Perspectives in Public Health

- Heatwaves and homelessness
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- Climate change and health in Nepal: an urgent need for action
- How do we measure unmet need within sexual and reproductive health? A systematic review

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Editorial

Duncan Radley
Deputy Editor, Perspectives in Public Health

Welcome to the March edition of *Perspectives in Public Health*.

In my new position as deputy editor, I am fortunate to review a fascinating and diverse assortment of peer-reviewed and front matter materials. This unthemed issue certainly meets expectations, and I hope you enjoy reading the assorted mix of topics, ranging from climate change, sexual and reproductive health, and data governance to men's transition to fatherhood and investigation of bedbug infestations.

Climate change poses a major threat to public health in several ways, some of which may not be immediately apparent to everyone. Legatt et al. draw our attention to the significant risk of heat-related illness during heatwaves for people experiencing rough sleeping, worryingly noting that 'it is not clear what interventions work to protect their health during extreme heat'. Bhatta et al. also highlight heat-related morbidity and mortality among the numerous direct or indirect consequences of climate change on health in Nepal. Notwithstanding existing policies, the authors outline five key gaps and ways forward for climate health actions.

In this issue's third current topics and opinions piece, Powell and a group of sociologists, who have collaborated closely with public health practitioners, raise two thought-provoking questions. First, why is it that sociology and public health do not collaborate more? Second, what might sociologists do to enhance their contributions to public health? Drawing from insights gained during a 2022 workshop, the authors outline the contributions of sociologists to public health knowledge and propose four strategies to advance this collaboration.

This issue's peer-reviewed material includes two reviews: Soloman et al. examine the methods and definitions that have been used to measure unmet need within sexual and reproductive health, while Bert et al. examine the evidence and data concerning COVID-19 spread and transmission within the high-risk indoor setting of places of worship. Baldwin et al. emphasise the significant role fathers play in the childbearing process. However, they note that perinatal health services often prioritise the needs of the mother and child, with little enquiry about fathers' mental health needs during routine perinatal assessments. Consequently, they conducted a process evaluation to investigate health visitors' perspectives on using Promotional Guides with fathers, including the level of engagement with and acceptability of the intervention, fidelity of delivery, and reported impact on first-time fathers' mental health and wellbeing.

Sheppard et al. explore the lived experience of coping with and managing bedbug infestations, examining the perspectives of low-income older adults residing in social housing in Toronto, Canada. They shed light on the challenges faced by elderly tenants in preparing their units and receiving treatment, as well as how bedbug infestations impact their access to in-home health and social services.

Also featured is an in-practice piece by Mwanga et al., which outlines how Africa's rapidly evolving digital landscape presents numerous challenges in managing, storing, and ethically sharing data while safeguarding individual human rights concerning data privacy. Following this, the authors provide insights and recommendations derived from a two-day workshop.

Finally, Solera-Sanchez et al. remind us of the crucial role of physical activity in children's wellbeing. Their research demonstrating both the cross-sectional and longitudinal associations between children's cardiorespiratory fitness and their health-related quality of life, while also highlighting the importance of physical activity self-efficacy and enjoyment.

Heatwaves and homelessness

The article highlights the deficit of evidence to understand the impact on people sleeping rough during periods of high temperature, as well as the lack of research regarding the actions that should be taken to protect them and promote their health. This dearth of evidence will become more concerning as heatwaves become more severe and more frequent due to human-induced climate change.

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Climate change is increasing the frequency, duration, and severity of extreme heatwaves across the globe.[1] In 2022, heatwave records were broken worldwide, and 2023 has been even hotter, making the last decade the hottest on record.[2] The impact of this on population health is clear: over 70,000 additional deaths occurred in Europe during the heatwaves of 2003,[3] and in 2022, there were 2985 heat-related deaths in England and Wales alone.[4] These deaths disproportionately occur in groups with pre-existing vulnerabilities,[5] yet for individuals sleeping rough – who count among the most vulnerable and marginalised in our societies – it is not clear what interventions work to protect their health during extreme heat.

Over 70,000 additional deaths occurred in Europe during the heatwaves of 2003, and in 2022, there were 2985 heat-related deaths in England and Wales alone

Rough sleeping or street homelessness is the act of sleeping outside or in places that are not designed for people to live in, most often due to lacking access to adequate shelter.[6] This lack of shelter increases the exposure of people experiencing rough sleeping to adverse weather, putting them at significant risk of heat-related illness during heatwaves. For example, people experiencing rough sleeping may sit or sleep in direct sunlight or on hot surfaces such as tarmac and have limited access to air-conditioned spaces. They also tend to be concentrated in urban settings and are therefore exposed to the urban heat island effect. There are also high rates of physical and mental health conditions in the rough sleeping population that increase their vulnerability to heat-related illness. For example, it is estimated that between a quarter and half of all people experiencing rough sleeping in London were affected by physical health conditions in 2022/2023 (*personal communication: R Young, 2023, unpublished data from 2022/23 CHAIN survey*), including a significant burden of respiratory conditions that may be exacerbated due to heat-induced increases in ground-level ozone and airborne organic small particulate matter.[7,8] Moreover, 50% of people experiencing rough sleeping have mental health needs that may be exacerbated by the heat[9] – with a particular increase in suicide risk noted during hot weather.[10] Many of the drugs prescribed to manage these conditions (antipsychotics, antidepressants, etc.) can also inhibit the sweating mechanism and reduce cognitive alertness, increasing the risk of heat-related illness.[11] Similarly, high rates of substance use in this population increase risk,[9] as recreational drugs can reduce one's ability to adapt behaviour in response to heat, and alter physiological response mechanisms.[5,11] People experiencing rough sleeping are also three times more likely to experience social isolation than the general population,[12] increasing vulnerability to heat-related illness not only because symptoms may be identified late, but also because this lack of social support may impair access to healthcare.[5]

People experiencing rough sleeping are three times more likely to experience social isolation than the general population

The above evidence demonstrates that people experiencing rough sleeping are at significantly higher risk of heat-related morbidity and mortality than the general population due to distinct patterns of heat exposure and pre-existing vulnerabilities. This contributes to the significantly elevated risk of hospitalisation associated with even moderately high temperatures in this

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population group relative to the general population.[13] This suggests that national heat-preparedness plans should provide specific guidance on how to protect the health and wellbeing of the rough sleeping community. In recognition of this, the United Kingdom Health Security Agency (UKHSA) recently released 'Supporting vulnerable people before and during hot weather' guidance,[14] that includes advice for those with responsibilities for the over 3000 people experiencing rough sleeping each night across England.[15] In the development of this guidance, however, a lack of relevant peer-reviewed evidence regarding both the impact of adverse hot weather on those experiencing homelessness and the optimal interventions to reduce risk was identified. For example, while the guidance draws on protocols implemented to protect the rough sleeping population in cities around the globe, the efficacy and effectiveness of such protocols has not been thoroughly evaluated to our knowledge. In addition, evidence from interventions to protect the general population was used pragmatically, but such interventions must be tailored to the particular context of street homelessness – ideally being co-developed with users – in order to be most effective for the rough sleeping population. Limited evaluations have highlighted some nuanced considerations, such as the importance of allowing people experiencing rough sleeping to safely store their belongings and bring their pets into respite spaces to facilitate their use of these interventions.[16] However, the range of factors required to ensure suitability of provision for people experiencing rough sleeping has not been established definitively, limiting the development of evidence-based guidance.

Accordingly, robust research is needed to establish: when to activate a response; how to reach and productively engage the rough sleeping population during adverse heat periods; how to identify and protect particularly vulnerable individuals; and what provisions (such as cooling centres, enhanced outreach, and overnight accommodation) are most effective for this population. We therefore urge the international research community to investigate the interplay between climate change impacts, vulnerability, and public health in this context as, without it, the health and wellbeing of those sleeping rough will be increasingly adversely impacted by heatwaves.

DISCLAIMER

The views expressed in this article are those of the authors and are not necessarily those of the UK Health Security Agency, the Department of Health and Social Care, or the Greater London Authority.

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Sociologists in public health: marginal observers or mainstream collaborators?

This article considers why sociology and public health do not collaborate more frequently and what sociologists might need to do to enhance their contributions to public health. It highlights a group of sociologists who have worked alongside public health practitioners that suggest ways to enhance sociology's accessibility and use within public health, deriving from a workshop conducted in 2022.

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INTRODUCTION

At first glance, sociology and public health should make for good partners. Both disciplines address the social, environmental, and community contexts of embodiment and well-being. Both are concerned with social inequality, social justice, and the politics of policy-making. Both are staffed by committed professionals who engage with the public, community leaders, and stakeholders to make a difference to people's lives.

However, the marginal influence of sociology within UK public health became apparent during the pandemic[1] in its role in UK Government scientific advisory groups. Sociological insights were missing, for instance, in responses to class, ethnic, and gender variations in infection and care-seeking.[2] The congruity of the disciplines has been recognised in recent UK public health guidance[3–5] which identifies a need to enhance public health's collaborative work with sociologists. So why is it that sociology and public health do not collaborate more? And what might sociologists do to enhance their contributions to public health? Here, a group of sociologists suggest some solutions, deriving from a workshop conducted in 2022.

BARRIERS TO COLLABORATION BETWEEN PUBLIC HEALTH AND SOCIOLOGY

Much of the failure of sociology to contribute more substantively to public health policy and practice derives from disciplinary boundaries.[6,7] First, unlike psychologists and economists, 'sociologists' are predominantly employed within academic centres;

physically distant from public health practitioners, activists, and policy-makers; and driven (by university managerial metrics) to target outputs in often inaccessible academic journals. Second, the evidence-based model of healthcare replicated in public health[8] has devalued sociological knowledge often generated through qualitative methods and theoretical frameworks, prioritising instead meta-analysis of randomised controlled trials. A sociological perspective requires alternatives to established experimental methods for evaluating the impact of planned interventions in collective terms.

Finally, the disciplines can sometimes diverge in their worldviews, despite a focus on inequality. Public health models of social determinants of health[9,10] can reify 'the social' as *contextual* risk factors for individual health outcomes[11] overlooking diversities in what constitutes a 'healthy life' and the unequal distribution of power within societies. Social theories of power, however, are multiple and contested within the discipline[12] and can seem abstract and inaccessible to public health practitioners and policy-makers concerned with the immediate practical challenges of health and social inequalities.

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The move of public health into local government in the UK has opened more opportunities for collaboration, and from experience, we recognise that sociological concepts (such as 'intersectionality') and methods (such as focus groups) are frequently applied within public health without acknowledging their disciplinary origins. In the spirit of breaking down barriers, the rest of this commentary considers how sociologists have contributed to public health knowledge, before outlining four proposals to move this collaboration forward.

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APPROACHES THAT CAN HARNESS SOCIOLOGY'S CONTRIBUTION TO POLICY AND PRACTICE

Sociologists need to interrogate their conventional model of research. As Karvonen et al.[13] suggest,

> *This requires new forms of data production and more intense interaction with end users and stakeholders . . . This means stepping out of the traditional superiority position . . . into a position that is accountable and dialogical with the 'publics', whether lay people or other professionals.*

Where sociologists have made a difference, often they have found ways to locate themselves physically or embed themselves and their research activities within practice communities. In the UK, the University of Huddersfield has seconded sociologists to work at Kirklees District Council to develop tools to assess health inequalities and re-purpose impact assessments to enhance practice.[14] Blake[15] describes how a research assistant was embedded within a community organisation in a former UK coal mining community, deploying social theory to explore opportunities to improve food security. Beyond the UK, sociologists have worked with public health professionals and communities on community development issues. A multidisciplinary team of US academics and students from Purdue University worked with citizen groups in Hartford, Indiana, to generate evidence of heavy metal pollution and subsequently engaged with environmental regulators and local government to address this.[16] Sociologists in Trondheim, Norway, established a sociology clinic in the shopping area of the city to offer sociological solutions to citizens' issues. This in turn led to projects working with urban planners, commercial endeavours, and community bodies and citizens.[17]

FOUR PROPOSALS TO SUPPORT PUBLIC HEALTH/SOCIOLOGY COLLABORATIONS

We suggest four interventions as ways to enhance sociology's accessibility and use within public health.

It is essential to research the practical needs and priorities for people in both disciplines, and to document current examples of collaboration. The outreach projects described above pose major funding and human relations questions. An increasing emphasis on impact by research funders is influencing work in multidisciplinary teams that include a range of publics, but questions remain. What financial and governance models for embedding sociologists in non-academic settings might be developed? How are these sociologists to be mentored and supported if they are physically and culturally distanced from the scholarly community of sociologists? What is the career structure and what are the opportunities for advancement exist for sociologists working in non-academic settings or devoting their efforts to applied projects that may not generate scholarly outputs? In the US and some other nations, applied sociologists have been professionalised, with the development of graduate programmes and professional accreditation bodies such as the *Association for Applied and Clinical Sociology*. Evaluation of previous collaborations could reveal important enablers.

A second action is to explore in more detail how existing sociological concepts, tools, and methods are used in practice, and how these may be adapted or developed to meet the particular needs of public health. Co-development and piloting of toolkits could be facilitated by bodies such as the *Association of Directors of Public Health* and the British Sociological Association's *Applied Sociology Group*.

The third intervention looks at how to raise the profile of sociology within public health and build alliances. A more robust, visible, and accessible public engagement is necessary to show how sociological approaches influence diverse public health projects, both through traditional academic dissemination and 'public sociology' initiatives such as blogs and podcasts. This can be enabled by collaborations between our professions to collate evidence-based case studies, public engagement projects, and impact studies.

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Finally, work is needed to ensure that the next generations of both sociologists and public health professionals acknowledge the value of each other's perspectives through both formal

educational programmes and continuing professional development. This could include enhancing sociological input within public health degree courses; supporting undergraduate sociology curricula to include modules on applied research; using a range of public health case studies and creating placements in public health; and providing health practitioners with opportunities to co-work with sociologists during their training.

We offer this commentary as a first step and invite our public health and sociological colleagues to share our different competences, to improve the health of the public.

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How do we measure unmet need within sexual and reproductive health? A systematic review

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sexual health; rep; health inequalities

Abstract

Background: Addressing health inequality with sexual and reproductive health requires an understanding of unmet need within a range of populations. This review examined the methods and definitions that have been used to measure unmet need, and the populations most frequently assessed.

Methods: Five databases (PubMed, Web of Science, Scopus, The Cumulative Index to Nursing and Allied Health Literature (CINAHL) and Health Management and Policy Database (HMIC)) were searched for studies that described quantitative measurement of unmet need within sexual and/or reproductive health between 2010 and 2021. A narrative synthesis was then undertaken to ascertain themes within the literature.

Results: The database search yielded 19,747 papers; 216 papers were included after screening. 190 studies assessed unmet reproductive health need, of which 137 were analyses of trends among people living in low/lower-middle income countries; 181 used cross-sectional data, with only nine analyses being longitudinal. Eighteen studies analysed unmet sexual health need, of which 12 focused on high and upper-middle income populations. 16 papers used cross-sectional analyses. The remaining 10 studies examined unmet need for a combination of sexual and reproductive health services, eight among populations from upper-middle or high income countries. All were cross-sectional analyses. 165 studies used the Demographic and Health Surveys (DHS) definition of unmet need; no other standardised definition was used among the remaining papers.

Discussion: There is a significant focus on unmet need for contraception among women in low income countries within the published literature, leaving considerable evidence gaps in relation to unmet need within sexual health generally and among men in particular, and unmet reproductive health need in high income settings. In addition, using an increased range of data collection methods, analyses and definitions of unmet need would enable better understanding of health inequality in this area.

INTRODUCTION

There is a large burden of sexual and reproductive morbidity across the globe, a burden that disproportionately affects some of the world's most vulnerable groups.[1] This pattern of illness and inequality is likely to be attributable, at least in part, to a combination of unmet needs.[2] It is, however, difficult to define, characterise or measure unmet need within healthcare,[3] and there are currently very few systems in place that identify needs within sexual and reproductive health, and monitor whether those needs are being met.

Although unmet need for contraception has been measured repeatedly across a range of populations,[4] there is much less discourse within the published literature regarding unmet need within reproductive health more broadly, or unmet need within sexual health. In addition, there has been little analysis of the methods that are being used to identify unmet need, and whether these methods are appropriately identifying the needs of the populations most at risk.

This review is a systematic investigation of the trends within the published literature surrounding

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unmet need in sexual and reproductive health (SRH) over the past 11 years. In particular, this review will examine the methods that have been used to characterise and measure unmet need, the populations in which unmet need within reproductive and sexual health has been most frequently measured, and the definitions of unmet need that have been used within these analyses.

METHODS

Search strategy

This review was undertaken according to the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines. To ensure a thorough review of the literature, a search of five databases was undertaken: PubMed, Web of Science, Scopus, The Cumulative Index to Nursing and Allied Health Literature (CINAHL) and the Health Management and Policy Database (HMIC). Studies that described a quantitative method to elucidate levels of unmet need within sexual and/or reproductive health in a specific population were included in the literature review. Exclusion criteria were studies that were not in English, systematic reviews and studies that used entirely qualitative methods (although mixed-methods studies were included). Maternity care was excluded from the definition of reproductive health for the purposes of this review. The search period was 2010 to 2021–in part for ease of analysis, due to the broad search strategy, and in part because methods described prior to 2010 were likely to be out of date, particularly if they had not been used again in subsequent, more recent, studies.

Study selection

Three stages of study selection were used to identify papers for inclusion within this literature review. Two reviewers (DS and MC) used Covidence software to assign 20% of titles identified during the database search for inclusion or exclusion. Any discrepancies were discussed between reviewers until there was 100% concordance, and DS then assigned the remaining titles. This process was repeated for the abstracts of the papers that had been flagged for inclusion during the title round. Once all abstracts had been screened, DS screened the full text of the papers that had been flagged for inclusion, and selected the papers that would proceed to data extraction.

Data extraction

A data extraction form was created in Microsoft Excel, and this was used to record relevant data from the remaining studies. The data extraction process captured whether the study concerned sexual or reproductive health, the sub-topic of interest, the country of data collection, the geographical level of analysis (multinational, national or regional), the income status of the setting (high, upper-middle, lower-middle or low income), the population of interest, the type of study, the methods used, the definition of unmet need and the source of this definition. The nature of the research question (ascertaining trends in the measurement of unmet need within sexual and reproductive health), and the heterogeneity of the included studies, meant that meta-analysis was an inappropriate methodology for analysis of the extracted data. A narrative synthesis of the themes within the literature was therefore carried out in accordance with the Synthesis without meta-analysis (SWiM) PRISMA extension guidance.[5]

RESULTS

The database search yielded 19,747 papers (Figure 1), and one paper was added after a search of the grey literature. 17,184 remained after removal of duplicates, and 377 remained after screening of abstracts and titles. The full text of these articles was subsequently screened; 91 were removed due to outcomes that did not relate to unmet need or SRH, 40 were removed due to study design (i.e. studies that did not attempt to calculate unmet need), 25 were removed as the methods were not described in enough detail, and five were removed as they were not in English. Data were subsequently extracted from the remaining 216 papers. The entire list of papers can be found summarised in Supplemental Appendices 1, 2 and 3.

Reproductive health

The majority of the studies found during this literature review (190 out of 216) were analyses of unmet need within reproductive health (Box 1).

Methods

The most commonly used method of data collection was the utilisation of questionnaire data. Nearly all of the studies collected information using questionnaires (179 out of 190) – seven studies reviewed medical records, two used modelling analyses, one used focus groups, and one used spatial epidemiology techniques.[6] Almost all of the analyses ($n = 181$) were cross-sectional, with the other nine being longitudinal. The high prevalence of certain methodologies was at least partially due to the fact that a large proportion of the papers were secondary analyses of similar datasets. Fifty-one of the 190 papers that focused on reproductive health used secondary analyses of data from the Demographic and Health Surveys (DHS) – a series of nationally representative household surveys that are conducted once every five years in 90 low and middle income countries – while another 23 used data from other national health surveys that use similar methodology to the DHS.

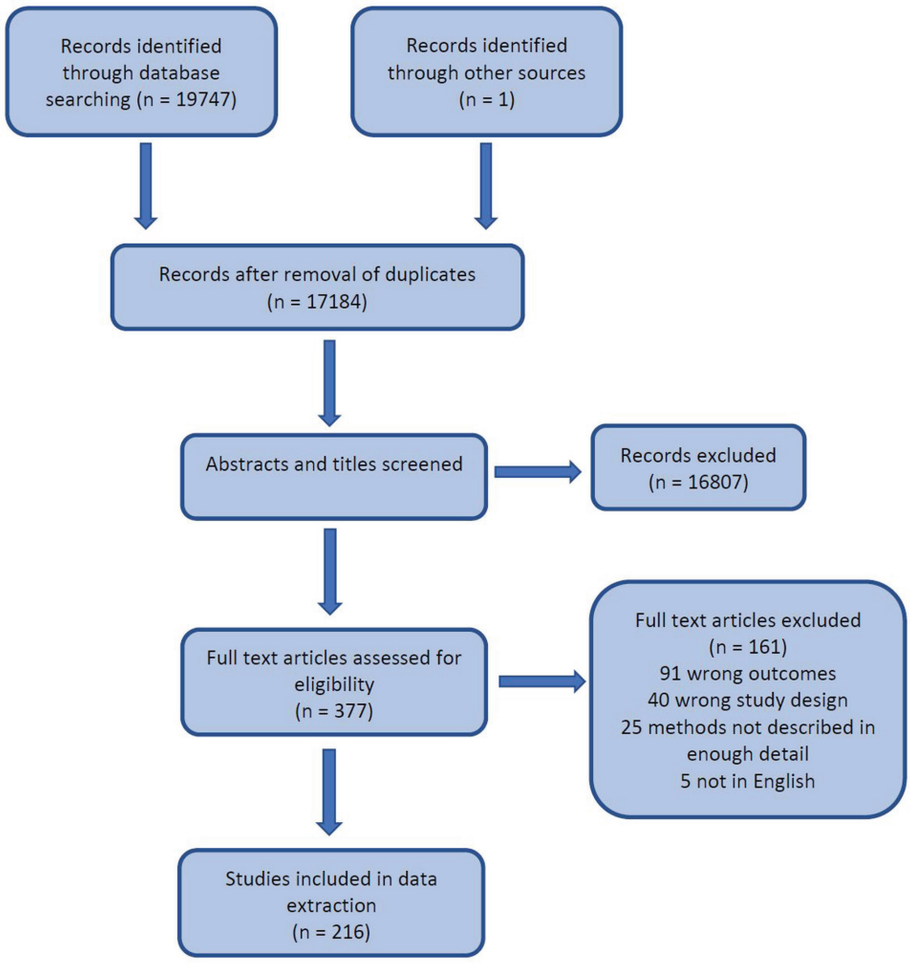
Population

Most of the studies were analyses of trends among populations living in low or lower-middle income countries; these comprised 137 papers, compared to 51 that were based on populations from upper-middle and high income countries, and two papers that aimed to perform global comparisons. Half of the papers ($n = 95$) drew conclusions at the national or multinational level, with the other half concentrating on regional analyses.

Only six papers considered the contraceptive needs of men. The remaining 184 papers focused solely on unmet need among women, with 89 limiting their analyses to women of reproductive age (usually defined as 15–45 years); 50 of these papers only analysed trends among women of this age group who were married or in-union.

Figure 1.

PRISMA flow diagram.



Box 1

Summary box 1: reproductive health

- **Literature predominantly focused on unmet need for contraception among women in low and lower-middle income countries.**
- **Most common definition of unmet need: Westoff and Bradley definition used in the Demographic and Health Surveys.**
- **Data most commonly collected using questionnaires.**
- **Analyses were predominantly cross-sectional secondary analyses of routinely collected data.**

Definition of unmet need

Among the 190 analyses of unmet need for contraception, 165 used the same definition of unmet need – the Westoff and Bradley indicator that is used as part of the DHS (or a slightly modified version). According to this definition, women are considered to have unmet need if they report being fecund and sexually active, would like to stop or postpone childbearing, and are not currently using a modern contraceptive method.[7]

Outside of these papers, definitions of unmet need were diverse. Only one study – a household questionnaire study analysing unmet need for contraception among married women in Mali and Benin[8] – utilised a measure of perception. Women were defined as having perceived met need (compared to real met need) if they were using an ineffective method of contraception. Five other questionnaire-based studies

Box 2

Summary box 2: sexual health

- **Literature predominantly focused on unmet need among women in higher and upper-middle countries.**
- **Range of definitions of unmet need.**
- **Data most commonly collected using questionnaires.**
- **Analyses were predominantly cross-sectional analyses of primary data.**

defined unmet need for contraception as a discordance between desired method or source of contraceptives and the actual method that was currently being used.[9–13] Two papers used disparity between underserved groups and a defined baseline to define unmet need; a UK-based study compared contraceptive use and abortion rates between women suffering from opioid addiction and the general population,[14] and a Dutch study analysed the disparity between contraceptive counselling and prescription among refugee women, other migrant women and native Dutch women. Two studies (one in Australia,[15] one in Ethiopia)[16] defined unmet need as lack of postpartum contraception planning. The outcomes used to measure unmet reproductive need outside of the need for contraception were equally varied. The three papers that analysed unmet need for cervical screening measured lack of uptake of routine cervical screening[17–19] and similarly, the analysis of unmet need for HPV vaccination measured women in the appropriate age group who had not received the vaccine during the Australian catch-up programme.[20] A cross-sectional analysis of unmet need for abortion services in Ghana defined any woman who reported an abortion outside of a facility as having unmet need.[21] Two studies analysed unmet need for abortion at the facility level, one defining unmet need as the inability of a health service to provide appropriate abortion services to women seeking treatment[22] and one using the treatment rate for complications of induced abortion as a marker of unmet need.[23] A study in Ireland investigated unmet need for abortion by comparing demand for services pre- and postlegalisation.[24] An analysis of unmet need in India defined women as having an unmet need if they had suffered from a reproductive morbidity and either sought care from a qualified medical practitioner but did not complete treatment; sought treatment from an unqualified practitioner; engaged in home remedy or did not seek any treatment.[25] Three studies used geographical techniques to measure unmet need: one measuring the correlation between driving distance from an abortion service and the geographical abortion rate,[26] one defining women who had travelled across country borders to access abortion as having unmet need[27] and one mapping 'contraception deserts' (areas with no affordable family planning clinic within a reasonable driving distance) within the US.[6]

Sexual health

Compared to those focusing on reproductive health, significantly fewer studies within this review analysed unmet need within sexual health ($n = 18$) (Box 2).

Methods

Methods of analysing unmet need within sexual health followed a similar pattern to analyses of unmet need within reproductive health; 13 of the 18 papers used questionnaire data, and 16 analyses were cross-sectional. The five papers that did not use questionnaire data used a diverse range of methods – three papers used medical records review, one used modelling techniques to estimate unmet need and one compared demand for sexual health services before and after an intervention. Unlike the analyses of unmet need within reproductive health, no papers used secondary data analyses to estimate unmet need for sexual health; 17 papers used primary data collection, and one used routinely collected data from national data sets.

Population

Compared to analyses of unmet need within reproductive health, papers that examined unmet need within sexual health analysed a range of populations. Twelve papers focused on high and upper-middle income populations, and six looked at populations from low and lower-middle income countries. The majority ($n = 13$) drew conclusions at the regional level, with four being national analyses and one being a multinational analysis. Only one used a nationally representative cohort, with the other papers concentrating on defined subgroups: people attending genitourinary medicine (GUM) clinics, female sex workers (FSW), men who have sex with men (MSM), incarcerated women, adolescent psychiatric patients, foreign-born HIV patients, men and women under the age of 25, university students and people seeking care for gynaecological cancers.

Definition of unmet need

The definitions of unmet need used within these analyses were equally diverse. Five analyses[28–32] defined unmet need as non-utilisation of sexual health services despite STI symptoms or history of unsafe sex. Another UK analysis measured unmet need by asking attendees at one of seven GUM clinics whether they had been previously turned away,[33] while two analyses of similar UK populations measured both provider delay (the gap between first contact with a health service and access to treatment) and patient delay (the gap between start of symptoms and seeking care).[34,35] The two analyses of access to sexual health services outside of the GUM setting (in an adolescent psychiatric unit[36] and a gynaecological oncology unit)[37] used lack of sexual health counselling within medical

Box 3

Summary box 3: sexual and reproductive health

- **Literature predominantly focused on unmet need among women in higher and upper-middle countries.**
- **Range of definitions of unmet need.**
- **Data most commonly collected using questionnaires.**
- **Analyses were predominantly cross-sectional analyses of primary data.**

notes as an indicator of unmet need, and an analysis of foreign-born Europeans used a negative HIV test in the years prior to an HIV diagnosis as an indicator of unmet need for HIV prevention services.[38] A Canadian study used the change in demand for STI services after the implementation of a women's healthcare centre within a prison as an indicator of unmet need,[39] and an Australian analysis of routinely collected data defined unmet need as the gap between estimated chlamydia incidence and actual chlamydia diagnoses.[40] A study in Papua New Guinea defined individuals who had fallen through gaps in the 90-90-90 cascade as having unmet need for HIV prevention or treatment.[41] The four studies investigating unmet need for PrEP all used different definitions: non-use of PrEP despite eligibility,[42] disparity between regional PrEP use and regional STI prevalence,[43] new HIV infection while waiting for inclusion in a PrEP trial,[44] and increased PrEP demand after reduction in the cost of PrEP.[45]

Sexual and reproductive health

Ten of the studies found during this literature review examined unmet need for a combination of sexual and reproductive health services within a certain population (Box 3).

Methods

All 10 studies investigating unmet need in sexual and reproductive health used questionnaire data: eight studies analysed primary data and two were secondary analyses of data from larger national studies. All 10 analyses were cross-sectional.

Population

Eight of the studies that examined unmet need in sexual and reproductive health were undertaken among populations from upper-middle or high income countries. Seven drew conclusions at the regional (rather than national or multinational) level. There was, once again, a focus on population subgroups, with only one study (a South African household study) collecting data from all eligible people over the age of 15.

Definition of unmet need

The definitions of unmet need for sexual and reproductive health care varied between papers. Two studies used a range of definitions: both used the Westoff and Bradley definition of unmet need for contraception, never having had a Pap smear and symptoms consistent with STIs that had remained untreated as indicators of unmet need.[46,47] A cross-sectional household questionnaire study conducted in China measured unmet need among older women by asking about untreated STI symptoms and intrauterine device (IUD) retention after the menopause.[48] One analysis compared SRH service use between women who reported similar sexual activity but differing levels of religious participation.[49] One study examined the disparity in SRH demand between areas that provided youth-friendly services and those that did not.[50] Three studies included measures of perceived need,[51–53] and two measured unmet need by asking participants if they had received the SRH services that they felt they needed.[50,54]

DISCUSSION

This literature review outlined 216 studies published over the past 11 years that examined unmet need in a range of populations using a variety of methods. Despite this heterogeneity, a number of patterns emerged on closer analysis that gave some insight into the way that unmet need within sexual and reproductive health is conceptualised, and revealed numerous gaps in the literature.

Topic

Most of the studies within this literature review were on the subject of unmet need within reproductive health, and within these, the majority focused on unmet need for contraception. Some of the reasons for this are likely historical; widespread discourse surrounding the concept of unmet need within sexual and reproductive health largely began in the 1960s within the 'family planning' space,[4] meaning that the definitions and methodology used in this area have shaped the way that unmet need is conceptualised within both theoretical and implementation science, to the point where 'unmet need for family planning' is used as a key indicator by the United Nations without much discussion of unmet need in other areas of sexual and reproductive health.[55] Another reason for the prevalence of studies that measure unmet need for contraception is likely to be feasibility. Unmet need for contraception is easier to define and measure due to the presence of a defined endpoint – unplanned pregnancy – that has few other causes. Measuring unmet need in sexual health is far more challenging. Tying a specific need to an outcome within sexual health is made difficult by the lack of data from those who are not receiving care, and causal links between needs and outcomes are less clearly defined. There remains, however, a large and under-treated global burden of morbidity within sexual health,[56] indicating that the conceptualisation and measurement of unmet need within sexual health should also be a research priority.

Population

The majority of the studies within this review aimed to measure unmet need among cisgender women – this trend that was particularly apparent among studies that were on the topic of unmet need within reproductive health. Although the reproductive needs of women are often more immediately apparent, there was a paucity of discourse within the literature about the role of unmet need for contraception among cisgender men with regards to unplanned pregnancy; something that is likely to become increasingly relevant as efforts to expand the range of male contraceptives continue.[57] There was also very little discussion of the needs of gender-diverse populations, and the needs of transgender women were often grouped together with the needs of MSM. Given the recognised morbidities and barriers to care faced by gender-diverse populations,[58] this is a significant gap in the literature exploring unmet need within sexual and reproductive health.

A large proportion of studies concentrated on the needs of women of reproductive age (usually defined as 15–45 years), and among these papers, a significant majority limited analysis to women who were married or in a union similar to marriage. This was in part due to the high prevalence of data from household studies, particularly those carried out via the DHS, that often specifically ask questions regarding reproductive health to women within this age group. Most studies that limited analyses to married or in-union women explained this as a method of confirming that respondents are sexually active. This assumption, however, may be somewhat archaic – as marriage rates decrease[59] and the age of first marriage increases globally[60] while age of sexual debut remains relatively steady,[61] the needs of an increasing number of women are not being measured. In addition, these methods overlook the needs of groups such as sex workers and those who have same-sex partners, who are likely to have unmet sexual and reproductive needs that lie outside of the bounds of a monogamous heterosexual relationship.[62] In addition, the focus on women of childbearing age leaves a gap in the understanding of the sexual and reproductive health needs of those who are younger than 15 years or older than 45 years, two groups who have been demonstrated to experience unique patterns of sexual and reproductive morbidity.[63,64]

Among studies that analysed unmet need within reproductive health, the majority investigated populations within low and lower-middle income areas. This trend was reversed among papers that investigated sexual health and SRH, the majority of which analysed populations within upper-middle and high income countries. There appear to be two resultant gaps in the literature. There is little investigation of unmet need within reproductive health in high income countries, despite the inequalities in reproductive outcomes that have been identified in these settings.[65,66] Similarly, there is little investigation of unmet need within sexual health in low income countries, despite the recognised lack of appropriate sexual health services in many such settings.[67]

Methods

Questionnaire studies were particularly prevalent within this literature review, and were used to examine unmet need within both reproductive and sexual health. Although such methods are often useful, the fact that questionnaires are the primary method used for the assessment of unmet need within sexual and reproductive health inherently leaves some areas of enquiry neglected. Questionnaires, particularly those centred around potentially sensitive topics, are susceptible to both recall bias – in which one group is systematically more likely to remember certain events, and social desirability bias – in which respondents are systematically more likely to report behaviours or opinions that they think will be viewed favourably.[68] In addition, the interpretation of a concept as complex as unmet need can be dependent on the perspective of the researcher. A 2017 mixed-methods study found that the perceptions of stakeholders did not at all mirror the responses of the local population when both were asked about the drivers of unmet need for contraception.[69] Despite this, very few studies directly asked respondents about their perception of need, or about demand.

A large proportion of the studies in this review were secondary analyses of large household studies. Only one of these studies – the National Survey of Sexual Attitudes and Lifestyles – was specifically designed to investigate sexual and reproductive health at the population level. The other surveys are focused on health more generally, and therefore may not be the most useful tools for investigating unmet need within sexual and reproductive health. In addition, the DHS is designed for monitoring and evaluation of national programme goals,[4] and the fact that it is one of the main sources of information regarding global unmet need within reproductive health means that there is little understanding within the published literature of the drivers of unmet need or the differences between regions or subgroups.

STRENGTHS AND LIMITATIONS

It is important to acknowledge the limitations of this review. The inclusion criteria for this review did not include qualitative analyses, which limits the discourse within this article to quantitative measures of unmet need. The role of qualitative and mixed-methods work within this area is a topic that would benefit from exploration in the future. The literature search was also limited to papers that were in English, which may have resulted in the omission of relevant literature. We believe, however, that the breadth of the search is likely to have captured the majority of the papers within this area.

This article also has multiple strengths. This is, to our knowledge, the first systematic review to examine the methodology being used to calculate unmet need within sexual and reproductive health across the published literature. The breadth and international scope of this review have allowed the authors to conduct an in depth analysis of the measurement of unmet need in a range of settings, allowing for a broader understanding of a concept that is vital within public health.

CONCLUSIONS

This review revealed multiple gaps in our understanding of unmet need within sexual and reproductive health. The vast majority focus on unmet need for contraception among in-union women in low income countries, leaving a significant need for investigation of unmet need within sexual health, unmet reproductive health need in high income settings and unmet need among women who are not of reproductive age. In addition, there is a need for data collected using a range of methods that can reflect regional patterns and sub-group trends and begin to elicit the causes of unmet need. If these gaps are not addressed, we run the risk of repeatedly measuring unmet need within sexual and reproductive health but not collecting the data that will allow us to make significant and sustainable change.

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AUTHOR CONTRIBUTIONS

DS conceived of the study and led on the paper. DS designed the protocol, and DS and MC carried out the search, screened search results and extracted data. All authors contributed to the interpretation and commented on the paper.

CONFLICT OF INTEREST

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SUPPLEMENTAL MATERIAL

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'When the bedbugs come, that's another problem': exploring the lived experiences of bedbug infestations among low-income older adults and service providers who support them

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Abstract

Aims: Older adults in low-income housing communities are more vulnerable to bedbug infestations. Prior research, however, has predominately focused on the effectiveness of integrated pest-management strategies, with little attention given to the lived experiences of tenants struggling with infestations. We used a qualitative approach to explore what it is like to live with and treat bedbug infestations from the perspectives of low-income older adults and service providers.

Methods: Participants included low-income older adults ($n = 58$) and service providers ($n = 58$) who offer supports directly in the buildings. Semi-structured qualitative interviews and focus groups were used to explore the challenges of preparing and treating units for bedbugs, and examine how bedbugs impact access to support services.

Results: Bedbugs were a widespread issue, and underlying physical, mental, social, and financial challenges made it difficult for older tenants to prepare their units and access treatment. Tenants also faced bedbug stigma from community services, as many were unwilling to provide services in infested units. Although some service providers utilized strategies to minimize exposure, many were concerned these strategies created additional stigma.

Conclusion: Our findings highlight an urgent need to increase public health funding to support older adults with the costs of bedbug elimination and to enhance pest-management strategies through partnerships with health and social service agencies to improve outcomes for older adults.

INTRODUCTION

Over the past 20 years, there has been a global resurgence of bedbugs.[1] Bedbugs are found in dark places, such as mattresses, bed frames, furniture, and baseboards.[2] They emerge at night for blood meals from a sleeping human host; with continual feeding access, bedbugs multiply exponentially in a few short months, leading to large infestations.[3] Bedbugs are prevalent in low-income communities,[3–5] where ineffective pest management has been linked to insufficient financial resources, low awareness among residents, and an inability to prepare units for treatment.[6–10] Control of bedbugs requires an integrated pest-management strategy that combines chemical (i.e. insecticide) and

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non-chemical (e.g. steaming, encasement, vacuuming, de-cluttering) elimination strategies with early detection, education, and outreach.[7]

Bedbug infestations represent a significant public health concern.[11] In addition to the economic impact,[12] the health consequences are tremendous: the bites lead to itchy and painful lesions and rashes,[5] and infestations cause sleep disturbances,[3] psychological distress, and stigma.[13] The detrimental impacts of bedbugs may be more severe for older adults,[13] who are least likely to be aware of and report infestations.[14] For instance, Wang et al.[15] found that awareness of bedbugs among low-income older adults was low, yet 45% of units were infested. When infestations were identified, older tenants struggled with treatment compliance due to limited financial resources and physical disabilities.[9] Older residents with unmanaged pest infestations may also be at risk of losing access to in-home health and social services, as service providers may be hesitant to go into infested homes.[16]

Much of the research to date has focused predominately on understanding the scope and clinical relevance of bedbug infestations and evaluating integrated pest-management strategies.[3,7] There is a dearth of research on the lived experiences of those with chronic infestations. For example, a recent scoping review on the mental health impacts of bedbugs found that only 5 of 51 reviewed articles presented original research.[13] There is also a lack of qualitative evidence, which limits our understanding of what it is like to live with and treat an infestation from the perspective of tenants. Given that low-income older adults may be more vulnerable to infestations,[9,13,15,17] it is critical to understand the unique challenges that they face living with bedbugs. This study used a qualitative approach with low-income older adults, as well as with service providers who support them, to explore: (1) the challenges older tenants face preparing their units and receiving treatment and (2) how bedbug infestations impact their access to in-home health and social services.

METHODS

This article is based on data from a larger qualitative study aimed at understanding the lived experiences of older adults residing in social housing in Toronto, Canada.[18] Pest control emerged as a pervasive issue negatively impacting quality of life for tenants. Therefore, this article explores the challenges of managing bedbug infestations from the perspectives of older adults and service providers who support them.

Study context

This study was conducted in Toronto, which was ranked as Canada's top bedbug city in 2019 and 2020.[19] We worked with a social housing provider that is home to over 35,000 older adults (aged 59 years or older). The housing provider recognizes that effective pest management is essential for building healthy communities; however, pest infestations have been on the rise. For example, recent news articles highlight how mail services were halted in a seniors' building due to an ongoing bedbug infestation in the mailroom. Furthermore, in 2020 the housing provider received over 50,000 service requests for pest infestations, predominately bedbugs. To manage infestations, the housing provider uses an integrated pest-management approach that incorporates community engagement, education, proper preparation for treatment, and responsible use of pesticides.

Sample

Older adults ($n = 58$) were recruited through flyers placed in common areas of their building (e.g. lobby). Interested tenants contacted the researcher to schedule an interview or sign up for a pre-scheduled focus group. Characteristics of participating tenants are shown in Table 1.

Service providers ($n = 58$) were recruited through flyers distributed to various health and social service agencies that operated in the buildings. Interested participants contacted the researcher to schedule an interview or sign up for a pre-scheduled focus group. Service providers represented frontline and management roles from a variety of sectors, including social work, nursing, housing, psychiatry, supportive housing, care coordination, and community support services (CSS).

Data collection

Interviews were conducted by telephone or in-person at an agreed upon location. In addition, six focus groups (two with tenants and four with service providers) were carried out. Tenants had the option to complete their interview in English ($n = 41$), Chinese ($n = 14$), or Tamil ($n = 3$). Data were collected between November 2019 and February 2020. All sessions were facilitated by a trained interviewer and lasted approximately 1 h. The discussion explored several topics related to tenancy management and access to services. Sample interview questions related to pest management are provided in Table 2. All sessions were audio-recorded and transcribed verbatim. Non-English transcripts were professionally translated and reviewed by the interviewer for accuracy. All transcripts were uploaded into NVivo 12 for analysis.

Ethics approval was granted from the Sunnybrook Health Sciences Centre, and informed consent was obtained from all participants at the beginning of the study. Tenants received a CAD$25 gift card for their participation while service providers received refreshments or a CAD$10 gift card.

Analytic approach

Our research team utilised a qualitative descriptive approach[20] to elicit a rich description of bedbug management from the perspective of older adult tenants and service providers. This approach is widely used in health research[21,22] due to the emphasis on learning from lived experiences and using that knowledge to influence policy and practice.[20] Following the principles outlined by Braun and Clark[23] and Saldana,[24] transcripts were read and re-read, and line-by-line coding was carried out using the method of constant comparison. Rigour was established through a combination of techniques including double-coding, audit trails, memoing, and team meetings.

Table 1

Tenant characteristics

Characteristics	Mean value ± standard deviation (range)	% (*n*)
Age	70.4 ± 8.4 years (57–92 years)	
Gender (male)		50% (*n* = 29)
Live alone		75% (*n* = 44)
Length of tenancy	9.1 ± 8.4 years (3 months–38 years)	

Table 2

Sample interview questions

Tenant interview questions:

- When you think about what makes a 'home', what three words come to mind?
- What do you like most about your home?
- What helps you to maintain your apartment (e.g. keep it free of pests)?
- What makes it challenging for you to keep your apartment in good shape?

Service provider interview questions:

- When you think about what makes a 'home' for older tenants, what three words come to mind?
- What are the main challenges older adults face maintaining their unit?
- What factors influence how successful tenants are at maintaining their unit?
- When tenants have challenges with their unit condition (e.g. pests), how do you work with housing staff/service providers to support them?

Following our analysis, a composite narrative was created to draw together the shared experiences of tenants managing a bedbug infestation. Composite narratives draw on data from several interviews to create a single story that reflects a common understanding,[25] and they give voices to groups with unique lived experiences.[26–28] The choice for a composite was also driven by the personal and compelling stories shared by tenants. Following the steps described by Willis,[25] the narrative was created out of coded data emerging from tenants who had lived through persistent bedbug infestations that spanned many treatment cycles. The creation of the narrative was iterative, involving repeated cycles of reviewing the data and writing the narrative. The final narrative synthesizes the lived experience of tenants and conveys the richness of their stories through verbatim quotes.

RESULTS

Bedbugs were a 'paramount issue [. . .] regardless of what building or what part of the city' (SP30, Care Coordinator). They were a constant source of fear, and tenants felt that no matter how hard they worked, the bedbugs always came back. Infestations had reportedly increased over the past two decades, with one geriatric psychiatrist describing how 'this is something I never thought I would talk about, I literally never dealt with it in the 80's and 90's [. . .] and now it's become a nightmare' (SP14, Geriatric Psychiatrist). In fact, infestations had become so widespread that this participant felt the housing provider was 'fighting a losing battle – they're like a finger in a dike but they don't have enough fingers'.

Many tenants had repeated experiences with bedbugs; the composite narrative shown in Box 1 reflects this experience. The remainder of our results discuss the challenges of preparing and treating units for bedbugs, including the reasons that make unit preparation challenging for older tenants, the difficulties coordinating treatment, and the impact of bedbugs on accessing in-home health and social services.

Preparing the unit – 'If things don't get prepped properly, you'll never get rid of the bedbugs, but you can't expect a senior to be able to prep their unit'

Service providers and tenants stressed the importance of the pre-treatment preparations, emphasizing that the unit 'has to be prepared in a flawless way' (SP13, Supportive Housing Manager) or else the bedbugs return; however, there was a widespread understanding that older adults face obstacles preparing their unit. As one service provider described, 'they might have the wherewithal to prep but they don't have the physical ability. Or they might have mental health [challenges] and not understand how to prep or comply with the requirements' (SP9, CSS Manager). These physical and mental health challenges were exacerbated by a lack of financial and social resources that would usually be drawn upon in the absence of accessible prep services (see Table 3).

'Flawless' unit preparation included de-cluttering and 'bag[ging] up all your stuff. Not just your clothes. Everything. Things on the walls, all into bags' (SP7, Tenant Services Coordinator). This was particularly difficult for tenants living in bachelor apartments 'where there is nowhere to put all your packed stuff' (Tenant 35). 'Living out of bags' (Tenant 27) was stressful and frustrating, as it was difficult to find belongings among the 'dozens of bags' (Tenant 28). Tenants described living in 'chaos' (Tenant 25) and noted that preparation process 'destroyed their life' (Tenant 21). Throwing out infested furniture was particularly traumatic but commonplace. As one tenant described,

> *I had nice drapes on there. I saw one crawling down. Gone. I got rid of my couches. I got rid of my bedding. I washed the clothes so much I don't*

Box 1 Rose.

Rose is 70 years old. For the past 5 years, she has lived alone in her bachelor apartment. Unfortunately, Rose has bedbugs. She has had them six or seven times since she moved in, and each time it destroys her life. She is not sure where they came from this time – she thought she had been so careful to avoid her neighbour who she knew had refused bedbug treatment. Rose puts out a powder she got from the hardware store to try and stop them, but the infestation continued to grow: '[The bedbugs] basically ended up [in] my couch, behind my bookcase, behind my wall unit. They were in my bedroom, they were actually in my bed [. . .] and literally when I would lie down to go to bed, I could feel them moving [on me]'.

Rose was afraid to tell her housing provider – she is worried they will make her throw out her things or that they might ask her to leave because she keeps having issues. After a few weeks, she finds the courage to report the infestation, and housing staff tell her that a pest control company would be coming to spray her apartment next week and that she needed to prepare her unit. Even though Rose is 'one of the more fit seniors in the building', she knows from experience that 'the prep is extremely hard' and she cannot do it on her own. Even though it's not her job, her social worker put on a 'hazmat suit' and helped Rose throw out her bed and her couch, which she was told were too infested to clean. Since Rose cannot afford to buy new furniture, her social worker is going to make a referral to the local furniture bank to replace the items that were thrown out, but until then, she will have to 'sleep on the floor'.

Throwing out her belongings makes Rose upset, but she knows it's her only option. 'I don't like losing my stuff, but I do. And the only way to get rid of [the bed bugs] is to get rid of all the stuff you have'. Together, they also packed away all of Rose's clothes, and put the rest of her belongings into freezer bags, including her books and pictures, so that the bugs won't get them. 'Everything I had in my apartment was all in plastic bags in the middle of my floor or on my kitchen table. I cannot move in my apartment, [. . .], I've got maybe [two or three feet] of space that I can maneuver in. [. . .] It looks like a tsunami'.

Since her apartment is so small, Rose 'filled up [her] bathtub [with bags], so every time [she] wanted to take a shower, [she] had to empty [it] out'. Rose is worried about how long she'll have to live this way; she knows it will be at least 6 weeks before she can unpack her things, but it could be longer. With all her stuff in bags, she no longer feels safe or at home in her apartment. She also doesn't want her friends to find out – what if they start avoiding her now?

Rose does not trust her housing provider to get rid of the bedbugs. The contractors rarely show up, and when they do, they 'are in and out in five minutes'. Tomorrow, she is going to go out and buy a steamer so that she can 'steam the bejeebers out of everything' like the baseboards and her chairs. Rose hopes that this will help her have more control in her life and stop living out of bags.

think they're even going to stand up any longer. I can't afford this anymore. I can't afford living on the floor, sleeping on the floor, because if I get them again, everything's going back to the garbage. I've just had enough. (Tenant 39)

Service providers indicated they do 'the best we can with the hours we have' (SP13, Supportive Housing Manager) to help with preparation, but most were not resourced to provide full support. There was also a noted gap with the lack of 'post-prep' services to help tenants unpack and re-organize their apartment after treatment:

A big problem [. . .] is there's not really any post prep. So, you got the prep, you got the treatment, but all your stuff is in bags on the floor now and it's been three months and your bags are all over the floor and you can't physically put the stuff away. Now you're pissed because you agreed to this service, and you didn't think it was going to disrupt your life and now it has [. . .] and no one is helping you put it away. (SP6, Social Worker)

Getting treated – 'It takes a concentrated effort to help the people that are most vulnerable'

Service providers emphasized the need to work together with tenants, housing staff, and vendors to successfully treat the units. Without effective coordination, service providers described the risks of tenants refusing treatment or bringing infested items back into the newly treated unit because their coats, bags, wheelchairs or walkers, and cat carriers were not steamed:

You need to organize to have a [personal support worker] there to make sure they get showered and bathed, that they put on clean clothes, and that somebody is there when the pest control guy comes so that he knows he needs to steam down the walker. It's a lot to coordinate. (SP7, Tenant Services Coordinator)

One service provider attributed their success to the fact that they were a member of an 'integrated pest-management table' that included staff from their agency and the housing provider who worked together to apply a case management approach to tenants with chronic bedbug infestations.

A notable challenge was that 'people don't know where to go when they have to be out of the unit for four hours' (SP7, Tenant Services Coordinator). While one nurse practitioner described how their 'program has access to a respite unit while they are getting bed bug treatment' (SP2, Nurse Practitioner), others stressed that tenants 'don't have anywhere to go' (SP24, Care Coordinator) and that it was unreasonable 'to ask an 80-year-old woman with mobility issues to spend five hours in the lobby' (SP1, Social Worker). This process was even more complicated for tenants with pets. One tenant discussed the difficulty he had putting his cats in carriers to keep them in the gymnasium all day (Tenant 7), while a service provider described how they 'put

Table 3

Challenges faced preparing units for treatment

Challenge	Supporting quote
Lack of education and awareness	'A lot of times people won't say anything if they see it's a problem. Others don't see the problem. 'Oh, it's couple of bugs' meanwhile they are everywhere. And so, that's challenging, as well as them understanding the cycle of bedbugs and the importance of prep. There are sometimes inconsistencies in how that's communicated and the expectations around that'. (SP1, Social Worker)
Lack of social support	'They have very limited social support, so there is no one to do the prep for them'. (SP14, Geriatric Psychiatrist)
Poor physical health	'I have osteoarthritis in both my legs and in my lower back. I've had two knee surgeries on my left knee, total knee replacement. I cannot bend down, and I cannot pick things off the floor'. (Tenant 7) 'If they have a visual impairment, they can't see the bedbugs. They don't always react to a bite, and they can't see the bite'. (SP15, Case Manager)
Memory problems	'We work with a lot of people with cognitive impairment, and someone will come in and put all the stuff in bags and then the tenant doesn't remember why [their stuff] is in bags. So, they open them all back up again'. (SP2, Nurse Practitioner)
Lack of financial resources	'[The housing provider] will come in to treat the unit, but these seniors, they don't have any income, they can't pay for any private help to come and help them [prep]'. (SP33, Care Coordinator)
Lack of support services	'A lot of times, a person can't get access to [prep] services unless they are going to be evicted'. (SP13, Supportive Housing Manager) 'The bed bugs end up coming back. [. . .] but it's hard to find funding for people who get bedbugs repeatedly. Agencies, I find, will fund the first time, then you're on your own'. (SP31, Care Coordinator)
Excess clutter	'Hoarding and bedbugs, they go together. Once they have accumulated a lot of things in the apartment, the bedbugs live there'. (SP51, Supportive Housing Nurse)
Fear of repercussions	'The tenants that are afraid to come forward because they're afraid of . . . Let's say, seniors in general, have a feeling where they're losing some control over their lives. [With bedbugs], the fear is that if someone comes in, maybe they'll make me throw away all of my belongings, maybe they'll throw me out, maybe they'll do something I don't understand, and I'll get sick, or whatever'. (Tenant 35)

the cat on the balcony and hope it's okay' (SP6, Social Worker) because there were no other options. Tenants and service providers alike questioned why there was not a more systematic approach to treatment supports; while tenants described that they were sometimes able to use an empty unit in their building, these were not reliably available.

Quality control with pest vendors was also an issue. Participants were concerned that the housing provider 'takes the lowest bidder' (SP52, Supportive Housing Nurse) and had several examples of vendors not coming at the designated day or time, as well as superficially treating the unit. Participants stressed the need to 'enforce' proper treatment protocols, as vendors were known to cut corners:

> *Sometimes I'm playing the role of, 'they didn't get their spraying this week? What happened with that?' or 'they've had all their sprayings, but it looks like there's still some bugs there', you know? Getting them back in. [I have to] advocate, but also [be] the bug inspector as well, it seems.* (SP1)

Tenants wanted to be able to give input on pest control vendors. One tenant exclaimed, 'we're the ones that live there, right? If anybody's going to know, we're going to know [. . .] we're going to see [who] is getting results or not getting results' (Tenant 27). In the absence of effective pest management, tenants took it upon themselves to implement their own measures. They used diatomaceous earth (Tenant 16) and eucalyptus and bleach cleaning solutions (Tenant 17), paid for private fumigation (Tenant 30), and purchased hand-held steamers (Tenant 15 and Tenant 27). Others lobbied their City Councillor for building-wide pest-management initiatives. For instance, one tenant shared a list of 21 written deputations presented at City Council describing their chronic infestations, while another discussed a recent experience organizing a meeting between housing staff and their local councillor:

> *We've been asking for [a building-wide treatment] for a long time, and we've done our own in-house surveys, we've followed the pest*

Table 4

Strategies used by service providers to reduce exposure in infested units

Safety strategy	Supporting quote
Wear personal protective equipment	'It depends on how bad the bedbugs are. So, it can be from just the booties that cover the shoes, if they are not bad at all, to the knee-high booties, to a full suit'. (SP13, Supportive Housing Manager)
Bring a change of clothes	'I always bring myself a change of clothes or two in my car, because sometimes if I know I've been in a unit that is pretty infested, then before I leave the building, I change my clothes'. (SP6, Social Worker)
Bring a stool to sit on	'Yeah, you can't really have a conversation with somebody, particularly if you're getting into complicated stuff, while you're standing. Plus, I need to be taking notes, like I can't do that standing up [. . .] if it's reasonably safe, if I can find like a plastic chair or something to sit on, I'll do that. But barring all of that, I have a little camp stool just a little foldable camp stool that I take with me, and I just sit on that'. (SP2, Nurse Practitioner)
Education sessions	'We do extensive training as well with staff. We actually brought [housing's pest control manager] in one time to give a presentation to staff just around what to do if you're in an environment with bedbugs. There are techniques and tactics that we teach staff. Some of the things, like you said, the bedbug one, some of the number ones are really like, not using cuffed pants, for example, not sitting, don't put your things down, checking yourself as soon as you leave. Or leave your belongings in the car or outside the door'. (SP10, CSS Manager)

> *people around to see how many units they were doing. No one in management was listening to our problems. So, we thought it was time to phone the councillor. It has taken [4 months] to get a response from [housing] to come to a building meeting. [In the end], they said the building is lined up for the full building treatment that we have been asking for since [last year].* (Tenant 35)

Access to services – 'There's a lot of agencies that won't even go into someone's place if they have bedbugs'

Tenants experienced bedbug stigma from community services: some were not eligible for services if they had an active infestation, and others were asked not to attend medical appointments until the infestation was cleared:

> *Going to physiotherapy, I put my coat on, and I saw that I had bedbugs on my coat that had been super dried twice. I thought, [if I tell them], they'll make me cancel and they will make me pay for the physio anyways.* (Tenant 15)

Service providers discussed going into infested units only if they felt comfortable. For instance, one nurse practitioner indicated that they would go into units 'as long as the infestation is not overwhelming, like [if] there's bedbugs falling off the ceiling, which we have sometimes' (SP2). In the absence of entering units, service providers would try to meet clients in common areas of the building but cautioned that this was 'not a practical policy' (SP1, Social Worker) because many clients are unable to safely leave due to mobility challenges. Other service providers distinguished between providing hands-on care versus psychiatric and mental health support, suggesting that it was more difficult to provide personal care (e.g. bathing) in infested units, especially as the packed bags create safety hazards navigating the unit.

Service providers did not want to 'be the cause of the bedbugs that spread' (SP16, CSS Manager). To reduce risk, they implemented a variety of strategies to limit exposure in infested units (see Table 4). Despite the need for these safety measures, some were concerned that they dehumanized their client. For instance, one service provider reflected that 'when you're pulling the [full] body suit on, the tenants know there is a real serious problem. Usually the first question is, why am I still here if it's bad enough for you to put that on?' (SP8, Tenant Services Coordinator). Another felt it was impossible to maintain a client's dignity if you bring your own chair into their home (FG34, Care Coordinator).

DISCUSSION

Our findings shed new light on the experiences of bedbug infestations among low-income older adults and the health and social service providers who support them. Participants described fighting a losing battle against pervasive bedbug infestations. Older tenants faced several obstacles navigating the pest-management process, including difficulties preparing their unit and coordinating treatment. In addition to the detrimental impacts on mental health, bedbugs negatively impacted access to services. Findings point to several opportunities to enhance integrated pest-management strategies to improve outcomes for low-income older adults.

This study highlights the stress that older adults experience managing bedbugs: tenants lived in fear of having to manage another infestation. The process of preparing their unit for treatment felt insurmountable due to physical, mental, social, and financial barriers. For those who were forced to throw away their belongings, the added financial strain of replacing their belongings created additional distress. Many tenants also experienced stigma from service providers who refused services due to bedbugs. While experiences of distress, stigma, and fear have been widely reported in commentaries and case

Table 5

Practice recommendations.

Provide More Unit Prep and Unprep Services	More public health funding is needed to support older tenants with unit preparation, furniture replacement, and reorganization (i.e. unprep) after treatment to reduce the physical, psychological, and financial impacts of bedbug infestations.
Include Service Providers as Members of the Integrated Pest-Management Team	Integrated pest-management teams should be expanded to include health and social service providers, as they play a critical role in identifying and reporting infestations, supporting unit preparation, liaising with pest control vendors, and facilitating follow-up preventive measures, including identifying re-emerging infestations, and providing support for factors (e.g. clutter) that place older tenants at risk for re-infestation. Including health and social service providers as members of the integrated pest-management team will allow for the co-creation of best practice guidelines for operating in infested units and facilitate opportunities for training on strategies to identify infestations and reduce personal exposure when supporting clients in infested units.
Enhance Pest-Management Approaches for Older Adults	Social housing providers need to tailor their pest-management approach in response to the unique challenges faced by older tenants. This should include more diligent, building-wide monitoring of infestations, as well as providing resources to support the preparation and treatment process such as mattress encasements, heavy duty garbage bags, and a safe place to stay in during treatment.

reports over the past decade, very little original research has been conducted.[13] Therefore, our findings provide some much-needed insights into the concerns of low-income older adults about bedbugs, and how these infestations impact their mental health.

In prior research, spatial factors (e.g. clutter) were recognized as key safety concerns in homecare.[29,30] Bedbugs, however, were not discussed, despite the potential reluctance to provide care in infested homes.[16] In this study, service providers discussed the need to balance their personal safety with their duty to clients; however, strategies to reduce exposure in infested units were not always perceived as feasible to implement, particularly when they further stigmatized the client. The lack of best practice guidelines for providing services in infested units also led to inconsistent policies across agencies, creating additional barriers to support.

Older tenants and service providers both expressed concerns over the quality of pest control vendors and the implications this had for the treatment process. Studies show that choosing the lowest cost vendor is not uncommon, but dedicated and careful vendors are needed to ensure success.[8] As a result of poor-quality vendors, tenants had little trust in their housing provider to manage infestations and resorted to implementing their own initiatives, including mobilizing political ties to advocate for better vendors and building-wide treatment protocols.

Recommendations

Based on our findings, three recommendations have emerged to enhance the integrated pest-management process for low-income older adults (see Table 5 for a summary).

Provide more unit prep and unprep services

Non-compliance with the preparation process is a well-known barrier in pest management.[6–10] Our findings build on this literature and shed further light on the physical and mental health challenges older tenants face executing and complying with the preparation process. Lack of social support and financial resources exacerbated these issues, and there were very few services available in the community to fill these gaps. There was also a dearth of formal supports to help tenants unpack and re-organize their apartment following treatment. In a noteworthy evaluation of an integrated pest-management approach with low-income older adults,[8] housing staff were responsible for carrying out preparations. Without resources to support underlying physical, mental, social health challenges, compliance with the preparation requirements is likely to be an ongoing issue.

Include service providers as members of the integrated pest-management team

Successful integrated pest-management programmes involve a three-way partnership between residents, building managers, and pest managers;[6] however, our findings identify health and social service providers as key partners. As evidenced by one agency in this study, integrated pest-management meetings between housing staff and service providers allowed for case management approaches to be applied, ensuring that tenants with complex needs were fully supported throughout the treatment process. This practice also facilitated training opportunities for frontline staff on how to identify bedbugs and strategies to reduce exposure in infested units. This type of interprofessional team is further supported by Ashcroft et al.[13] who called for interdisciplinary collaborations to develop effective strategies to support clients during pest infestations.

Enhance pest-management approaches for older adults

There are several ways for housing providers to tailor their pest-management approach to better support older tenants. One widely-requested example was a designated unit for older tenants and their pets to use while their unit is being treated. In other studies, housing staff provided mattress encasements and

heavy duty garbage bags to older tenants to support unit preparation.[8]

Our findings also highlight the need for more deliberate, building-wide monitoring to address persistent and re-emerging infestations. For instance, Cooper et al.[8] found that a rigorous bi-weekly post-treatment follow-up schedule with older tenants was important for ensuring infestations were completely cleared. Participants in this study also called for more regular unit inspections as well as more accountability for pest control vendors, as they observed that vendors cut corners during treatment. While this level of monitoring may be more resource intensive,[8] it may also help re-build trust among tenants that their housing provider is committed to providing a pest-free home.

Limitations

This study does not capture the experiences of housing administrators and pest managers, who are critical members of the integrated pest-management team. Future research should apply qualitative approaches to consider the barriers and facilitators of integrated pest-management strategies with low-income older adults from these perspectives.

CONCLUSION

Older adults in low-income housing communities are more vulnerable to pest infestations and face a variety of obstacles navigating the pest-management process. As a result, many have repeat experiences with bedbugs. There is an urgent need to increase public health funding to support older adults with the cost of bed bug elimination and to enhance pest-management strategies through partnerships with health and social service agencies.

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CONFLICT OF INTERESTS

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