased responsibilities at the home -Frustrations about family activities because it is difficult to organise them because of farm work -Even if it is rare, the importance of having family vacations for wellbeing of the family members
Uchida (2018)	US	Cross-Sectional	WTC Responders	WTC responders	Identifying the behavioural	<ul style="list-style-type: none"> -Behavioural problems for children such as fearful/clingy

			(police officers and non-traditional responders, such as construction, transportation, maintenance, repair, and installation workers)	(<i>n</i> =16386 (8034 police, 8352 non-traditional responders))	problems in children of WTC responders	behaviours and somatic problems.
Ulven (2007)	Norway	Cross-Sectional	Seafarers	Wives (<i>n</i> =237 (196 sea wives, 114 control))	Assessing the psychosocial impact of seafarers' work schedules (such as for a long time, absence from the home) on family members	-Concerns about seafarer's life and job security -Distress about the uncertainty of their husband's departure time -61% of women reported having difficulty coping with their husband's absence.
Yur (2012)	Turkey	Qualitative	Seafarers	Wives (<i>n</i> =15)	Identifying the challenges of seafarers' wives	-Increased domestic responsibilities for wives (paying bills, childcare. Elderly care, shopping) -Missing husband

						<ul style="list-style-type: none"> -Because of the husband's absence, social withdrawal (not willing to join the wedding, engagement, and circumcision ceremonies) - Behavioural problems for children (setting boundaries issues)
Ziello (2014)	Italy	Cross-Sectional	Seafarers	Family members (n=12)	Assessing the mental health issues of family members of kidnapped seafarers, 5 months after their release	-42% of family members reported state anxiety, 33% of family members reported trait anxiety, and 33% of them reported depression

3.3. Quality Appraisal

I assessed the quality of the qualitative studies using the CASP checklist for qualitative studies (CASP, 2017). A three-point scale was used as recommended by Lachal, Revah-Levy, Orri and Moro (2017) to categorise criteria as totally met, partially met, and not met. The results of the CASP checklist for qualitative studies and mixed studies are shown in Table 9.

Table 9. Number of Qualitative ($n=16$) and Mixed-method ($n=3$) Studies Meeting CASP Criteria

	Totally Met	Partially Met	Not Met
1. Was there a clear statement of the aims of the research?	18	1	0
2. Is a qualitative methodology appropriate?	18	1	0
3. Was the research design appropriate to address the aims of the research?	17	2	0
4. Was the recruitment strategy appropriate to the aims of the research?	19	0	0
5. Was the data collected in a way that addressed the research issue?	18	1	0
6. Has the relationship between researcher and participants been adequately considered?	13	4	2
7. Have ethical issues been taken into consideration?	13	6	0
8. Was the data analysis sufficiently rigorous?	16	1	2
9. Is there a clear statement of findings?	18	1	0
10. How valuable is the research?	18	1	0

Quantitative studies were all cross-sectional designs so to assess the quality of these we used the Appraisal tool for Cross-Sectional Studies (AXIS) (Downes, Brennan, Williams & Dean, 2016). The results of the AXIS for quantitative and mixed method papers are shown in Table 10.

Table 10. Number of Quantitative ($n=31$) and Mixed-method ($n=3$) Studies Meeting AXIS Criteria

	Yes	Don't Know	No
Introduction			
1. Were the aims/objectives of the study clear?	34	0	0
Method			
2. Was the study design appropriate for the stated aim(s)?	34	0	0
3. Was the sample size justified?	1	1	32
4. Was the target/reference population clearly defined? (Is it clear who the research was about?)	34	0	0
5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	29	0	5
6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	22	2	10
7. Were measures undertaken to address and categorise non-responders?	13	9	12
8. Were the risk factor and outcome variables measured appropriate to the aims of the study?	34	0	0
9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	33	1	0
10. Is it clear what was used to determined statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	32	1	1
11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	32	0	2
Results			
12. Were the basic data adequately described?	33	1	0
13. Does the response rate raise concerns about non-response bias?	22	6	6

14. If appropriate, was information about non-responders described?	8	2	24
15. Were the results internally consistent?	31	3	2
16. Were the results presented for all the analyses described in the methods?	33	1	0
Discussion			
17. Were the authors' discussions and conclusions justified by the results?	33	1	0
18. Were the limitations of the study discussed?	31	1	2
Other			
19. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	0	1	33
20. Was ethical approval or consent of participants obtained?	30	2	2

3.4. Best Evidence Synthesis

Findings were synthesised by outcomes. The outcomes of the studies and data are summarised in Table 8, and the list of the outcomes that I identified across the studies is in Table 11.

Table 11: List of the Outcomes of the Occupational Stress for Family Members of High-risk Occupational Group Workers Identified

Main outcomes of this review study	Number of studies that looked at that outcome	Strength of evidence
1. Mental Health		
Outcomes		
• Psychological distress	10	Strong evidence
• Anxiety and depression	15	Strong evidence
• Secondary traumatic stress and PTSD	8	Strong evidence

<ul style="list-style-type: none"> Other mental health issues such as somatic symptoms, self-injury, and suicidal thoughts 	4	Strong evidence
<hr/>		
2. Aggression, Hostility, Intimate Partner Violence (IPV)		
<ul style="list-style-type: none"> IPV 	3	Strong evidence
<ul style="list-style-type: none"> Aggression and hostility 	1	Limited evidence
<hr/>		
3. All About Family		
<ul style="list-style-type: none"> Family functioning 	2	Moderate evidence
<ul style="list-style-type: none"> Family relationships 	10	Strong evidence
<ul style="list-style-type: none"> Couple relationships 	6	Strong evidence
<ul style="list-style-type: none"> Communication between family members 	3	Strong evidence
<hr/>		
4. Coping Skills and Resilience		
<ul style="list-style-type: none"> Coping skills 	8	Strong evidence
<ul style="list-style-type: none"> → Humour 	2	Moderate evidence
<ul style="list-style-type: none"> → Religion 	3	Strong evidence
<ul style="list-style-type: none"> Resilience 	3	Strong evidence
<ul style="list-style-type: none"> Social support 	5	Strong evidence
<hr/>		
5. Quality of Life and Social Life		
<ul style="list-style-type: none"> Life satisfaction 	4	Strong evidence
<ul style="list-style-type: none"> Social life 	8	Strong evidence
<hr/>		
6. Practical Outcomes		
<ul style="list-style-type: none"> Domestic responsibilities 	8	Strong evidence

(cleaning, paying the bills, taking care of the vulnerable relatives, childcare, shopping, organising family vacations and activities)

- | | | |
|----------------------------|---|-------------------|
| • Discipline of children | 2 | Moderate evidence |
| • Choosing living location | 2 | Moderate evidence |
| • Emotional burden | 3 | Strong evidence |

3.4.1. Mental Health Outcomes

Psychological distress:

I found strong evidence that psychological distress is experienced by families of HCWs, first responders, and seafarers. For example, in a cross-sectional survey of 120 spouses of doctors in India, 72.5% of the spouses of doctors who worked during the pandemic reported psychological distress (Goud, Indla, Deshpande, & Reddy, 2021). Similarly, family members of HCWs in India (Sachdeva, Kumar, Nandini & Shaan, 2022), 177 spouses of police officers in the USA (Beehr, Johnson & Nieva, 1995), and six spouses of first responders in the USA (Porter & Henriksen, 2016) stated that they experienced psychological distress due to their family member's job.

There were some risk factors that caused family members to experience higher psychological distress such as negative public attitudes, safety, and working conditions. For instance, spouses of police officers reported concerns about negative public attitudes toward police officers (Karaffa, Openshaw, Koch, Clark, Harr & Stewart 2015). Spouses of paramedics (Regehr 2005), wives of seafarers (Ulven et al., 2007), family members and close friends of HCWs (Tekin, Glover, Greene, Lamb, Murphy & Billings, 2022), and families of emergency medical service workers (Roth & Moore, 2009) pointed out that they experienced high levels of stress due to concerns about physical safety,

working conditions (such as unhealthy foods in canteen, long working hours) and safety risks to their high-risk worker family member at work. During the COVID-19 pandemic, in addition to worrying about the lives of families working in high-risk jobs, family members of HCWs were particularly worried that their family member would bring the disease home and that their children and other family members would also contract it (Sheen et al., 2022; Tekin et al., 2022). Besides these risk factors, a protective factor stood out among the studies. According to Horan and Booth-Butterfield (2012), partners of police officers indicated that their partners' using humour helped them to reduce the stress that they experienced because of the police job.

Anxiety and depression:

There was strong evidence for clinically significant anxiety and depression being experienced by family members and closely connected people of [first responders](#) (Davidson, Berah & Simon, 2006; Feng, Xu, Cheng, Zhang, Li & Li, 2020; Meffert, Henn-Haase, Metzler, Qian, Best, Hirschfeld & Marmar, 2014; Menendez, Molloy & Magaldi, 2006; Pfefferbaum, North, BunchK., WilsonT. G., Tucker, & Schorr, 2002) , [HCWs](#) (Banitalebi, Mohammadi, MarjanianZ., Rabiei, & Masoudi, 2021; Ericson-Lidman & Strandberg, 2010; Sachdeva et al., 2022;), [seafarers](#) (Ulven et al., 2007; Ziello, Angioli., Fasanaro& Amenta, 2014), [farmers](#) (Beard, Hoppin, Richards, Alavanja, Blair, Sandler, & Kamel, 2013), [uranium workers](#) (Dawson & Madsen, 2011), and [Antarctic/Greenland/High Arctic Expeditioners](#) (Leon & Sandal, 2003). For example, 10% of the family members and spouses of police officers (Alexander & Walker, 1996) reported that they feel considerably anxious and stressed because of the police officers' job stress. Families of frontline rescue workers who had been working during the COVID-19 pandemic (Feng, Xu, Cheng, Zhang, Li & Li, 2020), and spouses of firefighters who were first responders after the World Trade Centre (WTC) attack (Menendez et al., 2006) stated that when the high-risk worker left home to save the lives of others, they experienced high anxiety due to the uncertainty of the situation and lack of knowledge about whether they would return home. Similarly, three studies focused on the relationship between uncertainty and sleep disturbances in families. There was strong

evidence that uncertainty and the high-risk of the job caused some sleep disturbances in families of first responders (Davidson et al., 2006; Feng et al., 2020; Menendez 2006).

Secondary traumatic stress and PTSD:

Eight studies focused on experiences of secondary traumatic stress and PTSD in family members of high-risk workers. I found strong evidence for secondary traumatic stress and PTSD among the family members and close connections of the high-risk workers. For instance, partners of emergency responders described that they struggle with intrusive thoughts, arousal, and avoidance of the trauma experienced by their partner (Alrutz, Buetow, Cameron & Huggard, 2020). Family members of HCWs who were working during the COVID-19 pandemic reported that they had vivid dreams about the traumatic situations that happened at their partner's work (Tekin et al., 2022). According to Meffert et al., (2014) spouses of police officers experienced secondary trauma due to hearing about traumatic situations their spouses had to face. Likewise, family members of first responders experienced PTSD symptoms (Feng et al., 2020; Pfefferbaum, Tucker, North, Jeon-Slaughter, Kent, Schorr & Bunch, 2006; Pfefferbaum et al., 2002). Children of high-risk workers' mental health were also shown to be impacted by occupational stress in four studies which looked at this. There was moderate evidence that the children of emergency medical technicians may experience PTSD from three studies (Duarte, Hovem, Wu, Bin, Cotel, Mandell & Markenson, 2006; Hoven, Duarte, Wu, Doan, Singh, Mandell, & Cohen, 2009).

Other mental health issues:

According to the results, I found only one study which focused on somatic symptoms, self-injury, and suicidal thoughts of families of high-risk workers. Feng et al. (2020) found family members of frontline rescue personnel had experienced self-injurious or suicidal thoughts. However, this one study only offers limited evidence for this association.

Also, Uchida, Feng, Feder, Mota, Schechter, Woodworth, & Pietrzak, (2018) examined the impact of parents' post-traumatic stress on children of World Trade Centre responders four years after the attack, and they found that children of non-traditional responders (such as construction, transportation, maintenance, repair, and installation

workers) tended to experience more behavioural problems than the children of traditional responders (police officers). Both group of children tended to experience fearful/clingy behaviour and somatic problems.

There was limited evidence for the correlation between the mental health of families and age, gender, relationship status, having children and employment status mainly as only a limited number of studies looked at these factors. For instance, Banitalebi et al., (2021) in their study of the families of nurses found that mental health problems are common in family members who are older than 57 years old, that there was a statistically significant relationship between being a female family member and experiencing mental health problems, and that married partners tended to experience more mental health problems than unmarried partners (Banitalebi et al., 2021). According to another study's findings, which was conducted with the 539 partners of seafarers in Croatia, having children and longer relationships were significantly correlated with low mental health (Slišković & Juranko, 2019). Interestingly, there was mixed evidence about the relationship between education and mental health with only two studies exploring this, with mixed findings. Banitalebi et al., (2021), found no relationship between the education level of the family member and mental health impact. However, Meffert et al., (2014) in their study of 71 spouses and partners of police officers did identify a positive correlation between education level and secondary trauma scores amongst spouses/partners.

3.4.2. Aggression, Hostility, and Intimate Partner Violence

One study focused on the correlation between couple violence and partners' secondary trauma in spouses and partners of police officers. Meffert et al. (2014) found that higher secondary traumatic stress of the spouses and partners of police officers was associated with higher relationship violence as reported by spouses and partners. Two studies examined intimate partner violence between construction workers and their spouses. Cunradi et al. (2009) reported that nearly 20% of couples described male-to-female partner violence, and 24% stated female-to-male partner violence (Cunradi, Todd, Duke & Ames, 2009). The most common examples of violence were pushing or shoving, grabbing and throwing something to hurt. (Cunradi, Bersamin & Ames, 2009). Some common risk factors were identified across this literature. For example, alcohol

abuse in males, current unemployment, and adverse childhood events lead to an increase in male-to-female partner violence risk (Cunradi et al., 2009). As the period of unemployment increased, the tendency of female to male partner violence increased (Cunradi et al., 2009). Impulsivity was significantly correlated with risk for partner violence from both genders (Cunradi et al., 2009). Furthermore, according to the results of a study conducted with the Antarctic, Greenland, and High Arctic explorers and their partners, after 6 weeks of trekking across Greenland, partners of Greenland explorers reported high levels of aggression when their family members returned home. In the same study, it is also stated that when High Arctic explorers' had emotional support from their spouses it was helpful to reduce the interpersonal tension among the explorers and increase the family functioning (Leon & Sandal, 2003).

As a protective factor, there was limited evidence that using humour to cope was negatively associated with hostility as only one study examined this relationship (Horan et al., 2012). This is discussed in more detail under the "*Coping Skills and Resilience*" section. Additionally, according to Roberts, Leonard, Butler, Levenson & Kanter (2013), when police officers have greater job stress, they tend to show less behavioural negativity to their wives, less attunement to their wives' negativity, but higher attunement to their wives' affection to protect the marriage from their job stress.

3.4.3. All About Family

Family relationship and functioning:

Ten studies investigated the relationship between high-risk occupational groups' work stress and its impact on family relationships. Results across these studies were consistent, offering strong evidence that high-risk workers' stress has a negative impact on family relationships. Family members and spouses of police officers in the US (Alexander et al., 1996; Karaffa et al., 2015) family members of HCWs in Hong Kong (Chua et al., 2021), and spouses of paramedics in Canada (Regehr, 2005) demonstrated that higher stress experienced by the high-risk occupational group worker was correlated with more negative family relationships. For example, in a study concerning spouses of police officers, 9% of 400 spouses reported that their relationship with the officer was considerably or extremely impaired (Alexander et al., 1996). In a qualitative study which

included 14 spouses of paramedics, spouses stated that there was an extreme negative impact of the paramedic's stress and trauma on family relationships. One wife of a paramedic shared her experiences with the words: *"He is not just withdrawing from me, he's withdrawing from our children as well. It's affecting us all"*. A husband shared his experiences: *"She crowds in on herself. She becomes very quiet, won't talk. And of course, the flip side of that is if you press the wrong button, then BOOM!"* (Regehr, 2005). Additionally, according to Morris & Blanton (1998)'s study conducted with 136 spouses of clergy in the US, job expectations affected spouses' competence in family functioning. It is reported that those stressors had a greater impact on wives across several family functioning dimensions such as low family functionality and lack of socialising as a family.

Two studies focused on the impact of high-risk workers' being absent from home and its impact on family relationships. I found moderate evidence of a negative impact on family relationships in cases where a high-risk worker had to leave home for work reasons. For instance, 15 wives of seafarers in Turkey described how after seafarers returned home, there was a period of adaptation for both family members and seafarers, during which the children tended to disobey everyone else in the family but their fathers, resulting in wives feeling jealous of their partners. This caused negative family relationships and distress in the family environment (Yur & Nas, 2012). Using positive coping mechanisms was not always easy for the family members. 61% of 196 wives of seafarers in Norway reported that they were struggling to cope with their husband's absence when they left home for periods of time away for work (Ulven et al., 2007). According to the findings of a study in New Zealand, which was focused on 12 expeditioners and their wives, couples were confident that their relationship would survive, even when their explorer husbands went to the Antarctic for long postings. However, sixteen months after they came back from the Antarctic, explorers reported that there was distress in their family relationships (Taylor & McCormick, 1987).

Three studies reported a sense of pride amongst family members of workers in high-risk roles (Karaffa et al., 2015; Regehr 2005; Tekin et al., 2022) For example, family members and close friends of HCWs who had been working on COVID-19 during the pandemic in

the UK reported that despite the lack of adequate equipment at the beginning of the epidemic and the high risk of contracting the disease, HCWs continued to save lives, and this caused a great sense of pride for family members (Tekin et al., 2022). Similarly, spouses of police officers in the US (Karaffa et al., 2005) and spouses of paramedics in Canada reported being proud of their high-risk worker family members.

Only one study pointed out that the family members of HCWs tended to see their HCW family member as a source of information. According to the findings of the study, which was conducted during the COVID-19 pandemic to explore the experiences of 14 family members of HCWs in the UK, family members tended to ask questions about the pandemic to their HCW family member and tend to feel safer with them (Tekin et al., 2022).

Communication:

There were three studies focusing on communication between high-risk workers and their spouses/partners, and I found strong evidence regarding communication and its impact on family relationships. Law enforcement officers and their partners stated that when both of them were more accessible, responsive, engaged, and using more constructive communication (which they described as being able to discuss problems, express emotions and talk about solutions without criticism and verbal attacks), they reported more satisfaction in their family relationships (Brimhall, Bonner, Tyndall & Jensen, 2019). However, spouses of the paediatricians (Emmett et al., 2013) and partners of explorers (Leon et al., 2003) reported challenges in communication and its negative impact on family relationships.

Couple relationship:

Six studies focused on the relationship between occupational stress and couple relationships and intimacy, providing strong evidence that job stress has a negative impact on couple relationships and intimacy. Twenty-one spouses of firefighters who were responders to the 9/11 World Trade Centre attack reported tension in their marriage in the first week after 9/11, with 24% of the spouses stating that there was still tension in their marital relationship five years later (Menendez et al., 2006). Similarly, partners of

law enforcement officers in the US reported that work-related traumatic stress had a negative impact on the couple's relationship (Campbell, Landers & Jackson, 2022). Additionally, job stress may have a different short- and long-term impacts on marriage of high-risk worker. For example, according to the results of a study by Roberts and Levenson (2001) with police officers and their wives, when wives feel their husband had a stressful workday, they tend to show less negativity to improve the quality of their interaction with their police officer husbands. Although this behaviour has a positive effect on the interaction of the couples in the short term, it may cause emotional withdrawal, distance between the couples, and a decrease in marital satisfaction in the long term (Roberts & Levenson, 2001). Additionally, spouses of the HCWs stated that their sacrifices are not recognised by their partners and society (Tekin et al., 2022), and spouses of the paediatricians reported that because of the nature of healthcare work, they experience intimacy and communication challenges (Emmett, Dovey & Wheeler, 2013).

There were some protective factors for spouses against the impact of occupational stress. For example, more affection and less hostility were correlated with higher marital satisfaction amongst wives of police officers in the US (Roberts et al., 2013). Partners' intimacy was correlated with stronger bonds between explorers and partners of explorers (Leon & Sandal, 2003).

3.4.4. Coping Skills and Resilience

Coping skills:

Eight studies focused on the impact of coping skills on psychological health and quality of life. The results of the studies were consistent, providing strong evidence for coping skills having an important direct impact on psychological health and quality of life amongst family members of high-risk workers (Banitalebi, Mohammadi, Torabi, Rabiei & Masoudi, 2022; Sachdeva et al., 2022; Slišković & Juranko, 2019). Family members and friends of HCWs in Sweden stated that searching for recuperation and learning something new about themselves helped them to re-energise and find strength to cope with the healthcare work stress (Ericson-Lidman & Strandberg, 2010). Similarly, twelve family members of emergency medical service (EMS) workers in the US pointed out that

developing their own interests helped them to cope with the impact of EMS work (Roth & Moore, 2009). Additionally, emotional support, positive thinking (Roth & Moore, 2009), physical exercise (Brodie & Eppler, 2012; Friese 2020), and active problem-solving (Leon & Sandal, 2003) were helpful for family members to cope with the high-risk worker family member.

There were two studies focusing on humour and three studies focusing on religion as coping strategies against occupational stress. I found strong evidence that humour and religion were helpful for family members with regards to coping with occupational stress and its consequences. For instance, in a study conducted with 117 partners of police officers, when partners use humour to cope, they experience less perceived and physical stress lower frequency of conflict and less intense hostile conflict (Horan et al., 2012). 14 spouses of paramedics stated that they used humour with their spouses to reduce the impact of tragic events. *“We’ve developed a very left field sense of humour. It’s questionable, but it’s good”* (Regehr, 2005). With respect to religion, religiosity of spouses was negatively associated with perceived stress and spouse’s drinking (Beehr et al., 1995). Furthermore, believing in a higher power, praying, and participating in religious activities were helpful for the partners of law enforcement officers to deal with the officer’s job stress (Brodie & Eppler, 2012). Interestingly, according to a study which was conducted with 21 spouses of firefighters who were first responders to the 9/11 terrorist attack, many of the spouses said they experienced no change in terms of faith, however, some of them said that they’d lost faith because of this situation (Menendez et al., 2006). Spouses of police officers stated that they tended to drink more when their police officer partner experienced more stress at work (Beehr et al., 1995). Also, 61% of spouses of law enforcement officers in the US pointed out being self-critical, and 55% reported drinking coffee or energy drinks which are determined as negative coping skills (Landers, Dimitropoulos, Mendenhall, Kennedy & Zemanek, 2020).

Resilience:

Three studies focused on the resilience of family members of HCWs and firefighters. According to the results of a study which was conducted with 150 family members of HCWs who had been working on COVID-19 during the pandemic in India more than 50%

of family members of HCWs had low resilience and coping scores, 29% moderate, and 18% were classed as highly resilient copers (Sachdeva et al., 2022). Anxiety and depression, which were experienced by family members of frontline rescue workers who were on duty during the COVID-19 pandemic in China, were associated with perceived stress but not with mental resilience (Feng et al., 2020). Additionally, one of the children of a firefighter who was a first responder to 9/11, wanted to be a social worker because her dad was a hero for what he did in his job, and he was an example for her (Menendez et al., 2006).

Social support:

Five studies explored the impact of social support on coping with occupational stress amongst family members, with consistent findings providing strong evidence of the importance of social support to cope with occupational stress. Partners of emergency responders (Alrutz et al., 2020), partners and wives of seafarers (Slišković et al., 2019; Ulven et al., 2007) family members of emergency medical service workers (Roth & Moore, 2009), partners of Antarctic, Greenland, and High Arctic explorers (Leon & Sandal, 2003), and spouses of clergies (Morris & Blanton, 1998) reported that thanks to social support, they coped with their high-risk worker family member's job stress. Partners of law enforcement officers stated that talking with their friends and families, participating in activities with them, and prioritising couple alone time helped them to cope with the stressful situation as well (Brodie et al., 2012). Additionally, spouses of police officers highlighted that they tended to turn to friends and family for support more than professional sources (Karaffa et al., 2015). However, spouses of paramedics mentioned that it is important to have peer support, but that is not enough. For this reason, professional support is crucial for family members and paramedics themselves (Regehr 2005). Importantly, spouses of firefighters reported that whilst there is social support for firefighters, wives feel isolated (Regehr 2005).

3.4.5. Quality of Life and Social Life

Life satisfaction:

Four studies explored the life satisfaction of family members of high-risk workers. Family members of HCWs who had been working on COVID-19 during the pandemic stated that

they had to sacrifice some elements of their own jobs because of increased shifts of HCW, which impacted their job satisfaction (Tekin et al., 2022). Additionally, 27 partners of firefighters who were first responders to the 1995 Oklahoma City Bombing reported that the bombing impacted their partners' job satisfaction negatively. However, they reported that they coped with their negative feelings with support from their friends and family members (Pfefferbaum et al., 2002). In a study conducting with 217 married farm couples, spouses and partners of farmers reported that their individual life satisfaction was mostly related to their own perspective related to farmer husband/partner's safety behaviour (i.e., taking more precautions) at work. When partners' increased perception of their farmer husband's/partner's safety behaviour, their life satisfaction is higher. For example, when the farmer's take more precautions at work, the spouse was reassured (Sprung & Britton, 2016).

Social life:

Eight studies examined the impact of shift work and long working hours on the social life of families, and there was strong evidence that shift work has a significant negative impact on the social life of family members of high-risk workers. In a study, 26% of 400 family members and spouses of police officers reported that their social life was considerably or extremely negatively impacted by the long working hours and shifts (Alexander & Walker, 1996). Similarly, partners of shift worker police officers in Portugal reported a greater negative impact on family reorganisation and joint social life than partners of day workers (Costa & Silva, 2019). Spouses of firefighters described themselves as "*Mr. Mom*" in a study which was conducted with 14 spouses of firefighters in Canada. They said that due to shift work, firefighters tended to miss family events with the remaining spouse feeling like a single parent. Likewise, findings of studies which examined the experiences of family members of emergency service workers (Roth & Moore, 2009), firefighters and police officers (Bochantin 2016), and children of first responders (Hoven et al., 2009) support the previous findings showing that shift work has a negative impact on family social life. Trussell & Shaw (2007) reported that visiting zoos, amusement parks, and extended family members, being sure that their kids are experiencing new, different activities rather than farm life, and having quality time as a

family are very important for farm families. However, because of the nature of farm work, this is elusive. Similarly, wives of seafarers said that there was great social withdrawal in the family while their husband was away on a duty. Interestingly, they stated that, even if they could join cultural activities such as weddings, engagements, and circumcision ceremonies, they do not want to join without their husband, and mostly they miss those activities (Yur & Nas, 2012).

Compared to other high-risk workers, construction workers prefer not to join social activities because of their work's physical demands, and they feel exhausted when they come back to home, which can cause tension in family relationships (Ames, Cunradi, Duke, Todd & Chen, 2013). In a study conducted with 501 construction workers and their spouses, construction workers stated that their spouses did not appreciate the physical challenges of their work, and that this often caused relationship problems (Ames, Cunradi, Duke, Todd & Chen, 2013).

For some workers there were difficulties of keeping social life in balance due to shifts and long working hours. However, there was strong evidence that even if families can spend more time together despite those circumstances (with shift work and long working hours), there will be some costs. Spouses of firefighters (Regehr et al., 2005) in Canada and paediatricians (Emmett et al., 2013) in New Zealand stated that while they spend time with their families, they do not have time for the couple activities. Additionally, it costs to lose personal space and "Me Time" (Sheen et al., 2022).

3.4.6. Practical Outcomes

Domestic responsibilities:

According to eight studies with consistent results, there was strong evidence that family members of high-risk workers tended to take on more responsibilities at home. Family members of HCWs (Sheenet al., 2022; Tekin et al., 2022; Ericson-Lidman & Strandberg, 2010; Roth & Moore, 2009), family members of frontline rescue workers in China (Feng et al., 2020), family members of farmers in Canada (Trussell & Shaw, 2007), wives of seafarers in Turkey (Yur & Nas, 2012), and partners of Antarctic, Greenland, and High Arctic explorers in the US (Leon & Sandal, 2003) stated that they have to be responsible for a lot of the responsibilities that couples normally share because of their high-risk

worker family members' job demands. Those responsibilities included cleaning, paying the bills, shopping, childcare, supporting vulnerable family members, and organising family vacations.

Discipline of children:

A couple of studies reported the potential discipline issues in children.

In a qualitative study which was conducted with fourteen spouses of firefighters in Canada, Regehr (2005) reported that the firefighter fathers were away for four to five days and then at home for four to five days because of the shifts, but this induced dualistic home life and disrupted rules and routines. Wives who participated in this study said that during the absence of the father, the mom and children discussed and agreed on the house rules and routines, and when the father returned from work, the rules and routines mostly needed to be re-arranged to integrate the father into home life. However, wives reported that those attempts to re-arrange the authority mostly were met with resistance and arguments. For example, one participant explained that *"[our daughter] misses him when he's finished four nights, but then they're together two hours and they're bickering and fighting. ... He's gotten out of the father mode and she's gotten used to being with me. ... I say no [and she's ok]. He says no and she's ticked off."* (p. 430).

Similarly, in a qualitative study which was conducted with fifteen wives of seafarers in Turkey, Yur et al., (2012) reported that after fathers came back home, children tended to disobey everyone but their fathers and showed jealousy for them. However, it is important to highlight that those studies were qualitative studies, and the participants were only wives. It is important to conduct more quantitative studies including husbands and other family members who provide childcare.

Choosing the living location:

Two studies focused on choosing a living location for high-risk workers. Based on the consistent results of these studies we found moderate evidence for moving constantly based on the high-risk worker's work location and its negative impact on the family. For example, 14 family members of HCWs in the UK (Tekin et al., 2022) and ten spouses of paediatricians in New Zealand (Emmett et al., 2013) pointed out that they have to choose

their home's location based on their HCW family members, because of long working hours and shifts. Because of that choice, family members of the HCWs sometimes needed to travel for hours every day to go to their own jobs, which caused tension between family members. Other issues included having to live far away from family support, and children having to change their living environment many times.

Emotional burden:

Additional to all these practical outcomes, there were three studies that focus on emotional burden that families experienced. Families of high-risk workers tend to see themselves as a source of support for their high-risk worker family members and make emotional sacrifices. They tend to carry all the emotional burden, protect the rest of the family from the details of traumatic events that their high-risk worker experienced, "walking on tiptoe" (Ericson-Lidman & Strandberg, 2010), listening the worker and supporting them (Tekin et al., 2022), trying to read the emotions of the worker and the level of the worker's exhaustion, the expression on the worker's face, or the lack of communication and try to comfort them (Regehr 2005).

4. Discussion

In this systematic review, the main purpose was to understand the impact of occupational traumatic stress on family members of a variety of high-risk workers including HCWs, first responders, uranium and construction workers, seafarers, farmers, explorers, and clergy. Based on the narrative synthesis of 50 studies, I identified six main outcomes for family members of high-risk workers.

Even though studies included family members from different occupational groups, their experiences of many issues were highly similar. For example, many of the family members of different high-risk occupational groups reported that they experienced mental health issues such as depression, anxiety, sleep deprivation, and PTSD. Regardless of the occupational group, almost all of the family members pointed out that occupational stress that is experienced by high-risk workers causes conflict in family relationship, and poorer functioning in the family. Additionally, most of the family members reported that the long working hours and shift work had a negative impact on families in terms of joint social activities and family members' quality of lives. Finally,

family members of high-risk workers pointed out that because of the high demands of a high-risk job, families have more responsibilities at home such as childcare, caring for vulnerable family members, paying the bills, cleaning and organising family activities. According to results of this review, emotional support, positive thinking, physical exercise, active problem solving, humour, and religion helped family members to cope with their high-risk worker family member's job stress and its negative impact on their families.

There were also differences between the experiences of family members of different high-risk workers. For instance, while spouses and partners of the police officers and construction workers reported intimate partner violence, there were no studies reporting this for the family members of other occupational group workers. This may be because these issues are not so prevalent in other occupational groups, or they have not yet been subject to research. Parents being away from home for long periods of time was also associated with an increased risk of discipline issues with children. There was no current research which focused on the children of high-risk workers who return home every day. Working long hours and shifts may raise some issues in the family as well. Because of the nature of their work, HCWs, first responders, and seafarers tended to work shifts and long working hours, and family members of those occupational groups tended to frequently experience social withdrawal and having less family time.

In previous literature, it has been well-documented that caregivers and family members of people from high-risk groups such as families of individuals with severe mental health illnesses are at risk of developing mental health issues. There are similarities between families of high-risk workers and families of people with severe mental health issues. For example, most of the family members of both groups reported that because of the increased responsibilities at home such as childcare, caring for vulnerable family members, paying bills, and cleaning, their mental health, and well-being were impacted negatively (Feng et al., 2020). Conversely, spouses of police officers stated that when they used positive coping strategies such as humour, it had a positive impact on family relationships (Horan et al., 2012).

In this review, I also synthesised important findings regarding the issues in child discipline. In the current literature, co-parenting was described as parents working together to raise their children and it included some important elements such as the division of the parenthood labours (responsibilities and roles) and differences in the styles of raising children (i.e., values, child education, and child discipline) (Feinberg, 2002). In a study which aimed to conceptualise co-parenting, Feinberg (2002) reported that disrupted co-parenting may cause mental health and wellbeing issues in children as well as school and behavioural problems and discipline issues. The findings of my review supported this. For example, wives of firefighters and seafarers had to establish house rules and routines with their children due to the father's absence. When the firefighter/seafarer father returned home, the house rules and routine needed to change to integrate the father into house life and re-establish the authority at home. However, wives reported that children tended to disobey the new rules, and it caused discipline issues in children (Regehr 2005; Yur et al., 2012). Similarly, in their study which aimed to understand how military work impacts the children and family lives of the military personnel during the conflict/war times, Lester and Flake (2013) reported that *"Research on co-parenting gives us more insight into military families, as couples negotiate separation, readjustment, and reactions to combat-related stress"* (p.127). Lester and Flake underlined that deployment may have a negative impact on co-parenting in some military families due to the changes in roles and responsibilities when the military personnel come back home, and this may cause discipline issues in children. Similarly, in studies which were conducted with 1,601 children of deployed military personnel (Rosen et al., 1993) and 195 wives of deployed military personnel (Yeatman, 1981), researchers reported that 25% to 50% of children who are younger than 5 years old showed discipline issues, sadness, and enhanced demands for attention from the deployed parent.

The primary findings of this review show that there is a risk to the mental health and wellbeing of family members of high-risk jobs. Very few papers looked at potential benefits or positive outcomes for family members. Most of the family members of HCWs who had been working on COVID-19 during the pandemic in the UK reported that they had a great sense of pride in their HCW family member's job (Tekin et al., 2022). Additionally,

spouses of police officers reported feeling pride about being with a police officer in the US (Karaffa et al., 2015). I did not find any papers related to post-traumatic growth in family members. However, one paper found that a firefighter's teenager daughter wanted to become a social worker because of what her dad did for people (Menendez et al., 2006).

4.1. Strengths and Limitations

4.1.1. Strengths and Limitations of the Included Papers

The studies included in this review met the criteria for high-quality research. Yet, there are a number of limitations in the articles included in this review. Firstly, I aimed to include studies that focused on the experiences, views, needs and mental health issues of a variety of family members of different high-risk workers in this review. However, most studies focused on spouses, partners, and wives in heterosexual relationships, and children and teenagers of high-risk occupational groups. This review found a gap in the literature, with a lack of research that focuses on the partners and spouses in same-sex relationships, parents, and siblings of high-risk workers. Secondly, I aimed to include family members of some other high-risk workers such as pharmacists, diplomats, journalists, astronauts, pilots, miners, Formula One drivers, and automotive mechanics. However, there was no research which examined those occupational group workers' families' experiences, needs, and mental health issues to date. Finally, in some of the qualitative studies included in this review, reflexivity was not included in the paper. For this reason, it is difficult to determine how the characteristics of the researchers who conducted this study may have impacted the data collection and analysis.

4.1.2. Strengths and Limitations of the Systematic Review

In this review, I have synthesized the results of qualitative, quantitative, and mixed-method studies, according to the highest quality standards. I included studies from sixteen different countries from four continents. For this reason, results are potentially generalisable to countries and cultures where English and Turkish are not the main languages. Our research team was diverse, including researchers from different career stages, clinical experiences, and different cultural groups. This allowed us to consider the findings from a variety of perspectives and build a rich and in-depth analysis. Yet,

there are some limitations. The search was restricted to the English and Turkish languages due to the spoken languages of the researchers. Therefore, there may have been studies that were written in other languages that we missed.

4.2. Implications

4.2.1. Research Implications

More research needs to be done regarding the experiences, needs, mental health, and well-being of families of high-risk workers. In the current literature, the focus was mostly on the mental health of spouses, partners, and wives. Therefore, it would be important to explore the experiences of different family members such as parents, siblings, and children. It is also important to explore the impact of different high-risk jobs such as astronauts, explorers, diplomats, and journalists. There is a prominent gap about any positive impacts or potential benefits of high-risk occupations on high-risk workers' families. Additionally, there are limited studies which focus on the vicarious and secondary trauma and those that do, mostly concern spouses of police officers. It is crucial to address these gaps.

4.2.2. Clinical Implications

Where occupational health and mental health services are available, extending them to families and household members should be considered. Clinicians in occupational health and psychological health services need to be aware of, and trained to understand that families of high-risk occupational groups are also at risk for mental health issues. Where necessary, these clinicians could provide support to family members.

4.2.3. Organisational Implications

There are significant impacts on the wider family when a worker needs to do shift work or move for their job. For this reason, urgent attention needs to be directed to making high-risk roles more family-friendly. Secondly, it is important to provide more information about the nature of high-risk working and the role and responsibilities of high-risk workers, in order to prepare family members for the nature of the role. For example, organisations could organise workshops to make families more aware of potential stressors, and how to cope with them and provide support resources that family members can reach. Finally, organisations may consider providing sessions with

multiple different families in attendance, to help family members, meet, discuss their concerns, and share information.

5. Conclusion

In this systematic review, I aimed to understand of the impact of occupational traumatic stress on family members of a variety of high-risk workers. As a result of the narrative synthesis of 50 studies, I determined that there is a high risk for adverse mental health and well-being of high-risk workers' family members. High-risk workers are at increased risk of experiencing mental health problems because of the nature of their jobs, and it can be challenging being a family member of someone with a mental health problem. Separately, because of the potentially traumatic nature of high-risk jobs, family members may experience negative impacts on their own mental health by hearing about traumatic incidents, or they could be affected by the long hours, shift work, and compassion fatigue that their high-risk worker family members experience. This review shows the similar and different experiences, needs, and mental health issues of family members of different high-risk workers. Organisations have legal, moral, and reputational responsibilities to protect high-risk workers and their families. In order to provide better support, it is important to conduct further research to expand and address gaps identified in the literature, train clinicians in widening clinical support, and extend health and wellbeing services to family members. At the point of presentation, clinicians assessing a worker in their organisation should also consider the potential impact on and needs of their families. Additionally, it is necessary to increase awareness amongst organisations of the potential impact of occupational stress on family members of high-risk workers.

6. Important Reflection

I submitted this review study to the Journal of Occupational and Organisational Psychology on the 22nd of May 2023. However, the reviewers rejected the paper in September 2023. The main rejection reasons were explained as follows:

- **Occupational groups**: Even though the reviewers understood my aim was to explore the similar and different experiences, views, and needs of family members of different high-risk occupational group workers, both of the reviewers

highlighted that I included too much in the context of a single review. They both suggested that the findings may be more interpretable and meaningful if the sample was broken down into more defined categories such as first responders, healthcare workers, construction workers, or farmers.

My action: In light of this feedback, I divided this review study into four different reviews. The first one which is included in my PhD thesis (see Section III, Chapter 7) aimed to explore the impact of occupational stress on family members of HCWs before and during the COVID-19 pandemic. The second purpose is to qualitatively synthesise the similar and different experiences, mental health, and wellbeing issues among family members of different first responders such as police officers and firefighters. An MSc student in the Division of Psychiatry is working on this project as part of her dissertation, and I am the primary supervisor of this project. We aim to submit the project to an international peer-reviewed journal by the end of this year. The third review is related to family members of explorers. Finally, the fourth review focuses on the family members of farmers and manual workers. The third and fourth reviews will be completed after my PhD thesis submission.

- **Method:** The editor of the journal (Dr Gavin Slempp) criticised the decision heuristic about how the evidence for a conclusion was interpreted as weak, moderate, or strong. He mainly mentioned that the number of studies which was determined as strong evidence was concerning for him. Even though I provided detail about the rate of the quality of the evidence of the different studies including using a range of different frameworks, he reported that there was not much discussion given to the nature or size of the studies that might affect the conclusions. For example, he highlighted that if three fairly small cross-sectional studies all converged in their findings, in this review it was interpreted as strong evidence. However, this evidence would typically be considered quite weak according to his experience.

My action: Before starting this study, as discussed in the method, it was clear that I would not be able to analyse the findings via meta-synthesis due to the heterogeneity of the studies included in the review. Narrative analysis seemed to

be the most methodologically appropriate option, and I researched for a long time to determine which approach was most appropriate. I chose between using the Popay et al., (2006) approach and Slavin's Best Evidence (1986) approach. However, since the Popay et al., (2006) approach is usually recommended for intervention studies and this review did not include intervention studies. For this reason, I decided to analyse the findings using Slavin's Best Evidence synthesis approach (1986), even though I was concerned about interpreting the findings as weak, moderate, and strong evidence. After reading this comment from the editor, I expanded my research a little more and realised that I could use the Popay et al., (2006) approach to synthesis the findings in my review even though it did not involve intervention studies. For example, Keles et al., (2020) used narrative synthesis to review the impact of social media on adolescents' anxiety, depression, and psychological distress experiences, a review which has subsequently been cited 1488 times. As a learning point, I, therefore, decided to use Popay and colleagues' (2006) approach to narrative synthesis for my subsequent systematic review, which focused more specifically on healthcare workers and their families.

Chapter 7. Systematic Review 2: Impact of Occupational Stress on Healthcare Workers' Family Members Before and During COVID-19:

A systematic review

A paper based on the content of this chapter was submitted to PLOS ONE on 18.03.2024 and accepted for publication on July 2024.

1. Introduction

There were almost 1.3 million healthcare workers (HCWs) in the UK in 2023 (NHS Workforce Statistics, 2023), and in 2020, 65.1 million HCWs worldwide (Boniol et al.,2022). Due to the nature of healthcare work and associated risk of exposure to traumatic stress such as high rates of morbidity and mortality of patients (Bandyopadhyay et al., 2020), HCWs are at risk of developing mental health issues such as depression, anxiety, and PTSD (Billings, et al.,2021). Occupational stress amongst HCWs long preceded the COVID-19 pandemic, for example, a pre-COVID-19 review study, found HCWs experienced burnout, distress, anxiety, and psychosomatic symptoms (Gray et al., 2019). Similarly, an earlier study found that HCWs who experienced burnout reported lower self-rated physical health (such as back and neck pain), greater sleep disturbances and impaired memory (Peterson et al., 2008).

Similar findings have been seen since the COVID-19 pandemic, with a systematic review of experiences of HCWs during COVID-19, as well as previous pandemics, showing that long working hours, limited resources and unsocial shifts were significantly challenging for HCWs' psychosocial wellbeing (Billings et al., 2021). Long and inflexible working hours, unsafe or poor working conditions, low pay, and limited support from colleagues and supervisors have been shown to increase the risk of mental health issues at work (World Health Organisation, 2022). Based on recent literature, the prevalence of occupational PTSD among emergency medical service (EMS) workers who have experienced work-related trauma, is estimated to be 8.4-41.1%, although estimates vary due to differences in the description of PTSD, type of traumatic event, exposure period, and differences in occupation (Lee et al.,2020).

Research has consistently shown that social support is one of the key protective factors against the development of PTSD (Brewin et al., 2000; Ozer et al., 2003). Workers from high-risk jobs may seek support from their families. However, this support can come at a cost. Exposure to trauma at work and PTSD impact not only the mental health and well-being of individuals exposed when those individuals come back home and share their traumatic work experiences with their families, this may also affect their families negatively (Monson, Taft & Fredman, 2009).

As yet, there has been relatively little research into the impact of occupational stress on HCWs families and no previous synthesis of what literature is available. Wider literature, however, highlights the difficulties that can be experienced by families of other high-risk workers such as police officers and firefighters. Findings of a recent systematic review of the experiences of families of emergency responders with PTSD highlight that families of emergency responders with PTSD can experience vicarious and secondary trauma (Sharp et al., 2022). Researchers reported that spouses of first responders were overwhelmed because of the increased domestic responsibilities and their new “carer responsibilities” (May et al., 2023). Similarly, spouses of law enforcement officers reported that they may experience nausea, intrusive thoughts, anxiety, and physiological symptoms such as shaking, after listening to what their law enforcement spouses had experienced after a traumatic event at work (Landers et al., 2020). Regehr (2005) highlighted that spouses of firefighters were keen to support their firefighter partners psychologically, but that this had a negative impact on their own wellbeing and increased their worry. According to Uchida et al., (2018), children of World Trade Centre responders in 2001, tended to experience behavioural problems such as fearful/clingy behaviours.

There is, to date, little research on HCWs at high-risk of being exposed to trauma at work, and very little consideration of their families, despite the consistently demonstrated benefit of familial social support, and potentially detrimental impact of occupational stress on families. In this review, I aimed to explore the impact of occupational stress and exposure to trauma on HCWs’ families by systematically reviewing existing primary research and synthesising findings across the literature. Additionally, I aimed to provide

insight into the experiences and mental health of families of HCWs before the COVID-19 pandemic and during/after the pandemic.

2. Method

The systematic review protocol was registered on the NIHR’s International Prospective Register of Systematic Reviews (PROSPERO) with the registration number “CRD42022310729” (See Appendix 6). I adhered to PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-analyses) guidance throughout this review (Page et al., 2021).

2.1. Search Strategy

I conducted a systematic literature search using the following electronic databases: Medline(Ovid), PTSDpubs, PsychINFO(Ovid), EMBASE(Ovid), and Scopus. Initial literature searches were completed between July 2022 and August 2022 and updated again between August and September 2023. Searches were repeated in order to update the initial review prior to being submitted for publication. With this updated search, I have found seven further publications, which were included in the review.

Keywords related to the research questions were organised based on the SPIDER tool (see previous discussion point on this use of this tool). Alternative terms were detailed to include database-specific topic titles and Medical Subject Headings. The key search terms are listed in Table 12. (For the full list see Appendix 11).). The results from the database searches were imported to reference management software EndNoteX9, and duplicates were removed. Backward and forward citation searching of included papers was also conducted to identify other potentially relevant papers.

Table 12. Key Search Terms

Sample	Phenomenon of Interest	Design	Evaluation	Research type
-High-risk occupational groups -Healthcare workers	-Occupational trauma -Occupational stress	-Survey -Interview	-Vicarious trauma -Experiences -Views -Family satisfaction	Original empirical peer reviewed published research, including

-Family members -Family relationships			-Interpersonal relationships	quantitative, qualitative and mixed methods studies.
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2.2. Eligibility Criteria

Articles were included based on the following criteria: a) peer-reviewed published qualitative, quantitative, or mixed-method studies written in English or Turkish; b) either comprised of a sample that identified its population as HCWs who talk about their families' experiences, needs, mental health, wellbeing, and/or their family life, or comprised of a sample which identified its population as families of HCWs; c) research that focused sufficiently on the impact of occupational stress on families of HCWs in terms of family life (family relationship, family cohesion, interpersonal relationships, family and social support), mental health (vicarious trauma, secondary trauma, post-traumatic stress disorder, stress-related disorders, compassion fatigue, burnout) and/or wellbeing of families (coping, happiness, marriage satisfaction, domestic responsibilities, the impact of work schedule and shifts), and their needs and experiences as families of those in healthcare work.

Articles were excluded if: a) they did not focus on the HCWs' family members' mental health, well-being and/or experiences; b) they did not focus on the impact of occupational stress experienced by HCWs on their families; c) studies were related to other high-risk occupational group workers' families; d) they were written before 1980.

I excluded studies prior to 1980 due to PTSD first being recognised as a diagnosis in the DSM III in 1980, and to capture more relevant research on the nature of modern working across the last 40 years.

2.3. Data Extraction and Quality Appraisal

The following information was extracted where available: Authors, date of publication, country, study design, type of qualitative/quantitative analyses used, sample size, (if

specified) HCWs' role, relationship with HCW, and main findings, including themes identified in the qualitative and mixed methods research.

I appraised the quality of studies using the Critical Appraisal Skills Programme (CASP) checklist (CASP, 2017) for qualitative studies and the Appraisal tool for Cross-Sectional Studies (AXIS) (Downes et al., 2016) for cross-sectional studies.

2.4. Synthesis

In this review I have used narrative synthesis to organise this study's findings. Neither meta-analysis nor meta-synthesis was applicable for this study because of the wide variability of studies in relation to study design, types of relationships between family members and HCWs, and outcome measures. The evidence was narratively synthesised by following Popay et al.'s (2006) approach. According to Popay et al., (2006), there are four main elements in a narrative synthesis:

a) ***Developing a theoretical model***: In this review study, I determined the research questions, and I provided information regarding the inclusion and exclusion criteria to address this element.

b) ***Developing a preliminary synthesis***: In this stage, the aim is to provide preliminary findings of the included studies. Popay et al., (2006) pointed out different tools and techniques during this stage. In this review, I preferred to use "translating data; thematic analysis" (Braun & Clarke, 2006; Braun & Clarke, 2019), because I aimed to examine the findings of both qualitative and quantitative studies focusing on the experiences and mental health of healthcare professionals' families in terms of the similarities and differences. A list of potential preliminary codes and themes was generated from the findings by me. At research meetings, these preliminary codes and themes were discussed based on the feedback from the research team, themes were improved, and final themes were determined.

c) ***Exploring relationships in the data***: In order to explore the relationship in the findings, I used a conceptual mapping technique (Mulrow, Langhorne & Grimshaw, 1997). In this stage, I re-read all the themes and findings of the included studies and compared and contrasted them based on their similarities and differences.

d) **Assessing the robustness of the synthesis:** According to Popay et al., (2006) for robustness, the quality of the included studies and the trustworthiness of the synthesis are significant. In order to assess the quality of the included studies and enhance the trustworthiness of the review; I completed quality appraisals for each included study. To minimise bias, all researchers were included in different stages. Two researchers (HN (20% of the included studies) and I) independently completed the title/abstract and full-text screening. During the synthesis, ST analysed the data and discussed the results with JB, and NG and DL re-read the manuscript and provided feedback.

3. Results

3.1. Study Selection

From database searches, I identified 16,984 articles (from July-August 2022 search) and 2345 articles (from August-September 2023 search). After deduplication, the abstracts and titles of 14,332 articles were screened by me, and a subset (N=700) were independently screened by HN. I excluded 14,099 articles that were not relevant to the research questions. Based on the eligibility criteria, I completed full-text screening of 233 articles and HN independently reviewed 40 articles. At this stage, 218 articles were excluded for the following reasons “not related to HCWs ($n=9$)”, “not focusing on families ($n=68$)”, “not focusing on the impact of occupational stress on family members ($n=43$)”, “not peer-reviewed ($n=42$)”, “written before 1980 ($n=4$)”, “review studies ($n=11$)”, and “related to other high-risk occupational group workers and/or their families ($n=41$)”. An additional 5 records were identified through backward and forward citation tracking. In total, 20 articles were included in this review (See Figure 5 for PRISMA Flow Chart).

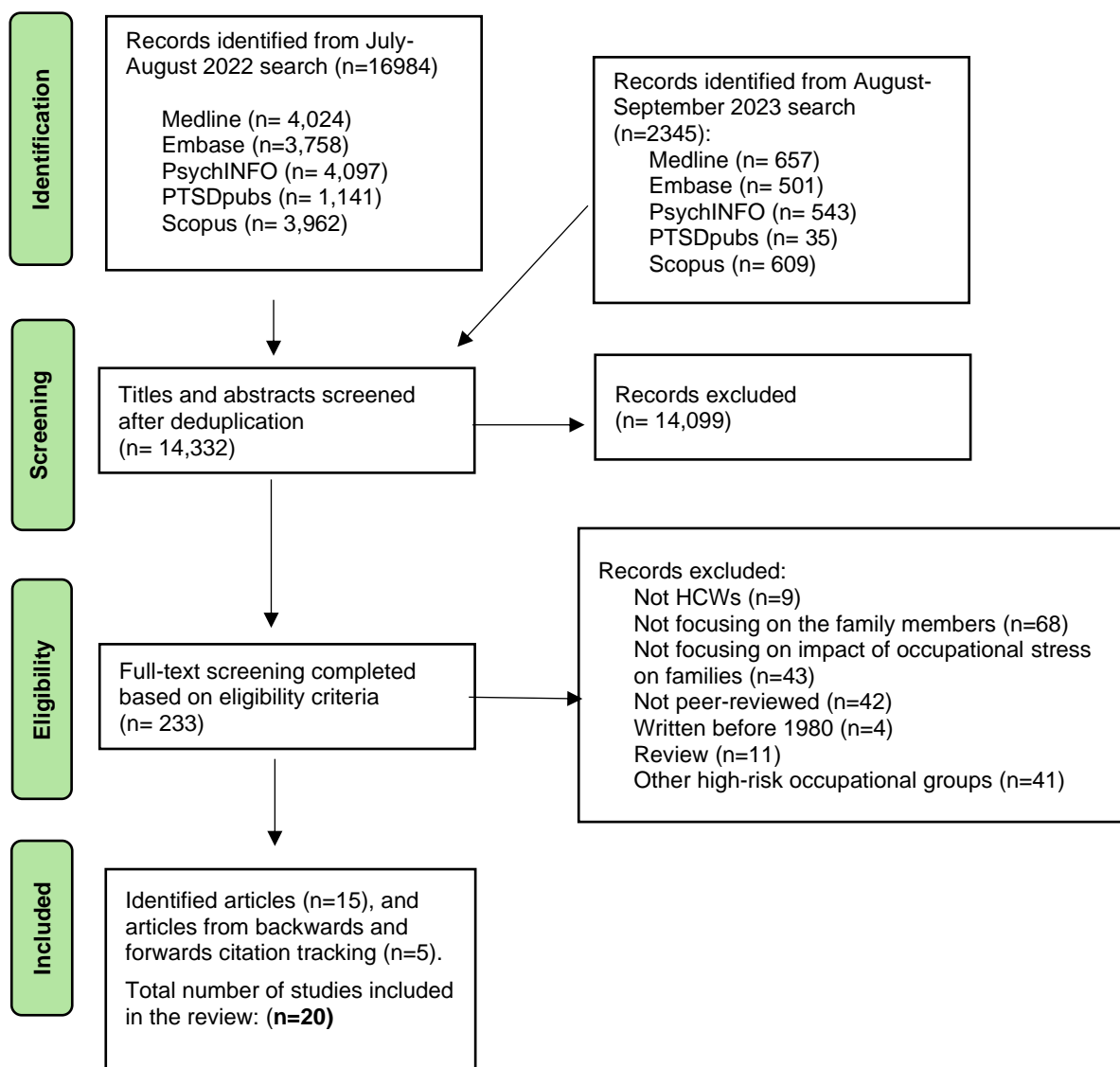


Figure 5. PRISMA Flowchart of Study Selection

3.2. Study Characteristics

Study and sample characteristics of the 20 included studies are shown in Table 13. Eleven studies were quantitative designs and nine were qualitative. Of the 20 papers, five studies were based on participants in North America (USA and Canada), eight in Asia (Iran, Hong Kong, China, and India), five in Europe (UK, Sweden, Italy, Turkey, and France), and two in Australia and New Zealand. Fourteen studies focused on the experiences and mental health issues of families of HCWs during the COVID-19 pandemic. Six studies focused on the experiences of families of HCWs regardless of the COVID-19 pandemic. Three studies directly focused on nurses, two on doctors, and four on EMS workers such as paramedics and ambulance service workers. Five studies were related to spouses and partners of HCWs, one was related to children, and fourteen studies focused on the families and close friends of HCWs together. The smallest sample size was five Ericson-Lidman et al., (2010) and the largest sample size was 39 (Sheen et al., 2021) amongst the included qualitative studies. The smallest sample size was 60 (Henry et al., 2024) and the largest sample size was 992 (Chua et al., 2021) among the included quantitative studies. All studies were published between 2005 and 2023. The data collection methods used included surveys ($n= 10$) and interviews ($n= 9$). One study focused on the transmission risk of COVID-19 from HCWs to families which used a blood test to determine transmission risk for families (Lorenzo & Carrisi, 2020).

Table 13. Characteristics of the Included Studies and Main Findings

Quantitative Studies						
First Author (Year)	Location	Study Design	Healthcare Worker Group	Study Population	Research Aims	Main Findings
Banitalebi, Mohammadi, Marjanian, Rabiei & Masoudi (2021)	Iran	Cross-Sectional	Nurses	Family members (n=208)	Assessing the impact of COVID-19 pandemic on mental health of family members of nurses	-High prevalence of depression symptoms experienced by family members -Potential risk factors for family members of nurses included age, gender, marriage status
Banitalebi, Mohammadi, Torabi, Rabiei & Masoudi (2022)	Iran	Cross-sectional	Nurses	Family members (n=220)	Investigation of the association between coping skills with mental health and quality of life of the family members of nurses during	- Higher coping skills score was related to higher scores in mental health and quality of life

					the COVID-19 pandemic	
Chua, Tung, Kwan, Wong, Chui, Li, . . . & Ip (2021)	Hong Kong	Cross-Sectional	Healthcare Workers (HCW) (Doctors, Nurses, Dentists, Pharmacists, Allied health professionals, and Healthcare assistants)	HCWs (<i>n</i> =747) and families (<i>n</i> =245)	Assessing the HCWs perceived stress and its impact of family members and family relationships	-Higher perceived stress of HCWs was related with negative changes in family relationships. However, there was a positive association between perceived stress of HCWs and family cohesion and family members stress level.
Feng, Xu, Cheng, Zhang, Li & Li (2020)	Chine	Cross-Sectional	Frontline rescue workers (93 front-line doctors, 179 nurses, 31 medical technicians, 82 rear-service personnel, 99 community street inspection personnel, 20 cleaning staff, 78	Family members (<i>n</i> =671)	Exploring the psychological distress of family members of frontline rescue workers	-Mental health outcomes of the frontline work for family members such as sleep problems, anxiety, depression, PTSD. -Increased domestic responsibilities at the home such as childcare, elderly

			volunteers, 30 police, and 59 managers			care, dealing with the daily life issues
Goud, Indla, Deshpande & Reddy (2021)	India	Cross-Sectional	Doctors	Spouses (n=120)	Investigating the level of psychological distress which was experienced by spouses of doctors, and factors which contributes to enhancement of this stress level.	-High psychological distress was reported by spouses -Financial insecurity was a risk factor for psychological distress
Henry, Burks & Zoernig (2023)	US	Cross-sectional	Emergency Medical Service personnel (EMS) (Emergency medical technician or paramedics who work for an ambulance service)	Emergency Medical Service personnel and their partners (n= 30 couples)	Assessing the association between EMS workers' self-reported PTSD symptoms and EMS workers' partners' self-reported PTSD symptoms, relationship	- There was an increased risk for partners of EMS workers who met diagnostic criteria for PTSD to develop PTSD symptoms compared to partners of EMS workers who met

					satisfaction, and social support	one criteria or no criteria of PTSD. - There was a negative impact of EMS workers' PTSD symptoms on partners' satisfaction for social support.
King & DeLongis (2014)	Canada	Longitudinal	Paramedics	Paramedics and their spouses (n= 87 couples)	Investigation of the occupational stress related negative coping skills such as rumination and interpersonal withdrawal and their impact on the relationships with their spouses.	- There was a relationship between paramedic's perceived stress and burnout experiences at work and spouse's interpersonal withdrawal. When paramedic experience higher stress and/or burnout at work, it increases spouse' interpersonal withdrawal at home. Spouses' enhanced

						withdrawal is also associated with increased marital tension.
Lorenzo & Carrisi (2020)	Italy	Prospective observational study	HCWs (Sub-groups not stated)	HCWs (<i>n</i> =38), their family members (<i>n</i> =81)	Examining the risk of COVID-19 transmission from HCWs to their family members	<ul style="list-style-type: none"> - Lower infection risk was found for HCWs compared to their family members. - HCWs were not a main source for the transmission to their family members.
Sachdeva, Kumar, Nandini & Shaan (2022)	India	Cross-Sectional	HCWs (Medical and Paramedical roles)	Family members (<i>n</i> =150)	Identifying the perceived stress, resilience and coping tendencies of family members of HCWs who had been working on COVID-19 during the pandemic in India	<ul style="list-style-type: none"> -High level of perceived anxiety and depression symptoms for family members. -Majority of the family members reported low resilience and coping scores

Tüğen, Göksu & Erdoğan (2023)	Turkey	Cross-sectional	HCWs (Doctors, Nurses, Dentists, and Others not specified)	HCW ($n=144$) and their children ($n=135$)	Examining the anxiety and associated factors of HCWs and their children during the first wave of the pandemic in Turkey.	- Children whose HCW parents worked directly with COVID-19 patients reported significantly higher SCARED scores compared to children whose HCW parent did not work with COVID-19 patients directly.
Ying, Ruan, Kong, Zhu, Ji & Lou (2020)	China	Cross-sectional	HCWs (Sub-groups not stated)	Family members ($n=845$)	Assessing the mental health of family members of HCWs during the COVID-19 pandemic.	- Family members reported that they experience anxiety and depression. - Family members of HCWs who work longer hours and work closely with the COVID-19 patients tended to experience higher anxiety and depression.

Qualitative Studies						
First Author (Year)	Location	Study Design	High-Risk Occupational Group	Study Population	Research question	Main Findings

Chandler-Jeanville, Nohra, Loizeau, Lartigue-Malgouyres, Zintchem, Naudin & Rothan-Tondeur (2021)	France	Semi-structured interview	Nurses	Nurses (<i>n</i> =49) and families (<i>n</i> =48)	Reporting the experiences of family members of nurses after the first wave of the COVID-19 in France	<ul style="list-style-type: none"> -Being family members of nurses during the first wave of the COVID-19 pandemic had negative impacts on families. - They experienced intense fear anxiety because of the high infection risk for their HCW family members. - They were overwhelmed by the information provided media which some of them were accurate but some of them were not.
Emmett, Dovey & Wheeler (2013)	New Zealand	Semi-structured interview	Paediatricians	Spouses (<i>n</i> =10)	Identifying the positive and negative effect of paediatric work on family members and	-Spouses' sacrifices such as while choosing the living location because of paediatrician family member's work,

					spouses of the paediatricians	-Challenges in communication -Lack of quality time as a family because of the long working hours and “after hours on-call”
Ericson-Lidman & Strandberg (2010)	Sweden	Semi-structured interview	HCWs (Nurses, Social workers, Occupational therapists, Physiotherapists)	Family members and friends (<i>n</i> =5)	Investigation of the family members and friends of healthcare workers who experience burnout	-Having so many responsibilities as a family member of a frontline rescue worker such as domestic responsibilities, supporting the worker emotionally
Mohammadi, Masoumi, Oshvandi, Borzou, Khodaveisi, Bashirian & Bijani (2022)	Iran	Semi-structured interview	HCWs (Sub-groups not stated)	Family members (<i>n</i> =25)	Exploring the experiences of family members of HCWs during the COVID-19 pandemic in Iran	- Family members reported experiences for both psychological tension (indescribable fear and worry, longing to see their loved ones, patient stone, bitter farewell, fear of the

						future) and dignity (acclamation, appreciation, feeling proud, spiritual growth).
Regehr (2005)	Canada	Interview	Paramedics	Spouses (<i>n</i> =14)	Exploring the effect of trauma exposure on paramedics' spouses	-Worrying about the firefighters because of the risks of the job -Negative impact of occupational trauma on family relationships -Using humour as a positive coping strategy
Roth & Moore (2009)	US	Semi-structured interview	Emergency Medical Service workers	Family members (<i>n</i> =12)	Identifying the factor which may impact the family system of the emergency medical service families	-Negative impact of shift work on family social lives, drops from the joint social activities as family because of the shift works -Changes in marital and parental roles and having more domestic

						<p>responsibilities as a family member of emergency service workers</p> <ul style="list-style-type: none"> -Family members reported that they concern about their EMS worker family member's safety. -Family members pointed out that they developed some strategies to cope their EMS worker family member's job stress such as seeking social support, thinking positive, negotiating family responsibilities
Schaffer, Kilanowski & Lee (2022)	US	Semi-structured interview	HCWs (Nurse, Respiratory therapist, Doctor, Physician's	HCWs (n=28)	Examining the impact of COVID-19 pandemic on HCW's	<ul style="list-style-type: none"> - Increased responsibilities at home for families - Due to the transmission risk,

			assistant, X-ray technician)		functionality and its perceived impact on family members	new hygiene rules at home such as social distancing and isolation - Stigma for family members of healthcare workers and society's attitude - Psychological distress and concern's about children's mental health and wellbeing
Sheen, Clancy, Considine, Dwyer, Tchernegovski, Aridas, . . . Boyd (2022)	Australia	Interview	Frontline HCWs (Allied health professionals, Nurses, Doctors)	Frontline HCWs (n=39)	Discovering the effect of COVID-19 pandemic on families of frontline HCWs in Australia	-Changed roles and increased responsibilities at the home for families -Concerns about HCWs lives and family members' lives because of the risk of contamination

						-Either spending more time as a family or having more personal time
Tekin, Glover, Greene, Lamb, Murphy & Billings (2022)	UK	Semi-structured interview	HCWs (Ambulance drivers, Doctors, Physiotherapists)	Family members and friends (n=14)	Exploring the experiences, views, needs, and mental health issues of family members and close friends of HCWs who were working on COVID-19 during the pandemic in the UK	-There was an increased domestic responsibility for family members such as childcare and cleaning because of HCWs' long working hours - Family members were worried about HCW's life and safety, but also, they were worried about whole families' health because of the high risk of contamination -Family members felt pride about what HCWs did during the pandemic

						<p>-Families also stated that there was a lack of recognition by the rest of the society about families' sacrifices. For example, some of them mentioned that they had to give up on some elements of their job because their responsibilities at home increased.</p> <p>-Potential vicarious trauma for family members</p>
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3.3. Quality Appraisal

I assessed the quality of the qualitative studies using the CASP checklist for qualitative studies (CASP, 2017). A three-point scale was used as recommended by Lachal, Revah-Levy, Orri, and Moro (2017) to categorise criteria as totally met, partially met, and not met. The results of the CASP checklist for qualitative studies are shown in Table 14.

Table 14. Number of Qualitative Studies ($n=9$) Meeting CASP Criteria

	Totally Met	Partially Met	Not Met
1. Was there a clear statement of the aims of the research?	9	0	0
2. Is a qualitative methodology appropriate?	9	0	0
3. Was the research design appropriate to address the aims of the research?	9	0	0
4. Was the recruitment strategy appropriate to the aims of the research?	9	0	0
5. Was the data collected in a way that addressed the research issue?	9	0	0
6. Has the relationship between researcher and participants been adequately considered?	6	2	1
7. Have ethical issues been taken into consideration?	6	2	1
8. Was the data analysis sufficiently rigorous?	8	1	0
9. Is there a clear statement of findings?	9	0	0
10. How valuable is the research?	9	0	0

The quantitative studies were all cross-sectional designs. To assess the quality of these studies, I therefore used the Appraisal tool for Cross-Sectional Studies (AXIS) (Downes et al., 2016). The results of the AXIS for quantitative papers are shown in Table 15.

Table 15. Number of Quantitative Studies ($n=11$) Meeting AXIS Criteria

	Yes	Don't Know	No
Introduction			
1. Were the aims/objectives of the study clear?	11	0	0

Method			
2. Was the study design appropriate for the stated aim(s)?	11	0	0
3. Was the sample size justified?	0	0	11
4. Was the target/reference population clearly defined? (Is it clear who the research was about?)	11	0	0
5. Was the sample frame taken from an appropriate population base so that it closely represented the target/reference population under investigation?	9	0	2
6. Was the selection process likely to select subjects/participants that were representative of the target/reference population under investigation?	8	0	3
7. Were measures undertaken to address and categorise non-responders?	5	0	6
8. Were the risk factor and outcome variables measured appropriate to the aims of the study?	10	1	0
9. Were the risk factor and outcome variables measured correctly using instruments/measurements that had been trialled, piloted or published previously?	11	0	0
10. Is it clear what was used to determine statistical significance and/or precision estimates? (e.g. p-values, confidence intervals)	10	0	1
11. Were the methods (including statistical methods) sufficiently described to enable them to be repeated?	11	0	0
Results			
12. Were the basic data adequately described?	10	0	1
13. Does the response rate raise concerns about non-response bias?	7	2	2
14. If appropriate, was information about non-responders described?	3	0	8
15. Were the results internally consistent?	10	1	0
16. Were the results presented for all the analyses described in the methods?	11	0	0
Discussion			

17. Were the authors' discussions and conclusions justified by the results?	11	0	0
18. Were the limitations of the study discussed?	7	0	4
Other			
19. Were there any funding sources or conflicts of interest that may affect the authors' interpretation of the results?	0	0	11
20. Was ethical approval or consent of participants obtained?	9	1	1

Overall, the ratings of the qualitative research were high. Similarly, overall ratings of quantitative research were good. However, none of the studies justified their sample sizes and some of the sample sizes stated were very small.

3.4. Narrative Synthesis

Findings were synthesised by outcomes. A summary of the findings from quantitative studies including the measures that were used in the studies and the identified risk factors is shown in Table 16. The qualitative findings are then briefly summarised with example quotes. The quantitative and qualitative findings are then narratively synthesised, exploring patterns across the included studies.

Table 16. Detailed Findings from Quantitative Studies of the Occupational Stress for Family Members of Healthcare Workers.

Type of outcomes studied	Study and prevalence	Countries	Measures used	Risk factors identified
1. Mental Health Outcomes				
Worry	<p><i>Goud et al., (2021)</i> In this cross-sectional study of 120 spouses of doctors in India, 72.5% of the spouses of doctors who worked during the COVID-19 pandemic reported psychological distress</p> <p><i>Sachdeva et al., (2022)</i> In this cross-sectional survey of 150 family members of HCWs in India, 75% of the family members of HCWs reported moderate to high levels of perceived stress during the COVID-19 pandemic.</p>	<p>-India</p> <p>-India</p>	<p>Kessler’s Psychological Distress Scale (K10)</p> <p>-Perceived Stress Scale, -Brief Resilience Coping Scale, -Hospital Anxiety Depression Scale</p>	<p>Financial insecurity</p> <p>Being a female family member</p>
Anxiety and depression	<p><i>Banitalebi et al., (2021)</i> 22.6% of family members of nurses reported mild depression, 71.4% of families reported moderate depression, and 1.8% of them reported severe depression</p>	-Iran	Patient Health Questionnaire-9 (PHQ-9)	Families of nurses found that mental health problems were more common in family members who are older than 57 years old, that there was a statistically significant

members who are younger than 40 years old, have a child or have an elderly relative at home (Sachdeva et al., 2022), and work in private sectors compared to government or institutional employees (Ying et al., 2020) were at risk of experiencing higher anxiety and depression symptoms. Family members who are younger than 40 years old, have a child or have an elderly relative at home were at risk of experiencing higher anxiety and depression symptoms. Furthermore, families of HCWs whose HCW family member worked

-Tüğen et al., (2023):

In this cross-sectional study which was conducted with 145 HCWs and their 135 children in Turkey, children's mean SCARED subscale scores were: for panic/somatic: 7.23 ± 5.71; for general anxiety: 6.89 ± 4.25; for separation anxiety: 6.88 ± 3.94.

-Turkey

Screen for Child Anxiety-Related Emotional Disorders (SCARED)

directly on COVID wards, worked more than 48 hours per week, and worked in poor conditions such as having a lack of protection equipment, tended to experience higher levels of anxiety and depression. Findings of a cross-sectional study conducted with HCWs and their children whose ages were between 8 to 18, showed that children had significantly higher somatic/panic subscale scores, generalised anxiety subscale scores, and separation anxiety scores when their HCW parent was directly involved in the

	<p><u>-Ying et al., (2020):</u> This cross-sectional study was conducted with 845 family members of HCWs in China,</p>	-China	-GAD-7 -PHQ-9	<p>care of COVID-19 patients. Female family members tend to experience significantly higher anxiety symptoms compared to male. Family members who work in private sectors compared to government or institutional employees. Family members whose HCW family member worked directly on COVID wards, worked more than 48 hours per week, and worked in poor conditions such as having a lack of protection equipment.</p>
Secondary Traumatic Stress and PTSD	<p><u>-Feng et al., 2020:</u></p>	-China	-Perceived Stress Scale	No risk factors identified

	<p>In a cross-sectional study which included 671 family members of first responders during the pandemic, researchers reported that 10.4% of family members may experience PTSD symptoms.</p> <p><i>-Henry et al., (2023):</i> HCWs' mental health has an impact on their loved one's mental health. According to the findings of this cross-sectional study, which was conducted with 30 couples in the US, partners of emergency service workers (emergency service technicians or paramedics) are at a higher risk of experiencing PTSD symptoms when the emergency service worker is diagnosed with PTSD.</p>	-US	<ul style="list-style-type: none"> -10-items Connor-Davidson Resilience Scale, -Generalized Anxiety Disorder-7 (GAD-7), -PHQ -The Self-Rating Inventory for PTSD (SRIP), -The Couple Satisfaction Index, -The Social Support Questionnaire 	HCW's PTSD
Emotional Burden	There was no quantitative study that focused on social support.			
2.Family Relationships				
Family functioning and relationships	<p><i>Chua et al., (2021):</i> There was a positive relationship between higher perceived stress in</p>	-Hong Kong	<ul style="list-style-type: none"> -Perceived Stress Scale (PSS-10), -Family 	No risk factors identified

	HCWs and more negative changes in family relationships.		APGAR (Adaption, Partnership, Growth, Affection, Resolve) scale,	
Couple relationships	<p><i>-Henry et al., (2023):</i> In this cross-sectional study with 30 couples in the US, PTSD symptoms of emergency medical service workers do not have a significant effect on the relationship satisfaction that was reported by their partners.</p> <p><i>-King et al., (2014):</i> In this study which was conducted with 87 couples (paramedics and their spouses') in Canada, enhanced withdrawal was associated with increased marital tension over time. c</p>	<p>-US</p> <p>-Canada</p>	<p>-The Self- Rating Inventory for PTSD (SRIP), -The Couple Satisfaction Index, -The Social Support Questionnaire</p> <p>-Perceived Stress Scale, -Maslach Burnout Inventory – Human Services Survey (MBI-HSS), -Rumination-Reflection Questionnaire, -Brief Ways of Coping Inventory</p>	<p>No risk factors identified</p> <p>No risk factors identified</p>
Absence and Separation	There was no quantitative study focused on the absence and separation.			

3. Coping Skills and Resilience				
Coping Skills	<p><u>-Banitalebi et al., (2022):</u> Coping skills had an important direct impact on psychological health and quality of life amongst family members of HCWs.</p> <p><u>-Sachdeva et al., (2022):</u> More than 50% of the family members had low resilience and coping scores.</p>	<p>-Iran</p> <p>-India</p>	<p>-PHQ-9</p> <p>-Coping Responses Inventory,</p> <p>-Quality of Life Inventory</p> <p>-Perceived Stress Scale,</p> <p>-Brief Resilience Coping Scale,</p> <p>-Hospital Anxiety and Depression Scale</p>	<p>No risk factors identified</p> <p>No risk factors identified</p>
Social Support	There was no quantitative study that focused on social support.			
4. Quality of Life and Social Life				
Life Satisfaction	<p><u>-Banitalebi et al., (2022):</u> 30.77% of family members of nurses reported poor quality of life, 27.88% reported moderate quality of life, and %41.35 reported good quality of life. In the same study, researchers also examined the different subscales of the quality of life for family members, and they found that while physical functioning had a maximum mean,</p>	-Iran	<p>-PHQ-9</p> <p>-Coping Responses Inventory,</p> <p>-Quality of Life Inventory</p>	No risk factors identified

	social functioning had a minimum mean score.			
Social Life	There was no quantitative study that focused on social life.			
5. Practical Outcomes				
Domestic responsibilities (cleaning, paying the bills, taking care of vulnerable relatives, childcare, shopping, organising family vacations and activities)	<i>-Feng et al., (2020):</i> 40.2% of the family members reported that their daily life was significantly impacted due to their support for frontline workers.	-China	-Perceived Stress Scale -10-items Connor-Davidson Resilience Scale, -Generalized Anxiety Disorder-7 (GAD-7), -PHQ	No risk factors identified
Choosing living location	There was no quantitative study that focused on choosing a living location.			

A total of 17 different scales were used to understand the impact of occupational stress on family members of HCWs in the included quantitative studies. Psychological distress amongst family members was assessed using Kessler's Psychological Distress Scale (K10) and the Perceived Stress Scale. The K10 (Kessler et al., 2002) and the Perceived Stress Scale (Cohen et al., 1983) both include ten items to examine the degree of psychological distress experienced by individuals in the last four weeks.

To assess anxiety and depression, authors used the Hospital Anxiety and Depression Scale (HADS), Generalised Anxiety Disorder-7 (GAD-7), the Screen for Child Anxiety-Related Emotional Disorders (SCARED), and the Patient Health Questionnaire-9 (PHQ-9). The HADS includes fourteen items to measure individuals' anxiety and depression symptoms in the past week (Ziagmond et al., 1983). The GAD-7 is a self-report questionnaire to examine anxiety symptoms in individuals in the last two weeks (Spitzer et al., 2006). SCARED has 41 questions and five subscales (somatic and panic, generalised anxiety, social anxiety, separation anxiety, and school anxiety) to assess anxiety symptoms in children (Birmaher et al., 1997). The PHQ-9 aims to examine the depressive symptoms of individuals over the preceding two weeks with nine questions (Kroenke et al., 2001).

Regarding the PTSD symptoms, burnout, and rumination, the Self-Rating Inventory for PTSD (SRIP), the Maslach Burnout Inventory – Human Services Survey (MBI-HSS), and the Rumination-Reflection Questionnaire (RRQ) were used in the included studies. The SRIP includes 22 items to examine the severity of PTSD with items based on DSM-IV criteria for PTSD (Hovens et al., 1994). The MBI-HSS includes 22 items and three subscales to assess the daily burnout experiences of individuals (Maslach et al., 1997). The RRQ includes 15 items that measure ruminative self-focus in individuals such as constantly thinking about how an individual acted in a previous event (Trapnell et al., 1999).

In terms of assessing coping skills and resilience, authors used the Brief Resilience Coping Scale (BRCS), 10-item Connor-Davidson Resilience Scale, The Social Support Questionnaire (SSQ), the Brief Ways of Coping Inventory, and the Coping Responses Inventory (CRI). The BRCS aims to investigate how individuals cope with a stressor using

four questions (Limonero et al., 2014). Connor and Davidson (2003) define resilience as growth in the face of challenges measured in their 10-item Connor-Davidson Resilience Scale. (Connor et al., 2003). The SSQ includes 27-item to examine the social support resources of individuals and how satisfied individuals are with the social support they receive (Sarason et al., 1983). The Brief Ways of Coping Inventory was designed based on the big five traits (Neuroticism, Extraversion, Openness to Experience, Agreeableness, and Conscientiousness) to evaluate how individuals cope with stress (Lee-Baggley et al., 2005). The quantitative study included in this review only used two items from this scale “(a) withdrew from the other person(s) involved, (b) gave the other person(s) involved the ‘silent treatment,’ and (c) sulked” (s King et al., (2014), p. 463). The CRI was developed to examine the coping responses of individuals by using 32 items (Moos, 2004).

Authors assessed couple satisfaction and family relationships by using The Couple Satisfaction Index and Family APGAR (Adaption, Partnership, Growth, Affection, Resolve) Scale. The Couple Satisfaction Index includes 32 items to measure the relationship between couples and how satisfied they are in their romantic relationship (Funk & Rogge, 2007). The Family APGAR Scale was designed to assess the family systems regarding adaptation, partnership, growth, affect, and resolve in the family, and includes five questions (Smilkstein, 1978).

Authors of the included studies reported that the questionnaires that they used in their studies had good reliability and validity.

Synthesised Outcomes from Included Qualitative and Quantitative Studies

3.4.1. Mental Health Outcomes

Worry:

Eight studies explored the potential worry experienced by families of HCWs. Only two studies explored this prior to COVID and reported that spouses of paramedics (Regehr, 2005) and families of EMS (Roth & Moore, 2009) experienced high levels of stress due to concerns about physical safety, working conditions (unhealthy foods in the canteen, long working hours) and safety risks to their HCW family member at work.

Six studies explored worry in families of healthcare workers in the context of COVID-19 specifically (Goud et al., 2021; Lorenzo et al., 2020; Mohammadi et al., 2022; Sachdeva et al., 2022; Sheen et al., 2022; Tekin et al., 2022). During the COVID-19 pandemic, family members were also worried about the physical safety of their HCW loved ones. For example, in a qualitative study conducted with 25 family members of HCWs in Iran during the pandemic, family members whose HCW wife or daughter was pregnant, specifically worried about both their wife's/daughter's lives as well as the life of the unborn child (Mohammadi et al., 2022). One of the spouses of a HCW shared his feelings with Mohammadi et al., (2022): *“My wife is 24-week pregnant. She loves her job and says she became a doctor for times like this. I understand her, but I can't help worrying. I'm afraid of the future. What if something happens to her and puts her life in danger. I'm afraid of premature birth, having a premature baby, and many complications that may follow. We don't know how this unknown disease affects mothers and their babies. Thinking about the future and uncertainty about what it holds is always with me.”* Families of HCWs were particularly worried that HCW would bring the disease home and that their children and other families would also contract it (Sheen et al., 2022; Tekin et al., 2022). In a prospective observational study, which was conducted with 38 HCWs and their 81 family members in Italy, infection rates were lower for HCWs compared to their families, and researchers pointed out that HCWs were not a main source for the transmission of the COVID-19 for their families (Lorenzo et al., 2020). However, even though HCWs may not be the main source of transmission, there was still concern amongst family members about transmission risks (Tekin et al., 2022).

Anxiety and depression:

Seven papers focused on anxiety and depression experienced by families and friends of HCWs (Banitalebi et al., 2021; Chandler-Jeanville et al., 2021; Ericson-Lidman & Strandberg, 2010; Feng et al., 2020; Mohammadi et al., 2022; Sachdeva et al., 2022; Tüngen et al., 2023; Ying et al., 2020).

Only one study focused on the experiences of families before the COVID-19 pandemic. This qualitative interview study was conducted with five family members and close friends of HCWs with burnout in Sweden (Ericson-Lidman et al., 2010). Family members

reported that they were worried because they were struggling to understand HCW's burnout experiences. Additionally, due to the burnout and job stress, family members were required to undertake more responsibilities in the home and family members described feeling anxious about how their daily lives were disrupted while they were taking more responsibilities at the home. However, it is important to highlight that this study failed to provide any detail about the demographics of participants, so it is difficult to know how transferable the findings of this study might be.

Six papers identified anxiety and depression in the families of HCWs in the context of the COVID pandemic. Families of frontline workers who had been working during the COVID-19 pandemic (Feng et al., 2020), stated that they experienced high anxiety. Similarly, families of HCWs in Iran (Banitalebi et al., 2021; Mohammadi et al., 2022), France (Chandler-Jeanville et al., 2021), China (Feng et al., 2020; Ying et al., 2020), India (Sachdeva et al., 2022), and Turkey (Tüğen et al., 2023), experienced intense anxiety and depression during the pandemic. Families mostly tended to be concerned about HCW's health and working conditions (Feng et al., 2020; Tekin et al., 2022), for example, having enough grocery supplies and when family members would be able to see their HCW loved one (Feng et al., 2020). However, since these studies were conducted at a single point in time during the COVID-19 pandemic and there is no data on the mental health of the participants before COVID-19, these results should be considered carefully.

Secondary traumatic stress and PTSD:

Four studies reported experiences of secondary traumatic stress and PTSD in families of HCWs, and all of these were conducted during or after the COVID-19 pandemic (Feng et al., 2020; Henry et al., 2023; Mohammadi et al., 2022; Tekin et al., 2022). Families of HCWs who were working during the COVID-19 pandemic reported that they had vivid dreams about the traumatic situations that happened at the HCW's work (Tekin et al., 2022). Likewise, it was reported that HCWs were sharing traumatic work experiences with families to seek support, but this may increase the risk of experiencing secondary traumatic stress amongst family members (Mohammadi et al., 2022; Tekin et al., 2022). However, these studies' sample sizes are very small making it hard to draw robust conclusions. Additionally, all four studies were either conducted during or after the

COVID-19 pandemic, with no comparisons about the mental health and wellbeing of those families and HCWs before the pandemic.

Emotional burden:

There were four studies that reported on the emotional burden that families experienced. Families of HCWs tended to see themselves as a source of support for the HCW and made emotional sacrifices, both before and during the pandemic.

Two studies were conducted before the pandemic and researchers reported that families tended to carry the emotional burden, protecting the rest of the family from the details of traumatic events that their HCW loved one experienced, “walking on tiptoe” (Ericson-Lidman & Strandberg, 2010), and trying to read the emotions of the worker and the level of the worker’s exhaustion, the expression on the worker’s face, or the lack of communication and try to comfort them (Regehr 2005).

Two studies were conducted during the pandemic and in these studies family members reported that they just tried to listen their HCW family member (Tekin et al., 2022) and hide their own anxiety and fear to support them (Mohammadi et al., 2022). These findings show that family members experience emotional burden while supporting their HCW family member, however, the COVID-19 pandemic may have aggravated this.

3.4.2. Family Relationships

Family relationships and functioning:

Seven studies investigated the relationship between work stress and its impact on family relationships. Results across these studies were consistent, showing that HCWs’ stress had a negative impact on family relationships before and during the COVID-19 pandemic. Families of HCWs in Hong Kong (Chua et al., 2021), and spouses of paramedics in Canada (Regehr, 2005) demonstrated that higher stress experienced by the HCWs was correlated with more negative family relationships. In a qualitative study which included 14 spouses of paramedics, spouses stated that there was an extreme negative impact of the paramedic’s stress and trauma on family relationships. A husband shared his experiences: “*She crowds in on herself. She becomes very quiet, won’t talk. And of course, the flip side of that is if you press the wrong button, then*

BOOM!” (Regehr, 2005). Some studies conducted during the COVID-19 pandemic have shown that conflicts experienced by families of HCWs in their family relationships have increased. For instance, in a study of 39 frontline HCWs, participants reported that they started to spend more time with their families, but this was emotionally draining because both families and managers required more time from HCWs and this caused conflicts at home (Sheen et al., 2020). Similarly, in a qualitative study, 28 HCWs pointed out that there was an enhanced tension in family relationships due to the financial concerns caused by COVID-19, one-sided parental decisions, or decreased couple’s time. For example, a nurse stated conflicts in family relationships due to parenting decisions: *“I guess I am more restrictive with the kids and what they can do. I would rather have them not do some things and go some places. My husband is less wary than I am about it so that can create some tension”* (Schaffer et al., 2022).

There were, however, studies which focused on the improvements in family relationships during the pandemic in HCW families. For example, according to the findings of a qualitative study which was conducted with 49 nurses and 48 family members in France, nurses and their family’s perceived lockdown as an opportunity to build stronger relationships with family members and to spend more time together cooking, baking, and playing games (Chandler-Jeanville et al., 2021). Similarly, Schaffer et al., (2022) highlighted that there was a stronger bond between family members, and they were willing to help each other compared to before pandemic. However, these study participants were mostly female. More research is required with male family members.

Four studies reported a sense of pride amongst families of HCWs. For example, family members of HCWs who had been working during the COVID-19 pandemic in the UK (Tekin et al., 2022), France (Chandler-Jeanville et al., 2021) and Iran (Mohammadi et al., 2022), reported that despite the lack of adequate equipment at the beginning of the epidemic, the high risk of contracting the disease, and poor working conditions, HCWs continued to save lives, and this led to a great sense of pride for families. Even before the COVID-19 pandemic, spouses of paramedics in Canada reported being proud of their HCW family members (Regehr 2005).

Couple relationships:

Six studies focused on the relationship between occupational stress and couple relationships and intimacy, reporting that job stress may have a negative impact on couple relationships and intimacy both before and during the pandemic (Emmet et al., 2013; Henry et al., 2023; King et al., 2014; Regehr 2005; Schaffer et al., 2022; Tekin et al., 2022) For example, before the pandemic, spouses of paediatricians reported that because of job stress and long working hours, they experienced intimacy and communication challenges (Emmett, Dovey & Wheeler, 2013). Similarly, a longitudinal study's findings highlighted that there was a relationship between paramedics' perceived stress and burnout experiences at work and spouses' interpersonal withdrawal (Regehr 2005). Studies which were conducted during the pandemic also support these findings. For example, spouses of HCWs in the UK stated that their sacrifices were not recognised by their HCW partners and society (Tekin et al., 2022). Additionally, lack of privacy during the pandemic also caused some tension in couple relationships: *"I think there is some tension in the marriage because the kids are around more. My husband and I are not getting as much alone time together and individually because the kids are around."* (Schaffer et al., 2022). However, this study's sample size is small.

Absence and Separation:

Four studies reported the negative impact of HCWs being absent and separated from their families and they were all conducted during the pandemic.

HCWs who worried that they might spread the virus to their families often isolated themselves from their loved ones. For example, in a qualitative study in the UK, it was reported that because of the long working hours and shifts, HCWs tended to be away from their families: *"Our kids didn't get to see as much of their dad, and they missed him as well."* (Tekin et al., 2022). Similarly, a study conducted with 25 family members in Iran reported that HCWs could not come back to their home regularly because of long working hours and shifts which significantly impacted family members, especially children (Mohammadi et al., 2022).

Even when HCWs were at home with their families, there was still often separation. For instance, Chandler-Jeanville et al., (2021) reported that, due to transmission risk, some

nurses limited their physical contact with their families. This was especially challenging for children who wanted to hug and kiss the HCW family member, but spouses and partners also stated that this limited physical contact impacted their relationship negatively as well. Schaffer et al., (2022) supported these findings in their research which was conducted with 28 HCWs in the US. They reported that because of limited physical contact, families started to be creative in terms of communicating with the HCW. A nurse shared her experiences: *“The girls text and facetime me more from their rooms in the house, which I used to never let them do.”* This helped them to build new routines and rituals to retain their relationships.

3.4.3. Coping Skills

Coping skills:

Seven studies focused on the impact of coping skills on psychological health and quality of life. The results of the studies were consistent, providing important knowledge about coping skills both before and during the COVID-19 pandemic. Studies conducted before the pandemic pointed out that family members and friends of HCWs in Sweden stated that searching for recuperation and learning something new about themselves helped them to re-energise and find strength to cope with the healthcare work stress (Ericson-Lidman & Strandberg, 2010). Similarly, twelve family members of EMS workers in the US pointed out that developing their own interests helped them to cope with the impact of EMS work (Roth & Moore, 2009). Additionally, emotional support, positive thinking, and sharing domestic responsibilities were helpful for families to cope with the HCW’s job (Roth & Moore, 2009). Similarly, studies conducted during the pandemic reported that coping skills had an important direct impact on psychological health and quality of life amongst families of HCWs (Banitalebi et al., 2022; Sachdeva et al., 2022;). For example, Banitalebi et al., (2022) reported a positive relationship between the health coping skills and quality of life.

One study focused on humour as a coping strategy against occupational stress. In this study which was conducted with 14 spouses of paramedics in Canada, spouses reported that they used humour with their HCW spouses to reduce the impact of tragic events. *“We’ve developed a very left field sense of humour. It’s questionable, but it’s*

good” (Regehr, 2005). However, this study focused on the experiences of families of HCWs before the COVID-19 pandemic. The perspective on humour and its use may have changed during the pandemic, when life was in serious danger not only for healthcare professionals but also for their families.

One study focused on religion as a coping strategy against occupational stress. During the pandemic, 22 out of 25 family members of HCWs in Iran reported that they spiritually grew during the pandemic and prayed for comfort and safety for everyone. One participant said that *“Since COVID-19 began to spread; I have done more talking with God, vows, good deeds, and altruism. I feel more spiritual than before”* (Mohammadi et al., 2022). However, since there is no other research which focused on the spirituality of families of HCWs, it is difficult to generalise these findings.

Social support:

Six studies explored the impact of social support on coping with occupational stress amongst family members, with consistent findings pointing out the importance of social support in coping with occupational stress.

Two studies focused on social support before the pandemic and researchers reported that thanks to social support, families of EMS workers in the US coped with the HCW’s job stress (Roth & Moore, 2009). Spouses of paramedics pointed out another important topic: paramedics mostly had peer support during their shift, but that was not enough. (Regehr 2005)

Four studies focused on the families’ experiences of social support during the pandemic. In their qualitative study which was conducted with nurses and their families in France, Chandler-Jeanville et al., (2021), reported that families were sincerely grateful to their friends and extended family members for their support during the pandemic. Additionally, they were happy to hear handclaps and to receive presents from the local community because they tended to interpret them as evidence of social support (Chandler-Jeanville et al., 2021). Similarly, in a qualitative study which included 25 family members in Iran, 23 of them pointed out that they felt social support by the rest of society showing their gratitude to families of HCWs (Mohammadi et al., 2022). On the other

hand, families of HCWs were worried that this appreciation would fade away too quickly and HCWs' working conditions would not be improved (Chandler-Jeanville et al., 2021; Tekin et al., 2022). In another qualitative study conducted with 28 HCWs in the US, HCWs reported that their families were stigmatised because of their healthcare work. For instance, one nurse manager shared her experience: *"I stopped telling people that I was a nurse in public. I told my kids to stop telling people that I was a nurse because people were afraid of me because of potential exposure to COVID-19"* (Schaffer et al., 2022).

3.4.4. Quality of Life and Social Life

Life satisfaction:

Two studies explored life satisfaction among family members of HCWs. Families of HCWs who had been working on COVID-19 during the pandemic in the UK stated that they had to sacrifice many elements of their own work because of increased shifts of the HCW family members, and this impacted their job satisfaction (Tekin et al., 2022). Additionally, in a cross-sectional study conducted with 220 family members of nurses in Iran, researchers found that 30.77% of family members reported poor quality of life (Banitalebi et al., 2022). However, these studies were conducted during the COVID-19 pandemic. We do not have information about the quality-of-life experiences of families of HCWs before the pandemic.

Social life:

Four studies examined the impact of shift work and long working hours on the social life of families. I found that shift work had a significant negative impact on the social life of families of HCWs and their experiences were similar before and during the pandemic.

Two studies were conducted before the COVID-19 pandemic. Findings of a qualitative study in the US with families of emergency medical workers demonstrated that shift work has a negative impact on family social life (Roth & Moore, 2009). Likewise, for some HCWs there were difficulties in keeping their work/life balance due to shifts and long working hours. They reported that even if families can spend more time together despite shift work and long working hours, there will be some costs. Spouses of paediatricians

(Emmett et al., 2013) in New Zealand stated that while they spend time with their wider families, they do not have time for activities as a couple.

Two studies focused on the social life of families during the pandemic. In a qualitative study which was conducted with 39 frontline workers in Australia, HCWs tried to spend time with their families, but they were already working long hours. For this reason, spending time with their families came at the cost of losing personal space and “Me Time” (Sheen et al., 2022). Also, the social lives of families of HCWs were disrupted not only because of the HCW’s long working hours and shifts, but also social isolation and stigma. Twenty-eight HCWs in the US reported that because of the infection risk, their family members were stigmatised and had to withdraw from social activities. They specifically reported that they were worried about the impact of stigma and social isolation on their children’s mental health and wellbeing (Schaffer et al., 2022).

3.4.5. Practical Outcomes

Domestic responsibilities:

According to six studies with consistent results, family members of HCWs tended to take on more responsibilities at home, regardless of the pandemic. Families of HCWs stated that they have to be responsible for a lot of the domestic responsibilities that couples normally share because of the HCW’s job demands. These responsibilities included cleaning, paying the bills, shopping, childcare, and supporting vulnerable family members (Ericson-Lidman & Strandberg, 2010; Feng et al., 2020; Roth & Moore, 2009; Sheen et al., 2022; Tekin et al., 2022). According to findings of two studies focused on the experiences of families before the pandemic, family members tended to have more responsibilities for cleaning and childcare (Ericson-Lidman & Strandberg, 2010; Roth & Moore, 2009) with family members perceiving that if they take over domestic responsibilities from the HCW family member, they may recover from their job stress quicker (Ericson-Lidman & Strandberg, 2010). Similarly, during the COVID-19 pandemic, family members were willing to take on more responsibilities at home to help the HCW, (Sheen et al., 2022; Tekin et al., 2022).

During the pandemic, however, family members’ domestic responsibilities were increased not only because of the increased working hours and shifts but also, because

of the high-risk of carrying the disease home, family members tended to clean the house more than usual. A male partner of a physiotherapist who worked closely with COVID-19 patients during the pandemic in the UK reported that: *"I've helped out making a packed lunch and when she came home from work every day, we got into a sort of routine where I would close all the curtains so she could strip off in front of the washing machine, put [her clothes] in the washing machine, and shower upstairs. So, I was helping out in that way"* (Tekin et al., 2022). Similarly, a HCW who worked with COVID-19 patients during the pandemic in the US said that: *"[My] husband goes around when I get home and wipes down and bleaches everything that I touch"* (Schaffer et al., 2022).

Impact on living location:

Two studies focused on how the families of HCWs are also impacted by a lack of choice of living location. For example, ten spouses of paediatricians in New Zealand before the pandemic (Emmett et al., 2013) and 14 family members of HCWs in the UK during the pandemic (Tekin et al., 2022) pointed out that they have to choose their home's location based on the HCW, because of long working hours and shifts. Because of that choice, families of the HCWs sometimes needed to travel for several hours every day to go to their own job, which caused tension between family members. Results show that moving constantly due to HCW's work location has a negative impact on families regardless of the COVID-19 pandemic (Emmett et al., 2013; Tekin et al., 2022).

4. Discussion

In this review, my aim was to understand the impact of occupational stress on family members of HCWs and how this impact varied before and during the COVID-19 pandemic. Based on the narrative synthesis of 20 studies, I identified five main outcomes for family members of HCWs.

Family members' experiences of many issues were similar before and during the COVID-19 pandemic. Firstly, many of the families of HCWs experienced mental health issues such as worry, depression, anxiety, and secondary traumatic stress both pre- and during the pandemic. Secondly, regardless of the pandemic, almost all family members in the included studies reported that occupational stress experienced by HCWs caused conflict in family relationships, and poorer functioning in the family. Long working hours

and shift work could also negatively impact families in terms of social life and quality of life. Finally, family members of HCWs identified that because of the high demands of healthcare work, family members tended to take on more responsibilities at home such as childcare, caring for vulnerable family members, paying the bills, and cleaning. According to the results of this review, emotional support, social support, positive thinking, humour, and religion helped family members cope with the HCW's job stress and its potentially negative impact on their families.

There were also some different experiences of families of HCWs during the COVID-19 pandemic compared to before the pandemic. For instance, researchers reported that family members of HCWs tended to experience Secondary Traumatic Stress and PTSD symptoms. Additionally, during the pandemic, HCWs stayed away from home for longer periods of time due to long working hours, additional shifts, and the risk of transmission of the disease. This separation and absence from home caused distress to families. With increased working hours and additional shifts during the COVID-19 pandemic, family members often had to sacrifice their own jobs, which decreased their life satisfaction.

COVID-19 also worsened some experiences for family members. Firstly, the COVID-19 pandemic could exacerbate conflict in some healthcare families. Secondly, families reported an even lower quality of social life due to the stigma attached to HCWs' families – that is, the rest of society could view HCWs' families as potential COVID-19 transmitters. Thirdly, families of HCWs tended to take on even more domestic responsibilities and cleaning during COVID-19. Finally, the emotional burden may have been increased even more as family members tended to suppress their emotions to help the HCW.

I identified potential relationships between some themes in the findings of this review. In terms of mental health and wellbeing, increased working hours of HCWs were associated with increased mental health issues for families. Ying et al., (2020) and Tugen et al., (2023) reported that when HCWs spent more time with COVID-19 patients, family members tended to interpret this situation as an increased risk for HCWs' lives and they tended to experience higher anxiety and depression symptoms. Additionally, joint activities and spending time as a family may increase life satisfaction and decrease

mental health issues (Parker et al., 2022). However, due to long working hours and shifts, family activities and routines of HCW families were disrupted, and this may increase the mental health issues among family members of HCWs.

In previous literature, it has been well-documented that families of other high-risk workers such as police officers, firefighters, and military personnel are at risk of developing mental health issues. There are similarities between families of other high-risk workers and families of HCWs. For example, in a systematic review which focused on the families of emergency responders (police officers and firefighters), researchers reported a negative impact of life threats for high-risk workers and increased domestic responsibilities for families on family members' mental health and well-being (Sharp et al., 2022). Also, families of military personnel tend to experience worry, anxiety, and depression due to the absence of military personnel from home (Ormeno et al., 2020). The findings are consistent with this. Similarly, spouses of firefighters who were first responders after the World Trade Centre (WTC) attack (Menendez et al., 2006) stated that when the firefighters left home to save the lives of others, they experienced high anxiety due to the uncertainty of the situation and lack of knowledge about whether they would return home. Ultimately, both other high-risk worker families and family members of HCWs appear to experience mental health issues and decreased well-being due to the uncertain and unsafe job environment of the workers, the workers' absence from home, and increased domestic responsibilities for families.

Based on the findings of the included studies conducted in different countries, it may be that the experiences of families of HCWs vary depending on the culture they live in. Hofstede (2003) mentioned that Asian countries are mostly collectivist which means that individuals are interconnected with their families and society, and they tend to support each other as a community to heal (Hechanova & Waelde, 2017). In the included studies, families from Asian and Middle Eastern countries reported that they felt the appreciation and applauses, but also, they felt a sincere support from the rest of society (Mohammadi et al., 2022; Sachdeva et al., 2022). In this review study, I found that families from Western countries reported that they also appreciated society's applauses and appreciation, but they worried that this would fade away too quickly. Also, some of the

HCWs in Western countries reported that they did not receive social support, and also felt stigmatised and seen as a transmitter of the disease by society (Schaffer et al., 2022). In terms of coping, Taylor et al., (2004) reported that individuals from different countries may use different coping strategies because they may tend to interpret the potential stressors differently. In this review, studies conducted in Asian countries reported on the importance of social support and family relationships. In addition to those, studies conducted in Western countries reported on the importance of couple relationships and individual coping strategies such as developing new interests and hobbies.

The primary findings of this review show that there is a potential risk to the mental health and well-being of families of HCWs. Very few papers looked at potential benefits or positive outcomes for families. Some of the family members of HCWs who had been working during the COVID-19 pandemic in the UK reported that they had a great sense of pride in the HCW's job (Tekin et al., 2022), and some of the family members reported that their family relationships improved during the pandemic (Schaffer et al., 2022). The potential positive impact of being a family member of a HCW remains a current gap in the literature.

4.1. Strengths and Limitations

4.1.1. Strengths and Limitations of the Included Papers

Most of the studies included in this review met the criteria for high-quality research. Yet, there are a number of limitations in the articles included in this review. Firstly, I aimed to include studies that focused on the experiences, views, needs and mental health issues of a variety of family members of HCWs. However, most studies focused on spouses, partners, and wives in heterosexual relationships and children and teenagers of HCWs. This review found a gap in the literature, with a lack of research that focuses on the partners and spouses in same-sex relationships, parents, and siblings of HCWs. Secondly, most of the participants in the included studies were female and there was a lack of research on male family members. Thirdly, most of the included studies reported on the mental health and wellbeing of family members during the COVID pandemic. There was no information in most studies about the previous mental health status of family members. Finally, in some of the qualitative studies included in this review,

reflexivity was not included in the paper. For this reason, it is difficult to determine how the characteristics of the researchers who conducted this study may have impacted the data collection and analysis.

4.1.2. *Strengths and Limitations of the Systematic Review*

In this review I have synthesised the results of qualitative and quantitative studies, according to the highest quality standards. I included studies from thirteen different countries from four continents. For this reason, this study's results are potentially transferrable to different countries and cultures. Our research team was diverse, including researchers from different career stages, clinical experiences, and different cultural groups. This allowed us to consider my findings from a variety of perspectives and build a rich and in-depth analysis. Yet, there are some limitations. The search was restricted to the English and Turkish languages due to the spoken languages of the researchers. Therefore, there may have been studies that were written in other languages that were missed.

4.2. *Future Research and Implications*

More research needs to be conducted regarding the experiences, needs, mental health, and well-being of families of HCWs. In the current published literature, the focus was mostly on the mental health of spouses, partners, and wives and there is a significant gap in the literature regarding the experiences of the other family members and close friends of HCWs and the experiences of the spouses and partners from same-sex relationships. Therefore, it would be important in future research to explore the experiences of different family members and close friends, and in addition partners from same-sex relationships. Therefore, it would be important to explore the experiences of different family members such as parents. There is a prominent gap about any positive impacts or potential benefits for healthcare workers' families which could usefully be explored further. Additionally, there are limited studies that focus on vicarious and secondary trauma, and those that do, mostly concern the COVID-19 pandemic. Clinicians in occupational health and psychological health services need to be aware of, and trained to understand that families of HCWs are also at risk for mental health issues. Where possible, these clinicians could provide support to family members.

5. Conclusion

In this systematic review I aimed to understand the impact of occupational stress on families of HCWs before and during the COVID-19 pandemic. As a result of the narrative synthesis of 20 studies, I identified that there is a high risk for adverse mental health and well-being of HCWs' family members. HCWs are more at risk of experiencing mental health problems because of the nature of their jobs, and it can be challenging being a family member of someone with a mental health problem. Separately, because of the potentially traumatic nature of healthcare work, family members may experience negative impacts on their own mental health by hearing about traumatic incidents, or they could be affected by the long hours, shift work, and compassion fatigue that their HCW family member experiences. This review shows the similar and different experiences, needs, and mental health issues of family members of HCWs before and during the pandemic. Organisations have legal, moral, and reputational responsibilities to protect HCWs and their families. In order to provide better support to family members, it is important to conduct further research to expand and address gaps identified in the literature, train clinicians for clinical support, and extend mental health services to family members. For instance, when workers engage with a service, clinicians should also consider the impact on and needs of their families. Additionally, it is necessary to increase organisational awareness of the impact of occupational stress on family members of HCWs.

Chapter 8. Mixed-Method Survey Study: Secondary Traumatic Stress Experiences of Household Members of Healthcare Workers in the UK-

A mixed method survey study

A paper based on the content of this chapter is currently under review with BMC Psychology.

1. Introduction

Secondary traumatic stress (STS) is characterised by distress due to being exposed to the details of a traumatic event experienced by a significant other (Figley 1995, p.7). STS symptoms present as post-traumatic stress disorder symptoms including arousal, avoidance, and intrusions (Galovski & Lyons, 2004), and the current definition of PTSD has now incorporated indirect exposure to traumatic events as well (DSM-5, 2013).

Previous literature shows that family members of military personnel and veterans often report high levels of STS (Bjornestad et al., 2010; Dirkzwager et al., 2005; Figley 1998; Rosenheck & Nathan, 1985;). For example, in a systematic review, Diehle et al., (2017) reported that spouses of help-seeking veterans with PTSD are at significantly high risk of STS. According to Diehle et al., (2017), help-seeking veterans tended to talk about traumatic experiences more and that may increase the risk of STS for family members. When rates of STS have been compared between partners and parents of Dutch soldiers, researchers reported that partners showed significantly higher STS compared to parents (Dirkzwager et al., 2005). The authors concluded that partners are usually the primary source of support as they are living in the same house with the soldiers, and thereby tended to be exposed to more details of the traumatic incidents and developed higher STS. (Dirkzwager et al., 2005). In a qualitative study conducted with wives of Israeli veterans with PTSD, some of the wives reported that while trying to help and support the veteran who suffered from PTSD, their family functionality was disrupted and the whole family started to experience the same symptoms as the veteran (Dekel et al., 2005)

Whilst a growing body of research has explored the impact of military work on military personnel and veterans' families, relatively little research has so far been conducted with household members of other potentially high-risk occupational groups. Due to

stressful, traumatic, and demanding work environments, long/unpredictable working hours and shifts, and poor working conditions (CDC,2023), healthcare workers (HCWs) can be considered one such high-risk occupational group (APA, 2011). Studies conducted since the COVID-19 pandemic, show that HCWs are at high risk of developing PTSD and depression (Greene et al., 2021), complex PTSD (Greene et al., 2023), moral injury and burnout (Billings et al., 2021; Ogińska-Bulik et al., 2021). To cope with their work, HCWs may turn to household members for support. However, while supporting their loved ones, household members may be exposed to the details of the HCWs' traumatic experiences and are thereby at risk of being significantly impacted by their HCW household member's job.

To date, there are only a few published research studies focusing on potential STS amongst household members of HCWs. In a qualitative study which included 14 family members and close friends of HCWs in the UK, family members and close friends of HCWs talked about being distressed by hearing about the details of traumatic incidents that the HCW experienced (Tekin et al., 2022). Similarly, in another qualitative study which was conducted in Iran, families of HCWs reported that they felt worried due to hearing the details of traumatic events experienced by the HCW (Mohammadi et al., 2022).

Understanding and supporting the mental health issues experienced by household members, who are often a key source of support for HCWs is significant not only for individuals' themselves, but also for the continuity of the healthcare worker's role and the wider healthcare system. As above, most studies related to secondary traumatic stress have mostly been conducted with veteran/military families and spouses and partners. To date, there is little qualitative literature, and no published quantitative research, reporting the degree of STS experienced by household members of HCWs.

In this study, I aimed to examine the impact of STS reported by household members (family members and housemates) of HCWs in the UK following the COVID-19 pandemic and explore associated predictors. I developed the following quantitative hypotheses: a) spouses and partners of HCWs will report higher secondary traumatic stress scores compared with other household members, b) household members of HCWs with clinical

roles will report higher STS compared with household members of HCWs with non-clinical roles, c) being a spouse/partner of a HCW and being a household member of a HCW in a clinical role, will be significant predictors of higher STS. Additionally, using free text responses, I also sought to understand qualitatively how household members were impacted by their HCW household member's work and what support household members thought would be beneficial.

2. Method

2.1. Design and Procedure

This mixed-method online survey study was conducted with household members (family members and housemates) of HCWs who worked during the COVID-19 pandemic in the UK and are still part of the National Health System (NHS). The data was collected between November 2023 and February 2024. A sample of family members and close friends of HCWs was recruited via the NHS CHECK study's email list. NHS Check is a major national longitudinal survey which examines the impact of the COVID-19 pandemic on the short- and long-term health and well-being of staff working in 18 NHS Trusts across the UK (Lamb et al., 2021). The NHS CHECK study has a list of over 23,000 HCWs who have agreed to be contacted about further research. I provided information about the survey via the NHS CHECK newsletter, inviting HCWs to make family members aware of this study and take part online. I added the link to the online Qualtrics survey and a QR code (which included participant information sheet, consent form, demographic questions, standardised questionnaires, and open-ended questions) to the newsletter with an explanation of the study, and I asked HCWs to share the link/code with their families and housemates.

I did not gather or retain any personal information about participants who participated in the NHS CHECK study, except collecting participants' email addresses if they opted into the prize draw. I provided a financial incentive for participants to take part in the survey, by offering 10 x £50 vouchers, and asked participants to provide their contact details if they would like to be included in the prize draw. I kept the participants' email information in a separate, password-protected electronic file and as soon as I completed data

collection, I conducted the prize draw and then deleted the participants' email information.

2.2. Ethics

This study was approved by the University College London Research Ethics Committee (ID: 20221.002; also, see Appendix 12). In the consent form, I explained the purpose of the study and the potential risks of the study. Participants were informed that their participation was voluntary and anonymous. However, participants were also informed that if they would like to join the prize draw to win a voucher, their email addresses would be collected, but these email addresses would be kept in electronically secure files and as soon as the draw was completed, they would be deleted. As the research team, we did not expect any serious harm for participants, due to their participation in this study. However, answering questions about secondary traumatic stress experiences could potentially be distressing. For this reason, I provided information about psychological support services that participants could access. This information was provided in the PIS and again on completion of the survey.

2.3. Power Analysis

Either an insufficient, or excessive, sample size may cause two types of errors: Type 1 error is characterised by finding a statistically significant difference when there is no significant difference. Type 2 error is characterised by finding a statistically insignificant difference when there is a significant difference (Kang 2021). (See below for example.) To avoid Type 1 error and Type 2 error and increase the quality of the findings I calculated the desired sample size of the study (Kang 2021) using G*Power software (Faul et al., 2007).



Figure 6: Example for Type 1 and Type 2 errors (To Err is Human: What are Type I and II Errors?, 2024)

In this study, I used Cohen Statistical Power Analysis (which is one of the most commonly used approaches (Cappelleri & Darlington, 1994)) to calculate the proper sample size. Some factors are needed to calculate the desired sample size in this approach such as effect size, power (1- β), significance level (α), and type of statistical analysis (In et al., 2020).

- **Effect size:** Effect size shows the degree of representation of a phenomenon in a population (Cohen, 1988). The effect size was categorised based on the type of applied statistical analysis (Chuan & Penyelidikan, 2006). In the regression analyses, the effect size index (f^2) was determined as small (.02), medium (.15), and large (.35) (Cohen, 1992). Chuan and Penyelidikan (2006) reported that “*The smaller the effect size, the more difficult it would be to detect the degree of deviation of the null hypothesis in actual units of response*” (p. 81). Cohen (1992) suggested using the medium effect size because the medium effect size may estimate the approximate size of the observed effect in a population. Cohen and Penyelidikan (1992) explained this effect with the following sentence “visible to the naked eye of a careful observer (p. 156).
- **Significance level (α err prob):** Alpha (α) is the possibility of incorrectly rejecting the null hypothesis which can cause Type 1 error and may disrupt the validity of the findings (Chuan & Penyelidikan, 2006). For example, determining a less stringent alpha could increase the risk of false rejection (for this study, it might have resulted in a finding of “other household members of HCWs recorded higher STS than spouses/partners of HCWs,” even if spouses/partners of HCWs showed higher STS than other family members). Similarly, determining a too-conservative alpha could increase the risk of failing to reject the null hypothesis (Chuan & Penyelidikan, 2006).
Cohen (1992) reported that the preferred significance level for a study should be fixed at $\alpha = .05$.

- **Power (1- β err prob):** Power (β) is the possibility of incorrectly accepting the null hypothesis which can cause a Type 2 error (Chuan & Penyelidikan, 2006). On the

one hand, High (2000) underlined that if low power is used in a study, even if the effect is present, due to the power being too low, the effect may not be detected. On the other hand, Cohen (1992) reported that using larger power requires a larger sample size and the researchers may not have enough sources to meet this. For this reason, Cohen's (1992)'s suggestion for power was .80.

Previous studies related to secondary traumatic stress have mostly used similar values consistent with Cohen's suggestion to calculate their sample sizes (Daud et al., 2005; Hendrix et al., 1995; Ruscio et al., 2002). For this study, I have used the following suggested values (Cohen 1992) to calculate the desired sample size.

F tests – Linear multiple regression: Fixed model, R^2 deviation from zero

Analysis: A priori: Compute required sample size

Input:

Effect size f^2	=	0.15 (medium effect size)
α err prob	=	0.05
Power (1- β err prob)	=	0.80
Number of predictors	=	5

Based on the results of the power analysis, a desired sample size of 109 for a multiple regression analysis was utilized in this study. As I have explained below (see Analysis strategies), for this study, I have used different tests to analyse the data such as t-test, chi-square, ANOVA, correlation, etc. However, the main analysis of this study was multiple linear regression, and according to Cohen (2016), the sample size can be chosen based on the power analysis of the primary statistical test of the study (p. 279-284). For this reason, I have determined the desired sample size of this study, based on the power needed for the multiple linear regression test.

2.4. Measures

The following questionnaires related to demographic information, secondary traumatic stress, and family functioning were included in the survey to be completed by family members and close friends of HCWs.

2.4.1. Sociodemographic form

This was a bespoke measure and included questions about the participant's age, gender, ethnicity, and employment status for both the participant (family members and

housemates) and for their healthcare worker household members. Participants were also asked to provide information about their relationship with the HCW (spouse, parent, child, friend, etc), the length of their relationship and what their HCW family member/housemate/friend's role was.

I would like to clarify a couple of demographic variables here. Firstly, in terms of the relationship with the HCW, many different family members of HCWs participated in the study, including husbands, wives, partners, daughters, sons, siblings, parents, cousins, etc. Similarly, there was a great diversity for HCWs' job roles as well (see Table 18 for the number of participants for each demographic variable). Due to the unequal distribution of participants in these groups, which could "compromise the quality of the analysis" (Minassian & Kuper, 2012 p.79-88), I decided to combine these categorical demographic responses as follows.

a. For the relationship with HCW:

- Group A: Spouses/Partners
- Group B: Other household members.

Current literature findings show that individuals frequently tend to turn to their spouses and partners for social support during stressful situations (Blood & Wolfe, 1960), and spouses and partners tend to be exposed to the details of traumatic incidents more than other family members (Dirkzwager et al., 2005). For this reason, I re-grouped the "relationship with the HCW" variable based on whether participants were spouses/partners of HCWs or other household members.

b. HCW's job role:

- Group A: Direct contact with patients (clinical role)
- Group B: Not directly contacted with patients (non-clinical role)

Findings from COVID-19-related studies show that family members of HCWs who have had direct contact with patients tended to experience more mental health problems and well-being issues compared to family members of HCWs who did not have direct contact with patients (Tugen et al., 2023). For example, in a cross-sectional study which was conducted with 135 children of HCWs in Turkey during the COVID-19 pandemic, children

whose HCW parents had direct contact with patients reported higher somatic/panic, generalised anxiety, and separation anxiety scores compared to children whose HCW parent had no direct contact with patients (Tugen et al., 2023). For this reason, I regrouped the “HCW’s job role” demographic variable based on whether the HCW had direct contact with patients to treat them or not.

2.4.2. Secondary Traumatic Stress Scale

This was used to measure secondary traumatic stress of household members of HCWs (Bride et al., 2004). The Secondary Traumatic Stress Scale is a 17-item questionnaire that corresponds to the DSM-4 PTSD symptom checklist. Its aim is to examine whether the respondents are experiencing secondary traumatic stress, including intrusions, avoidance, and arousal (Bride et al., 2004). This questionnaire is a 5-point Likert scale ranging from 1 (never) to 5 (very often). The range of the possible scores is from 17 to 85. Scores are calculated by summing the items within each subscale and a global rating is provided by summing scores on all sub-scales.

The cutoff scores were determined by Bride et al., (2007) following.

- When the total score is lower than 28: “little or no STS”.
- When the total score is between 28 and 37: “mild STS”.
- When the total score is between 38 and 43: “moderate STS”.
- When the total score is between 44 and 48: “high STS”.
- When the total score is higher than 49: “severe STS”.

According to previous testing, the STSS has good psychometric properties (Bride et al., 2007; Ting et al., 2005). For example, in terms of reliability, the Coefficient alpha value of the total score of the STSS was .93 (Bride et al., 2004). The Cronbach’s alpha was the .96 in the current study.

Participants provided socio-demographic information about themselves and their HCW family member/friend and then completed a number of validated quantitative questionnaires including the Secondary Traumatic Stress Scale (Bride et al., 2004), Brief Couple Satisfaction Index (Funk & Rogge, 2007), Family Assessment Device (Epstein et al., 1983), the Post-Traumatic Growth Scale (Cann et al., 2010). For the purposes of the

research question addressed in this chapter, I have only provided information here about the primary outcome variable (Secondary Traumatic Stress), open-ended questions, and the sociodemographic information collected (See Appendix 13 for more details). Further information about the other questionnaires which were included in the study, and which will be subject to further analyses after completion of the PhD, are provided in Appendix 14.

2.4.3. Open-ended Questions

After the questionnaires, participants were invited to answer six optional open-ended questions. These questions were as follows:

- a) Have you experienced any changes in your loved one's behaviour when she/he has had a difficult day at work? If yes, please elaborate.
- b) Have you ever been troubled by traumatic experiences of your family member/close friend healthcare worker's work that they have shared with you? If yes, can you share with us how this has impacted you.
- c) Are there any other ways in which your loved one's work has affected you/your family or your household? If yes, can you share with us how this has impacted you.
- d) Have there been any (other) positive benefits for you and/or your household/family of your loved one's work? If yes, please elaborate.
- e) What support would you like as a family member/close friend of a healthcare worker?
- f) Is there anything else that you would like to mention?

In my first PhD study (Tekin et al., 2022), I conducted semi-structured explorative interviews with family members and close friends of HCWs. The interview guide was prepared with the support of an Expert Reference Group which included specialists in psychological trauma. That research was conducted in 2021 and at that time, there were only a few published quantitative studies which focused on the experiences of family members of HCWs during the pandemic (Banitalebi et al., 2021; Chua 2021; Feng et al., 2020; Goud et al., 2021). There was no published qualitative study in the UK at that time. For this reason, in my first study, the questions were designed to *explore* the experiences of family members and close friends. However, in this study, open-ended questions were

created by myself, and the supervisory team based on the outcomes of my first-year project (Section III, Chapter 5; also see Tekin et al., 2022). For this reason, I created more specific and direct questions for the purposes of this survey to further *understand and describe* specific secondary traumatic stress experiences and needs of the participants.

2.5. Data Analysis

In this part, I have explained the variables included in the study and the analysis strategies for each hypothesis.

2.5.1. Quantitative Analysis

a) Variables

Demographic variables: after reading the participant information sheet and confirming the consent form, participants answered the following demographic questions related to themselves and their HCW family members and housemates such as age, gender, ethnicity, etc.

Predictor variables: the following predictor variables were included in the analyses, based on the research questions and my previous review of the literature and findings from my qualitative study.

- Gender of the household members
- Age of the household members
- Ethnicity of the household members
- Relationship with the healthcare worker (partner/spouses or other household members)
- Healthcare worker's job role (clinical role or non-clinical role)

Dependent variables: Secondary traumatic stress scores of the participants were used as an outcome variable in the regression model and the correlation test.

b) Analysis strategies

Relationship with the HCW household member was dichotomised into 'partners/spouses of HCWs' and 'other household members'. Healthcare workers' job setting was also dichotomised into "clinical" or "non-clinical" based on whether the HCW had direct contact with patients to treat them or not.

To assess whether there were significant differences in the degree of STS amongst spouses/partners of HCWs vs other household members, a two-tailed t-test was used. Similarly, the relationship between STS and age, sex, ethnicity, and HCW's job role was explored individually using two-tailed t-tests. Then, based on the current literature findings (which reported them as significantly associated variables for STS in other populations), age, sex, HCWs' job roles, and relationship with the HCW were included in the multivariable linear regression model. This regression model included age, sex, relationship with the HCWs, and the job role of the HCW. Also, multicollinearity was checked. I have done a complete case analysis and included the participants who filled out all of the forms and questionnaires in the study. IBM SPSS version 28.0 was used to analyse the data.

The rationale behind using the multivariable regression model in this study: In their study, which aimed to explain regression modelling strategies, Nunez and colleagues (2011) reported that researchers frequently use multivariable regression models in health science research, and they mostly collect data to examine the interrelationships between the variables or to determine the variables which affect an outcome of interest. When this is the case, multivariable regression models are useful for understanding simplified mathematical explanations between the potential predictors and the outcome, and *“The ultimate goal is to derive a parsimonious model that makes sense from the subject matter point of view, closely matches the observed data, and has valid predictions on independent data”* (Nunez et al., 2011, p. 501). Additionally, multiple linear regression helps researchers investigate all of the potentially significant variables in one model, and it may be helpful for “a more accurate and precise understanding of the association of each individual factor with the outcome (Marill 2004, p. 1) as well as an understanding of the relationship of all variables as a whole with the outcome (Marill 2004).

In light of the current literature related to regression models, in this study, I preferred to use multivariable linear regression for the following reasons:

- To date, there is no existing research related to secondary traumatic stress in household members of HCWs. For this reason, it was parsimonious to start with

more descriptive and simpler models in order to build a solid evidence base. Since multivariable regression models are useful for understanding simplified mathematical explanations between the potential predictors and the outcome (Nunez et al., 2011), I decided to use multivariable linear regression in this study.

- Regression models are used to predict outcomes based on observations (Marill, 2004; Nunez et al., 2011). The reason for using the regression model while investigating the secondary traumatic stress experiences among the household members of HCWs was a) the current literature findings showed that family members and friends of the high-risk workers may experience secondary traumatic stress (See Section II, Chapter 3; Section III Chapter 6 and 7) and b) during my qualitative study, I had observed some secondary traumatic stress experiences in family members and friend of HCWs.

Although I preferred to use multivariable regression analysis in this study, more advanced analysis methods could have also been used, such as latent profile analysis (LPA). Spurk and colleagues (2020) defined LPA as “*LPA aims to identify types, or groups, of people that have different configural profiles of personal and/or environmental attributes*” (p. 2). Based on the research questions, researchers may aim to investigate whether subgroups differ in specific symptoms, outcomes, or other characteristics, and subgroups may involve sex (male vs female), level of a disorder (low, medium, high), or treatment (pre vs post) (Mathew & Doorenbos, 2022). Those can be observed during the study (or they can be learned via demographic questionnaires). However, there may be other subgroups that may be unobserved (latent) or hidden in the sample. In this case, LPA helps to categorise individuals from heterogeneous populations into more homogenous subgroups according to “their values on continuous indicators”. In other words, “*LPA identifies the distinct patterns or combinations of responses to a set of observed continuous indicators in a sample of individuals, and these distinct response patterns are known as latent profiles*” (Mathew & Doorenbos, 2022, p. 2).

LPA has multiple advantages. For example, LPA is a person-centered statistical approach, which allows researchers to compare and contrast a specific symptom or phenomenon among the participants rather than relationships between the variables

(Mathew & Doorenbos, 2022). Additionally, it is accepted as a superior subgroup analysis regarding dealing with methodological issues such as low power and high Type 1 error (Lanza et al., 2013). Despite all these advantages I chose to use the regression model because of the following reasons:

- a) **Observed vs Unobserved indicators:** This study's participants were categorised based on the relationship with the HCW (spouses/partners vs other household members) and the HCW's job role (clinical vs non-clinical), and those indicators were observable. In LPA, there should be a hidden sub-category, which I did not need for this study.
- b) **Theory-driven subcategories:** According to Spurk et al., (2020), the first step of LPA is determining the sub-groups that need to be theory-driven. However, in this study, I determined the subgroups based on the current literature findings (See 2.4.1 Sociodemographic Form for more detail).
- c) **The aim of the study:** Since this study is the first study that investigated secondary traumatic stress in household members of HCWs, I designed a more descriptive study to be able to understand the basics of secondary traumatic stress among household members (see above for more explanation). However, in future research I could conduct a study using LPA by determining arousal, avoidance, and intrusion as unobserved categories. This would allow me to understand detecting patterns and modelling heterogeneity in the study sample by categorising participants based on their STS levels (such as low STS profile, moderate STS profile, high STS profile, and severe STS profile) each with distinct patterns of STS symptoms (such as moderate STS with moderate avoidance and moderate STS with high avoidance, etc.)

2.5.2. Content Analysis

Content analysis can be used for both quantitative (Berelson, 1952; Rourke & Anderson, 2004) and qualitative research. For this study, I have used qualitative content analysis (specifically, inductive content analysis (ICA)) to analyse the open-ended questions which were included in the survey.

ICA, is one of the many research methods used to analyse text-based data such as interview transcripts, blogs, etc. (Hsieh & Shannon, 2005; Vears & Gilliam, 2022). Vears and Gilliam (2022) reported that ICA has two basic elements: “inductive process” and “iterative coding” (p.113). During the ICA, researchers initially identify codes from the dataset; “inductive process” (Bennett et al., 2019). Researchers then engage with “iterative coding” referring to the repetitive coding process during the analysis of all the data. For example, Vears and Gilliam (2022) pointed out that for each document, researchers continue to code the text until they determine the categories and subcategories, which means that every document will be coded multiple times so as not to miss important categories. In light of these two key elements, Vears and Gilliam (2022) developed guidance to conduct content analysis for qualitative researchers. This guidance includes five different steps:

- **Step 1- Read and Familiarise:** Increasing familiarity with the data is suggested to all researchers before starting the analysis. However, if researchers did not collect the data in person, Vear and Gilliam (2022) suggest that it is even more important for the researchers to read the text data and increase familiarity. This study’s qualitative data was collected via Qualtrics. For this reason, to increase familiarity, I followed some strategies. Firstly, I exported the data as an Excel file. Then, I created a Word document, and I noted participants’ IDs (P1,P2....), the open-ended questions and participants’ answers for each question, their relationship with the HCW, and the HCW’s job setting.
- **Step 2- First Round Coding (Identifying big-picture meaning units):** In this step, I tried to address the question for all the text: “What is this paragraph/text about?” (Vear and Gilliam, 2022), and I provided broad categories of the content which were related to the research questions. When I completed the first-round coding,

as suggested by Elo et al., (2014), I shared my first-round coding schema which included a preliminary list of the broad categories with Professor Jo Billings. She subsequently shared her thoughts and comments on the preliminary categories. Then, after our discussions, I agreed on a preliminary coding schema including broad categories.

- **Step 3- Second Round Coding (Developing sub-categories and fine-grained codes):** Before starting step 3, I made an Excel file that included all of the preliminary broad categories. Then I noted the text from all of the participants' answers related to each category under the related category (See Appendix 15 for the prototype of this process). Then, I started the third step. Corbin and Strauss (2008) reported that it is important to "break open the data" in this step. In other words, I analysed the text under each preliminary category line by line (see Appendix 16 for the prototype of this process), and shared my second-round coding with the second coder, Millie Tamworth (MT), and a proportion of the data was independently categorised by a second coder (MT) using the identified categories and sub-categories.
- **Step 4- Refining the Fine-grained Sub-categories:** In this step, I met with the second coder (MT) to discuss the preliminary categories and subcategories. Additionally, we compared and contrasted subcategories with our own subcategories and each other's categories as well. Similar categories were merged. Also, broad categories that did not include sufficient information about that experience or did not address the research questions were re-coded. Then, I prepared a "Refined Coding Schema" which included agreed categories and subcategories between MT and myself.
- **Step 5- Synthesis and Interpretation:** In the final step, I have brought the content categories and subcategories together to build a narrative. In other words, I provided information about how different categories and subcategories are related to each other, and how categories and subcategories are related to the quantitative data. While synthesising the data, I have asked a question to myself "What is the message or story that my data is trying to tell?" (Vear and Gilliam, 2022).

Rigor: Johnson et al., (2020) reported that thanks to rigor in qualitative research, researchers can increase “accuracy and credibility” of their research (p.8). In this study, I have followed Drisko and Maschi (2015)’s steps which were created to “ensure the rigor of the content analysis approaches” (p. 121-130). See the details below.

- Step 1- Starting with a Research Question of Merit and Worth: To meet this criterion, I have clearly provided research questions and aims of the study in the last paragraph of the Introduction.
- Step 2- Ensuring Appropriate Research Ethics and Participant Safeguards: Drisko and Maschi (2015) reported that researchers need to provide information about consent forms, participant information sheets, potential ethical issues, and solutions if any ethical issues arise. In this research, I have provided information about consent form and participant information sheet in the Design and Procedure part of the Method. You can see their full forms in Appendix 13. Additionally, I have provided detailed information about the potential ethical issues and their solutions in Ethics part of the Method.
- Step 3- Stating the Study Research Design: Drisko and Maschi (2015) suggested that researchers should clarify whether their research is explanatory, descriptive, or both. In the “Trustworthiness” and the “Open-ended Questions” parts of the Method, I have provided detailed information about the aims of the content analysis in this study. To sum up, in my qualitative study, I have aimed to explore the experiences of the HCWs’ family members and close friends. Based on the outcomes of that study, JB and I have created open-ended questions to describe and explain the secondary traumatic stress experiences of the household members of HCWs in this mixed-method survey study.
- Step 4- Clarifying the Characteristics of the Sample: In this study, a purposive sample was chosen because the aim of this study is to advance our understanding (Palinkas et al., 2015) of STS experiences and the needs of household members of HCWs. For this reason, a purposive sample was the best sampling method for this study.

- Step 5- Detailing the Data Collection Methods: In this study, open-ended questions were used to collect data from household members of HCWs to understand their secondary traumatic stress experiences and their needs.
- Step 6- Detailing Coding and Data Analysis: Drisko and Maschi (2015) pointed out that the data analysis process (from coding to final categories and subcategories) needs to be clearly explained to the readers. In this study, I have provided detailed information about each data analysis step and the responsibilities of the researchers in each step. Additionally, I have also displayed the process of the identification of the categories and subcategories with tables in Appendix 15 and Appendix 16.
- Step 7- Researcher Self-Reflection and Reflexivity: Drisko and Maschi (2015) reported that *“The researcher should briefly state any biases or initial expectations that influenced the study question, data collection, and data analysis”* (p. 6). In terms of the data collection, since the data was collected via Qualtrics, the research team was not involved in this process. Research questions of this study were developed based on the outcomes of my qualitative study (Tekin et al., 2022) which was analysed by me and discussed with the rest of the research team (see Reflexivity part of Section III, Chapter 5; also Tekin et al., 2022). This mixed-method study was also analysed by me, but the preliminary categories and subcategories were discussed with JB and MT. JB is a clinical professor of psychological trauma and workplace mental health. MT is a second-year PhD student in the Division of Psychiatry at UCL.

Quality: To increase the quality of this research, I have followed both Roller & Lavrakas (2015) and Roller (2019) guidelines from data collection to reporting. According to the Total Quality Framework, there are four components that qualitative researchers need to attend to (Roller & Lavrakas, 2015; Roller, 2019).

- **Credibility:** Credibility is related to the data collection stage of the research. In this stage, it is suggested to provide information about how comprehensive and accurate the sample is (Roller, 2019). In other words, Brod et al., (2009) suggested that researchers should determine the target population and explain how and why

the sample was chosen from the population. In the Introduction, I have explained who and why the target population is, and “2.1. Design and Procedure”, I have explained how I collected the data from the participants. Additionally, Roller (2019) reported that there might be a researcher bias during the data collection due to the relationship between the researcher and participants (Brod et al., 2009). However, because of the nature of the content analysis (Forman & Damschroder, 2008; Guba & Lincoln, 1982) and the data collection process of this research (the data was collected via Qualtrics and I did not have any contact with participants) potential researcher bias was reduced during the data collection.

- **Analysability:** Analysability is related to how the analysis was conducted, the quality of the analysis, and how transparent the interpretation of the outcomes is (Roller, 2019). In the Content Analysis subheading of the Method, I have explained how I identified the categories and subcategories, in detail. Additionally, I would like to cover “researcher-as-instrument” distinction here. According to O’Brien et al., (2014), while analysing the data, some of the characteristics of researchers (such as experience, personal attributes, ethnicity, etc.,) may have an impact on the analysing process, called “researcher-as instrument” (Forman & Damschroder, 2008). However, in this research, there was a second coder who is a doctoral researcher, which was intended to reduce this impact. Additionally, here, Roller (2019) reported that there is one more important element of analysability: “*Verification*”. Verification is associated with the last step of the analysis, which is interpretation and the implications of outcomes (Roller, 2019). Graneheim et al., (2017) suggested that researchers can organise meetings with the research team with different expertise to discuss their interpretation of the outcomes to ensure the verification of the study. I followed this suggestion and organised meetings with the wider research team regularly from data collection to reporting. You can see more detail about the verification in the Content Analysis subheading of the Method (Step 5-specifically).
- **Transparency:** Transparency refers to reporting the studies’ details from start to end which includes “data collection and analysis process, and the interpretation

of the outcomes” (Roller & Lavrakas, 2015, p. 363). Roller (2019) reported that during the reporting, researchers need to include the following elements:

- “The decision of the research questions and data collection”: I have provided detailed information about the research questions in the last paragraph of the Introduction, and data collection process in 2.1. Design and Process.
- “Procedures for the selection, training, and monitoring of coders”: This research was conducted by a research team including my primary supervisor (JB), my thesis committee members (DL, TG, DM), a PhD student (MT), and myself. Qualitative data were analysed by me and MT, and JB supervised every stage of the research. MT and I joined modules and workshops at UCL related to conducting qualitative research. This information was not provided in the original article but was detailed in this thesis chapter.
- “Determination of the unit of analysis”, “Development of codes, the codebook, and the coding form”, “Coders' reflections on the coding form, e.g., concerning problems they may have had in determining the appropriate code for particular content”, “Techniques that were used to identify categories and themes, including the use of CAQDAS”, and “specific verification approaches that were used to support or refute preliminary interpretations and the results of the verification process”: I have provided detailed information about these in 2.5.2. Content Analysis.
- **Usefulness:** Roller (2019) described this component as a “So what?”. Basically, Roller (2019) suggested that in terms of usefulness, researchers need to ask some questions of themselves. For example, “Will the outcomes of the study allow me to form certain hypothesis?”, “Do these outcomes offer me viable next steps”, and “Can they be transferred to another context?” (p. 16). My study can address these questions. Firstly, based on the outcomes of this study, I built up new hypotheses to conduct more research in this area. For example, this study demonstrated that household members are reporting high levels of secondary traumatic stress and this has important implications for supporting their

wellbeing. Secondly, these outcomes offer me viable next steps because I will be keep continuing to conduct research in this field based on the knowledge that I have thanks to the outcomes of this study. Finally, HCWs are one of the high-risk occupational group workers and the outcomes of this study supported current literature findings which were conducted with military families. This is a sign of this study's transferability (see Discussion for more detail)

- ***Trustworthiness***: As explained in Section III, Chapter 5 (also, see Tekin et al., 2022), trustworthiness is the explanation of why data is collected in a certain way, how the analysis was run, and how the reporting process was (Pratt et al., 2022). Lincoln and Guba (1985) reported four criteria for the trustworthiness of a qualitative study: credibility, transferability, dependability, and confirmability. Elo et al., (2014) created a checklist for trustworthiness in content analysis based on the previously determined criteria. To increase the trustworthiness of this study I have followed the principles of Elo et al., (2014). See Table 17 below for items that were prepared by Elo and her colleagues (2014) and how they were addressed in this research.

Table 17. The Items Pointed Out by Elo et al., (2014) and How They Were Addressed in This Study.

“Phase of the Content Analysis Study” (Elo et al., 2014)	Items to Check	How/where it is addressed in this study
<p>Preparation phase</p>	<p><i>Data collection method</i></p> <p>a) How do I collect the most suitable data for my content analysis?</p> <p>b) Is this method the best available to answer the target research question?</p> <p>c) Should I use either descriptive or semi-structured questions?</p> <p>d) Self-awareness: what are my skills as a researcher?</p> <p>e) How do I pre-test my data collection method?</p>	<p>a) Data was collected via NHS CHECK, which includes more than 23,000 HCWs in the UK who worked during the COVID-19 pandemic. For this reason, I believe that the data was collected suitably for this research.</p> <p>b) Yes, because of the nature of the open-ended questions (which is specific and direct questions about the research questions) and little evidence in the current literature about this topic.</p> <p>c) I have decided to use descriptive questions to understand participants’ experiences. In my exploratory qualitative project, a semi-structured interview was conducted to explore family members’ experiences, and in this project, I planned to focus on more specific points that I have discovered in the qualitative project.</p> <p>d) This is my first experience in content analysis. I joined some modules and workshops about qualitative research at UCL. Additionally, JB is an experienced qualitative researcher with nearly 20 years of working in this field and she was supervising me in every stage.</p>

	<p style="text-align: center;"><i>Sampling strategy</i></p> <p>a) What is the best sampling method for my study?</p> <p>b) Who are the best informants for my study?</p> <p>c) What criteria should be used to select the participants?</p> <p>d) Is my sample appropriate?</p> <p>e) Is my data well-saturated?</p> <p style="text-align: center;"><i>Selecting the unit of analysis</i></p> <p>a) What is the unit of analysis?</p> <p>b) Is the unit of analysis too narrow or too broad?</p>	<p>e) I have used Qualtrics to collect data and before publishing the Qualtrics link, I have tested my data collection method on myself and on my husband, Dr Joseph McLaughlin, multiple times.</p> <p>a-b-c-d-e) For this study, the best sampling method was purposive sampling. Because I wanted to target a specific population (family members and housemates of HCWs), and I aim to advance our understanding (Palinkas et al., 2015) of STS experiences and the needs of family members and housemates of HCWs. My sample is appropriate for the research questions. Data is well saturated.</p> <p>a-b) According to Robson (1993) a letter, or even paragraphs can be used as the unit of analysis in research. In this research, the unit of analysis for this study was words and sentences. Graneheim & Lundman (2004) suggested that the unit of analysis should be chosen carefully because it may reduce the trustworthiness of the study. Elo et al., (2014) reported that “Too broad a unit of analysis will be difficult to manage and may have various meanings. Too narrow a meaning unit may result in fragmentation.” (p. 5). For this reason, to avoid having too narrow or too broad units of analysis, I have decided to use both words and sentences.</p>
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<p>Organisation phase</p>	<p><u>Categorisation and abstraction</u></p> <p>a) How should the concepts or categories be created? b) Are there still too many concepts? c) Is there any overlap between the categories?</p> <p><u>Interpretation</u></p> <p>a) What is the degree of interpretation in the analysis? b) How do I ensure that the data accurately represented the information that the participants provided?</p> <p><u>Representativeness</u></p> <p>a) How do I check the trustworthiness of the analysis project? b) How do I check the representativeness of the data as a whole?</p>	<p>a) Categories and subcategories were identified by me and discussed with JB and a second coder (MT). During the analysis process, I have followed the principles of Roller & Lavrakas (2015) and Roller (2019). b-c) There are not too many concepts or overlapped categories. Categories and subcategories were carefully discussed by the research team during the analysis process to avoid overlaps.</p> <p>a-b) As it suggested (Elo et al., 2014; Schreier, 2012), more than one researcher was included in the analysis and interpretation processes to ensure the conformability of the outcomes.</p> <p>a-b) Trustworthiness and representativeness were checked via quality and trustworthiness checklists (Elo et al., 2014; Roller, 2019).</p>
<p>Reporting phase</p>	<p><u>Reporting results</u></p> <p>a) Are the results reported systematically and logically? b) How are connections between the data and results reported?</p>	<p>a) Results were reported based on the quality criteria of Roller & Lavrakas (2015)'s and Roller (2019)'s publications. b) The connection between the data and results was reported using tables and quotes. Additionally, since this study is a</p>

	<p>c) Is the content and structure of concepts presented in a clear and understandable way?</p> <p>d) Can the reader evaluate the transferability of the results (are the data, sampling method, and participants described in a detailed manner)?</p> <p>e) Are quotations used systematically?</p> <p>f) How well do the categories cover the data?</p> <p>g) Are there similarities within and differences between categories?</p> <p>h) Is scientific language used to convey the results?</p>	<p>mixed-method study, quotes were used to support quantitative findings as well.</p> <p>c) The content and the structure of the concepts were clearly displayed. Researchers agreed that the presentation of the outcomes was understandable and clear.</p> <p>d) While reporting the data collection and data analysis, as much as possible detail was provided to the readers. For this reason, I believe that readers have enough information to evaluate the transferability of this study.</p> <p>e) Yes, the quotes were used to support to identified categories and subcategories.</p> <p>f) As it suggested by Elo et al., (2014), the main categories were associated with the data by quotes.</p> <p>g) As suggested by Roller et al., (2019), firstly main categories, and then subcategories were identified. Then, similar categories were discussed by me and second coder and merged when it is necessary. JB as a primary supervisor and the senior researcher of this study was supervising every stage. For this reason, similarities and differences between the categories and subcategories were identified and reported clearly.</p> <p>h) Scientific language was used in this. However, I would like to point out that, my first supervisor, JB, is one of the professors who advocates for the simplification of the scientific language, and I am one of the early career researchers who follow this path. For this reason, I have used</p>
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	<p style="text-align: center;"><i>Reporting analysis process</i></p> <p>a) Is there a full description of the analysis process?</p> <p>b) Is the trustworthiness of the content analysis discussed based on some criteria?</p>	<p>scientific terms without making any changes, and in accordance with the method of the study, but also the language of the article has been simplified by the research team such as I have reduced the usage of passive tenses.</p> <p>a) The steps of the content analysis were described clearly in the method.</p> <p>b) The trustworthiness of the study was discussed based on the checklist of Elo and her colleagues (2014).</p>
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Note: Questions for each phase were taken from Elo et al., (2014) checklist. My contribution to this table is the last column.

2.6. Future Planned Analysis

During the data collection, I collected data from participants related to their couple satisfaction using the Couple Satisfaction Index (Funk & Rogge 2007), their post-traumatic growth experiences using the Post-traumatic Growth Inventory (Cann et al., 2010), and their family functionality using the Family Assessment Device (Epstein et al., 1983) (See Appendix 14 for more detail). For my PhD thesis, I have chosen to work on the secondary traumatic stress experiences of family members of HCWs. However, the rest of the data will be used for different projects and publications as well. For example,

- An MSc student in the Clinical Mental Health Sciences programme at UCL, is completing their MSc dissertation on the impact of secondary traumatic stress on family functionality amongst healthcare families. I am the primary supervisor of this project, and on completion, we aim to submit this study to a high-quality peer-reviewed journal.
- I am planning to conduct further analyses from collected data after completion of the PhD.
 - The first study will examine how couple satisfaction is related to STS among the partners and spouses of HCWs.
 - The second study will examine the post-traumatic growth experiences of family members and close friends of HCWs.

3. Results

Six hundred and sixty-six participants responded to the study invitation, but only 383 participants completed the questionnaires. Fifty-one participants who lived in different households from the HCW and twelve participants who did not complete the STSS were excluded. In total, 320 participants completed all of the questions and were included in the statistical analyses.

Out of 320, 142 household members were female, and 171 household members were male. Seven household members preferred not to share their sex. Eighty-five percent of the participants described their ethnicity as white. Out of 330 participants, 258 were spouses or partners of HCWs. Seventy-six percent of the participants reported that their

HCW loved one had direct contact with patients (clinical role). See Table 18 below for the participants' characteristics.

Table 18. Demographic Characteristics and Mean STS Score ($n=320$)

	<i>n (%)</i>
Sex of the Household Members	
Female	142 (46%)
Male	171 (52%)
Prefer not to say	7 (2%)
Age Range	
18-24	29 (9%)
25-34	59 (19%)
35-44	80 (25%)
45-54	75 (23%)
55+	77 (24%)
Ethnicity of the Family Member	
White	274 (85.5%)
Other	46 (14.5%)
Missing	-
Relationship with the HCW	
Spouses/Partners	258 (79%)
Other household members	62 (21%)
HCW's Role	
Clinical role	234 (74%)
Non-clinical role	86 (26%)

3.1. Quantitative Analysis

A third of the participants ($n=108$) reported severe secondary traumatic stress scores ($M=61$, $SD=8.2$). Female household members ($n=142$) reported higher secondary traumatic stress ($M=44.1$, $SD=17.8$) compared to male ($n=171$) household members ($M=40.3$, $SD=15.1$), $t(311)= 2.03$, $p<.005$. While spouses and partners of HCWs reported significantly high STS ($M=44$, $SD=16.6$), other household members reported mild STS ($M=35$, $SD=13.5$), $t(318)= 3.85$, $p<.001$. Similarly, household members of HCWs with clinical-role showed significantly higher STS ($M=44.1$, $SD=16.7$) compared to household members of HCWs with non-clinical roles ($M=36.1$, $SD=14.1$), $t(318)= 3.7$, $p<.001$. Household members' secondary traumatic stress scores did not significantly differ based on their ethnicities or their ages. Full results are presented in Table 19.

Bivariate correlations were run independently amongst to the six variables (sex, age, ethnicity, HCW's job role, relationship with the HCW, and STS) (See Table 19). There was a positive correlation between STS and age range 18-24 ($r=.12$), being female ($r=.11$), being a spouse or partner of a HCW ($r=.20$), and having a HCW with clinical role ($r=.21$). There was no correlation between STS and ethnicity.

Multivariable linear regression analysis was conducted to examine the predictors of STS, specifically sex, age, job role of the HCW, and the relationship with the HCW. In the regression analysis, it was found that being female, having a HCW with a clinical role, and being a spouse or a partner of a HCW were statistically significant predictors of high STS ($R^2=.34$, $F(4, 315)= 10.2$, $p<.001$). The regression model significantly enhanced the proportion variance explained ($F(2, 315)= 17.2$, $p<.001$). R^2 (coefficient of determination) explains the goodness of fit of a model. In other words, it measures how the regression line resembles the actual data (Marill, 2004). R^2 can have a value from 0 to 1 and when it is closer to 1, it shows a better fit. In this analysis, R^2 was found .34, which means that %34 of the secondary traumatic stress experiences of the household members can be explained by being female, having a HCW with a clinical role, and being a spouse/partner of a HCW. The remaining 66% of the variance was unexplained in this model, which may be due to unmeasured factors such as inherent randomness (natural variation which occurs in the system and difficult to predict what they are) (Tabachnick & Fidell, 2019).

In the regression model, sex ($\beta_{\text{Sex}}=.172$, $t(315)= 3.07$, $p<.005$), HCW's job role ($\beta_{\text{ClinicalHCWRole}}=.21$, $t(315)= 3.9$, $p<.001$), and relationship with the HCW ($\beta_{\text{RelationshipWithHCW}}=.24$, $t(315)= 4.1$, $p<.001$) were statistically significant predictors for STS. STS was positively associated with having a HCW household member with clinical role ($r(315)= .216$, $p<.001$) and being a spouse/partner of a HCW ($r(315)= .223$, $p<.001$). This means that household members' sex was found positively correlated with enhanced STS scores by 0.172 standard deviations from male to female. Similarly, the beta coefficient (β) of 0.21 and 0.24 showed that having a HCW with a clinical role and being a spouse/partner of a HCW were correlated with increased STS by 0.21 and 0.24 standard deviations, respectively.

There was no evidence of multicollinearity for any of the variables. This means that predictor variables were not correlated with each other. To sum up, based on the multivariable linear regression models' findings, being a spouse/partner of a HCW and living with a HCW with a clinical role were predictors for high STS, after controlling for sex and age (See Table 20).

Table 19. Variables and Correlations With Each Other

Variables	STS	Sex	Age	Ethnicity	HCW's Job Role	Relationship with the HCW
STS						
Sex (Female)	.11*					
Age	.05	.16**				
Ethnicity (White)	.08	.09	.03			
HCW's Job Role (Clinical)	.20**	.01	.02	.02		
Relationship with the HCW (Spouses/Parnets)	.21**	.39**	.18**	.14**	.01	

* $p < .05$, ** $p < .01$

Table 20. Multilinear Regression Model ($n=320$)

Variables	SE	β	95% CI		P Value
			LL	UP	
Sex (Female)	1.6	.172	8.1	1.8	<.005*
Age	.68	.044	-.81	1.87	=44→SNS
HCW's Job Role (Clinical)	2.5	.21	5.2	15.0	<.001**
Relationship with HCW (Spouses/Partner)	2.1	.24	4.0	12.0	<.001**

LL: Lower Limit, UP: Upper Limit; * $p<.05$, ** $p<.01$, SNS: Statistically not significant

A brief explanation of Table 20:

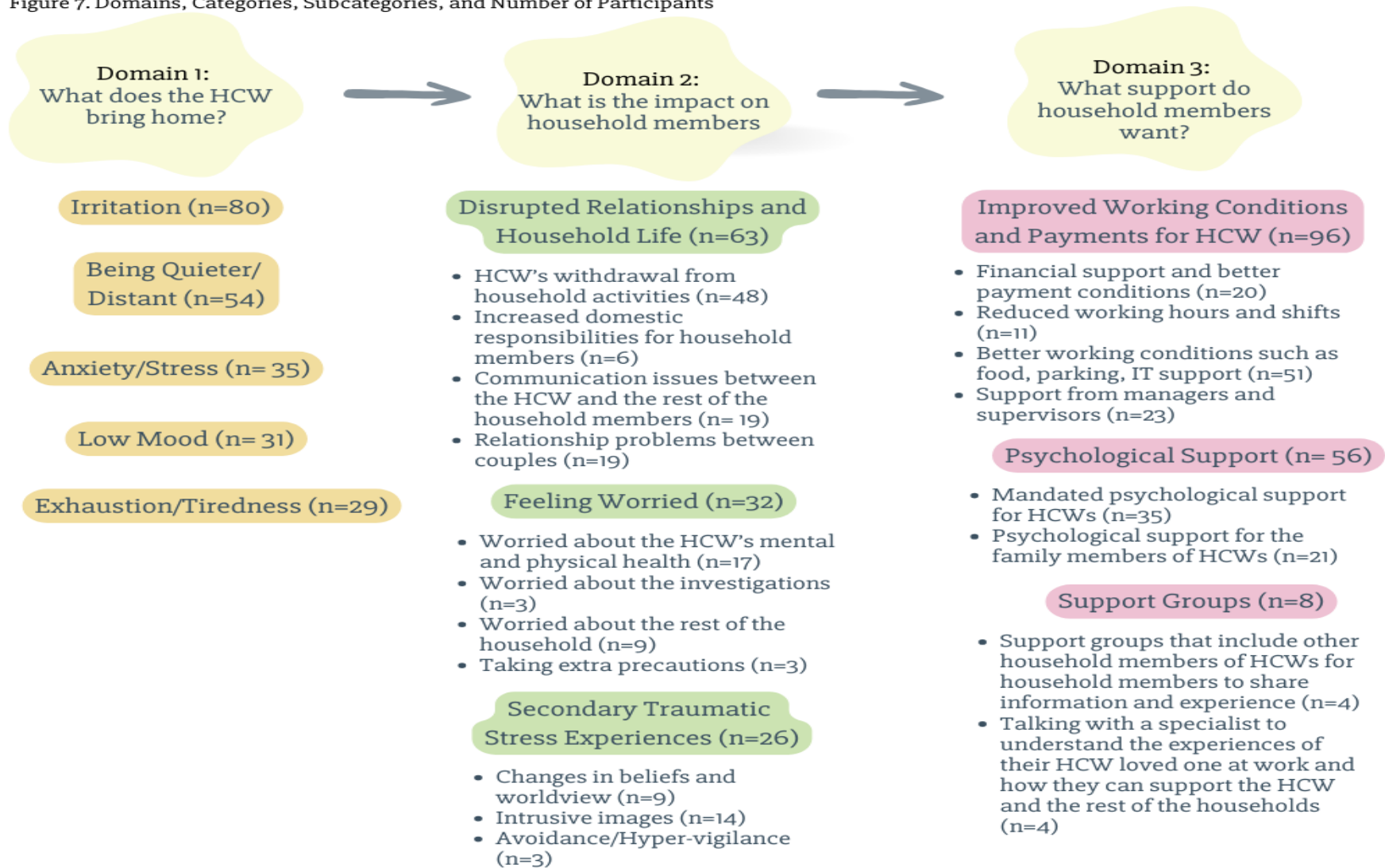
- a) **Sex:** In this multilinear regression model, being a female household member of a HCW was found statistically and positively correlated with STS experiences, which means that female household members tended to experience higher STS compared to male household members, and the true effect of sex of the household members on the STS was measured to be between 8.1 and 1.8. However, even though being female had an impact on the secondary traumatic stress experiences of the household members, this effect was relatively small (see $\beta = .172$). This may be interpreted as even though sex had an impact on STS experiences of the household members, the other factors may also have an impact in explaining the STS.
- b) **Age:** Age was not found as a predictor of STS among the household members of HCWs. High p -value () and weak β displayed that if there is any effect of age, it is minimal and not robust enough to be considered statistically significant in this model.
- c) **HCW's job role:** Having a HCW household member with a clinical role was found as a significant predictor of high STS in this model. Confidence interval values (5.2-15.0) and significant p -value (<.001) showed that household members of HCWs with clinical roles were at higher risk of experiencing higher STS.
- d) **Relationship with the HCW:** Being a spouse/partner of a HCW was found as a significant predictor of STS. Confidence interval values (4.0-12.0) and significant

p-value (<.001) showed that spouses/partners of HCWs were at higher risk of experiencing higher STS.

3.2. Qualitative Content Analysis

Out of 332 participants, 267 household members provided information in response to the open-ended questions. I deductively organised the analysis into three domains, within which I identified a number of inductive categories and subcategories (See Figure 7).

Figure 7. Domains, Categories, Subcategories, and Number of Participants



1.What HCWs bring home: Out of 267 participants who responded to this open-ended question, 102 household members reported that when the HCW had a difficult day at work, they experienced changes in the HCW's behaviour. For example, 80 household members observed that the HCW was more irritated, angry, and easily annoyed, after a difficult day at work compared to other days. Additionally, 35 household members reported that the HCW was more anxious, 31 of them reported that the HCW had lower mood and 29 household members observed that the HCW was more exhausted. Fifty-four household members of HCWs pointed out that after a difficult day at work, their HCW loved one tended to be quieter and distant from the rest of the household members. Some noted that on those difficult days, HCWs tended to be less empathetic and compassionate to the rest of the household. For example,

“[When she had a difficult day at work] I can usually tell because she will be quieter, sometimes emotional, sometimes a bit irritated by little things.” (Male partner of a nurse)

“[She] is struggling to sleep/worrying about specific patients and/or her clinical decision/action/inaction. If she feels like her work is incomplete or her clients are not ok until she next sees them she is worried and so grumpy and cranky with me.” (A partner of a nurse)

2.Impacts of healthcare workers' distress on household members: Out of 267 household members who answered this question, 130 household members reported that the HCW's work had affected themselves and the rest of the household in the ways detailed below.

2.1. Disrupted relationships and household life: Sixty-one household members said that their household life and relationships were disrupted due to HCW's job. For example, 48 household members pointed out that as a consequence of their HCW household member coming home from work and being upset, frustrated, or low in mood, that he/she did not want to participate in household activities. A male partner of a nurse shared his experiences below:

“[She is] in low mood, short tempered, doesn't want to be around others, only watches TV/reads a book alone. She does not want to participate any family activities after work.”

Similarly, 24 household members reported that the demanding nature of the HCW household members' work impacted the rest of the household, making it difficult to plan household activities. For instance, a female partner of a healthcare assistant reported that:

“Work schedules change every 3 months to suit needs of the hospital which makes planning my own work schedule and our joint social events much more complicated. The lack of staff at my partner's workplace also means there are only two points in the year they can take off a whole week of work at one time which limits how we plan family vacations and time off.”

Similarly, the male husband of an administrator shared his experiences with these words;

“I do feel like my husband had a choice to go into the work he has, but I don't have a choice around how it impacts us as a family or as a partnership. He chose that work, I didn't, and so when he is then less available at home emotionally or socially that leaves a greater burden on me and also means we are losing out on the best of him because work gets that a lot of the time.”

Due to workload and shifts, HCWs tended to come home mentally and physically tired. Six household members specifically reported that as a result of this they had to take on more domestic responsibilities. For example, the female wife of an occupational therapist shared her experiences below:

“Partner's exhaustion and physical pain - sometimes unable to manage childcare duties.”

Similarly, the female wife of a psychologist reported that:

“[Psychologist HCW] required to work overtime and thus impacting on childcare, household tasks. Their work takes priority, so family life and school pick up arrangements are changed in response to that”.

Six household members reported that HCWs struggled to separate home and work life. Due to feeling like their HCW household member was distant or cut off, four participants described how this made them feel like they were not a priority for the HCW. Nineteen household members reported that the HCWs’ feelings and behaviours created communication problems with other household members. For example,

“They often come home late and are stressed about work. I sometimes feel that they are not fully present.” (Female partner of a physiotherapist)

“I feel like my partner is overworking and prioritising work over me” (Female partner of other allied health professional)

“They did not share their experiences, they felt they needed to be strong and never got help from us or therapy. It ruined our family. We never speak at home, we never hug, our lives as a family are secondary to their work” (Son of a consultant doctor)

Specifically, 19 spouses and partners reported relationship problems due to a lack of intimacy, empathy, and compassion. For example, the wife of a doctor reported that

“My husband is frequently angry and feels miserable. Our daughter has had depression as a result. My husband all but stopped having sex, only watches TV at home and before going to work” (Female wife of a doctor)

2.2. Feeling worried: Thirty-two household members reported that they had felt worried due to the nature of the HCW’s job. For instance, 17 household members pointed out that they were worried about their HCW household member’s mental health and physical health.

I have been worried for her physical and mental wellbeing. Some examples: Twice a week for a year she worked alone late at night running a clinic with patients who were often angry, with no panic button and no way to escape the room, and no action from her superiors when the issue was raised. She has frequently been verbally, sexually,

and physically attacked by patients on the ward, sometimes with weapons, and it being laughed off by other staff. During covid she was sent onto ICU without a mask which fitted, which resulted in her getting covid. Repeatedly being discriminated against by her superiors due to her race and/or gender. I am convinced that one day this job will kill her, if not directly then by driving her to suicide. (Male husband of a pharmacist)

Three of the spouses and partners of HCWs reported that HCWs were working too long and that this could make them open to making mistakes. For this reason, they pointed out that they were worried about potential litigation. For example, a female wife of other allied health professional shared her feelings with us with these words:

“Patient complaint police involved poorly handled by trust husband was distraught and felt no one believed him, and effect on him and kids. [I felt] fear of jail and there was a lack of belief and support from trust”

Nine household members stated that they were also worried about the mental and physical health of the rest of the household members. For example, a female partner of an allied health professional said that due to the infection risk that the HCW could bring home, she was worried and taking more precautions in terms of hand hygiene and general increase in anti-bacterial cleaning. Additionally, some household members reported that they were worried about their own safety due to their HCW household member’s job. For example,

“I concern about mentally unstable colleague who knew where we lived. Made me worry for our safety.” (Female partner of a psychologist)

2.3. Secondary traumatic stress experiences: Out of 266 household members who responded to this question, 102 household members reported that they had been troubled by traumatic experiences related to their HCW household members’ work that the HCWs had shared with them. For example, 26 household members described experiences consistent with secondary traumatic stress. Several stated that there was a real physical threat for HCWs, and this impacted the whole household. Nine household members reported that after hearing about the traumatic experiences of HCWs, they

started to question humanity and the safety of the world, and reported changes in their beliefs and world view. For example,

“They have had to work with some very difficult cases which make me worried about humanity.”(A male husband of a psychologist)

“[I feel] distress when I remember the stories of her patients and their lives and/or recount the traumatic stories of her clients (NB her client group is the homeless population). Worry about the state of the NHS and its ability to provide for me and my family. Overwhelmed by state of the world that’s resulting in her client’s situations.”

(Female partner of a nurse)

HCWs’ traumatic experiences triggered household members’ previous traumatic experiences as well. For example, a nurse’s male partner who also worked on PICU stated that his partner’s experiences were triggering for him.

“She would often offload her stress when she comes home, which is fine with me, although I had worked on a PICU before, so could touch lightly on my own trauma from the ward.”

The female friend of a chaplain also reported that,

“Talking about people's death through cancer, remind me of my grandfather's death when I was a child aged 4.”

Fourteen household members reported that they experienced intrusive, repetitive images in their minds and associated distress related to the traumatic experiences their HCW household member had told them about.

“Some of the images and stories [that the doctor partner shared] are quite shocking and play over in my mind.” (Female partner of a doctor)

“Significantly concerned about partner's safety and mental wellbeing. Incidents that I've been told about coming back to me at random moments and triggering emotional response - fear, sadness, hopelessness, anxiety.” (Female wife of an occupational therapist)

Three household members reported avoidance and hypervigilant experiences related to their HCW loved one's traumatic experiences. For instance, a male husband of a nurse shared his experiences after HCW's traumatic experiences with these words;

“Someone made threats to kill him, this was a problem for many months. He works also close to where we live. So, we all became hypervigilant, would not go out for meal or socialising, because we think that that person can kill us too.”

3.Support that household members need: The question related to what kinds of support participants thought could be helpful for household members, and was answered by 130 household members, as detailed below.

3.1. Improved working conditions and payments: Ninety-six household members reported that the priority in supporting household members was primarily for HCWs to be better looked after and that their working conditions and pay needed to be improved. Twenty household members pointed out that providing financial support and better remuneration was required to support healthcare workers and their households. Fifty-one household members reported that HCWs' working environments needed to be improved. For example, a male husband of a nurse shared his thoughts with these words;

“Generally speaking I worry about her safety at work and being attacked/abused by patients/clients. The facilities are not there to provide a safe environment and the nature of her job means her wellbeing and physical safety are suffering detriment. There is also not adequate facilities to work remotely without causing back pain and she doesn't feel able to ask. I would like better equipment, ICT, money and proper cover so she's not feeling guilty when she takes annual leave and her clinics aren't covered by anyone. I also feel very angry with the lack of respect and pay that nurses get compared to doctors, it's hierarchical where nurses are bearing huge amounts of emotional/mental burden and doing more and more that doctors do but they are STILL seeming as 'less' than a doctor.”

Additionally, household members also pointed out that working conditions and lack of resources need to be addressed. A male husband of a psychotherapist said that,

“A part-time job should be part-time and not eat into all hours! NHS staff are HUGELY underpaid, undervalued, and way way way OVERWORKED.”

Twenty-three household members stated that their HCW loved one was not getting enough support from their supervisors and managers and this needed to be improved. For instance,

“The best support I can have [as a partner of a HCW] is to make sure they are well supported and managed.” (Male partner of other allied health professional)

3.2. Psychological Support: Fifty-six household members commented that their HCW loved ones and the household members needed psychological support. Thirty-five household members suggested that mandatory psychological support would be helpful for HCWs, and indirectly household members.

“More support for my partner in work with coping with workplace incidents, inconveniences and general stress. An outlet in work for raising issues that have caused grief, how to overcome them and avoid a repeat. Not leaving the issue to linger or grow out of control.” (Male partner of a nurse)

Twenty-one participants also suggested that household members would benefit from psychological support they are also impacted psychologically as well by supporting their HCW loved ones. A female partner of a physiotherapist wrote,

“My partner is a physiotherapist and worked on the 'frontline' during COVID-19. He came home most days saying he had a good day. It was only months later that he disclosed he had PTSD and felt he needed counselling. I felt that I had failed him, and the stories he shared with me of patients dying were deeply distressing. Now, I need psychological support too.”

3.3. Group-based Support: Four household members suggested that they would benefit from group-based support including other household members of HCWs. They felt this would facilitate information sharing and social support for each other. For example, the wife of a psychologist stated that,

“It could be nice to have a social group including other family members [of other HCWs] or a support group for those impacted.”

Four household members pointed out that they sometimes felt like they did not understand what their HCW household members experienced, and they did not best know how to support the HCW loved one, the rest of the household, and themselves. For this reason, these participants suggested that receiving professional support could be helpful.

“The NHS do not give enough recognition to the family's behind the worker. For example, when the workers have a tough time at work, and they cannot divulge all the confidential information. It's like trying to support them without having someone who could give me some advice on how to deal with things that might make things better for him or for the rest of the family.” (M husband of an administrator)

4. Discussion

In this mixed-method survey study, I aimed to investigate the degree of STS experienced by household members of HCWs in the UK after the COVID-19 pandemic and identify predictors of STS, in addition to examining whether there is a difference between spouses/partners and other household members. Additionally, I sought to qualitatively explore the impact of healthcare work on household members and what support household members thought would be helpful. I found that 33.8% of the household members experienced STS within the severe range. Female spouses/ partners of HCWs with clinical roles reported higher STS compared to male, other household members of the HCWs with non-clinical roles. Based on the findings from the multivariable linear regression model, being a spouse/partner of a HCW and having a HCW with a clinical role were significant predictors for high STS, after controlling for sex and age. I also found that according to household members, HCWs tended to be irritated, quieter/distant, anxious/stressed, in low moods, and exhausted after having a difficult day at work. These feelings and behaviours impacted the rest of the household members negatively. Household members reported disrupted relationships and household lives, worrying about HCWs and the rest of the household members' mental and physical health. The

qualitative findings also help to elaborate on the quantitative findings. For example, household members reported secondary traumatic stress experiences related to hearing about their household members' work and pointed out that the HCWs and their household members need support.

The findings of this study demonstrate that STS amongst household members of HCWs may be similar to family members of other high-risk occupational groups. For example, in a systematic review that included 16 qualitative and quantitative studies that explored the impact of occupational trauma on first responders and their families, Casas and Benuto (2022) reported that spouses and partners of first responders may experience STS and also experienced their partners' problematic behavioural and emotional responses at home. Whilst spouses and partners would provide support for their first responder, sometimes this came at a cost to their own mental health and wellbeing. Similar to my findings, Casas and Benuto (2022) also reported that while supporting their first responder spouses, they tended to be exposed to the details of HCW's traumatic job experiences, and this may increase the risk of developing mental health and wellbeing issues.

To the best of my knowledge, this was the first study that has explored partners and spouses of HCWs compared to other household members. In this study, I identified significantly higher STS in spouses and partners of HCWs compared to other household members of HCWs. This is consistent with research with other high-risk occupational group workers' families. In a survey conducted with 708 partners and 332 parents of Dutch military personnel, Dirkzwager et al., (2005) reported that partners reported higher STS scores compared to parents. They concluded that partners tended to be a primary source of support and therefore were exposed to more detail of the soldiers' traumatic experiences, and hence partners tended to develop higher STS. Similarly, in a longitudinal survey study with police officers and their spouses, Meffert et al., (2014) reported that spouses and partners of police officers with higher PTSD rates showed high STS scores.

In the open-ended questions, household members provided more detail about experiences related to STS, and some elaborated on how their beliefs and worldview

were changed in a negative way due to hearing about HCWs' work experiences. In their cross-sectional survey study with partners of emergency responders, Alruz et al. (2020) reported that 20% of partners experienced intrusive thoughts, arousal, and avoidance due to hearing about the traumatic experiences of the responder. In this study, fourteen household members reported intrusive images and three spouses/partners specifically described avoidance/hypervigilance related to HCW's traumatic work experience. This again may be explained by workers tending to share their traumatic experiences in detail with their spouses and partners more than other family members (Dirkzwager et al., 2005).

I also found that household members of HCWs with a clinical role reported higher STS compared to household members of HCWs with a non-clinical role. In a survey study conducted with 144 HCWs and their 135 children during the COVID-19 pandemic in Turkey, Tugen et al. (2023) reported that children of HCWs who had direct contact with patients during the pandemic showed higher anxiety compared to children whose parents were not working in a directly clinical role.

In the current study, household members' observations about the HCW's mental health and wellbeing being negatively impacted by their work were also consistent with other studies. Research conducted during the COVID pandemic reported that HCWs reported feeling overwhelmed (Billings et al., 2021), with high levels of anxiety, depression and post-traumatic stress symptoms (Greene et al., 2021). In this study, household members' observations about HCW's mental health and wellbeing were similar to the other qualitative findings in the literature. However, in this study, in addition to current literature findings, I found that household members observed that after experiencing a difficult day at work, their HCW household members tended to be irritated, quieter, and distant at home. Additionally, household members reported that their HCW household members tended to be in lower mood, more anxious, and exhausted after a difficult workday. Further, I found that household members of HCWs reported that their family life was often disrupted due to HCWs' withdrawal from family activities and HCWs' long working hours. These findings are consistent with a small body of relatively recently published research which has also explored the impact of high-risk occupational roles

on families. In a systematic review of qualitative research that focused on the experiences of family members of military personnel with PTSD, McGaw et al., (2019) reported that family life was often impacted due to military personnel's work. For example, family members reported that their military family member was often unable to participate in family life, and frequently missed family activities due to deployments. Similarly, in a cross-sectional study conducted with 515 partners of police officers in Portugal, Costa and Silva (2019), reported that their family activities and joint social life were impacted negatively due to police work. In a qualitative study with fourteen family members and close friends of HCWs in the UK during the COVID pandemic, Tekin and colleagues (2022) reported that family members tended to take on more domestic responsibilities at home to support HCW and reported an increased workload at home for themselves.

In this study, I identified that household members were worried about HCW's mental and physical health as well as other household member's health, regardless of the COVID-19 pandemic. Likewise, in my previous qualitative study conducted with family members and close friends of HCWs in the UK during the COVID-19 pandemic, families and friends expressed their worry about the HCW's health in addition to the rest of the household's health (Section III, Chapter 5; also, Tekin et al., 2022). In the current study, I found that household members were also worried about the risk of investigations and litigation for HCWs.

In this study, I also asked participants what kinds of support they thought household members needed. The majority of participants pointed out that taking care of the HCW, (such as providing a better work environment, payment, and managerial support) was one of the key elements in supporting the whole household. This was consistent with a meta-synthesis study related to the experiences and needs of HCWs during the pandemics; including the COVID-19 pandemic, that concluded that HCWs prioritise systematic changes and improvements in their work environments (such as manageable workloads and support from supervisors, managers, and peers) (Billings et al., 2021). Psychological support for both the HCW and household members was also suggested as a potential means for improving the mental health and wellbeing of the whole

household. Some household members also suggested that providing support groups that included household members of other HCWs to share information and experiences may be helpful for some household members, particularly as some participants pointed out that they struggled to understand their loved one HCW's job-related experiences.

4.1. Strengths and Limitations

There are a number of strengths of this study. Firstly, to the best of my knowledge, this is the first study to report on the degree of STS, associated predictors, and experiences of household members of HCWs. Secondly, the research team behind this study included senior clinical academics, mid and early-career researchers, bringing a diversity of experiences and perspectives to this study. Additional coders were included in the qualitative content analysis to increase the trustworthiness and the quality of the qualitative analysis. Thirdly, I achieved a reasonably large sample compared to other studies on household members of other high-risk occupational groups and this study's sample size was calculated via power analysis to reduce the risk of Type 1 and Type 2 errors.

There are also a number of limitations to this study. Firstly, due to the cross-sectional nature of the survey design, the findings reflect a single point in time and cannot provide information about the STS experiences of HCWs' household members over time. Secondly, STS was measured using the STSS which is based on DSM-IV criteria for PTSD and only asks questions about experiences within the last seven days (Bride et al., 2004). Thirdly, data was self-reported, and I have no means of corroborating reported rates of STS. Finally, there was an imbalance between some groups within the sample in terms of size. For example, while 263 participants described themselves as spouse or partner of a HCW, only 69 of the participants were other household members of HCWs. Additionally, the sample of this study was purposive. For this reason, it created a challenge to generalisability of the findings, and the external validity of the findings was limited (Andrade, 2021).

4.2. Implications

Based on household members' needs highlighted in the open-ended questions and synthesis of the findings from this study, we have highlighted organisational, clinical, and

research opportunities to potentially improve the mental health and wellbeing of household members of HCWs. In terms of organisational support, according to findings of a systematic review and meta-synthesis of 46 studies which focused on the experiences and views of the HCWs in different pandemics including COVID-19, SARS, and Ebola, Billings et al., (2021) recognised that increased working hours and shift patterns could have a detrimental impact on HCW's wellbeing. The findings of the current study extend this by demonstrating that such working patterns can have a detrimental impact on HCW's families as well as on the workers themselves. Prioritising pay and working conditions of HCWs, not only to maintain the healthcare force, but also potentially protect their families and support systems who are indirectly impacted by the healthcare work, and further maintain support for the HCWs themselves.

In terms of clinical implications, providing access to evidence-based psychological support, including timely assessment and treatment, may be beneficial the HCWs, directly, and indirectly of benefit to their families. However, potential issues with confidentiality and risk management need to be considered. Occupational Health Services in healthcare settings should make sure that they are asking questions about the impact on family members if a HCW has been affected by a traumatic incident, as well as exploring the impact on the HCW themselves. Psychological support could be extended to household members to identify their needs and to provide or signpost to evidence-based treatment where needed. I also found that some household members were struggling to understand their HCW loved one's experiences at work, and therefore services could consider piloting informational resources or pilot peer support groups which include household members of other HCWs to share information and experiences and to evaluate how helpful this might be. Additionally, induction programmes for families and household members of HCWs who have newly joined the NHS Trusts may be helpful for families to understand their HCW loved one's experiences.

In terms of research implications, secondary traumatic stress amongst household members of HCWs is a new topic in clinical research. For this reason, more research needs to be conducted related to secondary traumatic stress and associated factors, in addition to the demographics of household members of HCWs explored here. The data

for this study was collected via NHS CHECK which was developed during the COVID-19 pandemic. Even though the questions were not specific to the COVID-19 experiences, it has likely had an influence on participants' answers. More research is required to explore household members' experiences after the pandemic and if family members' mental health and wellbeing issues continue to persist in the post-pandemic context. (See Table 21 for the potential implications and recommendations)

Table 21. Potential Implications and Recommendations

Implications	Recommendations
<p>Organisational Implications</p> <p>1. Providing better working conditions</p>	<p>Providing better working conditions for HCWs (such as access to healthy food, IT support), better pay and conditions may be critical for both HCWs' wellbeing but also that of their household members.</p>
<p>Clinical Implications</p> <p>2. Psychological Support</p> <ul style="list-style-type: none"> - For HCW - For household members <p>3. Information and support</p>	<p>Carefully planned psychological support should be delivered to both HCWs and could be extended to their household members.</p> <p>Providing information for families and household members and potentially piloting sources of peer-based support.</p>
<p>Research Implications</p> <p>4. More research about mental health and wellbeing of household members of HCWs</p> <p>5. Conducting further research in the post COVID-19 pandemic context</p>	<p>Extending the current research and conducting further research exploring secondary traumatic stress in HCWs' household members, and factors associated with it, which go beyond the demographics examined here.</p> <p>Further research in the post COVID-19 pandemic context is required to explore whether similar findings are replicated and whether new challenges are identified.</p>

5. Conclusion

To date and to the best of my knowledge, this is the first study that has examined STS among the household members of HCWs. Similar to other studies which have focused on family members of other high-risk occupational groups, I found that in trying to

support their HCW loved ones, family members of HCWs were at high risk of developing STS. In addition to the findings of the previous studies, I also found evidence that STS was prevalent among the family members of HCW and that STS appeared to be linked not only to hearing about the experiences of the HCW but also more practical issues related to occupational stresses (such as work patterns, workload, etc). There are organisational, clinical, and research implications to protect and support both HCWs and their household members.

Section IV: Overall Synthesis

In this section, in Chapter 9, I summarise the main findings from my PhD projects. In Chapter 10, I compare and contrast my findings with the current literature in light of relevant models and theories. In Chapter 11, I reflect on the strengths and limitations of my PhD programme of research. Finally, in Chapter 12, I discuss the potential organisational, clinical, research, and theoretical implications of my research.

Chapter 9. Summary of My PhD Projects

In my qualitative project (Section III, Chapter 5; also, Tekin et al., 2022), I aimed to explore the experiences, views, and needs of family members and close friends of HCWs who worked during the COVID-19 pandemic in the UK. Family members and close friends of HCWs reported that due to the HCWs' long working hours and increased workload and shifts, they had to take on more domestic responsibilities such as cleaning, shopping, cooking, and childcare. While taking on additional domestic responsibilities, some family members had to make sacrifices with respect to their own lives and careers. However, they felt like these sacrifices had not been recognised by others. Family members and friends were also concerned that their HCW family members and the whole family were at physical risk due to contamination. For these reasons, they talked about feeling worried, anxious, scared, and frustrated. Family members were also concerned that the needs of their HCW loved ones were not being met by NHS. They pointed to a lack of training, a lack of PPE, poor pay and working conditions and long working hours. Most of the family members and close friends also reported that they were proud of their HCW loved ones, but they were also feeling uncomfortable about the media romanticising the healthcare work. They were worried that this romanticisation may overshadow the reality of problems that HCWs were facing such as poor working conditions. Finally, family members and friends pointed out that while supporting their HCW loved one, they were often exposed to the details of the HCW's traumatic work experiences, which could cause them distress and even vivid dreams related to the HCW's traumatic experiences.

In my first systematic review project (Section III, Chapter 6), I aimed to explore the impact of occupational trauma and occupational stress on family members and close friends of different high-risk occupational group workers. In this systematic review study which included 50 qualitative, quantitative, and mixed-method studies from 21 countries ($n=53,534$), I identified that, regardless of the high-risk occupational group worker's job type, family members tended to experience mental health and wellbeing issues such as psychological distress, anxiety, depression, STS, PTSD, somatic symptoms, self-injury, and suicidal thoughts. Family members also reported that their family functionality was disrupted due to the high-risk worker's absence from home, long working hours, and

shifts. They also pointed out decreased communication between family members and the high-risk worker and a lack of intimacy between high-risk workers and their spouses/partners. Additionally, some family members reported that their social life was negatively impacted due to their high-risk worker's job. Most family members pointed out practical challenges, for example, increased domestic responsibilities for household members due to the high-risk worker's long working hours and shifts, difficulties in the discipline of children due to the absence of the high-risk worker parent, and emotional burden such as worrying about the high-risk worker's safety. There were also different experiences amongst the family members of different high-risk workers. For example, spouses and partners of police officers and construction workers reported intimate partner violence, although there were to date no studies that focused on intimate partner violence or domestic violence amongst the family members of other high-risk worker groups. Additionally, discipline issues amongst the children of high-risk workers who are away from home for long periods of time were identified, but there is no current research which focused on the risk of discipline issues with children of high-risk workers who return home every day.

In my second systematic review study (Section III, Chapter 7; also, Tekin et al., 2024), I aimed to understand the impact of occupational trauma and occupational stress on family members of HCWs. I also sought to understand the similarities and differences between family members' experiences before and during the COVID-19 pandemic. This systematic review and narrative synthesis study included eleven quantitative and nine qualitative studies. While fourteen studies focused on families' experiences during the COVID-19 pandemic, six studies focused on families' experiences prior to the pandemic. Similar to my second project, regardless of the COVID-19 pandemic, family members of HCWs tended to experience mental health and wellbeing issues such as psychological distress, anxiety, depression, PTSD, and STS. They also stated that their family functionality and relationships were disrupted, and spouses reported low relationship satisfaction. Additionally, family members reported that their social life was impacted due to the HCWs' long working hours and shift patterns regardless of the COVID-19 pandemic. Similar to the findings of my first systematic review project, family members and household members had to take on more domestic responsibilities at home

regardless of the COVID-19 pandemic. However, based on the synthesis of the findings, it may be concluded that COVID-19 enhanced the negative impact of healthcare work on family members significantly. For example, most of the family members reported that they were feeling more anxious and scared during the COVID-19 pandemic due to the high risk of contamination. Additionally, some family members mentioned that conflicts in the family were exacerbated due to increased stress in the family. Also, some family members pointed out that their social lives were negatively impacted because people thought of them as potential COVID-19 transmitters. For this reason, they experienced stigma against both HCWs and themselves.

In my final project, which was a mixed-method survey study (Section III, Chapter 8), I aimed to examine the degree of STS experienced by household members (family members and housemates) of HCWs in the UK following the COVID-19 pandemic and determine the related predictors. In addition to this, my purpose was to understand the impact of healthcare work on the HCWs' household members and what their needs are qualitatively. According to the findings, 33.8% of the household members experienced severe STS. Female household members, spouses/partners of the HCWs, and household members of HCWs who were in patient-facing roles were at higher risk of developing STS compared to male household members, other household members, and household members of HCWs who were not in clinical roles. Based on the content analysis of open-ended text responses, household members observed that HCWs tended to be irritated, quieter/distant, anxious/stressed, low in mood, and exhausted after experiencing a difficult day at work, and that these feelings had a negative impact on the rest of the household members. Household members also highlighted that they were feeling worried about the mental health and wellbeing of the HCW and the rest of the household members. Additionally, household members reported secondary traumatic stress experiences due to hearing about the HCW's work, which supported the quantitative findings of this study as well.

Chapter 10. Synthesis of My PhD Projects' Findings

Since the number of studies examining the mental health and well-being of family members and close friends of high-risk occupational groups is quite limited in the current literature, my PhD projects were conducted with the aim of exploring the experiences, views, needs, and mental health and wellbeing of family members of high-risk workers. Given the exploratory aims of the thesis, I did not set out to test pre-determined theories or hypotheses. Rather, the specific objectives of my research studies were to explore and determine what factors may be relevant to the family members of high-risk workers. I have thus returned to theory in the analysis of my data. In this chapter, I discuss how my research fits into existing theories and models (specifically Family Stress Theory and the Spillover-Crossover Model) and how my research contributes to the current literature.

1. Family Stress Theory

In 1958, Reuben Hill proposed the Family Stress Theory that aimed to explain the reason while some families can deal with stressors, whereas others experience difficulties. Hill (1958) underlined two significant variables to understand the difference between families that can survive in challenging situations and families that cannot: i) available support for families and ii) the meaning of the event for the family. For example, in his research conducted with military families, Hill (1958) reported that during World War II, military families experienced high stress due to the war and its consequences (such as separation from the military family member). However, while some of the families experienced issues in their family life (such as financial issues, taking more responsibilities at home, and discipline issues with children due to the soldier's absence), other families experienced stronger relationships and improved family life. To explain this difference, he proposed the ABC-X model. According to Hill (1958) ABC-X refers to:

“A: The event”

“B: The families' crisis-meeting resources”

“C: The definition/meaning of the event for the family members”

“X: Crisis” (Hill, 1958, p. 143). See Figure 8 below for the relationship between these components, which is my visual representation of the Model based on Hill’s explanation of the figure (1958).

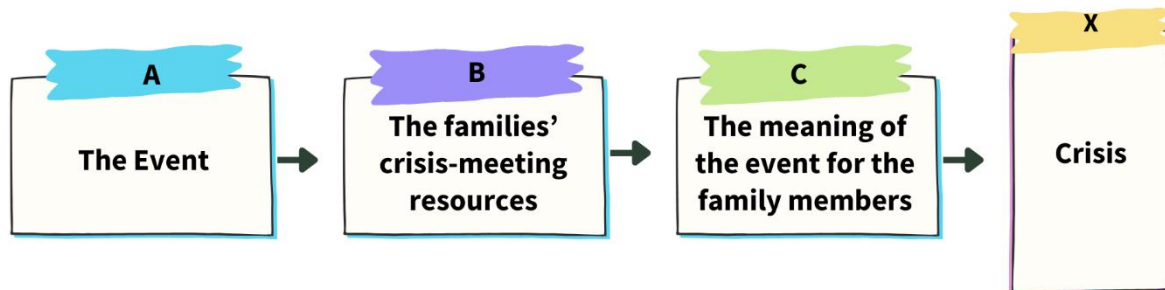


Figure 8. Hill (1958)’s ABC-X Model for Family Stress Theory

Family Stress Theory and Hill’s ABC-X Model (1958) were proposed in light of the research conducted during World War II and the Vietnam War with military families (Boss 2002; Hill 1958; McCubbin et al., 1983). For this reason, this model is particularly relevant when exploring the impact of military work on workers’ family members. According to ABC-X model, one of the most important components to understand how different military families react to the same stressors differently, are B (which is related to how family members cope with the stressors) (Sullivan et al., 2015) and C (which is related to the meaning of the stressor for each family member) (Hill 1958). For example, in their survey study which was conducted with 639 spouses of military personnel in Canada, Skomorovsky (2017) reported that perceived social support by spouses from other family members and friends decreases the negative impact of the military personnel’s deployment on the spouses’ mental health and wellbeing. Similarly, in their study which aimed to understand the association between social support and military families’ adjustment to military life, Bowen et al., (2003) found that informal support (from neighbours and friends) had a significant positive impact on the adaptation to military life for spouses of military personnel. Regarding the meaning of the stressor for family members, in their study which was conducted with 1507 children of military personnel in the US, Chandra et al., (2010) reported that the response of the non-military parent in the home to the deployment was significantly related to whether children developed emotional issues when the military personnel parent was deployed. For example,

Chandra et al., (2010) highlighted that parents who reported higher mental health and wellbeing issues for themselves also reported higher emotional and behavioural problems for their children during the deployment.

Similarly, in their study which was conducted with 126 wives of military personnel, Frankel et al., (1992) aimed to understand the adjustment experiences of the wives during their military husbands' deployment by using the family stress model. For this, they included B (resources) and C (meaning) components from the ABC-X model in their analysis (See Table 22).

Table 22. Items for B (Resources) and C (Meaning) from the ABC-X Model to Measure the Wives' Adjustment to Their Military Personnel Husband's Deployment

B (Resources)	C (Meaning)
Impact of the previous deployment	Wives' satisfaction of the military lifestyle
Family pride and accord	Wives' concerns about deployment-related issues
Social support	Wives' feelings and thoughts about future deployments
Financial situation	Wives' emotions about husbands' absence.

Regarding the examination of resources (B), according to Frankel et al.'s, (1992) findings, firstly, wives whose military husbands were deployed an "increased number of times which is beyond some threshold" (p.109) reported poorer adjustment to military life compared to wives whose husband experienced "a moderate number of deployments" (p.109). Secondly, they reported that wives who reported a strong feeling of pride in their husbands because of their military work coped with military-related stressors such as deployment, better as a family. Additionally, wives who experienced less feelings of pride reported higher burdens due to increased domestic responsibilities and experienced more health-related complaints. Thirdly, wives who received less social support from their friends reported lower marital satisfaction. Due to the lack of data, Frankel and his colleagues (1992) could not include the financial situations in their analysis to examine the adjustment of the wives to military life. Regarding the examination of the meaning (C), Frankel et al., (1992) reported that even though most of the spouses of military personnel

experienced increased domestic responsibilities at home during the deployment due to the absence of military personnel and lack of social support, spouses who felt more depressive and dysphoric tended to experience increased responsibilities at home more negatively. Additionally, wives who saw the future deployment as a threat and worried about the military husband's life tended to experience higher dysphoria compared to wives who thought that future deployments are a challenge, not a threat (Frankel et al., 1992).

Similarly, according to a review study which aimed to understand the available support for family members of the military personnel who combatted in Ukraine, and improve the support that they receive, Hrynovskyi et al., (2022) first highlighted the issues that family members experienced. For example, according to Hrynovskyi et al., (2022)'s findings some of the family members of the military personnel tended to interpret deployment as a reason of the family conflict, and they reported disruptions in family functionality such as raising children and joint family activities.

According to the findings of my PhD projects, the Family Stress Theory and ABC-X model are not only helpful in understanding the experiences of military personnels' family members but also potentially other high-risk workers' family members. In terms of the family resources (B) and meaning (C), the findings of my PhD projects support the current literature findings which focused on these components of the ABC-X Model in military families. According to the findings of my projects, family members of high-risk occupational group workers who received social support from extended family members, friends, and society tended to report better mental health and wellbeing compared to family members who did not receive social support (See Section III, Chapter 5 and 7; also, Tekin et al., 2022 and Tekin et al., 2024). Similarly, family members and close friends of the high-risk workers reported how proud they were of their high-risk workers family members, and they volunteered to take on more responsibilities at home to support the high-risk workers' continuity of their jobs (See Section III, Chapter 5 and 7; also, Tekin et al., 2022 and Tekin et al., 2024). Like the military personnel's family members, HCWs' family members were also worried about the mental health and wellbeing of the worker and shared concerns about the financial situation of the family

(See Section III, Chapter 5 and 8; also, Tekin et al., 2022). Additionally, like the family members of military personnel who reported discipline issues in children and a lack of joint activities as a family due to the deployment, according to findings of my first systematic review study (Section III, Chapter 6), family members of seafarers and explorers (who similarly are away from their families for long periods of time) report similar problems.

As well as providing some support for the Family Stress Theory and the ABC-X model, the findings of my research also extend these models to the families of other high-risk occupational groups. For example, even though some of the family members of HCWs appreciated the social support from the rest of society during the COVID-19 pandemic, they were worried that the sacrifices of the family members and close friends of HCWs were invisible to the rest of society (Section III Chapter 5; also, Tekin et al., 2022). Similarly, even though they were proud of their HCWs' job during the pandemic, some family members reported that HCWs were just doing their job, and society's and the media's attention and support were superficial, overshadowing the real problems of the HCWs such as low pay and poor working conditions (Section III Chapter 5; also, Tekin et al., 2022).

In light of these findings, I would consider that although social support, which is evaluated under component B in the ABC-X model, is very important (Frankel et al., 1992), the quality of this support and the way family members interpret this support may also shape the impact of the high-risk occupations on the family members of high-risk workers. Additionally, according to the B component of the ABC-X model, family members' worrying about the mental health and wellbeing of the military personnel has an impact on the family functionality and how to cope with occupation-related stressors (Frankel et al., 1992; Hill 1958). My findings also support this. However, in addition to worrying about the high-risk workers' mental and physical health, according to the qualitative study that I conducted during the COVID-19 pandemic and the mixed method survey study (see Section III, Chapter 5 and 8), family members and housemates of the HCWs were also worried about their own and the rest of the household's mental/physical health and wellbeing due to the serious risk of physical contamination of COVID.

Like military families, some of the HCWs' family members reported that they were impacted financially in some circumstances as well. For example, according to the findings of my mixed-method survey study, household members of HCWs reported that the HCW family worker was often working under poor working conditions and low pay. However, in addition to this, there is a risk of potential litigation and associated financial impact on household members. Some participants reported that during litigation, their families were struggling financially, and this impacted the mental health and wellbeing of the household members. According to the annual report of the NHS in 2022, the total number of reported serious adverse issues was 13,511 across the UK (NHS Resolution Annual Report, 2022). While the reported numbers are high, and its impact on both household members and HCWs themselves is serious (See Section III, Chapter 8), potential litigations need to be counted as a stressor and before this stressor (A) causes a crisis (D) in families, resources (B) should be developed for all household members (See more for Chapter 12 in this Section).

As outlined in detail above, even though the Family Stress Theory and ABC-X Model are supported by the current literature and have enduring value for modern families, I would like to highlight some criticisms about this model here. This model was built based on research conducted with military families during World War II and the Vietnam War (Boss 2002; Hill 1958; McCubbin et al., 1983). During the 1940s and 1950s, the “*ideal family*” was conceptualised as “*parents married for life, children are born inside the marriage, and the mother cares for the children in the home while the father works outside the home to provide for the family*” (Casper & Bianci, 2001, p. xvi). However, according to Judith Stacey (1990), the ideal family concept of the 1950s is no longer acceptable and family systems have changed since then. Judith Scott (2006) argued that due to changes in gender roles, family systems have changed since women started to join the labour market more and men started to take on more domestic responsibilities including childcare. However, studies that helped to build the ABC-X Model were conducted with male military personnel working and female family members staying at home and taking care of the children and housework. According to the Women and the UK Economy Report of the UK Parliament (2024), 10.05 million women are working full-time in the UK. Due to women's participation in the labour market and changes in the domestic divisions

of labour, it can be argued that this model may be outdated, lacking in the changes in today's family structure. Similarly, studies that helped to build the ABC-X Model were conducted with heterosexual couples. However, today, gay marriages are common and legal in 36 countries (Human Rights Campaign, 2024), and gay marriages may have different dynamics and their own specific issues such as stigma (Hoy, 2018) not accounted for in the ABC-X Model. Therefore, even though the ABC-X Model is valuable in interpreting my findings, I will also discuss my findings in light of more current models and theories below.

2. Spillover-Crossover Model

Conflict Theory lies at the core of the Spillover-Crossover Model (Bakker & Demerouti, 2018). According to Zedeck and Mosier (1990), Conflict Theory alleges that work and family environments are discordant because they have different norms and requirements. Greenhaus and Beutell (1985) defined Conflict Theory as “*a form of inter-role conflict in which the role pressures from the work and family domains are mutually incompatible in some respect. That is, participation in the work role is made more difficult by virtue of participation in the family role, or vice versa.*” (p. 77). Most researchers highlight two types of conflicts in the Conflict Theory: *work-family conflict* which explains the negative impact of the work-life on the family life, and *family-work conflict* which explains the impact of workers’ domestic responsibilities and conflicts with household members at home, on the workers’ work-life (Bakker & Demerouti, 2018).

The Spillover-Crossover Model (Bakker & Demerouti, 2018) elaborates specifically on work-family conflict, which is most relevant to my research. Below, I will elaborate on the Spillover-Crossover Model and provide evidence from current literature related to how the Spillover-Crossover Model may help to understand the experiences of families of military personnel and first responders. Then, I will discuss how the findings of my PhD projects are supported by, and extend, the Spillover-Crossover Model.

Spillover is defined as the transmission of the workers’ work experiences to workers’ family life (Bakker & Demerouti, 2018), and crossover is defined as the impact of the negative experiences of the workers at work on the workers’ partners and spouses (Westman, 2001). The Spillover-Crossover Model is a model that explains the impact of

employees' workplace experiences on their family lives and partners (Bakker & Demerouti, 2018). In other words, when a worker experiences a negative issue at work such as poor communication with managers, this might spillover to family life because the worker's behaviours might change in a negative way even at home due to the negative issue at work. Then, the worker's behaviours and feelings may in turn impact their partner's mental health and wellbeing (See Figure 9 below for my visual representation of the Spillover-Crossover Model).

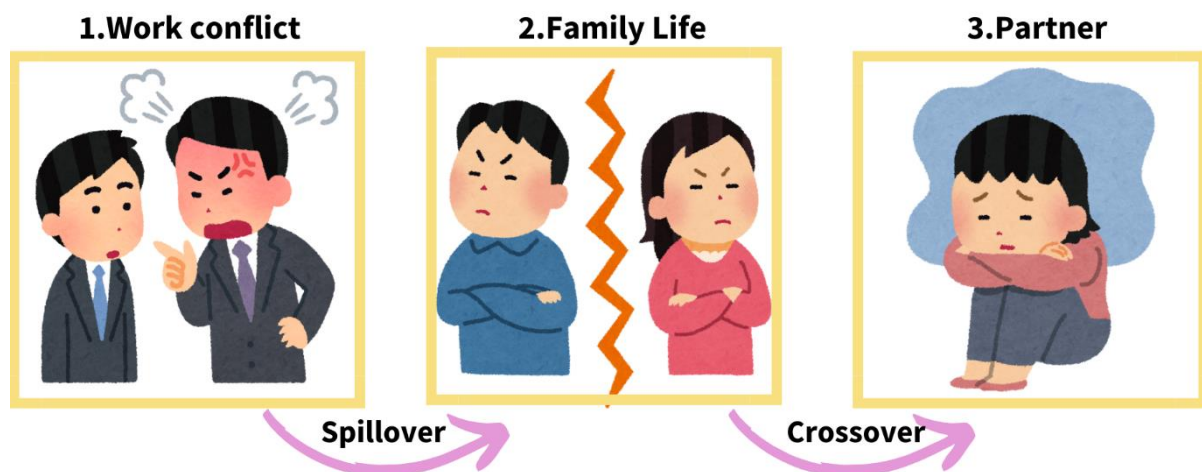


Figure 9. My Visual Representation of the Spillover-Crossover Model

For example, in the figure above, in the first part, a worker is seen having problems with his manager. In the second part, when the worker comes home, he continues to experience those negative emotions due to the problem he had with his manager at work, he is reflecting these feelings in his family life, and having issues with his partner. This is called spillover. Arguments occur when the negative emotions felt by the worker due to his job are reflected at home, and in the third part, his emotions and behaviours begin to negatively affect the mental health and well-being of his partner as well. This is called crossover.

According to Greenhaus and Beutell (1985), work and family conflicts may be experienced due to: a) *conflict of time*: for example when the worker has long working hours and shifts and is unable to spend time with family members, b) *conflict of tension*: for example when the worker has an emotionally demanding job (i.e., worker tends to experience anxiety, anger, fatigue due to the job and these feelings spillover to family

life), and finally c) *conflict of behaviour*: when the worker's behavioural patterns related to the job (such as being phlegmatic and non-affectionate in military or first responder work) is incompatible in family life.

High-risk occupational group families may be at particular risk of experiencing these three components. For example, Burrell et al., (2006) reported spouses of military personnel are at risk of spillover due to the risk of the military family member's death or serious injury, time spent in different (often high-threat) countries, frequent separation from family, and pressure experienced from superiors.

Similarly, in their systematic review study on the spouses of first responders which included 16 papers related to spillover experiences Casas and Benuto (2022) reported that the spouses of first responders tended to be negatively impacted by first responders' emotions and behaviours after the worker experienced a difficult day at work. They also highlighted that due to the work-related issues that the first responder brought home, spouses tended were often required to provide extensive support, and sometimes this came at a cost to their own social life and career. Additionally, due to the behavioural changes of the first responders at home after a traumatic incident at work, spouses experienced "*distress and secondary traumatic stress symptoms such as anxiety, avoidance, intrusive thoughts*" (Casas & Benuto, 2022, p.215)

The findings of my PhD projects support the findings of the current research conducted in light of the Spillover-Crossover Model. For example, according to the findings of my qualitative paper (Section III, Chapter 5; also, Tekin et al., 2022), spouses and partners of HCWs reported burden because they had to take on more domestic responsibilities at home such as cleaning, shopping, and childcare due to the long working hours and shifts of their HCW family member. Similarly, the findings of my first systematic review project which included 50 studies related to the family members of high-risk occupational group workers such as firefighters, police officers, seafarers and explorers showed that spouses and partners also reported emotional and practical burden due to the long working hours, shifts, and separation from the high-risk worker family member (Section III, Chapter 6).

My findings support Greenhaus and Beutell (1985)'s concept of work-family conflict due to the conflict of time. According to the qualitative study of Huffman et al., (2019), which was conducted on 50 soldiers to understand military work impacts on their spouses' careers in light of the spillover model, soldiers reported that due to the 'military comes first' mentality, their spouses tended to sacrifice their own careers. Similarly, in my qualitative paper (Section III, Chapter 5; also, Tekin et al., 2022), and my mixed-method survey study (Section III, Chapter 8), spouses and partners reported that due to the time that HCWs needed to spend at work, they had to sacrifice their own careers in order to take on more responsibilities at home, and this negatively impacted their mental health and wellbeing. The participants in both of these studies also reported that they felt like they were not a priority for the HCW.

The Spillover-Crossover model has not previously been applied to HCW families, but my research shows how the experiences of the spouses and partners of the HCWs may be a significant example to illustrate the Spillover-Crossover Model in healthcare families. For example, in my mixed-method survey study (Section III, Chapter 8), some of the spouses/partners of the HCWs reported that after a difficult day at work, the HCW tended to be quieter and distant from the rest of the household members, and this impacted the household functionality negatively (spillover). Due to the quiet and distant behaviours of the HCW and in addition to their anxiety, spouses and partners tended to feel isolated, alone, and depressed (crossover). This relates to Greenhaus and Beutell (1985)'s concept of work-family conflict due to the conflict of tension. According to the findings of my mixed method survey study, due to the emotional burden of the healthcare work, spouses and partners reported that sometimes HCWs came home exhausted, and then tended to engage less in family activities. This disrupts the family's functionality and social life and impacts the mental health and wellbeing of spouses and partners negatively.

The Spillover-Crossover Model focuses on explaining the impact of employees' workplace experiences on their family lives and their partners (Bakker & Demerouti, 2018). However, the findings of my PhD projects do not only fit into the Spillover-Crossover Model to explain the experiences of spouses and partners of the high-risk

workers, but my research also contributes to extending this model to other family members and close friends of high-risk occupational groups. For example, while spouses and partners of HCWs were worried about the mental health and wellbeing of the HCWs, their extended family members, close friends, and housemates were also worried about them. Similarly, not only spouses and partners of seafarers, explorers, police officers and firefighters were impacted negatively due to the long working hours, shifts, and separation, but also their children and elderly parents were impacted negatively (See Section III, Chapter 6-7). Increased domestic responsibilities were not an issue for only the spouses and partners due to the long working hours of HCWs (Section III, Chapter 5 and Chapter 7; also, Tekin et al., 2022 and Tekin et al., 2024), but also the rest of the household members (Section III, Chapter 8). For this reason, the findings of my PhD projects might be helpful in extending the Spillover-Crossover Model from spouses/partners to all of the family members and household members of high-risk workers.

Chapter 11. Strengths and Limitations of My PhD Projects

This programme of research is subject to some strengths and limitations which I will discuss further here.

In terms of strengths, firstly, this work is a mixed-method PhD thesis that includes qualitative, systematic review, and mixed-method studies. Manzoor et al., (2020) defined mixed method research as “*Mixed method research is a combination technique where statistical information obtained from quantitative measurements is supported and enriched by qualitative information obtained from the explanations provided by the research participants.*” (p. 95). According to John Creswell and his colleagues (2011), mixed-method research is a research approach which “a) *focuses on research questions that call for real-life contextual understandings, multi-level perspectives, and cultural influences, b) employs rigorous quantitative research assessing magnitude and frequency of constructs and rigorous qualitative research exploring the meaning and understanding of constructs, c) utilises multiple methods (e.g., intervention trials and in-depth interviews), d) intentionally integrates or combines these methods to draw on the strengths of each, and e) frames the investigation within philosophical and theoretical positions*” (p.4). One of the biggest strengths of mixed-method research is that it can offer diverse approaches and perspectives to researchers to address their research questions (Creswell et al., 2011; Klassen et al., 2012). In their guidance, Creswell and Clark (2011) defined three main mixed-method designs: sequential designs, convergent designs, and embedded designs. ***With sequential designs***, researchers can design a quantitative study, based on the findings of the qualitative study, or vice versa (Klassen et al., 2012). My PhD thesis as a whole has a sequential design which allowed me to build a quantitative design based on the findings of earlier qualitative data. My qualitative study (Section III, Chapter 5; also, Tekin et al., 2022) aimed to understand the experiences, views, and needs of the family members and close friends of the HCWs. After analysing the data, I recognised that family members and close friends of HCWs were describing experiences similar to the symptoms of STS. For this reason, I designed a mixed-method survey study (See Section III, Chapter 8) to further examine the experiences of STS among household members of HCWs. ***With convergent designs***, researchers can collect and analyse quantitative and qualitative data concurrently to

compare and contrast their findings (Klassen et al., 2012). In my mixed-method survey study (Section III, Chapter 8), I collected and analysed both quantitative and qualitative data to provide further context and to elaborate the quantitative findings related to STS. I have used both sequential and convergent research designs in my thesis. This strengthened my findings (Cresswell et al., 2011; Cresswell and Clark, 2011; Klassen et al., 2012).

Secondly, this work is also a multi-method PhD thesis that includes multiple qualitative methodologies; a qualitative study with thematic analysis and a mixed-method survey study with a content analysis. Collier and Elman (2008) defined multi-method research as using more than one type of qualitative analysis to better understand a phenomenon. According to Nanthagopan (2021), multi-method studies enable researchers to develop a deep understanding of their research questions and increase the trustworthiness and the quality of their research. By using multi-methods in my PhD thesis, first, I was able to inductively explore the experiences, needs, mental health, and wellbeing of the family members and close friends of the HCWs (Section III, Chapter 5; also, Tekin et al., 2022) by using thematic analysis. Then, I was able to complete an in-depth exploration of household members of HCWs' experiences specifically related to STS through the use of content analysis, building on the findings of the first qualitative study (See Section III, Chapter 8). Using this multi-method approach has strengthened my thesis by enabling me to conduct an in-depth exploration and increasing the trustworthiness and quality of my studies.

Thirdly, in my second systematic review study (Section III, Chapter 7), I narratively analysed my data using the Popay et al., (2006) guidance. Following the steps of this structured guidance during the analysis process also has strengthened my study (Popay et al., 2006).

Fourthly, in the existing literature, most of the research focused on the experiences of spouses and partners of high-risk workers and there was very limited research focusing on other family members and close friends of workers. In my studies, I recruited a broad sample of participants which provided diverse perspectives of individuals who support HCWs. To the best of my knowledge, my qualitative study (Section III, Chapter 5; also,

Tekin et al., 2022) is the first study in the UK which focused on the experiences, views, and needs of the family members and close friends of the HCWs who worked during the COVID-19 pandemic, and my mixed-method survey study (Section III, Chapter 8) is the globally first study which examined the degree of STS and associated factors, and experiences of the household members of HCWs.

Finally, throughout the course of completing this programme of research, I have completed relevant training at UCL, and in every stage of my PhD projects, I have received supervision from my primary supervisor Professor Jo Billings. Additionally, my second-supervisor Dr Naomi Glover, and my thesis committee members Dr Dannielle Lamb, Dr Talya Greene, and Professor Dominic Murphy were behind the projects and brought a diversity of experiences and perspectives to my PhD projects. This has strengthened the rigour, trustworthiness and quality of my PhD research (See Section III).

Despite these strengths, there are also some limitations of my PhD projects. Firstly, whilst I sought to gather a variety of individuals' perspectives, some groups are underrepresented in my qualitative and mixed-method survey studies, such as partners in same-sex relationships, family members and close friends who are from ethnic minorities, and family members and close friends with disabilities. Further research paying attention to these groups will help more family members' voices be heard. Secondly, in my first systematic review study, I analysed the data using Slavin's Best Evidence Synthesis (1985). Even though the cutoff scores were determined as strong, moderate, limited, or mixed evidence, according to the previous literature findings (de Oliveira et al., 2020), other dimensions needed to be examined carefully before counting the consistent findings from the three studies as strong evidence. For example, according to the evidence hierarchy of Pope et al., (2007) findings of some of the studies are more valuable than others. Pope, Mays, and Popay (2007) reported that the hierarchy of the evidence is following; "*systematic review and meta-analysis*> *RCTs*> *Quasi-experimental designs, cohort studies, case-control studies*> *Surveys*> *Case reports*, > *Qualitative methods*> *Anecdote/expert or user opinion*" (p.12). However, in Slavin's (1985) approach and therefore in my first review study, the type of study (such as RCTs or survey study) was not taken into account when determining the evidence for the

findings. This was a learning point for me, and I subsequently conducted my second systematic review study by using more structured guidelines (Popay et al., 2006) to analyse the findings of the included study, thanks to my experiences after conducting my first review study. Finally, my mixed-method survey study was a cross-sectional study, and due to the nature of the cross-sectional studies, my findings reflect a single point in time and cannot provide information about the experiences of STS amongst HCWs' household members over time (See Section III, Chapter 8). To better understand the longitudinal impact of the occupational stress on family members and close friends of high-risk workers, longitudinal studies are urgently needed.

Chapter 12. Implications

Overall, the projects that I conducted in this thesis have key theoretical, clinical, organisational, and research implications, primarily in bringing attention to the difficulties experienced by the families and friends of workers in high-risk occupations and how family members and friends can be better supported by identifying their needs. In this chapter I explain the theoretical, clinical, organisational, and research implications of my PhD projects.

1. Theoretical Implications

Under this subtitle, I discuss the theoretical implications of the findings of my PhD projects on understanding the experiences, views, needs, and mental health and wellbeing issues of family members and close friends of high-risk workers. By placing my findings within the existing literature, my purpose is to underline how my projects contribute to the current theoretical framework.

As discussed in Chapter 2 of Section IV, the ABC-X Model proposes that stress experienced by family members of military personnel may vary based on their coping skills (B) and their interpretation of the stressful events (C) (Hill, 1958). The findings of my PhD studies show that family members and close friends of high-risk workers are at high risk of developing mental health and wellbeing issues due to their loved one's high-risk work, which has significant implications for Hill's ABC-X Model (1958). Similar to the findings of the studies conducted with spouses and partners of military personnel in light of the ABC-C Model, in my PhD projects, I also found that strategies to cope with stressors (B) and how stressful events are interpreted (C) may make a difference in the experiences, views, mental health, and wellbeing of family members and close friends of the high-risk workers. For example, the findings of my qualitative and review studies showed that family members and friends of the high-risk workers who felt supported by extended family members, friends and the rest of society reported better mental health and wellbeing (see Section III). Likewise, while family members and close friends who interpreted media support in a positive way reported better wellbeing, whereas those who interpreted media support as overshadowing the real issues that HCWs experience reported increased worry and distress (Section III, Chapter 5; also, Tekin et al., 2022).

The ABX-C Model was proposed based on the findings of studies which were conducted with spouses and wives of military personnel who were deployed during World War II and the Vietnam War (Hill, 1958). However, the findings of my PhD projects suggest that the ABC-X model can be extended by incorporating the other family members and friends of other high-risk occupational group workers such as HCWs and emergency responders. Additionally, in the original model, component B focuses on coping with stressors and component C focuses on the interpretation of the stressors (Hill, 1958). However, in light of the findings of my PhD projects, I would consider that the quality of this support (B) and the way family members interpret this support may also shape the impact of the high-risk occupations on the family members of high-risk workers. Finally, according to the ABC-X model's component B, spouses' and partners' worry about the health of military personnel may impact their coping skills with occupation-related stressors in a negative way (Frankel et al., 1992; Hill, 1958). The findings of my PhD projects support this. However, in my qualitative study, my second systematic review, and my mixed method survey study where the samples were family members and friends of HCWs, I also found that family members and friends of HCWs not only worried about the worker's mental health physical health, but also, they worried about the rest of the household members (Section III, Chapters 1, 3, and 4). For this reason, I would highlight the importance of the potential that there may be different experiences of the family members of different high-risk workers while using this model.

Key Recommendations: Expanding the ABC-X Model to comprise other family members and friends of high-risk workers other than military personnel, such as HCWs and first responders.

Conducting more studies using an extended version of the model based on the modern family concept.

The Spillover-Crossover Model explains the impact of workers' workplace experiences on their family lives and partners (Bakker & Demerouti, 2018). The Spillover-Crossover Model has been previously applied to military families and first responders' families. However, the findings of my projects show that the experiences of family members and friends of HCWs may be an important example to demonstrate the Spillover-Crossover

Model in healthcare families. According to the findings of my qualitative and mixed-method survey studies (Section III, Chapter 5 and 8), family members and friends of the HCWs reported that their HCWs' daily job experiences had an impact on their mental health and wellbeing, as well as family relationships. For example, household members of HCWs underlined that after experiencing a difficult day at work, HCWs tended to be quieter and more distant from the rest of the household, and this disrupted their family relationships (spillover). Eventually, the changes in the HCW's emotions and behaviours impacted their relationships as a couple (spillover), and this led to depression in the spouse/partner (crossover) (Section III, Chapter 8).

My research does not only support the Spillover-Crossover Model, but also contributes to extending it to other family members and close friends of high-risk occupational group workers. For example, not only the spouses and partners of HCWs and first responders were impacted due to the long working hours, shifts, and separation, but also their children, extended family members, friends, and housemates were impacted (Section III). For this reason, my research may be helpful in extending the Spillover-Crossover Model by incorporating other family members and household members of the high-risk workers.

Key Recommendations: Expanding the Spillover-Crossover Model by incorporating other family members and household members of high-risk workers (which may provide a more comprehensive understanding of the experiences, views, needs, mental health, and wellbeing of family members and close friends of the high-risk workers).

2. Clinical and Organisational Implications

In the UK Armed Forces Families Strategy 2022-2032 (2022), the minister for Defence People and Veterans, Leo Docherty MP reported that “*Armed forces families are at the heart of the Defence community and play a key role in the protection of the United Kingdom at home and abroad*” (p. 2). According to the Armed Forces Families Action Plan (2022), in terms of providing support to family members of military personnel, the following objects were determined, which can be adapted to family members and friends of the other high-risk workers.

Family life: It is well-documented that military work has an impact on family life (Section II, Chapter 3). According to the findings of a qualitative study which was conducted with 30 family members and military personnel in the US (Wolf et al., 2018), family members and military personnel reported that families were struggling to understand military work and its impact on the worker, and they reported conflicts in the family due to the military work. In light of findings in the current literature, the first objective of the UK Armed Forces Families Strategy 2022-2032 (2022) was to help family members understand and cope with military work, more specifically, deployment, separation, and other stressors associated with military work. This is intended to provide support to both family members and military personnel to develop and maintain healthy relationships in the family. Additionally, this objective included resources that aimed to explain military lifestyle to the family members and make them feel informed and included.

The findings of my PhD projects also underlined that household members of HCWs were struggling to understand the HCWs' job experiences and mostly they were feeling excluded (Section III, Chapter 8). As it was suggested in the UK Armed Forces Families Strategy Plan 2022-2032 (2022), other high-risk workers' workplaces (for example, NHS services) could consider piloting informational resources or pilot peer support groups that include family and household members of other high-risk workers to share information and experiences (i.e., sharing information about the nature of the high-risk work and having a loved one who is a high-risk worker).

Induction programmes for family members, friends, and household members of high-risk workers who have newly started their jobs also may be worthwhile for families to understand their high-risk worker loved one's experiences at work.

Key Recommendations: Providing informal resources and piloting peer support groups for family members and friends of the high-risk workers to share information and experiences.

Preparing induction programmes for family members and friends of high-risk workers who have newly started their jobs to introduce the high-risk work and its potential impact on the worker and household

Additionally, my findings demonstrated that family members of high-risk workers (such as HCWs, firefighters, police officers, seafarers, and explorers) tend to experience communication and relationship problems in their families and households. For this reason, supporting family members and friends of high-risk workers in developing and maintaining healthy communication skills and relationships is crucial for high-risk workers' families and households.

Key Recommendations: Providing support to develop and maintain healthy communication skills and relationship between the family members/friends of the worker and the worker.

Support for children: In terms of providing support for children of military personnel, the UK Armed Forces Families Strategy Plan 2022-2032 (2022) specifically focused on children's education and childcare. In their systematic review study which included 47 studies, Alfano et al., (2016) reported that parental deployment may have a negative impact on military children's academic performance. According to the findings of a study which included 56,000 children who were enrolled in Department of Defence schools in the US between 2002-2005, school age children whose military personnel parent was deployed for a long time during the school year recorded lower academic success compared to children whose parent was deployed for a shorter period of time (Engel et al., 2010). However, in their systematic review of 47 papers, Alfano and colleagues (2016) discussed that the impact of the deployment on military children's academic performance may be secondary to other factors such as distress due to the parent's absence (when the military personnel left home for deployment) or changes in living locations (when they moved in a location as a family where military personal was deployed). Lyle (2006) reported that due to deployment, military children's living locations and their schools change, with classmates and friends left behind. This may negatively affect their academic performance. Since the education of children of military families is at risk of being affected by military work, objectives aiming to keep this negative impact at a minimum level were included in the UK Armed Forces Families Strategy Plan 2022-2032 (2022). For example, supporting children during the transaction

process and identifying vulnerable children and providing support to them and their parents.

In my PhD projects, I also found that children of other high-risk workers may be at risk of facing issues related to their education. For example, in my qualitative study (Section III, Chapter 5; also, Tekin et al., 2022), my second review study (Section III, Chapter 7; also, Tekin et al., 2024), and my mixed-method survey study (Section III, Chapter 8), family members of HCWs reported that healthcare work was not family friendly regarding the choosing of living locations. Family members of HCWs underlined that they had to move places to live based on the HCW's job due to long working hours and shifts, and families of HCWs sometimes needed to travel for several hours every day to go to their own job/school or they needed to change their workplaces/schools, which caused tension between family members. Additionally, during the COVID-19 pandemic, separation was a fact for many healthcare workers' families as well. Studies conducted with military families show that this separation negatively affects children's education and academic performance (Alfano et al., 2016; Lyle, 2006). However, we do not have evidence about the impact of such separation and changes in living locations on other high-risk occupational group workers' children, specifically HCWs' children. For this reason, more research is required to understand the impact of separation and changing living locations on the children of high-risk workers. Additionally, children of high-risk workers who are vulnerable in this regard need to be identified and supported properly.

Key Recommendations: Conducting more research to understand the impact of separation and changing living locations on children of high-risk workers. Identifying and supporting the children of high-risk workers in this regard.

In terms of childcare, according to findings of my PhD projects, family members of high-risk workers reported that they had to take more responsibilities at home including childcare due to the long working hours and shifts of the high-risk workers, which had a negative impact on their mental health and wellbeing (Section III). One of the objectives of the UK Armed Forces Families Strategy Plan 2022-2032 (2022) is to deliver funding to support military families regarding childcare. This plan, which was prepared based on

military families, could be expanded to include families of other high-risk occupational groups, and if families are provided with support regarding childcare, their mental health and wellbeing may be impacted positively.

Key Recommendations: Delivering funding to support family members of other high-risk workers including HCWs, firefighters, police officers, and seafarers, regarding childcare.

Support for careers of partners/spouses: The UK Armed Forces Families Strategy Plan 2022-2032 (2022) highlighted the difficulties of being a spouse/partner of someone in the military. For this reason, the objective was to increase the awareness of society and private sectors of the disadvantages of being a spouse/partner of a military personnel and support spouses/partners in developing their own careers. Additionally, it was suggested to play an active role in supporting the careers of spouses and partners (i.e., providing training or increasing access to the training for the spouses and partners to develop their own careers).

Unlike initiatives to support the careers of military personnel's partners and spouses, it may be more beneficial to offer support to high-risk workers themselves rather than directly to the spouses/partners to support their careers. For example, my PhD projects' findings demonstrated that spouses/partners explained that their career was impacted negatively due to the demanding nature of the high-risk work (Section III). Due to the long working hours and shifts of the high-risk workers, spouses and partners reported that they needed to take on more responsibilities at home, and this damaged their careers (Section III). For example, spouses and partners of HCWs who worked during the COVID-19 pandemic reported that they had to sacrifice their own careers to support their HCW partner and this impacted their mental health and wellbeing negatively (Section III, Chapter 5; also, Tekin et al., 2022). For this reason, I would consider that while supporting spouses and partners of high-risk workers to develop and maintain their own careers, it is significant to manage the high-risk worker's working conditions as well because high-risk workers' working patterns can have a significantly negative impact on the careers of spouses/partners. Arranging the working hours and shifts of high-risk workers and

making their work more family friendly may indirectly support the careers of spouses and partners.

Key Recommendations: Arranging working hours and shifts of high-risk workers and making the high-risk work more family friendly to support the careers of spouses/partners of high-risk workers may be useful.

Additionally, regarding the increasing awareness of society, similar to military families, spouses/partners of HCWs also reported that their sacrifices were not recognised by society (Section III, Chapter 5; also, Tekin et al., 2022). In the UK Armed Forces Families Strategy Plan 2022-2032 (2022), in order to increase the recruitment of partners, a plan to raise awareness in society about the "*difficulties of being a military spouse*" is highlighted (p. A2). However, the findings of my PhD projects showed that increasing awareness in society about the disadvantages of being a high-risk worker's spouse/partner is not only important for the careers of spouses and partners, but also, it may also improve their mental health and wellbeing (Section III).

Key Recommendations: Raising social awareness about the difficulties of being a spouse/partner of a high-risk worker and the sacrifices of spouses/partners.

Providing health and wellbeing support: UK Armed Forces Families Strategy Plan 2022-2032 (2022) highlighted the importance of providing health and wellbeing support to military personnel and their family members. In their rapid review and meta-analysis study which included 59 studies related to the psychological impact of epidemics on HCWs, Kisely et al., (2020) reported that it is critical to train HCWs to identify potential mental health and wellbeing issues in themselves, and cope with them. Additionally, Kisely et al., (2020) highlighted the importance of accessing services for psychological support. Similarly, in their systematic review study which included 27 papers related to the mental health and wellbeing of first responders, Jones et al., (2017) reported that first responders are at high risk of developing mental health and wellbeing issues such as anxiety, depression, and PTSD, and providing evidence-based efficient psychological support is crucial for them.

The findings of my PhD projects extend this by showing that the mental health and wellbeing of high-risk workers impact the mental health and wellbeing of their family members and friends as well. For example, according to the findings of my qualitative study (Section III, Chapter 5; also, Tekin et al., 2022) and the second review study (Section III, Chapter 7; also, Tekin et al., 2024), family members and close friends of HCWs are constantly worried about the mental and physical health of the HCW, and the rest of the household members. Similarly, in the findings of my first review study, family members and close friends of the other high-risk workers (such as firefighters, police officers, seafarers, and explorers) are also worried about the health of the workers. Based on the findings of my qualitative and mixed-method survey study (Section III, Chapter 5 and 8); while supporting HCWs, family members, friends, and household members expose the details of the traumatic incidents that HCWs experienced at work, hence they are at high risk to develop STS. For this reason, prioritising the mental health and wellbeing of both the high-risk worker and their family members and close friends is crucial.

Key Recommendations: Providing timely psychological assessment and evidence-based support to both the high-risk workers and their family members/friends

Organisations also need to make arrangements to support the family members and friends of individuals working in high-risk occupational groups. According to the findings of a systematic review and meta-synthesis of 46 studies that aimed to understand the experiences of HCWs in different epidemics, Billings et al., (2021) underlined that increased working hours and shifts could have a detrimental effect on mental health and wellbeing of HCWs. Similarly, in a systematic review and meta-analysis of 41 studies that aimed to understand the risk and protective factors related to burnout amongst police officers, Alves et al., (2023) reported a significant correlation between long working hours/shifts and burnout in police officers. The findings of my PhD projects extend this by showing that these working patterns can have a negative impact on high-risk workers' family members/friends as well as on the workers themselves. For this reason, the pay and working conditions of high-risk workers need to be prioritised not only for the

continuity of the high-risk workers' jobs but also to potentially protect their family members and friends who are the primary sources of support for the high-risk workers.

Key Recommendations: Providing better working conditions for high-risk workers (such as access to healthy food, IT support), better pay and conditions may be critical for both the high-risk workers' wellbeing but also that of their family members and friends.

In addition to mental health support for the family members and close friends of high-risk workers, long-term medical support is also significant for them. During the COVID-19 pandemic, due to the risk of transmission, there was a significant health risk not only for the HCWs themselves but also for their household members (Lorenzo et al., 2020). In my qualitative study, many of the family members reported that they caught COVID-19 in the first wave in the UK and several had been seriously ill. Some of the family members shared that they experienced long COVID, struggled to heal, and needed long-term medical support (Section III, Chapter 5). However, some of the family members reported that during the early phases of the pandemic, they struggled to have COVID tests as family members of a HCW, and they felt that family members of HCWs were not supported by the NHS. Hence, household members of HCWs require long-term medical follow up and support.

Key Recommendations: Providing adequate testing and long-term medical follow-up and support for household members of HCWs.

Providing mental and physical health support for family members/household members of high-risk workers

3. Research Implications

In the current literature base, findings related to the family members of high-risk workers are dominated by military families. More research needs to be conducted regarding the experiences, needs, mental health, and wellbeing of the families of other high-risk workers. It is important to explore the impact of different high-risk jobs such as astronauts, explorers, diplomats, and journalists on their loved ones. Secondly, in the current literature, the focus has mostly been on the mental health of spouses and

partners of high-risk workers. Therefore, more research needs to be done regarding the experiences of different family members and friends of high-risk workers such as parents, siblings, and children. Finally, partners in same-sex relationships, high-risk workers' family members and close friends who are from ethnic minorities, and high-risk workers' family members and friends with disabilities are underrepresented in the current literature. Further research paying attention to these groups may help more voices of the family members and friends of high-risk workers be heard.

Key Recommendations: Investigating the experiences, views, needs, mental health, and wellbeing issues of different family members and friends (i.e., siblings, parents, children) of different high-risk workers (i.e., astronauts, explorers, diplomats, and journalist).

Investigating the experiences views, needs, mental health, and wellbeing issues of underrepresented family members and friends of the high-risk workers (i.e., same-sex relationships, those who are from minority backgrounds, those with disabilities).

Regarding this field of research, there is an outstanding gap in the literature about the positive impacts of high-risk work on family members and friends of high-risk workers. In my qualitative study, some of the family members and friends reported that having a HCW in the family had advantages during the pandemic because they could ask questions about COVID-19 of their HCW loved one to understand the disease better. Additionally, some participants highlighted that they felt safer because there was a HCW in their family/household who could give them emergency treatment when they needed it and who could easily communicate with other doctors in the hospital when needed (Section III, Chapter 5; also, Tekin et al., 2022). However, other positive impacts of high-risk work on the workers' families and friends need to be investigated. Additionally, secondary traumatic stress and vicarious trauma amongst family members and household members of high-risk workers is a relatively new topic in clinical research. For this reason, more research needs to be conducted related to secondary traumatic stress/vicarious trauma and associated factors, in addition to the demographics of household members of high-risk workers.

Key Recommendations: Investigating the positive impact of high-risk work on the workers' family members and friends.

Investigating the mental health and wellbeing issues of the family members and close friends of the high-risk workers, specifically secondary traumatic stress and vicarious trauma experiences.

The data for my qualitative and mixed-method survey study was collected from family members and friends of HCWs who worked during the COVID-19 pandemic in the UK. In my mixed-method survey study, the open-ended questions or survey questions were not specific to the COVID-19 experiences but may nevertheless have had an effect on the responses of the participants. For this reason, more research (specifically longitudinal studies) should be conducted to investigate the mental health and wellbeing of family members and close friends of HCWs after the COVID-19 pandemic, and if the mental health and well-being issues of family members and friends continue to persist in a post-pandemic context.

Key Recommendations: Investigating the experiences, views, needs, mental health, and wellbeing of family members and friends of the HCWs after the COVID-19 pandemic.

Further longitudinal research is required to explore whether similar findings are replicated and whether new challenges are identified over time.

To the best of my knowledge, in the current literature, there is no information about the pre-existing psychiatric history of the family members and close friends of the high-risk workers. Due to the lack of information about the pre-existing psychiatric histories of the family members and close friends of the high-risk workers, a potential question may arise: "How do we know that the mental health and wellbeing issues that they experienced are related to high-risk workers' jobs?". According to the findings of my qualitative and mixed-method survey studies, family members and friends reported that they experienced anxiety, worry, and low mood in addition to severe secondary traumatic stress, and they reported that those feelings were associated with the HCW loved one's job. Similarly, in the first review study, I found that family members of different high-risk

workers (such as firefighters, police officers, and explorers) experienced mental health and wellbeing issues in addition to practical burdens and they all underlined that those experiences were related to their family members' job, for example such as due to absence or the health risks of the high-risk worker's role. However, those findings were from qualitative studies and more mixed-method research should be conducted to investigate the impact of high-risk jobs on the mental health and wellbeing issues of family members and close friends of high-risk workers which also includes the pre-existing psychiatric history of the family members/friends.

Key Recommendations: Including pre-existing psychiatric history of the family members/friends of the high-risk workers in future research

Further mixed-method research is required to explore the impact of high-risk jobs on the mental health and wellbeing of family members and close friends of high-risk workers by including the pre-existing psychiatric history of the family members/friends.

Overall, I would consider that while family members and friends in different high-risk works have similar issues, they may also have their own unique problems specific to the high-risk workers' occupations. For this reason, it is critical to determine and evaluate these issues, and create plans and tailor guidance to provide support for each high-risk group.

Section V: Conclusion

My PhD projects are some of the few studies that have focused to date on the experiences, views, needs, mental health, and wellbeing of the family members, friends, and housemates of high-risk workers. My qualitative study is the first study in the UK that explored the experiences of family members and friends of HCWs who worked during the COVID-19 pandemic. To the best of my knowledge, my first systematic review project is the only study that has focused on the experiences, views, needs, mental health, and wellbeing of family members and friends of different high-risk occupational group workers and compared and contrasted the experiences of the family members of different high-risk workers. My second review project is the first study that has compared and contrasted the experiences of the family members and friends of HCWs before and during the COVID-19 pandemic. Finally, to the best of my knowledge, my mixed method survey study is the first study globally that has examined secondary traumatic stress and associated factors amongst the household members of HCWs.

The findings of my qualitative study underlined that while supporting their HCW loved ones, family members and close friends are at high risk of developing physical, mental, and well-being issues. Even though family members and friends of the HCWs are proud of their HCW loved ones, they think that the needs of the HCWs and their family members are not met by NHS, and they feel neglected. For example, they reported that HCWs' working hours and shifts were increased during the COVID-19 pandemic, and there was a lack of PPE and training for the HCWs. Those did not only cause a lot of stress for families and friends of the HCWs, but also increased the transmission risk. Additionally, since the family members and close friends of HCWs are the primary support sources for the HCWs, they tend to be exposed to the traumatic details of the HCWs' jobs, which increases the risk of experiencing secondary traumatic stress in family members and close friends.

In my first systematic review study, I found that family members and friends of different high-risk workers have similar experiences and needs. For example, there is a significantly high risk of mental health and wellbeing issues for family members and close friends of all high-risk workers. There are also different experiences and needs among the family members of different high-risk workers. For instance, intimate partner

violence and discipline issues amongst children of certain occupational groups require further examination.

In my second systematic review study, I explored similar and different experiences of family members and friends of HCWs before and during the COVID-19 pandemic. My findings demonstrated there are some issues that family members/friends experience regardless of the COVID-19 pandemic, such as increased domestic responsibilities at home due to the long working hours and shifts of HCWs, mental health and wellbeing issues, and disrupted family functionality. However, I also found that the COVID-19 pandemic worsened those experiences. For example, family members and friends of HCWs reported that they were feeling anxious due to the health risks for HCWs. However, with the COVID-19 pandemic, they started to worry about the health of the rest of the family/household as well due to the risk of contamination. Additionally, before the pandemic, due to the nature of healthcare work, HCWs tended to come back home after their work. However, with the pandemic, they had to isolate themselves or had to work long shifts, which led to separation between workers and their families. Due to this separation, some family members reported even more disrupted family relationships.

Finally, in my mixed method survey study, 33.8% of the household members of HCWs reported severe STS, and female spouses/partners of the HCWs with clinical roles were at higher risk of developing STS compared to male other household members of HCWs with non-clinical roles. Additionally, household members reported that their household relationships were disrupted after the HCW experienced a difficult day at work as they tended to bring those feelings home and tended to be quieter, irritated, and stressed. Some household members reported that those feelings and behaviours not only negatively impacted relationships in the household but also family members mental health and wellbeing.

Overall, the findings of my PhD projects have theoretical, clinical, organisational, and research implications. In light of the findings of my PhD projects, firstly, I suggest that expanding the ABC-X Model and Spillover-Crossover Model by incorporating other family members and household members of other high-risk workers are required for a more comprehensive understanding of the experiences, needs, mental health, and wellbeing

of family members and friends of high-risk workers. Secondly, providing access to evidence-based psychological support including timely assessment and treatment to both the high-risk workers and their family members and friends is critical. Thirdly, providing informational resources and piloting peer support groups for family members/friends of high-risk workers to share information and experiences may be helpful. Additionally, induction programmes for families, friends, and household members of high-risk workers who have newly started their jobs may be beneficial to aid the understanding of their loved one's jobs. Fourthly, I suggest some organisational adjustments to improve the mental health and wellbeing of both the high-risk workers and their loved ones. For example, providing better working conditions for high-risk workers (such as access to healthy food, and IT support), better pay, and improved working hours and shifts could be helpful for the mental health and wellbeing of the worker and their loved ones. Finally, I would consider while family members and friends in different high-risk works have similar issues, they may also have their own unique problems specific to the high-risk workers' occupations. For this reason, more research is required to understand the experiences, needs, mental health, and wellbeing of different family members and friends (i.e., siblings, parents, and children) of different high-risk workers (i.e., astronauts, explorers, diplomats, journalists, and farmers). Specifically, under-represented family members and friends such as same-sex relationships, from minority backgrounds, and those with disabilities need to be investigated carefully. To sum up, it is critical to determine and evaluate these issues and create plans and guidance to provide support for each high-risk group and their households.

Section VI: Academic Achievements & Responsibilities During the PhD

During my PhD, working in the Division of Psychiatry with my team of supervisors and thesis committee members has provided me with opportunities to collaborate and contribute to wider related research and academic activities. In this section, I summarise my academic achievements and responsibilities during my PhD.

1. Publications

I have published six papers during my PhD.

- **Tekin, S.**, Nicholls, H., Lamb, D., Glover, N., & Billings, J. (2024). Impact of Occupational Traumatic Stress on the Family Members of Healthcare Workers Before and During the COVID-19 Pandemic: A systematic review. *PLOS ONE* (accepted for publication)
- Tamworth, M., **Tekin, S.**, Billings, J., & Killaspy, H. (2024). What Are the Experiences of Mental Health Practitioners Involved in a Coroner's Inquest and Other Inquiry Processes after an Unexpected Death of a Patient? A Systematic Review and Thematic Synthesis of the Literature. *International Journal of Environmental Research and Public Health*, 21(3), 357.
- Powling, R., Brown, D., **Tekin, S.**, & Billings, J. (2024). Partners' experiences of their loved ones' trauma and PTSD: An ongoing journey of loss and gain. *Plos one*, 19(2), e0292315.
- **Tekin, S.**, Burrows, K., Billings, J., Waters, M., & Lowe, S. R. (2023). Psychosocial resources underlying disaster survivors' posttraumatic stress symptom trajectories: insight from in-depth interviews with mothers who survived Hurricane Katrina. *European Journal of Psychotraumatology*, 14(2), 2211355. DOI: 10.1080/20008066.2023.2211355
- **Tekin, S.**, Glover, N., Greene, T., Lamb, D., Murphy, D., & Billings, J. (2022). Experiences and views of frontline healthcare workers' family members in the UK during the COVID-19 pandemic: a qualitative study. *European Journal of Psychotraumatology*, 13(1). DOI: 10.1080/20008198.2022.2057166
- Nicholls, H., Nicholls, M., **Tekin, S.**, Lamb, D., & Billings, J. (2022). The impact of working in academia on researchers' mental health and well-being: A systematic review and qualitative meta-synthesis. *PLOS ONE*, 17(5), e0268890. DOI: 10.1371/journal.pone.0268890

2. Papers Currently Under Review and Ongoing Projects

- **Tekin, S.**, Lamb, D., Greene, T., Tamworth, M., & Billings, J. (2024). Secondary Traumatic Stress Experiences of Household Members of Healthcare Workers in the UK-A mixed method survey study (under review)

- Tamworth, M., **Tekin, S.**, Billings, J., & Killaspy, H.(2024). Coroners' Inquests - A guide for healthcare workers in the UK: A systematic review (currently being prepared to submit for publication)
- Smith C., **Tekin, S.**, & Billings, J. (2024). Available interventions to support the staff who are at risk of exposure to distressing material in the line of work? (currently being prepared to submit for publication)

3. Other Academic Achievements

- UCL-YALE Exchange Programme: I was funded by UCL Doctoral School as part of the UCL-YALE Exchange Programme to work as a visiting researcher at Yale University. During my time at Yale University, I had a chance to be involved in two different research groups: The Trauma & Mental Health Lab (Dr Sarah Lowe's lab at Yale University) and the RISK Group (A research group consisting of researchers from different universities such as Yale University, Harvard University, University of British Columbia, and Brown University), examining the psychological and sociological impact of Hurricane Katrina on survivors. Thanks to this opportunity, I could work on a manuscript that aimed to explore the psychological capacities of survivors with different disaster-related PTSS trajectories (recovery, resilience, and chronic) and their mental health and psychological well-being changes from Round 1 (interviews conducted one year after the Katrina) to round 3 (interviews conducted twelve years after the Katrina). The co-authors of the research were Dr Jo Billings, Professor Mary Waters (from Harvard University), Dr Kate Burrows (from Brown University), and Dr Sarah Lowe (from Yale University). This manuscript was published in the European Journal of Psychotraumatology's special issue called "Climate Change, Disasters and Traumatic Stress" in 2023.
- Thanks to my time at Yale University, I prepared a presentation with Dr Jessica Bonumwezi for the International Society for Traumatic Stress Studies (ISTSS) Congress in 2022 with the title of "The Role of Meaning-making in Facilitating Posttraumatic Growth in Survivors and Children of Survivors of the 1994 Genocide against the Tutsi in Rwanda".

- I worked as an honorary assistant psychologist at Southwest London and St George's Traumatic Stress Clinic from February 2022 to August 2022.
- I have worked as a post-graduate teaching assistant (PGTA) at UCL in the Division of Psychiatry from May 2021 to September 2024. My PGTA roles included marking and facilitating teaching.
- I prepared a psychosocial support program for first responders and their families who responded to the 6th of February Turkey-Syria earthquake. Under my leadership, along with approximately 20 mental health professionals, we provided support to dozens of frontline workers and their families during the aftermath of the earthquake throughout 2023.
- I have presented the findings of my studies at the UK Trauma Research Group meeting (2022), the Trauma Seminar organised by the Social Sciences University of Ankara (2022), NHS CHECK Conference (2022), Ibn Haldun University International Mass Trauma Conference (2023), and AHBAP Association Turkey-Syria Earthquake Seminar (2023).
- I have written a blog for Mental Elf, which was related to the mental health and wellbeing of the mental health professionals who work with trauma survivors. (See [Vicarious trauma: how does working with trauma survivors affect therapists?](#))

4. **Supervision**

- **Hana Matoshi (2023-2024):** A Systematic Review Exploring Experiences, Views, and Needs of Family Members of Emergency Response Workers: A systematic review and meta-synthesis (as primary supervisor for the qualification of MSc in Clinical Mental Health Sciences)
- **Jessica Osler (2023-2024):** A Survey Study Examining the Relationship Between Secondary Traumatic Stress and Family Functionality in Families of Healthcare Workers in the UK (as primary supervisor for the qualification of MSc in Clinical Mental Health Sciences)
- **Charlotte Smith (2022-2023):** What are the current available interventions to support the staff who are at risk of exposure to distressing material in the line

of work? (as secondary supervisor for the qualification of MSc in Clinical Mental Health Sciences)

- **Connor Clarke (2022-2023):** The experience of accessing physical healthcare when you have a diagnosis of a 'personality disorder': a systematic review and meta-synthesis (as secondary supervisor for the qualification of MSc in Clinical Mental Health Sciences)

5. Experience as a Reviewer

- European Journal of Psychotraumatology (2024)
- Liaquat National Journal of Primary Care (2024)
- Journal of Paediatric Nursing (2023)

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Section VIII: Appendices

Appendix 1: Questionnaires that Measure the Psychological Distress

Questionnaire Name	Reference	Items	Notes
Distress Questionnaire-5	Batterham et al., (2016)	5 items	-This scale was generated to measure the level of psychological distress.
K-10 and K-6	Kessler et al., (2002)	K10: 10 items K6: 6 items	-K10 and K6 were generated to assess the psychological distress of individuals who experience a wide range of mental disorders.
Mental Health Inventory	Veit & Ware (1983)	38 items	-Mental Health Inventory was developed to assess the psychological distress and wellbeing across the general population.
Patient Health Questionnaire-9	Kroenke et al., (2001)	9 items	-The Patient Health Questionnaire (PHQ) is a questionnaire that measures depression and other psychological disorders.
Perceived Stress Scale	Cohen et al.,	14 items	-It is a scale that measures how

	(1983)		stressful a person perceives their life events.
Psychological Index	Sonino & Fava (1998)	55 items	-This index was developed to assess four elements of patients' lives: stress, well-being, psychological distress, and illness behaviour.
Self-report Questionnaire-20	Beusenberget al., (1994)	20 items	-A self-report questionnaire was developed to assess non-specific psychological distress and had subscales such as depression and anxiety, somatic symptoms, reduced vital energy, and depressive thoughts.

Appendix 2: Questionnaires that Measure the PTSD

Questionnaire Name	Reference	Items	Notes
Clinician-Administered PTSD Scale for DSM-5 (CAPS-5)	Weathers et al., (2013)	30 items	-In this structured interview, it is aimed to measure the PTSD symptoms a) over the last week, b) last month, c) lifetime diagnosis
Impact of Event Scale - Revised (IES-R) for DSM-IV	Weiss, D. S., & Marmar, C. R. (1996).	22 items	-This self-reported questionnaire was designed to measure experienced distress after a traumatic event.
PTSD Checklist for DSM-5 (PCL-5)	Weathers et al., (2013)	20 items	-This self-reported inventory was designed to examine the symptom change during and post-treatment, screen the PTSD symptoms, and help to diagnose the PTSD.
Structured Interview for PTSD (SI-PTSD)	Davidson et al., (1990)	17 items	-In this structured interview, PTSD symptoms are assessed in addition to survival and behavioural guilt.

Appendix 3: Questionnaires that Measure Secondary Traumatic Stress and Vicarious Trauma

Questionnaire Name	Reference	Items	Notes
Professional Quality of Life Scale	Stamm (2010)	30 items	<p>-This self-reported scale was developed to measure the compassion satisfaction, burnout, and secondary traumatic stress experiences of professionals.</p> <p>-However, lack of psychometric evaluation may be a potential limitation of this scale (Watts & Robertson, 2015).</p>
Secondary Traumatic Stress Scale	Bride et al., (2004)	17 items	<p>-This scale was designed to measure impact of working with traumatised clients on the professionals in last seven days.</p>
The Secondary Trauma Exposure Scale	Cieslak et al., (2013)	10 items	<p>-This scale was specifically designed to measure the mental health professionals' indirect exposure to different traumatic events such as disaster,</p>

			accidents, war, etc.
Trauma and Attachment Belief Scale (TABS)	Pearlman (2003)	84 items	<p>-This scale, which previously known as 'Traumatic Stress Institute Belief Scale', was used to measure vicarious trauma in different populations such as social workers and psychotherapists.</p> <p>-However, due to the lack of time and sources, this questionnaire may be too long for its usage in field (Aparicio et al., 2013).</p>
Vicarious Trauma Scale	Vrklevski & Franklin, (2008)	8 items	-This scale was developed to measure vicarious trauma.

Appendix 4: Questionnaires that Measure Burnout

Questionnaire Name	Reference	Items	Notes
The Maslach Burnout Inventory (MBI)	Maslach et al., (1997)	22 items	<p>-This inventor was designed to measure three elements of the burnout: exhaustion, depersonalisation (cynicism), and professional efficiency, and it is accepted as a golden standard to measure burnout (Schaufeli, 2003).</p> <p>-MBI has different forms to measure burnout in different populations such as medical personnel, human service workers, educators, and general use.</p>

Appendix 5: Questionnaires that Measure Moral Injury

Questionnaire Name	Reference	Items	Notes
The Moral Injury Event Scale	Nash et al., (2013)	9 items	-In this scale, it was aimed to measure the war-related experiences which are related to self-harm, harming others, and betrayal
Moral Injury Questionnaire (MIQ)	Currier et al., (2015)	20 items	-It aimed to assess the exposure and frequency of potentially moral injury events during the mission
Modified Moral Injury Questionnaire	Bratman et al., (2018)	27 items	-This scale was modified from MIQ and aimed to assess core symptoms of moral injury such as guilt, shame, isolation, and struggling to forgiving themselves and others.

Appendix 6: PROSEPERO Protocol of the Systematic Review Project 2

Citation

Sahra Tekin, Naomi Glover, Helen Nicholls, Danielle Lamb, Jo Billings. “Impact of Occupational Stress on Family Members of Healthcare Workers Before and During the COVID-19 Pandemic: A systematic review”

Review Question

What is the impact of occupational stress experienced by healthcare workers (HCWs) on their family members' mental health and wellbeing before and during the COVID-19 pandemic?

Sub-questions

1. What are experiences, views, and needs of family members as supporters of HCWs?
2. Are there signs of vicarious/secondary trauma in family members?
3. What are similar and different experiences, views, needs, and mental health issues of family members of HCWs, before and during the COVID-19 pandemic?
4. What could be done to increase the well-being of family members?

Searches

Relevant published and unpublished studies will be searched in the following databases:

MEDLINE, PubMed, PsychINFO, Embase, PTSDpubs, Scopus

Depending on the articles that we retrieve, we may search the grey literature as well.

Studies in English and Turkish will be included in this review. We will also use backwards and forwards citation searching of key included papers. OpenGrey was picked to search for the grey literature.

We will also search for MSc and PhD dissertations in our initial searches. These might be included in the final review, according to sufficient availability of peer reviewed published research. We will contact authors to ask whether there is any published research or not based on their dissertations.

The PRISMA guidelines will be followed during the overall search.

Search Strategy

Given limited literature available in this field, we will focus on the two participant groups (Healthcare workers and their family members) and one “impact factors” group for our search terms. In the table below, you can see the search terms we will include for these groups:

<i>Healthcare Workers</i>	<i>Family Members</i>	<i>Impact Factors</i>
Healthcare worker*	Husband*	Post traumatic stress disorder*
Healthcare staff*	Partner*	PTSD*
Health professional*	Child*	Compassion fatigue*
Doctor*	Parent*	Burnout*
Nurse*	Sibling*	Vicarious trauma*
Midwi*	Brother*	Secondary trauma*
Paramedic*	Sister*	Burden*
Ambulance driver*	Daughter*	Social support*
Social worker*	Son*	Family support*
Psychotherapist*		Coping*
Psychologist*		Family health*
Mental Health Professional*		Marriage*
High risk role		
High risk occupation*		
High risk worker*		
Emergency responder*		
First responder*		
Care home staff*		
Care home worker*		
Nursing home worker*		

Type of study to be included

- Qualitative studies
- Quantitative studies
- Mixed method studies
- Written in English and Turkish

- Peer reviewed articles

Condition or domain being studied

We are interested in the experiences of, and impact on, family members of workers in healthcare workers before and during the COVID-19 pandemic. We will explore the experiences and views of family members, the impact on them of being the family member of a worker in a HCWs, including practical, emotional, and psychological impacts, and any intervention or suggested support for family members. Additionally, we will explore these experiences' differences and similarities before and during the COVID-19 pandemic.

Participants/ population

Adult (older than 18 years old) family member/ spouse/ wife/ husband/ partner/ child/ parent/ sibling of a worker in a healthcare role.

We will exclude the studies when the sample is not of family members and/or not of HCWs, abstract is not available in English/Turkish, and commentaries/ editorials.

Intervention(s), exposure(s)

Reviewing all qualitative, quantitative, and mixed method studies related to experiences, views, and the impact of being the family member of a worker in a healthcare occupation, including practical, emotional, and psychological impacts.

Comparator(s)/control

Not applicable

Main outcome(s)

- Experiences, views, needs and the impact of being the family member of a HCW, including practical, emotional, and psychological impacts.
- Similar and different experiences of family members of HCWs, before and during the COVID-19 pandemic.

Additional outcome(s)

- Interventions and strategies to support family members of HCWs.

Measures of effect

This will include practical, emotional, and psychological impact, measured by standardised measures and/or subjective self-report. This will also include descriptors of any interventions aimed to support family members of workers in healthcare roles, any indicators of effectiveness of interventions and qualitative measures of experiences/acceptability of interventions.

Data extraction (selection and coding)

Database searches will be conducted by the primary author (ST) and then all the retrieved papers will be downloaded. Downloaded studies will be deduplicated and stored electronically in EndNote X9. The titles and abstracts of all downloaded studies will be reviewed against the inclusion criteria by the primary researcher with a sub-set (at least 10%) reviewed by a second reviewer (HN). Then, the full text of the selected studies will be evaluated by two independent researchers including the primary researcher, and for inter-rater reliability Kappa statistics will be used. When there is a disagreement between independent researchers, this will be resolved through discussion with a third researcher (JB and/or NG). A PRISMA flow diagram will be included in the review.

The following information, where available, will be included in the data extraction section:

The lead author, date of publication, country, setting, study design, type of qualitative/quantitative analyses used, sampling method, sample size, demographic information (age, gender, relationship with healthcare worker, occupational role of family member, etc.), main findings, including themes identified in the qualitative/mixed research.

Quality assessment

CASP, one of the quality assessment tools, will be used to assess study quality. For example, the CASP checklist for qualitative research includes 10 different questions to assess the quality of qualitative papers. Two independent researchers will assess the quality of the study by rating the CASP questions as "Yes", "No" or "I can't say". Disagreement between these researchers will be solved in the meetings or via third researcher. In the end, all of the studies will be ranked as totally met, met, and not met.

We will choose other appropriate quality assessment/risk of bias assessment tools for other study designs such as MMAT, based on NICE Guidelines during our work ("Appendix F Quality appraisal checklist – quantitative intervention studies | Methods for the development of NICE public health guidance (third edition) | Guidance | NICE", 2022).

Strategy for data synthesis

We will collate qualitative, quantitative, and mixed method papers and separate them according to method type.

Narrative synthesis and tabulations will be conducted for qualitative, quantitative, and mixed method study designs. Our aim is to capture the experiences, needs, and the impact of being the family member of a worker in healthcare work, including practical, emotional, and psychological impacts before and during the COVID-19 pandemic, across the qualitative literature.

Prevalence and types of mental health issues and family members' needs will be addressed where we find sufficient evidence about it.

Limitations will be addressed.

Analysis of subgroups or subsets

We will consider similar and different experiences among the family members of HCWs from different countries, before and during the pandemic. We anticipate that it will be unlikely that we can conduct a meta-analysis, as study designs and outcome measures are likely to be heterogeneous. However, we will describe similarities and differences in the findings from studies related to family members of HCWs from different countries and similarities and differences in the findings from studies which were conducted before the pandemic and during the pandemic.

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Type and method of review

Narrative synthesis, Systematic Review

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English

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England

Stage of review

Review Ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Family; Humas; Mental Health; Occupations

Date of registration in PROSPERO

Date of first submission

Stage of review at time of this submission

The stage of preliminary searches complete.

Stage

Appendix 7: Published Paper from the Qualitative Project

Experiences and Views of Frontline Healthcare Workers' Family Members in the UK during the COVID-19 Pandemic: A qualitative study

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Key Words

Secondary trauma, family members, healthcare workers, qualitative, occupational trauma

Abstract

Background. The COVID-19 pandemic has had a well-documented negative impact on the mental health and wellbeing of frontline healthcare workers (HCWs). Whilst no research has to date been carried out to explore the challenges experienced by the families of HCWs, some previous research has been conducted with military families, demonstrating that family members of deployed military personnel may also be affected seriously and negatively.

Objectives. This study aimed to explore the experiences, views, and mental health impact on frontline HCWs' families during the COVID-19 pandemic in the UK and what support the families of frontline HCWs may need.

Method. Close family members and friends of HCWs were interviewed. Transcripts were analysed in line with the principles of reflexive thematic analysis.

Results. We completed fourteen interviews with three siblings, one mother, one friend, and nine spouses of HCWs. Family members were highly motivated to support healthcare workers and felt an intense sense of pride in their work. However, they also experienced increased domestic responsibilities and emotional burden due to anxiety about their loved ones' work. The fact that sacrifices made by family members were not noticed by society, the anxiety they felt about their family's physical health, the impact of hearing about traumatic experiences, and the failure of healthcare organisations to meet the needs of the HCWs all negatively affected the family members.

Conclusions. We have an ethical responsibility to attend to the experiences and needs of the families of healthcare professionals. This study emphasizes the experiences and needs of family members of healthcare professionals, which have hitherto been missing from the literature. Further research is needed to hear from more parents, siblings and friends, partners in same sex relationships, as well as children of HCWs, to explore the variety of family members and supporters' experiences more fully.

Highlights

COVID19 has impacted families of HCWs as well as workers themselves. They have experienced more anxiety, increased practical burden, significant physical health risks and been exposed vicariously to workers' traumatic experiences. We must ensure HCW families are better supported.

1. Introduction

The COVID-19 pandemic has had a well-documented negative impact on the mental health and wellbeing of frontline healthcare workers (HCWs). Recent research has shown that nearly 60% of a sample of health and social care workers in the UK met criteria for depression, anxiety, and PTSD symptoms following the first wave of the pandemic (Greene, Harju-Seppänen, Adeniji, Steel, Grey, Brewin et al., 2021). Additionally, frontline workers may experience burnout, moral injury, and secondary trauma (Billings, Biggs, Ching, Gkofa, Singleton, Bloomfield & Greene, 2021; Greenberg, Docherty, Gnanapragasam & Wessely, 2020).

Social support is a well-established protective factor against mental distress (Brewin, Andrews & Valentine, 2000) and frontline workers often depend on family support as a key factor to help them to cope with this work (Ozer, Best, Lipsey & Weiss, 2003). In turn, families are likely to be significantly affected by their family member(s) working in a high-risk frontline occupation during the pandemic. However, at the time of writing and to the best of our knowledge, there is no published research which has examined the impact of health care workers' occupation on their families and what the family's support needs might be.

Whilst we are not aware of any research to date exploring the challenges experienced by the families of HCWs, some previous research has been conducted with military families, demonstrating that family members of military personnel may also be affected seriously and negatively (Davidson, Smith & Kudler, 1989). For example, children and adolescents of veterans with PTSD have been shown to experience more behavioural and emotional difficulties, and developmental problems (Selimbasic, Sinanovic, Avdilbegovic & Hamidovic, 2016). Spouses of veterans tend to experience distress (Toomey, Alpern, Reda, Baker, Vasterling, Blanchard & Eisen, 2019; Arzi, Solomon & Dekel, 2000) and spouses of military service members are at increased risk of mental disorders such as depression and anxiety (Eaton, Hoge, Messer, Whitt, Cabrera, Mcgurk et al., 2008), and alcohol and drug use (Booth, Segal, Bell, Martin, Ender & Rohall, 2007). Wives of veterans with PTSD have been shown to have more severe depression, anxiety and OCD symptoms compared to wives of veterans without PTSD (Galovski & Lyons, 2004).

In addition to literature on military families, there is also a small body of literature on families of first responders. According to the results of Alrutz , Buetow, Cameron &

Huggard's study (2020) with 664 partners of emergency responders, 20% of partners struggled with intrusive thoughts about the trauma experienced by their emergency responder family member. Friese (2020) also found that spouses of law enforcement officers tended to experience high levels of stress in addition to sleep deprivation, emotional exhaustion, and relational strain. Some other studies have examined the impact on first responder families of specific crises. Studies conducted after the September 11th, 2001, terrorist attack on the World Trade Centre show that rates of probable PTSD were found to be high among children with emergency medical technician family members (Duarte et al., 2006), and children of first responders were at heightened risk of behavioural problems (Uchida et al., 2018). Spouses of firefighters also reported insomnia and anxiety after 9/11 due to worries about their partners' health and safety (Menendez, Molloy & Magaldi, 2006).

This literature demonstrates that the families of workers in high-risk occupational roles may also be negatively affected by their loved one's work. Family members of healthcare workers may experience similar stressors to military families and family members of first responders. They too are likely to be worried about the health and safety of their HCW family member. They may also be indirectly exposed to hearing about death and trauma. However, HCW family members may also have unique experiences. Unlike military families, their family member is not deployed overseas for time-limited periods. HCWs continue to live with their families alongside their work and nor are they allocated any dedicated time to decompress and reconnect with their families (Billings et al, 2021). Unlike the family members of first responders in previous research, the nature of healthcare work during COVID-19 has placed HCWs' families' own health and safety directly at risk. Given the likely impact on HCWs' families and support systems, but as yet unknown nature of this impact, it is imperative to conduct good quality explorative research with this group, to better understand their experiences, views and needs.

Supporting family members who are frontline HCWs' key supporters is critically important. If the impact on HCW family members' is not considered, potentially significant mental health problems and needs could go undetected. Further, their ability to support HCWs may be compromised, removing a potentially protective factor for the HCWs' own mental health and

wellbeing. To date, there is no published research exploring the experiences and views, or needs, of family members of HCWs. To address this gap, we aimed to explore the experiences, views, and impact on frontline HCWs' families during the COVID-19 pandemic in the UK and what support the families of frontline HCWs may need.

2. Method

2.1. Participants and Procedures

The study was approved by the University College London Research Ethics Committee, reference number 20221/001.

Family members and supporters of frontline HCWs (spouse, parent, sibling, or friend) were reached via social media (Twitter and Facebook) and by snowball sampling through healthcare contacts. To increase diversity of perspectives, we included parents, siblings, and friends, as well as spouses. All supporters were considered eligible for the study if they were a key source of support for a HCW who had been working directly in a frontline role treating patients affected by COVID -19 during the pandemic in the UK. Participants either needed to reside in the same household as the HCW family member, be in close contact with them throughout the pandemic, and/or be in their "support bubble", defined as "a support network to link two households" during the pandemic by the UK Government (UK Government, 2020).

A Consent Form and Participant Information Sheet were sent by email to potential participants who expressed interest in the study. All participants provided informed consent prior to taking part in the interview. Interviews were completed by the first author (ST).

Interviews took place remotely via MS Teams and were digitally audio-recorded and then transcribed by the interviewer. The interview guide (see supplementary materials) was prepared in cooperation with our Expert Reference Group comprising experts in psychological trauma. Any identifying information about the participants, their frontline worker family member or their place of work was omitted from the transcript of the interview to protect anonymity.

All procedures were completed according to the ethical standards as agreed in the UCL ethical approval.

2.2. Analysis

Interview transcripts were analysed following the principles of reflexive thematic analysis (Braun & Clarke, 2006; Braun & Clarke, 2019). Braun and Clarke (2006) describe reflexive thematic analysis as independent of theory and epistemology. We chose reflexive thematic analysis as it can enable a rich, detailed, and complex account of data. It also offers researchers flexibility, and the analysis steps are well structured (Braun & Clarke, 2020). In the first step of the analysis, we read and re-read all transcripts to increase familiarity with the data and discussed emerging ideas in the research meetings. In the second step, each author initially analysed two transcripts independently and generated a list of potential initial codes. At research meetings, these codes were reviewed and agreed upon and combined into a provisional coding framework. In the third step, all transcripts were imported to NVivo Pro V12 and coded according to the provisional coding frame. All codes were inductive and generated from the data, rather than being determined a-priori by existing hypotheses. In the fourth step, we reviewed the entire data set as whole, and collapsed and combined a number of codes, to develop overlapped themes. The final version of the themes was refined and improved with feedback from all the authors.

2.3. Ethical Issues

This research involved participants potentially talking about distressing personal experiences. Participants were fully informed of the nature of the study in advance of taking part and participation was entirely voluntary. Participants were reminded of their right to pause, postpone, or terminate the interview at the beginning of the meeting. Information was given signposting to psychological support services as appropriate. We sought to protect the research team from potential emotional distress due to listening to the experiences of the family members with training and regular supervision.

2.4. Quality

We conducted this study according to the Standards for Reporting Qualitative Research Framework (O'Brien, Harris, Beckman & Cook, 2014) and specific guidance for quality practice in thematic analysis (Braun & Clarke 2020).

Six researchers were involved in the coding and analysis part of the study. Following coding and analyses, the researchers discussed their suppositions and “blind spots” to improve the validity of our analyses.

We do not aim to generalise the results of our study to the families and supporters of all frontline HCWs in the UK. However, we aimed to increase the transferability of the study findings by

including a diverse range of participants and exploring a variety of experiences and views amongst HCW's families and supporters.

In order to increase the trustworthiness of our study, we have clearly described all the procedures we have followed and provide quotes from participants to illustrate our analyses (Nowell, Norris, White & Mousles, 2017).

2.5. Reflexivity

There is diversity among the researchers who conducted the study including different career stages, genders (1 male, 5 female), and cultural groups. ST is a PhD student at the University College London (UCL), UK. NG is a Principal Clinical Psychologist in the NHS (UK National Health Service) and Clinical Lecturer in Clinical Mental Health Sciences at UCL. TG is an Associate Professor and Head of the Department of Community Mental Health at the University of Haifa and has expertise in psychological trauma research. DL is a Senior Research Fellow at UCL with over 10 years of experience of conducting mental health research in occupational settings. DM is a Consultant Clinical Psychologist and Professor in psychological trauma and current President of UK Psychological Trauma Society, with nearly 20 years working within this field. JB is a Consultant Clinical Psychologist and Associate Clinical Professor with over 20 years of experience working in the NHS, academia and UK Government and has specialist expertise in trauma, mental health, and well-being in high-risk occupational groups.

3. Results

Fourteen family members and supporters of frontline HCWs were recruited to the study. Most participants were spouses of HCWs, although we also spoke to three siblings, one parent, and one friend. The gender, age range and locations of the participants, as well as HCWs' roles and settings are shown in Table 1.

Characteristics	n (%)
Gender	
Female	8 (57)

Male	6 (43)
Relationship with HCWs	
Spouse	9 (65)
Sibling	3 (21)
Mother	1 (7)
Friend	1 (7)
Ethnic Group	
Asian or Asian British	1 (7)
Black African, Black British, or Caribbean	1 (7)
Southeast Asian	1 (7)
White	11 (79)
Age Range	
18-24	1 (14)
25-34	3 (21)
35-44	5 (36)
45-54	4 (29)
65+	1 (14)
HCWs' role	
Ambulance Driver	1 (7)
Doctor-Consultant	6 (43)
Doctor-Junior	4 (29)
Physiotherapist	3 (21)
HCWs' setting ^a	
Accident & Emergency (A&E) Department	2

Acute ward	2
Ambulance service	1
General Hospital/COVID wards	7
ICU	7
Older adults ward	1
Hospice	1
Palliative care	1
Geographical Location	
England-Southeast	2 (14)
England-London	5 (36)
England- South Central	1 (7)
England-Southwest	2 (14)
England- Midlands	1 (7)
England-Northeast	3 (22)

a. Several participants' HCW family members worked across more than one setting in response to the pandemic.

We also asked family members if they had contracted COVID-19 themselves. According to our findings, six of the family members sharing the same house with the healthcare worker ($n=9$) contracted COVID, and two of them described having had more severe symptoms than the healthcare worker.

Interviews were conducted between 24 May and 24 September 2021, which followed the second wave of COVID-19 in the UK. This wave peaked between January and April 2021, and the lifting of most social restrictions across the UK occurred between June and July 2021. Interviews ranged from 26 to 60 minutes, although most took between 40-45 minutes. From our analysis of the data, we derived eight inductive themes (see Table 2)

Table 2. Themes

Themes
9. Burden of responsibilities
10. Emotional burden
11. What about me?
12. Pride vs Just doing their job
13. Victims of neglect
14. Impact on physical health
15. Personal medical dictionary
16. Hearing about traumatic experiences of frontline worker

3.1. Burden of responsibilities

For most participants, alongside the increase in the workload of frontline professionals during the pandemic, the balance of at-home responsibilities also shifted. Many family members stated that domestic responsibilities which were previously shared, such as cleaning and cooking, were mostly taken on by them during the pandemic.

“I do everything to keep it going... we both like cooking, but I suppose I did more cooking during the pandemic. And we've also got a dog. So, I take our dog out all the time because I'm always at home. I do a lot more housework than she does... I definitely do more stuff” (Male fiancée of a doctor)

Family members also took on extra responsibilities and did more to take care of the HCW family member.

“I've helped out making a packed lunch and when she came home from work every day, we got into a sort of routine where I would close all the curtains so she could strip off in front of the washing machine and put [her clothes] in the washing machine, put the washing machine on enroute to the shower upstairs. She got to the shower and would be able to dive straight in the shower without touching too many doors or anything. So, I was helping out in that way” (Male partner of a physiotherapist)

The closure of the nurseries and schools due to the pandemic and the inability to meet other

family members who might usually help with childcare also led to an increase in responsibilities regarding childcare and home schooling.

“I have felt frustrated sometimes that the shifts and the kind of expectations on him and also then the knock-on effect on me. We have kids so that, you know, the kids need picking up from nursery. And if he's being put on additional shifts, that was very frustrating for me” (Wife of a doctor)

Where families of HCWs were still able to access nursery or school care due to having key worker status, this was very much appreciated. However, the reality of school closures and ongoing social restrictions continued to impact on HCW families with children.

“I think because our children's nursery stayed open that was the thing that made the single biggest difference to it being OK or making it manageable because those periods where I did have the kids home either when my partner was ill or when there was a contact at nursery that tested positive. Those were the hardest periods to manage and... if that had been the norm, I would really have struggled. But because we kept the kids in nursery, we retained a bit of normality.” (Wife of a doctor)

There were, however, also exceptions. A few participants described their HCW family member having more time for family during the pandemic. In other instances, the HCW might be relied on more to undertake tasks such as shopping, or if the family fell ill (often with COVID in the early stages of the pandemic, see theme 6) family members might not be able to take responsibility for housework and their domestic responsibilities had to be undertaken by the healthcare professional during this period.

“She would go shopping because we could not go shopping. She felt safe to go shopping and things like that” (Husband of a consultant doctor)

“My focus has had to be to trust that my husband will be coping with my children. So that I can focus on recovering here. I've had to kind of trust my husband and let go a little bit and some of the things I would normally be in control of. They might not be eating vegetables every night like they would be if I was at home cooking. But he's feeding them” (Wife of an ambulance driver who was in rehabilitation after contracting COVID)

3.2. Emotional Burden

Whilst practical burden was experienced most greatly by family members living with HCWs, all of the participants stated that they experienced increased anxiety, fear, and worry. Participants

described concerns about risk to their frontline worker family members' lives, worrying about their working conditions (see theme 5), and the health of the whole family.

“The main thing was the worry, just not knowing if he would be OK, if he would die, not knowing if he did die on his own and how that would be.” (Wife of a doctor)

“It's scary because like what if she gets it? What if something happens to her? It's kind of like you just have to wait and see, you cannot do anything, but you always worry about that.” (Sister of a junior doctor)

One of the biggest problems faced by the family members of HCWs was the separation of family members from each other due to the pandemic. Family members talked about the particular impact on children and how they were affected by being away from their healthcare family member.

“Particularly the older one had lots of sleep disturbances in those two weeks because my husband was away from us for maybe three weeks because he was isolating and then he got worse and worse then in the hospital.” (Wife of a consultant doctor)

“I think it affected my son, who is more emotional and more responsive to tension in family environments. He had expressed an interest in being a doctor when he's making some university choices. But he's chosen not to be a doctor, and one of the reasons he cited was that he didn't like to have seen what the pandemic had done to his mum” (Husband of a consultant doctor)

Where the physical health of family members was also affected by COVID (see theme 6), children could also be separated from wider family members who were ill, hospitalised or required to isolate.

“I think, in terms of my own family, the children, I think it has been quite difficult, particularly for my 14-year-old, because I've never really been away and left them before. Last weekend was the first time I'd seen them since April” (Ambulance driver's wife who was in rehabilitation after contracting COVID)

3.3. What about me?

The family members we spoke to had been involved in the pandemic as a second line, supporting their frontline family members both practically and emotionally. However, most of the family members felt like there was a lack of recognition by others of family members' sacrifices.

“I can be like really triggered because people, like, come up: “It's so hard. Isn't he just an angel?” And I'm just like, “I am the angel. I am the one at home with the kids!” That was my feeling, I found it a bit like it's not just him.... It's so many others. Look at me. I'm in front of my laptop for

12 hours. I'm going crazy.” (Wife of a doctor)

“Sometimes I look at our friends and their husbands work in offices so they can all be together, and I know that everybody's together, and it's awful because they're all on top of each other in the house but I'm often alone.... For example, my youngest child at the time was like 19 days old, and he had to do night shifts. And you're alone. You're like “I'm alone!”.” (Wife of a consultant doctor)

Increased domestic responsibilities and childcare had a negative impact on the lives and careers of several family members, who felt that they, and their work, had to be sacrificed for their family members' health care work.

“I had to stop some elements of my work so that I could look after the kids. When her shifts had to change, I could no longer work on one of the evenings a week. I've had to stop other elements of my work even after we were allowed to reopen because I've had to look after the kids more because we did not have the grandparents looking after them and because she has been working longer hours” (Husband of a junior doctor)

“I feel very proud, but the practicalities of the time were often frustrating... all of the childcare pressure was coming to me, and it meant our kids didn't get to see as much of their dad and they missed him as well. And my work is very demanding... When the kids are sick, we had one of our kids in isolation because there was a contact at nursery. So then I'm doing all of that, being with him at home. And my partner was not doing any of it because he had to study or work. What about my work?” (Female partner of a doctor)

Extended family members were also affected by being less involved in childcare. One mother of a physiotherapist told us how her identity as a grandmother was affected. She felt helpless and frustrated because of not being able to help her daughter and grandchildren. She subsequently took more risks and sacrificed her own health to help.

“I felt absolutely helpless initially that I couldn't do anything to help her. Normally I would have gone and helped her, I wasn't allowed to. You know, in fact, we did change that when we did do some childcare for her because it got so difficult, and her children were feeling the effects. So, I felt helpless... I felt cross with the whole pandemic, very cross with it, because as you get older, you realize your life expectancy is limited. You don't know how long you're going to be fit. Therefore, you want to spend as much time with your grandchildren, with your family doing things you want to do. And the pandemic took that away from everyone” (Mother of a physiotherapist)

3.4. Pride vs Just doing their job

Participants for the most part described a strong feeling of pride in their family member and the work they were doing during the pandemic.

“I think the main thing is just a sense of pride because of the work that he does...” (Brother of a doctor)

“The work itself I always feel proud of. I kind of had an understanding of the importance of the work and what it's like to be supporting people going through important transitions. And so, for the most part, I feel very proud.” (Wife of a doctor)

However, in addition to this sense of pride, several participants also stated that the HCWs were just doing their job as usual and were uncomfortable with the media romanticizing the situation. They also noted that while they appreciated the positive portrayal of healthcare workers in the media and wider society, they were concerned that it might be forgotten too quickly and overshadow real problems (see theme 5).

“I think it's their job. The fact it's a pandemic changes nothing. They do their job. That's what they are paid to do. It's a bit like being in the forces and sent to war. You're paid to do that... The media always romanticises these things. It always picks up on the worst aspects and sometimes I don't think that's right, but, you know, people needed to know, but then a lot of people jump on the bandwagon of it. They build things. You do your job in my world...” (Mother of a physiotherapist)

“I think on the whole, the media portrayal's been fairly positive, may be quite short lived. Maybe it was quickly forgotten, all the work that they put in and then, you know, we all kind of appreciated it. Well, it was the peak, and everyone thought how hard they were working and how grateful they were. And then, you know, everyone kind of moves on, perhaps very quickly and forgotten, you know, they are still working incredibly hard and always do” (Sister of a physiotherapist)

“Clapping for carers was cute for the first time. Not cute after that. It was too shallow... If we actually cared about what they've actually done, give them the more pay!” (Female friend of a doctor)

3.5. Victims of neglect

Family members of healthcare workers drew attention to ways in which they felt that the needs of their HCW loved ones had been neglected during the pandemic. For example, a wife of an ambulance driver told us that training was a significant requirement that was neglected.

“I do feel that my husband didn't have proper training, they did the two weeks preparation course, which did not include anything specific about infection control and COVID.”

She also mentioned that lack of support from managers caused stress in the family as well.

“There's not even been a consideration from my husband's employer at all in it. And they don't seem to understand the impact on him of me being very ill and in hospital and him trying to cope or the fact that we have two or three sort of growing children, those three young people at home. I don't think at any point have they asked if there's any support that he thinks he would need. I don't think so at all. It's just been “When are you coming back to work?” and “If you don't come back soon, then we're going to have to terminate your contract.” I don't think his managers have thought about that at all.”

Almost all the participants pointed to personal protective equipment (PPE) as one of the most neglected needs. The husband of a doctor shared his views:

“I was concerned for her safety because I didn't feel that they were being adequately protected to the point where I actually went online and bought her a full-face respirator because I was saying, “Well, if they're not protecting you properly, then you just need to take it into your own hands because you've got a family that you want to come home to”. But then as it turned out, it wasn't suitable because it wasn't easy enough to clean. But I was concerned, and I was frustrated with the whole PPE thing.”

Family members drew attention to the workload and shifts of HCWs and the negative impact this had on families. Participants talked about this as a longstanding issue, which was highlighted by, but not unique to, the COVID context.

“I think we need the shifts to be reduced. I think we need study days to be respected...I think we need health care professionals to have a manageable workload that recognizes family life... That's the biggest issue... Officially they are entitled to a certain number of study days and that these exams are compulsory, but then they're not able to take their study days because the rota is short. So, it doesn't matter what you say they're entitled to. If they're not actually able to make use of the provision, then it just means that studying still needs to happen. So, it's not like “OK, you can't take the study days.” (Wife of a doctor)

Participants emphasised problems in healthcare workers pay and working conditions.

“They're not superhuman. Somebody should take care of them... If they're heroes, that's great for everybody to see. But they're not always treated like that, even by the NHS. They're not getting more money when he goes, and he has to do a night shift. And the rooms that they stayed are really dirty, disgusting... People smoke in the room. The locks don't work. I'm sorry, yes, we're all here clapping but he's not really looked after... Like the canteen, the food... He's trying to be

healthy. The food was just disgusting. It's like chips every day. Really unhealthy food. How can he look after himself if it's not really looked after always? (Wife of a doctor)

3.6. Impact on physical health

In addition to having a serious impact on the physical health of HCWs, there was also a significant risk that HCWs could transmit COVID to their families. This made family members very anxious and often led to them isolating themselves from the healthcare family member or wider family and friendship groups.

“I was worried selfishly that she was going to catch it, bring it home and I was going to catch it. So, I felt exposed...” (Husband of a consultant doctor)

“We couldn't see her for four or five months because my parents were at risk, there was nothing else we could do. She could spread it. They were worried for their daughter's life, and they're worried for their own life too.” (Sister of a junior doctor)

Many of the family members we spoke to told us that they, and other family members, had caught COVID in the first wave in the UK, before vaccinations were available. Several had been very seriously ill. Some of the family members experienced long COVID symptoms and challenging recoveries. The husband of a physiotherapist, who had been struggling with long COVID, shared his experiences and his need for ongoing medical support:

“Because of my personal symptoms of COVID, I've slept less... I've had long COVID, I found myself with low energy after having it. And it's taken a long time to recover from it. I know I'm going to need increased medical support, definitely because of the long COVID symptoms.”

He also mentioned how difficult it had been to get COVID tests as a family member of a healthcare worker in the early phases of the pandemic, and as a result, how he felt that family members were not supported by the NHS.

“COVID testing... We were not actively provided with support is something as a member of a health care workers family. You have to actually go and seek out to get that support and that testing, which obviously gives that level of reassurance.”

3.7. Personal medical dictionary

The medical knowledge that healthcare professionals have often led to them being seen as a source of information during the pandemic. It was emphasized by many participants that having

medical knowledge had advantages as well as disadvantages. For example, the brother of a doctor told us the advantages of his brother's medical knowledge:

“I also really like asking questions to him because you learn things. So, I learn about the medical profession and get a bit of insight into what they do. Learn some technical terms, which is quite cool. It's exciting to hear about the things they do as well. And I think, yeah, it gives you a bit of a fly on the wall experience or kind of a bit of insight into the truth of COVID and the pandemic.”

We also noticed in our analysis that having someone in their family with medical knowledge made the family members feel more secure. A husband of a consultant doctor mentioned that:

“But at least she had the equipment. She could take our blood. She knew the situation. She knew the language to use when she was speaking to professionals about our situation. So, I suppose in that way, I was less stressed than some other people because the patient has knowledge.”

However, medical knowledge also brought some costs. For instance, the wife of a doctor, whose husband was seriously ill with COVID and had to stay in the COVID ward for 9 days, touched on the emotional burden of contracting COVID as a doctor with all the medical knowledge:

“I think that shook him for a while because he was hit. He was on a ward with four other guys. And he said, every day one of the guys would get transferred to intensive care and he wouldn't know if they recovered, if they died. He didn't know what happened to them. And then somebody else would come and then they would go to intensive care. And he didn't have to go to intensive care, which was very lucky. But still, the experience of being confined to one room where every day somebody else gets taken away to intensive care as a doctor. He also understands how serious that is. So, he knew how ill he was and how serious it was. I think that was a real shock”

3.8. Hearing about traumatic experiences of frontline workers

HCWs often shared stories about their traumatic experiences with their family members, whom they saw as a source of support and an opportunity to offload. However, the effect of hearing about HCWs' experiences could be very distressing for family members.

“It was very surreal to go into... He mentioned one person actually was a pregnant woman who was intubated, and they had to take the baby out when she was asleep, but the family couldn't come and see the baby and the family couldn't come and see her. And that was quite a strange thing for a baby to be in like a box by itself. It was very strange... And to call people up to

say that this has happened when they can't come to be with their daughter, or the grandchild was very strange..." (Wife of a doctor)

Hearing about these experiences could have serious negative effects on family members.

"I think secondary trauma and vicarious trauma would likely be a thing in families, I don't even think it's in mind. But I think I have heard that some family members have had that where they've kind of almost like imagined scenarios and having quite vivid images..." (Brother of a doctor)

4. Discussion

In this study we aimed to explore the experiences, views, and needs of family members of HCWs who have been working on the frontline during the COVID19 pandemic in the UK. We found that family members were proud of the work their healthcare worker loved ones did, were willing to provide additional support and took on more responsibilities at home. However, they also reported potentially negative impacts of providing this support and unmet support needs which need to be addressed.

While spouses living in the same house with HCWs experienced an increased burden of responsibilities like cleaning and childcare, the emotional burden of anxiety, fear and worry was experienced by all family members and supporters. Supporting HCWs also negatively affected the careers of many family members due to increased domestic responsibilities and made them feel that their sacrifices were being ignored by society. Although they were proud of their HCW family member, family members and supporters often felt that the HCWs' needs at work were not adequately met which led to frustration. The fact that family members are healthcare workers and have medical knowledge made them feel safer. However, hearing the traumatic experiences of HCWs could cause emotional distress for family members. High infection risk caused family members to feel intense anxiety about their health and many fell ill with COVID in the first wave of the pandemic.

The findings of this study show that families and close supporters of HCWs experienced a similar negative impact to families of military personnel, including experiencing distress (Toomey et al., 2019; Selimbasic et al., 2016), high anxiety and depression (Eaton et al., 2008), and secondary trauma (Yager, Gerszberg & Dohrenwen, 2016). There were also similar experiences among families of HCWs and families of first responders such as the family member sacrificing their own career for the frontline worker's work (Regehr, Dimitropoulos, Bright, George & Henderson,

2005), worrying about the danger of the frontline workers' job (Regehr, 2005), and experiencing high levels of anxiety (Alexander and Walker, 1996). However, unlike military and first responder families, there were some experiences which were specific to the families of HCWs. In addition to worrying about the health of the HCW, family members also worried intensely about their own health. Furthermore, whereas military family members do not live in the same traumatic environment as serving military personnel and hear about their experiences from a relatively safe/far distance or often after the military personnel had returned home from deployment, family members of HCWs were living in the same traumatic environment and were directly, as well as indirectly, affected by the pandemic. When the HCWs were exposed to traumatic experiences they often shared this with their families and friends, often just a few hours after the experience with associated intense emotion. This makes family members and supporters of HCWs more open to vicarious and secondary trauma.

Almost all of the participants emphasised that healthcare work in the UK is not family friendly, and that this experience pre-dated COVID. According to a 2018 NHS Staff Survey, 39.8% of HCWs across the UK reported feeling unwell due to work-related stress, and the main reasons for not feeling well were related to burnout and dissatisfaction due to the increased workload because of the lack of sufficient staffing and resources (Carrieri, Briscoe, Jackson, Mattick, Papoutsis, Pearson, et al. 2018). Our findings support the results of this study. Long working hours, shortening of exam study times, determining the hospital that the HCW will work in regardless of spouses' status or residence were very stressful for frontline workers and their families. COVID-19 has exacerbated an already difficult situation for HCWs and their families, but attention urgently needs to be paid to supporting the family life of HCWs beyond COVID.

4.1. Limitations and Strengths

This study has a number of strengths. We recruited a broad sample of participants which gave us the opportunity to explore different perspectives of those supporting HCWs. Our research team was also diverse, consisting of scientists from different backgrounds and clinical experience and including different genders, cultural groups, and career stages. This enabled us to consider our findings from multiple perspectives and build a rich and in-depth analysis. All analysis steps were meticulously applied by the team to increase the validity and trustworthiness of the findings.

This study still has some limitations. Firstly, whilst we sought to gather a variety of family members and supporters' views, we were only able to hear the experiences of one mother, three

siblings and one friend, alongside the voices of several spouses in heterosexual relationships. It would be important to hear from other parents, siblings and friends, partners in same sex relationships as well as children of HCWs, to more fully explore the variety of family members and supporters' experiences. Our participants were mostly families of doctors (71%), and we could not reach the families of nurses who are a key group of HCWs notably very impacted by the COVID pandemic. Our sample was also limited by a small number of participants from ethnic minority backgrounds. The families and supporters of these workers may have had other views and experiences to add to this study. Further research paying attention to these groups will help more family members' voices be heard.

4.2. Implications

Supporting healthcare workers families is important not only to support them, but also to support the work that HCWs do and the sustainability of the health services they provide. We have an ethical, legal, and financial obligation to support HCWs and their families. One of the most important needs of family members was to know that their HCW family members work in a safe environment. For this, it is crucial to make sure that the needs of frontline workers are fully met, such as ensuring that healthcare workers are adequately protected and trained, supported by managers, have manageable workloads and shifts, and see practical improvements (i.e., being provided with healthy food, and comfortable/clean resting areas).

The results of this study also support previous research that healthcare services are not a family-friendly place to work. More family-friendly policies and practices must be considered in order to support the longevity of this workforce.

Our results also highlight that family members have their own specific needs. Firstly, many family members reported that they needed long-term medical support after contracting COVID. Whilst social restrictions in the UK and in many places across the world are being lifted thanks to vaccination, COVID still threatens lives, and the families of frontline workers continue to be at great risk in this. Therefore, the families of frontline workers require adequate testing and long-term medical follow-up and support.

Secondly, one of the most difficult issues for HCW families was childcare. HCW family members really valued being able to access ongoing childcare during the pandemic, although this was not accessible to all families. Therefore, it is important to enable access to childcare support for HCW families, regardless of whether both parents are frontline workers or not. Not doing this

places significant burden on HCW's family members at significant detriment to their own wellbeing and careers.

The results of this study also suggest that there may be a significant impact on the mental health of family members of healthcare workers. Family members of HCWs were often anxious and worried about their family members' safety and wellbeing. Family members who hear the traumatic experiences of HCWs are also at significant risk of vicarious trauma. This warrants further research as well as consideration in the training of HCWs and managers of HCWs in order to increase awareness about the potential wide-reaching impact that healthcare work can have on others.

Finally, new support services have been made available for HCWs in many settings across the UK and we urge that these be extended to their families. This would provide more equitable support to similar services currently available to military families. Therapists in such support services should consider the family context of the healthcare workers they are supporting and whether additional information, signposting or support may be beneficial to them.

5. Conclusion

In this study, we aimed to explore the experiences, views, and needs of the family members of healthcare professionals, who are an important source of support for HCWs. Family members who are exposed to traumatic experiences of HCWs while living in the same traumatic pandemic environment with them may have a high risk of secondary trauma, anxiety, and depression. In order to help family members, it is crucial to improve the negative work environment of HCWs and to ensure their workloads and shifts are more family friendly. Families of HCWs place their physical health at significant risk so it is essential to ensure adequate access to PPE, testing and follow up medical support for HCWs and their families. Supporting the mental health and wellbeing of HCWs families is essential not only for their own wellbeing, but also to support the work that HCWs do and the sustainability of the health services they provide.

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Data availability

The data that support the findings of this study are available from the corresponding author (ST), upon reasonable request. The data have not been made publicly available due to the personal and sensitive content of the participants' accounts.

Declaration of Interests

We declare no competing interests.

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UCL RESEARCH ETHICS COMMITTEE OFFICE FOR THE VICE PROVOST RESEARCH

22nd April 2021

Dr Jo Billings Division of PsychiatryUCL

Cc: Sahra TekinDear Dr Billings

Further to your satisfactory responses to the Committee's comments, I am pleased to confirm in my capacity as Chair of the UCL Research Ethics Committee (REC) that your study ~~has been ethically approved~~ by the UCLREC until **22nd April 2022**.

Ethical approval is subject to the following conditions:

Notification of Amendments to the Research

You must seek Chair's approval for proposed amendments (to include extensions to the duration of the project) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form'
<http://ethics.grad.ucl.ac.uk/responsibilities.php>

Adverse Event Reporting – Serious and Non-Serious

It is your responsibility to report to the Committee any unanticipated problems or adverse events involving risks to participants or others. The Ethics Committee should be notified of all serious adverse events via the Ethics Committee Administrator (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is

unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events the Joint Chairs of the Ethics Committee should again be notified via the Ethics Committee Administrator within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol.

The Joint Chairs will confirm that the incident is non-serious and report to the Committee at the next meeting. The final view of the Committee will be communicated to you.

Final Report

At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes in particular issues relating to the ethical implications of the research

i.e. issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc.

Office of the Vice Provost Research, 2 Taverton Street University College London

Tel: +44 (0)20 7679 8717

Email: ethics@ucl.ac.uk <http://ethics.grad.ucl.ac.uk/>

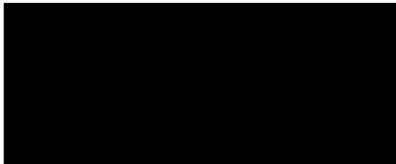
In addition, please:

ensure that you follow all relevant guidance as laid out in UCL's Code of Conduct for Research:

<https://www.ucl.ac.uk/srs/file/579>

note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research. Yours sincerely



Professor Lynn Ang

Joint Chair, UCL Research Ethics Committee

Appendix 9: PROSEPERO Protocol of the Systematic Review Project 1

Citation

Sahra Tekin, Naomi Glover, Helen Nicholls, Danielle Lamb, Jo Billings. “The impact of occupational trauma experienced by high-risk occupational groups on their family members: A systematic review”

Review Question

What is the impact of occupation trauma experienced by high-risk occupational groups on their family members' mental health and wellbeing?

Sub-questions

5. What are experiences, views, and needs of family members as supporters of high-risk occupational workers?
6. Are there signs of vicarious/secondary trauma in family members?
7. What are similar and different experiences, views, needs, and mental health issues of family members of different high-risk occupational groups?
8. What could be done to increase the well-being of family members?

Searches

Relevant published and unpublished studies will be searched in the following databases:

MEDLINE, PubMed, PsychINFO, Embase, PTSDpubs, Scopus

Depending on the articles that we retrieve, we may search the grey literature as well.

Studies in English and Turkish will be included in this review. We will also use backwards and forwards citation searching of key included papers. OpenGrey was picked to search for the grey literature.

We will also search for MSc and PhD dissertations in our initial searches. These might be included in the final review, according to sufficient availability of peer reviewed published research. We will contact authors to ask whether there is any published research or not based on their dissertations.

The PRISMA guidelines will be followed during the overall search.

Search Terms

Given limited literature available in this field, we will focus on the two participant groups (high-risk occupational groups and their family members) and one “impact factors” group for our search terms. In the table below, you can see the search terms we will include for these groups:

<i>High-Risk Occupational Groups</i>	<i>Family Members</i>	<i>Impact Factors</i>
Astronaut*	Famil*	Psychological stress*
Seafarer*	Spouse*	Mental health*
Fisherm?n	Wives	Stress disorder*
Oil rig worker*	Wife	Psychological trauma*
Healthcare worker*	Husband*	Post traumatic stress disorder*
Healthcare staff*	Partner*	PTSD*
Health professional*	Child*	Compassion fatigue*
Doctor*	Parent*	Burnout*
Nurse*	Sibling*	Vicarious trauma*
Midwi*	Brother*	Secondary trauma*
Paramedic*	Sister*	Burden*
Ambulance driver*	Daughter*	Social support*
Social worker*	Son*	Family support*
Psychotherapist*		Coping*
Psychologist*		Family health*
Mental Health Professional*		Marriage*
Aircraft pilot*		Interpersonal relationship*
Airline pilot*		Work schedule*
Aviator*		
Formula one driver*		
Racing driver*		
Antarctic worker*		
Antarctic explorer*		
Antarctic expeditioner*		
Police officer*		

Policem?n		
Firefighter*		
Firem?n		
Search and rescue*		
Miner*		
Foreign aid worker*		
Missionar*		
Farmer*		
Journalist*		
Diplomat*		
High risk role		
High risk occupation*		
High risk worker*		
Deep sea diver*		
Construction worker*		
Nuclear worker*		
Nuclear technician*		
Emergency responder*		
First responder*		
Care home staff*		
Care home worker*		
Nursing home worker*		

Type of study to be included

- Qualitative studies
- Quantitative studies
- Mixed method studies
- Written in English and Turkish
- Peer reviewed articles

Condition or domain being studied

We are interested in the experiences of, and impact on, family members of workers in high-risk occupational groups such as healthcare workers, journalists, seafarers etc. We will explore the experiences and views of family members, the impact on them of being the family member of a worker in a high-risk occupation, including practical, emotional, and psychological impacts, and any intervention or suggested support for family members

Participants/ population

Adult (older than 18 years old) family member/ spouse/ wife/ husband/ partner/ child/ parent/ sibling of a worker in a high-risk occupational role.

We will include high-risk occupational groups from the APA's statement on this subject when naming occupations as "high-risk occupational groups" ("High Risk Jobs and High-Risk Populations", 2022). We will include these in addition, based on guidance from experts in the area of job roles which might be considered high psychological and/or physical risk and which may affect their families. We will exclude the studies when the sample is not of family members and/or not of high-risk occupational groups, abstract is not available in English/Turkish, and commentaries/ editorials. We will also exclude studies focused on children.

Intervention(s), exposure(s)

Reviewing all qualitative, quantitative, and mixed method studies related to experiences, views, and the impact of being the family member of a worker in a high-risk occupation, including practical, emotional, and psychological impacts

Comparator(s)/control

Not applicable

Main outcome(s)

- Experiences, views, needs and the impact of being the family member of a worker in a high-risk occupation, including practical, emotional, and psychological impacts
- Similar and different experiences and impact between family members of different high-risk occupational groups workers.

Additional outcome(s)

- Interventions and strategies to support family members of different high-risk occupational groups workers

Measures of effect

This will include practical, emotional, and psychological impact, measured by standardised measures and/or subjective self-report. This will also include descriptors of any interventions aimed to support family members of workers in high-risk occupational roles, any indicators of effectiveness of interventions and qualitative measures of experiences/acceptability of interventions.

Data extraction (selection and coding)

Database searches will be conducted by the primary author (ST) and then all the retrieved papers will be downloaded. Downloaded studies will be deduplicated and stored electronically in EndNote X9. The titles and abstracts of all downloaded studies will be reviewed against the inclusion criteria by the primary researcher with a sub-set (at least 10%) reviewed by a second reviewer (XX). Then, the full text of the selected studies will be evaluated by 2 independent researchers including the primary researcher , and for inter-rater reliability Kappa statistics will be used. When there is a disagreement between independent researchers, this will be resolved through discussion with a third researcher (JB). A PRISMA flow diagram will be included in the review.

The following information, where available, will be included in the data extraction section:

The lead author, date of publication, country, setting, study design, type of qualitative/quantitative analyses used, sampling method, sample size, demographic information (age, gender, relationship with high-risk occupational group worker, occupational role of family member, etc.), main findings, including themes identified in the qualitative/mixed research.

Quality assessment

CASP, one of the quality assessment tools, will be used to assess study quality. For example, the CASP checklist for qualitative research includes 10 different questions to assess the quality of qualitative papers. Two independent researchers will assess the quality of the study by rating the CASP questions as "Yes", "No" or "I can't say". Disagreement between these researchers will be

solved in the meetings or via third researcher. In the end, all of the studies will be ranked as totally met, met, and not met.

We will choose other appropriate quality assessment/risk of bias assessment tools for other study designs such as MMAT, based on NICE Guidelines during our work ("Appendix F Quality appraisal checklist – quantitative intervention studies | Methods for the development of NICE public health guidance (third edition) | Guidance | NICE", 2022).

Strategy for data synthesis

We will collate qualitative, quantitative, and mixed method papers and separate them according to method type.

Narrative synthesis and tabulations will be conducted for qualitative, quantitative, and mixed method study designs. Our aim is to capture the experiences, needs, and the impact of being the family member of a worker in a high-risk occupation, including practical, emotional, and psychological impacts across the qualitative literature.

Prevalence and types of mental health issues and family members' needs will be addressed where we find sufficient evidence about it.

Limitations will be addressed.

Analysis of subgroups or subsets

We will consider similar and different experiences amongst the family members of different high-risk occupational risk groups: astronauts, military personnel, veterans, seafarers, fisherman, oil rig workers, health care workers, social workers, therapist, Antarctic explorers, policemen, firefighters, search and rescue, miners, farmers, foreign aid workers, journalists, diplomats. We anticipate that it will be unlikely that we can conduct a meta-analysis, as study designs and outcome measures are likely to be heterogeneous. However, we will describe similarities and differences in the findings from studies related to family members of different occupational groups, i.e., astronauts, military etc.

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Type and method of review

Systematic review; narrative synthesis.

Anticipated or actual start date

March 2022

Anticipated completion date

January 2023

Funding sources/ sponsors

None

Conflict of interest

None known

Language

English

Country

England

Stage of review

Review ongoing

Subject index terms status

Subject indexing assigned by CRD

Subject index terms

Qualitative research; quantitative research; mental health; occupational trauma; secondary trauma; vicarious trauma; family members; spouses; occupational stress

Date of registration in PROSPERO

Date of first submission

Stage of review at time of this submission

The stage of preliminary searches complete.

Stage

Appendix 10: Full Search Terms for the Systematic Review Project 1

PsychINFO Search

- 1 exp *personnel/ (441004)
- 2 astronaut*.ti,ab. (557)
- 3 seafarer*.ti,ab. (110)
- 4 fisherm?n*.ti,ab. (328)
- 5 oil rig worker*.ti,ab. (10)
- 6 healthcare worker*.ti,ab. (2144)
- 7 healthcare staff.ti,ab. (610)
- 8 health professional*.ti,ab. (36117)
- 9 doctor*.ti,ab. (42434)
- 10 Nurse*.ti,ab. (74243)
- 11 (midwives or midwife).ti,ab. (2734)
- 12 paramedic*.ti,ab. (1043)
- 13 ambulance driver*.ti,ab. (25)
- 14 social worker*.ti,ab. (26185)
- 15 psychotherapist*.ti,ab. (15431)
- 16 psychologist*.ti,ab. (90608)
- 17 mental health professional*.ti,ab. (17644)
- 18 aircraft pilot*.ti,ab. (146)
- 19 airline pilot*.ti,ab. (314)
- 20 aviator*.ti,ab. (599)
- 21 formula one driver*.ti,ab. (1)
- 22 racing driver*.ti,ab. (15)
- 23 antarctic worker*.ti,ab. (1)
- 24 antarctic explorer*.ti,ab. (10)
- 25 antarctic expeditioner*.ti,ab. (6)
- 26 police officer*.ti,ab. (6218)
- 27 policem?n.ti,ab. (656)

- 28 (firefighter* or fire fighter*).ti,ab. (1573)
- 29 firem?n.ti,ab. (159)
- 30 miner*.ti,ab. (4311)
- 31 foreign aid worker*.ti,ab. (5)
- 32 missionar*.ti,ab. (1166)
- 33 farmer*.ti,ab. (3294)
- 34 journalist*.ti,ab. (3803)
- 35 diplomat*.ti,ab. (897)
- 36 high risk role*.ti,ab. (4)
- 37 high risk occupation*.ti,ab. (145)
- 38 high risk worker*.ti,ab. (15)
- 39 high risk profession*.ti,ab. (55)
- 40 deep sea diver*.ti,ab. (7)
- 41 construction worker*.ti,ab. (454)
- 42 nuclear worker*.ti,ab. (5)
- 43 nuclear technician*.ti,ab. (0)
- 44 emergency responder*.ti,ab. (201)
- 45 emergency personnel*.ti,ab. (130)
- 46 first responder*.ti,ab. (1017)
- 47 care home staff*.ti,ab. (112)
- 48 care home worker*.ti,ab. (8)
- 49 nursing home worker*.ti,ab. (18)
- 50 (search and rescue*).ti,ab. (329)
- 51 or/1-50 (631074)
- 52 Occupational Exposure/ (1299)
- 53 industrial accidents/ (1300)
- 54 dangerousness/ (1476)
- 55 work related illnesses/ (1180)
- 56 occupational stress/ (24097)

57 occupation* stress*.ti,ab. (3061)
58 hazard*.ti,ab. (25111)
59 danger*.ti,ab. (32127)
60 high risk*.ti,ab. (44651)
61 accident*.ti,ab. (24001)
62 harm*.ti,ab. (72805)
63 (injury or injuries or injured).ti,ab. (95456)
64 emergency.ti,ab. (30255)
65 high impact*.ti,ab. (1485)
66 frontline*.ti,ab. (3757)
67 or/52-66 (325767)
68 51 and 67 (56187)
69 exp family/ (329594)
70 (family or families).ti,ab. (403711)
71 spouse*.ti,ab. (20284)
72 (wives or wife).ti,ab. (14291)
73 husband*.ti,ab. (14008)
74 partner*.ti,ab. (117338)
75 child*.ti,ab. (747676)
76 parent*.ti,ab. (295612)
77 sibling*.ti,ab. (23504)
78 brother*.ti,ab. (6462)
79 sister*.ti,ab. (6463)
80 daughter*.ti,ab. (13404)
81 son*.ti,ab. (39890)
82 or/69-81 (1228989)
83 exp Mental Health/ (81969)
84 exp Well Being/ (55069)
85 emotional trauma/ or posttraumatic stress/ or trauma reactions/ or traumatic experiences/ (18074)

- 86 psychological stress/ (9459)
- 87 exp posttraumatic stress disorder/ or "stress and trauma related disorders"/ (37830)
- 88 acute stress disorder/ (647)
- 89 occupational health psychology/ (195)
- 90 occupational neurosis/ (30)
- 91 psychological stress*.ti,ab. (5891)
- 92 mental health*.ti,ab. (210149)
- 93 stress* disorder*.ti,ab. (40286)
- 94 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab. (50738)
- 95 compassion fatigue*.ti,ab. (1253)
- 96 burnout*.ti,ab. (14734)
- 97 vicarious trauma*.ti,ab. (999)
- 98 secondary trauma*.ti,ab. (1570)
- 99 social support*.ti,ab. (53735)
- 100 family support*.ti,ab. (7465)
- 101 coping*.ti,ab. (84481)
- 102 family health*.ti,ab. (2348)
- 103 marriage*.ti,ab. (30938)
- 104 interpersonal relationship*.ti,ab. (12128)
- 105 work schedule*.ti,ab. (1395)
- 106 or/83-105 (493309)
- 107 job satisfaction/ (21198)
- 108 exp Life Experiences/ (32986)
- 109 attitudes/ or adolescent attitudes/ or adult attitudes/ or attitude change/ or child attitudes/ or female attitudes/ or health personnel attitudes/ or occupational attitudes/ or psychologist attitudes/ or "work (attitudes toward)"/ or world view/ (112646)
- 110 family health*.ti,ab. (2348)
- 111 experience*.ti,ab. (714820)
- 112 support*.ti,ab. (744450)
- 113 impact*.ti,ab. (430590)

- 114 perception*.ti,ab. (326202)
- 115 reflection*.ti,ab. (60152)
- 116 opinion*.ti,ab. (52104)
- 117 need*.ti,ab. (656412)
- 118 attitude*.ti,ab. (221281)
- 119 belief*.ti,ab. (139786)
- 120 satisfaction*.ti,ab. (118497)
- 121 feeling*.ti,ab. (115531)
- 122 expectation*.ti,ab. (90337)
- 123 view*.ti,ab. (322994)
- 124 or/107-123 (2563078)
- 125 what happens at work comes home.m_titl. (0)
- 126 posttraumatic stress in children with first responders in their families.m_titl. (1)
- 127 (Experiences and views of frontline healthcare workers family members in the UK during the COVID-19 pandemic).m_titl. (1)
- 128 68 and 82 and 106 and 124 (4103)

PTSDPubs Search

"high risk personnel*" OR "high risk staff" OR "high risk occupation*" OR "high risk role*" OR "high risk worker*" OR "high risk profession*" OR "first responder*" OR "frontline*" OR "frontline*" OR "emergency responder*" OR "emergency personnel*" OR astronaut* OR seafarer* OR police* OR "fire fighter*" OR firefighter* OR "health care worker*" OR "healthcare worker"

OR astronaut* OR seafarer* OR fisherman OR fishermen OR "oil rig worker*" OR "healthcare staff*" OR "healthcare worker*" OR "health professional*" or doctor* OR Nurse* OR midwives OR midwife OR paramedic* OR "ambulance driver*" OR "social worker*" OR psychotherapist* OR psychologist* OR "mental health professional*" OR "aircraft pilot*" OR "airline pilot*" OR aviator* OR "formula one driver*" OR "racing driver*" OR "antarctic worker*" OR "antarctic explorer*" OR "antarctic expeditioner*" OR "police officer*" OR policeman OR policemen OR miner* OR foreign aid worker* OR missionar* OR farmer* OR journalist* OR diplomat* OR "construction worker*" OR "nuclear worker*" OR "nuclear technician"

AND

family OR families OR spouse* OR wives OR wife OR husband* OR partner* OR child* OR parent* OR sibling* OR brother* OR sister* OR daughter* OR son*

AND

"Mental Health" OR "Well Being" OR wellbeing OR trauma* OR "psychological stress" OR "stress* disorder*" OR "post-traumatic stress*" OR PTSD* OR "posttraumatic stress*" OR "compassion fatigue*" OR burnout* OR "vicarious trauma*" OR "social support*" OR "family support*" OR coping* OR "family health*" OR marriage* OR "interpersonal relationship*" OR "work schedule*"

Scopus Search

"high risk personnel*" OR "high risk staff" OR "high risk occupation*" OR "high risk role*" OR "high risk worker*" OR "high risk profession*" OR "first responder*" OR "frontline*" OR "front-line*" OR "emergency responder*" OR "emergency personnel*" OR astronaut* OR seafarer* OR police* OR "fire fighter*" OR firefighter* OR "health care worker*" OR "healthcare worker*"

AND

family OR families OR spouse* OR wives OR wife OR husband* OR partner* OR child* OR parent* OR sibling* OR brother* OR sister* OR daughter* OR son*

AND

"Mental Health" OR "Well Being" OR wellbeing OR "emotional trauma*" OR "psychological trauma*" OR "psychological stress" OR "stress* disorder*" OR "post-traumatic stress*" OR PTSD* OR "posttraumatic stress*" OR "compassion fatigue*" OR burnout* OR "vicarious trauma*" OR "social support*" OR "family support*" OR coping* OR "family health*" OR marriage* OR "interpersonal relationship*" OR "work schedule*"

AND

"job satisfaction*" OR experience* OR attitude* OR view* OR support* OR impact* OR perception* OR reflection* OR opinion* OR need* OR belief* OR feeling* OR expectation*

Medline Search

- 1 exp occupational groups/
- 2 astronaut*.ti,ab.
- 3 seafarer*.ti,ab.
- 4 fisherm?n*.ti,ab.
- 5 oil rig worker*.ti,ab.
- 6 healthcare worker*.ti,ab.
- 7 healthcare staff.ti,ab.
- 8 health professional*.ti,ab.
- 9 doctor*.ti,ab.
- 10 Nurse*.ti,ab.

- 11 (midwives or midwife).ti,ab.
- 12 paramedic*.ti,ab.
- 13 ambulance driver*.ti,ab.
- 14 social worker*.ti,ab.
- 15 psychotherapist*.ti,ab.
- 16 psychologist*.ti,ab.
- 17 mental health professional*.ti,ab.
- 18 aircraft pilot*.ti,ab.
- 19 airline pilot*.ti,ab.
- 20 aviator*.ti,ab.
- 21 formula one driver*.ti,ab.
- 22 racing driver*.ti,ab.
- 23 antarctic worker*.ti,ab.
- 24 antarctic explorer*.ti,ab.
- 25 antarctic expeditioner*.ti,ab.
- 26 police officer*.ti,ab.
- 27 policem?n.ti,ab.
- 28 firefighter*.ti,ab.
- 29 firem?n.ti,ab.
- 30 miner*.ti,ab.
- 31 foreign aid worker*.ti,ab.
- 32 missionar*.ti,ab.
- 33 farmer*.ti,ab.
- 34 journalist*.ti,ab.
- 35 diplomat*.ti,ab.
- 36 high risk role*.ti,ab.
- 37 high risk occupation*.ti,ab.
- 38 high risk worker*.ti,ab.
- 39 high risk profession*.ti,ab.

40 deep sea diver*.ti,ab.
41 construction worker*.ti,ab.
42 nuclear worker*.ti,ab.
43 nuclear technician*.ti,ab.
44 emergency responder*.ti,ab.
45 first responder*.ti,ab.
46 care home staff*.ti,ab.
47 care home worker*.ti,ab.
48 nursing home worker*.ti,ab.
49 (search and rescue*).ti,ab.
50 or/1-49
51 Occupational Exposure/
52 Accidents, Occupational/
53 Occupational Injuries/
54 exp Occupational Diseases/
55 hazard*.ti,ab.
56 danger*.ti,ab.
57 high risk.ti,ab.
58 accident*.ti,ab.
59 harm*.ti,ab.
60 injury or injuries or injured).ti,ab.
61 emergency.ti,ab.
62 high impact*.ti,ab.
63 or/51-62
64 50 and 63
65 exp Family/
66 (family or families).ti,ab.
67 spouse*.ti,ab.
68 (wives or wife).ti,ab.

69 husband*.ti,ab.
70 partner*.ti,ab.
71 child*.ti,ab.
72 parent*.ti,ab.
73 sibling*.ti,ab.
74 brother*.ti,ab.
75 sister*.ti,ab.
76 daughter*.ti,ab.
77 son*.ti,ab.
78 or/65-77
79 Mental Health/
80 exp "Trauma and Stressor Related Disorders"/
81 psychological stress*.ti,ab.
82 mental health*.ti,ab.
83 stress disorder*.ti,ab.
84 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab.
85 compassion fatigue*.ti,ab.
86 burnout*.ti,ab.
87 vicarious trauma*.ti,ab.
88 secondary trauma*.ti,ab.
89 social support*.ti,ab.
90 family support*.ti,ab.
91 coping*.ti,ab.
92 family health*.ti,ab.
93 marriage*.ti,ab.
94 interpersonal relationship*.ti,ab.
95 work schedule*.ti,ab.
96 or/79-95
97 64 and 78 and 96

98 (Experiences and perceptions of family members of emergency first responders with post-traumatic stress disorder).m_titl.

99 Attitude/

100 Family Health/

101 experience*.ti,ab.

102 support*.ti,ab.

103 impact*.ti,ab.

104 perception*.ti,ab.

105 reflection*.ti,ab.

106 opinion*.ti,ab.

107 need*.ti,ab.

108 attitude*.ti,ab.

109 belief*.ti,ab.

110 satisfaction*.ti,ab.

111 feeling*.ti,ab.

112 expectation*.ti,ab.

113 or/99-112

114 97 and 113

Embase Search

120 exp *named groups by occupation/

121 astronaut*.ti,ab.

122 seafarer*.ti,ab.

123 fisherm?n*.ti,ab.

124 oil rig worker*.ti,ab.

125 healthcare worker*.ti,ab.

126 healthcare staff.ti,ab.

127 health professional*.ti,ab.

128 doctor*.ti,ab.

129 Nurse*.ti,ab.

- 130 (midwives or midwife).ti,ab.
- 131 paramedic*.ti,ab.
- 132 ambulance driver*.ti,ab.
- 133 social worker*.ti,ab.
- 134 psychotherapist*.ti,ab.
- 135 psychologist*.ti,ab.
- 136 mental health professional*.ti,ab.
- 137 aircraft pilot*.ti,ab.
- 138 airline pilot*.ti,ab.
- 139 aviator*.ti,ab.
- 140 formula one driver*.ti,ab.
- 141 racing driver*.ti,ab.
- 142 antarctic worker*.ti,ab.
- 143 antarctic explorer*.ti,ab.
- 144 antarctic expeditioner*.ti,ab.
- 145 police officer*.ti,ab.
- 146 policem?n.ti,ab.
- 147 (firefighter* or fire fighter*).ti,ab.
- 148 firem?n.ti,ab.
- 149 miner*.ti,ab.
- 150 foreign aid worker*.ti,ab.
- 151 missionar*.ti,ab.
- 152 farmer*.ti,ab.
- 153 journalist*.ti,ab.
- 154 diplomat*.ti,ab.
- 155 high risk role*.ti,ab.
- 156 high risk occupation*.ti,ab.
- 157 high risk worker*.ti,ab.
- 158 high risk profession*.ti,ab.

159 deep sea diver*.ti,ab.
160 construction worker*.ti,ab.
161 nuclear worker*.ti,ab.
162 nuclear technician*.ti,ab.
163 emergency responder*.ti,ab.
164 first responder*.ti,ab.
165 care home staff*.ti,ab.
166 care home worker*.ti,ab.
167 nursing home worker*.ti,ab.
168 (search and rescue*).ti,ab.
169 or/120-168
170 occupational hazard/
171 occupational exposure/
172 occupational accident/
173 exp *occupational disease/
174 occupational stress*.ti,ab.
175 hazard*.ti,ab.
176 danger*.ti,ab.
177 high risk*.ti,ab.
178 accident*.ti,ab.
179 harm*.ti,ab.
180 (injury or injuries or injured).ti,ab.
181 emergency.ti,ab.
182 high impact*.ti,ab.
183 frontline*.ti,ab.
184 or/170-183
185 169 and 184
186 exp *family/
187 (family or families).ti,ab.

188 spouse*.ti,ab.
189 (wives or wife).ti,ab.
190 husband*.ti,ab.
191 partner*.ti,ab.
192 child*.ti,ab.
193 parent*.ti,ab.
194 sibling*.ti,ab.
195 brother*.ti,ab.
196 sister*.ti,ab.
197 daughter*.ti,ab.
198 son*.ti,ab.
199 or/186-198
200 mental health/ or psychological well-being/
201 psychotrauma/
202 exp *mental stress/
203 posttraumatic stress disorder/
204 psychological stress*.ti,ab.
205 mental health*.ti,ab.
206 stress* disorder*.ti,ab.
207 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab.
208 compassion fatigue*.ti,ab.
209 burnout*.ti,ab.
210 vicarious trauma*.ti,ab.
211 secondary trauma*.ti,ab.
212 social support*.ti,ab.
213 family support*.ti,ab.
214 coping*.ti,ab.
215 family health*.ti,ab.
216 marriage*.ti,ab.

217 interpersonal relationship*.ti,ab.
218 work schedule*.ti,ab.
219 or/200-218
220 experience/
221 job experience/
222 work experience/
223 personal experience/
224 exp *attitude/
225 family health/
226 experience*.ti,ab.
227 support*.ti,ab.
228 impact*.ti,ab.
229 perception*.ti,ab.
230 reflection*.ti,ab.
231 opinion*.ti,ab.
232 need*.ti,ab.
233 attitude*.ti,ab.
234 belief*.ti,ab.
235 satisfaction*.ti,ab.
236 feeling*.ti,ab.
237 expectation*.ti,ab.
238 view*.ti,ab.
239 or/220-238
240 185 and 199 and 219 and 239

Appendix 11: Full Search Terms for the Systematic Review Project 2

PsychINFO Search

- 1 exp *personnel/ (441004)
- 2 astronaut*.ti,ab. (557)
- 3 seafarer*.ti,ab. (110)
- 4 fisherm?n*.ti,ab. (328)
- 5 oil rig worker*.ti,ab. (10)
- 6 healthcare worker*.ti,ab. (2144)
- 7 healthcare staff.ti,ab. (610)
- 8 health professional*.ti,ab. (36117)
- 9 doctor*.ti,ab. (42434)
- 10 Nurse*.ti,ab. (74243)
- 11 (midwives or midwife).ti,ab. (2734)
- 12 paramedic*.ti,ab. (1043)
- 13 ambulance driver*.ti,ab. (25)
- 14 social worker*.ti,ab. (26185)
- 15 psychotherapist*.ti,ab. (15431)
- 16 psychologist*.ti,ab. (90608)
- 17 mental health professional*.ti,ab. (17644)
- 18 aircraft pilot*.ti,ab. (146)
- 19 airline pilot*.ti,ab. (314)
- 20 aviator*.ti,ab. (599)
- 21 formula one driver*.ti,ab. (1)
- 22 racing driver*.ti,ab. (15)

- 23 antarctic worker*.ti,ab. (1)
- 24 antarctic explorer*.ti,ab. (10)
- 25 antarctic expeditioner*.ti,ab. (6)
- 26 police officer*.ti,ab. (6218)
- 27 policem?n.ti,ab. (656)
- 28 (firefighter* or fire fighter*).ti,ab. (1573)
- 29 firem?n.ti,ab. (159)
- 30 miner*.ti,ab. (4311)
- 31 foreign aid worker*.ti,ab. (5)
- 32 missionary*.ti,ab. (1166)
- 33 farmer*.ti,ab. (3294)
- 34 journalist*.ti,ab. (3803)
- 35 diplomat*.ti,ab. (897)
- 36 high risk role*.ti,ab. (4)
- 37 high risk occupation*.ti,ab. (145)
- 38 high risk worker*.ti,ab. (15)
- 39 high risk profession*.ti,ab. (55)
- 40 deep sea diver*.ti,ab. (7)
- 41 construction worker*.ti,ab. (454)
- 42 nuclear worker*.ti,ab. (5)
- 43 nuclear technician*.ti,ab. (0)
- 44 emergency responder*.ti,ab. (201)
- 45 emergency personnel*.ti,ab. (130)
- 46 first responder*.ti,ab. (1017)
- 47 care home staff*.ti,ab. (112)

48 care home worker*.ti,ab. (8)
49 nursing home worker*.ti,ab. (18)
50 (search and rescue*).ti,ab. (329)
51 or/1-50 (631074)
52 Occupational Exposure/ (1299)
53 industrial accidents/ (1300)
54 dangerousness/ (1476)
55 work related illnesses/ (1180)
56 occupational stress/ (24097)
57 occupation* stress*.ti,ab. (3061)
58 hazard*.ti,ab. (25111)
59 danger*.ti,ab. (32127)
60 high risk*.ti,ab. (44651)
61 accident*.ti,ab. (24001)
62 harm*.ti,ab. (72805)
63 (injury or injuries or injured).ti,ab. (95456)
64 emergency.ti,ab. (30255)
65 high impact*.ti,ab. (1485)
66 frontline*.ti,ab. (3757)
67 or/52-66 (325767)
68 51 and 67 (56187)
69 exp family/ (329594)
70 (family or families).ti,ab. (403711)
71 spouse*.ti,ab. (20284)
72 (wives or wife).ti,ab. (14291)

- 73 husband*.ti,ab. (14008)
- 74 partner*.ti,ab. (117338)
- 75 child*.ti,ab. (747676)
- 76 parent*.ti,ab. (295612)
- 77 sibling*.ti,ab. (23504)
- 78 brother*.ti,ab. (6462)
- 79 sister*.ti,ab. (6463)
- 80 daughter*.ti,ab. (13404)
- 81 son*.ti,ab. (39890)
- 82 or/69-81 (1228989)
- 83 exp Mental Health/ (81969)
- 84 exp Well Being/ (55069)
- 85 emotional trauma/ or posttraumatic stress/ or trauma reactions/ or traumatic experiences/ (18074)
- 86 psychological stress/ (9459)
- 87 exp posttraumatic stress disorder/ or "stress and trauma related disorders"/ (37830)
- 88 acute stress disorder/ (647)
- 89 occupational health psychology/ (195)
- 90 occupational neurosis/ (30)
- 91 psychological stress*.ti,ab. (5891)
- 92 mental health*.ti,ab. (210149)
- 93 stress* disorder*.ti,ab. (40286)
- 94 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab. (50738)
- 95 compassion fatigue*.ti,ab. (1253)
- 96 burnout*.ti,ab. (14734)

- 97 vicarious trauma*.ti,ab. (999)
- 98 secondary trauma*.ti,ab. (1570)
- 99 social support*.ti,ab. (53735)
- 100 family support*.ti,ab. (7465)
- 101 coping*.ti,ab. (84481)
- 102 family health*.ti,ab. (2348)
- 103 marriage*.ti,ab. (30938)
- 104 interpersonal relationship*.ti,ab. (12128)
- 105 work schedule*.ti,ab. (1395)
- 106 or/83-105 (493309)
- 107 job satisfaction/ (21198)
- 108 exp Life Experiences/ (32986)
- 109 attitudes/ or adolescent attitudes/ or adult attitudes/ or attitude change/ or child attitudes/ or female attitudes/ or health personnel attitudes/ or occupational attitudes/ or psychologist attitudes/ or "work (attitudes toward)"/ or world view/ (112646)
- 110 family health*.ti,ab. (2348)
- 111 experience*.ti,ab. (714820)
- 112 support*.ti,ab. (744450)
- 113 impact*.ti,ab. (430590)
- 114 perception*.ti,ab. (326202)
- 115 reflection*.ti,ab. (60152)
- 116 opinion*.ti,ab. (52104)
- 117 need*.ti,ab. (656412)
- 118 attitude*.ti,ab. (221281)
- 119 belief*.ti,ab. (139786)

- 120 satisfaction*.ti,ab. (118497)
- 121 feeling*.ti,ab. (115531)
- 122 expectation*.ti,ab. (90337)
- 123 view*.ti,ab. (322994)
- 124 or/107-123 (2563078)
- 125 what happens at work comes home.m_titl. (0)
- 126 posttraumatic stress in children with first responders in their families.m_titl. (1)
- 127 (Experiences and views of frontline healthcare workers family members in the UK during the COVID-19 pandemic).m_titl. (1)
- 128 68 and 82 and 106 and 124 (4103)

PTSDPubs Search

"high risk personnel*" OR "high risk staff" OR "high risk occupation*" OR "high risk role*" OR "high risk worker*" OR "high risk profession*" OR "first responder*" OR "frontline*" OR "front-line*" OR "emergency responder*" OR "emergency personnel*" OR astronaut* OR seafarer* OR police* OR "fire fighter*" OR firefighter* OR "health care worker*" OR "healthcare worker"

OR astronaut* OR seafarer* OR fisherman OR fishermen OR "oil rig worker*" OR "healthcare staff*" OR "healthcare worker*" OR "health professional*" or doctor* OR Nurse* OR midwives OR midwife OR paramedic* OR "ambulance driver*" OR "social worker*" OR psychotherapist* OR psychologist* OR "mental health professional*" OR "aircraft pilot*" OR "airline pilot*" OR aviator* OR "formula one driver*" OR "racing driver*" OR "antarctic worker*" OR "antarctic explorer*" OR "antarctic expeditioner*" OR "police officer*" OR policeman OR policemen OR miner* OR foreign aid worker* OR missionar* OR farmer* OR journalist* OR diplomat* OR "construction worker*" OR "nuclear worker*" OR "nuclear technician"

AND

family OR families OR spouse* OR wives OR wife OR husband* OR partner* OR child* OR parent* OR sibling* OR brother* OR sister* OR daughter* OR son*

AND

"Mental Health" OR "Well Being" OR wellbeing OR trauma* OR "psychological stress" OR "stress* disorder*" OR "post-traumatic stress*" OR PTSD* OR "posttraumatic stress*" OR "compassion fatigue*" OR burnout* OR "vicarious trauma*" OR "social support*" OR "family support*" OR coping* OR "family health*" OR marriage* OR "interpersonal relationship*" OR "work schedule*"

Scopus Search

"high risk personnel*" OR "high risk staff" OR "high risk occupation*" OR "high risk role*" OR "high risk worker*" OR "high risk profession*" OR "first responder*" OR "frontline*" OR "front-line*" OR "emergency responder*" OR "emergency personnel*" OR astronaut* OR seafarer* OR police* OR "fire fighter*" OR firefighter* OR "health care worker*" OR "healthcare worker*"

AND

family OR families OR spouse* OR wives OR wife OR husband* OR partner* OR child* OR parent* OR sibling* OR brother* OR sister* OR daughter* OR son*

AND

"Mental Health" OR "Well Being" OR wellbeing OR "emotional trauma*" OR "psychological trauma*" OR "psychological stress" OR "stress* disorder*" OR "post-traumatic stress*" OR PTSD* OR "posttraumatic stress*" OR "compassion fatigue*" OR burnout* OR "vicarious trauma*" OR "social support*" OR "family support*" OR coping* OR "family health*" OR marriage* OR "interpersonal relationship*" OR "work schedule*"

AND

"job satisfaction*" OR experience* OR attitude* OR view* OR support* OR impact* OR perception* OR reflection* OR opinion* OR need* OR belief* OR feeling* OR expectation*

Medline Search

- 1 exp occupational groups/
- 2 astronaut*.ti,ab.
- 3 seafarer*.ti,ab.
- 4 fisherm?n*.ti,ab.
- 5 oil rig worker*.ti,ab.

- 6 healthcare worker*.ti,ab.
- 7 healthcare staff.ti,ab.
- 8 health professional*.ti,ab.
- 9 doctor*.ti,ab.
- 10 Nurse*.ti,ab.
- 11 (midwives or midwife).ti,ab.
- 12 paramedic*.ti,ab.
- 13 ambulance driver*.ti,ab.
- 14 social worker*.ti,ab.
- 15 psychotherapist*.ti,ab.
- 16 psychologist*.ti,ab.
- 17 mental health professional*.ti,ab.
- 18 aircraft pilot*.ti,ab.
- 19 airline pilot*.ti,ab.
- 20 aviator*.ti,ab.
- 21 formula one driver*.ti,ab.
- 22 racing driver*.ti,ab.
- 23 antarctic worker*.ti,ab.
- 24 antarctic explorer*.ti,ab.
- 25 antarctic expeditioner*.ti,ab.
- 26 police officer*.ti,ab.
- 27 policem?n.ti,ab.
- 28 firefighter*.ti,ab.
- 29 firem?n.ti,ab.
- 30 miner*.ti,ab.

- 31 foreign aid worker*.ti,ab.
- 32 missionar*.ti,ab.
- 33 farmer*.ti,ab.
- 34 journalist*.ti,ab.
- 35 diplomat*.ti,ab.
- 36 high risk role*.ti,ab.
- 37 high risk occupation*.ti,ab.
- 38 high risk worker*.ti,ab.
- 39 high risk profession*.ti,ab.
- 40 deep sea diver*.ti,ab.
- 41 construction worker*.ti,ab.
- 42 nuclear worker*.ti,ab.
- 43 nuclear technician*.ti,ab.
- 44 emergency responder*.ti,ab.
- 45 first responder*.ti,ab.
- 46 care home staff*.ti,ab.
- 47 care home worker*.ti,ab.
- 48 nursing home worker*.ti,ab.
- 49 (search and rescue*).ti,ab.
- 50 or/1-49
- 51 Occupational Exposure/
- 52 Accidents, Occupational/
- 53 Occupational Injuries/
- 54 exp Occupational Diseases/
- 55 hazard*.ti,ab.

56 danger*.ti,ab.
57 high risk.ti,ab.
58 accident*.ti,ab.
59 harm*.ti,ab.
60 injury or injuries or injured).ti,ab.
61 emergency.ti,ab.
62 high impact*.ti,ab.
63 or/51-62
64 50 and 63
65 exp Family/
66 (family or families).ti,ab.
67 spouse*.ti,ab.
68 (wives or wife).ti,ab.
69 husband*.ti,ab.
70 partner*.ti,ab.
71 child*.ti,ab.
72 parent*.ti,ab.
73 sibling*.ti,ab.
74 brother*.ti,ab.
75 sister*.ti,ab.
76 daughter*.ti,ab.
77 son*.ti,ab.
78 or/65-77
79 Mental Health/
80 exp "Trauma and Stressor Related Disorders"/

- 81 psychological stress*.ti,ab.
- 82 mental health*.ti,ab.
- 83 stress disorder*.ti,ab.
- 84 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab.
- 85 compassion fatigue*.ti,ab.
- 86 burnout*.ti,ab.
- 87 vicarious trauma*.ti,ab.
- 88 secondary trauma*.ti,ab.
- 89 social support*.ti,ab.
- 90 family support*.ti,ab.
- 91 coping*.ti,ab.
- 92 family health*.ti,ab.
- 93 marriage*.ti,ab.
- 94 interpersonal relationship*.ti,ab.
- 95 work schedule*.ti,ab.
- 96 or/79-95
- 97 64 and 78 and 96
- 98 (Experiences and perceptions of family members of emergency first responders with post-traumatic stress disorder).m_titl.
- 99 Attitude/
- 100 Family Health/
- 101 experience*.ti,ab.
- 102 support*.ti,ab.
- 103 impact*.ti,ab.
- 104 perception*.ti,ab.

- 105 reflection*.ti,ab.
- 106 opinion*.ti,ab.
- 107 need*.ti,ab.
- 108 attitude*.ti,ab.
- 109 belief*.ti,ab.
- 110 satisfaction*.ti,ab.
- 111 feeling*.ti,ab.
- 112 expectation*.ti,ab.
- 113 or/99-112
- 114 97 and 113

Embase Search

- 120 exp *named groups by occupation/
- 121 astronaut*.ti,ab.
- 122 seafarer*.ti,ab.
- 123 fisherm?n*.ti,ab.
- 124 oil rig worker*.ti,ab.
- 125 healthcare worker*.ti,ab.
- 126 healthcare staff.ti,ab.
- 127 health professional*.ti,ab.
- 128 doctor*.ti,ab.
- 129 Nurse*.ti,ab.
- 130 (midwives or midwife).ti,ab.
- 131 paramedic*.ti,ab.
- 132 ambulance driver*.ti,ab.

- 133 social worker*.ti,ab.
- 134 psychotherapist*.ti,ab.
- 135 psychologist*.ti,ab.
- 136 mental health professional*.ti,ab.
- 137 aircraft pilot*.ti,ab.
- 138 airline pilot*.ti,ab.
- 139 aviator*.ti,ab.
- 140 formula one driver*.ti,ab.
- 141 racing driver*.ti,ab.
- 142 antarctic worker*.ti,ab.
- 143 antarctic explorer*.ti,ab.
- 144 antarctic expeditioner*.ti,ab.
- 145 police officer*.ti,ab.
- 146 policem?n.ti,ab.
- 147 (firefighter* or fire fighter*).ti,ab.
- 148 firem?n.ti,ab.
- 149 miner*.ti,ab.
- 150 foreign aid worker*.ti,ab.
- 151 missionar*.ti,ab.
- 152 farmer*.ti,ab.
- 153 journalist*.ti,ab.
- 154 diplomat*.ti,ab.
- 155 high risk role*.ti,ab.
- 156 high risk occupation*.ti,ab.
- 157 high risk worker*.ti,ab.

158 high risk profession*.ti,ab.
159 deep sea diver*.ti,ab.
160 construction worker*.ti,ab.
161 nuclear worker*.ti,ab.
162 nuclear technician*.ti,ab.
163 emergency responder*.ti,ab.
164 first responder*.ti,ab.
165 care home staff*.ti,ab.
166 care home worker*.ti,ab.
167 nursing home worker*.ti,ab.
168 (search and rescue*).ti,ab.
169 or/120-168
170 occupational hazard/
171 occupational exposure/
172 occupational accident/
173 exp *occupational disease/
174 occupational stress*.ti,ab.
175 hazard*.ti,ab.
176 danger*.ti,ab.
177 high risk*.ti,ab.
178 accident*.ti,ab.
179 harm*.ti,ab.
180 (injury or injuries or injured).ti,ab.
181 emergency.ti,ab.
182 high impact*.ti,ab.

183 frontline*.ti,ab.
184 or/170-183
185 169 and 184
186 exp *family/
187 (family or families).ti,ab.
188 spouse*.ti,ab.
189 (wives or wife).ti,ab.
190 husband*.ti,ab.
191 partner*.ti,ab.
192 child*.ti,ab.
193 parent*.ti,ab.
194 sibling*.ti,ab.
195 brother*.ti,ab.
196 sister*.ti,ab.
197 daughter*.ti,ab.
198 son*.ti,ab.
199 or/186-198
200 mental health/ or psychological well-being/
201 psychotrauma/
202 exp *mental stress/
203 posttraumatic stress disorder/
204 psychological stress*.ti,ab.
205 mental health*.ti,ab.
206 stress* disorder*.ti,ab.
207 (post-traumatic stress* or PTSD* or posttraumatic stress*).ti,ab.

208 compassion fatigue*.ti,ab.
209 burnout*.ti,ab.
210 vicarious trauma*.ti,ab.
211 secondary trauma*.ti,ab.
212 social support*.ti,ab.
213 family support*.ti,ab.
214 coping*.ti,ab.
215 family health*.ti,ab.
216 marriage*.ti,ab.
217 interpersonal relationship*.ti,ab.
218 work schedule*.ti,ab.
219 or/200-218
220 experience/
221 job experience/
222 work experience/
223 personal experience/
224 exp *attitude/
225 family health/
226 experience*.ti,ab.
227 support*.ti,ab.
228 impact*.ti,ab.
229 perception*.ti,ab.
230 reflection*.ti,ab.
231 opinion*.ti,ab.
232 need*.ti,ab.

- 233 attitude*.ti,ab.
- 234 belief*.ti,ab.
- 235 satisfaction*.ti,ab.
- 236 feeling*.ti,ab.
- 237 expectation*.ti,ab.
- 238 view*.ti,ab.
- 239 or/220-238
- 240 185 and 199 and 219 and 239

Appendix 12: Ethical Approval Letter for the Mixed-method Survey Project

04.07.2023

Dr Jo Billings

Faculty of Brain Sciences

UCL

Cc: Sahra Tekin

Notification of Ethical Approval

Ethics ID: 20221. 002

I am pleased to confirm that your study has been ethically approved by the UCL Research Ethics Committee (UCL REC) until 4th of July 2024.

Ethical approval is subject to the following conditions:

Notification of Amendments to the Research

Please seek Chair's approval for proposed amendments (to include extensions to duration) to the research for which this approval has been given. Each research project is reviewed separately and if there are significant changes to the research protocol you should seek confirmation of continued ethical approval by completing an 'Amendment Approval Request Form' <https://www.ucl.ac.uk/research-ethics/responsibilities-after-approval>

Adverse Event Reporting – Serious and Non-Serious

It is your responsibility to report to the REC any unanticipated problems or adverse events involving risks to participants or others. The REC should be notified of all serious adverse events via the Research Ethics Service (ethics@ucl.ac.uk) immediately the incident occurs. Where the adverse incident is unexpected and serious, the Joint Chairs will decide whether the study should be terminated pending the opinion of an independent expert. For non-serious adverse events, the Joint Chairs should again be notified via the Research Ethics Service within ten days of the incident occurring and provide a full written report that should include any amendments to the participant information sheet and study protocol. The Joint Chairs will confirm that the incident is non-serious and report to the REC at the next meeting. The final view of the REC will be communicated to you.

Final Report

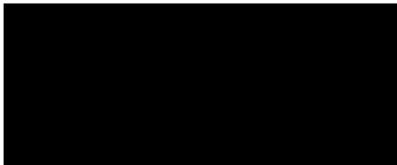
At the end of the data collection element of your research we ask that you submit a very brief report (1-2 paragraphs will suffice) which includes issues relating to the ethical implications of

the research i.e., any issues obtaining consent, participants withdrawing from the research, confidentiality, protection of participants from physical and mental harm etc. In addition, please:

- ensure that you follow all relevant guidance as laid out in UCL's Code of Conduct for Research;
- note that you are required to adhere to all research data/records management and storage procedures agreed as part of your application. This will be expected even after completion of the study.

With best wishes for the research.

Yours sincerely



Professor Lynn Ang and Professor Michael Heinrich Co-Chairs, UCL Research Ethics Committee

Appendix 13: Questionnaires Used in the Mixed-method Survey Project

Consent Form

*Please note that this form will be provided as online form in Qualtrics. You can click here to see how it will look like as an online form. You can see the Participant Consent Form below as a word document.

**Survey of the mental health impact on family members and close friends of
healthcare workers in the UK**

University College London

Division of Psychiatry

Dear Potential Participant,

Thank you for considering taking part in this research which has been approved by UCL Research Ethics Committee (Project ID 20221/002). Please complete this form after you have read the Participant Information Sheet. If you have any further questions, please do contact the researcher (sahra.tekin.20@ucl.ac.uk) before you decide whether to participate.

I confirm that I understand that by ticking/initialling each box below I am consenting to this element of the study. I understand that it will be assumed that unticked/initialled boxes means that I DO NOT consent to that part of the study. I understand that by not giving consent for any one element that I may be deemed ineligible for the study.

If you have any remaining questions about any aspect of the research process you can contact the lead researcher Sahra Tekin on sahra.tekin.20@ucl.ac.uk. If you have any questions about data protection, please contact the data protection office data-protection@ucl.ac.uk.

		Tick Box
--	--	----------

1.	I confirm that I have read and understood the Information Sheet for the above study. I have had an opportunity to consider the information and what will be expected of me. I have also had the opportunity to ask questions which have been answered to my satisfaction.	
2.	I understand that my participation is voluntary, and I am free to withdraw without giving a reason, up until one week after the survey completion. After one week the data will have been anonymised and included in the analysis and it will not be possible to retract the information.	
3.	I consent to participate in the study. I understand that my personal information (survey responses) will be used for the purposes explained to me. I understand that according to data protection legislation, 'public task' will be the lawful basis for processing.	
4.	<p>Use of the information by this research group</p> <p>I understand that all personal information will remain confidential and that all efforts will be made to ensure I cannot be identified.</p> <p>I understand that my data will be stored securely, and anonymous will be applied before analysis. It will not be possible to identify me in any publications.</p>	
5.	I understand that my information may be subject to review by responsible individuals from the University for monitoring purposes.	
6.	I understand the potential risks of participating and the support that will be available to me should I become distressed during the course of the survey.	
7.	I understand no promise or guarantee of benefits, direct or indirect have been made to encourage me to participate.	
8.	I understand that the data will not be made available to any commercial organisations but is solely the responsibility of the researcher(s) undertaking this study.	
9.	I understand that I will not benefit financially from this study or from any possible outcome it may result in in the future.	

10.	I agree that my anonymised research data may be used by others for future research, and no one will be able to identify me when this data is shared.	
11.	I hereby confirm that I understand the inclusion criteria as detailed in the Information Sheet and explained to me by the researcher.	
12.	I am aware of who I should contact if I wish to lodge a complaint.	
13.	I voluntarily agree to take part in this study.	
14.	<p>Use of information for this project and beyond</p> <p>I would be happy for the data I provide to be archived at UCL in accordance with data protection laws. If so, I understand that other authenticated researchers will have access to my anonymized data.</p>	

Please provide the information and click the box.

Participant Name

Date

Participant Information Sheet

Survey of the mental health impact on family members and close friends of healthcare workers in the UK

You are being invited to take part in a research project. Before you decide whether to take part it is important for you to understand why the research is being done and what participation will involve. Please take time to read the following information carefully and discuss it with others before deciding to take part if you wish. If you have any questions about any aspect of the research process, you can contact the Lead Researcher Sahra Tekin on sahra.tekin.20@ucl.ac.uk. Additionally, you can contact the Principal Investigator (PI) of the project Dr Jo Billings, Clinical Associate Professor and Consultant Clinical Psychologist on j.billings@ucl.ac.uk. If you have any questions about data protection, please contact the data protection office data-protection@ucl.ac.uk.

What is the project's purpose?

Healthcare work comes with high-risk for mental health issues for both the healthcare workers themselves and their loved ones in both the short and long term. However, there is limited research which focuses on

the impact of healthcare work on the mental health and wellbeing of healthcare workers' family members and their close friends.

The aim of this study is to investigate and understand:

- a) the experiences of family members and close friends of healthcare workers, and
- b) the impact of healthcare work on the mental health and well-being of healthcare workers' families and close friends.

Why have I been chosen?

You have been invited to take part in this study as you are a family member (spouse, parent, sibling, child over 18 etc.) or close friend of a healthcare professional (administrator, care home worker, cleaner, doctor, healthcare assistant, mental health care worker, nurse, occupational therapist, psychotherapist, paramedic, porter, other allied health profession not specified etc) who worked in a frontline healthcare service during the COVID19 pandemic and is registered on the NHS Check national study. We are interested in your experiences and views as a family member or close friend of a healthcare worker.

Do I have to take part?

Taking part in this study is entirely voluntary. If you do decide to take part, you will be asked to electronically confirm a consent form. . As the survey is anonymous once you have submitted your answers that it will not be possible to withdraw.

What will happen to me if I take part?

You will be invited to take part in a survey study, lasting approximately 10 minutes. This survey will start with a form in which we will ask questions about your age, gender, ethnicity, employment status, your living area, your frontline worker family member's professional group, and their work setting. Then, we will be asking you some questions about your experiences, views, and feelings as a family member or a close friend of healthcare worker.

What do I have to do?

If you decide you would like to take part in this study, after reading this Participant Information Sheet, at the end of this page, there will be an "I have read and I understand" box. When you tick that box, you will be taken to a separate page for your consent. Then, you can be part of this important study.

What are the possible disadvantages and risks of taking part?

You will be asked about your experiences of being a healthcare workers' family member/close friend. Some of your experiences may have been difficult and talking about this could be distressing. You will be able to

take breaks if needed and can continue the questions at another time if you prefer. You do not have to finish answering the questions. Should you continue to feel upset, the researcher will be able to signpost you to relevant sources of support.

Where can I get help if I become distressed?

Contact your GP for support and to access local Psychological Therapy Services. You can contact Samaritans calling 116 123 day or night or SANEline on 0300 304 7000.

What are the possible benefits of taking part?

Whilst there are no immediate and personal benefits for the people participating in the project, it is hoped that this work will inform future guidance about how best to support family members of healthcare staff.

What if something goes wrong?

If you are unhappy with any aspect of the research process, then please do contact the lead researcher Sahra Tekin on sahra.tekin.20@ucl.ac.uk. If the lead researcher is not able to handle your complaint to your satisfaction, you would be able to contact the Principal Investigator (PI) of the project Dr Jo Billings, Clinical Associate Professor and Consultant Clinical Psychologist on j.billings@ucl.ac.uk. If the PI is not able to as well, then you would be able to contact the UCL Research Ethics Chair on ethics@ucl.ac.uk.

Will my taking part in this project be kept confidential?

Any information that we collect about you will be kept strictly confidential. If you send us an email to join the study, your contact details will be used solely for the purposes of sending the link for the survey. Once the survey is sent, this information will be deleted. You will not be able to be identified in any ensuing reports or publications based on this research. If any potentially identifying information about your family member /friend or their place of work is mentioned, we will be sure to anonymise it or remove it from our write up.

What will happen to the results of the research project?

The answers of the survey from all the family members/close friends of the healthcare professionals will be analysed and written up into a brief report which we hope that it will subsequently inform guidance for NHS service managers and planners. The findings of the study will be written up in more detail for dissemination in academic paper(s) in a peer reviewed journal. The results will be included to the Sahra Tekin's PhD thesis. Additionally, the results may be posted in social media without any personal information of the participants. Findings from this study may also be presented at relevant conferences and healthcare forums. At any point, only the researcher team involved in this project will have access to your data. On completion of the project, the anonymised data will be archived by UCL and kept for 10 years, in line with UCL policy. This data may be

accessed at some point in the future, but only with permission and under the supervision of the Principal Investigator, Dr Jo Billings.

Who is organising the research?

The study is being organised by the Institute of Mental Health at UCL. There is no external funding or sponsorship of this research.

Local Data Protection Privacy Notice:

The controller for this project will be University College London (UCL). The UCL Data Protection Office provides oversight of UCL activities involving the processing of personal data, and can be contacted at data-protection@ucl.ac.uk. This 'local' privacy notice sets out the information that applies to this particular study. Further information on how UCL uses participant information can be found in our 'general' privacy notice: For participants in health and care research studies, click [here](#). The information that is required to be provided to participants under data protection legislation (GDPR and DPA 2018) is provided across both the 'local' and 'general' privacy notices. The lawful basis that will be used to process your personal data are: 'Public task' for personal data. Your personal data will be processed so long as it is required for the research project. If we are able to anonymise or pseudonymise the personal data you provide we will undertake this and will endeavour to minimise the processing of personal data wherever possible. If you are concerned about how your personal data is being processed, or if you would like to contact us about your rights, please contact UCL in the first instance at data-protection@ucl.ac.uk.

I have read the Participant Information Sheet and I understand it.

Sociodemographic Form, Questionnaires and Open-ended Questions

After reading the PIS and giving consent, participants will be asked to complete some brief sociodemographic questions. Participants will then be directed to the related questionnaires (see below). Sociodemographic questions and questionnaires will be compulsory to answer. Finally, all the participants will be invited to answer some optional open-ended questions.

Questionnaires and Target Population that will answer the questions

Questionnaires	Spouses/Partners	Other Family Members (+18)	Close Friends (+18)
----------------	------------------	----------------------------	---------------------

Consent Form	✓	✓	✓
Participant Information Sheet	✓	✓	✓
Sociodemographic Form	✓	✓	✓
Secondary Traumatic Stress Scale	✓	✓	✓
Open-ended Questions	✓	✓	✓

Amendments to Questionnaires: We have made some minor amendments to the questionnaires that will be used in this study based on the target populations which are explained in detail below:

- Since there is no questionnaire which examines the experiences of friends of high-risk occupational group workers, we revised the Family Assessment Device (FAD), and we added “household” to the questions. For example, the original question is *“Planning family activities is difficult because we misunderstand each other”*. However, we revised it as *“Planning household/family activities is difficult because we misunderstand each other”*.
- The authors of the Secondary Traumatic Stress Scale (Bride et al., 2004) recommend that their measure can be adapted to be appropriate for different respondent groups. We have revised “client” to *“healthcare worker family member or friend”*. For example, the original statement is *“It seemed as if I was relieving the trauma(s) experienced my client(s),* but we revised it as *“It seemed as if I was reliving the trauma(s) experienced by my healthcare worker family member/friend.”*
- Similar to the FAD, we have revised the explanation of the Short Form of Post Traumatic Growth Inventory. The original explanation is *“Indicate for each of the statements below the degree to which this change occurred in your life as a result of the crisis/disaster, using the following scale.”* We revised it as *“Indicate for each of the statements below the degree to which this change occurred in your life as a result of the crisis related to your healthcare worker family member/friend’s job, using the following scale.”*

Sociodemographic Form:

Family members and Close Friends: Please answer the questions below according to your own information as a family member or close friend of a healthcare worker.

Please state your gender:

- Female
- Male
- Other
- Prefer not to say

Please state your ethnic group:

- Asian or Asian British
- Black, African, Black British or Caribbean
- Mixed or multiple ethnic groups
- White
- Another ethnic group
- Prefer not to say

Please state your age range:

- 18-24
- 25-34
- 35-44
- 45-54
- 55-64
- 65+

Please state your own employment status :

- Full time employment
- Part time employment

- Unemployed
- Student
- Retired
- Other, please specify: _____

Please state your relationship with the healthcare worker (i.e. The healthcare worker is your....):

- Husband
- Wife
- Partner
- Daughter/Son
- Sibling
- Friend
- Parent
- Other, please specify: _____

Please state if you live with the healthcare worker in the same house or not

- In the same house
- In different houses

Please state the length of your relationship:

- Less than 1 year
- 1 year-5 years
- 5 years-10 years
- 10 years-15 years
- 15 years-20 years
- 20 years-25 years
- 25+

Please select the region where you live:

- England – South East
- England – London
- England – South Central
- England – South West
- England – Midlands
- England – North East
- England – North West
- Northern Ireland
- Scotland
- Wales
- Other

Healthcare workers: Please answer the questions below according to your healthcare worker family member or friend's information:

Please state your healthcare worker family member/friend's gender:

- Female
- Male
- Other
- Prefer not to say

Please state your healthcare worker family member/friend's ethnic group:

- Asian or Asian British
- Black, African, Black British or Caribbean
- Mixed or multiple ethnic groups
- White
- Another ethnic group

Prefer not to say

Please state your healthcare worker family member/friend's age range:

18-24

25-34

35-44

45-54

55-64

65+

Please state your healthcare worker family member/friend's employment status :

Full time employment

Part time employment

Unemployed

Student

Retired

Other, please specify: _____

Please state the professional group of your healthcare worker family member:

Administrator

Care home worker

Cleaner

Doctor – Consultant

Doctor – Junior

Healthcare assistant

Mental Health care worker

Nurse

Occupational Therapist

Other Allied Health profession not specified

Paramedic

- Physiotherapist
 - Porter
 - Psychologist
 - Other
- Please specify: _____

Questionnaires:

Secondary Traumatic Stress Scale:

The following is a list of statements made by someone who has been through a traumatic experience. Read each statement then indicate how frequently the statement was true for you in the past seven (7) days by clicking the corresponding number next to the statement.

	Never	Rarely	Occasionally	Often	Very Often
1. I felt emotionally numb.....	1	2	3	4	5
2. My heart started pounding when I thought about my healthcare worker family member/friend's work.....	1	2	3	4	5
3. It seemed as if I was reliving the trauma(s) experienced by my healthcare worker family member/friend.....	1	2	3	4	5
4. I had trouble sleeping.....	1	2	3	4	5
5. I felt discouraged about the future.....	1	2	3	4	5
6. Reminders of my healthcare worker family member/friend's work upset me.....	1	2	3	4	5

7. I had little interest in being around others.....	1	2	3	4	5
8. I felt jumpy.....	1	2	3	4	5
9. I was less active than usual.....	1	2	3	4	5
10. I thought about my healthcare worker friend/family member's work when I didn't intend to.....	1	2	3	4	5
11. I had trouble concentrating.....	1	2	3	4	5
12. I avoided people, places, or things that reminded me of my healthcare worker family member/friend's work.....	1	2	3	4	5
13. I had disturbing dreams about my healthcare worker family member/friend's experiences at work that they shared with me.....	1	2	3	4	5
14. I wanted to avoid listening to my family member/close friend's some experiences at work.....	1	2	3	4	5
15. I was easily annoyed.....	1	2	3	4	5
16. I expected something bad to happen.....	1	2	3	4	5
17. I noticed gaps in my memory about work experiences of my healthcare worker family member/friend shared with me.....	1	2	3	4	5

Open-ended Questions:

In this last section, we will be asking six optional open-ended questions related to your experiences as a family member or close friend of a healthcare worker. After reading the questions, please click “Yes” or “No” according to how well it describes your experiences. If you click yes, you can provide more detail about your experiences below.

1. Have you experienced any changes in your loved one’s behaviour when she/he has had a difficult day at work?

Yes No

If yes, please elaborate (optional).

.....

2. Have you ever been troubled by traumatic experiences of your family member/close friend healthcare worker’s work that they have shared with you?

Yes No

If yes, can you share with us how this has impacted you (optional).

.....

3. Are there any other ways in which your loved one's work has affected you/your family or your household?

Yes No

If yes, can you share with us how this has impacted you (optional).

.....

4. Have there been any (other) positive benefits for you and/or your household/family of your loved one’s work?

Yes No

If yes, please elaborate (optional).

.....

5. What support would you like as the family member/close friend of a frontline healthcare worker? (optional)

.....

6. Is there anything else that you would like to mention? (optional)

.....

Appendix 14. Other Questionnaires for the Mixed-method Survey Project

After reading the PIS and giving consent, participants will be asked to complete some brief sociodemographic questions. Participants will then be directed to the related questionnaires (see below). Sociodemographic questions and questionnaires will be compulsory to answer. Finally, all the participants will be invited to answer some optional open-ended questions.

Questionnaires and Target Population that will answer the questions

Questionnaires	Spouses/Partners	Other Family Members (+18)	Close Friends (+18)
Sociodemographic Form	✓	✓	✓
Couple Satisfaction Index (CSI-16)	✓		
Family Assessment Device (FAD) Subscales: Communication, Problem solving, Affective responsiveness, General functioning	✓	✓	✓
Secondary Traumatic Stress Scale	✓	✓	✓
Short Form of Post Traumatic Growth Inventory	✓	✓	✓
Open-ended Questions	✓	✓	✓

Couple Satisfaction Index (CSI-16):

1. Please indicate the degree of happiness, all things considered, of your relationship.

Extremely Unhappy	Faily Unhappy	A little Unhappy	Happy	Very Happy	Extremely Happy	Perfect
0	1	2	3	4	5	6

Most people have disagreements in their relationships. Please indicate below the approximate extent of agreement or disagreement between you and your partner for each item on the following list.

	All the Time	Most of the time	More often than Not	Occasionally	Rarely	Never
2. In general, how often do you think that things between you and your partner are going well?						
3. Our relationship is strong						
4. My relationship with my partner makes me happy						
5. I have a warm and comfortable						

relationship with my partner						
6. I really feel like part of a team with my partner.						
7. How rewarding is your relationship with your partner?						
8. How well does your partner meet your needs?						
9. To what extent has your relationship met your original expectations?						
10. In general, how satisfied are you with your relationship?						

For each of the following items, select the answer that best describes *how you feel about your relationship*. Base your responses on your first impressions and immediate feelings about the item.

11.INTERESTING	5	4	3	2	1	0	BORING
12. BAD	0	1	2	3	4	5	GOOD
13. FULL	5	4	3	2	1	0	EMPTY
14. STURDY	5	4	3	2	1	0	FRAGILE
15.DISOURAGING	0	1	2	3	4	5	HOPEFUL
16. ENJOYABLE	5	4	3	2	1	0	MISERABLE

Family Assessment Device (FAD)’s 4 Subscales: Communication, Problem Solving, Affective Responsiveness, Family Functioning

This section contains a number of statements. Please read each statement carefully and decide how well it describes your own relationship with the healthcare worker family/household member. You should answer as to how you see your family/household.

For each statement, there are four possible responses:

Strongly Agree (SA): Click SA, if you feel that the statement describes your family/household very accurately.

Agree (A): Click A, if you feel that the statement describes your family/household for the most part.

Disagree (D): Click D, if you feel that the statement does not describe your family/household for the most part.

Strongly Disagree (SD): Click D, if you feel that the statement does not describe your family/household at all.

- 1. Planning household/family activities is difficult SA A D SD
because we misunderstand each other.
- 2. When someone is upset the others know why. SA A D SD
- 3. In time of crisis we can turn to each other for support. SA A D SD
- 4. We are reluctant to show our affection for each other. SA A D SD

5. We cannot talk to each other about the sadness we feel	SA	A	D	SD
6. We usually act on our decisions regarding problems.	SA	A	D	SD
7. You can't tell how a person is feeling from what they are saying.	SA	A	D	SD
8. Individuals are accepted for what they are.	SA	A	D	SD
9. People come right out and say things instead of hinting at them.	SA	A	D	SD
10. Some of us just don't respond emotionally.	SA	A	D	SD
11. We avoid discussing our fears and concerns.	SA	A	D	SD
12. After our family/household members tries to solve a problem, we usually discuss whether it worked or not.	SA	A	D	SD
13. We can express the feelings to each other.	SA	A	D	SD
14. We do not show our love to each other.	SA	A	D	SD
15. There are lots of bad feeling in family/household	SA	A	D	SD
16. We feel accepted for what we are.	SA	A	D	SD
17. We resolve most emotional upsets that come up.	SA	A	D	SD
18. Tenderness takes second place to other things in our family.	SA	A	D	SD
19. Making decisions is a problem for our family/household.	SA	A	D	SD
20. We are frank with each other.	SA	A	D	SD
21. We are able to make decisions about how to solve problems.	SA	A	D	SD
22. We express tenderness.	SA	A	D	SD
23. We confront problems involving feelings.	SA	A	D	SD
24. We don't get along well together.	SA	A	D	SD
25. We don't talk to each other when we are angry.	SA	A	D	SD
26. We confide in each other.	SA	A	D	SD
27. We cry openly.	SA	A	D	SD

28. When we don't like what someone has done, we tell them. SA A D SD

29. We try to think of different ways to solve problems. SA A D SD

Short Form of Post Traumatic Growth Inventory:

Indicate for each of the statements below the degree to which this change occurred in your life as a result of the crisis related to your healthcare worker family member/friend's job, using the following scale.

0 = I did not experience this change as a result of the crisis related to my healthcare worker family member/friend's job.

1 = I experienced this change to a very small degree as a result of the crisis related to my healthcare worker family member/friend's job..

2 = I experienced this change to a small degree as a result of the crisis related to my healthcare worker family member/friend's job.

3 = I experienced this change to a moderate degree as a result of the crisis related to my healthcare worker family member/friend's job..

4 = I experienced this change to a great degree as a result of the crisis related to my healthcare worker family member/friend's job.

5 = I experienced this change to a very great degree as a result of the crisis related to my healthcare worker family member/friend's job.

Possible Areas of Growth and Change	0	1	2	3	4	5
1. I changed my priorities about what is important in life.						
2. I have a greater appreciation for the value of my own life.						
3. I have a better understanding of spiritual matters						
4. I established a new path for my life.						
5. I have a greater sense of closeness with others.						
6. I know better that I can handle difficulties better.						
7. I am able to do better things in my life.						
8. I have a stronger religious faith.						

9. I discovered that I am stronger than I thought I was.						
10. I learned a great deal about how wonderful people are.						

Appendix 15. Prototype 1 for the Process of the Content Analysis for the Mixed-method Survey Project

ID	Gender	Age	Relationship	Length of the Relationships	HCW's Job Role	Q1.	Q2.	Q3.	Q4.	Q5.	Q6.
						Have you experienced any changes in your loved one's behaviour when she/he has had a difficult day at work?	Have you ever been troubled by traumatic experiences of your family member/close friend healthcare worker's work that they have shared with you?	Are there any other ways in which your loved one's work has affected you/your family or your household?	Have there been any (other) positive benefits for you and/or your household/family of your loved one's work?	What support would you like as the family member/close friend of a frontline healthcare worker?	Is there anything else that you would like to mention? (optional)
1. P1	Female	65+	Friend	20 years-25 years	Nurse	Yes	No	No	No	None	
2.	Male	35-44	Partner	5 years-10 years	Administrator	Yes Angry short fused disengaged	No	Yes Depressed quiet moody	No	Councillor	Nothing else
3.	Female	45-54	Wife	15 years-20 years	Other	Yes Feels down & exhausted	Yes Discovering how his colleagues do their job.	Yes He could not easily get AL because of his colleague's poor attendance at work.	Yes Only his promotion.	So far we can handle it as a family. We talk about it and let our children understand that we can deal with it.	
4.	Male	25-34	Partner	5 years-10 years	Other	Yes	No	No	Yes		
5.	Male	25-34	Husband	10 years-15 years	Psychologist	Yes The mood can change from the morning where she has been spritely, to a more somber mood in the evening following difficult sessions	Yes They have had to work with some very difficult cases which make me worried about humanity, as well as my partners ability to separate work and home life.	Yes Cancelled events, low mood	Yes I have a deeper respect and understanding for the challenges of healthcare work	Knowing they have more support themselves	Support workers are the backbone of the NHS and should be recognised as such. From what I hear and what I've seen as a patient, wards couldn't function without them
6.	Male	65+	Partner	10 years-15 years	Mental Health care	Tired, grumpy	Yes I feel exasperated on her behalf-staff seem to have to work with decisions that are stupid or cause	Yes Sleeps a lot on her days off. Often says she's too tired for something-from		I don't need support-I wish managers were better and that support workers weren't treated as idiots. They seem to have more	

Colour Explanation:
 - Light green: Research Question 1
 - Light orange: RQ2
 - Light blue: RQ3

Research Question 1 represents Domain 1.

RQ2 represents Domain 2.

RQ3 represents Domain 3.

Appendix 16. Prototype 2 for the Process of the Content Analysis for the Mixed-method Survey Project

Participant ID	1.What are the household members' experiences of being exposed to their HCW loved one's trauma?	2.What impact does the HCW loved one's trauma have on household members?	3.What support do household members think would help them with coping HCW loved one's trauma?
Important Quotes	Changes in HCWs		
	Q1	Q2, Q3,Q4	Q5
P5 M husband of psychologist	The mood can change from the morning where she has been spritely, to a more somber mood in the evening following difficult sessions	<div style="border: 1px solid black; padding: 5px;"> <p><u>Preliminary Main Categories:</u></p> <ol style="list-style-type: none"> 1. Feelings of the HCWs 2. Mental and physical tiredness of HCW 3. Impact of the Family Relationships (Communication) 4. Impact of the Family Activities (withdrawal) 5. Withdrawal emotionally and responsibility-wise </div>	
P17 F wife of nurse	My husband is exhausted and cannot do anything in the evenings and often goes to bed at 7:30pm.		
P24 F wife of MH care worker	Feeling stressed, they talked to their Manager about the problems at work and nothing has changed		
P26 F wife of psychologist	less bandwidth to be present for others within our family unit.		
P27 F wife of a doc-cons	Can be angry if there have been challenges with management. More likely to share details about the day if something has happened		
	<p><u>Main changes in HCW:</u></p> <p>- Angry, short fused, Upset, frustration, snappy, annoyed: P2, P6, P12,P60 P27,P40, P56 P48,P50,P52, P62, P63, P69, P72, P82, P83, 102, 104, 114, 137, 138, 143 149, 156, 158, 160, 165, 166, 168, 185, 188, 189, 190, 205, 206, 209, 210, 211,259 212,213, 215, 219, 220, 233, 237, 250</p> <p>-Disengaged:P2,P48, 160, 173</p> <p>-Feels down-sad-crying: P3, P28, P37, P41, P60, P67, P69, P72, P76, P91,P97, p101, p119, 124, 140, 165, 166, 176, 189, 192, 193, 197, 198,212,213, 214,219, 233, 250, 267, 268</p> <p>-Exhausted-tired: P3, P6, P17, P46, P56, p71, P76, P78, P86, 91,P97, 102,111, 154, 156, 164, 167, 169, 173, 177, 197, 207, 211, 222, 224, 237, 242, 248, 256</p> <p>-Mood changes: P5, P25,P37, P41, P44,P56, 102, 117, 143, 198, 216, 259, 267</p> <p>- Grumpy: P6, P8, P52, 122, 133, 136, 150, 201, 215, 236, 245</p> <p>- Exasperated: P6</p> <p>-Irrationality: 143</p>		

