

Pain in People Experiencing Homelessness: A Scoping Review

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Abstract

Background Prior work suggests that people experiencing homelessness (PEH) are at heightened risk for developing pain and have a uniquely burdensome pain experience.

Purpose The aim of this scoping review was to map the current peer-reviewed, published literature on the pain experience of PEH.

Methods In accordance with the US Annual Homeless Assessment Report, we defined homelessness as lacking shelter or a fixed address within the last year. We conceptualized the pain experience via a modified version of the Social Communication Model of Pain, which considers patient, provider, and contextual factors. Published articles were identified with CINHAL, Embase, PubMed, PsycINFO, and Web of Science databases.

Results Sixty-nine studies met inclusion criteria. Studies revealed that PEH have high rates of pain and experience high levels of pain intensity and interference. Substantially fewer studies examined other factors relevant to the pain experience, such as self-management, treatment-seeking behaviors, and pain management within healthcare settings. Nonetheless, initial evidence suggests that pain is undermanaged in PEH.

Conclusions Future research directions to understand pain and homelessness are discussed, including factors contributing to the undermanagement of pain. This scoping review may inform future work to develop interventions to address the specific pain care needs of PEH.

People experiencing homelessness are at increased risk for developing pain and having an especially burdensome pain experience. This scoping review described the current literature on pain in people experiencing homelessness. We searched five databases and identified 69 articles of relevance. Studies revealed that people experiencing homelessness have high rates of pain and experience high levels of pain intensity and interference. Fewer studies examined other factors relevant to pain—such as self-management, treatment-seeking behaviors, and pain care within health settings—however, initial evidence does suggest that pain is undermanaged in people experiencing homelessness. This scoping review informs future research to better understand pain and homelessness, as well as future work to develop interventions to address the specific pain care needs of people experiencing homelessness.

Keywords Pain · Pain management · Homelessness · Scoping review · Disparities

Introduction

An estimated 150 million people worldwide experience homelessness [1]. Initial evidence suggests that people experiencing homelessness (PEH) are at heightened risk for pain and associated health problems (e.g., infectious disease, diabetes) [2, 3] and that PEH have a particularly burdensome pain experience due to their life circumstances [4]. Pain and homelessness share many risk factors, including low socioeconomic status (SES) [5–7], physical and mental health problems [3, 7–9], childhood adversity [7, 10], stressful life events [10, 11], and domestic violence [12, 13]. The environmental context of PEH can also contribute to pain: exposure to weather, experiencing violence, lacking reliable food sources, and safe places to sleep, and being physically demanding (i.e., needing to carry one's belongings) [2, 14, 15]. PEH have poor access to healthcare in general and pain care in particular [3, 16]. Low educational attainment, persistent poverty, and suboptimal living environments may also make it difficult to understand and implement treatment regimens [17, 18].

To the best of our knowledge, no comprehensive review has integrated the diffuse literature on pain and homelessness to chart a path for future research. We employed scoping review methodology to address this gap. Using Arksey and O'Malley's framework [19], we aimed to rapidly map the key concepts, identify the scope of the available evidence, and highlight research gaps and future research directions regarding the pain experience of PEH.

Methods

We followed the five-stage framework outlined by Arksey and O'Malley [19]: (i) identify the research questions, (ii) identify relevant studies, (iii) select studies, (iv) chart the data, and (v) summarize and report the results.

Identifying the Research Questions

We aimed to answer two questions: “What is the state of the peer-reviewed, published literature on the pain experience of

PEH?” and “What are the gaps in the research literature on pain and homelessness?”

Identifying Relevant Research Studies

Published articles were identified with CINHALL, Embase, PubMed, PsycINFO, and Web of Science databases. Relevant articles published through February 23, 2022 were included. Search terms for pain (pain OR nociception) were combined with search terms for homelessness (Supplementary material). Controlled vocabulary thesaurus searches were used when available (e.g., MeSH headings) to pull further literature. Backward searches were also performed on each identified article to find other relevant articles not identified in initial searches.

Study Selection

Quantitative and qualitative studies were included if: (i) in a peer-reviewed journal, (ii) in English, (iii) included a (sub) sample of adults (≥ 18 years) who experienced homelessness any length of time in the past 12 months, and (iv) measured a pain-related construct or examined providers’ perceptions of pain-related care for PEH. To cast a wide net, all forms of pain were included regardless of type or chronicity. In accord with the US Annual Homeless Assessment Report [20], we defined homelessness as lacking a shelter or fixed address. Thus, eligible studies needed to define homelessness in this manner or clearly describe their (sub)sample’s living arrangements (e.g., streets, shelters) to determine whether it fit our definition. Studies were excluded if they: (i) sampled youth (under age 18) and did not separate results for adults, (ii) were a review or commentary, (iii) were a conference presentation, (iv) were a case study, (v) were a book, (vi) were a dissertation not published in a peer-reviewed journal,

or (vii) did not report the relationship between pain and homelessness.

Charting the Data

Similar to a recent review [21], we used a modified version of the Social Communication Model of Pain (SCMP) as a framework to organize the literature on factors that impact the pain experience for PEH [22]. We organized articles into five categories: (i) personal experience of pain (e.g., pain characteristics), (ii) pain expression and response (e.g., coping), (iii) seeking pain treatment (e.g., barriers to care), (iv) patient pain management (e.g., healthcare service), and (v) provider pain management (e.g., perceptions of PEH with pain). Articles were further categorized into intrapersonal and interpersonal factors for each of the five categories. All categories were non-mutually exclusive given that one article may capture data relevant to multiple SCMP categories. Studies were charted by the first author and reviewed by remaining authors. Discrepancies were resolved by group discussion.

Results

The initial search identified 1,468 articles, 63 of which met inclusion criteria. Six more were identified through backward searching; thus, 69 articles were included in this review (Fig. 1).

SCMP Categories

The majority ($k = 58$) reported data relevant to the personal experience of pain (Fig. 2) followed by patient pain management ($k = 18$), pain expression and response ($k = 9$), seeking pain treatment ($k = 8$), and provider pain management ($k = 4$). More studies were relevant to intrapersonal than interpersonal factors across categories (56 vs. 34, respectively).

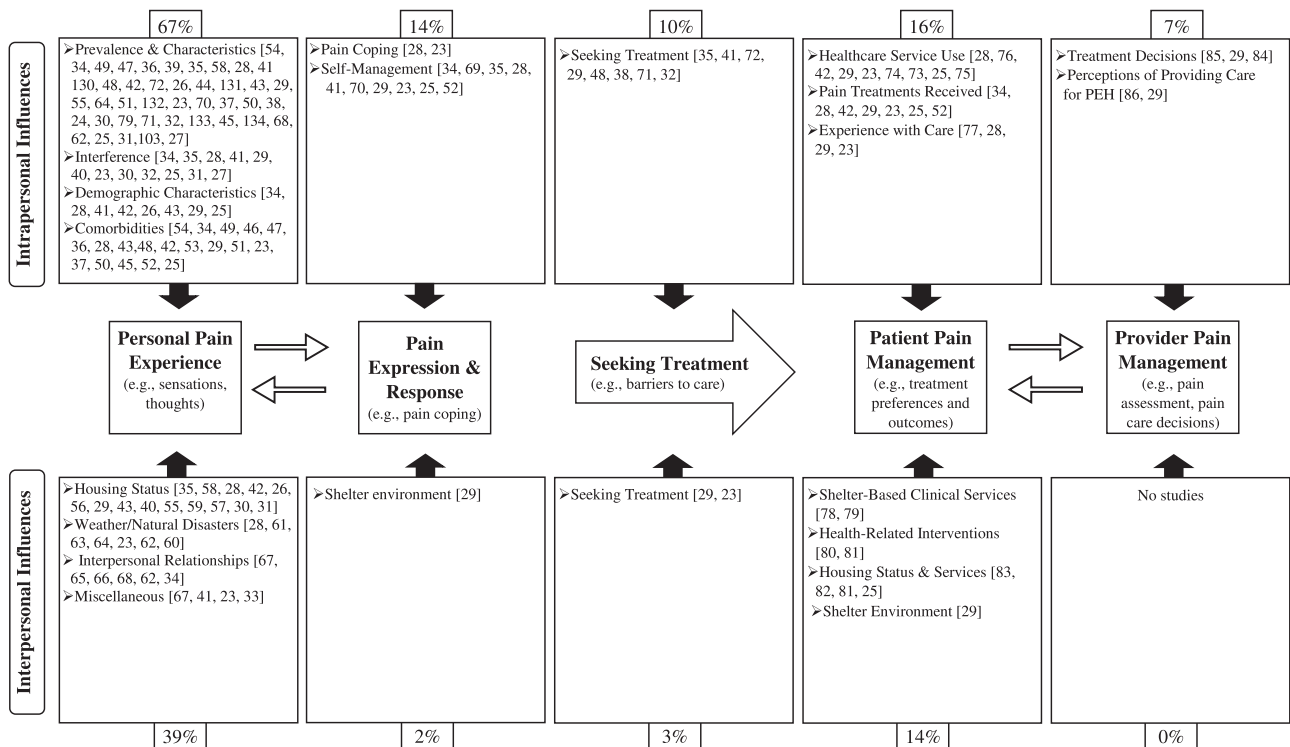


Figure 1. Pain in people experiencing homelessness, including relevant patient, provider, and contextual factors, captured by a modified Social Communication Model of Pain [22]. The percents listed are the number of articles in each category divided by the total included studies ($k=69$).

Populations Studied

Over half of the studies recruited a specific population experiencing homelessness. Studies that consisted of all women were most common ($k = 13$), followed by domestic violence ($k = 8$) and displaced natural disaster ($k = 8$) survivors. Five studies included all men. In studies of both men and women, the majority included more men than women (36 vs. 4, respectively). White ($k = 33$) and Black ($k = 26$) were the most common racial categories examined.

Measures of Pain

Most studies did not use standardized measures of pain ($k = 46$). Studies with standardized measures used pain or general health questionnaires with pain-related items that were reported separately. The 36-Item Short Form Health Survey (SF-36) was the most frequently used standardized measure ($k = 7$). One qualitative study assessed perceptions of the pain-related items from the Patient-Reported Outcomes Measurement Information System (PROMIS) bank [23]. Lack of clarity and relevance were identified as the top problems in using the items with PEH.

Personal Experience of Pain: Intrapersonal Factors

Pain prevalence and characteristics

Pain was common among PEH and reportedly moderate to severe [23–35] (Table 1). Non-localized pain ranged from 15 to 100% [36, 37]. Regarding pain duration, a study of PEH with chronic pain found that participants reported having pain for an average of 10 years [29]. In studies on dental pain, PEH (up to 66%) experienced pain episodes that lasted for days, and many reported having pain “fairly often” or “very often” (38%) and “sometimes or “always” (40%) [35, 38]. PEH with chronic pain most frequently described their pain as “sickening” (45%), “beating” (44%), and “tingling” (44%) [28]. In a study on podiatry needs of PEH, 16% and 21% reported “numbness” and “tingling” in their feet, respectively [39]. One study found that PEH endorsed an average of 2 pain locations [25]. Another study found that PEH reporting back and leg pain experienced greater pain and disability compared to those reporting pain in other locations [29].

Pain interference

PEH reported moderate to severe pain interference [23, 25, 27–32, 34, 66] impacting general activities, walking, work, energy/fatigue, relationships, sleep, enjoying life, mood, and eating, and speaking (dental pain) [23, 25, 28, 34, 35, 44, 66].

Demographic characteristics

Some studies found that pain was associated with being female [44, 47], whereas others did not find gender differences [25, 28, 29, 52]. Regarding race and ethnicity, one study found that non-White PEH were over three times more likely to report stomach pain compared to White PEH, but this became non-significant in multivariate analyses [52]. In a study of domestic violence survivors, there were race and ethnic differences in pain attribution—Latina women were most likely to attribute their pain to pregnancy/child-related causes, Black women to “other” reasons, White women to illness, and Asian woman to abuse [34]. Findings on age and pain were mixed. In a study of PEH with chronic pain, the average age of pain onset was 36 years [29]. Two studies found that PEH were

more likely to report pain as they aged [25, 47], while another study found that younger PEH were more likely to report toothaches than older PEH [50]. In contrast, two studies did not find any age effects [29, 52]. Sampled PEH had a range of education levels, but education was generally not associated with pain [29, 47], the one exception being a study of PEH with pain, which found that those with high and low education levels (vs. mid-level) were more likely to report pain-related interference [28].

Comorbidities

PEH with concurrent medical conditions were more likely to have greater pain severity and interference [29, 34]. Qualitative interviews revealed a belief that homelessness exacerbated their physical health conditions, many of which were associated with pain [23]. Other studies found that gastrointestinal conditions were associated with stomach pain [52], head injuries with headaches and high pain interference in general [34, 62], *Bartonella quintana* infections (“trench fever”) with leg pain and headaches [42, 67], and tooth decay with toothaches [46]. Injury was the most common reason for pain in one study of PEH with chronic pain [29]. Another study found that a majority of PEH reported that body movement aggravated their pain [28]. Associations between pain and mental health were common and bidirectional. PEH were more likely to have pain if they also experienced depression [25], post-traumatic stress disorder (PTSD) [25, 41], anxiety disorders [25], bipolar disorder [47], and psychotic symptoms [25]. Pain has also been found to heighten PEH’s risk for suicide [25, 58], depression [37], and general psychiatric and emotional problems [55]. In a study of PEH with chronic pain, 36% identified “emotional distress” as something that aggravated their pain [28]. Substance use was another common comorbidity [29, 36, 47], although the literature is somewhat mixed on its relationship to pain in PEH. Daily substance use and injecting drugs were associated with chronic pain among PEH [68]. Patients with chronic pain enrolled in methadone maintenance programs were more likely to experience homelessness compared to those without pain [48]. Another study found that PEH engaging in high-risk smoking behaviors (e.g., cigarette sharing) expressed mixed beliefs about whether these behaviors caused/exacerbated their headaches [40]. However, several studies did not find a relationship between substance use problems and pain in PEH [29, 47, 52].

Personal Experience of Pain: Interpersonal Factors

Housing status

Some studies found that PEH were more likely to report pain, and greater pain severity and interference, compared to housed people [26, 53, 66, 69], whereas others did not find such differences [26, 30, 31, 70]. Although living arrangements (e.g., streets, shelter) did not predict pain in one study [30], several studies identified the potential importance of homelessness duration. PEH for the first time were more likely to report chronic joint pain compared to PEH chronically [43], and longer duration of homelessness was associated with dental pain, “DIY” treatments for dental pain, pain interference with sleep, and different pain sensations (per the McGill Pain Questionnaire) [28, 35, 71]. However, several studies did not find a relationship between homelessness duration and pain [29, 43, 47, 52, 71].

Table 1 | Pain Prevalence of People Experiencing Homelessness

Study	Pain location/type ^a						
	Non-localized/unspecified pain	Head/neck	Abdominal/genitourinary	Back	Arms/chest	Lower extremity	Joint/miscellaneous
Aloot et al. [40]						3% leg	
Bargai et al. [41]							14% pain disorder (DSM-IV criteria)
Brouqui et al. [42]		51% headache				38% leg	
Chatterjee et al. [36] ^b	100% chronic pain						
Chen et al. [39]						56% foot 19% heel	
Comassetto et al. [35]							9% chronic joint pain disorder 74% musculoskeletal ^d
Creech et al. [43]	31% chronic pain disorder	91% lifetime dental pain					
de Campos et al. [28] ^c	83% pain at time of interview ^d						
do Carmo et al. [44]		50% dental pain					
Feitosa et al. [45]	70% pain	33% toothache					
Figueiredo et al. [46]							
Fond et al. [47]	52% moderate to extreme physical pain						30% joint
Gaeta et al. [48]	56% current chronic pain 77% lifetime chronic pain	25% toothache			21% chest pain on exertion		
Gelberg et al. [49]							
Gelberg et al. [50]		26% toothache					
Gelberg et al. [26]		27% toothache					
Greenough et al. [51]					9% chest		
Hwang et al. [52]			18% upper stomach				
Hwang et al. [29] ^e		11% neck ^d	12% abdomen/genitourinary ^d	51% back	21% shoulders ^d 15% hands ^d	28% knees ^d 18% feet ^d 16% legs ^d 14% hips ^d 16% ankles ^d	3% widespread ^d 38% other ^d
Kramer and Barker [53]		22% headache		59% back	37% chest		51% joint
Kwanbunjan et al. [54]				25% back ^e			
Lima et al. [55]		69% headache					
Ly et al. [56]		16% headache 6% sore throat 6% migraines					9% myalgia
Merdsoy et al. [57]	39% chronic pain						
Nyamathi et al. [37]	15% severe bodily pain						
Okamura et al. [58]	30% moderate to severe pain						

Table 1. Continued

Study	Pain location/type ^a						
	Non-localized/unspecified pain	Head/neck	Abdominal/genitourinary	Back	Arms/chest	Lower extremity	Joint/miscellaneous
Pallotta et al. [24]			58% abdominal 18% rectal 22% pelvic 16% dysmenorrhea 12% dysuria		27% chest 18% heartburn		
Podymow et al. [59]	89% pain	18% headache					
Salem et al. [60]	39% moderate to severe bodily pain						
Swarbi et al. [61]		42% headache 17% ear 36% headache					
Topolovec-Vrtnic et al. [62]							
Tsai et al. [63]	35–39% chronic pain						
Tsai et al. [64]	37% chronic pain diagnosis						
Turner et al. [65]	58% general aches and pains	60% headache					
Vogel et al. [25]	58% had pain most days in the past 3 months	26% head/neck ^d 3% oral/teeth ^{de} 1% face ^{de}	22% stomach aches 12% gastrointestinal ^{de}	50% back ^d		15% feet ^{de}	39% joints ^{de} 38% limbs ^{de} 11% other ^{de}
Yabuki et al. [27]	62% chronic pain	4% neck ^e 3% head ^e		6% back ^e 22% low back ^e		21% shoulder ^e 6% elbow ^e 3% hand ^e 1% arm ^e 1% chest ^e	6% hip ^e 34% knee ^e 10% foot ^e

^a% is out of overall PEH sample unless otherwise noted.

^bN = 10.

^cAll study participants were experiencing homelessness and pain.

^d% is of PEH (sub)sample reporting pain.

^eEstimated from bar graphs.

Weather and natural disasters

PEH reported that cold/poor weather aggravated their pain [23, 28]. People in temporary housing after natural disasters reported more headaches, stomach aches, musculoskeletal pain exacerbation, and general aches and pains [65, 72–74]. Additionally, one study found that back pain prevalence increased after a natural disaster among survivors living in temporary housing [54], but another study did not find that survivors of a natural disaster living in temporary housing (vs. permanent housing) experienced more back pain [73].

Interpersonal relationships

People in transitional camps after a tsunami reported more stomach aches and headaches if their living quarters were crowded [65]. In studies of domestic violence survivors in shelters, between 77–85% participants reported pain after a fight with their abuser within the past year [75, 76], higher pain ratings were associated with verbal but not physical abuse [34], but the severity of abuse did not predict pain 1-year later [77]. Lastly, one study found that female Veterans with children were less likely to report chronic pain than those without children, but no differences were found between male Veterans [64].

Miscellaneous interpersonal factors

One study on the evolving needs of homeless families found no differences in pain between mothers recruited in 1993 and 2003 [33]. Another study among domestic violence survivors who had resided in a shelter found no difference in pain between baseline and 1-year later [77]. Finally, poor sleeping conditions exacerbated the pain of PEH [23], and dental pain was associated with perceived discrimination [44].

Summary

The extant literature suggests that pain is prevalent among PEH and is often moderate to severe in intensity and interference. Studies examining demographic characteristics found that PEH who were women, minoritized (i.e., not White), and had low or high levels of education were more likely to have worse pain outcomes, but these findings were somewhat inconsistent. The relationship between age and pain in PEH was even more mixed. Physical, mental, and substance use comorbidities were associated with pain in PEH; emerging evidence suggests these relationships are bidirectional. Regarding interpersonal factors affecting the personal pain experience, homelessness status, and the duration of homelessness were associated with pain, but again, findings were inconsistent. Other interpersonal factors that impacted PEH's personal experience of pain included weather/natural disasters and social/intimate relationships.

Pain Expression and Response: Intrapersonal Factors

Pain coping

Two studies examined pain coping in PEH. First, in a sample of PEH in Brazil, none reported using religion to cope with pain; rather, taking prescribed medications (see Prescribed Medications) and consuming alcohol/drugs (see the Pain self-management section) were the modal strategies [28]. Second, in qualitative interviews, PEH with pain-related conditions described having to develop a high tolerance for pain to offset the lack of treatment options [23].

Pain self-management

PEH reported multiple barriers to pain self-management, including financial constraints, a motivation, and concerns about dependency and overdosing [29]. Nonprescription medication use was commonly reported [29, 34, 44, 57, 78], whereas other strategies (e.g., herbs, relaxation, exercise/rest) were reported less often [29, 34, 35]. A study on oral health found that 13% reported auto extraction of painful teeth [44]. Another study found that PEH who used “holistic” methods reported higher pain, and those who attributed their pain to illness were more likely to use exercise for relief [34]. Across several studies, 25–50% of PEH reported using illicit drugs and/or alcohol in response to pain, and daily substance use and injecting drugs were associated with using illicit drugs for pain [23, 25, 28, 29, 35, 68].

Pain Expression and Response: Interpersonal Factors

A qualitative study identified shelter conditions (e.g., poor sleeping conditions, lack of privacy) as key barriers to pain self-management [29].

Summary

A few studies aside, pain coping strategies used by PEH have been ignored in the literature. PEH reported using several self-management strategies, including nonprescription medications and non-pharmacological treatments; substance use was also common in response to pain. PEH identified shelter conditions as a barrier to effective pain self-management.

Seeking Treatment: Intrapersonal Factors

PEH with pain reported more interest in medical, dental, and mental health services than those without pain [32, 38, 44, 60]. Across several studies, 5–30% of PEH with dental pain sought treatment for it [35, 44, 46, 49]. PEH endorsed several personal barriers to accessing pain care, including difficulties obtaining transportation and finding a doctor [29].

Seeking Treatment: Interpersonal Factors

PEH noted long wait times for appointments as a barrier to accessing pain care [23, 29].

Summary

The literature on pain treatment-seeking behaviors of PEH is sparse, despite evidence that PEH with pain are interested in and in need of clinical services. The only studies that reported rates of treatment-seeking were focused on dental pain—the majority of afflicted PEH did not seek treatment. PEH identified key personal (e.g., transportation challenges) and healthcare system level (e.g., long wait times) barriers to accessing clinical services for pain.

Patient Pain Management: Intrapersonal Factors

Healthcare service use

Between 35 and 64% of PEH with pain had received clinical care [25, 28, 29]. One study found that about half had a regular physician, and 71% reported that this physician was treating their pain [29]. This study also found that more severe pain was associated with receiving care and having uncontrolled pain [29]. Pain was a common chief complaint among PEH in emergency departments—up to a quarter of these

visits were pain-related [79–81]. A qualitative study identified a lack of both health insurance and a primary care provider as key contributors to high use of urgent care for pain [23]. Regarding hospitalizations, chest pain did not increase the odds of 30-day readmission [82], and psychiatric hospitalization rates did not differ between PEH with or without pain in a sample of people with serious mental illness [47].

Pain treatments received

Up to 56% of PEH with pain reported using prescribed analgesics [25, 28, 29, 47], which were associated with greater pain severity [25, 29]. Ibuprofen use was common at urgent care centers [23]. Anti-depressant use was associated with greater pain severity, but taking analgesics or an opioid substitute, as well as general medication adherence, were not [47]. One study found that PEH with pain who used substances daily were less likely to have received treatment for pain and taken prescribed medications [68]. Also, up to 24% of PEH reported using non-pharmacological treatments (e.g., PT, acupuncture, psychotherapy) [29, 34].

Experience with care

One qualitative study solicited PEH's opinions about pain treatment [23]. Central themes included fear of addiction and concerns about grogginess as a side effect of medications, which might compromise their safety in unsheltered living environments. In a sample of PEH with pain, 27% endorsed unmet needs related to pain care, and of those receiving pain care, 42% were unsatisfied and this was associated with greater pain severity [29]. Another study found that only 15% of PEH who had received any pain care reported relief [28], and yet another study of hospitalized PEH found that pain interfered with their ability to complete functional assessments [83]. Barriers were common. PEH with pain endorsed medication adherence challenges, including difficulty following medication schedules, problems accessing medications, and concern about mixing medications with illicit drugs and alcohol [28, 29]. Alarming, one study found that of PEH with pain, 20% endorsed using illicit drugs concurrently with prescribed medications [29]. PEH also identified provider-related barriers. Providers were frequently described as being unable to identify the cause and/or cure for their pain [29]. PEH with pain also reported discrimination by providers/staff due to their homelessness status or characteristics (e.g., appearance) [23]. Providers were also reportedly too concerned about overmedicating or facilitating drug-seeking behaviors and withheld or restricted prescriptions due to addiction or other unspecified reasons [23, 29, 68]. Experiencing more barriers to pain management was associated with more severe pain [29].

Patient Pain Management: Interpersonal Factors

Shelter-based clinical services

An onsite oral health program reduced oral pain and interference in women living in a domestic violence shelter [84]. In a shelter-based palliative care program for PEH with life-threatening illnesses, nearly 75% of patients received continuous pain management, and pain was eventually controlled for all but one [59].

Health-related interventions

An primary care program integrating medical, mental health, addiction, and case management services did not improve

pain outcomes for PEH [85]. PEH did report significantly less pain following Accelerated Resolution Therapy for PTSD [86].

Housing status and services

PEH in an emergency department were less likely than housed people to report pain as the chief complaint [87]. Another study found that pain improved similarly for PEH and housed people after Accelerated Resolution Therapy [86]. Regarding housing services, one study found that permanent housing for PEH did not impact receipt of pain care, medication use, or pain interference [25]. However, another study found that after receiving temporary emergency housing, PEH had fewer Medicaid claims for pain [88].

Shelter environment

PEH reported that the lack of safe places to store and access medications at shelters is a key barrier to pain management [29].

Summary

About two-thirds of PEH with pain received clinical services for pain, and pain was a common reason for using emergency care. PEH often reported using prescription analgesics; however, adherence and provider communication are key barriers to pain management. PEH expressed concerns about medication addiction and side-effects (e.g., grogginess) impacting their personal safety. In contrast, there is scant research on use of non-pharmacologic modalities. Overall, PEH expressed dissatisfaction with pain care, including discrimination, and unmet needs. Shelter-based medical services and psychotherapy for PTSD reduced pain in PEH; surprisingly, an integrated primary care program did not. Also of note, with two exceptions, the majority of studies did not find a strong link between patient pain care, housing status, or housing services.

Provider Pain Management: Intrapersonal Factors

Treatment decisions

Three studies—one clinical and two experimental—examined providers' pain treatment decisions for PEH. Regarding the former, 64% of providers for PEH with pain were aware their patient had chronic pain, and 51% reported that pain was a focus of care [29]. Of those treating a patient's pain, about half reported altering their prescribing practices for PEH, such as dispensing a limited supply of medication. One of the experimental studies used mannequin-based emergency department simulations in which patients were described as having chest pain while walking to a homeless shelter (low SES) or office building (high SES) [89]. Medical students asked about pain more often for the high SES patient and physically touched the low SES patient (i.e., PEH) more often. In the other study, vignettes described a man as homeless or housed presenting to emergency department with pain and a history of hypertension and schizophrenia. Providers (medical and psychology trainees, licensed clinical psychologists) made equivalent pain treatment decisions for PEH and housed patients [90].

Perceptions of providing pain care for PEH

One study recruited providers of PEH with chronic pain. Over 75% reported difficulties managing patients' pain, including reluctance to prescribe opioids due to a history of substance abuse, missed appointments, and lack of insurance

for complementary therapies; 42% stated that opioids should be avoided altogether [29]. A particularly striking finding from this study is that 28% of providers were not aware their patient was homeless. In another study, staff providing end-of-life services to PEH cited managing pain as one of their most important clinical challenges [91].

Provider Pain Management: Interpersonal Factors

No study examined interpersonal factors related to provider pain management.

Summary

The few studies that investigated providers' pain care for PEH found that patient homeless status impacted providers' interactions and clinical decisions. It is noteworthy that one-third of PEH-serving providers were not aware their patient had pain. Pain was the focus of treatment for only half of PEH with pain, and the majority of providers reported significant challenges managing this pain. Over 40% of providers endorsed that opioids should be avoided for PEH. Studies on interpersonal provider pain management factors were entirely absent.

Discussion

This scoping review investigated the pain experience of PEH. Sixty-nine articles met inclusion criteria. Most focused on the personal experience of pain, whereas few examined topics relevant to other SCMP categories. Additionally, more studies examined intrapersonal than interpersonal factors. It is also important to note that pain was the primary focus of only ten studies [23, 25, 28, 29, 34, 35, 44, 47, 52, 68]. In most studies, pain was secondary or tertiary to the primary topic (e.g., general health of PEH). Thus, this review brings attention to the fact that studies examining PEH have largely been absent in the pain field. Nevertheless, we found the modified SCMP to be a comprehensive and useful framework to map the literature on the pain experience of PEH, and we advocate for its continued use to guide future research.

Homelessness Definition

We defined homelessness as lacking shelter or a fixed address [20]. Our initial search identified some studies with different definitions (e.g., at-risk of losing housing) and, thus, were outside the scope of this review. Together with prior studies on homelessness in general [92], this highlights the pitfalls of not having a widely accepted, standardized definition. A standard definition could bring clarity to the impact of housing status on pain and provide clear directions for future work. The Global Homelessness Framework articulates three categories: (i) people without accommodations, (ii) people living in temporary accommodations, and (iii) people living in inadequate/insecure accommodations. This framework is inclusive of the homeless experience globally, and we recommend that future studies examining pain in PEH adopt it.

Populations Studied

About half of the included studies focused on a specific demographic group, highlighting the diversity of PEH and the imperative for future studies to take this into account. There

were a dearth of studies on older adults, which is problematic in that they face unique pain-related challenges, such as difficulty reporting and managing pain due to cognitive aging [93]. Given the aging homeless population—approximately half are over 50—there is an urgent need to better understand the pain care needs of these older adults [94]. Our review also revealed a conspicuous research gap regarding minoritized people. No studies specifically investigated pain in Black PEH, despite the fact that 40% of the US homeless population is Black [95] and that Black people have a particularly high burden of pain [96, 97]. Only three studies in this review even examined the link between race/ethnicity and pain [25, 34, 52]. This needs to change.

Pain Measures

This review raises concerns about pain assessment in PEH. Despite its developmental rigor and widespread use, the PROMIS bank may lack relevance to the context of homelessness [23]. Measures may also need to be modified for PEH, who often have lower levels of education and literacy [98, 99]. Similar issues about content relevance and item legibility for PEH have been found for other standardized health measures [100]. The take-home point is clear: there is a pressing need for reliable and valid pain measures for use with PEH. Whether that will require modifying existing measures or creating new ones is an open question.

Personal Pain Experience

Our review suggests that pain is more prevalent in PEH than the general population. Chronic pain rates were high—exceeding 50% in some studies—compared to the estimated 20% of the general population [101]. PEH also appear to have more severe pain [27, 30, 31] than referent groups [102]. Despite this, few studies examined pain characteristics other than severity; this needs future research. For example, research should elucidate the inception and temporal patterns of homelessness and pain. Furthermore, clarifying how lifestyle demands put PEH at-risk for certain types of pain (e.g., excessive ambulation leading to lower extremity injury) may enhance the precision and effectiveness of pain care. Qualitative methods may be especially fruitful in these research efforts given the unique circumstances of PEH.

Regarding interpersonal factors, future research should clarify the mixed findings on the relationship between housing status and pain. We hypothesize that income and mental health factors will provide key insights and thus should be rigorously assessed. The current review also highlights a need to better understand how the living environment—interpersonal relationships, weather, natural disasters, and sleeping conditions—impacts PEH's pain experience.

Pain Expression and Response

One of the more consistent findings was that PEH frequently endorsed using substances for pain relief. An important future research direction is to identify factors that amplify or mitigate this link. Mental health comorbidity and a history of substance use before pain onset are likely candidates [103, 104]. Additionally, given the high rates of substance use and the fact that pain often interferes with recovery [105, 106], there is a pressing need to determine whether and how pain is a barrier to harm reduction and sobriety in PEH. Unfortunately, the literature on other pain self-management strategies was

limited. Future work in this area may benefit from qualitative methods, as PEH likely must rely on different strategies than housed populations. Emerging evidence also suggests that PEH face multiple personal (e.g., poverty) and systemic (e.g., shelter environments) barriers in responding to pain and lack adequate resources to overcome them. It is essential that future work identify these barriers and implement targeted interventions such as modifying shelter environments (e.g., secure medication storage).

Seeking Treatment

Pain treatment-seeking behaviors are another topic in need of study. We call for research to determine the rate, frequency, and predictors of these behaviors among PEH. Initial evidence from this review and the general homeless literature indicates myriad barriers to accessing clinical services for pain [16]. We hypothesize at least two additional barriers that have yet to be examined. The first is that essential needs (e.g., shelter, food) and/or acute and life-threatening medical concerns are prioritized by PEH over pain-related services [107, 108]. The second involves pain itself—because PEH often rely on walking for transportation, pain may limit their ability to travel to the clinic. Research should test these hypotheses, as well as the effectiveness of embedding clinical services in non-traditional settings (e.g., shelters, churches) [109].

Patient Pain Management

PEH are high utilizers of emergency and urgent care for pain, mirroring their treatment-seeking for general health, likely due to lack of access to primary care [110]. Future work should continue to elucidate the settings and predictors of where PEH receive pain care. Surprisingly, none of the reviewed studies examined PEH's use of primary care services for pain, which is a conspicuous gap given that about half of patients with chronic pain are managed in primary care [97]. Up to 56% of PEH were prescribed analgesics in the reviewed studies, but there were few details on medications and doses. Surprisingly, we did not find a single study on prescription opioid misuse or adverse events. Such research should be prioritized given PEH's high rates of substance use [105], a known risk factor for opioid misuse and overdose [111, 112]. Few studies examined non-pharmacologic treatments, and many combined multiple modalities into a single item (e.g., PT, psychotherapy, acupuncture), making it difficult to determine which were most frequently used. Chronic pain is a biopsychosocial experience that requires an interdisciplinary approach [113]; thus, elucidating PEH's use of these treatments is a key gap to address.

Studies on treatment preferences were also lacking. Given the practical challenges of homelessness, identifying patients' preferences is crucial to developing pain care plans that are compatible with their circumstances. Shelter-based medical services appear to be an effective approach and warrant further study, including how these services can be widely implemented. One study found that psychotherapy for PTSD reduced pain symptoms in PEH. This aligns with prior work in housed samples showing that mental health treatments improve pain outcomes [114, 115]. Given PEH's high mental health burden [7, 105] and the overall benefits of psychotherapy for pain [116], future research should continue to explicate how psychotherapy can address the pain and mental health needs of PEH. This may include adapting

evidence-based psychotherapies to meet the needs of PEH with pain (e.g., literacy-adapted CBT [117]).

Provider Pain Management

There are substantial knowledge gaps on provider treatment of PEH with pain. Initial evidence suggests a bleak picture, as many PEH report unmet pain care needs. Future work on provider characteristics might be particularly fruitful. Provider beliefs about SES and race have been found to impact their pain decisions [118, 119]. Some also have specific beliefs about PEH, including that they are lazy and at fault for being homeless [120, 121]. Although research has yet to examine provider beliefs about PEH with pain, related work has found that providers believe people with lower SES are more pain tolerant and at greater risk for opioid misuse [3, 122]. The current scoping review also found that providers face challenges in managing pain in PEH [120, 121, 123]. Both providers and PEH report concerns about concurrent use of analgesics and other substances. Considering the high rates of substance use among PEH [105, 106], future investigations should first characterize the relationship between pain and substance use in PEH and subsequently test interventions that address them concurrently vs. sequentially. These concerns also reinforce the need for research on non-pharmacological options for PEH.

Studies on interpersonal factors related to provider pain management were entirely absent from the literature. The National Health Care for Homeless Council outlined recommendations for caring for homeless adults with chronic pain in primary care [124]. These include training integrated care teams, building data registries to identify and address behaviors outside of treatment plans, and developing partnerships for additional services (e.g., substance use treatment). We advise that these recommendations guide future work on the interpersonal aspects of pain care for PEH. Research might also examine the impact of peer support programs and healthcare navigators, given that such programs have been beneficial for PEH and people with chronic pain [125–127].

Clinical and Practical Implications

This review highlights just how essential it is to screen for pain when caring for PEH. It also reinforces the imperative-ness of patient-centered care, particularly for PEH with pain, who are more likely to carry comorbidities, have limited resources, and live in settings that aggravate pain. Assessing current and past substance use is crucial for treatment planning, given their high prevalence among PEH and consequent increased risk of opioid-related adverse events [111, 112]. PEH with pain would likely benefit from community-based services, such as those provided in shelters. When considering interventions for pain in PEH, stakeholders may need to think creatively. For example, free or low-cost secure public storage facilities could reduce the need to carry belongings and allow for safe storage of medications.

Despite the success of several programs [128–130], homelessness remains a global problem and is a crisis in some regions (e.g., West Coast of the U.S.) [131, 132]. To our knowledge, such programs have yet to consider the role of pain. This is important, as some initiatives—such as dismantling homeless camps—may exacerbate pain [131]. As such, integrating pain into broader homeless remediation plans may be worthwhile. On this front, two questions are pressing: (i) How does pain affect PEH's ability to secure and maintain permanent

housing? (ii) How do housing and pain care services, separately and together, impact key outcomes among PEH?

Limitations

A majority of studies were conducted in North America; thus, caution is in order when generalizing to other regions. Consistent with scoping review methodology [133], study quality was not assessed. Our inclusion criteria, which required a pain-related measure, may have biased the sample towards quantitative work. Other relevant literature may have been omitted due to search term and database selection. Our search terms were general and did not include specific conditions (e.g., headache) or populations that often experience homelessness (e.g., domestic violence survivors). Finally, as noted above, homelessness was defined, a priori, as lacking shelter or a fixed address. Other, non-pain reviews [134] have used different definitions and, thus, may not be directly comparable to the current one. Despite these limitations, this scoping review highlights the prevalence and impact of pain in PEH, and it specifies key areas in need of future research and clinical attention for this long-neglected and marginalized community.

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Compliance with Ethical Standards

Transparency statements: This study was not formally registered. The analysis plan was not formally pre-registered. Data from this study are available in the electronic supplementary materials or by emailing the corresponding author. There is no analytic code associated with this study. There are no special materials associated with this study.

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