



RESEARCH ARTICLE

Engaging health professions students in community-based service learning through the design of a needs assessment survey [version 1; peer review: 2 approved with reservations]

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Abstract

Background: Interprofessional student participation in community-based service learning projects is critically important for the preparation of future health professionals to care for underserved and vulnerable populations. Oftentimes, there is a disconnect between existing community services and the actual needs of individuals being served, such as those experiencing homelessness. A best practice of launching a new service learning project is to begin with a needs assessment. This study describes the stepwise approach taken to guide students launching a new street medicine program in developing and administering a needs assessment survey and is generalizable to other student-led service learning outreaches.

Methods: We conducted a needs assessment from April-June 2018 on 144 unsheltered homeless individuals in metro Phoenix, Arizona. The 16-question survey investigated perceptions of priority needs, sources of medical care, health literacy, and health status. Survey results were analyzed using Wilcoxon Rank Sum Test, chi-squared analysis, and multivariable logistic regression. **Results:** Most respondents (91.6%) identified food as a top need. The majority (64.1%) utilized emergency departments as their primary source of care, and 40.1% reported suboptimal health. Suboptimal health was more likely to be reported in those who expressed transportation (OR 3.03, 95% CI: 1.30-7.07) as a top priority need. Health illiteracy (OR 3.68, 95% CI: 0.76-17.9) was associated with suboptimal health, as was obtaining care at an Emergency Department (OR 2.05, 95% CI: 0.81-5.25). **Conclusions:** Pairing healthcare with meals and other primary needs may be an effective strategy to increase service utilization by this population. Future needs assessments should consider implementing open-ended

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questions to better assess the holistic needs of study populations and match community partner organization services with these needs. Needs assessments provide an opportunity for health professional students to learn about social needs and more effectively connect patients with services from community agencies and healthcare organizations.

Keywords

homelessness, unsheltered, needs assessment, social determinants of health, social needs, medical education, street medicine, service learning, student-led programs

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Introduction

Homelessness is defined as the state of not having permanent housing. Individuals experiencing homelessness may live on the streets; stay in a shelter, transitional housing, mission, single room occupancy facilities, abandoned buildings or their vehicle; or in any other unstable or non-permanent situation (Salhi *et al.*, 2018). A total of more than 326,000 people were experiencing sheltered homelessness on a single night in the United States in 2021 with hundreds of thousands of unaccounted for unsheltered homeless individuals due to concerns of exacerbating COVID-19 transmission (Department of Housing and Urban Development, 2021). According to the Point-in-Time (PIT) Count conducted by the Maricopa Association of Governments, on the night of January 24, 2022, there were 9,026 people experiencing homelessness in Maricopa County in Arizona. Of these, 5,029 individuals were living in unsheltered situations (i.e., living on the streets). This represents a 22% increase in the total number of individuals experiencing homelessness from 2020 to 2022 (from 7,419 to 9,026) and a 34% increase in the unsheltered homeless population (from 3,767 to 5,029) (Maricopa Association of Governments, 2022).

These levels of homelessness are concerning because homelessness has a detrimental effect on health-related quality of life (Sun *et al.*, 2012). Needs assessments in urban areas, such as Alameda County in California (Alameda County Health Care for the Homeless Program, 2015), have found that homeless persons (sheltered or unsheltered) experience rates of morbidity and mortality much higher than that of the general population (Baggett *et al.*, 2011; Bandura, 2004). For unsheltered homeless persons in particular, there is an increased risk of premature mortality along with poor access to care (Montgomery *et al.*, 2017; Roncarati *et al.*, 2018). Many individuals experiencing homelessness utilize Emergency Departments (ED) for their medical care due to accessibility and the requirement that everyone must be treated, regardless of ability to pay (Montgomery *et al.*, 2017). Individuals experiencing homelessness utilize EDs for many non-emergent medical issues and accordingly, do not receive adequate care for chronic medical conditions (American Hospital Association, 2017; Kushel *et al.*, 2002).

Despite increases in aid to individuals experiencing homelessness and a plethora of homeless service agencies, these services remain underutilized and poorly understood. This was evidenced by a needs assessment in Seattle, Washington in which only 10% of individuals experiencing homelessness reported learning of services from an agency or program (City of Seattle, 2009). Many argue that there is a discrepancy between the services provided by agencies and the actual services desired by individuals experiencing homelessness. Many agencies traditionally aid individuals experiencing homelessness based on traditional perceptions of basic needs. Studies demonstrate that individuals experiencing homelessness require mental health services, addiction rehabilitation services or domestic violence support (based on the high rates of mental disorders, substance use, and

violence among this population). However, few studies have directly asked individuals experiencing homelessness to identify their needs and what types of assistance would provide them with the most benefit (Acosta & Toro, 2000).

In addition, many services fail to address the social factors that influence health-related behaviors and health status. Social determinants of health, such as working and living conditions, educational attainment, and income, play a crucial role in shaping health outcomes (Braveman & Gottlieb, 2014). Homelessness is caused by a multitude of these complex socioeconomic factors, along with structural inequities and policy gaps. However, despite the acknowledgement and general understanding of social factors, the heterogeneity of homeless populations and complexity surrounding the causes of homelessness often lead to inadequate service delivery (Braveman & Gottlieb, 2014). It is essential to consider context when addressing causes and precipitating factors of homelessness. For example, in Phoenix, Arizona, inadequate homeless shelter beds (Boehm, 2020) and limited access to potable water (Demyers *et al.*, 2017) are principal issues perpetuating the homelessness crisis.

Based on a desire to match services provided, utilization and needs, a needs assessment survey was designed for the unsheltered homeless population in metro Phoenix, Arizona. Specific objectives of the needs assessment were to identify prioritized needs of the unsheltered homeless population in metro Phoenix and measure associations with self-reported health. The unsheltered homeless population was selected because mortality rates for this population are higher than those for the sheltered homeless population (Roncarati *et al.*, 2018). The goal is to utilize the results of the needs assessment to inform the development of a street medicine program that will meet the needs of the homeless population in metro Phoenix. The implications of this needs assessment will impact stakeholders at multiple levels in the local community, spanning legislation, medical care, and public health, and highlight the most optimal partnerships in service to those experiencing homelessness. This entails both valuable connections with community organizations as well as the most impactful professions that will constitute our outreach teams. We anticipate that the needs assessment will provide direction on future outreach as well as providing unique, nuanced, and valuable education for the interprofessional team that is the core of our program.

Methods

Study background

During the summer of 2017, two incoming medical students began development of a street medicine program using other student-led street medicine programs across the USA as an example. After hashing out important details about the initiative, including the mission, vision, volunteer composition, and proposed services, the students reached out to several faculty physicians of their medical school in August 2017 who they believed would serve as champions for their program. These faculty physicians were selected based on their focus

on primary care, expertise in caring for underserved populations, and commitment to supporting student-led projects. During a meeting with the faculty champions in September 2017, the idea to conduct a needs assessment of the homeless population was proposed to better match the street medicine program’s services with the needs of this population.

Needs assessment development

The first iteration of the needs assessment was created in November 2017 and consisted of 12 questions. Additional questions soliciting information about drug and alcohol use were added based on feedback from faculty champions. The subsequent version was developed in December 2017 and consisted of 18 questions. The survey was piloted from January-March 2018 with 20 individuals experiencing homelessness in a downtown Phoenix park and based on feedback solicited from participants, several changes were made. These changes were 1) removing the questions about perceptions of healthcare workers because they were “confusing,” “did not relate to the other questions being asked,” and “took too much time,” 2) rewording questions for brevity and simplicity, and 3) reworking several questions with numbered scales to shorter Likert scales to reduce confusion.

The final version of the needs assessment consisted of 16 questions soliciting information about current housing status, primary needs, usage of community resources, source of health care, health literacy level, self-reported health, drug and alcohol use, health concerns, and demographic information. Ten questions were adopted from previously validated surveys (Table 1) and six were uniquely created for this study population. The novel questions were created using elements from needs assessments of homeless populations in other urban areas across the USA. Questions #1-4, 6, and 11 were created in the form of validated Likert Scales, to align with specific aims of the study, as such questions were not found in existing literature (Matell & Jacoby, 1971). Specifically,

questions #1-3, 6, and 11 were designed to yield less time-intensive, more generalizable data in our population than previously published options. Question #4 was designed to provide information unique to metro Phoenix’s homeless population. The needs assessment can be found under *Extended data* (Zeien *et al.*, 2022).

Eligibility criteria

We conducted the needs assessment of the unsheltered homeless population in metro Phoenix, Arizona from April-June 2018. Metro Phoenix was defined as the cities of Phoenix, Mesa, Scottsdale, and Tempe. Inclusion criteria limited the study population to unsheltered homeless individuals who were living on the streets or in public spaces (e.g., parks and alleys). Exclusion criteria included residing in a shelter or other transitional/temporary housing, age < 18 years, and inability to speak English.

Ethical considerations

This study was reviewed by the University of Arizona Institutional Review Board and given exempt status (IRB #1711015285). Consent was obtained verbally to protect patient confidentiality. A script was read to each participant and their verbal agreement to proceed along with completion of the needs assessment was proof of a participant’s conferred consent. Participants were informed that their data would be used to inform the development of Street Medicine Phoenix’s services and would be published online for public access without identifying information.

Data collection

Potential adult subjects were identified by walking in public spaces (e.g., parks and alleys) and along the streets of metro Phoenix to find individuals who appeared to be living in these areas. Recruitment was conducted on varying days of the week, typically during the late morning or early afternoon. The interviewers consisted of several health professional

Table 1. Validated survey sources of needs assessment survey for unsheltered homeless population in metro Phoenix, Arizona.

Question #	Validated survey source
5, 8, 10, 14	Rand Health’s homelessness survey (The RAND Corporation, 1990)
7	Single Item Literacy screener (Morris <i>et al.</i> , 2006)
9	Substance Abuse and Mental Health Services Administration (SAMHSA) 2015 National Survey on Drug Use and Health (SAMHSA, 2017)
10	National Institute on Drug Abuse (NIDA) Quick Screen (NIDA, 2012)
12, 13	Williams Institute at the UCLA College of Law (Sexual Minority Assessment Research Team (SMART), 2009; The GenIUSS Group, 2014)
16	Department of Veteran Affairs National Survey of Veterans (Department of Veteran Affairs, 2010)

This table shows the validated surveys that were referenced to source the corresponding questions in the needs assessment.

students, primarily medical students. Both interviewers conducted each interview. Potential subjects were offered a water bottle and asked if they would like to participate in a survey about their health and their needs using a recruitment script. For potential subjects that indicated interest and consented, the first housing status question was asked to screen out individuals who were not experiencing homelessness nor were unsheltered. In order to avoid literacy limits from preventing participants to complete the survey, each question from the needs assessment was read aloud to participants by medical student research team members, along with answer options. For free-response questions, participants were invited to respond in an open-ended fashion. Response data was entered into Qualtrics® during the interview. Non-monetary compensation provided at survey completion included a care kit (snack bars, a reusable water bottle, socks, and personal hygiene items).

The sample size was determined by calculating 5% of the unsheltered homeless population in metro Phoenix in 2018 (the time at which the survey was conducted). This number, in addition to a small buffer of participants, enabled power calculations to be done.

Data analysis

Data were analyzed using the SAS statistical software package. Participants’ demographic and survey characteristics data were reported as means, standard deviations for continuous variables and frequencies, and percentages for categorical variables. The Wilcoxon Rank Sum Test was used to determine differences in continuous variables relative to self-reported health status. Chi-squared analysis / Fisher’s Exact Test was selected to compare categorical variables. Odds ratios and 95% confidence intervals were calculated via multivariable logistic regression, adjusting for age, sex, race/ethnicity and insurance status, to analyze associations between primary needs and self-reported health. Primary needs were defined as items that respondents marked as “Very Important” or “Important.” Suboptimal self-reported health was defined as either a “Fair” or “Poor” response to the self-reported health question. All p-values were two-sided and $p < .05$ was considered statistically significant.

Additional comparisons were made using the Wilcoxon Rank Sum for continuous variables and Chi-squared analysis / Fisher’s Exact Test for categorical variables. Two secondary analyses were also conducted. Odds ratios and 95% confidence intervals were calculated via multivariable logistic regression, adjusting for age, sex, race/ethnicity and insurance status, to define the association between 1) self-reported health and health literacy and 2) prioritized needs and source of medical care.

Results

A total of 175 individuals agreed to participate in the needs assessment; however, 15 were excluded due to currently residing in a shelter. Of the 160 individuals who met the inclusion criteria, 144 completed the survey. Length of homelessness ranged from two days to 29 years. The average length of homelessness was 30.6 months. Demographic

information is listed in Table 2. Priority needs and other key findings from the needs assessment are in Table 3. Alcohol and drug use data is listed in Table 4. The full dataset can be found under *Underlying data* (Zeien *et al.*, 2022).

The relationship between self-reported health and primary needs was studied to delineate the influence of social determinants on self-perceived health. Individuals who expressed transportation as a primary need were more likely to describe their health as “Fair” or “Poor” (OR 3.03, 95% CI: 1.30-7.07) and this relationship was statistically

Table 2. Demographics of unsheltered homeless individuals in metro Phoenix, Arizona who participated in the needs assessment.

Gender	
Male	71.5% (n = 103)
Female	28.4% (n = 41)
Age	
18 - 24	8.3% (n = 12)
25 - 34	13.8% (n = 20)
35 - 44	22.9% (n = 33)
45 - 54	31.9% (n = 46)
55 - 64	20.1% (n = 29)
65+	2.7% (n = 4)
Sexual orientation	
Heterosexual	96.5% (n = 139)
Homosexual	2.0% (n = 3)
Bisexual	1.3% (n = 2)
Race/ethnicity	
Hispanic	14.5% (n = 21)
White (non-Hispanic)	41.6% (n = 60)
African American	34.7% (n = 50)
Native American	4.1% (n = 6)
Mixed/Multiple	2.0% (n = 3)
Other: Middle Eastern	2.7% (n = 4)
Veteran status	
Veteran	11.8% (n = 17)
Non-Veteran	88.1% (n = 127)

This table displays the demographic details of the 144 individuals experiencing homelessness who participated in the needs assessment. Demographic details include gender, age, sexual orientation, race/ethnicity, and veteran status.

Table 3. Priority needs and other primary results from needs assessment of unsheltered homeless population in metro Phoenix, Arizona.

Priority needs*	
Food	91.6% (n = 132)
Medical Care	83.3% (n = 120)
Housing/Shelter	79.8% (n = 115)
Transportation	65.2% (n = 94)
Cooling station/heat relief tent awareness	
No Awareness	63.1% (n = 91)
Awareness without Past Use	20.1% (n = 29)
Awareness with Past Use	16.6% (n = 24)
Health insurance status**	
Medicaid	73.6% (n = 106)
Uninsured	16.6% (n = 24)
Primary source of medical care	
Emergency Department	64.1% (n = 102)
Community Clinic	20.7% (n = 33)
No Medical Care	4.4% (n = 7)
Self-reported health literacy	
Health Literate (never or rarely need assistance with reading material from the doctor or pharmacy)	88.9% (n = 121)
Not Completely Health Literate (sometimes, often, or always need assistance with reading material from the doctor or pharmacy)	11.1% (n = 16)
Self-reported state of health	
Excellent	14.0% (n = 20)
Very Good	17.6% (n = 25)
Good	28.1% (n = 40)
Fair	30.2% (n = 43)
Poor	9.8% (n = 12)
Top self-reported health concerns**	
High Blood Pressure	13.7% (n = 17)
Visual Impairment	12.9% (n = 16)
Depression	12.1% (n = 15)
No Concerns	9.6% (n = 12)

This table displays responses to select questions in the needs assessment such as the prioritization of needs, cooling station awareness, health insurance status, primary source of medical care, self-reported health literacy, self-reported state of health, and self-reported health concerns. * denotes that some participants identified more than one priority need. ** denotes that only top responses were included in the table for these questions.

Table 4. Alcohol and drug use of unsheltered homeless individuals in metro Phoenix, Arizona.

Alcohol use in past 30 days	
Excessive (5+ drinks in men, 4+ drinks in women in single night)	4.8% (n = 7)
Some	38.8% (n = 56)
None	56.2% (n = 81)
Tobacco use in past 30 days*	
Daily or Almost Daily	74.3% (n = 107)
Weekly or Less Frequently	8.3% (n = 12)
Never	17.3% (n = 25)
Prescription drug use for medical reasons	
Daily or Almost Daily	14.8% (n = 21)
Weekly or Less Frequently	20.5% (n = 29)
Never	64.5% (n = 91)
Common prescription drugs used**	
Antipsychotics	17.0% (n = 24)
Antidepressants	15.6% (n = 22)
Angiotensin-Converting Enzyme Inhibitors (a type of anti-hypertensives)	14.8% (n = 21)
Prescription drug use for non-medical reasons	
Daily or Almost Daily	16.6% (n = 23)
Weekly or Less Frequently	21.7% (n = 30)
Never	61.5% (n = 85)
Street drug use	
Daily or Almost Daily	7.1% (n = 10)
Weekly or Less Frequently	19.2% (n = 27)
Never	73.5% (n = 103)
Common street drugs used**	
Marijuana	42.3% (n = 61)
Methamphetamines	20.8% (n = 30)

This table shows the responses from the substance use questions in the needs assessment. * denotes that most tobacco use consisted of cigarette smoking. ** denotes that only top responses were included in the table for these questions.

significant. Respondents that expressed medical care (OR 2.47, 95% CI: 0.99-6.14) or food (OR 1.34, 95% CI: 0.53-3.42) as a primary need were also more likely to describe their health as “Fair” or “Poor;” however, neither relationship was statistically significant. Shelter or housing as a primary need was associated with lower odds of perceiving one’s health as fair or poor (OR 0.81, 95% CI: 0.34-1.93) but this relationship was not significant.

The relationship between self-reported health and health literacy was examined as well to determine what effect, if any, health literacy has on subjective health. Health illiteracy was associated with suboptimal self-reported health (OR 3.68, 95% CI: 0.76-17.9); however, this relationship was not statistically significant. Lastly, the relationship between primary needs and source of medical care was analyzed. Medical care as a primary need was strongly associated with utilizing an ED as the main source of medical care (OR 2.05, 95% CI: 0.81-5.25) but this relationship was not statistically significant. Individuals who designated food, shelter/housing, or transportation as a primary need were more likely to utilize locations other than the ED (e.g., community clinics) as their main source of medical care.

Discussion

The purpose of this needs assessment was to gain an understanding of the unsheltered homeless population in metro Phoenix, particularly their prioritized needs and any associations with self-reported health. In addition, our goal was to understand which community partnerships would most benefit this population and which professions should be represented in our outreach teams. Since the needs assessment consisted entirely of self-reported data, all corresponding findings were subjective and specific to the context of this study. The results showed a significant association between transportation as a primary need and suboptimal health. Lack of transportation is known to affect a person's access to health care services, eventually leading to poorer health outcomes (Bibbins-Domingo *et al.*, 2019).

Understanding an individual's social context (e.g., transportation needs) is a vital component of providing comprehensive health care. Patient-centered care models should incorporate social care to ensure health disparities and health-related social needs are adequately addressed (Bibbins-Domingo *et al.*, 2019). This finding is particularly vital for policymakers, health care organizations, and homeless service agencies who have the capacity to develop solutions to increase access to transportation, ultimately improving the subjective health of the homeless population.

In our study, an association also existed between ranking medical care as a primary need and self-perceived suboptimal health. This association shows that many individuals experiencing homelessness are aware of their health problems and accordingly, recognize that they need medical care. A national study of homeless adults found the majority reported at least one unmet health need; significant predictors of unmet health needs included food insufficiency and lack of health insurance (Baggett *et al.*, 2010). With that being said, the lack of significance of this association shows the complexity of health care. Despite struggling with poor health, many individuals experiencing homelessness forgo seeking care. Reasons include perceived discrimination by the medical community (Rask *et al.*, 1994), lack of health insurance (Cheung *et al.*, 2012), lack of transportation (Cheung *et al.*, 2012), and poor access to primary care (Wen *et al.*, 2007).

For some, they may view their health as a lower priority than other items, such as food, as evidenced by our results.

Health illiteracy was also associated with suboptimal self-reported health. Self-efficacy with navigating health information correlates with better self-reported health, but factors influencing self-perception may be multifactorial, and may include a lack of exposure to the complexities of the health system. Any level of health illiteracy impedes an individual's ability to access health care services and understand how to manage their health (Rademakers & Heijmans, 2018). In homeless populations, health literacy rates are significantly lower than those of the general population, which results in inadequate management of health conditions and worse health outcomes (Buck *et al.*, 2012). Interestingly, in our needs assessment, most participants indicated no deficiency in health literacy skills. This may have been due to lack of awareness of their health literacy limitations or they may have felt embarrassed/ashamed to disclose this problem. It should be noted that the Single Item Literacy screener used was found to perform only "moderately well at ruling out limited reading ability in adults..." (Morris *et al.*, 2006)

Additionally, our data showed a connection between identifying medical care as a primary need and utilizing an ED as the main source of medical care. These results highlight future opportunities to provide outreach in EDs where individuals experiencing homelessness are seeking care to connect them with a primary care provider or other primary care medical home. In addition, since medical care as a top priority need is shown to be associated with both ED utilization and worse reported health (Wang *et al.*, 2015), future studies could explore whether individuals experiencing homelessness experience worse long-term health outcomes receiving care from an ED versus a primary care provider.

Several key recommendations emerged from our results and informed the development of our street medicine model's current services. The results indicated that pairing services, such as health care with primary needs such as meals and referrals to primary medical homes, may increase service utilization. Street Medicine Phoenix (<https://www.publichealth.arizona.edu/outreach/street-medicine-phoenix>) incorporated these findings by connecting with patients at churches and soup kitchens where they receive meals. Our results also demonstrated the need for unique services from other health professions including optometry and veterinary. These highly desired services have oftentimes been utilized to establish rapport with patients and earn buy-in for our core services like health screenings. Additionally, this study highlighted the community agencies with whom our street medicine program should partner. Based on the needs expressed by study participants and the prevalence of chronic health conditions, our team connected with local food banks, shelters, and federally qualified health centers to ensure that when we couldn't meet a patient's need, we could direct them somewhere that could. We also connected with fellow street medicine programs, both nationally and internationally, through the Street Medicine Institute for mentorship, logistical

support, and research as we built our program. Over the past few years, Street Medicine Institute has helped direct us to valuable resources and provided insightful guidance as we continue expanding our program.

The results of this needs assessment should be considered in the context of several limitations. First, the needs assessment consisted of several unvalidated questions. This may have affected the significance of the associations observed in the needs assessment results. A future validation study of our questionnaire would provide important information regarding future directions. Second, this needs assessment was conducted in several parks across metro Phoenix and the results reflect this limited survey area. The needs, health concerns, and demographics of unsheltered homeless individuals in other regions of the United States may differ significantly from those represented in this study, making it difficult to formulate generalizable conclusions.

In addition, only unsheltered homeless individuals were surveyed, limiting the generalizability to sheltered homeless individuals, who may have more services and support available. Third, this needs assessment consisted entirely of information self-reported by the participants. Recall bias, along with factors such as misunderstanding intended question meaning and lack of rapport/trust, could have influenced the participants' responses and possibly skewed the results. Moreover, the lack of rapport/trust likely resulted in reporting bias with participants underreporting sensitive information, such as drug use and health status. Fourth, the interviewers selected participants that appeared approachable and capable of completing the needs assessment, which may have introduced selection bias. Finally, although the sample size was originally calculated to yield results with sufficient power, the unsheltered homeless population has increased significantly since data collection, rendering the sample size inadequately small.

After completing this needs assessment, we realized there were several missed opportunities. Future needs assessments should investigate the holistic needs of individuals experiencing homelessness, such as physical therapy, optometry, and veterinary needs. This information would better inform the further development of our interprofessional teams to ensure that the diverse needs of the homeless population are addressed. Additionally, we were not able to capture the full views and experiences of those experiencing homelessness through this survey due to the lack of open-ended questions intended to elicit more detailed and nuanced responses from participants. Future studies that assess experiences directly tied to individual respondents can provide unique insights into how we may utilize our opportunities and partnerships to better serve these vulnerable individuals. In line with that, expanding the needs assessment to consider and include the needs identified by our partner organizations that support our outreach efforts would be valuable in both strengthening our ties and expanding our services to the homeless population in Phoenix. Although a

single-item health literacy screening question was included in the needs assessment, this information did not provide adequate insight into the health literacy of the study population. We learned the importance of a more in-depth analysis of the health literacy of our population, entailing educational attainment and comfort with health topics, to better gauge the need for health education and health promotion efforts.

As medical and health professional students, this study and Street Medicine Phoenix have taught us many lessons that will inform our practice and benefit our future patients. In general, street medicine programs emphasize social determinants of health and social needs. Our study results and experiences in Street Medicine Phoenix have illuminated how these concepts play an integral role in the health of all patients and should be assessed for every patient. The study also taught us the importance of building connections, both in clinical settings with interprofessional colleagues and in the community with service agencies. Collaborating with interprofessional colleagues enables us to meet the diverse holistic needs of our future patients and expand our perspective on medicine and patient care. Similarly, gaining awareness of service agencies in our community provides us with opportunities to meet the complex social needs of our patients and ensure continuity of care. Ultimately, we anticipate that these opportunities to serve those experiencing homelessness in Phoenix will enrich our educational and professional experiences by learning how we can best collaborate with others who share our mission and bring empathetic and comprehensive service to individuals in need.

Data availability

Underlying data

Zenodo: Engaging health professions students in community-based service learning through design of a needs assessment survey. <https://doi.org/10.5281/zenodo.7258456>. (Zeien *et al.* (2022))

This project contains the following underlying data:

- Needs Assessment Complete Responses.csv (This file contains the responses from the 144 unsheltered homeless individuals in Phoenix, Arizona who participated in a 16-question needs assessment.)

Extended data

Zenodo: Engaging health professions students in community-based service learning through design of a needs assessment survey. <https://doi.org/10.5281/zenodo.7258456>. (Zeien *et al.* (2022))

This project contains the following extended data:

- Needs Assessment Questions.docx

Data are available under the terms of the [Creative Commons Attribution 4.0 International license \(CC-BY 4.0\)](https://creativecommons.org/licenses/by/4.0/).

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Open Peer Review

Current Peer Review Status: ? ?

Version 1

Reviewer Report 21 August 2023

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Emma Lo 

Yale University School of Medicine, New Haven, USA

This article describes a valuable needs assessment conducted among the unsheltered unhoused population of Phoenix, AZ, uniquely framed as an endeavor completed by medical students to not only define needs of a vulnerable population, but serve to further their out-of-classroom education in the social determinants of health.

However the framing is a little hard to decipher at the beginning e.g. the title and intro. Initially by the title, it seems like a paper about medical education and serving learning, but the intro really frames this as more of a health advocacy effort supporting health of unhoused peoples rather than giving any background in medical education/service learning. It almost seems as though it is a street medicine program implementation paper, though you did touch on the value to health education at the background in the abstract, and at the very end of the paper. Suggested title could be "Street medicine as service-learning: lessons from a needs assessment conducted by medical students" to encapsulate your scope more accurately. But I might also add some background about service learning in medical school (e.g. what projects have been done before like yours, is there a huge gap in service learning in medical school?, why is this unique--highlight more explicitly why it matters that you are medical students and not just anyone conducting a needs assessment; in which case this would be in more of a health services journal; have the "background" of your abstract better match your intro).

I might comment further on your main finding about transportation's relationship to health, and how that would translate into justifying your future street medicine program (e.g. justifies its existence by bringing medical care to people eliminating that barrier altogether) or providing bus passes, free cab rides for people to get to specialty appts/tests.

This is a really important piece of work and extremely impressive. I think the data are sound and the methods seem appropriate. The implications of the design and results are really important for future street medicine programs and implementation.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

I cannot comment. A qualified statistician is required.

Have any limitations of the research been acknowledged?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Homelessness and medical education

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.

Reviewer Report 21 July 2023

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Yu-Che Chang 

Chang Gung University, Taoyuan, Taiwan

This article is well-written which aims to highlight the importance and impact of the needs assessment survey conducted to unsheltered homeless people in Metro Phoenix, Arizona in US. Information gathered from the survey is expected to match service provided, utilization and need which will benefit or strengthen the connection between community organizations or impactful professionals and street homeless people. This article also highlights the importance of the Street Medicine Program by which healthcare professions students can be equipped to effectively provide service to the target population. However, there are some suggestions I considered

helpful to the authors if this article will be expected to add new understanding to the literature body.

This article can already set the research problem as a local issue and could consider to address more international point of view for global readers. In this literature, method and discussion, the authors did not address the gap in the literature body to hook the reader's eyes. As there are numerous literatures reported new understandings about homeless people's need and effective intervention, such as transportation, healthcare, education, psychometric situation. It is not easy to catch the contribution of this article when concerning to add new understanding to the current literature body, e.g. Food or meal are the prioritized needs in many need surveys. The paper has also found the transportation is one of the determining factors to the homeless people who self-perceived health is in suboptimal level. There are some other literatures I considered worthy to be cited:

1. Morrison DS, Petticrew M, Thomson H. What are the most effective ways of improving population health through transport interventions? Evidence from systematic reviews. *J Epidemiol Community Health*. 2003;57(5):327-333. doi:10.1136/jech.57.5.327¹

2. Erin Roark Murphy (2019) Transportation and homelessness: a systematic review, *Journal of Social Distress and Homelessness*, 28:2, 96-105, DOI: 10.1080/10530789.2019.1582202²

The study design is convenient sampling in a Metro, which indeed limited the transferability of the study outcome, of course, it is already disclosed by the authors addressed in the limitation. However, the most critical concern would be the validation of the data collected as some items are collected by verbal inform and response. I saw the author has also addressed this concern in the data interpretation and limitation. Therefore the outcome might raise concern about validity among our readers.

In the data analysis, I disagree with the current interpretation as the authors addressed some outcomes, such as health illiteracy was associated with self-reported health; medical care as a primary need was strongly associated with utilizing an ED as the main source of medical care; shelter or housing as a primary need was associated with lower odds of perceiving one's health as fair or poor, because these comparisons were not statistically significant, which is not a way of expression we consider scientific valid in academic publications.

The research topic is "Engaging health professions students in community-based service learning through the design of a needs assessment survey". I saw there is limited content focused on discussion of engagement of health professions students, what impact the street medicine program can benefit their engagement or what mechanism the community or specific health professions can follow to optimize the service provided to homeless people. How to integrate the need assessment data interpretation into the educational activities will make sense the study aim. I saw the research aim also set for enhance interprofessional learning but the following data interpretation and discussion did not respond to the point.

References

1. Morrison DS, Petticrew M, Thomson H: What are the most effective ways of improving population health through transport interventions? Evidence from systematic reviews. *J Epidemiol Community Health*. 2003; **57** (5): 327-33 [PubMed Abstract](#) | [Publisher Full Text](#)
2. Murphy E: Transportation and homelessness: a systematic review. *Journal of Social Distress and the Homeless*. 2019; **28** (2): 96-105 [Publisher Full Text](#)

Is the work clearly and accurately presented and does it cite the current literature?

Partly

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Partly

If applicable, is the statistical analysis and its interpretation appropriate?

Partly

Have any limitations of the research been acknowledged?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Professional identity, resilience, clinical preparedness, emergency medicine

I confirm that I have read this submission and believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard, however I have significant reservations, as outlined above.
