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Review Article

Food insecurity and mental health outcomes among homeless adults: a scoping review

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Abstract

Objective: This review summarises and synthesises the existing literature on the relationship between food insecurity (FS) and mental health conditions among adult individuals experiencing homelessness.

Design: Scoping review. Papers published between 1 January 2008 and 2 November 2018, searched in PubMed, Web of Science, Scopus, PsycINFO, Cochrane Library and CINAHL, using homelessness, food security and mental health keywords.

Setting: Global evidence.

Participants: Homeless adults aged 18 years or more.

Results: Nine articles (eight cross-sectional and one longitudinal) were included in the present review. FS was measured using the Household Food Insecurity Access Scale, the United States Department of Agriculture Household Food Security Survey Module, as well as single-item or constructed measures. Depression and depressive symptoms were the most common mental health conditions studied. Other mental health conditions assessed included alcohol and substance use, emotional disorders, mental health problems symptoms severity and psychiatric hospitalisations. Composite measures such as axis I and II categories and a cluster of severe mental conditions and mental health-related functioning status were also analysed. FS and mental health-related problems were considered as both exposure and outcome variables. The existing evidence suggests a potential association between FS and several mental health conditions, particularly depression, mental health symptoms severity and poor mental health status scores.

Conclusions: This review suggests the potential association between some mental health conditions and FS among homeless adults. However, there is a need for more longitudinal- and interventional-based studies, in order to understand the nature and directionality of the links between FS and mental health in this population group.

Keywords
Food
Food security
Homelessness
Mental health
Mental illness

Homelessness, defined as a situation in which an individual is without stable, safe, permanent and appropriate housing, or the immediate prospect, means or ability to acquire it[1], is a concerning social phenomenon that affects an estimated 100 million people worldwide[2]. Globally, there are also an estimated 1·6 billion people who lack adequate housing[3]. The identified pathways into and out of homelessness are complex, but often include interrelated individual-level factors such as mental health conditions, substance abuse disorders or family violence, as well as system-level failures such as discharge from social or health services or institutions into homelessness[1,4–6]. Alongside the previous factors, structural factors such as poverty, discrimination and a lack of affordable housing contribute to the prevalence of homelessness[1,4,5].

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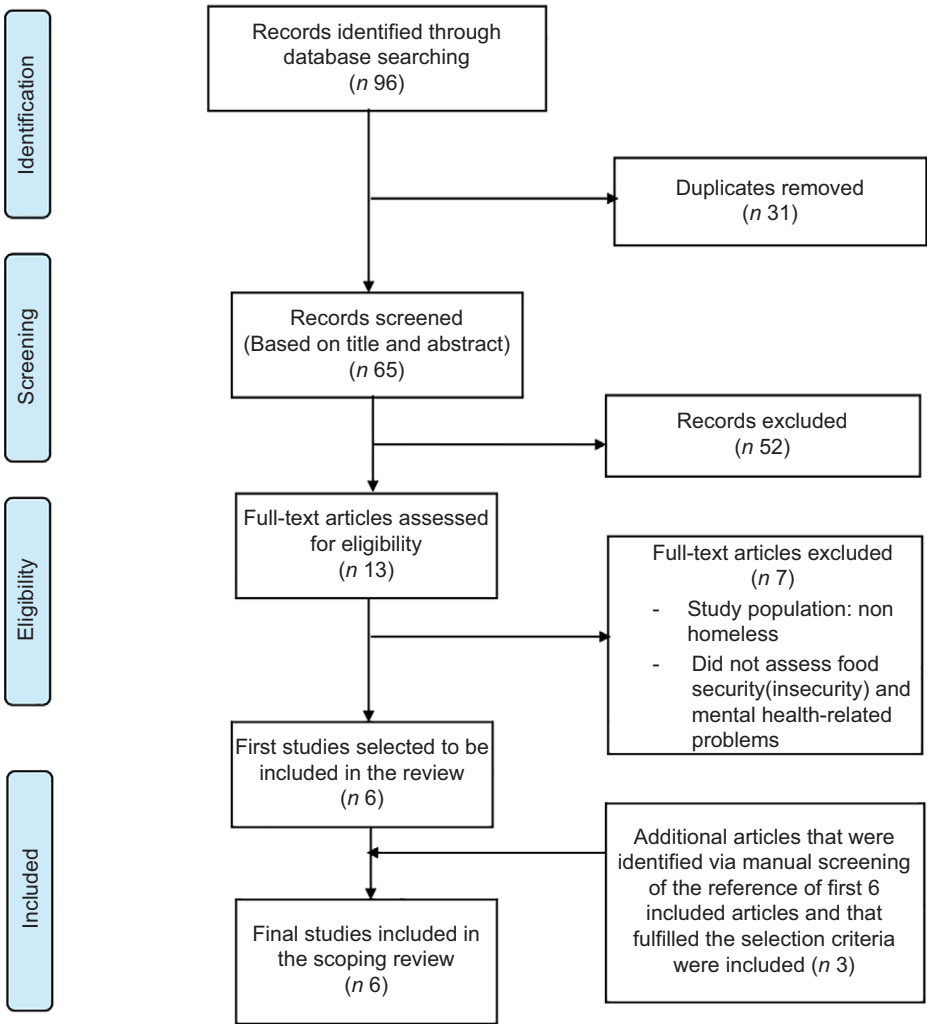

Fig. 1 (colour online) Overview of identification and screening records included in the present scoping review

Food security is defined by the Rome Declaration on World Food Security as an ideal state in which 'all people, at all times, have physical, social and economic access to sufficient, safe, and nutritious food to meet their dietary needs and food preferences for an active and healthy life'[7]. Globally, the number of food-insecure individuals is estimated to have reached 821 million, which is approximately one out of every nine people[8]. Food insecurity (FS) is a complex phenomenon generally understood through an economic lens, as inadequate or insecure access to food due to financial constraints[9], poverty, urbanisation, environmental changes, the global trade market and agricultural policy[10]. FS has detrimental effects on individuals' overall health and well-being. For example, FS results in increased negative physical health outcomes including chronic diseases, such as diabetes, pulmonary diseases, cardiac disease and obesity; a decrease in quality of life[11] and increased mortality rates[12]. FS has also been found to be associated with poor mental health[13–15] in the overall population. In particular, the risk of experiencing depression, anxiety disorders, mood disorders or suicidal thoughts increases with the severity of FS[16].

Mental health conditions and FS are disproportionately prevalent in the homeless population[4,6,17–20]. In addition, the complex, interrelated factors that affect the pathways into and out of homelessness include mental health and food security[1,4–6]. Thus, it is important to understand the existing evidence on the nature and direction of the relationship between FS and mental health conditions. This information can also help inform research priorities and evidence-based social and public policies aimed at improving the mental health and food security of people experiencing homelessness.

We therefore conducted a scoping review to identify and synthesise the existing literature on the relationship between FS and mental health conditions among homeless adults. We particularly aimed to answer the following questions: (1) What is known about the relationships between FS and mental health conditions among homeless adults? (2) What are the nature and direction of these relationships?

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(3) What are the implications of the existing literature for future research?

Methods

We conducted this scoping review in accordance with the framework suggested by Colquhoun *et al.*[21] and the recently published PRISMA extension checklist for Scoping Reviews (PRISMA-ScR)[22].

Literature search strategy and study selection

The search strategy for the present review was developed in consultation with a research librarian and was designed to capture the most recent literature in an area that has only started to receive significant attention within the last decade. The search captured literature published between 1 January 2008 and 2 November 2018 (the date that the literature search was conducted) on the following databases: PubMed, Web of Science, Scopus, PsycINFO, Cochrane Library and CINAHL, using search terms associated with homeless adults, food security and FS, and mental health conditions (see online supplementary material, Appendix A and B).

We established the following inclusion criteria *a priori*: articles written in English and published in peer-reviewed journals that examined associations, relations or correlations between mental health-related conditions and FS among homeless adults (aged 18 years or more). We excluded articles where the population of interest was not homeless adults; where relationships between mental health and FS were not examined; and those published outside of the specified date range or in a language other than English.

The paper selection process is outlined in Fig. 1. The initial search yielded sixty-five articles after de-duplication. Then, the screening of titles and abstracts of retrieved records was conducted independently by at least two researchers. The results of the screenings were compared and discussed, after which thirteen articles were selected for full-text review. After full-text review (conducted independently by E.I.L., C.M.L. and J.L.), six articles were found to meet inclusion criteria. A manual review of the reference lists of these six articles yielded an additional three articles, for a total of nine papers included in the present scoping review (Fig. 1).

The main characteristics and findings of the studies were abstracted independently by at least two researchers. Two researchers (C.M.L. and J.L.) conducted independent quality appraisal of the included studies, after which a consensus quality appraisal was reached. The AXIS tool[23] was used for cross-sectional studies, and the Newcastle-Ottawa quality assessment scale[24] was used for longitudinal studies. The quality appraisal of the studies is presented in online supplementary material, Appendix C and D.

Results

Overview of included articles

The main characteristics of the nine studies included in this review are outlined in Table 1. Five articles were published from 2015 onwards, and the majority (n 8) had a cross-sectional design[18,19,25–30], while one had a longitudinal design[31]. As per The AXIS tool[23], the majority of the cross-sectional studies were found to have a 'good' reporting quality and 'good' study design (see online supplementary material, Appendix C). However, the majority of the studies used secondary data, rather than collecting specific primary data, to respond to their studies' objectives. Regarding the presence of potential bias, only four[18,26,28,30] of the eight cross-sectional studies took steps to address the potential effect on the findings derived from the non-responders or missing data. Furthermore, the majority of the cross-sectional studies were based on self-reported data for the exposure or outcome variables, instead of using confirmed medical diagnosis criteria or administrative records. Moreover, some studies used single items rather than existing validated scales or criteria to assess food security[19,26] or mental health problems[28]. Thus, the findings from the cross-sectional studies may be influenced by potential recalling and misreporting bias. The longitudinal study[31] was appraised as fair quality using the Newcastle-Ottawa quality assessment scale[24], as it rated six stars over a maximum of nine stars available (see online supplementary material, Appendix D).

Most of the studies were conducted in the USA or Canada (n 8), and one study was carried out in Europe[28]. One study focused on homeless individuals aged 50 years or more[29]. One paper included homeless families, rather than individuals, as its study population[28]. Two of the papers analysed data from one study of individuals living with HIV/AIDS[25,31]. All of the included studies considered other covariates in their analyses including demographics, indicators of socio-economic position (educational level and income), housing status, duration and frequency of episodes of homelessness, risk behaviours (alcohol and substances use), social support and physical health outcomes[18,19,25–31]. Only the longitudinal study[31] specifically examined the relationship between food security and mental health conditions, while the remaining studies considered food security and mental health conditions as part of a larger set of predictor or outcome variables. Two of the studies were embedded within randomised clinical trials of Housing First, where food security was not the main outcome of the intervention evaluated[27,30].

Identification and definition of homeless individuals

Definitions and identification of homeless individuals varied throughout the included studies. Four studies clearly defined their homeless populations as individuals with

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Table 1 Extraction table of included studies

Reference (first author, year)	Design; population; setting	Objectives	Food security measure	Mental health measure	Main findings
Lee *et al.*, 2008[19]	Cross-sectional Homeless adults ≥18 years of age, who utilised homeless services including meals, shelters and health care, who were homeless or vulnerably housed at the time of the interview (*n* 2898) USA	Examine the character and correlates of hunger among homeless adults	Food insecurity was measured by an *overall hunger scale*, constructed by the sum of five dichotomous variables: Infrequent meals (consuming fewer than three meals per day, on average) Fasting (going an entire day without eating, in the past month) Inadequate food (not always getting enough or the kind of food one wants to eat) Subsistence eating (getting food from handouts or garbage cans, in the past week) Being hungry but unable to afford food, at any time in the past month (Cronbach's $\alpha = 0.67$)	A composite mental health index was created to capture difficulties that respondents had with any of alcohol, drugs or mental health problems (ADM), in the year before the interview.	Respondents with ADM were significantly more food insecure than those without such deficits. *All homeless individuals:* ADM coefficient: 0·151*** *Chronically homeless individuals:* ADM coefficient: 0·06 and NS *Transitionally homeless individuals:* ADM coefficient: 0·151*** ***: $P < 0.001$ (no CI was reported) Multivariate linear regression
Hamelin *et al.*, 2009[18]	Cross-sectional Homeless adults ≥18 years of age frequenting shelters, soup kitchens and drop-in centres for the homeless in twenty-four centres in Montreal and fifteen centres in Quebec City (*n* 458) Canada	Describe the clientele of services for homeless people who report food insufficiency, to explore the relationship between food insufficiency and the physical and mental health of that clientele and to compare that clientele with the general population in Quebec and in Canada on the association between food insufficiency and health	Single-item, self-reported. Respondents were asked, 'Over the past seven days, was having enough food to eat a problem to you: (a) often, (b) sometimes, (c) rarely, or (d) never?' Those who responded with 'often,' 'sometimes' or 'rarely' were classified as food insufficient.	Alcohol and drug disorders Depression Emotional disorders Axis 1 disorders: including major mental disorders such as schizophrenia and other psychotic problems, affective disorders and pathological gambling and other situations that can be evaluated clinically; Axis 2 disorders: Troubles linked to pervasive or personality conditions, and mental retardation It is measured using the Diagnostic Interview Schedule and the Composite International Diagnostic Interview Simplified which correspond to the DSM-IV.	Food insufficient individuals were more likely to report: *emotional disorders*, AOR: 3·3 (1·6–6·.8) *depression*, AOR: 2·9 (1·4–5·80) and *axis 1 disorders*, (AOR: 1·9 (1·0–3·6)

Table 1 *Continued*

Reference (first author, year)	Design; population; setting	Objectives	Food security measure	Mental health measure	Main findings
Weiser *et al.*, 2009[25]	Cross-sectional Homeless and marginally housed adults ≥18 years of age living with HIV, recruited from homeless shelters, free-meal programmes and single-room occupancy hotels in San Francisco (*n* 250) USA	Examine the prevalence of and factors associated with food insecurity among homeless and marginally housed HIV-infected individuals	Household Food. Insecurity Access Scale (HFIAS) Based on the score of the HFIAS scale score (range 0–27), food security was defined as: Food insecure *v.* food secure (Cronbach's α of 0·94)	Depression was measured with the 21-item Beck Depression Inventory Version II (BDI-II). Depression was considered when BDI score was ≥14. A mental health composite score (MCS) was measured via the Short Form (SF-36).	Participants with poorer mental health status had a higher prevalence of food insecurity than those who had a better mental health status. BDI (score >14): AOR: NS MCS for SF-36 (per 10 units), AOR: 0·68 (0·54–0·85)
Baggett *et al.*, 2011[26]	Cross-sectional Homeless adults ≥18 years of age (*n* 966) USA	Describe the prevalence and characteristics of food insufficiency among homeless adults and to determine the relationship between food insufficiency and utilisation of acute health services among homeless adults	Single-item, self-reported. Participants were asked to describe their situation in terms of the food they eat. Food insufficiency was classified as 'sometimes' or 'often' not getting enough to eat.	Psychiatric hospitalisation in the year prior to the interview. Self-reported information on hospitalisations.	Food insufficiency was associated with significantly greater odds of past-year psychiatric hospitalisation. In adjusted analyses, participants experiencing food insufficiency had a significantly higher rate of psychiatric hospitalisation than food insufficient respondents (AOR*: 3·12, 95 % CI 1·73, 5·62). *AOR: adjusted OR in multivariate models
Palar *et al.*, 2015[31]	Longitudinal Homeless and marginally housed adults ≥18 years of age living with HIV, recruited from homeless shelters, free meal programs, and single-room occupancy hotels in San Francisco, California (*n* 346) USA	Assess the longitudinal association of food insecurity with symptoms of depression using validated measures among homeless and marginally housed HIV-infected individuals.	Household Food. Insecurity Access Scale (HFIAS) The HFIAS comprises 9 questions and has an overall score range of 0–27. Based on the overall score, food insecurity was categorized as food secure, mild food insecurity, moderate food insecurity, and severe food insecurity.	Depression, as measured using the 21-item BDI-II, was used to measure depressive symptom severity and probability of depression.	Having severe food insecurity status was longitudinally associated with increased depressive symptom severity (Coefficient: 1·22 (SE: 0·35)) and the probability of depression (AOR: 1·6 (1·26–2·13)).

Table 1 *Continued*

Reference (first author, year)	Design; population; setting	Objectives	Food security measure	Mental health measure	Main findings
Parpouchi *et al.*, 2016[30]	Cross-sectional study embedded within a Randomized Controlled Trial Homeless adults ≥19 years of age with mental illness (*n* 421) Canada	Investigate the prevalence and correlates of food insecurity among a cohort of homeless adults with mental illness.	US FSSM, modified for single adults with a period of interest being 30 days before the interview. Participants were categorized into two groups based on their score (0–10): Food secure (score 0–2) and food insecure (score 3–10).	Mental health disorders: included panic disorder, post-traumatic stress disorder, major depressive episodes, current substance and alcohol dependence Mental health disorders were analyzed as Less severe vs more severe, and Having 2 or more mental health disorders. Mental health disorders were measured using the MINI. A subjective mental health score, as measured by the Short-form-12 mental health score (SF-12), was dichotomized as poor, excellent/very good/good/ fair.	Participants with poorer subjective mental health had higher food insecurity than those with better mental health. SF-12 mental health score: AOR 0·97 (0·96–0·99)
O'Campo *et al.*, 2017[27]	Cross-sectional study embedded within a randomised controlled trial Homeless adults ≥ 18 years of age with mental illness (*n* 2148) Canada	Examine baseline levels of food security among homeless adults with mental illness and to evaluate the effect of a Housing First intervention on food security in this population.	US Household Food Security Survey Module (US HFSSM), modified for single adults with a period of interest being 30 d prior to the interview. Based on the 0 to 10 overall food security score, food security was categorised as high food security (score of 0), marginal food security (score 1–2), low food security (score 3–5) and very low food security (score 6–10).	The Colorado Symptoms Index (CSI) index: (1) if CSI ≥30 for significant accumulation of psychiatric symptoms, otherwise (0). Alcohol and substance use problem severity measured using the Global Appraisal of Individual Needs (GAIN)1	Participants with more psychiatric symptoms were less likely to report marginal or high food security than those with less severe mental health symptoms: Stratified analysis: *Moderate needs for mental services*. AOR: 0·5 (0·3–0·7) *High mental needs group* AOR: 0·4 (0·3–0·7)

Table 1 *Continued*

Reference (first author, year)	Design; population; setting	Objectives	Food security measure	Mental health measure	Main findings
Martin-Fernandez *et al.*, 2018[28]	Cross-sectional Homeless families with at least one parent ≥18 years of age, recruited through emergency centres or shelters, social rehabilitation centres, and inexpensive hotels where asylum seekers are frequently accommodated (*n* 772) France	Estimate the prevalence of food insecurity in homeless families and children and the associated living conditions and to identify the characteristics of families that managed to remain food secure while homeless, and the characteristics of families experiencing the most severe level of food insecurity.	18-item U.S. Household Food Security Survey Module (US HFSSM) Based on the overall HFSSM score, food security was categorised as: food secure (score < 3), marginal food security 9 scores = 3–7), low food security (score = 8–12) and very low food security (score > 13). For the final analysis, FS was further categorised into two groups: food secure and food insecure, which included those participants with marginal, low and very low food security.	Depressive mood (lasting at least 2 weeks) during the 12 months prior to the interview. Single item, self-reported.	Depressive mood was positively associated with very low food security (VLFS). Stratified analysis: *For families with household income less than 477 Euros*: adjusted Incidence Rate Ratios (aIRR): 2·37 (1·50–3·73) *For families with household income less than 477 Euros:* aIRR: 2·32 (1·51–3·58) Adjusted Poisson Regression
Tong *et al.*, 2018[29]	Cross-sectional Homeless adults ≥50 years of age (*n* 350) USA	Examine the prevalence of food insecurity and associated factors among homeless adults aged 50 and older.	Six-item US HFSSM Food security status was categorised based on the FSSM score as high or marginal (0–1), low (2–4) and very low (5–6) food security. Very low food security was analysed as a dichotomous dependent variable in multivariable analysis.	Depressive symptoms The Center for Epidemiologic Studies Depression Scale.	People with depressive symptoms had a greater probability of experiencing very low food security, compared with those without depressive symptoms (AOR: 3·01, 1·69–5·38).

no permanent, adequate physical shelter and having little likelihood of obtaining it, or as living in places not intended as sleeping accommodation[19,27,29,30]. The remaining studies used data from homelessness surveys like the 2003 Health Care for the Homeless User Survey[26] or recruited homeless participants from a specific programme such as the Research on Access to Care in the Homeless Cohort, a cohort of HIV-infected homeless and marginally housed adults[25,31], or identified homeless individuals through their use of services for the homeless including clinical services[26], temporary shelters[18,25,28,31], free-meal homeless programmes or services[18,25,31], drop in centres[18] and centres for asylum seekers[28].

Food insecurity measures

FS was measured in a variety of ways. A modified version of the US Department of Agriculture's Adult Food Security Survey Module was the most frequently used instrument, being used in four studies[27–30], followed by the modified version of the Household Food Insecurity Access Scale used in two studies[25,31]. Two studies used a single item as a food security/food insufficiency indicator[18,26], while in one study, authors constructed a 'Hunger Scale' composed of several items related to frequency, adequate amount and affordability of food, as well as on the prevalence of subsistence eating behaviours[19] (Table 1).

Mental health-related measures

Depression and depressive symptoms were the most common mental health conditions assessed, with associations examined in six articles[18,25,28–31]. Depression and depressive symptoms were measured via the Mini International Neuropsychiatric Interview 6.0[30], 21-item Beck Depression Inventory version 2[25,31], the Center for Epidemiologic Studies Depression Scale[29], the Diagnostic Interview Schedule[18] and by a single-item question that asked whether a person felt sad, depressed or without hope in the 12 months prior to the interview[28].

Other specific conditions assessed included alcohol and substance use problems[18,27,30]. The Mini International Neuropsychiatric Interview 6.0 and Diagnostic Interview Schedule[18,30] were used to assess drug or alcohol dependency, while the Global Appraisal of Individual Needs and the Colorado Symptoms Index were used to assess alcohol and substance use symptoms severity and mental health symptoms, respectively[27]. Psychiatric hospitalisation was assessed using self-reported information on whether a participant has been hospitalised in the previous year to the interview[26] (Table 1).

In some studies, authors used mental health-related composite measures. For example, Lee and Greif (2008) created an alcohol, drug or mental health index to capture difficulties that participants experienced during the year prior to the NSHAPC interview. Hamelin *et al.* (2009) grouped different mental conditions under diagnostic categories (axis I and axis II problems) based on the DSM-IV[18]. Parpouchi *et al.*[30] classified individuals as having two or more, and less severe *v.* more severe conditions[30]. Furthermore, two studies assessed mental health-related functioning status using the twelve-item and thirty-six-item short forms of the health survey questionnaire (SF-12 and SF-36)[25,30].

Overview of findings on food insecurity and mental health

Directionality of the associations

The study of the directionality of the associations between FS and mental health conditions varied within the reviewed literature. The longitudinal study considered food security as the exposure factor and mental health condition (depression symptoms and probability of depression) as the primary outcome[31]. Among the eight cross-sectional studies, six considered food security-related aspects as outcomes[19,25,27–30], and two studies consider food security as the predictor factor for mental health-related problems[18,26].

Main findings on the specific association between food security and mental health problems

Food security as exposure measure and mental health-related problems as outcome measure

The longitudinal study showed that severe FS was significantly associated with depressive symptom severity and probability of depression[31]. Two of the cross-sectional studies found that food insufficient individuals were more likely to have depression, emotional disorders[18], axis 1 mental disorders and more frequent incidents of psychiatric hospitalisation[26] (Table 1).

Food security as outcomes and mental health-related problems as main predictors

Based on the reviewed eight cross-sectional studies, most of the studies found that mental health problems were associated with food security, such as in the studies which found that homeless individuals with poor mental health scores[25,30], more severe mental health problems[18,27] and depressive symptoms[28,29] were more likely to be food insecure after considering other covariates in their models. However, one study found that there was no significant association between the severe cluster of mental health disorders[30] and food security.

The association of alcohol and drug problems with food security as an outcome remains inconclusive. Several studies found alcohol and drug symptom severity and dependence were not related to food security after adjustments, such as in the studies which found that drug and alcohol symptoms severity[27], and substance and alcohol dependence[30] were not significantly associated with FS. Another study found individuals with higher composite values of

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alcohol and drug problems were more likely to be food insecure when adjusted for other covariates[19]. However, this study used a composite measure that includes alcohol, drug and mental health problems, which makes it impossible to differentiate the associations of FS with alcohol and drug problems *v.* the associations with mental health problems.

Discussion

In this scoping review, we analysed the relationship between food security and mental health conditions in homeless adults by reviewing peer-reviewed research over the past 10 years. We found limited research on this topic. The majority of studies used a cross-sectional design, where the association between food security and mental health conditions was not the primary goal of the analysis. Despite these limitations, the literature provides insight into the relationship between mental health and food security in homeless adults. More research in this area is needed, as food security, homelessness and poor mental health are conditions that have significant adverse health effects at the individual and population levels[15,32].

Regarding the associations between food security and mental health-related conditions, the evidence from this review supports a relationship between FS and certain mental health conditions in the homeless adult population. This is particularly evident for depressive symptoms and the presence of depression, where food-insecure homeless individuals tend to have a greater probability of experiencing depressive symptoms or depression than food-secure individuals[18,28,31]. In one study, homeless individuals with higher levels of depressive symptoms were more likely to be food insecure[29]. These findings are in line with what has been reported in studies carried out in the general population, where bidirectional associations between food security and depression have been observed[33–35]. In interpreting these findings, it is essential to note that two of these studies[25,31] examine patients with HIV/AIDS, who may have specific neurocognitive, immunity, comorbid and psychological profiles due to their HIV disease status. Thus, the associations of food security and mental health problems from these studies may not be generalisable to homeless adults without this condition.

We found that measures of mental health problems such as a composite measure of alcohol, drug and mental health problems[19], mental health symptom severity[27] and mental health status[25,30] were significant predictors of FS. In a recent large cross-sectional study on FS and mental health status performed in 149 countries, FS was related to poorer scores on several mental health indices[15]. In our review, we also found that food insufficiency was a positive predictor of psychiatric hospitalisations[26]; this finding highlights the need for an improved understanding of the effects of food security on the mental health of the homeless population as well as health care systems[36,37].

There may be several potential pathways underlying the relationship between FS and mental health conditions in homeless people. Homelessness itself has negative impacts on physical and mental health, food security, nutrition and diet quality[19,30,38–40]. Homeless individuals live in extreme poverty and face resource-related barriers that prevent them from accessing nutritionally adequate foods[6,18]. Food programmes or food pantries that are available may offer limited food of inadequate nutritional quality and may be difficult to access for homeless individuals[9,41,42]. Additionally, socioeconomically deprived individuals do not have access to important material sources and a stable living environment in which they can store and prepare foods, which contributes to low food security[18,19,30,43,44].

Another potential pathway linking FS and some mental health conditions is biological in nature. Homeless individuals tend to consume a significant portion of their daily energetic intake in the form of highly processed foods[41,43,45–47]. As a result, this population group can experience poor nutrition and/or nutritional deficiencies more frequently than the general population[41,43,45,46]. Sustained nutritional deficiencies have adverse health impacts[31,41,45,46], including the potential development of mental illnesses[31].

Gaps in the existing literature and recommendations

We identified several gaps in the reviewed articles. First, the majority of studies were cross-sectional in design and thus cannot establish causality between FS and mental health conditions. Longitudinal and intervention studies are required to better understand the potential links between food security and mental health conditions in homeless adult and would serve to inform evidence-based interventions and support services for improving both mental health and food security in this population group. Second, there is a need to explore the relationship between FS and specific major mental health conditions such as psychotic disorder, major depressive disorder, post-traumatic stress disorder or mood disorders in homeless populations. Previous research on the general population has demonstrated that traumatic events[48] or mood disorders are strongly associated with FS, and all these mental conditions have been identified as being disproportionately prevalent in studies on homeless populations[49].

Third, the existing literature focuses on the North American context, particularly Canada and the USA[50], and thus our understanding of this phenomenon in different socio-economic, cultural and political environments is limited. This highlights the need to conduct more research in this field in other geographical areas, such as low- and

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middle-income countries, where there may be a disproportionately high prevalence of homelessness[51] and FS[52], and where mental health problems may present in specific ways and rates[32,53].

Fourth, few studies have focused on specific subgroups within the homeless population, with the exception of the studies included in this review that focus on homeless individuals living with HIV[25,31] and homeless families[28]. Thus, further studies in overrepresented subgroups of homeless individuals such as LGBTQ+, Indigenous and other ethno-racial and cultural minorities, veterans and migrants are warranted to better understand the potential socio-cultural underlying pathways between food security and mental disorders in people experiencing homelessness.

Fifth, in the majority of the existing studies, the relationship between FS and mental health was not the primary focus of analysis and thus studies looking at these specific associations are needed. Primary research with longitudinal- or interventional-based study designs is particularly warranted.

Sixth, efforts are also needed to identify mechanisms underlying the relationship between FS and mental health among homeless individuals, which would require cohort and interventional studies.

Finally, the findings for the present scoping revision suggest a linkage between FS and mental health problems in adults experiencing homelessness. Hence, it is crucial to facilitate and support access to food sources and mental health care services for this socially excluded population.

The present scoping review has the following limitations. First, it only included peer-reviewed papers published in English. Second, this review only focused on the adult population, aged 18 years or older, and thus does not capture the experiences of homeless children or youth. Finally, due to the cross-sectional design and the limited contextual settings of the studies included in the present review, the findings may not be generalisable.

In conclusion, the findings of this scoping review suggest a potential association between FS and several mental health conditions among homeless adults. More longitudinal and interventional-based studies are needed to better understand the nature and directionality of the links between food security and mental health in this population. Validated tools to measure both food security and mental health problems should be used to improve the quality of evidence. Additional research in diverse populations and countries is needed. This study has implications for public policy, as it draws attention to the intertwinement of FS and mental health, which remain a significant issue in the lives of people experiencing homelessness. While more research is needed in this area, the existing evidence included in this review suggests that effective homelessness policy and interventions should include support and joint actions to reduce FS and address mental health issues of people experiencing homelessness.

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Supplementary material

For supplementary material accompanying this paper visit https://doi.org/10.1017/S1368980020001998

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