# Perspectives in
# Public Health

**Special issue: Understanding Loneliness**

- Making connections in a time of disconnection
- Combating intergenerational loneliness with Homeshare UK
- Addressing and understanding loneliness in the context of Covid-19
- More in Common: taking a holistic approach in tackling the loneliness crisis



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# *'Ah, look at all the lonely people . . .':* loneliness and solitude in public mental health

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Even a year ago, perhaps the majority of us in our wildest dreams would not have imagined the words of the Beatle's song, 'Eleanor Rigby', being applied to societies across the globe as one of the devastating results of a pandemic. In the wake of disease and death, there is also acute loneliness. However, loneliness has been a feature of cultures throughout time and is one facet of the human condition with or without pandemic. Never before in history have humans been able to be so connected with others during periods of isolation through the wonders of technology. Nevertheless, in spite of methods of technological connection, loneliness remains a serious twenty-first century problem for many people. A deep feeling of loneliness is so much more than the effects of being alone; at times, being in a crowded place can be the loneliest experience.

The psychosocial causes and effects of loneliness are manifold and rightly the concern of public health practitioners and researchers. We are delighted therefore in concentrating this special issue on the subject. In her guest editorial, Alison Iliff introduces readers to the contents of this issue. In this introductory editorial, however, I consider the issue of loneliness in relation to the mental health benefits of solitude.

In his excellent book on solitude, Anthony Storr[1] notes that some of the great thinkers in history eschewed relationships in favour of solitude, for example, Descartes, Newton, Spinoza, Kant, Wittgenstein and many more (the fact they are all men, I shall ignore for the moment). In contemporary society it seems that to find health and happiness, we seek out fulfilling and positive relationships that mitigate against loneliness. We do, however, at times, still seek solitude.

The British-Czech philosopher Ernest Gellner[2] argues that this tendency to seek out relationships to prevent loneliness has not always been the case, and he suggests that our modern preoccupation with relationships has taken over from the historical preoccupation with survival. For most of the time that humans have inhabited the planet, there have been repeat experiences of wars, plagues, famine, high mortality and low life expectancy. Historically, the survival of the human race depended largely upon strategies and actions to protect individuals and local communities. In recent centuries, this role of protection has become the business of civic authorities and governments. In a previous world, void of government protection from disaster and nothing more than primitive technology, to endure being left alone to cope may have become the norm for human experience. It was normal for people to feel subject to external supernatural forces, and religious frameworks provided ways to commune with those forces to give some form of control to individuals. It was often solitude that created the experiential space for individuals to communicate with the gods and establish some kind of existential meaning. This meaning could then be shared with the local community and bonds were formed and social belonging was experienced.

Solitude, therefore, can be seen as a retreat for an atavistic instinct to survive. In the Western world, parents all too often leave their children in solitude with electronic devices; but how often do we leave them alone in nature? It is by being left alone in nature that a child's curiosity and imagination is stimulated by this atavistic response to solitude. This kind of experience is one of the greatest gifts we can give to our children, but such opportunities are seldom found. As we move into adulthood, a healthy, psychological developmental process enables individuals to enjoy solitude and find within it, imaginative creativity and a sense of peace. A key factor here is agency. If solitude is forced, then people may become extremely lonely; if chosen, it can become a deep and significant resource.[3] Social exclusion through many and varied forms of inequalities may in turn bring about loneliness. Inequalities have widened and deepened in the twentieth century, and loneliness experienced by many, referred to by political theorist Hannah Arendt as the crisis of the century.[4]

I have personally known deep loneliness at times and healing from those experiences takes time to recover. Sadly, it may happen that at periods of time we seek solitude, but find only loneliness. As we consider ways in which we strive to combat
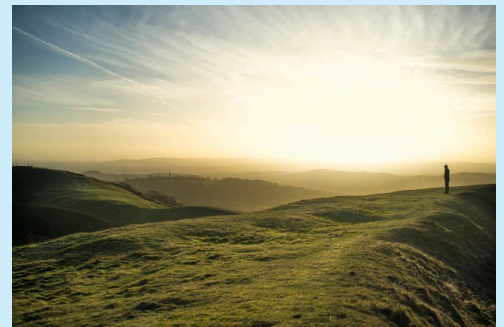
loneliness, we should also give space to consider the important need for solitude. With this final and personal reflection, we welcome this special issue to help enable our understanding of public mental health approaches to help address this all-important topic.

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# Guest Editorial

**Alison Iliff**
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The past year has been typified by isolation, where for many people work has been conducted from home and social life conducted online. Living through COVID restrictions and losing day-to-day social and work contacts has given us more of insight into the challenges of living with chronic loneliness, where the interactions we have with others are lacking in either the quantity or quality we desire.

Loneliness is often thought of as a problem of later life, but Office for National Statistics data shows us people of any age can experience it. The most recent release found working-age adults living alone; people with a disability; people in bad or very bad health; living in rented accommodation; and people who are single, divorced, separated or a former or separated civil partner are more likely to report chronic loneliness.[1] Lockdown loneliness (the percentage of those whose wellbeing had been affected through feeling lonely in the last 7 days) was most likely to have been experienced by young people aged 16–24 than older age groups.[2]

This pervasive nature of loneliness is reflected in the articles in this issue, which examine its impact throughout the life course: upon young people, parents and older adults. As Ambassador for The Jo Cox Foundation, Kim Leadbeater outlines how loneliness can only be tackled by taking a holistic view as the contributing factors for each person will be different, will be multiple and varied and may change over time. Kathryn Cunningham also considers how interventions to address loneliness need to differ according to the root cause.

We also showcase some inspiring interventions to address loneliness: B:friend, a small voluntary sector organisation in South Yorkshire providing one-to-one befriending and community social group activities that bring the members out of their comfort zones to try new pursuits; and Homeshare UK, which matches older adults living alone with someone younger looking for a place to stay. Both projects demonstrate that the younger befriender often benefits as much from the intervention as the perceived recipient. The University of the Third Age (U3A) swiftly adapted its provision as Covid took hold and lockdown meant delivery in different ways was needed to maintain support for members experiencing loneliness.

Among the peer review papers, we consider how loneliness impacts upon a number of specific population groups. Chronic loneliness is experienced by around a third of parents, but there is little research in this area to help us understand who these parents are, and why and how they experience loneliness. Trends in adolescent loneliness are examined and how these may impact on educational achievement and health outcomes. We also look at the important role the voluntary sector plays delivering interventions to tackle loneliness – it is no surprise that our *In Practice* examples are all delivered by voluntary sector organisations. Finally, we consider the impact of social prescribing in tackling loneliness. With the significant investment in NHS-provided social prescribing programmes, this is a timely review to inform its potential in this area.

Loneliness is common, its causes complex and its resolution challenging. I hope you find the articles in this edition of *Perspectives* bring you a deeper understanding of the work being delivered and that it is still needed to recognise and help the millions living with loneliness in the UK.

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# First steps in identifying and addressing loneliness in the context of COVID-19

*Already a significant public health problem prior to the COVID-19 pandemic due to its associations with low wellbeing, poor mental and physical health and premature mortality, loneliness has likely escalated greatly across the world following the introduction of physical distancing measures to control the spread of coronavirus. In this article, Kathryn Cunningham and co-authors outline how addressing loneliness and its related adverse health outcomes is therefore critical in the longer-term response to the pandemic.*

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*Coronavirus and social distancing has forced all of us to look loneliness in the eye.*[1]

Prior to the COVID-19 pandemic, loneliness was already a serious public health problem in Western society, due to both its prevalence and its associations with low wellbeing, poor mental and physical health, and premature mortality.[2–4] The relevance and significance of the problem has been amplified by the introduction of physical distancing measures to control the spread of coronavirus. Such measures have changed the nature of people's interaction and communication with others and have raised considerable international concern regarding their adverse impact on loneliness.[5–7] This concern has been validated by evidence that loneliness has increased in several countries during the COVID-19 pandemic.[8–11] Addressing loneliness, and its associated health outcomes, has been identified as critical in the long-term response to the pandemic.[12]

Loneliness is challenging to address due to its multidimensional nature and the resulting need for tailored interventions that target the root causes of the problem.[13,14] This challenge is compounded by both the lack of a unified definition of loneliness and the absence of standardised measures to identify loneliness.[3,13]

Based on the findings of our theoretical concept analysis and qualitative study of loneliness (see Cunningham et al.[15] for an overview of these) and a decade of discussions with academics, health, social care and third-sector professionals, patients and the public, we present a comprehensive conceptualisation and definition of loneliness. These facilitate understanding of the problem and provide a basis for effective identification, assessment and intervention. We use them to illustrate how COVID-19-related physical distancing measures might generate or exacerbate loneliness. We then suggest potential interventions for different experiences of loneliness in the context of COVID-19.

We have identified that loneliness comprises social and emotional elements and its root causes are self-perceived deficiencies in four types of relationships: (1) emotional (e.g. intimate partner); (2) social (e.g. engaging friendship); (3) cultural (e.g. group affiliation); and (4) professional (e.g. supportive healthcare). It can therefore be defined as '*the negative feeling a person experiences when the quantity or quality of his/her emotional, social,*

> **Loneliness is challenging to address due to its multidimensional nature and the resulting need for tailored interventions that target the root causes of the problem**

*cultural or professional relationships does not meet what (s)he needs or desires*'.

COVID-19-related physical distancing measures may adversely affect all four types of relationships, thereby generating or exacerbating loneliness. For example, the forced confinement of families and the inability to be physically close to a partner or spouse residing separately may strain or even damage emotional relationships, while the disruption of normal in-person activities such as meeting a friend for a face-to-face coffee catch-up might impair social relationships. The cessation of group meetings such as religious services and the requirement to work from home may reduce a sense of belonging, therefore weakening cultural relationships, and the necessity of personal protective equipment (PPE) for staff and the postponement of investigations and treatments might compromise supportive healthcare relationships.

Given that different people's loneliness experiences stem from different self-perceived relationship deficiencies, a 'one size fits all' approach to preventing or mitigating loneliness in the context of COVID-19 is unlikely to be appropriate.

> **Our conceptualisation and definition facilitate identification and assessment of loneliness, promoting consideration of which relationships are adversely affected by physical distancing measures**

Instead, tailored interventions that target the self-perceived relationship deficiencies generating or exacerbating different loneliness experiences (i.e. the root causes of the problem) are necessary. For example, an effective intervention for a person whose loneliness stems from a strained relationship with his or her partner due to forced confinement might include a range of strategies to explore expectations and rebuild communication and intimacy. However, loneliness that arises from the disruption of a weekly face-to-face coffee catch-up with a friend is likely to need a different approach – perhaps a weekly telephone catch-up with that friend could help to alleviate those feelings of loneliness. Loneliness emanating from a reduced sense of belonging due to cessation of normal religious services is likely to need yet another approach, such as connection with an online community of others with similar religious beliefs and participation in virtual religious services, while an effective intervention for a person feeling lonely due to postponement of treatment for a health condition might include having questions and concerns addressed by a trusted healthcare professional.

Addressing loneliness in the context of COVID-19 therefore requires an understanding of the complexity of the problem. Our conceptualisation and definition facilitate identification and assessment of loneliness, promoting consideration of which relationships are adversely affected by physical distancing measures, how, and why. This enables signposting to, or development of, tailored interventions to prevent or alleviate loneliness by targeting the root causes of the problem, thereby reducing loneliness and its related adverse health outcomes.

## CONFLICT OF INTEREST

## FUNDING

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# Understanding loneliness: a systematic review of the impact of social prescribing initiatives on loneliness

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## Abstract

**Aims:** The aim of this systematic literature review is to assess the impact of social prescribing (SP) programmes on loneliness among participants and the population.

**Methods:** We followed Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines to search EBSCOHost (CINAHL Complete, eBook Collection, E-Journals, MEDLINE with Full Text, Open Dissertations, PsycARTICLES, and PsycINFO), UK National Institute for Health and Care Excellence (NICE), Web of Science Core Collection, and grey literature. We included studies measuring the effectiveness and impact of SP programmes in terms of loneliness. We excluded systematic reviews and studies without evaluations. Due to the absence of confidence intervals and the low number of studies, we conduct no meta-analysis.

**Results:** From 4415 unique citations, nine articles met the inclusion criteria. The studies do not use uniform measures or randomised samples. All nine studies report positive individual impacts; three report reductions in general practitioner (GP), A&E, social worker, or inpatient/outpatient services; and one shows that belonging to a group reduces loneliness and healthcare usage.

**Conclusion:** The findings of this systematic review indicate that individuals and service providers view SP as a helpful tool to address loneliness. However, evidence variability and the small number of studies make it difficult to draw a conclusion on the extent of the impact and the pathways to achieving positive change. More research is needed into the impact of SP programmes on participants, populations, and communities in terms of loneliness, isolation, and connectedness, especially in light of the surge in SP activity as a key part of pandemic response.

## INTRODUCTION

Addressing loneliness has been part of the public health agenda in countries like the UK and Canada since before the COVID-19 (coronavirus disease 2019) pandemic. Linked to numerous physical and mental health conditions, adverse effects of loneliness have been observed in educational, workplace, and wider community settings. Loneliness is also linked to increases in health and social care usage[1] due to increased mortality, blood pressure, depression and anxiety, and decreased mobility and quality of life.[2,3]

*Loneliness* is a subjective, unwelcome feeling of lack or loss of companionship that occurs when there is a mismatch between the quantity and quality of social relationships that a person has, and those that person wants.[4,5] Though often associated with isolation, loneliness is distinct in that it is a feeling, while *isolation* is an objective measure of the number and quality of contacts that one has.[6] Thus, it is possible to be lonely while surrounded by others, or to have very few social contacts but not feel lonely. Loneliness can also perpetuate itself, disrupting social interaction

and integration and reducing one's healthy relationships.

The need to address loneliness has become all the more urgent since the onset of COVID-19, as individuals and organisations have sought to maintain social connection amid restrictions on physical interaction. Social care and public health agencies have distributed digital tablets, created online forums, and hosted virtual events in attempts to help keep people connected. To help inform efforts to address this need, we present this systematic review of evaluations of interventions designed to tackle loneliness.

Specifically, we focus on interventions known as *social prescribing* (SP). Concurrent with increased awareness about loneliness and its threat to public health, practitioners, policy makers, and researchers around the world have been calling for a fundamental change in healthcare systems to implement person-centred, holistic care. This social model of health has been adopted in various forms in Canada,[7] the UK,[8] and the US,[9] and SP programmes are a part of it.

The example of the UK can help illustrate the believed linkages between loneliness and SP. In 2018, the UK Government published the Loneliness Strategy. Since then it has devoted significant resources to combatting loneliness and improving individual and community wellbeing, including engaging with numerous charities, to demonstrate its commitment to tackling loneliness and promoting social connections.[10] In 2019, the UK Government launched Universal Personalised Care (UPC), a system designed around six key pillars meant to give individuals choice and control over their mental and physical health. UPC was intended to help the UK health system enhance value for money and improve overall health and wellbeing, including through the reduction of loneliness.[11]

The fourth UPC pillar is centred on SP. SP programmes employ link workers (also called community connectors, community navigators, and/or village agents) to guide participants to co-develop personalised solutions for their own health. As an asset-based, collaborative approach, SP programmes

are designed to identify needs and resources, promote and develop individual and community capacities, and ameliorate symptoms and consequences of poor health.[12] With the UPC launch, the UK Government committed to reaching more than 900,000 people through SP by 2023–2024. Through this commitment, it was intended to also reduce loneliness and improve public health.[13]

In the UK, there are four sectors associated with SP interventions. First, some general practitioner (GP) practices within the health sector are actively engaging link workers to accept referrals and work individually with people and families. Second, organisations in the voluntary and community service (VCS) sector individually with people and families supply an array of innovative and engaging activities for them to access for support and connection. This sector employs link workers directly and supplies many of the services that other link workers recommend.

Third, social care services offer complementary support to vulnerable and elderly people and families by developing the market for SP, by commissioning and funding community activities, and by supplying SP through local authorities and/or councils. And finally, Departments of Public Health provide SP services as they seek to enhance the health of the population as a whole, providing evidence on the position and quality of public health and filling gaps in the availability of services. One person might therefore encounter SP through any one of these sectors, or through an integrated care system that combines these sectors to offer a holistic approach to care and wellbeing.

The variety of ways in which SP can be offered means there can also be a variety of aims and goals between programmes. Many SP services run out of GPs, for example, are interested in how SP can improve health and reduce the burden on the healthcare system; these programmes are overseen by the National Health Service (NHS) in the UK. Those SP services run by local councils might be overseen by Departments of Public Health, Social Services, or Public Safety; their key goals could be improved

public health or security. SP programmes implemented by the VCS tend to be focused on individual wellbeing.

The diversity of goals of SP programmes, combined with the recent surge in SP in the UK and person-centred care around the world, raises questions regarding the effectiveness and impact of these models on mental and physical wellbeing in general, and on loneliness in particular. As a collaborative effort between public, private, and third sector organisations, SP is well-suited to provide person-centred healthcare and improve public health outcomes. Yet, we need more information about SP outcomes if we are to understand the extent to which they affect loneliness.[11,14,15] This systematic review therefore focuses on interventions designed to reduce loneliness, detailing methods used to differentiate and define individuals' health conditions and needs, as well as the impact of the SP interventions employed to reach lonely individuals.

We analyse research into SP schemes in the UK and internationally over two decades. In contrast to previous reviews,[16,17] we follow 2019 NHS England and Drinkwater et al.'s recommendations[8,13] to evaluate the outcomes of SP-type programmes by assessing the impact of a programme at three levels: the person, the health and social care systems, and the community. These three levels of measurement capture a range of potential impacts and help us understand the effects of SP as an approach to engage and empower individuals and communities to co-design health plans, reduce loneliness, and promote public health.

As we detail below, our work yields evidence on the use of SP initiatives to address loneliness in the UK, but does not end up including evaluations of initiatives from other countries, despite the fact that we did not restrict our search geographically. We offer two potential explanations for this outcome. First, the use of SP to address loneliness is still a novel concept; SP programmes are often evaluated in terms of other aims and the UK is the only context that measures outcomes in terms of loneliness.

Understanding loneliness: a systematic review of the impact of social prescribing initiatives on loneliness

| Box 1 |
| --- |
| **Search strategy used in the systematic review of social prescribing programmes on loneliness** |
| (social prescri* AND lonel*) AND (interven* OR evaluat* OR program*) |
| (social prescri* AND connect*) AND (interven* OR evaluat* OR program*) |
| (social prescri* AND well-being) AND (interven* OR evaluat* OR program*) |
| (social prescri* AND wellbeing) AND (interven* OR evaluat* OR program*) |
| (social prescri* AND well being) AND (interven* OR evaluat* OR program*) |
| (social prescri* AND isolat*) AND (interven* OR evaluat* OR program*) |

Second, we focus on the term 'social prescribing' for our search to isolate an increase in the literature on SP across the globe (see Box 1). As a result, our findings do not include research on other similar programmes, such as Local Area Coordination, Community Navigation, or Village Agents, unless they also include the 'social prescribing' moniker. To the extent that this alterative terminology is more commonly used in other contexts, these programmes highlight parts of the world or health systems excluded from our search.

## METHODS
We followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines and Petticrew and Roberts' advice in conducting our review.[18,19] Our protocol has not been registered on the PROSPERO register of systematic reviews, but is available from the authors upon request.

## DESIGN AND SAMPLE
### Research strategy
We conducted a comprehensive search in social science and public health repositories to identify existing studies on the effect of SP on loneliness. Through EBSCOHost, we searched nine bibliographic databases (CINAHL Complete, eBook Collection, E-Journals, MEDLINE with Full Text, Open Dissertations, PsycARTICLES, and PsycINFO), as well as the UK National Institute for Health and Care Excellence (NICE) and Web of Science Core Collection, for research published in the English language from 1 January 2000 to 30 November 2019. EBSCOHost and Web of Science Core Collection include

many peer-reviewed, high-quality scholarly journals published worldwide (including open access journals) as well as conference proceedings and books. NICE provides access to numerous social science and medical journals such as *The BMJ*, as well as links to work published by think tanks, non-profit organisations, community health groups, and the government.[20] We searched for combinations of SP, evaluation, and potential impact (Box 1).

As mentioned above, the UK commonly uses the term 'social prescribing' to characterise an asset-based model of service delivery. Models such as Local Area Co-ordinators, community navigators, or village agents are also based on the social model of health to connect people to their communities and universal services, often through voluntary sector services. We chose to focus on the term 'social prescribing' to recognise and investigate the rise of literature and programming across the globe using this term.

### Inclusion criteria and data collection
Two researchers screened the identified abstracts. Studies were eligible for inclusion if they included a programme or initiative designed to offer person-centred care. We included both peer-reviewed and grey literature reporting studies evaluating the impact of one or more interventions on one or more levels of analysis: the person, the health and care system, or the community. When doubt or disagreement occurred on whether an article met the inclusion criteria, the article was moved to the next stage of screening. After initial screening, we appraised the studies to determine whether the programmes were

designed to address loneliness either as a sole characteristic or as one of several. We excluded systematic reviews, studies that did not include an evaluation of an intervention, and instructional materials that gave advice on how to conduct SP programmes.
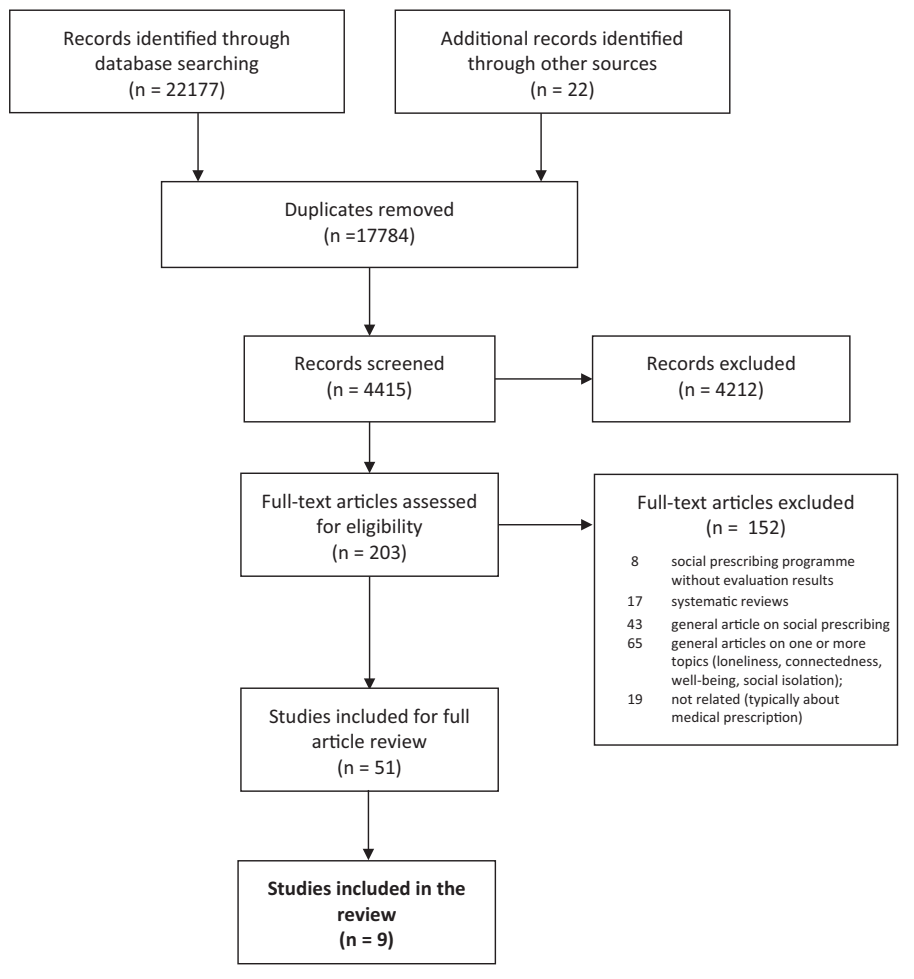
### Data synthesis
The researchers independently assessed the full text of potentially eligible studies and extracted details of the studies into a database. The data collected were as follows: country and area of the programme or intervention; aim of the programme; type of programme (signposting, light, medium, or holistic);[21] whether programme was implemented through GPs, the voluntary sector, social care workers, or an integrated care system; study time frame and data collection period; study type and sampling method; description of study population (age, gender, location, health characteristics); sample size; analytical method; evaluation design (randomised, control group present, pre/post testing); and outcome/impact reported on the person, the health and social care system, and/or the community. The outcome of interest for the review was loneliness.

## RESULTS
### Study identification
Our search yielded 22,199 references, of which 4415 were unique entries. Figure 1 illustrates our process. We excluded 4212 articles after screening titles and abstracts. Of the 203 references that potentially met the inclusion criteria, 152 were excluded for different reasons (Figure 1). Left with 51 studies, we

## Figure 1

**PRISMA flow diagram of the systematic review of social prescribing programmes designed to address loneliness across the globe**

Records identified through database searching
(n = 22177)

Additional records identified through other sources
(n = 22)

Duplicates removed
(n =17784)

Records screened
(n = 4415)

Records excluded
(n = 4212)

Full-text articles assessed for eligibility
(n = 203)

Full-text articles excluded
(n = 152)

- 8 social prescribing programme without evaluation results
- 17 systematic reviews
- 43 general article on social prescribing
- 65 general articles on one or more topics (loneliness, connectedness, well-being, social isolation);
- 19 not related (typically about medical prescription)

Studies included for full article review
(n = 51)

**Studies included in the review
(n = 9)**

excluded 42 because they were not designed to address loneliness. This process left nine articles for review. Of these, three were designed to address loneliness as a sole characteristic and six were designed to address loneliness in addition to social isolation, wellbeing, and/or connectedness. Study results are highly heterogeneous due to variability in sampling methods and the definition of loneliness. In view of this heterogeneity and the absence of confidence intervals, we do not attempt meta-analysis.

### Study characteristics

Two publications are peer-reviewed articles and seven are study reports. The nine articles are based on nine SP initiatives conducted in the UK from 2014 to 2019 (Table 1). Eight of the studies include a total of 12,359 study participants, plus at least 9000 in the ninth study that does not report exact numbers. Three of the studies include individuals aged 16 years or older,[22,23] one has participants aged 29–85 years,[15] one has participants aged 36–40 years,[24] one has participants aged either below 30 or above 60 years, and one has participants aged above 65 years.[25] Two of the studies do not specify participants' ages.[26,27]

Six studies employ a pre/post design[15,22–26] and three report case studies with evidence taken at one point in time.[27–29] None of the studies consider a control group. Three studies conduct surveys only,[22,23,25] two conduct interviews only,[28,29] and four mix the two

methods.[15,24,26,27] Five studies are conducted with SP recipients only,[22–25,29] while four also present information gathered from link workers, volunteers, and GPs who deliver the programme.[15,26–28]

Four studies either do not distinguish between *loneliness, connectedness*, and *isolation* or use the terms interchangeably.[23–25,28] Five studies define and justify how they measure loneliness.[30] Of these, two use the 8-item UCLA (University of California, Los Angeles) scale,[5,15,29] one uses the 3-item UCLA scale,[22,31] one uses the Adult Social Care and Public Health Outcome Framework,[25,32] and one uses the Hawthorne Friendship Scale.[24,33] Four either do not report how they assess loneliness[26–28] or do not report how their assessments were designed or chosen.[23]

### Impact on the individual

All nine studies report positive impact on the individual social prescribing participant. Impact areas in addition to loneliness include healthcare service usage[15,23–29] and social care service usage.[34] Two studies report individuals expressing in interviews that they feel less lonely/more connected to others[28,29] and two report changes in loneliness scores across the participant sample.[22,23] The highest impact reported is 69% of individuals feeling less lonely (UCLA 3-question version).[22]

Two of the studies examine the extent to which age might impact social prescribing programme implementation and loneliness.[15,22] One of these studies reports greater improvements in loneliness for individuals below 60 years of age in comparison with those aged 60 and above.[22] One examines age as a contextual factor determining the pathway between a social prescribing programme and healthcare usage outcomes.[15]

### Impact on the health and care system(s) and community

Evaluation of the impact on health and care services is primarily focused on documenting numbers of GP visits, Accident and Emergency (A&E) visits, inpatient admissions, and outpatient

## Table 1

**Systematic review of social prescribing (SP) programmes designed to implement loneliness across the globe, during 2000–2019 period**

| SP programme name Location | Aim of SP initiative Sample characteristics SP programme participant characteristics | Date of SP programme Evaluation research design, method Measures of loneliness | Impact |
|---|---|---|---|
| **Programme name:** Dudley Community and Voluntary Services[23] **Location:** Dudley, UK | **Aim:** Connecting people, helping them find purpose in their lives. Reducing patient demand on GP and A&E. N = 2720 **Age:** 16+; 60% aged 64+, 37% aged 24–63, with remaining 3% between 16 and 23. **Participants:** Patients who frequently attend their GP practice, are in top 2% at high risk of admission, and any vulnerable person in need of non-clinical support as identified by their GP. Isolation was the highest reason for referral. | **Date:** September 2014 to August 2018 **Design and method:** Pre/post and case studies; surveys. **Measurement:** Isolation/Loneliness used interchangeably. Six indicators of social contact, no justification. | **Person:** Number of people feeling lonely and without enough contact reduced by 46% (87–46). Number of people not feeling lonely and with enough contact increased by 39% (97–135). **System:** GP visits: Of the 43 GP practices, 6-month post-programme 8 practices had an increase of 63 additional consultations in total, 34 had a decrease of 2125 in total, and 1 had no change. Most healthcare providers reported the key benefit of SP to be reduction in participants' isolation and loneliness. A&E: 14% reduction in participants' attendance after 6months, 17% reduction after 12months. Inpatient admissions: 14% reduction after 6months, 15% reduction after 12months. **Community:** Not assessed. |
| **Programme name:** Connecting Communities Programme[22] **Location:** 30 locations across the UK | **Aim:** To re-connect lonely or socially isolated people to their communities and provide emotional and practical support. To offer person-centred support to build self-confidence and resilience and help people forge social connections. N = Over 9000 (no exact number). **Age:** 51% aged below 70; 82% of the sample was classed as being lonely (UCLA scale) at the start of the programme. **Participants:** Statutory health and care services such as the NHS (22%) and local authorities (19%), and others such as family and friends, private organisations, and self-referral. | **Date:** May 2017 to December 2018 **Design and method:** Pre/post; surveys. **Measurement:** 3-item UCLA Loneliness Scale. | **Person:** 69% less lonely, 27% no change, 4% more lonely. Participants below 60years had more improvement in loneliness compared to those above 60years. Greater impact on participants identified as being in a life transition (health issues, mobility limitations, new child, recent bereavement, divorce/separation, retirement, children moving out) than on those not experiencing transition. **System:** Not assessed. **Community:** Not assessed. |
| **Programme name:** Social Cure[15] **Location:** East Midlands, UK | **Aim:** To determine which social factors are central to understanding SP, how SP is experienced across participants and those who deliver the programme, provide evidence base for impact of SP and the consequences for patient's healthcare use. **N = Study 1:** 19 participants; 7 GPs referring participants; 3 health coaches; and 6 link workers working with participants. **N = Study 2:** 630 participants at a 4-month follow-up after initial referral assessment. **Age:** 29–85 (average age: 60.4). **Participants:** Referred by GP or self-referral. 37% (n = 7) multiple/complex needs including loneliness. 53% (n = 10) weight loss + multiple needs including loneliness. Social cure received 1483 referrals and supported approximately 650 patients. | **Date:** November 2017 to February 2019 **Design and method:** Pre/post; Study 1: semi-structured interviews; Study 2: longitudinal survey. Considers participants' gender, age, relationship status, employment status, education levels, and pre/post-programme levels of loneliness, community belonging, and healthcare usage to test the pathway between the programme designed to address loneliness and healthcare usage outcomes. **Measurement:** 8-item UCLA Loneliness Scale (ULS-8). | **Person:** Loneliness and social isolation are key threats to public health and can be addressed through SP. Interviews revealed that being a part of a group (family, community, and volunteering group) and feeling that one belongs to a community helps people feel less lonely. Participants report that having a positive relationship with link workers has helped them build self-confidence, which in turn has helped them address their experiences of loneliness. Group membership alone is not directly and significantly related to primary case usage. Sense of community belonging should be considered when examining this pathway. **System:** GP visits: GPs, health coaches, and link workers recognise the limitations of the 'traditional medical model' and express concerns over addressing loneliness with medical provisions. GPs view SP as best model to address loneliness and reduce its negative health impacts. **Community:** Primarily focuses on understanding how community resources can be used to reduce loneliness and healthcare usage, and less so on impact of the programme on community. |

*(Continued)*

Understanding loneliness: a systematic review of the impact of social prescribing initiatives on loneliness

**Table 1** (Continued)

**Systematic review of social prescribing (SP) programmes designed to implement loneliness across the globe, during 2000–2019 period**

| SP programme name Location | Aim of SP initiative Sample characteristics SP programme participant characteristics | Date of SP programme Evaluation research design, method Measures of loneliness | Impact |
|---|---|---|---|
| **Programme name:** Museum on Prescription[29] **Location:** London and Kent, UK | **Aim:** To support the wellbeing of socially isolated and lonely older people by assessing the impact of participation in 12 Museum on Prescription programmes. **N**=20 **Age:** 65–94 **Participants:** Selected from a pool of 155 individuals who self-identified as lonely or socially isolated. | **Date:** Not specified. **Design and method:** Case study; interviews, theory building using grounded theory analysis and inductive approach. **Measurement:** R-UCLA Loneliness Scale.[31] | **Person:** Participants report feeling less lonely, more able to develop meaningful connections and friendships, greater confidence, more mental stimulation, and more feelings of happiness. **System:** Not directly assessed. Theoretical discussion supports prevention-based initiatives. Offers framework for considering individual characteristics and life experiences when developing community-based later-life social interventions. **Community:** Not directly assessed. Theoretical discussion suggests that opportunities to develop new connections, engage in new experiences, and become more socially engaged could inspire participants to make a positive change in their own communities. |
| **Programme name:** Not reported[26] **Location:** Unnamed local authority area, UK | **Aim:** Pilot was developed with an aim to discover sustainable and strategic approach to commissioning services that supported primary care objectives. The aim of the evaluation was to examine the changes in the healthcare use and changes in participants' wellbeing. **N1**=108 (consists of 42 opted to participate in a 'pump-priming' component; 62 opted out of 'pump-priming' portion) **N2**=280 participants from pilot only assessed for their wellbeing. **Age:** not specified. **Participants:** Referred by GP. | **Date:** Not specified. **Design and method:** Pre/post; surveys and interviews with 44 carers, commissioners, and providers **Measurement:** Not provided. | **Person:** Quotations evidence a reduction in loneliness and social isolation. **System:** *A&E:* 20% reduction in number of visits in 12-month post-participation period. Participants in pump-primed service experienced greater reduction in this service demand compared to those who opted out – an average difference of 0.22 attendances per participant. *Inpatient admissions:* 21% reduction in the number of admissions in 12-month post-participation period. Participants in pump-primed service experienced greater reduction in inpatient service demand compared to those who opted out – an average difference of 0.10 attendances per participant. *Outpatient appointments:* 21% reduction in the number of admissions in 12-month post-participation period. Participants in pump-primed service experienced greater reduction in outpatient service demand compared to those who opted out – an average difference of 0.31 attendances per participant. **Community:** Reports that unspecified number of participants became volunteers engaged in wider voluntary and community activity once pilot concluded. |
| **Programme name:** Doncaster Social Prescribing[25] **Location:** Doncaster, UK | **Aim:** To help with the effects of long-term physical and mental health conditions. **N**=1054 **Age:** More than half of the sample aged 60 and above, around one-quarter aged above 80, and the rest were ≤30. **Participants:** Referred by GP, community nurses, and pharmacists. | **Date:** August 2015 to June 2016 **Design and method:** 254 participants completed an intake questionnaire and either 3- or 6-month follow-up ($n$=215). Pre- and post-programme comparisons. **Measurement:** Adult Social Care and Public Health Outcome Framework (ASCOF/PHOF) is used to assess the levels of social isolation and loneliness (used interchangeably). | **Person:** Participants felt less isolated or alone post-participation, 'feeling like they had someone they could turn to'. No direct evidence or discussion on the loneliness measure that was administered. 19% increase in people having 'enough social contact'. **System:** *GP visits:* 68% report reduction in GP appointments; 15% report increase; 17% no change. *A&E:* 7% report reduction in attendance; 1% report increase; 92% no change. *Inpatient admissions:* 9% report reduction in stays; 3% increase; 90% no change. *Social care:* 3% report reduction in contacts with social worker; 97% report no change (3% of sample reported having a contact with social services 3 months prior to start of the programme). **Community:** A non-specified number of volunteers have found employment since being involved the project. 88% report greater awareness of the services and support available. |

*(Continued)*

Understanding loneliness: a systematic review of the impact of social prescribing initiatives on loneliness

**Table 1** (Continued)

**Systematic review of social prescribing (SP) programmes designed to implement loneliness across the globe, during 2000–2019 period**

| SP programme name Location | Aim of SP initiative Sample characteristics SP programme participant characteristics | Date of SP programme Evaluation research design, method Measures of loneliness | Impact |
|---|---|---|---|
| **Programme name:** Age UK's Cascade Training[27] **Location:** Across England, UK | **Aim:** To evaluate the effectiveness of the consultancy support, training, and training packs. To engage older people in activities to improve health and wellbeing, reduce the demand for health and social care, and help delivery organisations to train volunteers to engage hard-to-reach, older people. **N** = 5368 older people; 1382 volunteers; 75 delivery organisations **Age:** Not reported. **Participants:** Not reported. | **Date:** 2013 to 2015 **Design and method:** Interviews, surveys, focus groups, documentary analysis, follow-up with organisations' data collection teams. **Measurement:** Not reported. | **Person:** Service delivery staff report positive impact of SP on loneliness, recommended that training manuals include measures to address loneliness and social isolation. 95% of staff report ability to support more older people as a direct result of the programme. 58% of volunteers report positive impact on their own mental health and wellbeing. **System:** Positive impact on care home services, improving residents' quality of life. **Community:** Delivery organisations report expanding services and creating new activities due to programme. Programme brought together housing associations, sheltered housing and care home staff, healthcare providers, faith-based organisations, and local charities, which has a positive impact on community engagement. Participants report interest in helping others and sharing information, thereby expanding community capacity to respond to challenges. |
| **Programme name:** Social Prescribing Pilot[28] **Location:** Rotherham, UK | **Aim:** To assist GPs to meet the non-clinical needs of patients with complex long-term conditions. **N** = 559; $n$ = 451 (6 months post-referral) $n$ = 108 (12 months post-referral). **Age:** 87% aged 60–69; 75% aged 70–79; 47% aged 80–89; 10% aged ≥90. **Participants:** GP-led Integrated Case Management Teams referring patients through GPs to Community and Voluntary Services | **Date:** September 2012 to April 2014 **Design and method:** Case studies; interviews with participants (17) and with individuals delivering service (10). **Measurement:** none. | **Person:** Participants report feeling like they belong more to a community and that they have enjoyed more social contact, with researchers drawing conclusions on reduction in loneliness and isolation. **System:** *GP visits:* not reported. *A&E:* 38% of participants report a reduction in attendance 12 months post-referral, 25% report reduction 6 months post-referral. *Inpatient admissions:* 40% reduction 12 months post-referral, 24% 6 months post-referral. *Outpatient admissions:* 47% reduction 12 months post-referral, 30% 6 months post-referral. Impact greater for participants referred to other funded services (48% reduction in inpatient admissions, 43% in A&E visits, 12 months post-referral). **Community:** Small organisations without previous access to NHS funding were able to access it for the first time, which enhanced their provision and improved their sustainability. |
| **Programme name:** Wellspring Wellbeing Programme[24] **Location:** Bristol, UK | **Aim:** To connect, be active, take notice, keep learning, and give. **N** = 128 **Age:** 36–40 **Participants:** Referred by GP. | **Date:** May 2012 to April 2013 **Design and method:** Pre/post; interviews, and questionnaires. **Measurement:** Hawthorne Friendship Scale and Wellspring Wellbeing Questionnaire to assess loneliness and social isolation. | **Person:** Number of socially isolated (lonely) Friendship Scale measure decreased from 67.8% ($n$ = 59) to 33.4% ($n$ = 15) 3 months post-programme. **System:** *GP visits:* 60% of participants reduced GP attendance rates 12 months post-intervention, 26% no change, 14% increase. **Community:** Not assessed. |

NHS: National Health Service; GP: general practitioner; UCLA: University of California, Los Angeles; R-UCLA: Revised UCLA Loneliness Scale; ASCOF/PHOF: Adult Social Care and Public Health Outcome Framework.

admissions. Three studies report GP visit reduction ranging from 20% to 68%.[23–25] Two studies report an increase in GP and A&E visits following programme implementation.[23,25] One study reports a 3% reduction in the number of contacts participants had with a social worker following programme implementation.[25]

One study links measures of community belonging to system and individual health measures. It shows that being a member of a group (family, community, and volunteering group) positively predicts one's sense of community belonging, which in turn predicts reduced loneliness and reduced healthcare usage.[15] This study also reports that GPs view social prescribing as the best model to address loneliness and its negative impact on health.[15]

The nine studies diverge in how they assess impact on the community. One study reports greater participant awareness of available services and support.[25] Two report organisations expanding their service capacity.[27,28] One reports a greater sense of community connectedness.[15] Five studies do not address programme impact on the community.

## DISCUSSION

Nine studies in this systematic review gauge the effects of social prescribing on loneliness. Overall, social prescribing models designed to address loneliness have been largely viewed as helpful by both participants and service providers. Participants report feeling less lonely and more connected to others. Participants feel good about their relationship with a link worker and appreciate the service delivery model. GPs, volunteers, and delivery service members view social prescribing as a valid model to deliver comprehensive, people-centred, and integrated care, and some GPs view social prescribing as the best possible approach to successfully address loneliness. The positive impact appears as a large percentage of reductions in GP, A&E, and inpatient and outpatient services following programme implementation. However, the variability and paucity of evidence and lack of control group

comparisons make it difficult to draw conclusions regarding the impact of the social prescribing model on loneliness in particular, or on public health in general.

## Quality of impact evidence

Largely insufficient supporting evidence makes it difficult to quantify the impact of these programmes and interventions. The nine studies primarily rely on a pre/post-study design, lack control group comparisons, and neglect to consider the potential influence of other conditions on the outcomes of interest. Study participants are typically selected through GP referrals, a selection that is not systematic or explained. In addition, several studies do not provide a clear definition or a measure of loneliness and often use social isolation and loneliness interchangeably.

Despite programme participants reporting various health and social care needs, only one study examines social care outcomes.[25] Because these initiatives are designed to address loneliness, the lack of attention to social care usage should be troubling. Without knowing the extent to which social service usage is affected, it is impossible to know whether social prescribing is meeting individual needs, changing referral rates, or yielding cost savings. We therefore have little to learn from these studies regarding the relationship between loneliness and social care usage, and even less regarding how the social prescribing person-centred approach might affect that relationship.

Because social prescribing programmes are meant to deliver person-centred care, it is natural to be concerned with the impact of such programmes on individuals. Since person-centred care is intended to account for social relationships and overall community connectedness, however, the impact of social prescribing on communities should also be considered. It is therefore surprising how few of the existing studies examine the relationship between social prescribing programmes and the communities in which they operate.

The NHS England has proposed a more systematic approach to capture community impact, which they assert should be done by assessing the capacity of community groups to manage social prescribing referrals.[8,13] Given that community connectedness has also been linked to economic productivity, crime rates, civic behaviour, and empowerment, these are also community attributes wherein social prescribing programme impact could be measured.[35]

## Implications for research and/or practice

A significant contribution of the social prescribing approach to person-centred care is that it allows services users and providers to co-design a model of care tailored to individual needs. The relationship participants and social prescribers develop over time is a potentially useful way for individuals to become less lonely, reconnect with their community, and improve their physical and mental wellbeing. The social prescribing model has the capacity to shift the focus from curative care to health promotion and disease prevention, and to thereby reduce pressure on health and care services.

Yet, for social prescribing models to reach their full impact potential, the quality of evidence must improve. Studies should develop and file clear design protocols specifying pathways to impact and outcomes to be measured before programme implementation begins, accounting for potential intervening and contextual factors, and striving to achieve measures for comparative control groups. Employing good practices at both the implementation and the evaluation stages will benefit participants in person-centred care systems as well as researchers who engage in the comparative study of public health.

## CONCLUSION

Our study broadens current literature in two key respects. First, we are one of the first reviews to utilise NHS England and Drinkwater et al.'s guidelines[8,13] to

examine the evidence of social prescribing impact on the individual, community, and health/care system. Second, we are the only review to our knowledge to assess the evidence of social prescribing specifically as it addresses the 'loneliness epidemic'. Our findings show that individuals and organisations view social prescribing initatives as useful and necessary to tackle loneliness. However, given the wide variation in social prescribing interventions and how/whether their impact is investigated, it is difficult to draw definite conclusions regarding the effectiveness of these initiatives on individuals, communities, and health/care systems in general.

Similar to previous social prescribing research, our review highlights a fundamental need for consensus on what constitutes good impact evidence with respect to social prescribing.[8,14,16,22] We demonstrate a gap between social prescribing design and social prescribing evaluation and illuminate a lack of impact assessment in relation to social care. We also note a lack of consensus on what the impact of a person-centred approach such as social prescribing should be. Social prescribing is presented as a person-centred, holistic, integrated approach to addressing individual needs, meaning impact on the whole person, including social service usage, should be studied.

Futhermore, we note a need for methodological and conceptual clarity in relation to loneliness and related concepts such as social isolation. Being able to distinguish between these related phenomena is an essential first step for mapping out needs and services required to help lonely individuals, who are likely to feel alone even in a crowd. Improved

impact evidence is needed to know best how to reach lonely individuals and address complex health and social needs that emerge as a result of loneliness. In particular, we note the need to study links between an individual's level of loneliness and one's health and social care usage, as well as the impact of these individual attributes on one's wider community.

We are compelled to point out that the COVID-19 pandemic has changed both the way person-centred care such as social prescribing is and can be delivered, and the ways in which such programmes fit into the larger health picture. In particular, much social prescribing in the UK is now being delivered through digital tablet, telephone, and email, with link workers connecting participants to social outlets virtually, helping to coordinate prescription delivery, and providing ways for people to connect to their communities while observing pandemic-related restrictions.[36] Importantly, social prescribing has also reportedly eased much of the burden GPs expected to encounter during pandemic management, as GPs have been able to refer patients to social prescribing services based on telephone consultations, without causing anyone to physically attend a GP appointment.[37] It thus appears that social prescribing is filling the role it was originally intended to have. Systematic and rigorous evaluations to this effect are long overdue.

## LIMITATIONS
Our review includes the most recently available evidence on social prescribing. All of the studies were conducted from 2014 to 2019 in the UK. Although our

search was not limited geographically or to this date range, our findings suggest that the 'social prescribing' nomenclature is not utilised regularly outside the UK, Canada, and a few select places, and/or that social prescribing programmes are rarely assessed in terms of their impact on loneliness. Our work also demonstrates that the UK initiative to deliver person-centred care through social prescribing can only be based on evidence from the past 5 years.

## CONFLICT OF INTEREST

## FUNDING

## ETHICAL APPROVAL AND PATIENT CONSENT
The authors confirm that Ethical Committee approval was sought where necessary and is acknowledged where relevant within the text of this manuscript. They also confirm that guidelines on patient consent have been met and any details of informed consent obtained are indicated within the text of this manuscript.

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# Experiencing loneliness in parenthood: a scoping review

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## Abstract

**Aims:** Chronic loneliness is experienced by around a third of parents, but there is no comprehensive review into how, why and which parents experience loneliness. This scoping review aimed to provide insight into what is already known about parental loneliness and give directions for further applied and methodological research.

**Methods:** Searches for peer-reviewed articles were undertaken in six databases: PsycINFO, Medline, CINAHL, Embase, Web of Science and Scopus, during May 2019 to February 2020. We searched for English studies which examined loneliness experienced during parenthood, including studies that involved parents with children under 16 years and living at home and excluding studies on pregnancy, childbirth or postbirth hospital care.

**Results:** From 2566 studies retrieved, 133 were included for analysis. Most studies ($n = 80$) examined the experience of loneliness in specific groups of parents, for example, teenage parents, parents of a disabled child. Other studies examined theoretical issues ($n = 6$) or health and wellbeing impacts on parents ($n = 16$) and their offspring ($n = 17$). There were 14 intervention studies with parents that measured loneliness as an outcome. Insights indicate that parental loneliness may be different to loneliness experienced in other cohorts. There is evidence that parental loneliness has direct and intergenerational impacts on parent and child mental health. Some parents (e.g. with children with chronic illness or disability, immigrant or ethnic minority parents) also appear to be at increased risk of loneliness although evidence is not conclusive.

**Conclusion:** This work has identified key gaps with further international, comparative and conceptual research needed.

## INTRODUCTION

Loneliness is now widely understood as a painful subjective experience when the social connections a person has do not meet their interpersonal needs in respect to quality of or quantity of friendship or social contact.[1] Loneliness can be experienced in the presence of others and is different from objective measures of social connection, such as social isolation (the absence of social relationships) and social network size (number of social connections).[2]

Much of the existing loneliness literature has been conducted with undergraduate and elderly populations and shows that loneliness has associations with poor mental and physical health,[3,4] impacting on early mortality.[5] This focus in the literature means that interventions for loneliness are based on knowledge about the experience of loneliness limited to these restricted populations. It is therefore not known whether and how the experience of loneliness differs in other populations.

One such population where there has been little examination of the experience of loneliness is parents. Surveys have shown that around a third of parents in the UK report experiencing loneliness often or always[6] and research studies have shown similar prevalence, with 30% of parents experiencing high and persistent levels of loneliness over time.[7] However, despite such high numbers of parents being affected, there is currently no comprehensive synthesis of existing knowledge on the impacts and experiences of loneliness in this population and no reviews in this area. Given the mental and physical health impacts of loneliness in other populations,[3–5] it is

important to establish what is known about the health implications of loneliness in parenthood and whether there is evidence of intergenerational effects, impacting health and wellbeing of their offspring. Establishing what is known about the experiences of loneliness and which parents are at an increased risk of experiencing loneliness is important to underpin and direct appropriate strategies, support and future research.

### The current study
We aimed to address the current knowledge gap by undertaking a scoping review to map existing research evidence on parental loneliness, to establish what is already known about experiences and impacts of loneliness in parenthood, and which parents are at increased risk of experiencing loneliness. As we aimed to examine evidence from disparate or heterogeneous sources, rather than seeking only the best evidence to answer a specific question, a scoping review methodology was considered appropriate.[7] This methodology enables an examination and synthesis of the extent, range and nature of research on parental loneliness, to inform future systematic reviews, and to identify gaps in the literature.[8] In the current scoping review, we focused specifically on loneliness, rather than other measures of social connection (i.e. social support, social isolation), in order to establish what is known about parental loneliness and what research has been conducted in this specific area.

### METHOD
### Search strategy
We conducted some preliminary scoping searches during October 2018 to January 2019 which identified the diversity of study types and findings in this research area and informed our search strategy, review protocol and choice of review type. We used the scoping review stages outlined by Arksey and O'Malley[8] and Levac et al.[9] as a framework for the review. The following search terms were developed: (mother* or maternal or parent* or father* or paternal) AND (lonel* or 'perceived social isolat*'). The search strategy was

adapted to meet the truncation and Boolean operations of each database as appropriate (see Supplemental Information 1). Initial database searches were conducted in May 2019 and repeated in February 2020 in six bibliographic databases: PsycINFO, Medline, CINAHL, Embase, Web of Science and Scopus. Handsearching was also conducted, involving reference list searching of reviews and key papers and google scholar searches (first 200 hits for search terms).

### Inclusion and exclusion criteria
Included studies were those that examined the following: (1) prevalence and/or experiences of loneliness for mothers and fathers, (2) impacts of parental loneliness on mothers' and fathers' health and wellbeing and relationships with their child/ren, and (3) the impacts of parental loneliness on the child, including intergenerational transmission of loneliness. Inclusion and exclusion criteria are detailed in Table 1. We only included studies involving parents with children under 16 years old and living at home, thereby capturing insights with parents who had full parental accountabilities and responsibilities. All study types were included, but we excluded grey literature such as books and book chapters, dissertations, editorials, opinion pieces, commentaries, book or movie reviews, and erratum. There was no date restriction on searches, but only studies written in English were included. Systematic/literature reviews undertaken into parental loneliness were not included in our synthesis and mapping, but we reported on the numbers of relevant reviews identified in this area.

### Screening
Papers identified from database searches were downloaded to Endnote and duplicates removed. Title and abstract screening were conducted in Rayyan.[10] One reviewer independently screened titles and abstracts for eligibility, with a sample of 20% of the papers screened by the rest of the team to check for accuracy prior to independent screening. Papers selected for full-text screening were then

sourced and examined by one author independently, noting decision-making and reasons for exclusion. A sample of 50% of full-text papers were screened by at least one other reviewer prior to independent screening. Percentage of agreement for title and abstract screening was 93.2% and 88.73% for full-text screening. Agreement was made by consensus, with disagreements resolved through discussion. It is becoming widely accepted that double screening all papers in a systematic review is more appropriate to reduce articles missed due to human error.[11,12] However, where reviews are conducted by experienced reviewers missing studies have been shown to have negligible or no impact on meta-analysis findings.[13] Thus, double screening 20% of title and abstract (where there was higher agreement) and 50% of full-text screening was deemed appropriate for this scoping review following reconciliation exercises[11] because it was an experienced review team.

### Data extraction and synthesis
Data were extracted from all selected texts using a data extraction sheet developed by the authors, with at least 20% of data extracted charted by two authors independently.[14] Once sufficient agreement (>80%) was reached in the trial phase, the first author independently applied the tool to the remaining studies. During data extraction, review team meetings were held periodically to ensure accuracy of data extraction and to discuss any anomalies. Studies were assigned categories in discussion with the full review team. For each of these categories, we collated the key information and summaries of findings and then conducted a narrative synthesis. We did not conduct a meta-analysis because the purposes of the scoping review were to map and synthesis literature on a wide topic, involving disparate methodologies and measures and due to the lack of homogeneity such an analysis was not deemed appropriate.

### RESULTS
A total of 133 studies were included. The PRISMA diagram outlines the results of

Experiencing loneliness in parenthood: a scoping review

| Table 1 | | | |
|---|---|---|---|
| **Inclusion and exclusion criteria** | | | |
| | **Inclusion** | **Exclusion** | **Search terms** |
| Population | Mothers, fathers, (biological or step parents), children 16 years and under and living in the family home | Non-parental caregivers (e.g. grandparents), pregnant women, adoptive/foster parents<br><br>Mothers, fathers (biological or step parents with children over the age of 16 and/or not living in the family home) | mother* or maternal or parent* or father* or paternal |
| Exposure | Loneliness, perceived social isolation | Other mental health issues (e.g. depression) but do not explicitly refer to loneliness | Lonel* or 'perceived social isolat*' |
| Outcome | Experiences, attitudes and opinions of loneliness, prevalence of loneliness, impacts of parental loneliness on parent or child's health and wellbeing | Studies that examine loneliness in child only, pregnancy, birth experiences | |
| Study types | All research study design | Books and book chapters, editorials, erratum, opinion pieces, conference abstracts, reviews, dissertations, protocols | |
| Language | English only | Non-English | |

the systematic searches and screening (Figure 1), and Supplemental Table 2 (see Supplemental material) provides a description of the included studies. Only two review papers were identified, both narrative reviews focusing on loneliness within the family unit (i.e. in relation to marital or family conflict) and impacts on the child,[15,16] rather than focusing specifically on loneliness experienced in parenthood.

Most of the included studies were conducted in America ($n = 46$; 34.59%) and Canada ($n = 13$; 9.77%), with others conducted in Australia ($n = 9$; 6.77%), Finland ($n = 8$; 6.02%), Sweden ($n = 7$; 5.26%), Netherlands ($n = 7$; 5.26%), Israel ($n = 7$; 5.26%) and England ($n = 7$; 5.26%). The included studies had publication dates from 1974 to 2020, with around half ($n = 66$; 49.62%) published in the last 10 years and 30.83% ($n = 41$) in the last 5 years. All bar one of the included studies were published as peer-reviewed journal articles; with the remaining study published as a short report.[17] Most studies used a quantitative design ($n = 81$; 60.90%), with the rest using either a qualitative ($n = 48$; 36.09%) or

mixed methods ($n = 4$; 3.01%) design. Most studies examined loneliness in mothers only ($n = 90$; 67.67%), with others exploring relationships in both parents ($n = 39$; 29.32%). Only three studies examined loneliness in fathers only, with one exploring the experience of living with a partner with postnatal depression rather than fathers' loneliness during parenthood.[18] One study examined loneliness in transgender men[19] and the other in gender variant parents.[20] Most studies were cross-sectional ($n = 102$; 76.69%), with only 31 (23.31%) using a longitudinal design. More than half of the studies that used a quantitative or mixed design ($n = 78$, 91.76%) used a loneliness scale, such as the UCLA loneliness measure[21] ($n = 40$; 47.06%), but with varying versions (i.e. number of items). Eleven (12.94%) of the quantitative studies used single item measures of loneliness, but the questions and response items varied. In quantitative or mixed design studies where a loneliness scale was not used ($n = 6$, 4.51%), parents were asked to detail any problems they were experiencing via open text answers or preselected responses including

loneliness (i.e. frequency counts typically reported).

### Data analysis
The categories of the included studies are outlined in Figure 2 and described below.

### Theoretical aspects of loneliness in parenthood (n = 6)
Only six studies examined theoretical issues relating to loneliness in parenthood. Three of these studies examined changes in loneliness associated with becoming a parent. One used a longitudinal design and found loneliness to be stable across pregnancy, infant and toddler years in mothers and fathers.[22] Another study found no changes in women's wellbeing, but men who became fathers became lonelier, and this effect was strongest in married parents, indicating that issues in the marriage are most likely to be the cause of increased loneliness rather than the arrival of a child.[23] However, in contrast, a further study involving data from 17 nations found lower loneliness was associated with marital status.[24] This

Figure 1

**PRISMA flow diagram**
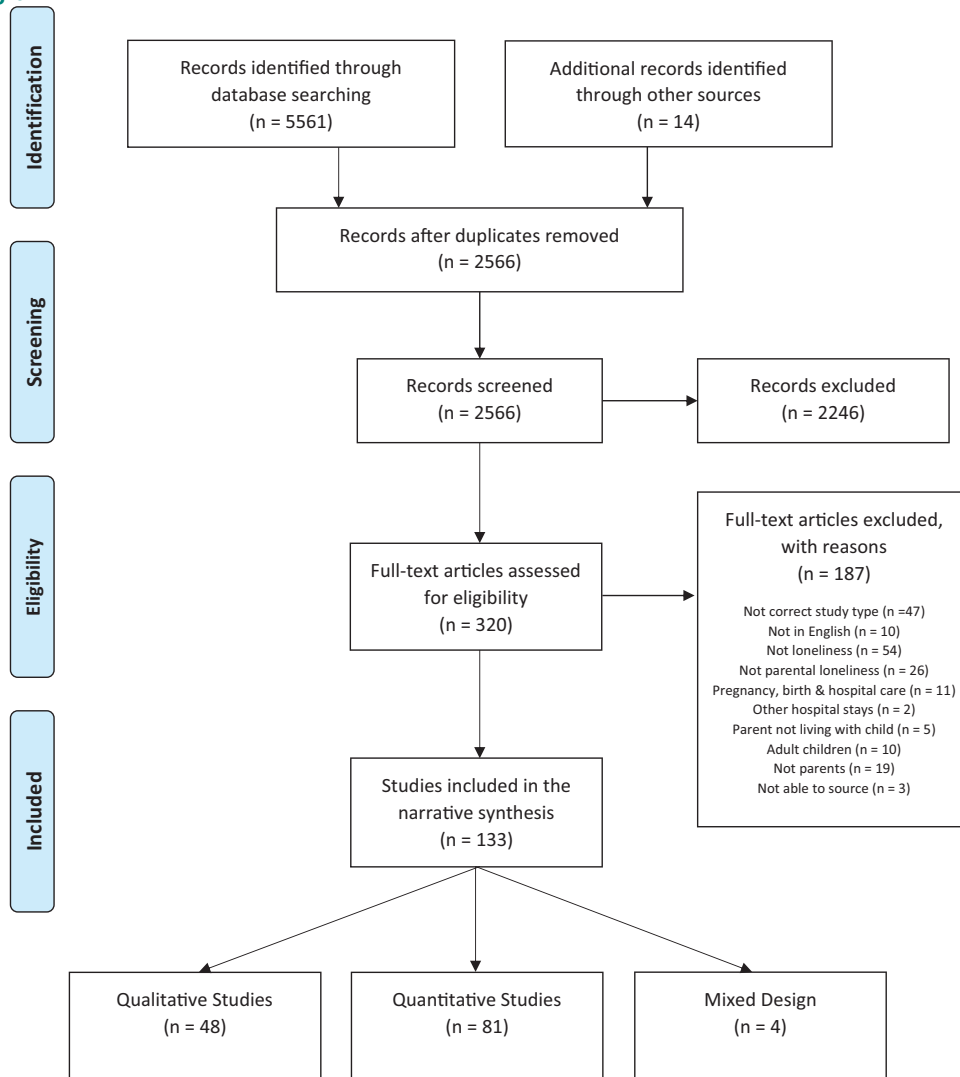


study found that loneliness related to parenting status in men, but not in women; being married and having children was protective of male loneliness but not female loneliness. But in most nations, however, having children had no impact on adult loneliness, indicating that there may be cultural differences in the prevalence of parental loneliness.

Another three studies examined conceptual aspects of loneliness and whether the experience differs in motherhood. These studies used a methodology whereby participants were given a loneliness questionnaire (designed by the authors) and differences in responses across sub-scales were

examined between mothers and women who were not parents. One study by Rokach[25] found that pregnant women and new mothers had lower levels of emotional distress, social inadequacy and alienation, interpersonal isolation, and self-alienation in relation to loneliness when compared to women in the general population. Another study by Rokach[26] found that pregnant women and new mothers were less likely to report experiencing loneliness that they felt was a result of their own personal inadequacies, such as mistrust or low self-esteem or social marginalisation (i.e. isolation and alienation) than women who were not parents. A further study, also by

Rokach,[27] examining coping with loneliness found that women who were not parents scored higher on reflection and acceptance, distancing and denial of loneliness than new parents and pregnant women. These studies indicate that causes of loneliness and strategies for coping may be different in parents than in other cohorts.

*Parents at increased risk of loneliness (n = 80)*
Most of the included studies examined loneliness in specific cohorts of parents, demonstrating that some parents may be at an increased risk of experiencing loneliness. However, few of these studies

| Table 2 | | | | | | |
|---|---|---|---|---|---|---|
| **Studies examining impacts of parental loneliness on child's mental health and social competence** | | | | | | |
| **Author** | **Year** | **Country** | **Child's age** | **Design** | **Loneliness measure** | **Findings** |
| Alvik[72] | 2014 | Norway | 6 months | Long | Single item measure | Mothers' loneliness at 30 weeks in pregnancy predicted child's low scores on problem-solving aspect of Ages and Stages Questionnaire at 6 months |
| Al-Yagon[73] | 2007 | Israel | 9–10 years | CS | ESL (mothers), LSDQ (child) | Mother's loneliness associated with child's internalising behaviours (not child's loneliness), but when maternal resources included in analysis, mothers' loneliness did not predict any child measures |
| Henwood and Solano[74] | 1994 | US | 6–7 years | CS | ABLS (parents), LSDQ (child) | Association between mothers and child's loneliness, but not between fathers and their child's loneliness |
| Junttila and Vauras[75] | 2009 | Finland | 10–11 years | Long | UCLA[21] (parents), PNDLS (child) | Mother's and father's loneliness predicted peer-evaluated cooperating skills of girls (but not boys), which predicted their social and emotional loneliness |
| Junttila et al.[76] | 2007 | Finland | 10–11 years | CS | UCLA (parents) PNDLS (child) | Association between high parental loneliness and low parenting self-efficacy. Parenting self-efficacy was related to children's loneliness |
| Luoma et al.[68] | 2019 | Finland | 16–17 years | Long | Single item, 'Do you feel lonely?' | Mother's prenatal loneliness predicted the child's internalising problems in adolescence |
| Salo et al.[77] | 2020 | Turkey | 10–11 years | Long | UCLA (parents), PNDLS (child) | Long-term loneliness of sons was predicted by their father's loneliness and daughters by mothers |
| Stednitz and Epkins[78] | 2006 | US | 9–12 years | CS | SELSA | Mother's loneliness predicted girls' self-reported social anxiety |
| Zafar Kausar[79] | 2015 | India | 13–17 years | CS | UCLA | Mothers' high loneliness predicted adolescent's lower social competence, hostility and fear of negative evaluation |

SELSA = Social and Emotional Scale for Adults[80]; SELSA-S = Social and Emotional Loneliness Scale for Adults[81]; PNDLS = Peer Network and Dyadic Loneliness Scale[82]; ABLS = Abbreviated Loneliness Scale[83]; ESL = Emotional and Social Loneliness[84]; LSDQ = Loneliness and Social Dissatisfaction Questionnaire.[85]

had comparison or control groups, which makes it difficult to draw conclusions about whether these parents have higher loneliness or are at increased risk of loneliness.

The largest number of studies in this category related to loneliness in parents with a child with a chronic health condition or disability (n = 25). Many of these studies (n = 10) used a qualitative design, and loneliness in this group of parents was experienced due to a sense of helplessness, lack of psychosocial resources, feeling burdened by the child's needs, lack of support from others or support available not meeting their needs, and changes in relationships with their partner.[28–31] There were only three studies that compared loneliness in parents with a child with a chronic illness or disability to a control group that did not have a child with an illness or disability. In two of three studies, loneliness was higher in the parents with a child with a chronic illness or disability than the control group,[32,33] but in one, there was no difference between the groups.[34] A further six studies used frequency counting or content analysis and the percentage of parents with children with chronic illness or disability reporting loneliness ranged from 19.1% to 70%.[35–40]

**Figure 2**

**Category mapping of studies on parental loneliness**
Other category includes sub-categories where there are two or less studies, which includes housing (*n* = 2), partner violence/abuse (*n* = 2), military wives (*n* = 1), specific work patterns (*n* = 2), parents with substance abuse (*n* = 2) and gender variant parents (*n* = 2).
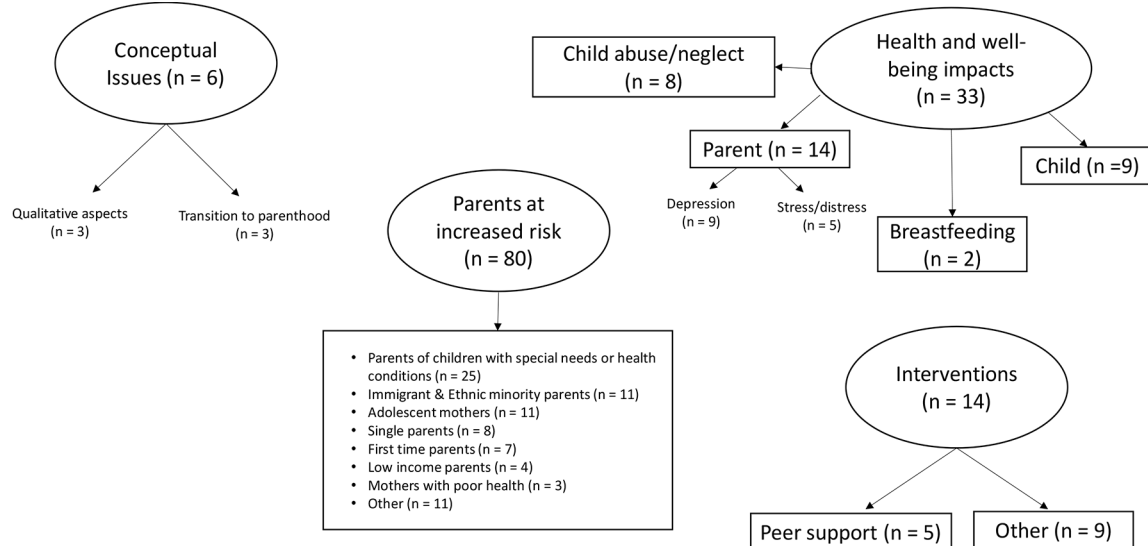
Another group of parents identified as experiencing loneliness were immigrant or ethnic minority parents (*n* = 11). All of these studies involved mothers only, there were no comparison studies, and most used a qualitative design. Loneliness was experienced in these mothers due to an absence of support from their mother or mother-in-law. These mothers expressed a sense that the culture in the country they were in was different to their home country in the availability of support from kin and community in caring for their baby, which made them feel isolated, particularly in the postpartum period.[41–44] Loneliness was particularly intensified when there were problems with their baby.[41] Discrimination and language barriers further isolated them.[45,46]

There were several studies (*n* = 11) that examined loneliness in adolescent mothers, but evidence was less homogeneous and revealed conflicting findings. Two comparison studies found loneliness was higher in adolescent mothers than mothers in other age groups,[47,48] but another found loneliness to be higher in non-parent adolescents than adolescents who were parents.[49] In another study, adolescent mothers were no more likely to be lonely than mothers

of other ages.[50] Qualitative studies revealed that loneliness in adolescent mothers was linked to losing friendships; adolescents' mothers did not experience loneliness if they were able to maintain existing friendships or make new ones.[51,52]

Single parents (*n* = 8) were also identified as experiencing loneliness, with studies showing between 8% and 21% of single parents reporting feeling lonely.[53–55] Loneliness was experienced by single parents because of the absence of a partner and a lack of companionship (particularly someone to share experiences with).[56] For some, the transition to single parenthood brought loneliness, but for others, it brought a sense of selfhood, freedom and liberation.[57]

There were some studies (*n* = 7) examining loneliness in first-time parents. Loneliness in this population was linked to finding parenthood unexpectedly difficult, feeling vulnerable as a parent, having fewer social interactions after becoming a parent and when first-time parents felt that the support received from their partner was superficial and/or that parenting responsibility rested with them.[58]

There were some studies that examined loneliness in low-income

parents (*n* = 4) and mothers with poor health (*n* = 3) but were not sufficient in number to synthesise. Further studies explored loneliness in parents in relation to housing (e.g. living in a flat or sheltered accommodation; *n* = 2), partner violence/abuse (*n* = 2), returning to work after parental leave (*n* = 2), substance abuse (*n* = 2), being a gender variant parent (*n* = 2) or military wife (*n* = 1).

*Impacts of loneliness on health and well-being (n = 33)*

*Impacts on parent health and wellbeing (n = 14).* Studies that have examined the impacts of loneliness on parent health and wellbeing have only measured stress/distress and depression outcomes. Five studies examined relationships between parenting stress/distress and loneliness. Two of these studies used a correlational design and show cross-sectional associations between loneliness and parenting stress and distress.[59,60] In a further cross-sectional study, mothers of different age children were surveyed and loneliness was found to be highest in preschool and middle school years and although the study did not examine an association with stress directly, stress followed a similar pattern of change across time as

loneliness.[61] In another qualitative study, parents who were experiencing burnout were recruited to explore their lived accounts of loneliness.[62] That study found loneliness was associated with burnout through a sense of feeling strange and disconnected due to feelings of exhaustion. A further study[63] examined the reasons for referral to parenting support services (i.e. demonstrating parental distress) and found that loneliness and low emotional wellbeing were the most common reasons for referral (38%). Findings here are limited because all the studies are cross-sectional so the direction of effect is not clear, it could be that parenting stress leads to loneliness or feeling lonely as a parent increases a parent's stress/distress.

A further nine studies examined relationships between loneliness and depression in parents. Two qualitative studies with parents with postnatal depression found loneliness to be reported,[64,65] with loneliness being due to discomfort with others and not feeling understood.[65] In two cross-sectional studies comparing groups of mothers with depression symptoms or postnatal depression with those who were not depressed, we found that loneliness was more frequent or higher in mothers with depression.[66,67] In one longitudinal study, loneliness predicted postnatal depression[68] and in another loneliness was predictive of chronic depression in mothers.[69] In a further longitudinal study, depression was higher in both mothers and fathers experiencing prolonged loneliness.[70] However, in another study that included both mothers and fathers, loneliness was associated with depression, but marital dissatisfaction was a stronger predictor of depression than loneliness in mothers.[71] A further study with fathers of children whose mothers have postnatal depression found that fathers developed loneliness as a result of a sense of not knowing whether their supportive efforts were working.[18]

*Impacts on child's health and wellbeing (n = 9).* Studies examining the impact of parental loneliness on child's health and wellbeing are displayed in Table 2. Five of those studies used a

cross-sectional design (i.e. measuring psychosocial variables in parent and child at the same time point), and the rest (n = 4) used a longitudinal design (typically measuring parent's loneliness at one time point and child's at another time point or series of timepoints). All nine studies used a loneliness measure, but these varied greatly. In four studies, impacts of fathers and mothers' loneliness on their offspring were examined, but in five, only the impact of the mothers' loneliness was examined. Findings across the studies show that loneliness in parents impacts child's outcomes, but there are gender-specific effects. Mothers' loneliness was associated with her child's poorer problem-solving skills,[72] internalising problems,[73,86] social competence, hostility and fear of negative evaluation[79] and social anxiety (but in girls only).[78] Mothers and fathers' loneliness impacted on peer-evaluated cooperating skills in girls.[75] Mothers' loneliness was associated with child's loneliness, but not fathers' loneliness in one cross-sectional study,[74] whereas in another study, father's loneliness was predictive of son's persisting loneliness and mother's loneliness was predictive of daughters.[77] Only one study examined potential mediators of the relationship between parent's and child's loneliness finding an association between high parental loneliness and low parenting self-efficacy which was associated with children's loneliness.[76]

*Loneliness and breastfeeding (n = 2)*
There were two studies involving interviews with mothers which demonstrated that loneliness influences a women's decision to stop breastfeeding. One qualitative study found that postpartum loneliness and sadness were due to mothers feeling that no one understood their difficulties with breastfeeding and that they had no one to support them.[87] The other study used a lifeworld hermeneutical approach and found that women sought social connections as a means to mitigate loneliness aligned with their needs to either continue or stop breastfeeding.[88] For women who wanted to or who had stopped breastfeeding, loneliness led to

social withdrawal because of a fear of being detected as underperforming, useless and different; these women sought out others who had stopped breastfeeding to reinforce their choice. For others, to escape loneliness, they sought out others who could provide support to continue breastfeeding and their loneliness reduced as a result of these social connections and a sense of belonging.

*Child abuse/neglect (n = 8)*
There were also some studies that examined relationships between loneliness and child abuse/neglect but these were quite dated, with publication dates ranging from 1980 to 2011 and all but one study conducted more than 10 years ago. In addition, all studies in this category were conducted in America thus lacking a cross-cultural comparison. All but one study examined loneliness in mothers who were in families identified as neglectful or at risk of child abuse, with the others examining mothers and fathers where parents are identified as abusers. All the studies in this category used a quantitative design and measured loneliness using a loneliness scale. Five used versions of the UCLA scale,[21] two used the Loneliness subscale of the Child Abuse Potential Inventory (CAPI)[89] and one used Emotional Social Loneliness and Isolation Scale.[90]

The relationship between loneliness and child abuse/neglect has been examined in these studies in two ways: (1) whether there is an association between loneliness and child abuse/neglect and/or whether loneliness predicts child abuse/neglect (n = 3) and (2) whether mothers in families identified as neglectful have higher loneliness (n = 5). The studies in this category were all cross-sectional, so although they do use regression models to look at predictors of abuse/neglect, the studies can only show an influence/association. In two out of the three association studies, loneliness was not associated with parental use of punishment[91] and did not predict child neglect.[92] Whereas in the other study, loneliness predicted child abuse potential in mothers with disabled children.[93] Where level of loneliness was compared to a control

group, loneliness was higher in neglectful parents,[94] abusing parents[95] and mothers in families identified as neglectful.[96,97] In families that were identified as at risk of child abuse, loneliness was higher in mothers where fathers were not involved than mothers with a resident father.[98]

### Intervention studies (n = 14)

The review identified 14 intervention studies with parents that measured loneliness as an outcome (see Table 3). Most of these intervention studies were conducted with new parents, with some specifically conducted with mothers who had postnatal depression or who were at risk of child abuse/neglect. None of the interventions were specifically designed to reduce loneliness, but one was designed to target social isolation in parents with children with cerebral palsy[100] and another to increase social support in parents at risk of child maltreatment.[99] Most studies used a quantitative design, with one study using a mixed design and another a qualitative design. All but one intervention study measured loneliness using UCLA,[21] but the version used varied across the studies. Only three of the studies were noted as randomised trials.[101–103] In relation to effectiveness, only 6 of the 14 intervention studies showed reductions in loneliness. Interventions that reduced or showed promise of reducing loneliness involved home visiting peer support, tele-health involving e-meeting forum with HCP and peers, universally provided child development parenting programme, interpersonal skills training and short-term cognitive therapy.

## DISCUSSION

The aim of this scoping review was to map existing literature to establish what is already known about parental loneliness. Although there is a scarcity of studies that have specifically focussed on understanding loneliness in parenthood, there are a large number of studies that have included loneliness as an outcome or have examined the lived experience of parents in specific populations (e.g. adolescent parents) where loneliness has been identified.

Studies show that loneliness during parenthood is stable and may be different to loneliness experienced in other cohorts.[22,25–27] However, there was a lack of conceptual studies to identify the key underlying mechanisms associated with parental loneliness, and no prospective studies that commenced in the preconception period to help understand whether and how loneliness changes over parenthood. It is plausible to assume that while parenthood may help to mitigate loneliness as there is a dependent infant to care for, there is evidence to suggest that loneliness may be exacerbated by becoming a parent. Other transitory phases in life, where changes are made in social connections and friendships, are also associated with increased loneliness, such as the transition to university[104] or retirement.[105]

Wider research indicates, and is reflected in some of the included studies in the scoping review,[61,63,86] that loneliness is associated with increased risks of depression, anxiety and increased stress.[3,106] Our findings also support those from other cohorts in terms of reciprocal relationships between loneliness and depression,[107] with loneliness in parents found to be predictive of depression[86] and depression predictive of loneliness.[70] However, the direction of this effect has not yet been examined in this population, and further research (i.e. using cross-lagged designs where reciprocal relationships between loneliness and depression over time can be examined enabling direction of effect to be explored) is needed. While loneliness has been associated with poor physical health in other cohorts,[4] we found no studies that examined the association between loneliness in parents and physical health outcomes; thereby identifying a further gap where more research is needed.

Parental loneliness, similar to other evidence of the negative impacts of poor parental mental health,[108] was associated with adverse repercussions on child's health and wellbeing, in relation to breastfeeding cessation, mental health and social competence. The findings from the scoping review also indicate the potential for some

gender-specific effects of intergenerational transmission of loneliness and social competence from parent to child. This is similar to other research where gender-specific effects have been found for the intergenerational transmission of internalising behaviours (depression and irritability)[109] and depression,[110] but because there are few studies, this warrants further investigation.

The findings that parental loneliness was also associated with child abuse and neglect need to be treated with caution as the evidence base only includes cross-sectional studies and other factors had not been accounted for (e.g. social isolation, being in an abusive relationship or poor mental health). Furthermore, while it is perhaps not surprising that parents who face additional challenges (e.g. who have children with chronic illness or disability, immigrant or ethnic minority parent, single parents) are at increased risk of loneliness, the evidence is not conclusive due to a lack of comparison studies and further research is needed. It may also prove beneficial to consider factors that can help mitigate adversities, rather than assumptions that all outcomes associated with loneliness will be negative, and to identify more resilience-based factors that can help to combat loneliness, such as personal or community assets.[111,112] Further research is also needed with fathers and wider partners to assess differences between the parents, and international studies to explore cross-national and cross-cultural differences.

While interventions included in this scoping review have not generally been designed to reduce loneliness, this work has identified some key mechanisms of effectiveness to consider within future intervention designs. These include developing communication skills and forming social connections via engaging women in peer support. This aligns with wider literature that reveals that peer support provides feelings of validation, normalisation and reassurance,[113] and helps to reduce negative emotional impacts (such as social isolation) through building social connections and networks.[114]

While it will be important to conduct further systematic reviews and

## Table 3

**Intervention studies measuring loneliness as an outcome**

| Author | Year | Sample | Intervention | Country | Data collection waves | Findings |
|---|---|---|---|---|---|---|
| *Studies showing reductions in loneliness* | | | | | | |
| Chan | 2005 | New mothers (locality with high incidence of child abuse) | Home visiting peer support | China | Before receiving service and 1 year later | Loneliness reduced in the intervention group but not in the control group |
| Nystrom | 2006 | New mothers | Telehealth, involving e-meeting forum with Health Care Professional | Sweden | | Mothers reported having good social networks but spent most of the day alone with their children; meeting others in a similar situation made them feel less alone and friends were made in the group |
| Richey et al.[99] | 1991 | Mothers at risk for child maltreatment | Interpersonal skills training | US | Pre- and post-training sessions | Slight decrease in loneliness was reported pre- and post-training (no statistical analysis conducted – only 6 mothers) |
| Skar | 2015 | New mothers | Child development parenting programme | Norway | Immediately after, 6–12 months after | Greater reduction in loneliness in the intervention group than the control group |
| Sorenson | 2003 | New mothers (traumatic childbirth provider interactions) | Short-term cognitive group therapy | US | Pre- and postintervention | Loneliness was reduced pre- to postintervention |
| Zare et al.[100] | 2017 | Mothers with children with CP | Self-management empowerment intervention | Iran | Pre- and postintervention | Intervention shows promise of reducing loneliness (independent *t*-test used rather than ANOVA so difficult to be conclusive) |
| *Studies not showing reductions in loneliness* | | | | | | |
| Dennis et al.[101] | 2009 | New mothers (high postnatal depression) | Telephone peer support | Canada | Baseline, 12 weeks and 24 weeks | No difference in loneliness between intervention group and control group |
| Dennis[102] | 2003 | New mothers (high depression) | Peer support by lay volunteers | Canada | Baseline and 8 weeks later | No difference in loneliness between the control and intervention group |
| Hudson | 2012 | New mothers | Online discussion forum with Health Care Professional | US | 1 week, 6 weeks, 3 months and 6 months following birth | No differences across the intervention period in loneliness or differences between the intervention and control group |
| Razani et al.[103] | 2018 | Low-income parents | Park prescription | US | Baseline, 1 month and 3 months later | Reduction in loneliness in both groups from baseline and 3 months later, but no differences between the groups |
| Shorey | 2019 | New mothers at risk of postnatal depression | Technology-based peer-support | Singapore | 1 month and 3 months postpartum | No differences in loneliness scores and no difference in change in loneliness scores |
| Tuominen | 2016 | New mothers | Relational continuity of care | Finland | | Relational continuity of care associated with higher levels of mothers' emotional loneliness |
| White | 1987 | Single parents | Peer support group | Australia | | The old peer support and never had peer support groups were very similar on loneliness and new group reported higher levels of loneliness |
| Yarnoz | 2008 | Divorced parents | Attachment-based intervention | Spain | Pre- and postintervention | No differences in loneliness pre- and postintervention |

meta-syntheses in this area, particularly in relation to conceptual aspects and potential mechanisms of parental loneliness, this scope of the literature highlights some potential common factors of experiencing loneliness in parenthood. The evidence appears to point to parents being at increased risk of loneliness if they have few or no peers in a similar situation with whom they can share their particular circumstances, have negative thoughts towards themselves, or have reduced social support or ability to seek extra support. These findings overlap with those in the wider literature with other cohorts where loneliness has been associated with a lack of belonging, internalising attributional style, low self-worth and lacking emotional support.[115,116] Although, there is also evidence that there may be some differences in the causes and experiences of loneliness in parents[25–27] that warrant further investigation to ensure we have a nuanced understanding of those who are at risk of experiencing loneliness and how they experience loneliness overtime, and to help inform appropriate and relevant interventions.

### Strengths and limitations of the review

The strengths of this review are its broad and comprehensive approach that meant that a wide range of relevant studies were included. We also only focused on studies that measured loneliness rather than include other related social connection measures such as social network size and social support. Further reviews could examine specific aspects of parental loneliness and social connection more generally to help understand the underpinning mechanisms that explain loneliness in parenthood and to inform future interventions. The end date of the review period was restricted to February 2020, to prevent COVID-related studies being included. While loneliness is undoubtedly a key feature of the current pandemic, our aim was to elicit insights into parental loneliness per se, rather than loneliness created via enforced isolation and restricted social connections. As this is a scoping review, we did not assess for quality, which means that studies of low quality may have been included. As we intended to map and synthesis extant literature on a wide topic area using disparate methods, a meta-analysis was not deemed appropriate, which means that the review involves a narrative synthesis of the findings focussed on general themes and patterns in the data. The review does however provide the first, comprehensive understanding of the work undertaken in this area and offers insights to direct future research, highlighting gaps in the existing literature.

### CONCLUSION

This scoping review aimed to address a knowledge gap to elicit what is known about parental loneliness. One hundred thirty-one studies were included which examined conceptual issues, loneliness in families with different sociodemographic profiles, health and wellbeing impacts on parents and their offspring, and intervention studies that included loneliness as an outcome, rather than as a direct focus. Findings highlight that parental loneliness has direct and indirect impacts on parent and child health; that parents who face more complex issues, such as having a child with a chronic illness or disability, appear more likely to be negatively affected by loneliness; and that types of support that seem to be effective in alleviating loneliness include communication training and peer support. Overall, this work has highlighted wide heterogeneity and key evidence gaps, with further international, comparative and conceptual research needed. As loneliness is a pervasive and negative psychosocial condition with wide, and intergenerational, impacts, targeted efforts to understand its key mechanisms and to inform suitable support strategies are essential.

### CONFLICT OF INTEREST

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### SUPPLEMENTAL MATERIAL

Supplemental material for this article is available online.

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Short communication

# Loneliness during COVID-19 and its association with eating habits and 24-hour movement behaviours in a sample of Canadian adolescents

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## ARTICLE INFO

## ABSTRACT

Loneliness, a feeling of distress, has aggravated due to the COVID-19 pandemic lockdowns and reduced social interactions. The objective of this study was to explore whether increased loneliness due to the COVID-19 pandemic was associated with various health behaviours in adolescence, a critical period for the development of lasting lifestyle habits. We used self-reported data from 40,521 Canadian adolescents aged 12–19 years (collected between November 2020 and June 2021) for this cross-sectional study. Logistic regression was used to predict the odds of skipping breakfast and not meeting movement behaviour guidelines [moderate-to-vigorous physical activity ($\geq$60 min/day), recreational screen time ($\leq$2 h/day), sleep duration ($\geq$8 h/day)] among adolescents with increased loneliness due to the COVID-19 pandemic. We found higher odds of skipping breakfast [boys: OR 1.40 (95% CI: 1.32, 1.49), girls: OR 1.62 (95% CI: 1.53, 1.71)], exceeding screen time guidelines [boys: OR 1.43 (95% CI: 1.24, 1.66), girls: OR 1.72 (95% CI: 1.54, 1.92)], and insufficient sleep duration [boys: OR 1.38 (95% CI: 1.28, 1.48), girls: OR 1.36 (95% CI: 1.27, 1.45)] in adolescents with increased loneliness (versus decreased/stayed the same loneliness group). However, we found clinically insignificant results with moderate-to-vigorous physical activity. Future longitudinal studies in adolescents are needed to confirm the directionality of these associations. Recovery efforts are needed to support adolescent social health and establish healthy behavioural habits across the lifespan.

## 1. Introduction

Loneliness is defined as a feeling of distress that can arise from individuals' perceived inadequacy of the quantity and quality of their social relationships (e.g., lack of support, low-quality friendships, having limited social contacts) (Perlman and Peplau, 1981). Loneliness is a significant risk factor for developing various physical and mental health conditions (Christiansen et al., 2021), and evidence indicates a gradual increase in levels of loneliness across adolescence and young adulthood (MacDonald et al., 2022).

Adolescence is a period of significant transition and is associated with increased vulnerability to risk-taking and impulsive behaviour, initiation of intimate relationships, greater autonomy from parental/

family figures, figuring out their identity, and heightened importance of peer acceptance (Spear and Kulbok, 2004). Public health measures used to tackle the ongoing COVID-19 pandemic have affected the daily routines of adolescents. Decreased social interactions with peers and conflicts with parents/guardians/family members may lead to reduced communication and emotional support, enhancing feelings of loneliness in adolescents (Heinrich and Gullone, 2006).

Loneliness is a recognized public health concern and has exacerbated during the COVID-19 pandemic due to the lockdowns and decreased social interactions (Ernst et al., 2022). This may have resulted in emotional distress and disordered eating in adolescents; however, no studies have examined the association between loneliness and breakfast skipping. Skipping breakfast is an unhealthy behaviour pattern that can

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transition from adolescence to adulthood with detrimental impacts on health (Smith et al., 2010). Many adolescents skip breakfast despite the benefits of regular breakfast consumption. In a nationally representative sample of Canadian adolescents, nearly 48.5% skipped breakfast at least once a week (Lazzeri et al., 2016). Loneliness, when included as a co-variate, has been associated with lower odds of breakfast consumption in adolescents (Mathew et al., 2022).

Additionally, various lockdown measures imposed during the COVID-19 pandemic to limit the spread of the virus may have negatively impacted 24-hour movement behaviours. The 24-hour movement guidelines suggest $\geq$ 60 min/day of moderate-to-vigorous physical activity [MVPA], $\leq$2 h/day of recreational screen time [ST], and 8–10 h/night of sleep for adolescents (Tremblay et al., 2016). A scoping review exploring the impact of COVID-19 on movement behaviours in children and adolescents reported a consistent decline in MVPA, significant increases in ST and sleep duration, and a decrease in sleep quality (Paterson et al., 2021).

Two cross-sectional studies in adolescents found that youth who were less physically active had higher loneliness (Page et al., 2003; Pinto et al., 2021). However, in another study of adolescents aged 14–19 years, being physically inactive was not associated with feelings of loneliness (dos Santos et al., 2015). Loneliness in adolescents assessed prior to the COVID-19 pandemic has been associated with increased ST in cross-sectional analyses (Lawrence et al., 2022; MacDonald et al., 2022); however, this relationship was not supported when analysed longitudinally (MacDonald et al., 2022). Regarding loneliness and sleep duration, higher levels of loneliness were associated with inadequate sleep at night in adolescents (Eccles et al., 2020a). Finally, in a longitudinal study that examined different trajectories of loneliness in children and adolescents, no significant differences in sleep duration amongst the various loneliness groups were found (Eccles et al., 2020b). However, these studies analysed data collected prior to the COVID-19 pandemic.

With limited and contradicting pre-pandemic evidence in adolescents, the objective of the present study was to examine the association between loneliness levels due to the COVID-19 pandemic with eating habits and 24-hour movement behaviours. We hypothesized that increased loneliness in adolescents due to COVID-19 would result in skipping breakfast and lower likelihood of meeting the MVPA, screen time and sleep duration recommendations. As loneliness is known to steadily increase across the lifespan with chronic detrimental health implications, our study is the first to examine loneliness levels specifically due to the COVID-19 pandemic and its association with breakfast skipping and adherence to the 24-hour movement guidelines amongst a sample of Canadian adolescents. This information is important to inform future intervention strategies and public health policies.

## 2. Materials and methods

We used data from the 2020-21 wave of the COMPASS study (Cannabis, Obesity, Mental health, Physical activity, Alcohol, Smoking, and Sedentary behaviour), an ongoing prospective study, collecting annual health survey data from students in grades 9–12 (ages 12–19 years) attending participating secondary schools in Ontario, Alberta, British Columbia, and Quebec (secondary I-V), Canada (Leatherdale et al., 2014). All study protocols have been approved by the Human Research Ethics Board at the University of Waterloo (ORE #30118) and appropriate school board committees. Detailed information regarding the COMPASS design and methodology is available on the study website (https://uwaterloo.ca/compass-system/) and in print (Leatherdale et al., 2014). This paper used a cross-sectional study design and post-pandemic onset student data collected from November 2020 – June 2021.

We used adolescents' self-reported loneliness levels (i.e., increased, decreased, or stayed the same) due to COVID-19 as our independent variable. We pooled "decreased" (n = 2,225) and "stayed the same" (n =

16,687) loneliness groups due to the small sample size in the "decreased only" group. Adolescents self-reported eating habits and 24-hour movement behaviours were used as outcomes. Variables were dichotomized (yes/no) for meeting the MVPA ($\geq$60 min/day), recreational ST ($\leq$2h/day) and sleep duration ($\geq$8h/night) guideline recommendations. For eating habits, adolescents were asked to report if they had breakfast everyday (yes/no). For MVPA, adolescents were asked to report the number of minutes they spent doing moderate (i.e., low intensity workouts such as walking, biking to school and recreational swimming) and hard physical activity (i.e., jogging, team sports, fast dancing, jump-rope, or other activities that increased heart rate) during the past week. Regarding ST, adolescents were asked to report the number of hours per day they spent doing the following activities in the past week: a) watching/streaming TV shows or movies; b) playing video games/computer games; c) surfing the internet; and d) texting, messaging, and emailing. For sleep duration, adolescents were asked to report at what time they turned out the lights and went to sleep during the past week on weekdays and weekends, and at what time they woke up on weekdays and weekends. Additional information regarding the calculation of total MVPA, ST and sleep duration can be found in the notes under Table 1.

Covariates included age (years), gender (boy/girl/other), race/ethnicity (White/Non-White), province (Quebec, Ontario, British Columbia, Alberta), body weight category (body mass index [BMI] categories of underweight, normal weight, overweight, and obesity using the World Health Organization growth curves), learning mode (in-person, online, hybrid/blended), and socioeconomic status (SES) category (a composite of six items; see in notes under Table 1). For gender, as we did not have a sufficient sample size (n = 1,334) in the "other" category, they were not included in our analysis.

We used chi-squared tests to estimate the bivariate associations for categorical variables and t-tests for continuous variables. We conducted multivariable logistic regression models for all the outcomes. We tested for interactions between gender and loneliness in our models. We also tested for changes in odds ratios with age. We conducted a sensitivity analysis by removing the "decreased" loneliness group. Data analyses were performed using SAS version 9.4. We followed STROBE guidelines (Strengthening the Reporting of Observational Studies in Epidemiology) for cross-sectional studies (https://www.equator-network.org/reporting-guidelines/strobe/).

## 3. Results

We had a total of 40,521 adolescents (18,294 boys and 22,227 girls) with data available for loneliness due to COVID-19 (Table 1). In the group of adolescents with increased loneliness, we found a higher prevalence of skipping breakfast and lower prevalence of meeting the guidelines for MVPA, ST and sleep duration in comparison to those in the decreased/stayed the same loneliness group. For girls and boys in the increased loneliness group, we found a higher prevalence of overweight/obesity, online learning, and lower SES compared to girls and boys in the decreased/stayed the same loneliness group.

As the interaction term between loneliness and gender was significant for breakfast skipping and meeting screen time guidelines, we stratified our logistic regression results by gender for all the outcomes. As ten observations were missing for age, we were left with a total sample size of 40,511 (18,290 boys and 22,221 girls) in our logistic regression models. After adjusting for covariates, adolescents with increased loneliness during the COVID-19 pandemic were more likely to skip breakfast [boys: OR 1.40 (95% CI: 1.32, 1.49) and girls: OR 1.62 (95% CI: 1.53, 1.71)], exceed ST guidelines [boys: OR 1.43 (95% CI: 1.24, 1.66) and girls: OR 1.72 (95% CI: 1.54, 1.92)], and report insufficient sleep duration [boys: OR 1.38 (95% CI: 1.28, 1.48) and girls: OR 1.36 (95% CI: 1.27, 1.45)] compared to those with decreased/stayed the same loneliness (Table 2). The odds of not meeting MVPA guidelines was significantly associated with increased loneliness for boys [OR 1.07 (95% CI: 1.00,1.14), however, these results lack clinical significance. In

**Table 1**
Prevalence of eating habits, 24-hour movement behaviours, and covariates among Canadian adolescents by loneliness levels due to the COVID-19 pandemic, COMPASS study data 2020–21 (n = 40,521).

| Characteristics | Boys (n=18,294) | | Girls (n=22,227) | |
|---|---|---|---|---|
| | Loneliness increased | Loneliness decreased/ stayed the same | Loneliness increased | Loneliness decreased/ stayed the same |
| *Covariates* | | | | |
| Age, years (mean, SD) * | 15.1 (1.47) | 14.7 (1.56) | 15.0 (1.48) | 14.8 (1.56) |
| SES category (%) * | | | | |
| High SES | 64.7 | 67.5 | 62.8 | 67.3 |
| Low SES | 35.3 | 32.5 | 37.2 | 32.7 |
| Province (%) * | | | | |
| Quebec | 60.4 | 63.9 | 61.3 | 62.0 |
| Ontario | 26.8 | 23.1 | 26.6 | 23.1 |
| British Columbia | 8.10 | 8.80 | 8.03 | 10.7 |
| Alberta | 4.66 | 4.20 | 4.01 | 4.24 |
| Ethnicity (%) * | | | | |
| White | 78.1 | 77.7 | 79.7 | 74.4 |
| Non-white | 21.9 | 22.3 | 20.3 | 25.6 |
| Learning situation (%) * | | | | |
| Online | 49.9 | 44.7 | 51.5 | 44.8 |
| In-person | 27.8 | 33.9 | 26.0 | 34.6 |
| Hybrid | 22.3 | 21.5 | 22.5 | 20.6 |
| Body weight categories (%) * | | | | |
| Underweight/ normal weight | 75.3 | 75.5 | 83.5 | 84.2 |
| Overweight/ obesity | 24.7 | 24.5 | 16.5 | 15.8 |
| | | | | |
| *Outcomes* | | | | |
| Eating habits | | | | |
| Ate breakfast everyday (%) * | | | | |
| Yes | 55.9 | 64.7 | 42.8 | 54.8 |
| No | 44.1 | 35.3 | 57.2 | 45.2 |
| 24-hour movement behaviours | | | | |
| ≥60 minutes of MVPA per day (%) * | | | | |
| Yes | 66.0 | 68.4 | 52.9 | 54.9 |
| No | 34.0 | 31.6 | 47.1 | 45.1 |
| ≤2 hours of screen time per day (%) * | | | | |
| Yes | 3.60 | 5.40 | 5.0 | 8.8 |
| No | 96.4 | 94.6 | 95.0 | 91.2 |
| ≥8 hours of sleep per night (%) * | | | | |
| Yes | 70.0 | 77.1 | 72.4 | 77.6 |
| No | 30.0 | 22.9 | 27.6 | 22.4 |

Note: Data for 41,927 students were available for loneliness levels due to the COVID-19 pandemic and the outcome variables. We have presented data for 40,521 students (18,294 boys and 22,227 girls) and excluded those in the "other" category for gender due to a small size (accounts for 3% of the total sample). Data are presented as mean (SD) for continuous variables and as percentages (%) for categorical data.
Missing data for covariates are: age (0.07%), SES category (31.3%), gender (3.4%), ethnicity (0.3%), body weight category (43.4%) and learning situation (0.28%). Missing data for covariates were re-coded as an unknown category to retain all data points.
SES was evaluated by creating a sum SES score using six items: Income level (Less than median income level = 0, Greater than or equal to median income

level = 1); Environment (Rural = 0, Medium Urban = 1, Large Urban = 2); "In your house, do you have your own bedroom?" (1 = Yes, 0 = No); "Do you sometimes go to bed hungry because there is not enough money to buy food?" (1 = No, 0 = Yes); "Would you say that you and your family are more or less comfortable financially than the average student in your class?" (0 = Less comfortable, 1 = As comfortable, 2 = More comfortable); "How true are the following statements about COVID-19 for you right now? I am worried about my family being able to pay bills and expenses" (1 = Neutral/I do not know/Mostly false/False), 0 = True/Mostly True). Scores ranged from 0 to 9, with higher scores indicating higher SES. SES category was created using the median value for SES score (i.e., ≥7: High SES, <7: Low SES).
Time spent in moderate physical activity (e.g., walking, biking to school) and vigorous physical activity (e.g., jogging, team sports, fast dancing) were collected and combined to calculate total time spent in MVPA. The total was averaged to reflect the number of minutes spent doing MVPA per day.
Screen time was assessed by asking adolescents how much time they spend doing the following activities – a) Watching/Streaming TV or movies; b) Playing video games; c) Surfing the internet; and d) Texting, messaging, and emailing. Total screen time per day was calculated by adding responses from questions a to d.
Sleep duration was assessed by asking adolescents at what time they went to sleep and woke up during the past week. An average was calculated for number of hours for sleep duration per night.
*p < 0.01 for the comparison between increased loneliness and decreased/ stayed the same loneliness for both boys and girls.
Abbreviations: SD - standard deviation; SES - socioeconomic status; MVPA - moderate-to-vigorous physical activity.

**Table 2**
Logistic regression model results in adolescents reporting increased loneliness due to COVID-19 and its associations with eating habits and 24-hour movement behaviours.

| Outcomes | Boys (n = 18,290) | Girls (n = 22,221) |
|---|---|---|
| *Eating habits* | | |
| Ate breakfast daily | | |
| Yes | 1.00 (reference) | 1.00 (reference) |
| No | 1.40 (1.32, 1.49) | 1.62 (1.53, 1.71) |
| | | |
| *24-hour movement behaviours* | | |
| MVPA (≥60 mins per day) | | |
| Yes | 1.00 (reference) | 1.00 (reference) |
| No | 1.07 (1.00, 1.14) | 1.06 (0.99, 1.12) |
| | | |
| Screen time (≤2 h per day) | | |
| Yes | 1.00 (reference) | 1.00 (reference) |
| No | 1.43 (1.24, 1.66) | 1.72 (1.54, 1.92) |
| | | |
| Sleep (≥8 h per night) | | |
| Yes | 1.00 (reference) | 1.00 (reference) |
| No | 1.38 (1.28, 1.48) | 1.36 (1.27, 1.45) |

Abbreviations: MVPA – Moderate-to-vigorous physical activity, OR - Odds Ratio, CI - Confidence interval.
Note: "Decreased/stayed the same" loneliness was used as the reference category in the logistic regression models. All models were adjusted for age, ethnicity, province, body weight category, learning mode, and socioeconomic status (SES) category.

girls, the odds of not meeting MVPA guidelines was not significantly associated with increased loneliness. In a sensitivity analysis, we found higher odds of skipping breakfast and not meeting the 24-hour movement guidelines regardless of age (see Supplementary Tables). We also reported the odds ratios for adolescents with increased loneliness due to COVID-19 with covariates (see Supplementary Tables). We performed another sensitivity analysis by removing those in the "decreased" loneliness group, which accounted for 5% of the total sample size, but observed no change in the odds ratios (data not shown).

## 4. Discussion

### 4.1. Key findings

To our knowledge, this is the first study examining the relationship between loneliness due to COVID-19 with eating habits and 24-hour movement behaviours in adolescents. This cross-sectional study found that adolescents with increased loneliness were more likely to skip breakfast, exceed ST guidelines and report shorter sleep duration compared to those with decreased/stayed the same loneliness. The odds of skipping breakfast and not meeting ST guidelines were higher in girls compared to boys for skipping breakfast. In boys and girls with increased loneliness, the odds of insufficient MVPA levels were not clinically significant. As this is the first study to examine loneliness in adolescence due to COVID-19 with eating habits and 24-hour movement behaviours, we do not have studies to directly compare our results to.

### 4.2. Eating habits

In the increased loneliness group, 44.1% of boys and 57.2% of girls skipped breakfast (compared to 35.3% of boys and 45.2% of girls in the decreased/stayed the same loneliness group). We found statistically significant higher odds of skipping breakfast in both boys and girls. A recent review found an average increase of 83% in the number of hospital admissions due to eating disorders in the paediatric population during the pandemic (Devoe et al., 2023). It also suggested that feelings of loneliness may have contributed to the worsening of eating disorder symptoms (Devoe et al., 2023). In girls, higher loneliness levels at age 12 was associated with higher BMI z-scores at age 13 (Qualter et al., 2018), which may lead to breakfast skipping as a compensatory weight loss strategy (Cohen et al., 2003). Loneliness in adolescents may lead to a loss of appetite, which may further lead to skipping meals. However, longitudinal studies are needed to corroborate our findings and to better understand the mechanisms through which loneliness may lead to skipping breakfast in adolescents.

### 4.3. 24-hour movement behaviours

#### 4.3.1. Physical activity

In our sample, 52.9% of girls and 66.0% of boys with increased loneliness met the recommended guidelines for MVPA (compared to 68.4% of boys and 54.9% of girls in the decreased/stayed the same loneliness group). We found that the odds of insufficient MVPA were small and not clinically meaningful for boys and girls in the increased loneliness group with reference to those in the decreased/stayed the same loneliness group. Previous pre-pandemic cross-sectional research that examined physical activity in association with loneliness as an outcome reported mixed findings in adolescents (dos Santos et al., 2015; Page et al., 2003; Pinto et al., 2021). Physical activity can be obtained through different means (e.g., active play, sports, physical education, active transportation) and it is reassuring to note that increased loneliness was not unfavourably associated with physical activity levels in this study.

#### 4.3.2. Screen time

Almost all adolescents with increased loneliness did not meet the ST guidelines (96.4% of boys and 95.0% of girls compared to 94.6% of boys and 91.2% of girls in the decreased/stayed the same loneliness group). The odds of not meeting the ST guidelines were statistically significant in both boys and girls. Girls tend to spend more time watching TV, communicating online and using social media compared to boys, while boys spend more time playing video games (Thomas et al., 2020). MacDonald et al. (2022) assessed loneliness in Canadian adolescents using data collected between 2017 and 18 and one year apart (2018–19). The study found that loneliness was significantly associated with higher ST (watching TV, playing video games, texting), with

associations more pronounced in girls (MacDonald et al., 2022). A study by Lawrence et al. (2022) also found that higher isolation loneliness scores among adolescents were associated with increases in passive ST and gaming.

#### 4.3.3. Sleep duration

In our sample, 30.0% of boys and 27.6% of girls with increased loneliness did not meet the sleep duration guidelines (compared to 22.9% of boys and 22.4% of girls in the decreased/stayed the same loneliness group). We found that the odds of shorter sleep duration were statistically significant in adolescents with increased loneliness. A study of Danish adolescents (11–15 years old) prior to the COVID-19 pandemic found that a higher loneliness score was associated with lower odds of experiencing adequate sleep at night (Eccles et al., 2020a). The stronger associations observed in our study could be since we examined data during the pandemic, with adolescents reporting higher levels of loneliness and exceeding ST guidelines, which might have further impacted adolescents sleep duration at night. In a longitudinal study, increased social media use was associated with shorter sleep duration in adolescents (Sampasa-Kanyinga et al., 2018).

### 4.4. Limitations

The study has several limitations. First, this is a cross-sectional study design, which limits our ability to determine causality and temporality of the relationship between loneliness in adolescents with eating habits and 24-hour movement behaviours. Second, self-reported data might be subject to recall bias and social desirability. Finally, the psychometric properties of some questions are unknown (e.g., loneliness levels due to COVID-19, breakfast measure, sleep duration).

## 5. Conclusion

While skipping breakfast is a common phenomenon amongst adolescents, no studies examined the association with increased loneliness. Findings from this study show for the first time that increased loneliness in adolescents due to the COVID-19 pandemic was associated with breakfast skipping, higher ST levels, and shorter sleep duration. Efforts to reduce loneliness and interventions to establish healthy lifestyle behaviours during adolescence are critical to preventing detrimental mental and physical health consequences across the lifespan. Future longitudinal studies in adolescents with gender-stratified results and objective measures are needed to confirm our findings.

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## CRediT authorship contribution statement

**Saniya Tandon:** Conceptualization, Data curation, Formal analysis, Writing – original draft, Writing – review & editing. **Karen A. Patte:** Writing – review & editing, Funding acquisition. **Gary S. Goldfield:** Writing – review & editing. **Scott T. Leatherdale:** Writing – review & editing, Funding acquisition. **Jean-Philippe Chaput:** Conceptualization, Writing – review & editing, Supervision.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

## Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2023.102287.

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