

RESEARCH

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Social isolation and loneliness



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Introduction

Social isolation and loneliness (SIL) are major social and health issues representing a growing global public health challenge, particularly for socio-economically

Sciences Citation Index and Science Citation Index. The search strategies had a broad range of subject headings and keywords, adapted for each database, for the two core concepts of SIL and homelessness or social housing, combined with the Boolean operator AND. The searches were limited to articles in English, French, and Spanish published between January 1st, 2000 to October 27, 2021, followed by an updated search to January 3rd, 2023. The publication languages were chosen for feasibility purpose, considering the linguistic capacity of the research team. Comments, editorials, and letters were excluded from the search. There were a total of 8,398 results from these two rounds of searches prior to de-duplication (7,356 at search one and 1,042 at search two) and the records were compiled in EndNote. The complete search strategies as run are included in the [Supplementary material](#).

Definition and screening process

To refine our screening process, we defined individuals experiencing homelessness as those lacking stable, safe, permanent, and appropriate housing, or the immediate means and ability to acquire such housing [25]. This definition encompasses individuals who are marginally housed or at high risk of eviction, including individuals who are "doubled up," couch surfing, or living in overcrowded conditions [26].

To be considered eligible for inclusion, we established the following inclusion criteria for the scoping review:

- studies had to include participants that were people with homelessness experience or marginally/vulnerably housed populations (people living in supportive housing or shelters). While our screening process did not establish an age criterion, we excluded studies that focused exclusively on minors (under 18 years old) experiencing homelessness. This decision was made as a recent study showed that minors experiencing homelessness might need specific considerations and theoretical framework [27];
- studies had to be peer-reviewed qualitative and quantitative original research papers published in English, French, or Spanish;
- studies had to be published between 2000 and January 3, 2023;
- studies had to examine or include in the analyses: loneliness, social isolation, social disconnection, solitude, social withdrawal, abandonment, lack of contact, social exclusion or rejection.

We excluded papers that were systematic or scoping reviews, and papers where the studied populations was exclusively minors; where the field activities and data were collected from caregivers or other workers, and

not people with homelessness experience or marginally/vulnerably housed; studies that only focused on networking, social or community integration and did not refer to social isolation or loneliness. No exclusion was made based on geographic region or countries, however we excluded studies that focused on people residing in camps due to displacement from war, insecurity, or major natural disasters, as these situations are typically addressed by different theoretical and humanitarian frameworks [28].

The results from all searches were imported to Covidence systematic review software, where duplicates were removed. The searches yielded 5,294 papers for screening after the deletion of duplicates. Four researchers (AY, EG, FM, and MP) screened the article titles and abstracts independently and in duplicate in Covidence using the predetermined inclusion and exclusion criteria. The full-text of the articles that met our eligibility criteria were then assessed by two independent reviewers. At both stages, differences in voting were discussed and resolved as a group, and included the Principal Investigator (JL). In total, 52 articles met the criteria for data extraction and analyses. The PRISMA diagram in Fig. 1 shows the flow of information through the different stages of the review.

Data extraction

The main characteristics, research questions, targeted populations, measurement and findings of the selected studies were extracted in an Excel database file by the four researchers (AY, EG, FM, and MP) and reviewed by the Principal Investigator (JL). A summary of each selected paper can be found in Tables 1 and Table 2.

Data synthesis

The studies reviewed exhibited considerable variability in their methodological approaches, participant demographics (including young adults, adults, and seniors) or sex and gender-based groups, measures of SIL, definitions of homelessness experience, and countries where they were conducted. To provide a thorough overview, we examined both quantitative and qualitative research. Initially, we assessed the theoretical frameworks used in these studies to better grasp the conceptualization and ongoing discussions about SIL within the target population. In our analysis of quantitative studies, we identified key similarities and differences in SIL measurements, demographic characteristics, discussions of the prevalence and patterns of SIL and its relationship with health status. To deepen our understanding, we used a cross-walk approach [29] using both quantitative and qualitative studies to examine how participants described,

contextualized, and nuanced their experiences of SIL, and how SIL related to demographic factors, gender, and homelessness experience.

Results

Table 1 Quantitative studies summary

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
6	The causes of loneliness in homeless youth	Rokach (2005) [49]							

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
8	Stigmatization and Victimization of People Experiencing Homelessness: Psychological Functioning, Social Functioning, and Social Distance as Predictors of Reporting Violence to the Police(1)	Lehmann et al. (2022) [38]	Germany	Cross-sectional	To address individual factors relevant in people experiencing homelessness who report their victimization to the police	Currently homeless individuals with history of victimization in last 5 years (n=30) participants who reported victimization to police and n=30 participants who did not report victimization to the police) compared with sample of currently homeless individuals and a development sample of people from the general population (n=3225)	n=60, approximately 52% reported that they were mostly sleeping outdoors and 35% commonly stayed in shelters; participants: range age: 19 to 67 years (mean=43) and all self-identified as male; more than one-quarter (26%) reported completing the equivalent of a US college entry qualification; approximately 57% reported being victims of aggravated assault, 30% of robbery, and 13% of both	UCLA Loneliness Scale (revised) with 12 items used	Loneliness was measured using the UCLA Loneliness Scale Revised. Participants who did not report victimization to police reported more loneliness (M=1.74, SD=0.73) than those who reported victimization to police (M=1.39, SD=0.70), however the difference was not significant. Participants experienced stronger loneliness in terms of being excluded and emotionally isolated but they did not feel lonely in terms of the quantity of relationships; the interpersonal quality of these relationships was important
9	A biobehavioral framework for examining altered sleep-wake patterns in homeless women	Davis et al. (2000) [32]	USA	Cross-sectional	To investigate the self-reported sleep patterns and lifestyle factors associated with sleep in a group of homeless, urban women	Currently homeless defined as person who spent previous night in an emergency shelter, the outdoors, any space not designed for shelter, or a hotel, motel, or home of a relative or friend and was uncertain whether they could continue to live there for at least the next sixty days; and stated that they did not have a permanent house or apartment to which she could go	n=50 participants, all women with a mean age of 29.9 years and age range of 18-44 years; 82% not married, 64% Black, 26% Latina, and 10% White; 75% considered themselves to be homeless	Model-based history form to assess participants' needs, with 7 questions specific to sleep, sleep patterns and factors affecting sleep	Loneliness was reported by a significantly greater number of women who also reported restless sleep (77%) vs. restful sleep (45%)

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
10	Experiences with eviction, house foreclosure, and homelessness among COVID-19 infected adults and their relation to mental health in a large U.S. city	Tsai et al. (2022) [67]	USA	Cross-sectional	To examine (1) histories of housing instability as evidenced by eviction, house foreclosures, and homelessness; (2) the relation between histories of housing instability and current mental health and substance use during the pandemic	Sample of residents infected with COVID-19 (n=3595). Lifetime history of eviction and foreclosure assessed with three response options: been evicted from apartment, experienced foreclosure on a house, and never been evicted or had foreclosure before; lifetime history of homelessness assessed with "in your entire adult lifetime, have you ever been homeless (did not have a stable nighttime residence, such as staying on streets, in shelters, cars etc?; recent housing instability assessed in terms of evictions and late mortgage payments	n=2344 female participants and n=1238 male participants, most were white, in their late 30s, with at least some college education, employed, with an annual income below \$ 60,000, and no psychiatric history; 294 participants (8.18%) reported experiencing homelessness in their lifetime and 34 (0.94%) reported experiencing homelessness in the past month. White non-Hispanic=951 (26.45%); White Hispanic=2003 (55.72%); Black non-Hispanic=297 (8.26%); Black Hispanic=78 (2.17%); Asian/Pacific Islander=100 (2.78%); Native American/Alaskan Native=30 (0.83%); other=136 (3.78%)	UCLA Loneliness Scale (Short Form) with 3 items asking participants on a scale of 1 (Hardly Ever) to 3 (Often) how often they lack companionship, feel left out and feel isolated from others	Relative importance analysis revealed that measures of loneliness (percentage relative importance=17.12) and severity of substance use (percentage relative importance=16.93) were the most important variables associated with any lifetime eviction and

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive statistics on Social Isolation/loneliness (if provided)
12	Loneliness in homeless participants of a Housing First program: Outcomes of a Randomized Controlled Trial	Ferreiro et al. (2021) [73]	73 Housing First program: Outcomes of a Randomized Controlled Trial	Randomized Controlled Trial	Assess the impact of the Housing First program on loneliness and social isolation among homeless individuals.	Homeless individuals	Participants with a history of homelessness and current residence in a Housing First program.	UCLA Loneliness Scale (ULS) and Social Isolation Scale (SIS)	Loneliness: 70% (n=14) High; 30% (n=6) Low. Social Isolation: 70% (n=14) High; 30% (n=6) Low.

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
13	Immigrant women living homeless in Madrid (Spain)	Vazquez et al. (2020) [30]	Spain	Cross-sectional	To examine the differences between women living homeless who came to Spain from other countries and those who were born in Spain	Homeless women/Immigrant women who are currently homeless	n=136. 81 participants were born in Spain and 55 participants were born outside of Spain. For non-immigrant women, average age was 45.5 years (SD=10.47) and marital status was single 60.5% (n=49), married 4.9% (n=4), For immigrant women, average age was 45.5 years (SD=10.47) and marital status was single 60.5% (n=49), married 4.9% (n=4)	Scale of Social Isolation and Loneliness (SIL)	

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
16	Private lives in public places: Loneliness of the homeless	Rokach (2005) [49]	Canada	Cross-sectional	To compare the experience of loneliness of people experiencing homelessness to that of the general population	People recruited in centres for the homeless when they dropped in to eat, get a change of clothes or socialize and spend time with others	n=288 with a mean age of 33.59 years (age range of 1663) 76% were men and 67% were single	Loneliness Questionnaire e-30 developed by Rokach and Brock. The questionnaire includes five factors or subscales: emotional distress, social inadequacy and alienation, growth and discovery, interpersonal isolation and selfalienation	Homeless participants had significantly higher mean subscale scores than non-homeless participants on four of five subscales measuring loneliness: interpersonal isolation (3.44 vs 2.82), self-alienation (1.92 vs 1.27), emotional distress (2.97 vs 2.73), and social inadequacy and alienation (2.92 vs 2.70). Non-homeless participants had a significantly lower mean subscale score on only one of five subscales measuring loneliness: growth and discovery (1.95 vs 2.35)
17	Association between perceived loneliness and Internet use among homeless people	Valerio-Urena, Herrera-Murillo and Rodríguez-Martínez (2020) [70]	Mexico	Cross-sectional	To examine: (1) the level of loneliness perceived by homeless people; (2) the patterns of internet use among homeless people; and (3) any statistically significant difference between the levels of loneliness perceived by homeless people who are internet users and those who are not	Currently homeless, attending the public shelter	n=129, 96.1% (124/129) were male, 3.9% (5/129) were female; 24.8% (32/129) were young adult (<35 years), 67.4% (87/129) were mature adults (between ages 35 and 60), 7.8% (10/129) were older adult (ages >60); 21.7% (28/129) were non-foreign born and 78.3% (101/129) were foreign-born	De Jong Gierveld Loneliness Scale consisting of 11 items with a rating scale of 0=no solitude to 11=extreme solitude	Participants reported an average score of 7.12, which is close to moderate to severe loneliness (8.0). Younger participants (ages < 35) reported higher levels of loneliness (mean score= 7.88) compared with older adults (between ages 35-60) (mean score=7.4). Participants who reported being ill had a higher level of loneliness (mean score=7.82) than those who reported being healthy (mean score=6.89)

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
18	Homeless Patients in the ICU: An observational propensity-matched cohort study	Bigge et al. (2015) [56]	France	Cross-sectional	To investigate the association of four social deprivation features (living place, financial resources, health insurance status, and social				

Table 1 (continued)

#	Study title	First author and year	Country where the study is taking place	Study design	Specific objectives of study or research questions	Targeted groups	Participants' characteristics	Measurement tool and scale of social isolation/loneliness	Descriptive stats on Social Isolation/loneliness (if provided)
20	Social isolation schema responds to positive social experiences; longitudinal evidence from vulnerable populations	Cruwys et al. (2014) [71]	Australia	Longitudinal	To investigate whether improvements in social isolation schema in group CBT could be accounted for by longitudinal evidence				

Table 2 Qualitative and mixed method studies summary

#	Study title	First author and year	CounStudy title	First author a439(F)22(first author)ghable
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Table 2 (continued)

#	Study title	First author and year	Country where the study is taking place	Type of study	Setting	Specific objectives of study or research questions	Targeted groups	Participants # and Characteristics	Methods of data collection	Date of collection	Methods of analysis
4	Australian homeless persons' experiences of social connectedness, isolation and loneliness	Bower et al. (2018) [10]	Australia	Qualitative	Community setting	To explore how participants understand and construct their social networks, including experiences of social isolation and loneliness, within the context of their lives before, during, and where applicable, after homelessness	Currently or formerly homeless adults	n=16 participants ages 22-70 years; n=6 men, n=7 women, n=1 transsexual and n=2 women n=11 self-identified as Anglo-Australian, n=1 self-identified as Indigenous Australian, n=4 self-identified as other nationalities n=11 were currently homeless, n=5 were previously homeless (<5 years) and living in public housing. History of homelessness ranged from weeks to up to 10 year.	One-on-one semistructured interviews	Not reported	Thematic analysis
5	Finding home after homelessness: older men's experiences in single-site permanent supportive housing	Burns et al. (2020) [39]	Canada	Qualitative	Permanent supportive housing program	To examine: 1) How older men experience home in single-site permanent supportive housing and 2) How are older men's experiences of homelessness affected by the dynamics of social exclusion?	Men living in permanent supportive housing	N=10 participants ages 55-77 All participants histories of chronic homelessness	One-on-one semistructured interviews	Not reported	Constructivist grounded theory permanent supportive housing to O4d (analy)housing#10 part

Table 2 (continued)

#	Study title	First author and year	Country where the study is taking place	Type of study	Setting	Specific objectives of study or research questions	Targeted groups	Participants # and Characteristics	Methods of data collection	Date of collection	Methods of analysis
7	Growing old in shelters and 'on the street': Experiences of older homeless people	Grenier et al. (2016) [41]	Canada	Qualitative	Community setting	To explore the inter-sections of aging and homelessness including social relationships, the challenges of living on the streets and in shelters in later life, and the future	Older adults using shelter services	n=40 participants with an average age of 58, n=29 (73%) self-identified as male and n=11 (27%) self-identified as female n=19 enrolled in the in-house transitional program, n=17 staying at emergency shelters, n=3 living in subsidized housing linked to a shelter, and n=1 housed for a year and continuing to use the cafeteria of a shelter	One-on-one interviews	2014	Guided by a narrative approach and constructivist grounded theory
8	Understanding risk environments in permanent supportive housing for formerly homeless adults	Henwood (2018) [81]	USA	Qualitative	Supportive housing program	To: (1) understand how different types of environments (i.e. physical, social, economic, and policy) interact to produce or reduce substance use risk for newly housed permanent supportive housing; and (2) understand to what extent are permanent supportive housing tenants able to change or negotiate micro- or macro-level factors that influence risk?	Adults aged 39 and over living in a permanent supportive housing program	n=23 participants with an average age of 55.2 (SD=6.6) n=16 (59%) participants self-identified as male, n=16 (59%) self-identified as Black, n=23 (85.2%) self-identified as heterosexual, and n=11 (40.7%) were veterans. Participants reported 7.7 years (SD=6.2) literally homeless in their lifetime	Ethnographic interviews	Not reported	Thematic analysis

Table 2 (continued)

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#	Study title	First author and year	Country where the study is taking place	Type of study	Setting	Specific objectives of study or research questions	Targeted groups	Participants # and Characteristics	Methods of data collection	Date of collection	Methods of analysis
14	Social relations and experiences of social isolation among socially marginalized people	Pedersen et al. (2012) [77]	Denmark	Qualitative	11 different shelters and drop-in centres in three Danish cities	To explore the relationship between social relations and social isolation among socially marginalized users of shelters and drop-in centres in Denmark using a typology combining the two concepts.	In Denmark, shelters and drop-in centres provide services not only to homeless people but to a broader spectrum of socially marginalized people such as, among others, substance users, the mentally ill and the poor.	n=7 participants self-identified as female and n=39 participants self-identified as male, ranging in age from 22 to 64 Six interviewees were born outside Denmark (in Greenland, Iceland, Germany, Iran or Somalia). All interviewees lived on social security benefits At the time of interview, 32 participants were homeless, of which 29 lived at shelters and 3 lived on the streets.	One-on-one interviews	25 interviews from July to September 2008 and 21 interviews with new interviewees from December 2010 and January 2011	Typology analysis
15	Supported housing for adults with psychiatric disabilities: How tenants confront the problem of loneliness	Piat et al. (2018) [80]	Canada	Qualitative	Five supportive housing programs	To examine the experience of loneliness among people with psychiatric disabilities after moving from custodial housing, including group homes, boarding homes, and family-type residences to independent, supported apartments	There were 75 participants across four respondent groups, including tenants (n=24), family members (n=15), case managers (n=19), and housing staff (n=17) Mean age of tenants was 46, with 18 self-identified as males and 6 self-identified as females	One-on-one semi-structured interview	May 2014 and July 2015	Constructivist approach	

Table 2 (continued)

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#	Study title	First author and year	Country where the study is taking place	Type of study	Setting	Specific objectives of study or research questions	Targeted groups	Participants # and Characteristics	Methods of data collection	Date of collection	Methods of analysis
18	Friends and pets as companions: strategies for coping with loneliness among homeless youth	Rew (2000) [46]	USA	Qualitative	Community setting	To describe feelings of loneliness among homeless adolescents and identify strategies for dealing with these feelings	Currently homeless	N=32 participants with n=18 self-identified as males and n=14 self-identified as females, ranged in age from 16 to 23 years, participated in one of four focus groups (with 6-10 participants each); majority (88%) were of European-American descent n=10 participants agreed to provide in-depth individual interviews for more detailed information (sub-sample) and ranged in age from 15 to 23 years; subsample consisted of n=6 self-identified as males, n=3 self-identified as females, and n=1 who self-identified as both genders, participants in the subsample had experienced homelessness for 1 to 7 years	Focus groups with 32 participants and one-time individual interviews with a subsample of 10 participants	Not reported	Manifest and latent content analysis

Table 2 (continued)

to measure SIL among people experiencing homelessness: the Rokach Loneliness questionnaire, the UCLA Loneliness Scale and its revised versions, and the De Jong Gierveld Loneliness Scale.

The rokach loneliness questionnaire

Five studies used the Rokach Loneliness Questionnaire [47–49, 63, 64]. The Rokach Loneliness Questionnaire [47, 48] measures causes of loneliness and coping strategies and has been used in studies with young people aged 15–30 in Toronto, Canada. The questionnaire measures the experience of loneliness across five factors, with yes/no items on five subscales: emotional distress such as pain or feelings of hopelessness; social inadequacy and alienation including a sense of detachment; growth and discovery such as feelings of inner strength and self-reliance; interpersonal isolation including alienation or rejection; and self-alienation such as feelings of numbness or denial. The items on the interpersonal isolation subscale relate to an overall lack of close or romantic relationships.

The UCLA loneliness scale

Six of the studies in this review used the UCLA Loneliness Scale or a revised version. Novacek et al. [54] assessed subjective feelings of SIL among Black and White identifying veterans with psychosis and recent homelessness compared with a control group at the onset of the COVID-19 pandemic. The 20-item scale was used to measure subjective feelings of SIL over the past month. Participants rated their experience ranging from “never” to “often,” with higher scores indicating higher subjective feelings of loneliness. Lehmann et al. [38] used a revised version of the UCLA Loneliness Scale to examine individual factors including loneliness relevant in people experiencing homelessness to report their victimization to police. The researcher recruited 60 self-identified adult males aged 19 to 67 currently experiencing homelessness in Germany and used a revised and shorter German UCLA Loneliness Scale developed by Bilsky and Hosser [65], to measure loneliness. The scale is composed of 12 items with a 5-point Likert scale ranging from 0 (“not at all”) to 5 (“very much”) and positively formulated items were recorded to reflect a higher level of loneliness. The load factors for the scale are experiences of general loneliness, emotional loneliness, and inner distance. Drum and Medvene [66] used the UCLA-R Loneliness Scale, which has been adapted for an older adult population to measure loneliness among older adults living in aordable seniors housing in Wichita, Kansas. This version is composed of 23 items, with a four-point Likert scale-type of response options. Participants’ total score ranged

from 20 to 80, with a higher score representing greater loneliness.

Tsai et al. [67], Dost et al. [68] and Ferrari et al. [69] used a shortened revised version of the UCLA Loneliness Scale Version 3, which consists of three items: “how often they feel they lack companionship, how often they feel left out, and how often they feel isolated from others.” Participants self-reported their responses using a 3-point Likert scale (“hardly ever,” “some of the time,” and “often”) to answer questions. A summed score of 3 to 5 is defined as not lonely and a summed score of 6 or more is defined as lonely. The 3-item scale is used widely in research and clinical settings as a short assessment of loneliness.

De Jong Gierveld loneliness scale

Valerio-Urena, Herrera-Murillo and Rodriguez-Martinez [70] examined the association between perceived loneliness and internet use among 129 currently homeless single adults aged 35–60 staying in a public shelter in Monterrey, Mexico. The authors used questions from the De Jong Gierveld Loneliness Scale, which includes 11 items with three response options (1 = no, 2 = more or less, 3 = yes) asking about having friends or people to talk with or contact, feeling empty or missing other people’s company, and having people or friends you can trust.

The subscales measure emotional loneliness (due to the lack of a close relationship) and social loneliness (due to the lack of a general social network) with scores ranging between 0 (no solitude) and 11 (extreme solitude).

Other social isolation and loneliness scales

Some of the quantitative studies used subscales or single questions from measurement tools that were not primarily designed to measure SIL. For example, Cruwys et al. [71] used the short form of the Young Schema Questionnaire, which included 75 items with five items assessing each of the 15 schemas. This study focused on the social isolation schema, which was described as a “feeling that one is isolated from the rest of the world, different from others, and or/ not part of a group.” Statements included “I don’t fit in; I don’t belong; I’m a loner; I feel outside the groups.” Respondents answered on a 6-point scale from 1 if “completely untrue to me” to 6 if “describes me perfectly.” In this study, participants who responded with 5 or 6 (“Mostly true of me” or “describes me perfectly”) on the scale were assigned 1 point, otherwise they were assigned 0 points.

Wrucke et al. [72] investigated factors associated with cigarette use among people with experiences of homelessness. Social isolation was one of the variables hypothesized to be associated with smoking among this population. The authors used the short form of the social isolation questionnaire developed using the

Patient-Reported Outcomes Measurement Information System (PROMIS). PROMIS defines social isolation as the “perceptions of being avoided, excluded, detached, and disconnected from, or unknown by others.” It uses a 4-item social isolation questionnaire to capture each of these dimensions, for which the option of responses range from never to always.

In their study, Drum and Medvene [66] used the Lubben Social Network Scale (LSNS) to measure social isolation in addition to the UCLA-R Loneliness Scale mentioned above. LSNS was used as a measure of risk of isolation and included 10 items; three (3) items referred to family networks, three items (3) to friend networks, and four items (4) to confident relationships. Each of the items had a five-point Likert scale-type response, with the total adding up to a score between 0 and 50. A higher score on the LSNS represents greater risk of social isolation. Participants were categorized based on their LSNS score as low risk (0–20), moderate risk (21–25), high risk (26–30), or isolated (31–50).

Ferreiro et al. [73] used one question from the 22-item Camberwell Assessment of Need (CAN) to measure loneliness among Housing First program participants in Spain. One item asks, “Does the person need help with social contact?” and the answer is classified as a serious problem if a respondent answered, “Frequently feels lonely and isolated.” Rodriguez-Moreno [31] used the General Health Questionnaire (GHQ-28) which includes a subscale of somatic symptoms, anxiety and insomnia, social dysfunction and depression to study the mental health risk of women with homelessness experience. e GHQ has one question related to “feeling lonely or abandoned.” Similarly, Vazquez et al. [30] reported one question on the extent participants feel lonely or abandoned using a 4-point Likert scale ranging from “not at all” to “a lot.” Pedersen, Gronbaek and Curtis [74], Bige et al. [56] and Muir et al. [57] also measured loneliness using one question. Another study by Rivera-Rivera et al. [55] examined factors associated with readmission to a housing program for veterans with a number of measurement tools and administrative data to create a profile of participants. In their study, social isolation was measured using the relationships section of the significant psychosocial tconthe

Table 3 Studies reporting associations measures between SIL and health status or outcomes

#	Lead author	Study design	Data	Health Indicators	Results
1	Patanwala (2018) [40]	Cross-sectional analysis (within a longitudinal study)	Patient Health Questionnaire-15 (PHQ-15)	Physical symptom burden (dichotomized as: 0–9 (minimal–low) and 10 (moderate–high)) (Outcome)	(AOR 2.32, 95% CI 1.26–4.28)
2	Pedersen (2012) [77]	Cross-sectional analysis	Self-reported data	Poor self-rated health (Dichotomized) (Outcome)	Men (OR: 1.98, 95% CI 1.36–2.88) Women: (OR: 1.71, 95% CI 0.96–3.05)
3	Bige (2015) [56]	Cross-sectional analysis using a Propensity-Matched Cohort Study	Health administrative data	ICU mortality Hospital mortality (Outcome)	ICU mortality: OR (0.56, 95% CI 0.18–1.89) Hospital mortality: OR: (0.38, 95% CI 0.14–1.07), p=0.06
4	Drum (2017) [66]	Cross-sectional analysis	Self-reported data	Subjective health on SIL	Correlation of Isolation and subjective health: (r=-.39, p = .03) Correlation of Isolation and subjective health: (r=-.27, NS)
5	Rodriguez-Moreno (2020) [70]	Cross-sectional analysis	Self-reported data using Short- General Health Questionnaire (GHQ-28)	Risk of mental ill-health measured by the Total Score GHQ-28 (< 7 vs >7) (Outcome)	OR: (0.24, 95% CI 0.09–0.64)
6	Davis (2000) [85]	Cross-sectional analysis	Self-report data on sleep patterns	Type of sleep (restless sleep vs restful sleep) (Outcome)	Chi square test: (restless sleep 77 vs restful sleep 45 among people with loneliness, p<0.05)
7	Valerio-Urena (2020) [70]	Cross-sectional analysis	Self-report data	Health status (Healthy vs. Sick (Sick=1)) (Explanative variable)	Being sick (OR: Sick 1.228 95%CI 0.524) p<0.05)
8	Wrucke (2022) [72]	Cross-sectional analysis	Self-report	Current Cigarette Use (Outcome)	OR: 1.02 95% CI 0.95 – 1.10)

95% CI 1.36–2.88), but not statistically significant for women (OR: 1.71, 95% CI 0.96–3.05) [74]. Another study found participants who reported being sick had a higher level of SIL than those who reported being healthy (OR: Sick 1.228(0.524) p<0.05) [70].

Moreover, a study by Patanwala et al. [40] reported that participants in the moderate-high physical symptom burden category had a significantly higher SIL score than participants in the minimal-low physical symptom burden category (AOR 2.32, 95% CI 1.26–4.28). In addition, homeless veteran participants who reported SIL were 1.36 more likely (95% CI: 1.04–1.78) to report readmission to the Homeless Program of the VA Caribbean Healthcare System when compared to those who did not report social isolation [55].

Furthermore, people with severe mental health problems are generally at higher risk of being socially isolated or feeling alone. For example, Rodriguez-Moreno [31] compared homeless adult women at high risk of mental-ill health (HW-MI) and homeless women not at high risk of mental-ill health (HW-NMI) and found that HW-MI participants reported feeling significantly lonelier than

homeless women without this risk (OR: 0.24, 95% CI 0.09–0.64).

Association between SIL, substance use, and social distress

None of the quantitative studies investigated the association between SIL and substance use, despite the fact that substance use is a prevalent issue among people with homelessness experience. However, some of the qualitative studies discussed how SIL and substance use are interconnected among people with experiences of homelessness [86]. Lafuente [36] reported participants relapsed to alcohol and other risk behaviors due to SIL: “I’ve started drinking and at this particular time. They ordered to put me back into treatment and at this time I was not homeless...and I refuse it...the alcohol has really taken over me.” Another study discussed how substance use contributed to SIL for participants who identified as male [59]. Participants discussed how the use of substances affected their social relationships in different ways including added strain, limited availability of resources from social relationships, and the interplay

self-identifying as a woman. These findings are not only consistent with broader research [95, 96] but also underscore deeper, often systemic issues within social service frameworks [97]. The intersection of SIL with identity-related factors indicates that care and social services may be insufficiently trained and equipped to address the unique challenges faced by different demographic groups [98, 99].

Findings from studies included in this review show a relationship between SIL, health and social distress among people with homelessness experience. SIL was associated with poor sleeping patterns [85], and with lower social identification with homelessness services [71], with any lifetime eviction and lifetime homelessness [67]. Related to health, SIL is negatively associated with subjective health [66], self-reported illness [70], health and mental health among both men and women [74], severe mental health problems [31] and substance use [59]. These findings are

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