



REVIEW ARTICLE



<https://doi.org/10.1057/s41599-023-02271-z>

OPEN

Mobilising volunteer groups, communities and agencies during the pandemic: a rapid realist view of the evidence

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The COVID-19 pandemic represented a rise in ‘people power’ globally, expressed through manifold acts of kindness, solidarity and mutualism as communities organised and came together where governments could or would not. In this study we were interested in the mechanisms through which communities and agencies extended existing practices and structures to respond to the pandemic or adopted new ways of organising. We undertook a rapid realist systematic review, following established steps and drawing on the Volunteer Process Model as our core theory. We worked with 59 studies to identify the mechanisms through which individuals, agencies and organisations, and communities mobilised and we identified six mechanisms. Gaining experience and developing role identity were key in mobilising volunteers to undertake activities and also resulted in positive outcomes for the volunteers themselves. Adaptability ensured that individuals, groups and local agencies and organisations were able to respond to the changing needs of beneficiary groups. Co-ordination helped communities, agencies and mutual aid groups to work together rather than in competition. Emotional support, support in the form of social and material recognition, and support through training were important in sustaining a volunteer workforce and protecting the wellbeing of the volunteer workforce. Altruism was a key motivator for stepping up during the pandemic and becoming a volunteer while greater trust was linked with the extent to which groups and communities were able to scale up efforts to respond to higher demands during the pandemic. While the COVID-19 pandemic represented a period of great social upheaval, it illuminated the ‘power of people’ working together. Our findings identify six key mechanisms that supported this mobilisation, which may be critical to activate in future health emergencies, but are also largely reflective of investments made before the pandemic to support the development of social capital and the development of volunteering infrastructure.

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Background

The COVID-19 pandemic triggered a rise in ‘people power’ globally, expressed through multifarious acts of kindness, solidarity and mutualism as communities organised and came together where governments could or would not (Matthewman and Huppatz, 2020). Across multiple settings, greater value and emphasis was placed on collaboration between citizens, civil society (including the third sector and community-based groups), and localised government structures, as a means of responding to the pandemic and its impacts (Miao et al. 2021). This review addresses these themes through examining how communities and local agencies responded to the COVID-19 pandemic through mobilising volunteers.

What is volunteering and how was volunteering organised during the COVID-19 pandemic? Volunteering takes place through a number of different activities, and broad definitions suggest that volunteering can encompass any unpaid activity that benefits others and is carried out through free choice (Taylor-Collins et al. 2021), although these activities usually do not include providing care or support for members of one’s own family. Informal volunteering reflects several different activities that could be viewed as acts of kindness, support, or neighbourliness (e.g., providing informal advice or keeping in touch with those who may not be able to go out) through to providing more instrumental supports, such as cleaning or preparing food or providing transport. Some of these forms of informal volunteering have low ‘entry’ thresholds, with almost half of adults who reported undertaking informal volunteering during the first lockdown in England giving advice to others (46%), and a similar proportion keeping in touch with someone who had difficulty going out (43%) rising to almost three-fifths (58%) in the second lockdown (DCMS, 2020). In contrast, formal volunteering may have a higher ‘entry’ threshold (i.e., can require planning, organisation and commitment in a way not always necessary for informal volunteering) and typically takes place within an organisational context.

The pandemic also saw a proliferation of mutual aid groups (Boelman and Stuart, 2021, Lofton et al. 2022). Mutual aid groups were emblematic of hyperlocalised responses to the pandemic, and some groups were formed on the basis of existing group infrastructure, while others operated entirely independently of existing civic societal infrastructure (Boelman and Stuart, 2021). Mutual aid itself has been viewed as a form of informal volunteering (Taylor-Collins et al. 2021), although mutual aid groups occupy a spectrum of approaches that straddle a distinction between formal and informal volunteering (Boelman and Stuart, 2021).

The COVID-19 pandemic, as an iterative crisis with a definite beginning but no end, offers an opportunity to examine the way in which volunteering is understood and to question whether new trends that have emerged need to be reflected in our understandings (Bynner et al. 2022).

Who volunteered? Efforts to recruit volunteers to respond to the COVID-19 pandemic were hugely successful across several settings. For example, estimates from England suggest that around one-in-five of the population volunteered for an organisation or group (21% in total) during the first lockdown, and 9% of the population as a whole engaged in formal volunteering for the first time (DCMS, 2020). Meanwhile almost half of the population in England (47%) is estimated to have volunteered informally through ‘acts of kindness’ and giving some form of unpaid help over the same period (DCMS, 2020). Similar patterns were observed across a range of settings globally (UNRIC Brussels, 2021). In India for

example, volunteers worked together to facilitate lifesaving treatment through, for example, locating critical care beds, stocks of Remdesivir (covid antiviral medication), oxygen concentrators or ambulances (Monnappa and Deka, 2021). Despite the widescale deployment of volunteers across different settings, the characteristics of people volunteering during the pandemic were found to be socially patterned. For example in the UK, women, those with higher levels of education, those living in rural areas, and those whose roles were understood as ‘keyworkers’ were more likely to volunteer (Mak and Fancourt, 2022).

Volunteering is also related to the notion of social capital, which describes the benefits and resources we derive through our interactions with others in our communities (Rodgers et al. 2019). Studies suggest that those with higher levels of social capital were also more likely to volunteer during the pandemic (Mak and Fancourt, 2022), perhaps indicating an intrinsic motivation of gaining satisfaction from the interactions that follow from collective action. Furthermore, social capital may also be a necessary precursor for engagement in volunteering, given that volunteering often takes place through social connections. During the pandemic, while many stepped up their volunteering activities, many also reduced the frequency with which they volunteered or stopped altogether, with people who were living with a long-term illness for example tending to reduce their volunteering (DCMS, 2020, Mak et al. 2022).

What do we want to know in this review? Although informal (dyadic) acts of kindness certainly increased during the pandemic (DCMS, 2020), a distinct trend observed was a rise in people working together to improve outcomes, either within or extending from existing local structures and agencies, or emerging independently and on informal terms (Boelman and Stuart, 2021). While the existing evidence (pre-COVID) can help us to understand the antecedent characteristics and patterns of volunteering, it does not necessarily illuminate the mechanisms through which communities and agencies extended existing practices and structures to respond to the pandemic or adopted new ways of organising. This review examines how local agencies and communities responded and mobilised volunteers to provide support – we are interested in volunteering that was based within and led by communities. We did not impose a strict definition of community beyond a group of individuals connected to a shared geographic locality – a community in this review could have been a place where people lived or worked. However, this locality was generally at a sub-regional level and therefore nationally coordinated efforts to mobilise volunteers were not included in this review. Similarly, studies that seek to understand where volunteers were mobilised to provide support online where there was no shared geographic locality were not included as the mechanisms were likely to differ; however, several of the included studies do include at least a partial element of online or remote support due to pandemic-related restrictions on movement. We include studies from high-income countries, as defined by the World Bank (2020), to develop a comprehensive understanding around mechanisms that helped to mobilise volunteers across contexts.

Our main research question is: What were the core mechanisms for mobilising volunteers for local groups, communities, and organisations during the COVID-19 pandemic and under what circumstances did these mechanisms occur?

Methods

Overview of approach. This review is based on a systematic mapping exercise conducted by the authors examining the role of social capital during the pandemic which identified 302 studies published up to March 2022 (see map [Anonymised]). A subset

of these studies connected social capital with volunteering. To identify further evidence, we expanded the search to include more specific terms related to volunteering (e.g., volunteers, voluntary, mutual aid) to ensure other relevant evidence had been identified (see supplementary materials for a full outline of methods).

Our approach to reviewing the literature and identifying mechanisms is to undertake a rapid realist review. A core aim of realist reviews is to identify configurations of evidence around context-mechanism-outcome (CMO) in order to address questions about what works for whom and in what circumstances. In this review, as we were synthesising evidence from a variety of high-income contexts, it was clear from the outset that we would be unable to identify with any granularity recurring patterns around context. Therefore, we focussed our treatment of context around equity in the opportunity or capacity to volunteer, and whether there was any evidence from the studies that the mechanisms described might raise issues around equity defined in this way. To help structure our thinking around equity-promoting and inhibiting factors, we drew on the PROGRESS-Plus framework (see Welch et al. 2019), which is used widely across the systematic review literature.

In developing this review, we followed the RAMESES checklist (Wong et al. 2013); see supplementary materials) and the steps laid out elsewhere (see Rycroft-Malone et al. 2012, Wong et al. 2010) which identify 5 main stages in a realist synthesis including: (i) identifying the underlying theories and designing the conceptual framework; (ii) identifying evidence (i.e. identifying eligible studies); (iii) appraising primary studies; (iv) extracting data to support the exploration of CMO configurations (and additional information about study characteristics); and (v) analysing and synthesising evidence.

Stage 1 - Searching and identifying candidate theories. Given the focus of this review on community-level and community-led volunteering, and particularly the readiness of communities to mobilise during the pandemic, we base much of our theoretical framework around the Volunteer Process Model (Omoto and Snyder, 2002, Snyder and Omoto, 2008). This model was chosen as it has been widely used to assess engagement across different volunteering contexts. It considers influencers across a number of contextual levels and examines different temporal stages that were also deemed to roughly map onto CMO components which include the antecedents (context), experiences (mechanisms) and consequences of volunteering (outcomes). We also augment the Volunteer Process Model through looking at other ecological and community-focussed theories (described in the supplementary materials). The model below forms the basis of our data extraction template for understanding CMO configurations that explain how communities and groups are mobilised to volunteer during the COVID-19 pandemic.

Stage 2 - Searching for evidence. Searches for literature evidencing the role of social capital in helping communities respond to the pandemic were conducted in March 2022, and this evidence was presented as a systematic map (see map [Anonymised]). The additional searches for evidence on volunteering during the pandemic were conducted in May 2022. Details of the searches are included in the supplementary materials.

Screening on title and abstract was conducted by two reviewers initially to ensure consistency in the application of screening criteria, before being conducted independently; this was replicated for full text screening. Records were excluded if they were:

- Not focussed on COVID-19
- Non-empirical studies (e.g., commentaries or editorials that contained no data)

- Not focussed on community-based or community-led volunteering (it was beyond the scope of the review to examine individual patterns of volunteering and acts of kindness; and these forms of volunteering may also have occurred under a distinct set of context-mechanism-outcome configurations)
- Not focussed on volunteering processes (i.e., they did not describe activities or processes of volunteer engagement and recruitment)
- Not focussed on actual volunteering experiences (e.g., they reported on attitudes towards volunteering but not observed behaviour)
- Not in English

After extracting data from the first ten studies, a decision was made to prioritise studies from high-income countries, as defined by the World Bank (2020), to ensure the coherence of mechanisms. The PRISMA flow chart for the flow of studies through the review is shown in Fig. 1.

Stage 3 - Appraising the studies. All studies were appraised for relevance using screening criteria. Studies were included in the synthesis if they contained descriptive data that could support the refinement of theory (relevance); and if their findings appeared to be credible and trustworthy (rigour) (these are described in the supplementary materials).

Stage 4 - Extracting data. The properties of each study were mapped using a data extraction tool applied across all studies (see supplementary materials). We used the underlying theory to identify the levels at which different mechanisms may generate outcomes (and consequently where policy actions may be most appropriately directed), with some mechanisms occurring at multiple levels (individual, beneficiary, agency, community, and social structure). Each study included was read in-depth by a reviewer who undertook line-by-line coding to identify explanatory accounts for outcomes that occurred in the study. Using a preliminary sample of ten studies that had been assessed as having high relevance, these explanatory accounts were then examined for demi-regularities, before being developed into a framework for extraction.

Stage 5 - Analysing and synthesising evidence. We followed some of the approaches outlined in Rycroft-Malone et al. (2012)'s exemplar through first organising the data into evidence tables; (ii) examining themes in the data; (iii) comparing reviewer themes for an article and developing chains of inference (due to the tight timescales available to us, this comparison was conducted fully for sixteen core studies); (iv) looking for connections across extracted data and themes, and in this case we also looked for connections across the different ecological levels (individual, beneficiary, agency, community, and social structure) set out in the theory (see Appendix 1 of supplementary materials for details of theory development); (v) explication of CMO configurations and discussion of the CMO configurations across the team.

Results

In total, we screened 506 records and identified 59 studies eligible for inclusion (see Fig. 1).

C-M-O synthesis and results. CMO configurations were identified across 6 mechanisms which are summarised below in Table 1.

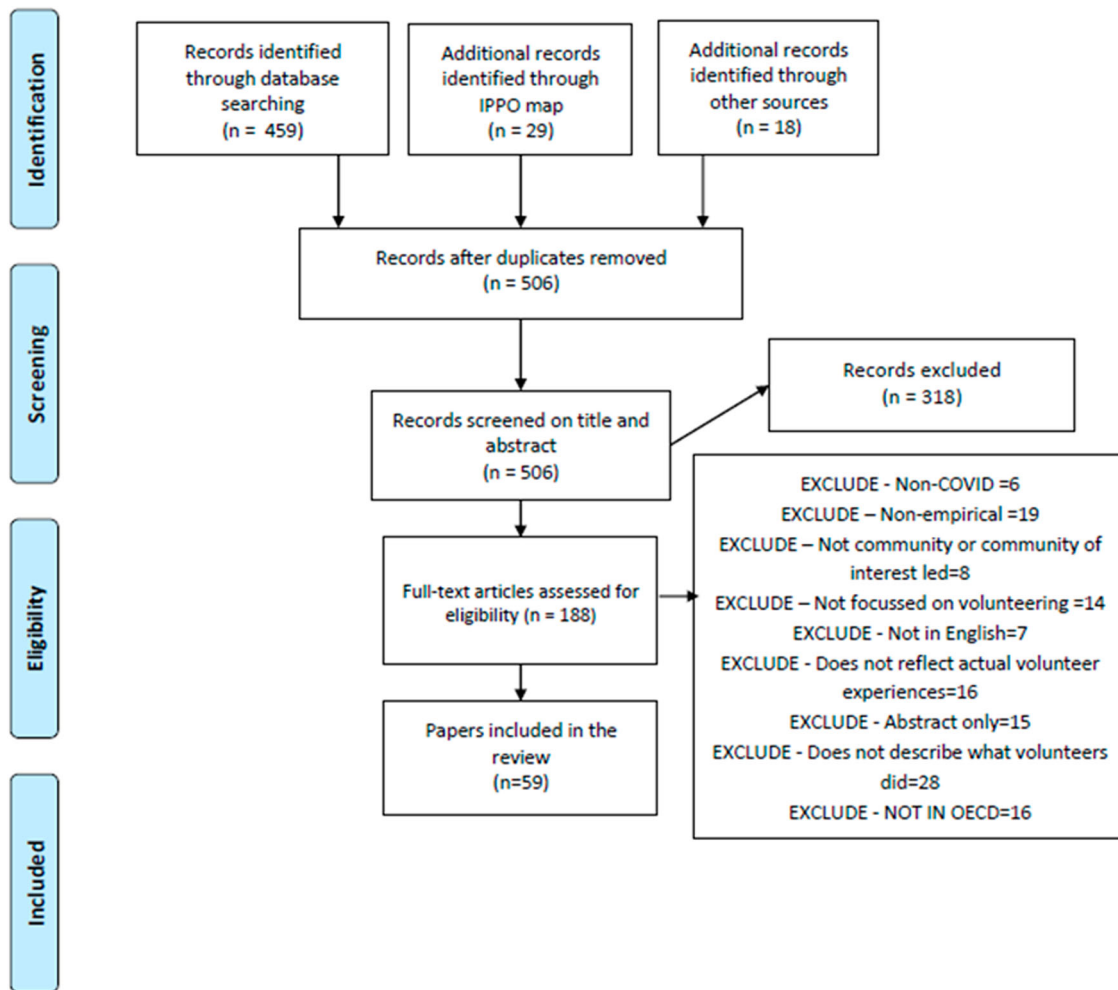


Fig. 1 Flow of studies through the review. This figure is based on a standard PRISMA flow diagram that shows how studies pass through the different phases of the review.

Mechanism 1 - Developing role identity through gaining experience.

- a. When volunteers are able to complete new tasks or draw on existing volunteer capital (pre-existing skills and experiences) (**Context**), they gain or solidify their role identity as volunteers (**Mechanism**) which helps to raise their level of confidence and feelings of empowerment (**Outcome**) (Badger et al. 2022, Chow et al. 2021, Kulik, 2021, Boelman and Stuart, 2021). Volunteers drew on existing experience to feel confident in situations that COVID-19 presented (Badger et al. 2022, Boelman and Stuart, 2021, Chow et al. 2021), while some felt a sense of empowerment through completing activities and developing experience ‘on the job’ (Kulik, 2021). Example evidence for this mechanism is demonstrated through a study of healthcare workers working as part of mobile medical teams at migrant worker dormitories where “concerns eventually diminished as they gained work experience and confidence” (Chow et al. 2021, p3). Some studies also suggested that greater confidence helped foster a sense of belonging in the role which led to more effective service contribution (Badger et al. 2022).
- b. Through undertaking volunteering roles during the uncertainty of the pandemic (**Context**), volunteers gain or solidify their role identity (**Mechanism**) which helps improve their skills and professional knowledge

- (**Outcome**), (Ali et al. 2021, Parravicini et al. 2021, Badger et al. 2022, Boelman and Stuart, 2021, Chow et al. 2021, Kulik, 2021, Fernandes-Jesus et al. 2021) and which can also have positive reinforcing effects (**Outcome**). Volunteers described that the demands of the pandemic meant that they were often asked to take on roles that were unfamiliar to them or that may otherwise be confined to full-time (paid) staff or more experienced volunteers. In turn, this helped volunteers to address intrinsic motivations for undertaking volunteering (i.e. the satisfaction from taking part in volunteering) as well as extrinsic motivations (i.e. responding to some form of external pressure or prospect of reward) (Forsyth et al. 2021). There were indications that online volunteering tended to generate lower feelings of satisfaction than face-to-face roles (Kulik, 2021), which may indicate that this CMO is more challenging to activate from online roles.
- c. Through undertaking a diversity of volunteering roles when help was needed (**Context**), volunteers gain or solidify their role identity (**Mechanism**) from which volunteers reported personal growth and the development of life skills (**Outcome**) (Ali et al. 2021, Chawlowska et al. 2020, Cooney and McCashin, 2022, Forsyth et al. 2021, Parravicini et al. 2021, Chow et al. 2021, Fernandes-Jesus et al. 2021). Volunteers reported that volunteering during the pandemic helped to broaden their perspectives, offered opportunities for

Table 1 Summary of context-mechanism-outcomes identified for mobilising volunteers for local groups, communities, and organisations.

Context (Equity)	Mechanism	Outcome
<ul style="list-style-type: none"> Types of occupation groups Resources and skills before the pandemic Pre-existing networks and relationships 	<p>Developing role identity through gaining experience</p>	<ul style="list-style-type: none"> Confidence Develop skills and knowledge Personal development Encourage future volunteering Improving(decreasing) well being Being able to address the urgent needs of service users Becoming a volunteer Having new ways of working Having new services/continuing of services Having new volunteer opportunities Improving efficiency
<p>Individual</p> <ul style="list-style-type: none"> People with vulnerabilities People with more resources and capacity <p>Agency</p> <ul style="list-style-type: none"> Technology use Previous structure for service delivery in health care settings <p>Social system:</p> <ul style="list-style-type: none"> Financial support policies People working on the frontline Level of social capital The volunteer workforce does not (always) represent the whole population Disadvantaged groups 	<p>Adaptability</p>	<ul style="list-style-type: none"> Mental health and well-being Sustaining and broadening volunteer opportunities Sustaining and broadening volunteer opportunities
<ul style="list-style-type: none"> Community members in need Social capital- bonding Socially excluded populations Not all populations can act e.g., disadvantaged populations Across levels: proactive connections such as community hubs; mutual aid groups and community groups; Mutual understanding and trust 	<p>Supporting volunteers: Mental and well-being support for volunteers</p> <p>Supporting volunteers: Material support</p> <p>Supporting volunteers: Provide support through suitable training and management</p> <p>Supporting volunteers: Support as activism</p>	<ul style="list-style-type: none"> Basic essentials for community members Inclusiveness
<ul style="list-style-type: none"> At community level: Mutual aid groups, local community groups 	<p>Altruism and intrinsic motivation</p> <p>Coordination</p> <p>Trust and sense of community</p>	<ul style="list-style-type: none"> Becoming a volunteer Working more effectively Having different approaches of working Having (Less) duplication Sharing information Managing volunteer mobilisation Identifying resources Making timely decisions Social capital such as constructing new social relations and having new relationships Scaling up

self-reflection, and helped to develop life skills that were transferable and advantageous to their own lives. As was the case above, some volunteers identified a reciprocal relationship where they gained personally through helping others. In some studies, the experiences developed through volunteering in the COVID-19 pandemic in particular were emotionally challenging and stressful, although overcoming these challenges could result in personal development: “Regarding resilience, this showed me that I can adapt to a new challenge, even if it is frightening, and make myself useful and productive” (Ali et al. 2021, p4). Some also expressed that volunteering during the pandemic broadened their horizons around the challenges faced by minoritised groups and broadened their horizons around societal inequalities and helped them to acknowledge and respect cultural differences (Chow et al. 2021).

d. Through undertaking volunteering (**Context**), volunteers gain or solidify their role identity (**Mechanism**) which sustains and encourages future volunteering (**Outcome**) (Lee et al. 2022, Research Works Limited, 2021, Taylor-Collins et al. 2021, Chow et al. 2021, Addario et al. 2022, Fernandes-Jesus et al. 2021). Studies described that people with previous experience of volunteer roles (a form of ‘volunteer capital’) develop stronger role identities which helped to mobilise action during health emergencies. In a study conducted by Chow et al. (2021, p4) among

Singaporean volunteer healthcare workers, “having had personal experiences with Severe Acute Respiratory Syndrome (SARS), the H1N1 influenza pandemic, and local disasters with significant mortality, some participants felt inspired by these events and the healthcare workers who contributed to them.” Research conducted by Addario et al. (2022) highlighted that those who had volunteered (formally) before the pandemic and had been forced to stop because of the lockdown were more likely to participate in informal volunteering during periods of lockdown.

e. COVID impacted all strata of society (**Context**), although greater engagement in volunteering and adopting the role of a volunteer (**Mechanism**) helped to improve levels of well-being (**Outcome**), which in some cases appeared to trigger a virtuous cycle (Boelman and Stuart, 2021, Cooney and McCashin, 2022, Taylor-Collins et al. 2021, Nikendei et al. 2021, Fernandes-Jesus et al. 2021, Dolan et al. 2021); however some threshold effects were also observed. Three studies provided suggestive evidence that volunteering could promote a virtuous cycle where a greater amount of volunteering could help to improve mental health which in turn could lead to further volunteering. For example, one study documented that volunteers to the NHS Volunteer Responder (NHSVR) Programme during Covid-19 were more likely to agree with the statement that volunteering

'improves my mental health and wellbeing' after completing 10 volunteer tasks (63%) than after completing one (38%) (Boelman and Stuart, 2021). However, a further study suggested that while volunteering generated initial positive changes in wellbeing, these effects diminished after reaching a particular threshold, so that the benefits of volunteering on wellbeing showed an inverse u-shaped distribution (Dolan et al. 2021). The study authors speculated that possible reasons could be "overexposure to negative experiences of Covid-19 risk groups, or a growing time commitment that could become emotionally straining, whereby highly active volunteers fail to draw the boundary between their own wellbeing and that of others" (Dolan et al. 2021, p16).

Equity issues around developing a role identity: Many studies exploring this mechanism around developing role identity were focussed on a particular occupation group (e.g., healthcare workers and medical students), suggesting that the mechanism of developing a role identity through gaining experience may be activated more commonly among volunteers who possess technical skills. In addition, where there is a link between volunteers' usual occupation and the organisation's purpose, or a link between the volunteer and beneficiary characteristics (e.g., characteristics such as socioeconomic status), the mechanism may be amplified. This emphasises the importance of developing a diverse group of volunteers and suggests that reducing the social distance between volunteers and beneficiaries could bring dividends.

Mechanism 2 - Adaptability to respond to new needs and responsibilities. We identified **adaptability as a mechanism** across different levels: (a) individuals; (b) agencies and communities; and (c) social and political systems.

- a. The COVID-19 pandemic brought unprecedented challenges (**Context**), and adaptability and flexibility among individual volunteers (**Mechanism**) helped ensure the continuation of support to those most in need (**Outcome**). Seven studies suggested that an ability to adapt and change current commitments and responsibilities during the pandemic provided opportunities for volunteers to address **the urgent needs of service users** (Ali et al. 2021, Bruce et al. 2021, Bynner et al. 2022, Chevée, 2022, Fearn et al. 2021, Jopling and Jones, 2021). Many volunteers described the situations where they '*can adapt to a new challenge*' and change their routine or normal practices to perform 'a new way of working' to connect and **engage with people with vulnerabilities**. This often involved using new technology, telephone or online platforms to interact with service users (Lyon et al. 2021). Volunteers developed new ways of working and undertook additional efforts to maintain contact and provide physical and emotional support to the vulnerable such as providing a quick check-in to ensure safety for older people or organising food deliveries (Bruce et al. 2021, Bynner et al. 2022). Flexibility was viewed as a driver for volunteering by empowering volunteers to decide when they could adapt their practice or work environments to **become a volunteer** in five studies (Alalouf-Hall and Grant-Poitras, 2021, Bertogg and Koos, 2021, Fearn et al. 2021, Forsyth et al. 2021, Grey et al. 2022). For example, some social groups who had more resources and capacity such as those having free time and fewer other commitments felt motivated to volunteer and get more involved in the community. However, the capacity to volunteer was negatively affected

by the pandemic for other groups, with those who were shielding for example being less able to engage in volunteering (Forsyth et al. 2021). Other barriers to volunteering, particularly for those living in deprived areas included distance and lack of transport, health problems or having no free time because they had to work (Grey et al. 2022).

- b. The COVID-19 pandemic necessitated developing new ways of working (**Context**), and organisations that were able to adapt in terms of adopting new technology such as online communication, empowering volunteers to make decisions, and finding new ways of engaging with volunteers (**Mechanism**) were able to expand the opportunities available for volunteers and were able to improve efficiency (**Outcome**). During the lockdown periods, many organisations moved volunteering activities to virtual spaces (Alalouf-Hall and Grant-Poitras, 2021, Colibaba et al. 2021, Cooney and McCashin, 2022, Fearn et al. 2021, Grey et al. 2022, Jopling and Jones, 2021, Lyon et al. 2021, Mao et al. 2021a) or streamlined volunteer management processes by using online platforms or digital devices (Fish et al. 2022, Jopling and Jones, 2021). Volunteers emphasised "*the importance of continually adapting and evolving with changes*" so that the organisation was able to provide services in some capacity (Colibaba et al. 2021, p6). The transformation to online activities also helped the organisations to navigate and identify new ways of working with volunteers (Alalouf-Hall and Grant-Poitras, 2021, Colibaba et al. 2021). These organisations recognised the advantages of online services in terms of flexibility, availability, and inclusiveness (Fearn et al. 2021, Jopling and Jones, 2021). In some cases, organisations and local communities adapted rapidly by starting **new services or support systems** such as driving, shopping, delivering food, providing shelters, arranging online lunch club, and setting up mutual aid groups (Alalouf-Hall and Grant-Poitras, 2021, Chevée, 2022, Forsyth et al. 2021, Mao et al. 2021a, Mao et al. 2021b, Pichan et al. 2021). This often was managed or provided by online technology as described by one co-ordinator: "*They go into one centralised system and geographically, the software says, 'Right, the best person for that individual, who also has the right skills, is this volunteer here', and then we'll try and match them with that. Then if it's a long-term goal, then we'll get that volunteer then becomes their good neighbour, and they'll go and do whatever that person needs them to do for them*" (Forsyth et al. 2021, p22). During the pandemic, greater numbers of people had free time through, for example, being furloughed. To utilise this emerging 'army' of volunteers and in order to **continue their service delivery**, organisations adjusted the roles of volunteers, changed the way they matched the volunteers with required services, and adapted services they offered (Alalouf-Hall and Grant-Poitras, 2021, Forsyth et al. 2021). In clinical care settings, it became crucial that hospitals were flexible in terms of how they recruited and deployed medical student volunteers, so clinical services met the high demands whilst facing staff absences due to illness and isolation (Badger et al. 2022). Finally, organisations that were able to adapt the volunteer management processes by empowering volunteers to make decisions could improve satisfaction and motivation and future commitment of volunteers (Badger et al. 2022, Gardner et al. 2021, Hauck et al. 2021). One study investigated a structured volunteering programme in

teaching medical hospitals in the UK during the pandemic and found that by empowering volunteers to choose their role, that this could improve motivation and satisfaction with the programme, facilitating the continuity of services (Badger et al. 2022). Enabling volunteers to decide when and how they can work could remove barriers to engagement in volunteering, particularly for those who have commitments such as full-time jobs or childcare responsibilities (Forsyth et al. 2021).

- c. The COVID-19 pandemic necessitated developing social policy (**Context**), which included the furlough scheme that created new spaces and opportunities for people to have more free time and flexibility (**Mechanism**) which led some individuals to volunteer and allowed some organisations to capitalise upon this (**Outcome**) (Forsyth et al. 2021, Gardner et al. 2021, Rees et al. 2021).

Equity issues: Adapting to online volunteering in some settings may have introduced considerations around equity for both volunteers and beneficiaries (e.g., age, geography, and financial circumstances) which needs further exploration. For instance, volunteer organisations in rural areas may have limited access to internet as one described “...our Wi-Fi out there at the lake, which is not always the best, so that was a thing. If anything, it's not so much as the aspect of applying the technology but more so rural internet which has challenges...” (Colibaba et al. 2021, p6). There were also concerns on how organisations would adapt and provide alternative solutions to reach groups with a history of digital exclusion such as those from low-socioeconomic backgrounds or older people who might have challenges in accessing and using the new technology (Bruce et al. 2021, Bynner et al. 2022, Pichan et al. 2021).

Mechanism 3 – Supporting volunteers.

- a. Volunteering during the pandemic was a challenging experience that exposed volunteers to risk (**Context**), although where volunteers felt supported emotionally and relationally within teams and organisations (**Mechanism**), this helped to improve levels of mental wellbeing and satisfaction among volunteers (**Outcome**) (Ali et al. 2021, Badger et al. 2022, Boelman and Stuart, 2021, Cooney and McCashin, 2022, Lee et al. 2022, Bruce et al. 2021, Colibaba et al. 2021, Hauck et al. 2021, Jopling and Jones, 2021, Rees et al., Gardner et al. 2021, Fernandes-Jesus et al. 2021) In some cases, this boosted morale across organisations as a whole and helped more effective delivery of services. In some studies, emotional support was described as being provided informally through the development of camaraderie between teams, with a participant in Cooney and McCashin (2022, p7) describing how a volunteer team felt like a family: “You’d argue it’s a family anyway, but I mean you-you know that they’re there supporting you and you know they have your back”. In other studies, provision of emotional support was described through establishing successful individual supervision arrangements. Finally, some studies reported how agencies took more purposeful steps to try to safeguard volunteer wellbeing. For example in Jopling and Jones (2021, p26), one agency described supporting volunteers through relational activities: “We have a monthly almost like an online office hour. We’re on Zoom for an hour once a month and volunteers join us for as much or as little of that hour as they can. And it’s very informal, but it’s their chance to meet other volunteers, but also bring any challenges that we can work through”. Counterfactual examples were also presented within studies

where individual volunteers (even if they represented atypical experiences) described how a lack of support could make them feel unprepared for the emotional realities of volunteering during the pandemic.

- b. Volunteers contribute for a variety of intrinsic and extrinsic motivations (**Context**), and where systems and processes are put into place that help to understand and acknowledge the role of volunteers and provide instrumental support where needed (**Mechanism**) this can lead to more sustained patterns of volunteering and a more diverse volunteering workforce (**Outcome**) (Badger et al. 2022, Chawłowska et al. 2020, Chow et al. 2021, Forsyth et al. 2021, Lee et al. 2022, Rees et al. 2021, Research Works Limited, 2021, Mao et al. 2021a, Mao et al. 2021b). Supporting volunteers can include making efforts to understand and acknowledge the difference that volunteers make, which was associated with sustaining a volunteer workforce and broadening its profile (Forsyth et al. 2021, Mao et al. 2021a, Research Works Limited, 2021). Some organisations were moving towards regarding volunteers in a less instrumental way as a means of meeting the organisation’s goals, but were instead considering volunteer development more reciprocally: “We don’t use volunteers in a way that we need volunteers to run our activity; we develop leaders and volunteers to better themselves for the purpose of what we believe as an organisation.” (Forsyth et al. 2021, p17). A number of studies described social rewards as well as more instrumental support which could be put into place to support volunteers, remove barriers to participation, and broaden the profile of volunteers (Chawłowska et al. 2020, Chow et al. 2021, Grey et al. 2021, Mao et al. 2021a, Rees et al. 2021, Research Works Limited, 2021). It was acknowledged that broader system level factors, such as a culture of low wages and job instability, could inhibit diversifying the social profile of volunteers: “Proper living wages that mean people do not have to work such long hours and therefore miss out on volunteering. Change the image of volunteering; it is heavily white, female, aged 30/40 plus dominated - it needs to be made more attractive to wider demographic.” (Rees et al. 2021, p13). Where adequate instrumental support was not reported, this could mean that volunteers incurred unsustainable personal costs (for example Lee et al. 2022). In Grey et al. (2021), volunteers in more deprived areas reported that a lack of time, a lack of transport and health issues were barriers to volunteering more commonly than among volunteers in more advantaged areas. This emphasises a need for organisations to first understand the profile of volunteers and also to provide suitable support to volunteers to sustain and broaden their workforce.
- c. Volunteers have a diversity of skills and experiences (**Context**), although where there is a clear understanding of the role that volunteers will undertake and training is provided to carry out this role (**Mechanism**) this can lead to more sustained patterns of volunteering and improve the quality of services provided (**Outcome**) (Ali et al. 2021, Chow et al. 2021, Forsyth et al. 2021, Grey et al. 2021, Jopling and Jones, 2021, Lee et al. 2022, Fearn et al. 2021, Alalouf-Hall and Grant-Poitras, 2021). Studies found that volunteers perceived that training in the roles that they would undertake directly contributed to the improvement or continuation of services. For example, in exploring community-led responses to the pandemic in Wales, Grey et al. (2021, p27) found that some organisations reported that “many volunteers received training to be able to notice any signs of recipients requiring any other additional

support, for example, when delivering shopping or prescriptions” in an effort to better respond to the changing needs of beneficiaries. However, some studies emphasised that expectations of needing to complete lengthy training regimes could serve as a deterrent to some volunteers, and could serve to raise expectations around the nature of volunteer roles available: “*what stops us getting people in is that people go through a huge amount of training and then don't feel like the opportunities they do meet their needs in terms of that training*” (Forsyth et al. 2021). However, where adequate training or information about the role is not provided, volunteers reportedly felt unprepared and for volunteers in frontline clinical roles this had safety implications for volunteers and patients (Alalouf-Hall and Grant-Poitras, 2021, Hauck et al. 2021, Lee et al. 2022).

- d. When community members were in need (**Context**), social activism was a form of support that galvanised communities to step in where the government was unable or unwilling (**Mechanism**) to ensure that community members were provided with basic essentials (**Outcome**) (Bradley et al. 2021, Diz et al. 2022, O'Dwyer et al. 2022, Mao et al. 2021b, Chevée, 2022). This mechanism was observed at a community level and implied that mutual aid groups were mobilising outside the confines of state and charity structures. Their actions were often expressions of mutuality and community, rather than charity, and represented a new way of supporting each other (Mao et al. 2021b). These groups helped fellow citizens in multifarious ways, for example from distributing food, linking community members with different skills to one another, through to providing shelter to vulnerable community members (Diz et al. 2022). Such was the scale and embeddedness of their activities within the community that participants in some studies described being engaged in “*a parallel social welfare system, including financial assistance, emotional support, and even a public health component*” (O'Dwyer et al. 2022). While some mutual aid groups may be formed with a desire to step in where the state was unwilling or unable to, some studies did also suggest that the state still had a role in ‘minimal, supportive facilitation’ (O'Dwyer et al. 2022). Other studies that included respondents from mutual aid groups also indicated that having support available from (state funded) hubs working at a local level (i.e. Local Authority and more localised) could also help facilitate communities to provide basic services and essentials (Burchell and et al. 2020, Taylor-Collins et al. 2021), albeit where this support was not viewed as ‘bureaucratizing’ the practices of mutual aid groups (O'Dwyer et al. 2022).

Equity issues: For some volunteer roles – particularly those who were in frontline medical roles – the emotional toll of volunteering is likely to be greater and additional support may be needed. More broadly, supporting volunteers’ wellbeing may depend both on agency actions as well as practicing self-care and drawing on volunteers’ own social capital, which has equity implications suggesting that volunteers with low pre-existing levels of social capital may need additional support. Studies described that the volunteer workforce did not represent the population as a whole and in some cases had limited social connection with target beneficiary groups. Removing barriers to participation could mean providing material support, such as helping with transport costs, or providing forms of social credit (such as ‘training points’ or broader acknowledgement) which can open up volunteering to those with lower resources in terms of time or money.

Communities with weaker bonds may be less likely to provide support and those who are socially excluded within communities may also be less likely to benefit (Bertog and Koos, 2021, Carlsen et al. 2021); mutual aid groups may be more likely to have formed in localities that were not necessarily the most deprived (Bradley et al. 2021). Conversely, through being less bureaucratic, one study positioned mutual aid as being more welcoming to socially excluded people (e.g. asylum seekers) as they were less likely to enquire about people’s eligibility and to have lower thresholds for support (O'Dwyer et al. 2022).

Mechanism 4 – Altruism and intrinsic motivation. For many people, the existential threat of COVID-19 helped to engender a sense of collective unity (**Context**), that developed into altruistic motivations and a sense of duty (**Mechanism**) which mobilised large numbers of people to volunteer during the pandemic (**Outcome**) (Alalouf-Hall and Grant-Poitras, 2021, Ali et al. 2021, Badger et al. 2022, Boelman and Stuart, 2021, Chawlowaska et al. 2020, Colibaba et al. 2021, Forsyth et al. 2021, Grey et al. 2021, Lee et al. 2022, Taylor-Collins et al. 2021, Addario et al. 2022, Ntontis et al. 2022, Tong et al. 2022, Elboj-Saso et al. 2021). This mechanism was replicated across several studies and was observed in individual accounts of volunteering motivations as well as studies that considered individual acts in the context of broader population-level trends (Alalouf-Hall and Grant-Poitras, 2021, Ntontis et al. 2022, Taylor-Collins et al. 2021). In several studies exploring volunteers in medical settings, a sense of duty was explicitly tied into individuals’ broader identities as medical professionals and a recognition that their skills would be valuable in the response to the pandemic (Badger et al. 2022, Chawlowaska et al. 2020, Chow et al. 2021, Lee et al. 2022, Tong et al. 2022). A participant in Badger et al. (2022) described “*as a medical student, I felt it was my duty to help the NHS and Imperial Trusts as much as I can in the face of a pandemic*”.

Altruism was also tied with feelings of empathy in several cases (Colibaba et al. 2021, Tong et al. 2022, Elboj-Saso et al. 2021), and a perception that the pandemic had the potential to reach those in similar circumstances. There were also indications that social distance between volunteer and beneficiary group moderated the level of empathy and altruism (Elboj-Saso et al. 2021).

In many settings, the COVID pandemic triggered multiple lockdown periods but the volunteering response was not consistent across these periods. Some studies emphasised that the public response to volunteering witnessed during initial lockdowns did not correspond to a re-mobilisation of volunteers in subsequent lockdowns, despite cases and the need for support being similarly high at both timepoints (Ntontis et al. 2022, Taylor-Collins et al. 2021). In Taylor-Collins et al. (2021), a number of pragmatic reasons were identified as potential explanations for a drop in interest in volunteers to remote befriending schemes: “*However, they subsequently found it more difficult to recruit telephone befrienders later in the year due to individuals returning to work after being furloughed and many volunteers growing tired of staying indoors and wanting more active roles outside of the home.*” In Ntontis et al. (2022), broader secular trends in attitudes were also posited as an explanation for a diminished response in the second lockdown including increased familiarity with the pandemic and with restrictions such as lockdowns, leading to a weaker sense of camaraderie and unity than was characteristic of the first lockdown.

Equity issues: Volunteers with differing characteristics that cut across the PROGRESS-Plus framework will be in variable positions in terms of their capacity to act upon altruistic motivations.

Mechanism 5 – Co-ordination.

- a. Co-ordination across and within different levels and systems (**Mechanism**) helped agencies **work more effectively and develop different approaches of working** with local and national governments (**Outcome**). One community organisation worker stated,

“... We’re now working a lot closer with each other. There are a couple of other infrastructure organisations in the local area, working together a lot more positively, openly, quite closely really, in ways that I don’t think anybody ever would have seen coming” (Avdoulos et al. 2021, p11).

Organisations, mutual aid groups and local communities informally engaged and coordinated the support or activities with other partner organisations to work together rather than in competition, including with Local Authorities (LAs). Local organisations or mutual aid groups were also able to provide essential services where local authorities could not provide these effectively (Soden and Owen, 2021). Mao et al. (2021a) highlight different models of support for agencies and mutual aid groups that could work with LAs (based on the work of Tiratelli and Kaye (2020)). One of the key features of successful coordination was the effort from LAs and leadership that helped to set up a proactive connection of volunteers with existing networks and other groups such as community hubs (Grey et al. 2022, Mao et al. 2021a, Volunteer Scotland, 2022). At different levels, organisations and communities recognised the importance of having mutual understanding and trust as a ‘key advantage, as it enabled organisations to come together and act quickly’ (McGarvey et al. 2021, p10).

- b. Co-ordination of support (**Mechanism**) brought a number of benefits including a more **efficient use of resources and less duplication** (**Outcome**). Partnerships between community groups and frontline organisations helped to understand demands and needs which avoided duplication of effort (Forsyth et al. 2021, Rendall et al. 2022). However, even where efforts were made to co-ordinate support, some duplication was observed (Rees et al. 2021). For example, Mao et al (2021a, 2021b) highlight the COVID-19 Community Champion scheme, where volunteer champions were asked to share information about the virus through their channels and note some duplication in information sharing efforts with activities taking place organically through mutual aid schemes. Nevertheless, where co-ordination was found to be absent or where systems were unclear, this led to duplication and confusion (Research Works Limited, 2021).
- c. Co-ordination across and within different levels and systems (**Mechanism**) helped agencies to **share and disseminate** relevant information and to coordinate responses effectively (**Outcome**). In the context of mutual aid and community groups, organisers coordinated work and exchanged information between volunteers and local organisations during the pandemic to facilitate the support activities (Burchell and et al. 2020, Chevé, 2022, Rendall et al. 2022). One study explored volunteer passports, as a means of strengthening co-ordination between agencies and to better match volunteering opportunities with volunteer skill sets (Research Works Limited, 2021). Although ‘volunteer passports’ represent a number of different models, they tend to have common aims of helping to ensure volunteer ‘portability’ across different organisations and helping to validate (and safeguard) volunteers’

experience, skills and contributions. The research was conducted in 2021 towards the end of periods of strict lockdowns, where organisations were able to reflect on the benefits that such schemes did, or could, bring in the future. These benefits included improvement in standards and quality of delivery through better matching of volunteers’ skills with available opportunities; a wider pool of available volunteers to undertake roles at short notice, and greater opportunities for supporting volunteer growth (supporting mechanisms outlined earlier).

Equity issues: There is limited evidence from the literature discussing equity relating to this mechanism.

Mechanism 6 – Trust and sense of community. Where there was a chance to connect with others through mutual aid groups or local community groups, trust and sense of community (**Mechanism**) influenced the **way in which support was delivered and how volunteers were organised and mobilised** (**Outcome**) (Bertogg and Koos, 2021, Burchell and et al. 2020, Diz et al. 2022, Fernandes-Jesus et al. 2021, Mao et al. 2021a, Mao et al. 2021b, Volunteer Scotland, 2022). Building trust and creating sense of community can take time and require collective efforts between partners and community members. Pre-existing relationships between and across communities and with local municipalities helped to mobilise existing resources to respond to the crises in a timely way. Pre-existing relationships created environments where communities could build trust, make timely decisions and respond to rapid changing positions and priorities (Grey et al. 2022). Equally, new partnerships and networks set up during the pandemic played an important role in ‘bringing people together’ during the difficult circumstances, constructing new social relations and creating new community bonds (Fernandes-Jesus et al. 2021, p11). One described mutual aid as a ‘chain’ where people link together, work together and care for others (Diz et al. 2022). Lack of trust, local relationships, and coordination were seen as barriers to scale up the efforts to respond to higher levels of demand (Mao et al. 2021b).

Equity issues: Equity issues discussed in the literature were related to services provided by local communities and mutual aid groups and the availability of support in socio-economically deprived places or more rural areas.

Discussion and Conclusions

Summary and discussion. From a total of 59 studies, six mechanisms and fourteen CMO configurations were identified in the review, most of which were hypothesised in our original rough working theory, and some of which were unanticipated. Given that our rough working theory was drawn mainly from the Volunteer Process Model, this review also emphasises the utility of this model as a framework for understanding processes of volunteer engagement across socioecological levels, even in the context of health emergencies.

Gaining experience and developing role identity was a core mechanism that was key in mobilising volunteers to undertake activities during the pandemic; gaining experience and developing role identity also resulted in positive outcomes for volunteers themselves in terms of greater confidence, professional and skill development, personal development, and better mental wellbeing outcomes. The CMO configurations identified through this mechanism were broadly similar to those we anticipated in our original rough working theory (Fig. 2). However, what our initial theory did not adequately capture was the virtuous cycle that gaining some experience could activate whereby developing a

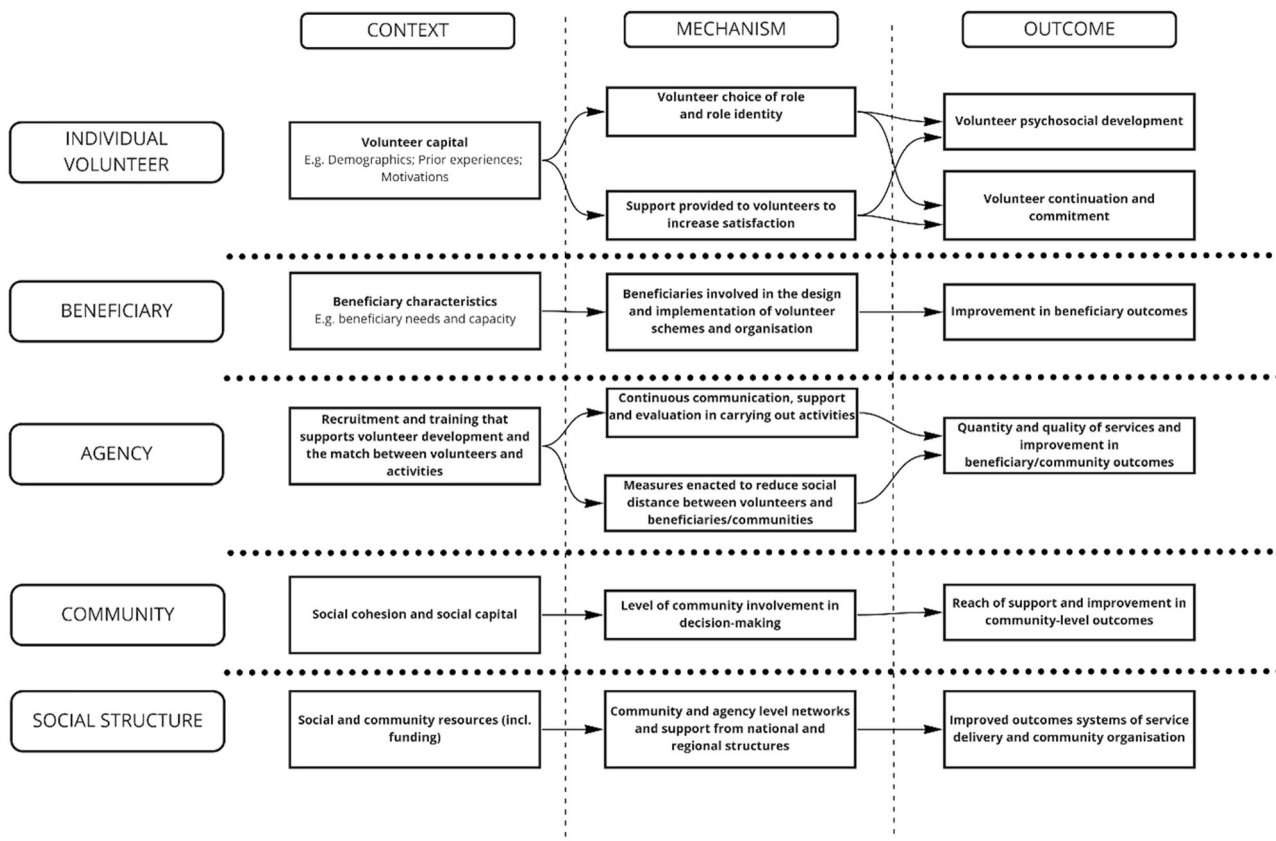


Fig. 2 Initial rough working theory for understanding how communities and groups are mobilised to volunteer during the COVID-19 pandemic. This figure shows our initial rough working theory, informed heavily by Omoto and Snyder’s Volunteer Process Model, as well as other theories relevant to mobilising volunteers (see supplementary files).

stronger role identity through gaining experience could sustain current volunteering practice and predict stronger commitments in the future. Given that volunteering tended to lead to better psychosocial outcomes, activating such a mechanism could be advantageous to both volunteers and their beneficiaries; however, some studies also indicated the importance of managing the demands made on volunteers in an effort to avoid overexposure to challenging experiences and burnout.

Our original rough working theory was mainly based on theoretical frameworks that did not reflect the COVID-19 pandemic. Perhaps unsurprisingly, therefore, a core mechanism for mobilising large numbers of volunteers during the pandemic was adaptability, which was not represented in Fig. 2, although it was a mechanism observed at several different levels (individual, agency, community). This mechanism broadly ensured that individuals, groups and local agencies and organisations were able to respond to the changing needs of beneficiary groups (e.g., where social isolation or inability to access essential supplies became problematic) and were able to adapt to new ways of working (particularly to adapt to the circumstances of lockdown). Where individuals, groups and agencies, and communities were able to adapt, they were to develop new ways of working and offer responsive new services. Adaptability was, however, a mechanism that was more easily engaged by more socially advantaged individuals and communities, as well as better-funded and larger organisations and agencies.

Support was represented in our original framework as being linked with volunteer continuation and enrolment and psychosocial outcomes. Our work has verified these mechanism-outcome configurations, finding emotional support, support in

the form of social and material recognition, and support through training were important in sustaining a volunteer workforce and protecting wellbeing of the volunteer workforce. In addition, social and material recognition may be important in increasing the diversity of the volunteer workforce, which some studies found to be lacking. While community involvement in decision-making was theorised to be an important mechanism (Fig. 2), the evidence suggests that communities and groups performed on a much more radical basis. Specifically, community-level support during the pandemic, organised through mutual aid groups, assumed a form of activism where communities stepped in as a response to the limitations of the state to provide basic essentials for community members in need. Many mutual aid groups were operating entirely independently of the state or civil society, although there remains a role in offering support to some groups that is not viewed as overly bureaucratic.

Two mechanisms that were critical for mobilising volunteers, but where the policy actions that could be taken to support these are more opaque, were altruism and trust. Altruism was linked to the broader social context, with studies noting a more muted response to the pressures of the pandemic during the second lockdown compared with the first. Differing levels of trust were linked with the organisation of volunteers during the pandemic and the extent to which groups and communities were able to scale up efforts to respond to the higher demands that were exhibited during the COVID-19 pandemic. Several of the studies described trust as being based on relationships that had formed pre-pandemic. While both trust and altruism are mechanisms that may be viewed as less malleable by policy, their appearance as core mechanisms in this review does perhaps underscore the

significance of community development and interventions (Brunton et al. 2015, O'Mara-Eves et al. 2013).

Finally, our sixth mechanism, co-ordination, was one that was originally identified at the social structure level (Fig. 2), but also appeared at the community level in this review. During the chaotic backdrop of the pandemic, which created a crowded market of volunteers for some causes and left others relatively unattended, coordination helped communities, agencies and mutual aid groups to work together rather than in competition, and similarly to work more efficiently around one another rather than in duplication. Co-ordination in this review was not solely based on relational factors, it also involved developing interoperable systems and processes to collect and share information. Such systems have the potential to help develop the volunteer workforce and to respond to broader trends around preferences for episodic volunteering.

Strength and limitations. While this rapid review identified six mechanisms, five of which were reflected in the initial working theory used to support the review (Fig. 2) and one of which emerged from the descriptions provided in the studies, it may be that other mechanisms were also relevant in mobilising volunteers to work together during the COVID-19 pandemic but were not identified here. We identified mechanisms that were described as pivotal in studies. It is possible that mechanisms were overlooked due to many studies putting more emphasis on the reporting of the difference that volunteers made (the outcome) rather than the process (the mechanism). Similarly, important mechanisms may have been described in studies that were not included in the current review. Our approach to iteratively examining mechanisms took on elements that were both deductive (i.e., we started with a theory to examine mechanisms) and inductive in that we examined studies that described the process of successfully mobilising volunteers. These were based on reviewers agreeing that an explanatory account either described a known mechanism or indicated one that was not theorised in our original working theory. Finally, while the mechanisms identified were pivotal in triggering a given outcome in the context, the mechanisms are presented as 'monocausal' in the configurations, although in practice mobilising large numbers to volunteer may be dependent on activating different configurations of mechanisms.

Using the rapid realist review approach, we developed our CMO configurations based on relevant research published since the start of the pandemic in 2020. Throughout the review process, the research team had several discussion meetings with inputs from experts participating in roundtables about the included studies. This helped to define key concepts and the scope of the work, extract relevant information, develop initial CMOs, configure and refine CMOs, and check our understanding of the emerging findings, arguments, and conclusions of the review. Although this approach generated highly relevant literature within a limited timeframe, it may be not entirely replicable.

We have not conducted an overall quality assessment of each study, but we have assessed them in terms of relevance and credibility to the review questions. However, we did note that there were few longitudinal studies (quantitative or qualitative) included within the review which may weaken the credibility of the findings. Some studies also blended data and experiences of volunteers from before the pandemic with those collected during the pandemic. In addition, we used a loose definition of the pandemic drawing on any literature published in 2020 onwards that purports to focus on the pandemic, given that arguably we remained within a pandemic albeit not within a lockdown at the time of writing.

It is also worth highlighting that we were not aiming to determine or quantify causal effects of volunteering itself, but to identify possible mechanisms that might influence how volunteers are mobilised during the pandemic. These mechanisms might be relevant to different policy sectors (health, social welfare, education etc), types of volunteering (formal and informal volunteering, etc), or contexts (post pandemic, places, populations, etc) to inform policy design and development in volunteering.

Conclusions and recommendations for further research. While the COVID-19 pandemic clearly was a period of great social upheaval, it illuminated the 'power of people' working together to help others. Our findings identify six key mechanisms that supported this mobilisation, which may be critical to activate in future health emergencies but are also largely reflective of investments made before the pandemic to support the development of social capital and the development of infrastructure. Where volunteering emerged independently of state or civic infrastructure, this did not always develop in the areas of greatest need. At the time of writing, the UK is in a period of political and economic uncertainty. However, plans proposed for further austerity (being discussed at the time of writing), if enacted, are highly likely to undermine the emergence of several if not all of the mechanisms identified here in future pandemic and lockdown situations.

The pandemic may have helped to hasten changes in the patterns of volunteering towards greater online engagement, potentially towards increased episodic and task-based patterns of volunteering, and may have weakened the distinction between informal and formal volunteering through the rise of informally organised groups. Two key challenges that emerge from this work that are worthy of further research are: (i) to examine the most effective ways of removing barriers to engagement in volunteering that many groups appear to face; and (ii) to examine the extent to which volunteering *should* be understood as a mutually beneficial and reciprocal arrangement that connects community members with other community members.

Data availability

Data sharing is not applicable to this article as no datasets were generated or analysed during the current study; all data based on articles already within the public domain are available in the Supplementary Materials.

Received: 1 March 2023; Accepted: 12 October 2023;

Published online: 04 December 2023

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Author contributions

DK is corresponding author, led on the initial draft of the paper and co-led on all stages of the research along with MB; MB co-led the study and contributed to all stages including drafting and re-drafting the manuscript; KH and MH contributed to all stages of the research including drafting and re-drafting the manuscript.

Funding

This work was undertaken as part of the International Public Policy Observatory (IPPO) (<https://theippo.co.uk/>) which is ESRC-funded.

Competing interests

The authors declare no competing interests.

Ethical approval

Ethical approval was not applicable for this research – this article does not contain any studies with human participants performed by any of the authors.

Informed consent

This article does not contain any studies with human participants performed by any of the authors.

Additional information

Supplementary information The online version contains supplementary material available at <https://doi.org/10.1057/s41599-023-02271-z>.

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