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Journal of Public Mental

Community-based interventions on the social determinants of mental health in the UK: an umbrella review

Journal:	*Journal of Public Mental Health*
Manuscript ID	JPMH-07-2024-0087.R1
Manuscript Type:	Systematic Review
Keywords:	social determinants of health, prevention, mental health, community intervention, financial insecurity, umbrella review

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Author names redacted

KEYWORDS: *Mental health, UK, social determinants of health, community intervention, umbrella review, financial insecurity, social isolation, advice services, social prescribing, housing*

Word count: 4,970~~716~~

Tables: 2

Figures: 1

Author accepted manuscript. Accepted on 21 Oct 2024

This work has been accepted for publication in the Journal of Public Mental Health

Doi: 10.1108/JPMH-07-2024-0087

Abstract

Purpose

There is growing evidence that several social determinants influence mental health outcomes, but whether or not community-based prevention strategies are effective in intervening on these social determinants to improve mental health is unclear. We synthesised the state of knowledge on this topic in the UK context, by conducting an umbrella review of the relevant systematic review literature.

Methodology

We searched five electronic databases for systematic reviews of community-based interventions that addressed any social determinant of mental health (SDOMH) in the UK, provided that mental health outcomes were measured. We reported the results according to PRISMA guidelines and synthesised narratively.

Findings

Our search yielded 1,101 citations, of which 10 systematic reviews met inclusion criteria. These reviews included 285 original studies, of which 147 (51.6%) were from the UK. Two reviews focussed on children and young people, with the remainder based on working-age adult populations. We identified five categories of SDMOH, where financial insecurity and welfare advice interventions were addressed by the largest number of reviews (N=4), followed by reviews of interventions around social isolation and support (N=3), and housing regeneration initiatives (N=2). Results across all social determinants and mental health outcomes were highly heterogenous, but evidence most consistently supported the effectiveness of interventions addressing financial and welfare support on mental health outcomes.

Originality

Our review highlights the paucity of high quality, causal evidence from the UK and beyond on the effectiveness of interventions on the social determinants of mental health; severe methodological heterogeneity hampers progress to identify scalable interventions to improve population mental health.

Background

A critical challenge now facing public mental health is how best to intervene on the root causes of mental ill health to prevent the onset or worsening of various symptoms or disorders. This prescient challenge is made all the more urgent given rapid rises in some mental health outcomes amongst adolescents and young people over the last decade, including in the UK (Dykxhoorn *et al.*, 2024), USA (Keyes *et al.*, 2019) and ~~elsewhere~~ globally (Castelpietra *et al.*, 2022).

It is increasingly recognised that, rather than having a solely biological cause, several mental health conditions are also influenced by social and environmental factors, known as 'social determinants' (WHO and Calouste Gulbenkian Foundation, 2014). Evidence of the impact of social determinants on mental health has been identified in several countries (Kirkbride *et al.*, 2024), including in the UK, where strong social gradients in the burden (prevalence) of mental health conditions have been demonstrated (Marmot, *et al*., 2020). The idea that mental health is influenced by the social, economic and environmental conditions in which a person is born, lives and works is known as the social determinants of health (SDOH) framework (WHO Social Determinants of Health Team, 2008). This social determinants framework encompasses a broad range of socially-determined factors that may affect health over the life course, including early life and childhood adversities, socioeconomic factors including educational attainment, employment and financial security, social isolation and loneliness, neighbourhood disadvantage (of various forms), minoritised positionality, exposure to racial or other forms of discrimination (at multiple levels), pollution, or even climate change (Kirkbride *et al.*, 2024). There is emerging evidence that many of these factors – distributed unevenly within and between societies – affect mental health (Bhui, 2018; Kirkbride *et al.*, 2024; Marmot Review Team, 2010), something which has become more profoundly apparent since the COVID-19 pandemic (Herrmann et al., 2024). The social determinants of mental health (SDOMH) framework specifically focuses on the relationship of these SDOH with mental health outcomes, including the onset, burden and consequences of mental health symptoms and disorders, as well as mental wellbeing. There is now a growing literature – although sometimes lacking longitudinal or causal evidence – that these determinants are strongly and consistently associated with mental health. Examples include strong, longitudinal associations between exposure to financial insecurity and risk of

psychiatric disorders (Marchi *et al.*, 2023; Xu *et al.*, 2024), racial discrimination and psychosis (Jongsma *et al.*, 2021; Luo *et al.*, 2024), and familial adversity and major depressive disorder (Najman *et al.*, 2017).

Despite broad acceptance of the social determinants framework in mental health (Shah *et al.*, 2021), a comprehensive, systematic synthesis of the systematic review literature evidencing the effectiveness of prevention strategies that seek to intervene on these determinants in order to prevent or reduce adverse mental health outcomes is currently missing. Such interventions hold potential in both primary and secondary prevention spheres, and include opportunities to intervene at different scales – from universal prevention at the whole population level, through to indicated prevention strategies that identify and work with individuals and families already vulnerable to mental ill health. Understanding the effectiveness of preventive responses on these social determinants will provide crucial information to policymakers, health and social care commissioners and other stakeholders who aim to reduce individual and population-level disparities in mental health outcomes (Kirkbride *et al.*, 2024; Marmot Review Team, 2010).

To address this gap, and build on recent selected review evidence (Kirkbride *et al.*, 2024), we conducted an

~~In this~~ umbrella review~~, we sought~~ to address the question: what evidence is there for the effectiveness of community-based interventions that address the social determinants to prevent, reduce or improve mental health outcomes in the UK? To our knowledge, no umbrella review on this issue has been conducted. ~~We defined community-based interventions as approaches to preventing or reducing mental health outcomes that are enacted on local or regional scales that utilise community assets (Castillo *et al.*, 2019).~~ Given the need for place-based understanding of the effectiveness of these interventions to provide actionable insights for policymakers working in specific jurisdictions, and given substantial attention to the social determinants of health in the UK (Marmot Review Team, 2010), this umbrella review aims to synthesise evidence for the effectiveness of community-based SDOMH interventions in the UK.

Methodology

The methodology of this umbrella review (an overview of systematic reviews) is based upon the Cochrane overview of reviews guidance (Pollock *et al.*, 2023), and further guidance for umbrella reviews (Fusar-Poli and Radua, 2018). Our reporting adheres to the PRISMA 2020 updated guidelines (Page *et al.*, 2021).

Eligibility criteria

Only systematic reviews of community-based SDOMH interventions in the UK were eligible for inclusion in this study. We defined community-based interventions as approaches to preventing or reducing mental health outcomes that are enacted on local or regional scales that utilise community assets or multifactorial services (Castillo *et al.*, 2019). ~~We defined community-based interventions as those that make use of community resources or multifactorial services (Castillo *et al.*, 2019).~~ Community-based interventions had to focus on participants living in residential settings; reviews or primary studies of interventions solely based on institutionalized populations were excluded. Interventions that directly addressed mental health (i.e. via a psychological therapy) rather than at least one SDOMH were excluded. Reviews had to report effectiveness on at least one mental health or wellbeing outcome. Eligibility was limited to peer-reviewed journal articles published in English. The complete PICO ~~search~~ criteria are outlined in Table I. No time limit was applied.

Table I about here

Search strategy

We developed a set of search terms relating to social determinants compiled from previous major reviews of SDOMH (Dykxhoorn *et al.*, 2022; Kirkbride *et al.*, 2024; Lund *et al.*, 2018). Our basic search structure included terms for systematic reviews, type of intervention, social determinants and mental health (Table SI). We conducted systematic searches on the ASSIA, Scopus, CINAHL, ProQuest Central and Web of Knowledge indexes, based on these terms. The search strategy consisted of a title-abstract-keyword search (Table SII), filtered by language ("English") and geography ("UK" and "UK and Ireland" for CINAHL).

Selection process

Citations were deduplicated using Zotero software. Title and abstract screening was completed by a single reviewer (NW), with eligible or potentially eligible systematic reviews forwarded to full text screening by the same author. We used backward citation screening of included reviews to identify any other potentially eligible systematic reviews missed by the original search strategy.

Data extraction and synthesis

Data extraction was guided by the Cochrane handbook suggestions for descriptive characteristics of systematic reviews and their primary studies to be included in umbrella reviews (Pollock *et al.*, 2023). Due to high anticipated heterogeneity, we planned a narrative synthesis of the data according to guidance on organising findings by patterns observed (Popay *et al.*, 2006). We synthesised evidence, where it existed, from UK studies within the included reviews. Data extraction was conducted by one reviewer (NW).

Risk of bias assessment

As per Cochrane guidelines for umbrella reviews (Pollock *et al.*, 2023), we assessed the risk of bias present in the reporting of each systematic review, using the ROBIS tool (Whiting *et al.*, 2016). The tool assesses risk of bias present in each systematic review according to reporting across five key domains: study eligibility criteria; identification and selection of studies; data collection and study appraisal; synthesis and findings, and; interpretation of review findings. Risk of bias across each domain can be rated low, high or unclear. The ROBIS tool assesses risk of bias introduced by the review authors, and is not indicative of the risk of bias or data quality of the included primary studies. One author (NW) assessed risk of bias.

Results

Overview

From 1,101 initial citations, we identified ten systematic reviews which met inclusion criteria for this umbrella review, four (40.0%) of which were identified from backward citation screening (Figure I). These reviews consisted of 285 primary studies, of which 147 (51.6%) were conducted in the UK, with most remaining primary studies conducted in high-income countries. Three reviews (30%) encompassed evidence across universal, selective and indicated prevention scales (Hsueh *et al.*, 2022; Reece *et al.*, 2022; Young and Bates, 2022), four (40%) focussed on selective populations

(Mansfield *et al.*, 2024; McGrath *et al.*, 2021; Moore *et al.*, 2017; Thomson *et al.*, 2013), and three (30%) on indicated samples (Bee *et al.*, 2014; Brooks *et al.*, 2023; Chatterjee *et al.*, 2018) (Table I). Seventy-four primary studies (–26.0%) were randomised controlled trials (RCTs). Review publication dates ranged from 2013 (Thomson *et al.*, 2013) to 2024 (Mansfield *et al.*, 2024), while primary studies ranged from those published in 1938 (Thomson *et al.*, 2013) to 2022 (Mansfield *et al.*, 2024). Six primary studies appeared in more than one of the included reviews (see Table SIII).

Figure I about here

Risk of bias

We assessed five out of the ten reviews (50.0%) as having low risk of bias across all five domains (Table II; Table SIV) (Bee *et al.*, 2014; Brooks *et al.*, 2023; Mansfield *et al.*, 2024; Moore *et al.*, 2017; Thomson *et al.*, 2013). We scored one further review with low risk of bias in four domains, and two in three domains of five domains. We assigned three reviews with high risk of bias in three (Young and Bates, 2022), and one review with high risk of bias in all five domains (Chatterjee *et al.*, 2018).

Table II about here

Intervention characteristics

The ten included reviews focussed on a diverse range of interventions designed to act upon five broad categories of SDOMH that we identified (Table II), including: financial insecurity and welfare advice (n=4; McGrath *et al.*, 2021; Moore *et al.*, 2017; Reece *et al.*, 2022; Young and Bates, 2022); parental mental health and~~&~~ family functioning (n=1; Bee, *et al.*, 2014); social isolation and support (n=3; Brooks *et al.*, 2023; Chatterjee *et al.*, 2018; Mansfield *et al.*, 2024); place-based factors (n=1; Hsueh *et al.*, 2022), and; housing interventions (n=2; Hsueh *et al.*, 2022; Thomson *et al.*, 2013). Further characteristics are provided in Table SV.

Population characteristics

Eight reviews focussed on general or working age adult populations, while just two focussed on children and young people (Bee et al., 2014; Mansfield et al., 2024). Where reported, a majority of participants were of White ethnic background. Men and women were the only genders generally represented in most reviews, while only one review specified the inclusion of transgender participants (Brooks et al., 2023).

Impact on mental health outcomes

Financial insecurity and welfare advice

We identified four reviews that evaluated interventions addressing the impact of financial insecurity and welfare advice services on mental health (McGrath *et al.*, 2021; Moore *et al.*, 2017; Reece *et al.*, 2022; Young and Bates, 2022). These reviews found mixed evidence for the effectiveness of these interventions. Moore *et al.*'s (2017) review (low risk of bias) found that intensive one to two week-long job club interventions that addressed unemployment were associated with sustained improvements in depression measures, particularly for high-risk individuals, but none were conducted in the UK; the two UK studies in this review (Proudfoot *et al.*, 1997, 1999) provided CBT for unemployed participants (an intervention out-of-scope for this umbrella review), which demonstrated some effects on improvements in mental health and employment status at follow-up. Meanwhile, two solely UK-based reviews, with higher risk of bias, found evidence for a positive association between financial advice and welfare services and better mental health outcomes (Reece *et al.*, 2022; Young and Bates, 2022), but "understanding [was] limited by an inconsistent evidence base" (pp. 1174; Young and Bates, 2022) (see Table II). While positive effects on mental health and wellbeing outcomes were identified from moderate- and high-quality primary studies in Young and Bates' (2022) review, some high-quality studies also demonstrated inconclusive results for the same outcomes. A UK-based RCT evaluating debt advice interventions for an unemployed population found no effect on STAI-6 anxiety scores, although this study was limited by low participant uptake (Pleasence and Balmer, 2007, as cited by Moore *et al.*, 2017). Finally, McGrath et al. (2021) found partial evidence that community-based interventions to address financial difficulties improved mental health in selective populations. In the UK context, one

moderate quality study identified by their review reported improvements in mental health for collocated welfare and advice services, but these improvements were restricted to those for whom advice resulted in positive financial outcomes, or in subgroup analyses (notably for women, and Black participants) (Woodhead *et al.*, 2017, as cited by McGrath *et al.*, 2021). McGrath *et al*. (2021) also reported improvements in mental health in three lower quality, uncontrolled studies of welfare and financial advice in the UK.

Parental mental health

We identified one review, with low risk of bias, that evaluated the effectiveness of community-based interventions that addressed parental mental health to improve offspring mental health and wellbeing in selective samples of parents with existing serious mental illness (Bee *et al.*, 2014). Interventions primarily focussed on quality-of-life (QoL) or emotional outcomes for offspring, but few conclusive findings emerged from this review. The review found high quality RCT evidence was generally lacking, with issues around trial methodology including randomisation, concealment, attrition and poor outcome measurement. Bee *et al*.'s (2014) review identified eleven studies which had evaluated interventions in serious mental illness (SMI) samples (defined by Bee *et al* to include psychotic disorders and personality disorders), of which only one uncontrolled study was conducted in the UK (Alder, 2005), but this study only assessed parenting, family and social needs in relation to parental mental health outcomes. Four further studies from this review investigated these interventions in relation to severe depression in the UK, but revealed only sparse evidence of improvements in QoL for children (Bee *et al.*, 2014). When all studies (including non-UK studies) on severe depression were pooled, there was no evidence of a statistically significant improvement in offspring QoL associated with interventions that sought to address severe depression in caregivers (Bee *et al.*, 2014).

Social isolation, support and networks

Three reviews broadly evaluated interventions addressing social isolation, social support and social networks, wherein some evidence for positive effects on mental health was identified (Brooks *et al.*, 2023; Chatterjee *et al.*, 2018; Mansfield *et al.*, 2024). Two of these reviews addressed social isolation in indicated populations with mental and physical health difficulties (Brooks *et al.*, 2023; Chatterjee *et al.*, 2018),

including one review of social prescribing interventions (Chatterjee *et al.*, 2018). The final review addressed social support and self-esteem in a selective population of young offenders via arts-based interventions (Mansfield *et al.*, 2024).

In their low risk-of-bias review, Brooks *et al*. (2023) reported improvements in mental illness symptoms and wellbeing measures were associated with social network interventions for older adults. Interventions tailored to participants needs, interest and health were most effective, as well as those that took place in the community rather than in formal healthcare settings. Twenty-five of 54 identified studies were set in the UK, although the review did not synthesise results separately by geographical location.

In their high risk-of-bias review, Chatterjee *et al*. (2018) evaluated the role of various social prescribing interventions in the UK to improve social isolation, social exclusion and social capital as a mechanism for improving mental health outcomes for people with pre-existing mental or physical health conditions. Various social prescribing interventions were included, such as arts-on-prescription, educational services, exercise referral, healthy living initiatives, signposting to support services, mutual volunteering initiatives known as timebanks, and eco-therapies. The reviewers noted substantive methodological variation in the original studies, with over half of identified interventions providing no formal evaluation of outcomes, and many further studies restricted to non-randomised, uncontrolled pre- / post-intervention comparisons or simple descriptive comparisons. Nonetheless, the review reported that arts-on-prescription interventions were associated with pre- / post improvements in anxiety, depression, mood, self-esteem and wellbeing in six quantitative studies. The review also reported that exercise-on-prescription referral programmes were associated with increased wellbeing in one study (Flannery *et al.*, 2014), but not depression or anxiety in two others (Dinan *et al.*, 2006; Murphy *et al.*, 2012), including a randomised controlled trial (Murphy *et al.*, 2012).

In their low risk-of-bias review of arts-based interventions for selective populations of youth offenders, including 19 UK-based studies (of 43 included in total), Mansfield *et al*. (2024) reported insufficient quantitative evidence that arts-based interventions improved mental health or wellbeing outcomes. Nevertheless, the reviewed qualitative literature suggested arts-based interventions may have been associated with

increases in positive emotions indicative of good wellbeing, albeit with low certainty (Mansfield *et al.*, 2024).

Place-based factors

We identified one review that evaluated the role of interventions to address place-based factors in mental health (Hsueh *et al.*, 2022). Interventions consisted of those that sought to improve the built environment that may lead to improvements in loneliness and mental health outcomes. These included the provision of facilities to improve community engagement and connectedness and gardening and green space activities, as well as housing regeneration schemes (see next section). The review identified seven studies, none of which were randomised controlled trials. Although methodological and sampling heterogeneity again precluded definitive conclusions, this review reported initial evidence that interventions which sought to improve the provision of local community facilities were associated with improved short-term mental health outcomes (Hsueh *et al.*, 2022). The only UK-based study identified by the review consisted of a green space intervention for a selective sample of schoolchildren experiencing behavioural, emotional and social difficulties (Chiumento *et al.*, 2018), which yielded no statistically significant changes in wellbeing amongst participants. Of note, Hsueh *et al.* (2022) graded this study with the lowest quality as it only met 60% of their quality criteria.

Housing

We identified two reviews that evaluated the role of housing interventions to improve mental health and wellbeing (Hsueh *et al.*, 2022; Thomson *et al.*, 2013). Thomson *et al*.'s (2013) overall low risk of bias review identified seven high quality studies from the UK that assessed mental health impacts of housing regeneration schemes, which included warmth and energy efficiency interventions, and rehousing or retrofitting interventions. Findings for mental health outcomes were inconclusive, again limited by methodological and sampling heterogeneity, though there was some evidence from better quality experimental and non-experimental studies that that warmth and energy efficiency interventions had a positive mental health impact (Thomson *et al.*, 2013). Lower, but not better quality studies tended to report positive effects of housing regeneration schemes on mental health outcomes in this review (Thomson *et al.*, 2013); a second review, which identified a single study (not from the UK) also

concluded there was no evidence to support the role of housing regeneration on mental health (Hsueh *et al.*, 2022).

Discussion

Principal findings

In this umbrella review we found a paucity of evidence to support the effectiveness of interventions that sought to tackle the social determinants of mental health in the UK. Although we identified ten systematic reviews on this topic, over half of which had a low risk of bias, evidence from the underlying primary studies was marked by extreme methodological and sampling heterogeneity, making it difficult to draw reliable inferences and conclusions from the available data. Despite these challenges, we found the strongest, most consistent evidence supported interventions that addressed financial insecurity and welfare support to improve mental health outcomes, including specific UK-focussed reviews (Reece *et al.*, 2022; Young and Bates, 2022).

Evidence in context

Our umbrella review is in agreement with the wider international literature that also shows that direct economic interventions, particularly for selective populations including those who are unemployed or living on low incomes, have a substantiated effect on improving mental health (Kirkbride *et al.*, 2024; Shah *et al.*, 2021). We also found some limited evidence from this umbrella review that supports the effectiveness of housing warmth interventions which is also broadly consistent with a review that focussed on UK population-level housing and socioeconomic initiatives (Shah *et al.*, 2021).

We did not include evidence from non-systematic reviews in this umbrella review. This meant some important, recent UK-based scoping reviews of community-based interventions on the social determinants of mental health were excluded (Baskin *et al.*, 2021; Lee *et al.*, 2022). For example, Lee et al. (2022) conducted a scoping review of the role of community-based interventions on mental health of older adults in the UK, identifying 54 such studies, and Baskin et al conducted a similar scoping review focussed on ethnic minority populations, identifying a further seven studies. While both reviews found some evidence, including from RCTs, that interventions to reduce social isolation were associated with improvements in mental health outcomes, the evidence

base was again heterogeneous with a high risk of bias. Lee *et al*. (2022) concluded that heterogeneity in design, intervention, outcomes and reporting made it impossible to consider any "single category of intervention…[as standing]… out as 'promising'" (pp.27, Lee *et al*., 2022).

Meaning of the findings

Most of the reviews identified in this umbrella review noted substantive limitations in quantitively or narratively synthesising the current evidence base for interventions on the social determinants of mental health. The high degrees of methodological and sampling heterogeneity make it difficult to draw reliable conclusions from the available published works. This heterogeneity arises through fundamental variation in the design choices made in the overall study design (experimental versus observational studies, use of randomisation, uncontrolled designs), choice of intervention(s) and outcome measure(s), target level of prevention (universal, selective, indicated samples), geographical location, phase of study (feasibility, pilot, or full study) and analytical or reporting standards (appropriate use of statistical methods, appropriate reporting of statistical methods). As a result, the current level of risk of bias inherent to systematic reviews that assess the role of interventions on the social determinants to improve mental health and wellbeing results in a signal-to-noise ratio that is sufficiently low to preclude meaningful, actionable recommendations for public mental health.

Few reviews were able to extract sufficient data from the primary studies to explore intersectional or subgroup effects that may have existed for some interventions on mental health outcomes. Of those reviews that did include sufficient data by ethnicity, for example, White participants were overrepresented in this research (Bee *et al.*, 2014; Mansfield *et al.*, 2024; McGrath *et al.*, 2021; Moore *et al.*, 2017; Reece *et al.*, 2022), yet we know from previous evidence that people from minoritised ethnic backgrounds are much more likely to be exposed to social inequalities that partially give rise to differences in mental health outcomes (Kirkbride *et al.*, 2024).

Limitations of our umbrella review

The diverse objectives and heterogenous eligibility criteria among the included reviews meant we sometimes included reviews of populations, outcomes and interventions that fell beyond the scope of this umbrella review. For example, only four reviews

synthesised studies solely from the UK (Chatterjee *et al.*, 2018; Lee *et al.*, 2022; Reece *et al.*, 2022; Young and Bates, 2022). Further, there may also be a barrier to the applicability of findings across the different nations of the UK due to the predominance of studies that were conducted in England. Finally, on this issue, we applied a UK filter to each database search, which may have excluded relevant reviews that were not indexed by geography. We adhered to a pre-specified umbrella review protocol and PRISMA reporting guidelines. We provide a copy of our protocol on our Open Science Framework repository (https://osf.io/3cwur/). Although we developed a comprehensive set of *a priori* search terms, some terms to define our key concepts may have been excluded. One example is the role of empowerment interventions that may provide community assets that help improve mental health, as suggested by initial systematic review evidence on this topic from outside of the UK (Russell et al., 2023).

In our umbrella review, only one reviewer screened and assessed citations for eligibility and risk of bias; this may have introduced some misclassification in our review or omission of relevant works. A further limitation of our review is that we excluded the grey literature from the search strategy, thereby raising the possibility that we overlooked other relevant reviews. Nonetheless, we did identify reviews published in both the Cochrane Database of Systematic Reviews (Mansfield *et al.*, 2024) and Campbell Systematic Reviews (Thomson *et al.*, 2013), as well as the NIHR Journals Library (Bee *et al.*, 2014). We will also have captured relevant primary studies published in the grey literature, where these sources were included in the systematic reviews. This is particularly important in the context of social determinants of mental health evidence, where many small-scale public health initiatives may be undertaken by local governments, charities or other agencies whose primary purpose may not have been to evaluate the effectiveness of a given intervention.

Some systematic reviews also included studies that evaluated clinical or non-SDOMH interventions that alone would not have met this umbrella review's eligibility criteria (Bee *et al.*, 2014; Brooks *et al.*, 2023; Chatterjee *et al.*, 2018; Moore *et al.*, 2017). Since the distinctions were not always clear, or even reported in the reviews, there is a possibility that our findings are contaminated with results from non-eligible studies.

Future directions

The included reviews featured a highly diverse array of SDOMH interventions, which by no means fully represent the breadth of interventions on social determinants that may act upon mental health (Duncan *et al.*, 2021). This includes the important role that structural interventions that address more immediate individual and familial determinants can play in improving mental health, including interventions that target financial insecurity such as income support and debt relief programs (Kirkbride et al., 2024). There also remains no unifying conceptual basis for how social determinants operate over the life course – in isolation or synergistically – to affect mental health and wellbeing (Kirkbride *et al.*, 2024). We also do not yet know the level ~~of~~ at which these effects operate most perniciously (individual, familial or societal), the specificity of these effects on different mental health outcomes, or the scale at which interventions should be deployed (universal, selective or indicated) on these social determinants to have the biggest impact on population mental health outcomes. These issues may, in part, account for some of the observed heterogeneity in the evidence base regarding interventions on these social determinants we identified in this umbrella review. The implications of this are sobering, and threefold.

First, we need to ensure that all public mental health interventions on the SDOMH are rooted in theoretical frameworks that provide a coherent and robust conceptual model of how social factors affect mental health outcomes. Hsueh *et al*. (2022) and Lee *et al*. (2022) both identified a lack of detailed evidence for the mechanisms of change between their respective interventions and their outcomes, while other reviews proposed their own directional theories of change (Brooks *et al.*, 2023; Reece *et al.*, 2022). Meanwhile, McGrath, *et al*. (2021) offers a conceptual framework that posited the relationship between financial insecurity and mental health as bidirectional, referring to the cyclical relationships between mental health and employment, debt, welfare, and food and housing security, which complicates models that evoke linear relationships. A coherent, sufficiently complex theoretical framework to understand how social determinants affect mental health will allow prioritisation of clear, testable and focussed research questions in the field.

Second, informed via such a framework, we need to accelerate what we call “basic epidemiology” to strengthen the causal evidence base around the social determinants of mental health. By basic epidemiology, we mean investment in fundamental population mental health science that strengthens the causal evidence base regarding

the social determinants of different mental health conditions. We are not the first to echo this call (Castillo *et al.*, 2019; Dykxhoorn *et al.*, 2022; Kirkbride *et al.*, 2024). Major challenges in the field include selection bias, including genetic and familial confounding, and unmeasured confounding that often constrain, and at worst, distort our understanding of the causal effect of social factors on mental health risk. This evidence base should prioritise both high quality experimental and observational studies (i.e. longitudinal cohorts) in psychiatric epidemiology, which leverage modern causal inference methods to identify those social determinants for which there is most robust evidence of causal effects on mental health. Applications of such methods are growing. Recent examples include quasi-experimental longitudinal evidence using an interrupted time series design that demonstrates the negative causal impact that conservative immigration policies have on mental health for some minoritised ethnic groups (Jeffery *et al.*, 2024), the causal effect of racial discrimination on mental health using G-estimation methods to assess bias due to unmeasured confounding (Luo *et al.*, 2024), and the use of Mendelian randomisation to confirm a causal association between socioeconomic disadvantage and risk of psychiatric disorders (Marchi *et al.*, 2023; Xu *et al.*, 2024). Accelerating the application of robust causal inference methods in basic psychiatric epidemiology to identify prevention targets, and critical windows of exposure over the life course, is a necessary prerequisite for guiding the intervention strategies.

Third, we need a unified public mental health approach that tests the strongest of these interventions via robust experimental or quasi-experimental designs. Public mental health should work in concert alongside psychiatric epidemiologists, implementation science, health economists, social scientists, policymakers, mental health and social service providers, and experts by experience to optimise primary prevention strategies in terms of: their target population (universal, selective, and/or indicated); the critical window(s) of the life course where they could deliver greatest impact and interrupt any intergenerational transmission of mental health risks, and; the most suitable mode(s) and level(s) of delivery, for example by considering whether interventions are optimally deployed as individual, familial, group, neighbourhood or societal measures. In doing so, we should be mindful, and measure, any unintended or adverse consequences of primary prevention.

These priorities highlight the considerable theoretical and scientific hurdles we are still to overcome before we can begin to realise any potential gains in public mental health. Our umbrella review of the highly heterogeneous and often poor quality evidence surrounding interventions on social determinants to improve population mental health is testament to this need. In the UK, as elsewhere (Kirkbride *et al.*, 2024), our review suggests the strongest evidence to improve population mental health involves prevention strategies that address financial insecurity and welfare support. We now need greater political will from governments, funders and policymakers to strengthen the evidence base for these and other social determinants of mental health, which will in turn give governments, funders and policymakers the confidence to invest in primary prevention strategies that deliver actualised benefits across population health.

Acknowledgements

This work was supported by UK Research and Innovation funding for the Population Mental Health consortium (grant no MR/Y030788/1) which is part of Population Health Improvement UK (PHI-UK), a national research network which works to transform health and reduce inequalities through change at the population level.

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Figure I: PRISMA selection process flow diagram, created using software by Haddaway, et al. (2022).

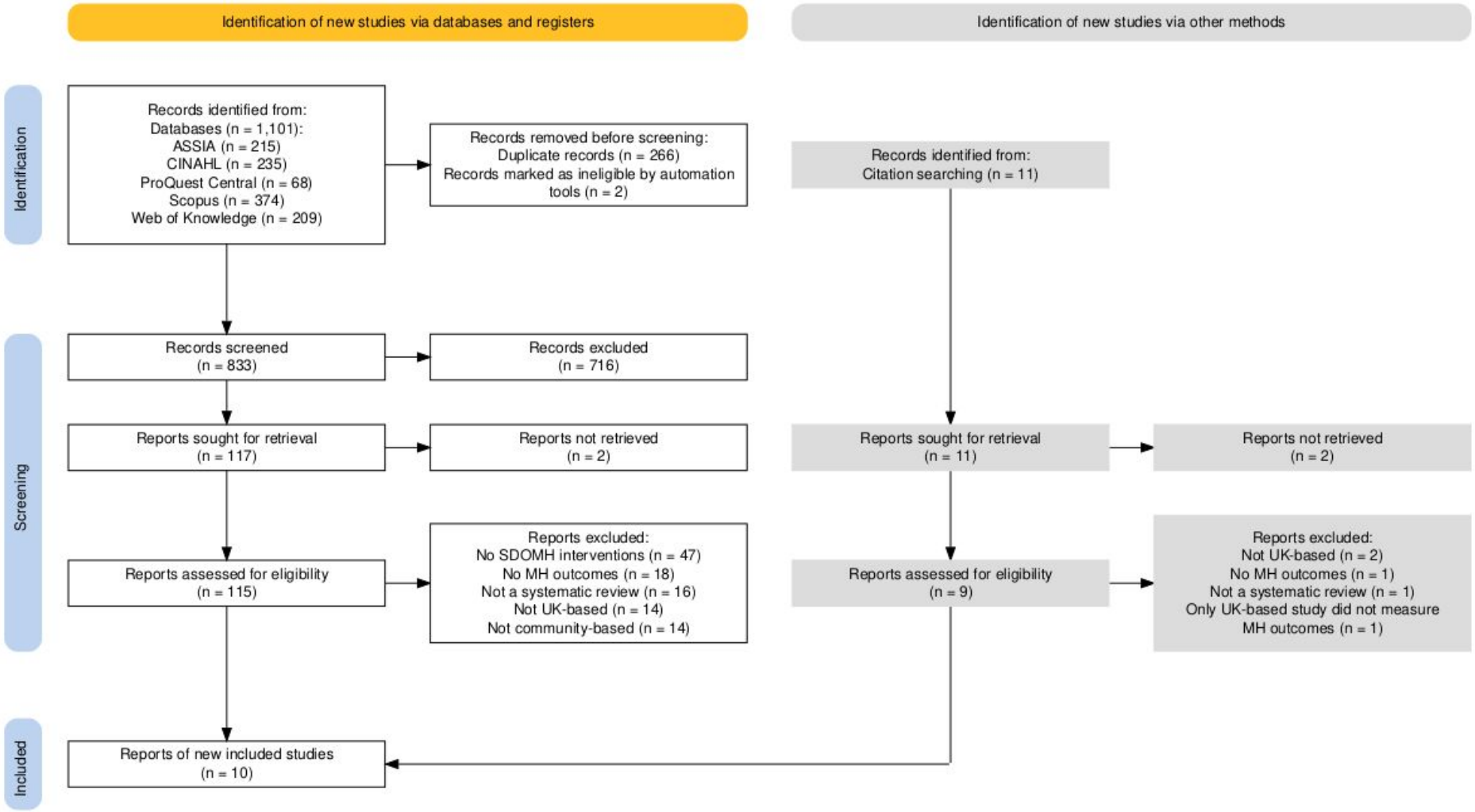

Table I: Search inclusion criteria according to PICO criteria

Inclusion criteria	Exclusion criteria
Type of review Systematic reviews or meta-analyses of any study type. *Population* Systematic reviews that contain: • At least one UK-based primary study. • Studies of interventions delivered in the community. *Intervention setting* Systematic reviews that include: • Studies based in community settings, including but not limited to private residences, workplaces, schools, public spaces, community centres, places of worship, arts & heritage settings, and digital platforms. *Type of intervention* Systematic reviews that include: • Interventions where the aim of the intervention is to address one or more of the SDOMH. *Outcomes*	*Type of review* Scoping, rapid, literature or narrative reviews and umbrella reviews. *Population* Systematic reviews of studies that: • Do not contain at least one UK-based primary study or do not report the primary study locations. • Are delivered solely to individuals (i.e. one to one therapies). *Intervention setting* Systematic reviews that only include: • Studies that do not report the intervention settings. • Studies on interventions in clinical settings, prisons, or secure/non-volitional residences. *Type of intervention* Systematic reviews that only include: • Studies of interventions that do not aim to intervene on a SDOMH. • Studies solely reporting pharmacological interventions. *Outcomes* Systematic reviews that do not include:

Systematic reviews that include: • Studies where mental health or wellbeing is a primary outcome • Studies where mental health or wellbeing is a secondary outcome.	• Studies where mental health or wellbeing is an outcome

Table II: Summary of review characteristics

Review	ROBIS domains rated 'low' (of 5)	UK studies[1]	Population	Prevention scale	SDOMH addressed[1]	Intervention(s)	Mental health outcome(s)	Results
Bee *et al.*, 2014	5	9/57	Parents with severe mental illness, including severe depression, with children under 18	Indicated	**Parental mental health, family functioning,** childhood adversity	Psychotherapy, psychoeducation & extended care for parents with SMI	Children's QoL and/or emotional wellbeing	Insufficient conclusive evidence
Brooks *et al.*, 2023	5	25/54	Adults 18+ with mental health difficulties	Indicated	**Social isolation**, community integration, social network strength	Social network interventions including: community or social activities, intensive community treatment, peer support, action research & sheltered accommodation	Mental health symptoms, QoL	Significant evidence for effectiveness of social network interventions for older adults
Chatterjee *et al.*, 2018	0	40/40	People with mental or physical health conditions	Indicated	**Social isolation**, social capital, social exclusion, access to services, education	UK social prescribing schemes, including exercise referral, arts-on-prescription, supported referral, time banks & healthy living initiatives	Anxiety, depression, functional status, hospital admissions, mental health, wellbeing, QoL	Insufficient conclusive evidence
Hsueh *et al.*, 2022	3	1/7	No restriction	Universal, Selective, Indicated	**Place-based factors**, including socio-spatial and built environment characteristics, including **housing interventions**	Place-based interventions including community facilities, active engagement in green spaces, housing regeneration	Loneliness & mental health problems	Sole UK study yielded no significant results; other evidence too heterogenous to draw conclusions

Mansfield *et al.*, 2024	5	19/43	CYP offenders or those at risk of (re)offending	Selective	**Social support** including self-esteem, peer, family & community relationships & support	Visual and performance arts activities	Wellbeing (secondary outcome; primary outcome was preventing youth violence)	Unclear and low-certainty evidence of effect
McGrath *et al.*, 2021	4	10/15	Adults 18-65 years experiencing acute financial insecurity	Selective	**Financial insecurity**, including low income, recent unemployment, debt, and food & housing insecurity, **welfare advice services**	Community interventions addressing mental health effects of financial insecurity	Mental health, psychological distress, symptoms of CMD, wellbeing and positive affect (includes QoL, happiness, self-esteem), and mental health service use	Limited evidence for effectiveness of interventions delivered to people experiencing financial insecurity, but higher quality studies showed some effects in subpopulations, i.e. CMD symptom improvement in women & Black people
Moore *et al.*, 2017	5	2/11	No restriction	Selective	**Financial insecurity**, unemployment, debt	Job clubs, emotional competency training, guided imagery, debt advice, CBT	Any	Strong global evidence in favour of 'job club' interventions for depression, but no evidence in UK
Reece *et al.*, 2022	3	14/14	Adults 18+	Universal, Selective, Indicated	**Financial insecurity, welfare advice services**	Welfare advice services co-located in health settings in the UK	Any	Evidence for positive association with advice service use and mental health improvement
Thomson *et al.*, 2013	5	21/39	People in direct receipt of housing interventions	Selective	**Housing interventions**, deprivation	Warmth & energy efficiency improvements, rehousing or retrofitting, provision of basic housing	Any; not health service use	Results mostly inconclusive, with some evidence of mental health improvement
Young & Bates, 2022	2	13/13	No restriction	Universal, selective	**Financial insecurity,** including unemployment, **welfare advice services**	Welfare advice services provided by public sector or not-for-profit organisations in the UK	Any	Mental health improvements associated with welfare advice services, but "understanding limited by an inconsistent evidence base"

ROBIS: Risk of Bias tool for systematic reviews (Whiting *et al.*, 2016); CMD: common mental disorder; QoL: quality of life; CBT: cognitive behavioural therapy

[1]Numbers of UK and all primary studies reported by each review. Totals: UK primary studies: n=154; all primary studies: n=293. After excluding instances of duplicate primary studies (n=6 studies (n=5 UK), n=8 instances of duplication (n=7 UK); see Supplemental Table SIII), the totals were: UK primary studies n=147; all primary studies: n=285

1

Supplemental materials

Supplemental Table SI: Search terms

TYPE OF REVIEW	AND	TYPE OF INTERVENTION	AND	SOCIAL DETERMINANTS OF MENTAL HEALTH	AND	MENTAL HEALTH
Systematic review OR meta-analysis		community intervention* OR "non-pharmacological intervention* OR community-based intervention* OR intervention* OR strateg* OR program* OR creative intervention* OR art*-based intervention* OR art* therap* OR music therap* OR ecotherap* OR nature-based intervention* OR cultural intervention* OR co-design OR co-production OR participatory art*		Social inclusion OR isolation OR social cohesion OR social capital OR social welfare OR social determinants of health OR social inequit* OR social inequalit* OR social status OR deprivation OR social environment OR social participation OR inequit* OR inequalit* OR stressors OR social support OR public service* OR health service* OR young offender* OR criminal justice system OR social care OR food bank* OR advice service* OR employment support* OR offending OR anti-social OR Substance misuse OR abuse OR drug* OR alcohol* OR addict* OR "tobacco" OR smok* OR domestic violence OR interpersonal violence OR health behaviour* OR lifestyle behaviour* OR leisure OR hobb* OR adverse childhood experience* OR child welfare OR physical inactivity OR abus* OR youth violence OR family violence OR intimate partner violence OR elder abuse OR rape OR sexual assault OR sexual violence OR child sexual assault OR child sexual abuse OR child criminal exploitation OR criminal exploitation OR neglect OR county line* OR child traffic* OR human traffic* OR gang-related activit* OR gang involvement OR stigma OR discrimination OR disadvantage OR racism OR sexism OR homophobia OR transphobia OR ableism OR		Mental health OR mental wellbeing OR mental disorder* OR wellbeing* OR well-being OR psychological disorder* OR mental illness* OR anxiet* OR depress* OR PTSD OR OCD OR stress disorder* OR CMD OR common mental disorder* OR personality disorder* OR behaviour disorder* OR

2

				social class OR classism OR prejudice OR bullying OR abuse OR maltreatment OR marginalis* OR power OR race OR ethnic* OR racial OR female OR women OR LGBT* OR transgender OR BAME OR disabl* OR ethnic minority OR race-based discrimination OR gender-based discrimination OR gender bias OR rac* bias OR gender-based violence OR FGM OR female genital mutilation OR chest-ironing OR chest ironing OR forced marriage* OR child marriage* OR child bride* OR family OR familial OR maternal mental health OR child OR parent* OR family connectivity OR divorce OR single parent* OR heating OR fuel poverty OR poverty OR stability OR overcrowding OR housing OR homeless* OR unhoused OR evict* OR security OR household composition OR diet OR nutrition OR food OR food insecurity OR housing conditions OR council housing OR carer OR informal carer OR young carer OR school absence* OR deportation OR visa OR migration OR unemploy* OR benefits OR welfare status OR income OR employ* OR financial insecurity OR education OR school OR refugee* OR refugee status OR asylum seeker* OR immigra* OR poverty OR debt OR neighbourhood safety OR violent crime OR crim* OR green space* OR communal spaces OR community centre* OR cultural spaces OR place* of worship OR built environment OR urban planning OR rural OR remote countryside		stress OR psychological distress OR happiness* OR self-harm* OR suicid* OR suicidal ideation OR emotional health OR psychos* OR psychotic disorder* OR schizo*

3

Supplemental Table SII: Search strategy

Search strategy (ProQuest protocol)
NOFT(“systematic review” OR “meta-analysis”) AND NOFT(“community intervention*” OR “non-pharmacological intervention*” OR “community-based intervention*” OR “intervention*” OR “participatory art*” OR “creative intervention*” OR “art*-based intervention*” OR “art* therap*” OR “music therap*” OR “ecotherap*” OR “nature-based intervention*” OR “cultural intervention*” OR “co-design” OR “co-production”) AND NOFT(“wellbeing” OR “mental health” OR “mental wellbeing” OR “mental disorder*” OR “well-being” OR “psychological disorder*” OR “mental illness*” OR “anxiet*” OR “depress*” OR “PTSD” OR “OCD” OR “stress disorder*” OR “CMD” OR “common mental disorder*” OR “personality disorder*” OR “behaviour disorder*” OR “stress” OR “psychological distress” OR “happiness*” OR “self-harm*” OR “suicid*” OR “suicidal ideation” OR “emotional health” OR “psychos*” OR “psychotic disorder*” OR “schizo*”) AND NOFT(“parent*” OR “family” OR “child*” OR “familial” OR “maternal mental health” OR “family connectivity” OR “divorce” OR “single parent*” OR “heating” OR “fuel poverty” OR “poverty” OR “stability” OR “overcrowding” OR “housing” OR “homeless*” OR “unhoused” OR “evict*” OR “security” OR “household composition” OR “diet” OR “nutrition” OR “food” OR “food insecurity” OR “housing conditions” OR “council housing” OR “carer” OR “informal carer” OR “young carer” OR “school absence*” OR “social inclusion” OR “isolation” OR “social cohesion” OR “social capital” OR “social welfare” OR “social determinants of health” OR “social inequit*” OR “social inequalit*” OR “social status” OR “deprivation” OR “social environment” OR “social participation” OR “stigma” OR “discrimination” OR “disadvantage” OR “race” OR “ethnic*” OR “racial” OR “ethnic minority” OR “racism” OR “race-based discrimination” OR “gender-based discrimination” OR “gender bias” OR “rac* bias” OR “gender-based violence” OR “FGM” OR “female genital mutilation” OR “chest ironing” OR “chest-ironing” OR “sexism” OR “female” OR “wom*n” OR “LGBT*” OR “transgender” OR “BAME” OR “homophobia” OR “transphobia” OR “ableism” OR “disabl*” OR “social class” OR “classism” OR “prejudice” OR “bullying” OR “abuse” OR “maltreatment” OR “marginalis*” OR “power” OR “child marriage” OR “forced marriage” OR “child bride*” OR “deportation” OR “visa” OR “migration” OR “unemploy*” OR “benefits” OR “welfare status” OR “income” OR “employ*” OR “financial insecurity” OR “education” OR “school” OR “refugee*” OR “refugee status” OR “asylum seeker*” OR “immigra*” OR “poverty” OR “debt” OR “neighbourhood safety” OR “violent crime” OR “crim*” OR “green space*” OR “communal spaces” OR “community centre*” OR “cultural space*” OR “place* of worship” OR “built environment” OR “urban planning” OR “remote” OR “rural” OR “countryside” OR “substance misuse” OR “abuse” OR “abus*” OR “tobacco” OR “drug*” OR “alcohol*” OR “addict*” OR “smok*” OR “domestic violence” OR “interpersonal violence” OR “health behaviour*” OR “lifestyle behaviour*” OR “leisure” OR “hobb*” OR “adverse childhood experience*” OR “child welfare” OR “physical inactivity” OR “youth violence” OR “family violence” OR “intimate partner violence” OR “elder abuse” OR “rape” OR “sexual assault” OR “sexual violence” OR “child sexual assault” OR “CSA” OR “child sexual abuse” OR “child criminal exploitation” OR “criminal exploitation” OR “neglect” OR “county line*” OR “child traffic*” OR “human traffic*” OR “gang-related activit*” OR “gang involvement” OR “social support” OR “public service*” OR “health service*” OR “young offender*” OR “youth offender” OR “criminal justice

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system” OR “social care” OR “food bank*” OR “advice service*” OR “employment support*” OR “offend*” OR “anti-social behaviour” OR “social inclusion” OR “isolation” OR “social cohesion” OR “social capital” OR “social welfare” OR “social determinants of health” OR “determinants of health” OR “stressors” OR “social inequit*” OR “social inequalit*” OR “inequit*” OR “inequalit*” OR “social status” OR “deprivation” OR “social environment” OR “social participation”)
Limits applied: English (language), United Kingdom (location), peer-reviewed.

5

Supplemental Table SIII: Overview of primary studies that appeared in more than one included systematic review[1]

Primary studies Citation	**Setting**	Bee *et al.*, 2014	Brooks *et al.*, 2023	Chatterjee *et al.*, 2018	Hsueh *et al.*, 2022	Mansfield *et al.*, 2024	McGrath *et al.*, 2021	Moore *et al.*, 2017	Reece *et al.*, 2022	Thomson *et al.*, 2013	Young & Bates, 2022
Grant 2000	UK			X			X				
Krska *et al.*, 2013	UK						X		X		X
Moffatt *et al.*, 2012	UK								X		X
Pleasence & Balmer 2007	UK						X	X			
Vinokur *et al.*, 2000	US						X	X			
Woodhead *et al.*, 2017	UK						X		X		X

[1]Six primary studies (n=5 UK) were included in more than one systematic review included in this review. Four primary studies (n=3 UK) (Grant, 2000; Moffatt *et al.*, 2012; Pleasence and Balmer, 2007; Vinokur *et al.*, 2000) appeared in two reviews (various), while two primary studies (both UK) (Krska *et al.*, 2013; Woodhead *et al.*, 2017) appeared in three reviews (McGrath *et al.*, 2021; Reece *et al.*, 2022; Young and Bates, 2022).

6

Supplement Table SIV: Risk of bias ratings for included reviews, assessed using ROBIS[1]

	Phase 2				Phase 3
Review	**1. Study eligibility criteria**	**2. Identification and selection of studies**	**3. Data collection and study appraisal**	**4. Synthesis and findings**	**Risk of bias in the review**
Bee, *et al*., 2014	LOW	LOW	LOW	LOW	LOW
Brooks, *et al*., 2023	LOW	LOW	LOW	LOW	LOW
Chatterjee, *et al*., 2018	HIGH	HIGH	HIGH	HIGH	HIGH
Hsueh, *et al*., 2022	LOW	HIGH	LOW	LOW	HIGH
McGrath, *et al*., 2021	LOW	LOW	LOW	HIGH	LOW
Mansfield, *et al*., 2024	LOW	LOW	LOW	LOW	LOW
Moore, *et al*., 2017	LOW	LOW	LOW	LOW	LOW
Reece, *et al*., 2022	LOW	LOW	HIGH	LOW	HIGH
Thomson, *et al*., 2013	LOW	LOW	LOW	LOW	LOW
Young & Bates, 2022	LOW	HIGH	HIGH	HIGH	LOW

[1]We used the ROBIS tool to assess systematic review quality (Whiting *et al.*, 2016). The tool assesses four methodological domains (Phase 2) and one interpretation of the evidence domain (Phase 3). We did not perform the optional Phase 1, assessing the relevance of the systematic review question.

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Supplemental Table SV: Full characteristics of included systematic reviews

Review	Number of studies	Primary study location	Search strategy	Population	Primary outcomes	Secondary outcomes	Heterogeneity	Primary study data quality and bias assessment
Bee *et al.*, 2014	Total n=57 Phase 1 (SMI): n=11 (RCTs n=3, nRCTs n=4, uncontrolled n=4) Phase 2 (Severe depression): n=41 (RCTs n=26, nRCTs n=4, uncontrolled n=11) Phase 3 (acceptability): studies from Phase 1 n=10, studies from Phase 2 n=37	UK total n=9 Phase 1 UK studies: n=1 (uncontrolled study) Phase 2 UK studies: n=4 (RCTs), n=2 (nRCTs), n=2 (uncontrolled) Phase 1 totals: USA n=5; UK n=1; Australia n=4; Canada n=1 Phase 2 RCTs: USA n=11; Australia n=4; UK n=4; Canada n=3; France n=1; Pakistan n=1; Chile n=1; Sweden n=1 Phase 2 nRCTs (excl. UK) USA n=2 Phase 2 uncontrolled (excl. UK): USA n=5; New Zealand n=1; Australia n=3; Canada n=1	Systematic search of 19 databases, hand search of 9 journals, citation searching and grey literature search.	CYP less than 18 years old with one or more primary caregivers ('parents') with serious mental illness, or the caregivers themselves. In the second synthesis, the same but for caregivers with severe depression. 83% of RCTs across both syntheses involved children 12 years or younger, and 62% involved children 2.5 years or younger. 59% of RCTs did report ethnicity but, where reported, authors identified an over-representation of White people of European descent.	Validated measures of children's QoL and/or emotional wellbeing	Additional QoL measures derived from stakeholder consultation: children's physical health, safety, social function, self-esteem, mental health literacy, coping skills, family function, parental mental health symptoms.	Phase 1: high heterogeneity of both RCTs and nRCTs, meta-analysis deemed inappropriate Phase 2: high heterogeneity of outcome measures, some meta-analysis achieved with n=5 trials	Cochrane Risk of Bias Assessment tool Phase 1 RCTs: overall risk of bias high n=2, unclear n= 1 Phase 1 nRCTs: high for all. Phase 2 RCTs: high n=4, unclear n=21, low n=1

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Brooks *et al*., 2023	n=54 6,249 participants RCTs n=17 Quantitative n=12 Qualitative n=13 Mixed methods n=12	UK n=25 USA n=8 Australia n=5 China, India, Ireland, Italy, Netherlands, Sweden, Canada n=2 each Denmark and Hungary n=1	Systematic search of 7 scholarly databases, 2 grey literature databases, hand-search	Eligibility criteria required mean age to be >=18 years old. The mean age of included studies is 47.42 years with broadly equal gender representation. n=21 studies consisted of participants with mixed forms of mental health issues and emotional distress. Number of remaining studies consisting of participants with: Psychosis/schizophrenia n=12 Serious/long-term mental health problems n=10 Depression n=4 Mild-moderate mental health issues n=2 DSM AXIS 1 disorders n=2 Psychotic and affective disorders n=1 Eating disorders n=1 PTSD and depression n=1 n=2 studies involved transgender participants, but no studies recorded sexuality or neurodiversity.	Social network size or quality	Mental health symptomatology, general health, social anxiety, social support, social capital and satisfaction with aspects social relationships, distress, general and social functioning/engagement, occupational functioning, structured activity levels, loneliness, relatedness and social inclusion, sense of belonging, self-esteem, quality of life, wellbeing, treatment adherence, service use, satisfaction with care.	Meta-analysis of the quantitative data was not possible due to high heterogeneity	The quality assessments that were carried out averaged the number of quality criteria met by each study and the range of how many criteria were met: RCTs: mean number of quality criteria met x = 3, range of number of criteria met: 0-5 Other quant: x = 3, 1-4 Qualitative: x = 5, 3-5 Mixed methods: x = 2, 0-5
Chatterjee *et al*., 2018	n=40, of which: Quantitative studies n=17 RCTs n=8 Mixed methods n=7 Qualitative studies n=16	All UK based (n=40) England n=31	Systematic search of 11 databases and 1 register	UK population, including people with both mental health and physical health problems as stated in the review criteria.	Standardised measures of: anxiety, cost effectiveness, depression, functional status (health and wellbeing), hospital admissions, mental health, mental wellbeing, physical activity, psychological wellbeing, QoL, social isolation, social support	Referral pathways	High heterogeneity of analysis methods, sample size, and measures used	Quality not assessed.

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Hsueh *et al.*, 2022	n=7 RCTs n=0 Quantitative n=3 Qualitative n=2 Mixed methods n=2	Australia n=3 USA n=2 China n=1 England n=1	Systematic search of 3 databases including a grey literature database and hand search	Both general population and clinical populations, with no age or diagnosis requirement. Number of studies that sampled: working age adults (18-60 years old) n=4 older adults (60-98 years old) n=2 schoolchildren (9-15 years old) n=1 clinical populations with underlying MH conditions n=3 general population n=4 Authors identified an overrepresentation of females in one study.	Loneliness and mental health problems/suicidality	Acceptability, perceived impact or potential harms	High heterogeneity of study designs, settings, participants and interventions, therefore no meta-analysis was possible, and results were synthesised narratively.	Data quality assessed using the Mixed Methods Appraisal Tool (MMAT) Overall studies ranked moderately high for quality, studies that met: 100% of quality criteria: n=3 80% of quality criteria: n=3 60% of criteria: n=1
Mansfield *et al.*, 2024	n=43 Quantitative n=3 Qualitative n=38 Mixed Methods n=2 RCTs = 2 Quantitative studies with no control or comparator group excluded.	UK n=19 Quantitative n=3 (n=1 RCT) Qualitative n=16 USA n=18 Quantitative n=2 (n=1 RCT) Qualitative n=16 Qualitative: Australia n=4 South Africa n=2 Spain n=1 South Korea n=1	Systematic search of 18 databases grey literature search expert consultation citation search	Consisting of CYP (8-25 years old) at-risk of offending or already in the CJS. Quantitative studies: Of total participants where sex was reported (n=156 participants), 87% were male. Mean age ranged from 14 to 18.2 years old Ethnicity only recorded in USA studies. Qualitative studies: In studies where sex was reported (n=300 participants), 66% were male. Ages ranged from 7-25 years. n=15 studies reported ethnicity but of these only n=5 reported descriptive numerical data: White participants ranged from 0-60%, other ethnic groups consisting of Black, Hispanic America, Roma, Latino, BME, American Indian*, and mixed race (ethnicities not reported). n=3 studies reported participants with adverse life experiences. **unclear whether this refers to a*	Offending behaviour and anti-/pro-social behaviours	Participation/attendance at arts interventions, educational attainment, school attendance, engagement and exclusions, workplace engagement, wellbeing, costs and associated economic outcomes, adverse events	Heterogeneity of outcome measurement tools in quantitative studies. Meta-analysis not possible.	Quantitative quality assessed using GRADE and GRADE CERQal; qualitative data assessed by confidence and certainty. Primary studies were assessed for risk of bias using the Cochrane Risk of Bias tool for RCTs and CASP tool for qualitative research. All quantitative studies, n=5, rated at high risk of bias Observed methodological limitations of

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				dual US-India national or use of an archaic term for a Native American participant.				qualitative studies.
McGrath *et al.*, 2021	n=15 RCT n=3 Quasi-experimental Controlled study n=1 Controlled or uncontrolled before-after studies n=11 Qualitative studies excluded.	UK n=10 USA n=2 Finland n=1 Germany n=1 Canada n=1	Systematic search of 8 databases, manual search	Working age adults (18-65 years old) experiencing acute periods of financial (personal or household) insecurity. In studies where ethnicity is reported, most consist of mostly White participants, similarly for females.	Mental health, psychological distress, symptoms of CMD, wellbeing and positive affect (includes QoL, happiness, self-esteem), and mental health service utilisation (e.g. consultations, referrals, prescribing)	Cost-effectiveness	Not reported formally by the authors but the presented data indicated high levels of heterogeneity in participants, outcome measurements and study design.	Moderate quality n=3 Low quality n=12
Moore *et al.*, 2017	n=11 RCTs, reported in 26 papers.	USA n=6 UK n=2 Spain n=1 Australia n=1 Finland n=1	Systematic search of five databases	All participants were working-age, unemployed and from the general population. Mean unemployment durations ranging from 2.3-33 months. n=3 studies solely recruited white collar workers. Mean age ranged from 32-58 years Sex ranged from 13-98% male Ethnicity was reported in n=6 studies, but only measured White participants. The ethnic composition ranged from 66-94% White.	Any mental health outcomes	Employment	Insufficient data from job club interventions to perform a meta-analysis. Remaining data from other interventions too heterogenous in terms of intervention type, participants and study size to pool.	Assessed using Cochrane Risk of Bias tool. All RCTs deemed high risk of bias.

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Reece *et al.*, 2022	n=14 nRCT n=1 Pilot RCT n=1 Before-after study n=1 Qualitative n=3 Case studies n=8	All UK based n=14	Systematic search of 19 databases, websites, grey literature, and manual search	Adults aged 18+ years. Mostly female Mean age 46 years Ethnicity reported in limited detail across n=4 studies, which revealed 74% of participants were White. Averaged across 2 studies, 51% participants had a mean household income of <£4800 per annum. Averaged across 2 studies, 42% (majority) of participants were not working due to long term illness or disability.	Any outcome (including health and social)	Cost-effectiveness/financial evaluation, barriers and facilitators	Large amount of heterogeneity in methods and lack of statistical analysis led to narrative/descriptive synthesis of findings. For mental health outcomes, heterogeneity in outcome measures prevented meta-analysis of the two quantitative studies.	Quality assessment conducted using CEBMa for quantitative and qualitative study designs, and MMAT for mixed methods. 'Richness' and relevance of studies also evaluated.
Thomson, *et al.*, 2013	n=39 studies Only quantitative n=28 Mixed methods n=5 Only qualitative n=6 RCTs = 5	UK n=21 (66%)	Systematic search of 41 databases, citation search, grey literature, expert consultation	Eligibility criteria dictated that participants had to currently be receiving a discrete housing intervention. Participants were generally low-income and living in poor quality housing, including publicly owned housing. Participants were adults (inc. elderly) and children. Where reported, some demographic variables were included in the appendices, but not included in the discussion.	Any measure of physical and mental health or mental and physical illness, general measures of self-reported wellbeing and QoL measures. NOT health service use.	Any social determinant of health indicators e.g. fuel costs, household income, social contact, social exclusion, education, employment, time off work	High heterogeneity of methodologies, intervention types, samples, contexts and outcomes which prevented meta-analysis. Validated measures used but not consistently across the studies.	Study quality evaluated using Cochrane Risk of Bias tool and adapted Hamilton Assessment Tool for qualitative and quantitative studies. Only high-quality studies (n=19, grades A and B) included in the synthesis. Risk of bias rarely assessed as 'low'. Unclear levels of reporting bias from primary studies. None of the studies judged free from contamination,

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								due to unclear reporting.
Young & Bates, 2022	Total n=13 Quantitative n=2 Qualitative n=3 Mixed methods n=7, including n=1 RCT	All UK based	Systematic search of 2 databases, grey literature and websites, and manual citation searching	General population, but n=1 study focussed on cancer patients and n=1 study focussed on older adults 60yrs+.	Any mental health and wellbeing outcomes	Any measure of acceptability, satisfaction, barriers and facilitators, accessibility and other social determinants of health.	High heterogeneity of outcome measures and reporting.	JBI appraisal criteria Most studies' methodological quality rated moderate or strong

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