REVIEW ARTICLE

Postnatal Depression and Homelessness in Women Living in High-Income Countries: A Scoping Review

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Abstract Postnatal depression (PND) is estimated to affect approximately 17% of mothers, and if left untreated can have negative health consequences, not only for the mother but for the family unit. Homelessness is a multifaceted concept which also has negative health consequences and is often termed a stressful life event. Exploring the literature which links these two factors may promote the implementation of policies which work to address both these health issues. The aim of this scoping review was to determine the breadth and nature of the literature investigating the quantitative relationship between PND and homelessness in women living in high-income countries. Comprehensive searches were performed in June 2020 in MEDLINE, PsychInfo, Embase, Social Policy and Practice and Applied Social Sciences Index and Abstracts. Grey literature was also searched, including unpublished studies, dissertations, conference proceedings and reports by the UK charities. Twelve studies met the eligibility criteria. There are few well-controlled longitudinal studies and a high level of variability between studies in terms of the definitions used for homelessness and in the screening tools to detect PND symptoms. Future research would benefit from undertaking waves of prospective data collection, using a well-defined concept of homelessness and implementing validated tools for measuring PND.

Keywords Postnatal depression · Homelessness · Maternal · High-income countries

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Introduction

Untreated postnatal (postpartum) depression, or PND, is linked to negative maternal health consequences for some mothers, including social relationship problems, addictive behaviours, poorer quality of life and suicidal ideation (Slomian et al., 2019). The environment created by PND may also not be conducive for the optimal development of an infant, with possible adverse outcomes including insecure attachment, behavioural problems and impaired emotional development (Stanley et al., 2004). PND is estimated to affect approximately 17% of mothers (Hahn-Holbrook et al., 2018; Shorey et al., 2018). PND is considered to be a depressive episode which occurs in a specified time frame after birth; ranging from within the first 4 weeks (American Psychiatric Association, 2013) to up to 1 year (Wisner et al., 2010). There is debate on whether PND is a distinct diagnosis, with general diagnostic interview schedules and both general and postnatal specific symptom questionnaires used to identify cases and ascertain severity (Hewitt et al., 2009).

Homelessness is a life event which has been linked to poor health outcomes (Thomson et al., 2013). These health impacts result in rates of morbidity and mortality that are higher in homeless individuals than in the general population (Fazel et al., 2014). Homelessness and ill health are intrinsically linked. Whilst homelessness can result in ill health, ill health can also be a contributary factor for entering a state of homelessness. The relationship between poor mental health and homelessness has been systematically reviewed, showing a positive association between housing insecurity and poor mental health outcomes (Singh et al., 2019). Mental health problems are more prevalent in people who are socioeconomically disadvantaged (McManus et al., 2016). Housing as a key social determinant of mental health may reflect the correlation between housing insecurity and stress,

as well as the possible barriers for people without stable residency in accessing primary and secondary mental health services (Perry and Craig, 2015). Housing is a fundamental determinant of health, security of which is directly related to income and social position (Braubach and Fairburn, 2010).

There is no universally accepted definition of homelessness and varying typologies of homelessness reflect the different realities of people without shelter in different regions of the world (United Nations Centre for Human Settlements, 2000). The lower level of social provision in developing countries results in a narrower concept of homelessness, often defined as simply being 'roofless'. In high-income countries where secure tenure is the norm, the concept of homelessness is often widened, reflective of higher general living standards. The European Federation of National Organisations working with the Homeless (FEANTSA) proposed a definition which incorporates those who are roofless, houseless or living in insecure or inadequate housing (FEANTSA, 2017). This includes those living in threat of eviction, in overnight shelters or refuge accommodation. The lack of consensus on the definition of homelessness in either political or research environments has led to the definition of homelessness in studies being operationalised differently by individual research teams, which can be problematic for describing the extent of the problem (Fitzgerald et al., 2001).

Outside of statutory or organisational bodies' definition of homelessness, particular emphasis may be placed of homelessness on the concept of 'home'. Home has a plurality of physical and emotional meanings attached to it (Ravenhill, 2003). For Jackson-Wilson and Borgers, homelessness is a form of alienation from the rest of society, caused by the loss of a bond that links, or connects, the individual with society (1993). This disaffiliation may be a result of a loss in work, home or family links. For women particularly, marital and family instability can lead to a form of societal alienation and feeling of homelessness, irrespective of their economic living situation. Conversely, those with poor living standards may not identify with FEANTSA's definition of homelessness, as their strong social ties mean that they still identify themselves as having a 'home' (Ravenhill, 2003).

Most of the research on homelessness has focused on men who are roofless (Bretherton, 2017). For mothers who perceive themselves as homeless, or are defined by organisations such as FEANSTA as homeless, their lived experience can differ depending on their cultural background. The cultural underpinnings of a society, such as a collective system of values or beliefs, as well as political and economic factors can create vulnerability in individuals (Shier et al., 2011). The lived experiences of women who are homeless may differ depending on public perceptions, societal discrimination and their own ideological values and beliefs. Some mothers have discussed feelings of fear, shame and embarrassment because of their homelessness (Milaney et al., 2017). Some

mothers have also cited the needs of their children as first and foremost, whether that be for health, safety or stability. The extent to which homelessness and PND co-occur is relatively unknown (Bretherton, 2017). It is also important to understand whether PND might be a precipitating factor in moving into a state of homelessness for some families, or whether homelessness is more likely to be a risk factor for PND. This type of research requires longitudinal studies. A greater understanding of the pathways into homelessness and its relationship with mental health, along with the potential extent of co-occurrence, might promote the implementation of policies that broach both public health sectors, not just addressing individual problems in isolation to other socioeconomic issues (Mago et al., 2013).

In recognition of the uncertainty of the evidence sources or potential gaps in the knowledge base, we applied a scoping review methodology to establish how much quantitative research existed on this topic, how key concepts were measured and the study designs used. The review was guided by the research question, 'How has the literature quantitively explored the relationship between PND and homelessness in women in high-income countries?' and three objectives: 1. To ascertain the extent to which the literature has quantified the nature of the relationship between homelessness and PND; 2. To determine how the outcome of homelessness and PND were measured and analysed and 3. To determine whether there was a possibility of establishing causality through classifying the quantitative study designs employed.

Methods

We used a framework for scoping reviews (Arksey and O'Malley, 2005) and the scoping review reporting framework (PRISMA-ScR) (Tricco et al., 2018).

A comprehensive search strategy was developed in MEDLINE and then adapted for PsychInfo, Embase, Social Policy and Practice and Applied Social Sciences Index and Abstracts electronic databases. This was an iterative process, refining the search strategy based on abstracts retrieved during piloting. The final search was conducted on 17 June 2020. Keywords such as homeless, inadequate housing, insecure housing and postnatal depression were used. Subject headings, synonyms, truncations and boolean operators were used to expand the search. The full search strategy conducted in MEDLINE is found in Appendix 1.

Grey literature was searched through Opengrey, Health Management Information Consortium (HMIC) database, e-thesis online service (EThOS) and databases of relevant UK charities. Grey literature from charities was searched for only in the UK in recognition of the practical difficulties for searching in all high-income countries. Websites of the UK charities that produce reports in the fields of mental

health, pregnancy or homelessness were searched (Appendix 2). Reference lists of all included studies were reviewed to locate additional papers. All retrieved studies were downloaded into Endnote (version X9.2) and de-duplicated using this software. The titles and abstracts of retrieved studies were screened by one reviewer for eligibility and the full text of potentially eligible studies obtained. These were then assessed against the inclusion and exclusion criteria by one author. The inclusion and exclusion criteria are found in Table 1. Data were extracted using a charting form which was adapted and expanded from the version proposed by Arksey and O'Malley (2005). As is usual for this kind of review, quality assessment of the studies was not performed.

Results

The electronic search strategy yielded a total of 6009 records, and the grey literature and reference list searches yielded 61 records. After deduplication, 3631 records were screened. After screening against eligibility criteria,
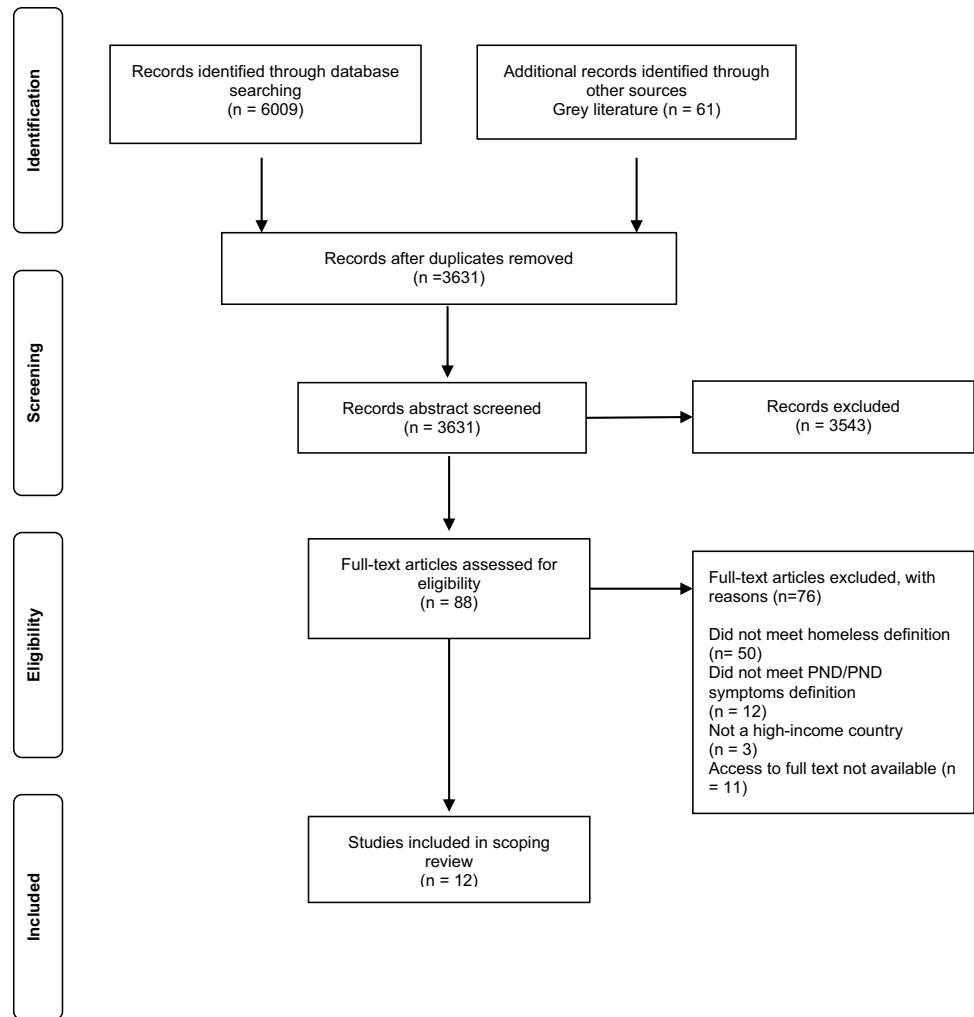
12 studies were found to be relevant for this review (see Fig. 1). Included studies were conducted in four high-income countries, the US (8), the UK (2), Australia (1) and Canada (1). All studies analysed observational datasets consisting of large populations, ranging from 2631 to 91,253 women. The mean sample size across the studies was 26,527 women. The general study characteristics are displayed in Table 2.

Definition of PND

Across the studies, six different methods for measuring PND and four different concepts of homelessness were used. The most common method for measuring PND symptoms was the Pregnancy Risk Assessment Monitoring System (PRAMS) Core questionnaire (Centers for Disease Control and Prevention, 2021), 42%, which asks mothers about their attitude and feelings since giving birth. The six studies which used the PRAMS questionnaire used the same cutoff value to determine depression, women scoring nine or more out of a possible 15 were classed as depressed (Liu et al., 2018; Mukherjee et al., 2017, 2018; Pooler et al., 2013;

Table 1 Inclusion and exclusion criteria

Inclusion criteria	Exclusion criteria
Population	1) Studies not published in English (due to the limitations of time and resources)
Women who have experienced, or are experiencing PND, and homelessness. The definition of PND is adopted from the Health Technology Assessment report's definition of depressive symptoms or a diagnosis of depression, beginning in or extending into the post-natal period (up to 1 year after giving birth) (Hewitt et al., 2009). The diagnosis of depression or reporting of depressive symptoms could be collected either through the use of standardised diagnostic instruments for PND or self-reporting measures, such as a symptom questionnaire	2) Full-text article was not accessible
In addition, the study population were identified as having experienced, or were experiencing, homelessness. For this review, homelessness included those meeting FEANTSA's definition which includes those who are roofless,	3) Opinion pieces, newspaper articles, case reports or studies containing only qualitative outcomes
houseless and living in insecure or inadequate housing (FEANTSA, 2017). There is no age limit on the population of interest	4) Studies undertaken in low- or middle-income countries
Concept	
Exploring the extent to which the literature has examined the nature of the relationship between PND symptoms and homelessness as a life event, including any methodological and empirical gaps which may suggest future research requirements	
Context	
Limited to studies in high-income countries as defined by the World Bank for the 2020 fiscal year (The World Bank, 2020)	
Study design	
Studies using quantitative research methods. These included primary research studies, secondary data analysis, meta-analysis, surveys, systematic reviews and scoping reviews. Reviews were used to identify quantitative studies	
There were no date limitations	
Publication type	
In order to minimise publication bias, this scoping review aimed to include peer-reviewed journal articles and grey literature	

Fig. 1 PRISMA flowchart

Qobadi et al., 2016; Salm Ward et al., 2017). Two other studies used a validated scale**,** the 10-question Edinburgh Postnatal Depression Scale (EPDS), to measure depressive symptoms (Cox et al., 1987). Dennis et al. (2012) considered scores of 13 or more on the EPDS as depressive symptoms whilst Denckla et al. (2018) did not use a cutoff value as this study aimed to review symptom trajectories. The Millennium Cohort Study analysed by Tunstall et al. (2010) used unvalidated questions, instead asking the mother about feeling low or sad for 2 or more weeks since birth.

In contrast, three methods of measuring PND were used in the included studies which were not specifically designed to measure depressive symptoms in postnatal women or to diagnose PND. The Patient Health Questionnaire-2 (PHQ-2) is a screening tool for depression, used by Pooler et al. (2013), adapted from the PHQ-9 (Kroenke et al., 2001, 2003). The Depression Anxiety Stress Scale (DASS), is a self-reported 21 item severity questionnaire, used by Yelland et al. (2010) with scores over 10 characterising depressive symptoms, again not specifically designed for the postnatal

period (Lovibond and Lovibond, 1996). The Composite International Diagnostic Interview-Short Form (CIDI-SF) used in two studies was the only measure of PND assessed by a diagnostic interview. The CIDI-SF was designed for large-scale epidemiology studies, it does not require clinical judgement and the long form is considered a 'gold standard' in the diagnosis of depression (Kessler et al., 1998). Both studies that used the CIDI-SF defined a major depressive episode as the experience of three or more symptoms of dysphoria or anhedonia (Curtis et al., 2014; Park et al., 2011).

Definition of Homelessness

As defined by FEANTSA, and conceptually theorised by the United Nations Centre for Human Settlements, homelessness in high-income countries incorporates not only those who are roofless or houseless but individuals living in insecure or inadequate housing (FEANTSA, 2017). Nine studies, spanning all four countries, measured homelessness by using a yes/no questionnaire in which homelessness was defined

Table 2 Characteristics of included studies

Author(s) and year of publication	Country of origin	Study's aim/purpose	Study participants	Dataset	Data analysis	Findings
Curtis et al. (2014)	US	To estimate the effects of maternal depression during the postpartum year on subsequent homelessness and risk of homelessness in a national sample of urban, mostly low-income mothers	2974 mothers from 75 hospitals in 20 US cities	Fragile Families and Child Well-being study, a longitudinal birth cohort survey. 1998–2000	Data analysis from two data waves, the 1-year follow-up for PND symptoms and 3-year follow-up for homelessness	Depression during the postpartum year was associated with more than twice the odds of homelessness (OR 2.29) and almost 1.5 times the odds of risk of homelessness (OR 1.40) at 3 years post-birth
Denckla et al. (2018)	UK	To track patterns of chronically elevated levels of depressive symptoms during pregnancy and after childbirth and to identify sociodemographic factors associated with these different trajectories	12,121 mothers	Avon Longitudinal Study of Parents and Children (ALSPAC), longitudinal prospective observational study 1990–5	First wave of data collection at 18 weeks gestation for homelessness. Depressive symptoms assessed at seven waves, at 18 and 32 weeks of gestation, 8 weeks postpartum and thereafter at 8, 21, 33 and 61 months	Comparing the trajectories of depression, the chronic (high levels of depressive symptoms antenatally and postnatally) and improving group (depressive symptoms decline postnatally) experienced greater difficulty with housing compared to the resilient group (stable low depressive symptoms)
Dennis et al. (2012)	Canada	To describe the prevalence and identify predictive factors for depressive symptoms in women 12 weeks postpartum	6421 women	Canadian Perinatal Surveillance System, a cross-sectional survey 2005–6	Cross-sectional data analysis of PND and homelessness at 5–14 months postpartum	Comparing women with and without postnatal depression, the proportion who reported homelessness was 'not reportable', owing to a large coefficient of variation

Table 2 (continued)

Author(s) and year of publication	Country of origin	Study's aim/purpose	Study participants	Dataset	Data analysis	Findings
Liu et al. (2018)	US	To examine racial/ethnic disparities in PND symptoms and to identify specific predictors	3010 women	Pregnancy Risk Assessment Monitoring System (PRAMS), a population-based survey 2009–2011 from New York City	Cross-sectional data analysis. Mean infant age at the time of survey completion was 3.9 months	Stressors, including homelessness, were reported as a count. Women were significantly more likely to be identified with PND if they had 1–2 stressors (1.8 OR), 3–5 stressors (3.4 OR) and 6+ stressors (10.6 OR). Relative to no stressors, having 3–5 stressors was associated with PND for Whites, Hispanics and African Americans, and 6+ stressors were associated with PND only for Hispanics and African Americans
Mukherjee et al. (2017)	US	To examine patterns of antenatal stressful life events experienced by women in the US and their association with PND	91,253 women	PRAMS 2009–11 and state-level indicators published by the Institute of Women's Policy Research	Cross-sectional analysis of PND symptoms and homelessness administered 2–4 months postpartum	Stressful life events, including homelessness, were grouped into four categories for reporting. Women who experienced all the four stressor categories had the highest prevalence (34.5%) of PND symptoms, whilst the prevalence was the lowest (5.4%) among those who did not experience any stressor
Mukherjee et al. (2018)	US	To explore the racial/ethnic differences in the prevalence and correlates of PND	87,565 women	PRAMS 2009–11	Cross-sectional analysis of PND symptoms and homelessness administered 2–4 months postpartum	Four ethnic groups who experienced homelessness were more likely to experience PND, in comparison with those not reporting homelessness. Non-Hispanic black (OR 1.13); Hispanic (OR 1.07); Asian and Pacific Islanders (OR 1.3) and mixed race ethnicities (OR 1.43). Non-Hispanic Whites were less likely (OR 0.94)

Table 2 (continued)

Author(s) and year of publication	Country of origin	Study's aim/purpose	Study participants	Dataset	Data analysis	Findings
Park et al. (2011)	US	To examine whether the health and health behaviours of homeless and doubled-up (sharing home with friends/family) families differ from those of other low-income families	2631 women	Fragile Families and Child Well-being Study, a longitudinal birth cohort survey. 1998–2000	Longitudinal analysis of survey administered at 1-, 3- and 5-year postpartum for PND and 1-year postpartum for homelessness	At the 1-year and 3-year surveys, depression problems were statistically significantly higher for mothers in the homeless group than for those in the low-income group
Pooler, Perry and Ghandou (2013)	US	To determine the prevalence and correlates of postpartum depressive symptoms (PDS) among women with a recent live birth	75,234 women	PRAMS, the population-based survey 2006–8	Survey administered 2–6 months postpartum. A cross-sectional analysis	Homelessness in the 12 months prior to the birth of their last child was associated with higher rates of postpartum depressive symptoms
Qobadi et al. (2016)	US	To estimate the prevalence of PND among new mothers in Mississippi during 2009–2011 and evaluate the effects of different stressful life events in the year before delivery on the likelihood of PND	3695 women	PRAMS, the population-based survey from 2009 to 2011	Cross-sectional analysis of PND symptoms and homelessness administered to 'new mothers'	The average number of stressful life events was significantly higher among mothers with PND (3.5) than those without PND (1.8). Mothers with high trauma-related stress (which includes women who answer yes to homelessness question) had a greater likelihood of reporting PND (OR 4.1; 95% CI 2.8, 6.1), compared to women with low traumatic stress
Salm Ward et al. (2017)	US	To examine the association of stressful life events with experiencing PDS among postpartum women in Georgia	10,859 women	Georgia PRAMS, population-based survey from 2004 to 2011	Cross-sectional analysis of PND symptoms and homelessness. Survey mailed within 2–6 months of delivery	Homelessness was associated with an increased risk of PDS (OR 1.86; 95% CI 1.26, 2.75). However, after controlling for other life events, homelessness was not associated with increased odds of PDS (OR 0.95; 95% CI 0.58, 1.56)

Table 2 (continued)

Author(s) and year of publication	Country of origin	Study's aim/purpose	Study participants	Dataset	Data analysis	Findings
Tunstall et al. (2010)	UK	To gain a more comprehensive picture of the relationship between mobility and health among pregnant women, infants and mothers in the UK	18,197 women	The Millennium Cohort born in the UK during 2000–2002	Cross-sectional analysis. Study wave one of infants aged 8–12 months	Elevated statistically significant odds ratios for maternal depression among those homeless (OR 1.60; 95% CI 1.08, 2.38) and negative movers (OR 1.61; 95% CI 1.27, 2.03)
Yelland, Sutherland and Brown (2010)	Australia	To determine the prevalence of maternal anxiety and depressive symptoms and to investigate the association between postpartum anxiety and depression and stressful life events	4366 women	Healthy Mothers Healthy Families Survey questionnaire 2007 in South Australia	Cross-sectional analysis. Measure stressful life events and depression 6 months postpartum	Reporting three or more stressful life events or social health issues was associated with a greater than fivefold increase in odds of depressive symptoms. One–two stressful life events (OR 1.78; 95% CI 1.5, 2.1), three or more (OR 5.95; 95% CI 4.7, 7.6)

ALSPAC Avon Longitudinal Study of Parents and Children, *CI* Confidence interval, *OR* Odds ratio, *PDS* Postpartum depressive symptoms, *PND* Postnatal depression, *PRAMS* Pregnancy Risk Assessment Monitoring System

only by the term itself (Denckla et al., 2018; Dennis et al., 2012; Liu et al., 2018; Mukherjee et al., 2017, 2018; Pooler et al., 2013; Qobadi et al., 2016; Salm Ward et al., 2017; Yelland et al., 2010). No other information was provided in these papers on how the authors defined the concept of homelessness to the participant; limiting the understanding of how this term was interpreted by the participants.

Three studies used a more detailed description of homelessness. The study conducted by Curtis et al. (2014), defined homelessness as not having a fixed, regular and adequate night-time residence, or living in a shelter or temporary accommodation. Using this definition incorporates all four domains of FEANTSA's definition of homelessness. In addition, they measured the imminent risk of homelessness by threat of eviction, which is included in FEANTSA's definition of homelessness under the conceptual category of an insecure living situation. Tunstall et al. (2010) used the definition of having nowhere permanent to live, which would include those who identify as roofless or houseless. An additional term used and measured in the Tunstall paper was 'negative movers', which included those with relationship breakdowns and those who are at threat of housing eviction. Although relational breakdowns are not included in FEANTSA's definition, it is cited in the literature as a key contributory factor to homelessness (Tischler et al., 2007).

Park et al. (2011) defined homelessness as those living in temporary housing, in a group shelter, abandoned building, on the street or other place not meant for regular housing. This definition meets FEANTSA's roofless and houseless categories. The Fragile Families and Child Well-being dataset analysed in this study used an extensive questionnaire to evaluate homelessness, enabling a more detailed definition than just 'homeless'.

Analysis of Multiple Stressful Life Events

Nine studies analysed more than one stressful life event alongside homelessness. In analysing more than one outcome, the researchers employed three different approaches in determining the relationship between homelessness as a stressful life event and PND. Six of the nine studies examined the risk of individual stressors on PND, thereby reporting separate figures on the association of PND and homelessness (Denckla et al., 2018; Dennis et al., 2012; Mukherjee et al., 2018; Pooler et al., 2013; Qobadi et al., 2016; Salm Ward et al., 2017). By measuring more than one outcome associated with PND, this gives the opportunity for authors to control for other stressful life events. Two studies took a cumulative approach by aggregating the number of stressors, regardless of the type, to report the association of an accumulation of reported stressful life events on the risk of PND. Liu et al. (2018) grouped the findings into 1–2 stressors, 3–5 stressors and 6+stressors. Yelland

et al. (2010) aggregated homelessness within 1–2 stressors or 3+stressors. The final approach, adopted by Mukherjee et al. (2017), was to categorise life events in four domains, including partner-related, traumatic, emotional and financial and to evaluate the effects of these domains on the risk of PND, regardless of the number of stressors in each category. Homelessness was included within the financial category of stressful life events. Although the studies which aggregated homelessness with other stressful life events did not produce results on a direct association between homelessness and PND, as these variables were measured independently from other outcomes, it would be possible to retrieve this figure from the raw data.

The Temporal Sequence of Homelessness and PND

The ability to determine a causal relationship between homelessness and PND is dependent on the study designs employed. Three studies conducted a longitudinal analysis of their datasets. Denckla et al. (2018) used the ALSPAC dataset whilst Curtis et al. (2014) and Park et al. (2011) analysed the Fragile Families and Child Well-being study. Curtis et al. (2014) considered maternal depression in the first wave of data collection at 1-year postpartum and then homelessness in the second wave of data collection at 3 years postpartum. The two data collection points were chosen in order to illustrate any effects of PND on subsequent homelessness. The other two longitudinal studies measured the association between homelessness and PND through observations at different time points. Denckla et al. (2018) used six waves of data collection on depressive symptoms, spanning 5 years after their initial data collection on homelessness status. Park et al. (2011) administered surveys at 1, 3 and 5 years postpartum for PND and 1-year postpartum for homelessness. Both these studies aimed to evaluate a causal inference between homelessness in the perinatal or postnatal period and subsequent depressive symptoms postnatally.

The remaining nine studies used a cross-sectional study design. However, seven of these included studies did consider the sequential order of homelessness and PND by analysing data collected retrospectively over different time periods. Six studies analysed data that asked about stressful life events in the year preceding childbirth. One study analysed stressful life events during pregnancy, whilst depressive symptoms were measured in the postnatal time period. None of the studies analysed whether bi-directionality was possible.

Discussion

In this scoping review, we explored the design of studies that have quantified a relationship between PND and homelessness in women living in high-income countries. Across the 12 included studies, only six different sources of data were reported, collected from four countries. The study design used was predominantly cross-sectional, with only three studies using longitudinal analysis to explore a unidirectional relationship between homelessness and PND. There was a large degree of variation, both in terms of PND measurement methods and definitions of homelessness. The variety of measures available for PND and its symptoms, as well as cutoff values, reflects the variability in concepts of PND adopted by authors and the potential practical limitations for large-scale studies to collect this information.

The geographical spread of included studies was expected. It correlates with a mapping of worldwide research productivity into maternal depression (Brüggmann et al., 2017). It also correlates with a recent global evidence map on homelessness research, which found that the US, the UK, Australia and Canada dominated the field (White et al., 2018).

Singh et al. (2019) conducted a systematic review of longitudinal studies to examine the temporal sequence between housing instability and the broader concept of mental health. They concluded that 'prior exposure to housing disadvantage may impact mental health later in life' (p.262). A limitation identified of the studies in Singh's review was the variability of measures used for housing inequality and mental health, resulting in a large amount of heterogeneity. The methodological limitations identified are similar to the findings of this review. Few of the studies included in this review used a well-defined concept of homelessness, with a poorly detailed definition allowing subjective interpretation of the term by the participant completing the questionnaire. Focusing on a narrower more stereotypical concept of homelessness, as in those living without a roof over their head, underestimates the extent of residential instability.

All 12 studies analysed large observational datasets, either longitudinal or cross-sectional in design, collected for surveillance reasons or as part of large study cohorts. Whilst the majority only used cross-sectional data, seven studies attempted to account for temporality by asking about events retrospectively. Recollecting depression symptoms or homelessness retrospectively, especially over long periods, can result in recall bias. Retrospective recall of depressive symptoms has been shown to be inaccurate when compared to momentary affect reports, with individuals prone to exaggeration of either positive or negative symptoms dependent on their current mental state (Ben-Zeev et al., 2009). The impact of retrospective recall bias on episodes of homelessness is not known.

Strengths and Limitations of this Review

We followed a published scoping review framework and searched a range of databases and grey literature sources across disciplines, using a wide range of key search terms (Arksey and O'Malley, 2005). The included studies in this review were limited to those published in English, which may have resulted in language bias and the exclusion of relevant papers that were published in other languages. All four countries have English as an official language, which may reflect this exclusion criterion. Grey literature from key charities was only searched for in the UK, this means it is likely we will have missed unpublished studies from charities in other high-income countries.

Recommendations for Future Research

This review identified multiple methodological limitations in the current evidence base that elucidates a relationship between PND and homelessness. The definitions of homelessness proved to be largely non-descriptive, with only three studies detailing homelessness beyond the term itself. Future studies may benefit from research materials with a definition of homelessness similar to that proposed by FEANSTA, thereby ensuring that the broad range of living conditions included under the umbrella of homeless is evaluated. There is also a scarcity in longitudinal studies with repeated measures on PND and homelessness, and most data collection on homelessness was done retrospectively. Novel studies going forward may benefit from waves of prospective data collection, enabling temporality between PND and homelessness. The use of structured or semi-structured interviews to establish postnatal depressive symptoms may also remedy the shortcomings of self-reporting measures. However, it is acknowledged that more intensive data collection methods are expensive and potentially unrealistic for large-scale studies, as well as the burden and difficulty of repeated data collections on a demographic of people who have troubled lives and high attrition rates in longitudinal research (Molewyk Doornbos et al., 2020). The use of symptom questionnaires is a more realistic method for large-scale studies, appreciating the likelihood of self-reporting to overestimate the prevalence of depression in the population (Thombs et al., 2018). Future research may also benefit from understanding the impact of retrospective recall bias on episodes of homelessness, and if, therefore, prospective data collection is necessary for accurate self-reporting.

Investigating a relationship between homelessness and PND should be viewed in the context of mothers having a number of other potential underlying economic and social stressors,

which are dependent on the society they live in Bina, 2008. In gaining a better understanding of these hierarchal structures, this could assist societies in creating and implementing policies which will effectively identify or manage PND. Future research into PND and homelessness in mothers should be designed in the context of the lived experience of mothers, accepting the different social structures that women reside in.

Conclusion

Research investigating the relationship between PND and homelessness in women from high-income countries has multiple methodological limitations. To more effectively investigate a relationship between PND and homelessness, longitudinal studies with well-defined concepts of homelessness are required.

Data and material availability All data are presented.

Code availability Not applicable.

Declarations

Conflicts of interest The authors declare no competing interests.

Ethics approval Not applicable.

Consent to participate Not applicable.

Consent for publication Not applicable.

Appendix 1 Search strategy in medline

1. exp Homeless Persons/
2. homeless*.mp.
3. (inadequat* adj2 (hous* or accommod*)).mp
4. (insecur* adj2 (hous* or accommod*)).mp.
5. (temporary adj2 (hous* or accommod*)).mp.
6. (unstabl* adj2 (hous* or accommod*)).mp.
7. (emergency adj2 (hous* or accommod*)).mp.
8. (evict* adj2 threat*).mp.
9. (rough adj1 sleep*).mp.
10. houseless*.mp.
11. roofless*.mp.
12. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 or 10 or 11
13. exp Postnatal Care/
14. postnatal.mp.
15. post-natal.mp.
16. perinatal.mp.
17. peri-natal.mp.
18. postpartum.mp.
19. post-partum.mp.
20. matern*.mp.
21. puerper*.mp.
22. 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21
23. depress*.mp.
24. exp Depression/
25. mood-disorder.mp.
26. 23 or 24 or 25
27. 12 and 22 and 26

Appendix 2 Key charities for grey literature in the UK

St Mungos
    Joseph Rowntree foundation
    SHELTER
    CRISIS
    The big issue foundation
    Centre point
    Homeless link
    Mental health foundation.
    Maternity action

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