



## Research article

## Backgrounds and perspectives of San Antonio street sleepers

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## ABSTRACT

**Background:** The question of what brings someone to homelessness and keeps them there has many varied and complex answers. The authors believe the answers lie within the persons experiencing homelessness (PEH).

**Methods:** This is an interpretive approach study based on convenience sampling of the San Antonio, TX, unsheltered population, utilizing semi-structured interviews from January 2022 through November 2022.

**Results:** The six most common themes that emerged from the subjects' backgrounds were 1) jail or prison time or other personally significant legal issues; 2) personal substance abuse or addiction struggles; 3) physical and mental health challenges as an adult; 4) disdain of shelters and preference for rough sleeping; 5) a problematic childhood; 6) did not enjoy school as a child or young adult.

**Conclusion:** To gain more insight into a situation as complex as the state of homelessness, researchers should meet with those on the frontline of this epidemic and hear first-hand their personal histories, challenges, successes, and suggestions. Though not a novel approach, the researchers found limited previous literature in regard to approach, scope and in relation of causation related to homelessness, especially about the U.S. unsheltered population. The ultimate goal is for such research to help guide outreach services and legislation related to PEH.

## 1. Background and literature review

Many characteristics related to homelessness, such as being a veteran with PTSD [1], a person with addiction [2], or a victim of abuse [3], are well described. However, the plight of persons experiencing homelessness (PEH) is not straightforward. PEH often have multiple comorbidities exacerbated by other factors, including cost of living [4] and ability to navigate social services [5]. For example, in cities experiencing rapid growth, such as Austin, TX, the homeless population is growing alongside the housing and business markets [6].

To further complicate the issue, access to housing, coping mechanisms for life on the street, and integration into mainstream society are often fluid states for PEH. *Tent cities* are found ubiquitously across the United States [7]. It is clear that the issue of homelessness is not a community- or state-specific issue but rather a complex national topic that requires focused attention, most notably demonstrated

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by the interstate busing system [8]. On the micro level, the interstate busing system lightly demonstrates two facets of local government's approach to the issue: the interrelatedness of seemingly isolated policies, and the lack of communication and coordination between local governments. On the macro level, this illustrates the complexity of the issue and highlights the need for a broad scope when approaching the homeless population. In order to have a comprehensive view on the causes of homelessness, common and known factors should be evaluated. Unconventional or lesser-known causes, like a nationwide busing system, must be evaluated with the same vigor.

Yet, if one were to review available research into this topic using data banks like JAMA Network, Lippincott, ScienceDirect, Wiley Online Library, BMJ Journals, PubMed, and Google Scholar, they would find a large majority of the available research to be at best a comparison of one, two, or even three variables in relation to each other [9–15]. They would also find research that works to describe different portions or characteristics of the PEH population [16–21]. This is not to say that existing research into this topic is not relevant. It has provided the basis for how the PEH population can be engaged. This statement is to point out that, given the increases in PEH populations nationwide and the increases in the financial revenue provided to this population, the proposed solutions used to relieve this population of its difficulties are not only not working, but also indexing an actively worsening problem noticeable via increases in homeless populations nationwide. The next logical thought should be whether the solutions being implemented are based on small information sets and if so, whether these solutions would benefit from a more robust and comprehensive data-gathering effort. The overarching goal of this initial phase of research is part of a larger mission to collect data around the PEH population with as broad of a view as possible. It works to address the perceived gap in the available literature by implementing a philosophy of expansiveness: viewing the causes of homelessness as a complex and convoluted process involving multiple facets of the overall society.

Following this philosophy, this research is the initial phase of a robust seven-phase process; it includes data collection with complex relationships in mind and a broad-enough scope to observe this complexity. To begin this process, it was determined by the researchers that in-person interviews with the PEH individuals would be the best place to start and would provide groundwork for the following phases. While the data from in-person interviews was not expected to provide new correlations, the goal was to identify the value of including PEH populations themselves in the data-collecting and interpretation process, as the ones living through it. From here, a second literature review was conducted for research matching in-person-interview data gathering. Through the use of data banks, the key term “interviews with the homeless” was searched for to provide a basis to begin in-person interviews. From this search, eleven primary articles were identified, published from 2000 through 2021 [3,22–31]. These studies took place in the U.S. and abroad. Interview topics spanned from homeless individuals' access to technology [23] to the prevalence of abuse in the early life of young adults [3]. All interviews were semi-structured [3,22–31], allowing interviewees the flexibility to answer questions in the areas and to the extents they were comfortable. These articles were selected to provide an evidence-based background for the interview phase. Following the literature review, the authors deemed that more interview-based studies are necessary to sufficiently capture the diversity of this population, especially in the United States. The discussion section of this paper elaborates on these eleven primary articles.

### 1.1. Study objectives and rationale

The objective of this research is twofold: first, to address its place in the broader research pursuit, as outlined by “The Enigma of Homelessness,” a research proposal drafted by one of the contributing authors based on experiences with homeless individuals in the San Francisco Bay Area. It is the first phase of seven that the original proposal described as crucial to an all-encompassing approach to solutions for this cultural issue. This all-encompassing approach was determined to be beneficial because the causation of something as complicated as homelessness cannot be reduced to one or even two factors. This is evidenced by the continued growth of the homeless population nationwide, despite increased spending on this population. Thus, the original proposal was drafted as an attempt to be as robust as possible in the pursuit of causation, with what is described as exhaustive intent. It concluded that at, minimum, seven different phases would be needed to collect enough data to make truly informed decisions. The seven areas of interest related to homelessness are firsthand accounts by homeless individuals; legislative measures affecting PEH; state and national economic factors affecting PEH; police interactions with PEH; civilian interactions with PEH; healthcare interactions with PEH; and lastly, ethnographic study. The original proposal postulates that the current research to determine causation of homelessness, in conjunction with how this data is obtained, is too simplistic in its approach. This simplistic data is used to apply legislative and financial decisions to this population. The objective of this research is to highlight the lack of comprehensive data retrieval.

The second objective is smaller in scale: to obtain the cause of homelessness from the very people who are homeless. This was determined to be the first phase because direct representation of the group being researched was viewed as critical. Individuals of the PEH population should be a part of the data collection and solution process to provide insight from within the community, as opposed to being viewed from the outside in. By allowing the individuals of this group to speak for themselves, researchers avoid applying preconceived notions to research gathering. Rather, the individuals being questioned guide the direction of data retrieval through a carefully drawn-up questionnaire, allowing for new paths of information to be discovered or new ways of thinking about the issue to be revealed.

This study aims to draw out such information by learning more about the backgrounds, perspectives, and future goals of PEH through their own words. Through the in-person interviews, the researchers expected to find a clearer picture of the local PEH population and common roadblocks the PEH population of San Antonio encounters. These roadblocks include issues such as difficulty of access to technology and the internet, access to supportive services, access to healthcare, chronic health conditions, access to housing, and how much, if any, receive familial support. In addition, this research expected to identify common themes among the population correlated to increased chances of becoming a PEH, such as sexual abuse as a child and drug abuse. The ultimate goal,

which is beyond the scope of this study, is to improve support and services to the unsheltered population by providing our legislative bodies with a more robust representation of the issue. The researchers postulate that allowing PEH individuals to be a part of the solution process will uncover unforeseen and unknown data, laying groundwork that can serve as a launching point for continued research phases.

## 2. Materials and methods

San Antonio has a population of roughly 1.5 million inhabitants. It has a nearly 50/50 split between males and females; 12.8 % are over 65 years old and nearly 25 % are under 18. It is demographically composed of 65 % Latino/Hispanic individuals, 23 % White individuals, with the remaining 10 % composed of Asian, Black, and Native Hawaiian and Other Pacific Islander individuals. It has 89,121 veterans and foreign-born persons, making up 14 % of the total population. The median household income is \$59,593 and nearly 18 % of the population is considered below the poverty line [33]. The majority of Texas is Republican politically, yet many of the major cities, such as San Antonio, Austin, and Houston, have Democratic legislators. The major economic activities in San Antonio include United States military bases, “15 colleges and universities and robust Information Technology/Cybersecurity, Bioscience, Aerospace, New Energy, Financial Services, and Advanced Manufacturing sectors” [34]. There are also demographic studies that show a 20-year greater difference in the life span of those on the North side of San Antonio compared with those on the South side [35].

Access to the field was straightforward for this research team. The organizers of the local homeless shelters like Haven for Hope and Church Under the Bridge were more than willing to help set up space for interviews, with the only restrictions encountered being areas where PEH populations were overtly unwelcoming to the interviewer’s approach. In these situations the interviews did not engage to prevent any misunderstanding or conflict.

It is also worth mentioning the effect of COVID on the researcher’s ability to acquire information. There were no hindrances from local government on the researcher’s ability to interact with the PEH population. The required usage of masks made communication difficult at times, but this was overcome with proper distancing and logistical setup. There was general hesitation by PEH individuals to speak with the interviewers, but this was noted to be related more to their distrust of outsiders than an aversion to communicable diseases.

The first part of this research used an interpretive-approach to procure qualitative data via in-person interviews. The data collection was based on convenience sampling of the unsheltered population in San Antonio, TX, utilizing semi-structured interviews from January 2022 through November 2022. Initially, the data collected in the in-person interviews followed the idea of purposive sampling, keeping in mind that some PEH may not wish to or be able to participate. The data-collecting process followed the steps described in the Grounding Theory of data collection. The second part of this research involved taking the collected data through a thematic analysis so the qualitative data could be interpreted quantitatively. The first phase of coding began at the completion of six interviews. With initial statistical themes emerging, sampling via in-person continued until the goal of 28 interviews was reached. During this timeframe, constant comparative analysis along with memoing was performed. Eventually, theoretical saturation was reached, as no new themes emerged from in-person interviews, and additional phases of coding, intermediate then advanced, occurred to provide the quantitative data. The following illustrates the step-by-step processes followed to implement the principles of Grounding Theory.

1. Before data collection, all six investigators met for three inter-rater reliability sessions to discuss interviewing techniques, including awareness of one’s presence and dispositional affect [28], active listening, and displaying support and empathy without making judgments or assumptions. Investigators also reviewed the importance of a semi-structured interview model, encouraging participants to drive much of the conversation.
2. Based on previous research, the authors proposed a sample size of 28 for the protocol. Investigators planned to recruit more interviewees if needed. Twenty-eight was also the number of subjects included by Ferguson [24]. The sample size for other similar studies in the literature review ranged from 16 to 40 [3,22–31]. All investigators served as interviewers, and there was a near-equal split of interviews conducted by each investigator.
3. Investigators performed convenience sampling as they approached attendees at soup kitchens, shelters, and on the street about interest in participating in a one-on-one interview for approximately 45 min.
4. Those interested and of sound mind and body per pre-established criteria consented verbally via an audio recording. The protocol defined “sound mind and body” as the ability of the individual to
  - a. Provide verbal consent and acknowledgment of the purpose of the study and how the researchers intended to protect their personal information and interests,
  - b. Answer questions appropriately,
  - c. Speak in coherent sentences in the first language of the interviewer,
  - d. Show no signs of large erratic movements or threatening behavior that may pose a danger to the participant, interviewer, or others present.
5. If there was any question regarding an individual’s ability to consent, then an interview was not to be conducted with said individual. The interviewers agreed to default towards not interviewing if there were concerns about a potential subject’s physical or mental state. No potential interviewees were excluded based on the above criteria.
6. Once identified, one to two interviewers met with each subject in a semi-private location, at least 15 feet from others/passersby.

7. Following recorded verbal consent, interviewers requested permission to audio record the interview. Participants who did not agree to this but wanted to partake in the study could have short-hand notes taken by the interviewer(s). All interviewees except one agreed to an audio recording of the entire interview.
8. Subjects did not complete any surveys or other documentation as a part of the study.
9. The investigators conducted semi-structured interviews per the outline in [Appendix A](#). The scope and limitations of the 11 primary literature review studies shaped the questionnaire, which all study investigators developed. Individual demographics and medical histories were obtained, in addition to perspectives on what led participants to become homeless, what life on the street entailed, personal strengths, and future goals. Specific questions focused on knowledge of and treatment by San Antonio's Street Medicine organization (SMSA) and access to technology and communication.
10. The sessions had no minimum or maximum time limit. Though the investigators introduced all items from the outline, participants determined the interviews' content, depth, and pace.
11. The end of the interview concluded a subject's involvement in the study. Investigators did not collect any personally identifiable information as a part of the study, nor were any gifts or payments given to participants.

Researchers utilized an interpretive approach to discover the most common themes that emerged. The coding process was as follows.

1. Three of the six investigators served as the primary coding team. They conducted coding and data analysis by hand.
2. The first step, open coding, was conducted after the first six interviews, or 21 % of the total. Two coders evaluated each interview and identified 25 themes during this phase.
3. Axial coding followed open coding to account for possible new themes from the remaining 22 interviews. During the axial coding phase, each of the six investigators coded their interviews, and rotating coding team members did a second pass. No new themes emerged during the axial coding phase.
4. The coding team began observing data saturation by 14 interviews but coded the entire 28 to ensure no additional insight.
5. Each investigator also performed memoing for their interviews to highlight participant affect and particularly striking quotations.

### 3. Results

[Table 1](#) and [Fig. 1](#) list PEH demographics of the interviewed participants. Though age was not an exclusion criterion, no youth eighteen years of age or under were interviewed as a part of the study. The youngest participants were between 20 and 29 years old, and the oldest represented were between 60 and 69. Nearly 18 % of the participants were female. Eighty-nine percent were single, widowed, or divorced, with the remaining being married.

[Figs. 2 and 3](#) highlight self-reported medical and behavioral health history. The most common physical health conditions included a history of seizures ( $n = 5$ ), stroke ( $n = 3$ ), high blood pressure ( $n = 3$ ), and arthritis ( $n = 3$ ). Regarding behavioral health, the most common ailments were anxiety/depression ( $n = 6$ ), PTSD ( $n = 5$ ), and bipolar disorder ( $n = 4$ ). Sixty-four percent of participants denied any known or previously treated psychological conditions.

[Table 2](#) lists acute care, hospital, and street medicine physical health encounters in the past year. Thirteen interviewees reported utilizing acute care services. One of these participants frequented the emergency department 36 times. That same participant accounted for three of nine hospital admissions. As this individual's results were outlier data, [Table 2](#) does not include them in the overall average. SMSA previously treated all but one of the seven participants who were aware of the organization.

[Fig. 4](#) displays the six most common themes from the subjects' backgrounds. The most common theme was a history of legal problems, including jail or prison time (71.4 %). Other themes that made the top ten list include having physical and mental health challenges at a young age, as opposed to adulthood (17.9 %); rough sleeping as a choice (14.3 %); lack of technology as a barrier to permanently getting off of the street (14.3 %); having left childhood home before 18 years of age (10.3 %); poor social support (10.3 %); unstable childhood home environment (10.3 %); history of physical, sexual or emotional abuse (10.3 %); and current estrangement from immediate family (10.3 %).

[Table 3](#) details findings on access to various forms of technology and communication. Fifty-seven percent of participants reported owning phones; only one had an email address. Less than half had a mailing address. Half reported knowing where to access public

**Table 1**  
Participant age and sex.

Age	Frequency	Percentage
20–29	4	14.3 %
30–39	5	17.9 %
40–49	6	21.4 %
50–59	8	28.6 %
60–69	5	17.9 %
Sex	Frequency	Percentage
Male	23	82.1 %
Female	5	17.9 %

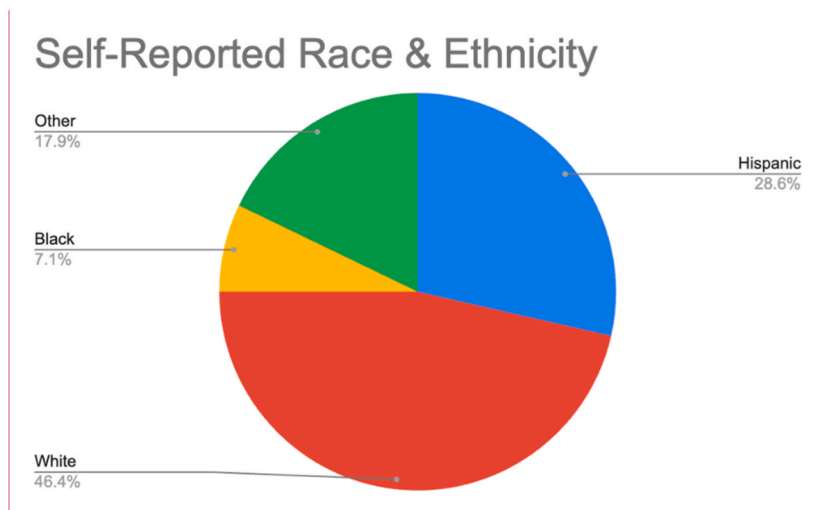


Fig. 1. Self-reported participant race and ethnicity.

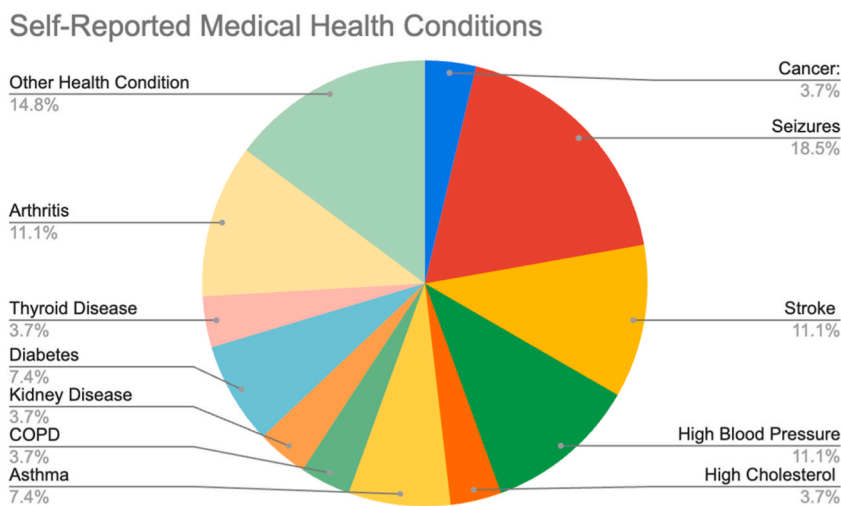


Fig. 2. Past medical history.

communication, such as a library or outreach shelter.

The prevalence of having one’s items stolen was another common theme. This lack of security appeared to be an equal threat on the street and in shelters and was one of the reasons why many individuals had a disdain for group housing. In addition to the fear of losing a high-value item such as a cell phone, loss of medications was a frequent concern. Insomnia and stimulant drug use were associated with wanting to protect one’s personal effects.

#### 4. Discussion

The number of female participants in this study was slightly less than in other similar research, which had closer to a 70/30 breakdown of male-to-female participants [24,27]. Racial demographics largely varied in previous studies, with African Americans prevalent in some and White Europeans in others [3,24,27]. In contrast to this study’s demographics, the 2022 San Antonio Bexar County Point-in-Time Count reported that 26.6 % of PEH are white, 47 % Hispanic/Latino, and 22.5 % Black/African American [32]. Additionally, as interviewers inquired about race in an open-ended question, there was no differentiation between race and ethnicity. Researchers marked any individuals who reported mixed race as “other,” which may explain why that category was nearly 18 %.

This study’s findings on the most common mental health conditions reported are similar to those found by McConalogue et al. [27] The authors in that study noted that the unsheltered population felt the continuum between past trauma, addiction, subsequent mental health and legal impact, poor social support and financial management, and current homelessness [27]. Substance misuse was a significant theme by McConalogue et al. [27], with a desire to shut out bad memories being a reason for repeated use. Future studies

### Self-Reported Behavioral Health Conditions

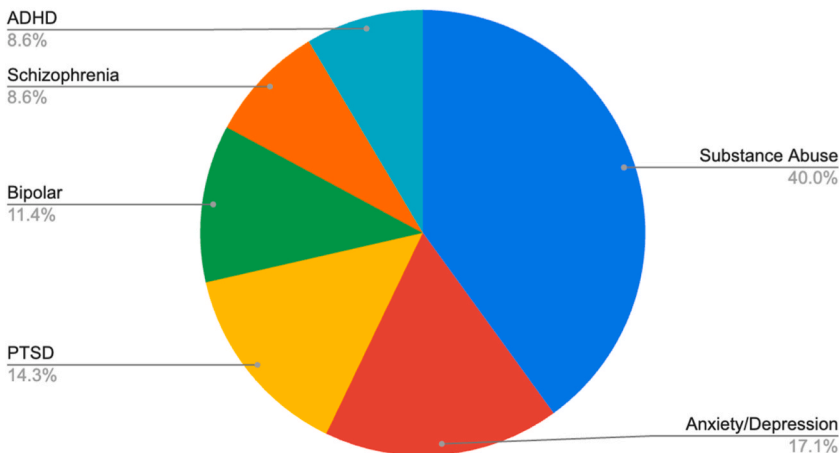


Fig. 3. Past behavioral health history.

**Table 2**  
Healthcare encounters.

Healthcare Encounters in Past Year	Average per Interviewee
UC/ED visits	0.63
Hospitalizations	0.22
Street Medicine San Antonio	Frequency
Aware of SMSA	7
Treated by SMSA	6

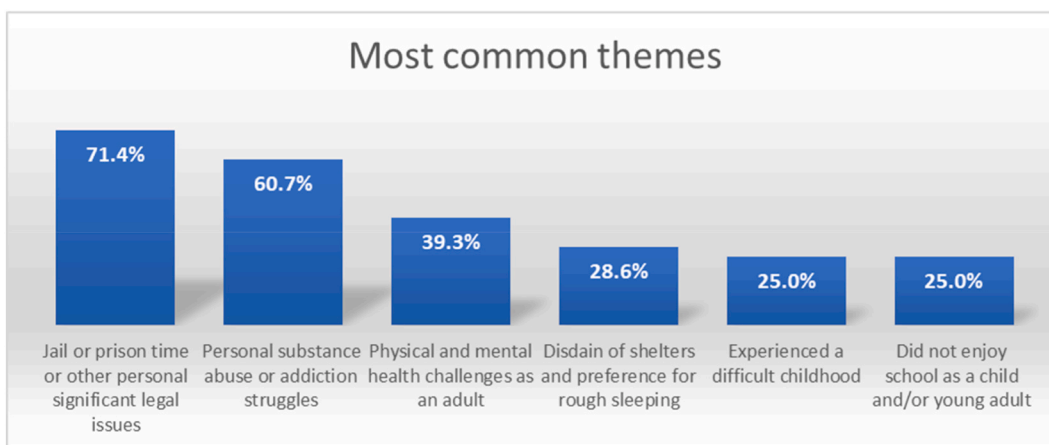


Fig. 4. Most common themes.

could benefit from evaluating how social services address many of these interrelated conditions, at what rate, and how effective participants feel wrap-around services are.

One of the themes, experiencing a difficult childhood, is notably broad and overlaps with many of the top ten concepts from this study, including physical, emotional, and sexual abuse, leaving home before the age of 18, an unstable childhood home environment, current estrangement from immediate family, and poor social support. Ferguson also found that an unstable home environment, caregiver abandonment, and various forms of abuse were some of the primary reasons for childhood trauma [24]. McConalogue et al. noted a shared history of family breakdown and physical and emotional abuse at a young age [27]. In another study, 90 % of participants reported physical abuse in childhood [3]. Though some subjects volunteered such information, it would have been insightful to include questioning about the impact of indirect abuse and whether any treatment had been rendered for abuse in youth or following

**Table 3**  
Technology and communication access.

Technology Access	Total	Percentage
Owns phone	16	57.1 %
Does not own phone	12	42.9 %
Wi-Fi only	7	25.0 %
Cellular access	21	75.0 %
Month-to-month	5	17.8 %
Contract	4	14.2 %
Did not answer or N/A	19	67.8 %
Mailing address	12	42.9 %
No mailing address	16	57.1 %
Email address	15	53.6 %
No email address	13	46.4 %
Aware of location for free communication access	14	50.0 %
Not aware of location	14	50.0 %

[24].

Boydell et al. identified various forms of self with which unsheltered individuals identified [29]. There is the present self who had proven to be resourceful, a survivor, and a future self who would gain complete independence and give back to others [29]. Similarly, interviewees in this study were proud of their generous natures and dreamt big. This study strengthened the findings of Boydell et al. [29], in that participants noted that their past selves, whom they had been proud of, were lost and devalued by society.

With 43 % of interviewees not owning a phone or mailing address and 50 % unaware of a public location for accessible communication, access to technology and communication is a significant barrier for PEH. Harris notes that this lack of technology disproportionately affects the elderly and impacts benefit claims and socioeconomic mobility for all [23]. Future studies and quality improvement projects should focus on how technology access and education can be better made available to unsheltered individuals.

The authors agree with past researchers that the semi-structured format is ideal for future studies. As noted by Gelberg and Sieck, it is essential that the interviewee paces interviews and does not feel pressured, even though some information may be missing [36]. In this study, objective information such as physical and mental health conditions was self-reported and may be misrepresented.

Regarding physical health, the average rate of acute care visits across all participants within the last year was 0.63. A future survey might focus more on healthcare access and care avoidance for PEH. Klop notes that the term *care avoidance* has as much to do with inadequate or inaccessible healthcare as it does an individual's decision to avoid it and the many reasons for doing so [31].

The themes and demographic information observed through the conducted interviews were aligned with the current research available. While identified themes were not new to the body of research, the themes that emerged do reinforce the objective of the research in that firsthand knowledge of the problems faced by the PEH population is given in their own words. By allowing the individuals to tell their stories, the individuals felt heard and seen as humans, not as test subjects or data points. It also provided space for individuals of the PEH population to be a part of the process.

## 5. Limitations

Coders noted data saturation prior to the 28 interviews; however, it is essential to note that due to the small sample size of this study, results are not generalizable to the San Antonio community or PEH across the U.S. Another limitation of this study might be the varying length and depth of the interviews. The shortest interview was approximately 7 min long, the longest 106 min, and the average 37 min.

One explanation for the diversity of interview results is the inherent personality differences of each participant, leading them to share more-or-less with the interviewer. Another is that investigators had different experience levels and rapport with the unsheltered population. Three inter-rater reliability sessions were held before enrollment to discuss appropriate interviewer affect and presence to combat this potential confounder. The goal was to establish trust in a non-judgmental, non-presumptuous manner and allow the participants to guide the interview.

Ten of the 28 interviews occurred on the street, three at a shelter, one at a formerly homeless neighbor's apartment, and the others at a soup kitchen. If investigators had recruited more participants on the street, their histories might have differed, as these individuals might be less likely to seek outreach assistance [24]. The more comfortable environment provided by central heat and air and warm meals could accommodate longer, more thorough, or more optimistic interviews.

## 6. Implications for future research and conclusion

"The Enigma of Homelessness," a research proposal by Paulo, one of the authors of this study, served as the inspiration for *Backgrounds and Perspectives of San Antonio Street Sleepers*, also referred to as "Phase 1." Paulo intends this study to be the first of a more considerable seven-part effort. The remaining phases are as follows:

Phase 2: Non-PEH interactions with PEH. This phase aims to characterize society's general feelings (ambivalence, animosity, pity, empathy, disgust, fear, etc.) and to explore the direct and indirect effects of non-PEH behavior that influence PEH, including voting.

Phase 3: Healthcare worker interactions with the homeless population. This phase is designated to interview healthcare workers

about their perspectives on PEH. Additionally, this study would examine the cost of emergency healthcare for the homeless population and the financial burden of that care on taxpayers.

Phase 4: Police interactions with the homeless population. This phase is designated to interview law enforcement officers about what they can and cannot do regarding interactions with PEH. The authors intend to understand better how law enforcement perceives its role concerning the homeless population.

Phase 5: Regional economic factors. This phase will review cost of living trends within an area, including average income, job availability, commute duration and methods, housing costs, affordable housing availability, and community growth.

Phase 6: Legislative actions. This phase will examine the laws currently in place that impact PEH and the background and intent of such legislation. This study will also review aid available to the unsheltered population through government entities and private organizations and any incentives for reintegration into mainstream society.

Phase 7: Ethnographic study. This phase will pursue an in-depth view of the experience of homelessness in order to gain first-hand knowledge of the daily challenges faced by this population.

In conclusion, the authors feel that the backgrounds and perspectives of San Antonio street sleepers are a critical resource for better understanding the challenges facing PEH. This dataset was collected under the premise of including the PEH population in the data-retrieval and solution-building process. The authors felt that this was achieved and its importance demonstrated. The authors also felt that this initial research achieved the broader goal of serving as a launching point for continued research phases. To reiterate, this research was framed by the philosophy that to gain more insight into any situation, especially one as complex as the state of homelessness, researchers should begin by going to the source. Researchers must meet with those on the frontline of this epidemic to hear first-hand individuals' personal histories, challenges, successes, and suggestions. The ultimate goal of this and future research is to guide outreach services and legislation related to PEH.

### Ethics statement

This research underwent approval through the University of the Incarnate Word School of Osteopathic Medicine (UIWSOM), San Antonio, Texas, IRB in November 2021. Approval number: 21-11-001. This study complies with all regulations set out by the UIWSOM IRB.

### Declaration of funding

This research received no specific grant from any funding agency in the public, commercial, or not-for-profit sectors.

### Declaration of study data

The authors confirm that the data supporting the findings of this study are available within the article [and/or] its supplementary materials. Information not published will be shared upon request.

### Data availability statement

Data has not been deposited into a publicly available repository.  
Data will be made available upon request.

### CRedit authorship contribution statement

**Christopher Paulo:** Writing – review & editing, Writing – original draft, Validation, Resources, Methodology, Investigation, Conceptualization. **Amy Moore:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Project administration, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Anastasia Abbott:** Writing – review & editing, Writing – original draft, Visualization, Validation, Resources, Methodology, Investigation, Formal analysis, Data curation, Conceptualization. **Logan Bruntmyer:** Validation, Methodology, Investigation. **Ui Lee:** Validation, Methodology, Investigation, Data curation. **Hannah Redwine:** Validation, Resources, Methodology, Investigation. **Patrick Muehlberger:** Supervision.

### Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

### Appendix A. Supplementary data

Supplementary data to this article can be found online at <https://doi.org/10.1016/j.heliyon.2024.e30584>.



## References

- [1] T. Harris, S. Kintzle, S.L. Wenzel, C.A. Castro, Expanding the understanding of risk behavior associated with homelessness among veterans, *Mil. Med.* 182 (9) (2017) e1900–e1907, <https://doi.org/10.7205/milmed-d-16-00337>.
- [2] D.L. Polcin, Co-occurring substance abuse and mental health problems among homeless persons: suggestions for research and practice, *J. Soc. Distress Homeless* 25 (1) (2015) 1–10, <https://doi.org/10.1179/1573658x15y.0000000004>.
- [3] K.A. Tyler, A qualitative study of early family histories and transitions of homeless youth, *J. Interpers Violence* 21 (10) (2006) 1385–1393, <https://doi.org/10.1177/0886260506291650>.
- [4] V. Cabales, A deeper dive into California's housing and homelessness crisis, KPBS Public Media (2018, August 28). <https://www.kpbs.org/news/2018/aug/28/deeper-dive-californias-housing-and-homelessness-c/>.
- [5] D. Wagner, Thousands of Californians are working while homeless, and many don't want their boss to know, KQED (2018, September 4). <https://www.kqed.org/news/11690325/thousands-of-californians-are-working-while-homeless-and-many-dont-want-their-boss-to-know>.
- [6] M. Mackowiak, C. Petricek, Austin's revolt against a homelessness surge, *Natl. Rev.* (2021, May 23). <https://www.nationalreview.com/2021/05/austins-revolt-against-a-homelessness-surge/>.
- [7] M. Moiz, A List of Tent Cities in America, CAUF Society, 2023, August 21. <https://caufsociety.com/list-of-tent-cities-in-america/>.
- [8] The Guardian, Bussed out: how America moves thousands of homeless people around the country. <https://www.theguardian.com/us-news/ng-interactive/2017/dec/20/bussed-out-america-moves-homeless-people-country-study>, 2020, November 4.
- [9] R.M. Bossarte, J.R. Blonich, R. Piegari, L.L. Hill, V. Kane, Housing instability and mental distress among US veterans, *Am. J. Publ. Health* 103 (S2) (2013) S213–S216, <https://doi.org/10.2105/ajph.2013.301277>.
- [10] M. Cano, S. Oh, State-level homelessness and drug overdose mortality: evidence from US panel data, *Drug Alcohol Depend.* 250 (2023) 110910, <https://doi.org/10.1016/j.drugalcdep.2023.110910>.
- [11] T.P. Baggett, L.A. Lebrun-Harris, N.A. Rigotti, Homelessness, cigarette smoking and desire to quit: results from a US national study, *Addiction* 108 (11) (2013) 2009–2018, <https://doi.org/10.1111/add.12292>.
- [12] J. Tsai, X. Cao, Association between suicide attempts and homelessness in a population-based sample of US veterans and non-veterans, *J. Epidemiol. Community Health* 73 (4) (2019) 346–352, <https://doi.org/10.1136/jech-2018-211065>.
- [13] E. Brignone, A.V. Gundlapalli, R.K. Blais, M.E. Carter, Y. Suo, M.H. Samore, R. Kimerling, J.D. Fargo, Differential risk for homelessness among US male and female veterans with a positive screen for military sexual trauma, *JAMA Psychiatr.* 73 (6) (2016) 582, <https://doi.org/10.1001/jamapsychiatry.2016.0101>.
- [14] J. Tsai, D. Hooshyar, Prevalence of eviction, home foreclosure, and homelessness among low-income US veterans: the National Veteran Homeless and Other Poverty Experiences study, *Publ. Health* 213 (2022) 181–188, <https://doi.org/10.1016/j.puhe.2022.10.017>.
- [15] R.H. Pietrzak, J. Tsai, S.M. Southwick, Association of symptoms of posttraumatic stress disorder with posttraumatic psychological growth among US veterans during the COVID-19 pandemic, *JAMA Netw. Open* 4 (4) (2021) e214972, <https://doi.org/10.1001/jamanetworkopen.2021.4972>.
- [16] J. Tsai, J. Shen, S.M. Southwick, R.H. Pietrzak, Is there more public support for US veterans who experience homelessness and posttraumatic stress disorder than other US adults? *Mil. Psychol.* 33 (1) (2021) 15–22, <https://doi.org/10.1080/08995605.2020.1842036>.
- [17] C.J. Tompsett, P.A. Toro, M. Guzik, N. Schlienz, M. Blume, S. Lombardo, Homelessness in the US and Germany: a cross-national analysis, *J. Community Appl. Soc. Psychol.* 13 (3) (2003) 240–257, <https://doi.org/10.1002/casp.724>.
- [18] M.A. Rahman, J.F. Turner, S. Elbedour, The U.S. homeless student population: homeless youth education, review of research classifications and typologies, and the U.S. federal legislative response, *Child Youth Care Forum* 44 (5) (2015) 687–709, <https://doi.org/10.1007/s10566-014-9298-2>.
- [19] W. Pettey, D. Toth, A. Redd, M.E. Carter, M.H. Samore, A.V. Gundlapalli, Using network projections to explore co-incidence and context in large clinical datasets: application to homelessness among U.S. Veterans, *J. Biomed. Inf.* 61 (2016) 203–213, <https://doi.org/10.1016/j.jbi.2016.03.023>.
- [20] M.E. O'Connell, Responding to homelessness: an overview of US and UK policy interventions, *Community & Applied Social Psychology* 13 (2) (2003) 158–170, <https://doi.org/10.1002/casp.720>.
- [21] V. Denvall, Evaluating homelessness – a comparative analysis of top 10 articles from the US and Europe, *Eur. J. Soc. Work* 20 (5) (2016) 724–740, <https://doi.org/10.1080/13691457.2016.1255595>.
- [22] W. Lee, L.P. Donaldson, Street outreach workers' understanding and experience of working with chronically homeless populations, *J. Poverty* 22 (5) (2018) 421–436, <https://doi.org/10.1080/10875549.2018.1460737>.
- [23] J. Harris, The digitization of advice and welfare benefits services: re-imagining the homeless user, *Hous. Stud.* 35 (1) (2019) 143–162, <https://doi.org/10.1080/02673037.2019.1594709>.
- [24] K.M. Ferguson, Exploring family environment characteristics and multiple abuse experiences among homeless youth, *J. Interpers Violence* 24 (11) (2008) 1875–1891, <https://doi.org/10.1177/0886260508325490>.
- [25] V. Paudyal, K. MacLure, C. Buchanan, L. Wilson, J. MacLeod, D. Stewart, 'When you are homeless, you are not thinking about your medication, but your food, shelter or heat for the night': behavioural determinants of homeless patients' adherence to prescribed medicines, *Publ. Health* 148 (2017) 1–8, <https://doi.org/10.1016/j.puhe.2017.03.002>.
- [26] D.C. Martins, Experiences of homeless people in the health care delivery System: a descriptive phenomenological study, *Publ. Health Nurs.* 25 (5) (2008) 420–430, <https://doi.org/10.1111/j.1525-1446.2008.00726.x>.
- [27] D. McConalogue, N. Maunder, A. Areington, K. Martin, V. Clarke, S. Scott, Homeless people and health: a qualitative enquiry into their practices and perceptions, *J. Publ. Health* 43 (2) (2019) 287–294, <https://doi.org/10.1093/pubmed/fdz104>.
- [28] K.M. Nousiainen, Reflecting narrative interview context as performance: interviews with former homeless persons with intoxication and mental health problems, *Nordic Social Work Research* 5 (2) (2015) 129–142, <https://doi.org/10.1080/2156857x.2015.1042018>.
- [29] K.M. Boydell, P. Goering, T.L. Morrell-Bellai, Narratives of identity: Re-presentation of self in people who are homeless, *Qual. Health Res.* 10 (1) (2000) 26–38, <https://doi.org/10.1177/104973200129118228>.
- [30] S.J. Thompson, D.E. Pollio, K.M. Eyrich, E. Bradbury, C.S. North, Successfully exiting homelessness: experiences of formerly homeless mentally ill individuals, *Eval. Progr. Plann.* 27 (4) (2004) 423–431, <https://doi.org/10.1016/j.evalprogplan.2004.07.005>.
- [31] H.T. Klop, K. Evenblij, J. Gootjes, A. De Veer, B.D. Onwuteaka-Phillipsen, Care avoidance among homeless people and access to care: an interview study among spiritual caregivers, street pastors, homeless outreach workers and formerly homeless people, *BMC Publ. Health* 18 (1) (2018), <https://doi.org/10.1186/s12889-018-5989-1>.
- [32] South Alamo Regional Alliance for the Homeless (SARAH), 2020 point-in time Count report: san Antonio and bexar county. <https://sanantonioreport.org/wp-content/uploads/2022/05/SARAH-2022-PIT-Count-Report.pdf>, 2022, May.
- [33] United States Census Bureau QuickFacts. (n.d.). U.S. Census Bureau QuickFacts: San Antonio city, Texas. <https://www.census.gov/quickfacts/fact/table/sanantoniocitytexas/PST045222>.
- [34] Visit San Antonio (n.d.). Key Industries (Retrieved 2024, April 1). <https://www.visitsanantonio.com/meeting-professionals/why-san-antonio/key-industries/#:~:text=The%207th%20largest%20city%20in,Services%2C%20and%20Advanced%20Manufacturing%20sectors>.
- [35] E. Baucum, Life Expectancy Longer in North Side Neighborhoods, 2016, July 26. News 4 San Antonio, <https://news4sanantonio.com/news/local/life-expectancy-20-years-longer-on-north-side>.
- [36] L. Gelberg, N. Siecke, Accuracy of homeless adults' self-reports, *Med. Care* 35 (3) (1997) 287–290, <https://doi.org/10.1097/00005650-199703000-00008>.

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