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Access to hygiene facilities and experiences of hygiene-related disease: A pilot study of unsheltered individuals in Tucson, Arizona

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Abstract

Unsheltered individuals have limited access to restroom facilities. With this, many unsheltered individuals are forced to urinate, defecate, and engage in other hygiene practices outdoors. They may also lack access to necessary hygiene toiletries or wait to urinate or defecate until they are able to gain access to a facility. These challenges can lead to health issues, like urinary tract infections (UTIs), diarrhea, rashes, etc. The study objective was to understand the relationship between lack of access to basic hygiene facilities and health effects among unsheltered individuals. A verbal survey (English and Spanish) was used to explore the relationship between hygiene and unsheltered status. In Fall 2022, a researcher accompanied the homeless outreach team from El Rio Health, a Federally Qualified Health Center in Tucson, Arizona to verbally consent and recruit participants. Thirty consenting unsheltered adults ranging in ages from 29 to 68 years old participated in the study. Access to water was the greatest reported hygiene barrier, followed by access to soap, concerns for privacy, and concerns for safety. Eleven of thirty participants experienced a UTI at least once since becoming unsheltered and nine of thirty experienced a yeast infection at least once, with female participants having a statistically significant ($p < 0.05$) higher rate of occurrence than male participants. In addition, 19/30 of participants experienced a rash at least once and 17/30 of participants experienced diarrhea at least once. However, 20/30 of participants did not seek medical care for their health-related issues. Low healthcare utilization when there is a high need for care highlights the importance of community outreach and care for those experiencing homelessness. Next steps include replicating the project on a larger scale to determine generalizability.

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CRedit authorship contribution statement

Bianca Nava: Writing – review & editing, Writing – original draft, Investigation, Formal analysis, Data curation, Conceptualization.

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Declaration of competing interest

The authors declare the following financial interests/personal relationships which may be considered as potential competing interests: Amanda Wilson reports a relationship with Southwest Environmental Health Sciences Center that includes: non-financial support. If there are other authors, they declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Keywords

Unsheltered; Hygiene; UTI

Introduction

In the U.S., on a given night, over 600,000 people in the U.S. are homeless (also referred to as “unsheltered”), and the number of unsheltered individuals in the U.S. increased 12 % from 2022 to 2023 (de Sousa et al. 2023). Homelessness is linked to a number of negative health outcomes, including asthma, infectious diseases, diabetes, and more (Bharel et al. 2013; Bensken et al. 2021), and is a widely recognized social determinant of health (Sleet and Francescutti 2021). Among many challenges associated with homelessness, we focus specifically on access to hygiene facilities and potential contributions to increased infectious disease burden in unsheltered communities. Hygiene practices are strongly correlated to incidence of UTIs and yeast infections (Demir et al. 2020), and unsheltered populations often have limited access to hygiene facilities for hand washing, showering, and washing laundry. Unsheltered individuals may also experience skin rashes as a result of lack of hygiene facility access (Adly et al. 2021). They may also face higher risk for diarrheal disease due to difficulty in accessing restrooms (Frye et al. 2019). Other hygiene facility needs include sexual health hygiene (e.g., male or female not washing genitals before and after intercourse) and nonsexual health hygiene (e.g., replacing undergarments, use of toilet paper, etc.) (Demir et al. 2020).

This study was conducted in Arizona, a state that experienced a 29 % increase in homelessness from 2020 to 2023 (Department of Economic Security 2023). Attributable factors to the rapid increase in homelessness include lack of affordable housing (Marashi 2022) and COVID-19 pandemic stressors (Department of Economic Security 2023). With a rising population of unsheltered individuals, the public health burden of health issues faced by unsheltered individuals is likely to increase. An important component of maintaining proper health is reliable access to hygiene facilities.

The study objective was to conduct a pilot study through verbal surveys focused on facility access and hygiene for unsheltered individuals. The goal with the verbal survey was to measure access to basic hygiene facilities (i.e., bathrooms and showers) and the prevalence of common health problems associated with lack of hygiene facility access (i.e., urinary tract infection, yeast infection, rash, diarrhea, and lice).

Methods

This study was approved by the University of Arizona Institutional Review Board (protocol #00001478). An in-person verbal survey was administered by a bilingual researcher in English or Spanish from August – December 2022. Based on personnel availability, recruitment was conducted for 3 h, twice a week with a recruitment goal of 30 individuals. Recruitment stopped when the recruitment goal was met. The bilingual researcher was a volunteer and student who consented and surveyed individuals in coordination with the

Homeless Outreach Team at El Rio Health. Inclusion criteria for participants included being unsheltered, 18 years or older, and being verbally fluent in English or Spanish.

The survey included open-ended and closed-ended questions, where participants were given specific options for closed-ended questions. Closed-ended questions were specific to hygiene behaviors, facility access, and health issues. Open-ended questions included demographics and final questions in which participants could discuss any remaining thoughts on hygiene practices, access to hygiene facilities, or how lack of access has impacted their health at the close of the survey.

Answers to open-ended questions were categorized by the person conducting oral surveys as responses were given using categories listed in Table 1. Race and ethnicity were collapsed in analyses due to some individuals identifying their race as Hispanic/Latino. In cases where closed-ended questions were followed up by more information beyond confirming the categories that applied to their experience, quotes were transcribed in real time when possible and additional notes (e.g., challenges described regarding access that did not apply to the categories given to participants) were recorded in real time. Audio and video recording were not conducted to protect participant privacy and to increase the likelihood that individuals would agree to participate. Data were stored in an encrypted password-protected University of Arizona Box folder. The El Rio health care team offered medical services to individuals who needed assistance, and the provision of medical care and services offered were not dependent on research participation. Regardless of research participation, all unsheltered individuals in need were offered the necessary care.

Categorical and continuous data were summarized with descriptive statistics, and Fisher's Exact Tests were used to test for statistically significant ($\alpha=0.05$) differences in 1) proportions of males and females for never vs. ever having a UTI or yeast infection since becoming unsheltered, and never vs. ever having been asked to leave a public restroom since becoming unsheltered, and 2) proportions of those never vs. ever having been asked to leave a public restroom since becoming unsheltered and those reporting negative health outcomes.

Results

Participant demographics

Participants ($N=30$) ranged from 29 to 68 years, with a mean age of 47 years old ($SD=9$ years) (Table 2). Seventeen percent (5/30) of participants were Black or African American, 47 % (14/30) were White, 33 % (10/30) were Hispanic/Latino, and 3 % were American Indian or Alaska Native. Fifty-three percent of participants were male, and 47 % were female (Table 2).

Barriers to hygiene access

The most reported challenges and barriers to maintaining personal hygiene in order from most to least frequently reported included access to water (100 %, 30/30), access to soap (53 %, 16/30), privacy concerns (43 %, 13/30), and concerns of safety for themselves or their belongings (27 %, 8/30) (Table 2). Seventy seven percent (23/30) of participants urinated or defecated or showered outdoors, 13 % used hygiene facilities at a shelter, 37 % at a

friend or family member's home, and 87 % in a public restroom (Table 2). Seven percent reported showering daily, 53 % showered weekly, and 37 % showered monthly (Table 2). Most participants (53 %) reported being asked to leave a public restroom more than three times since being unsheltered, while 23 % reported that they have never been asked to leave a restroom since being unsheltered, 17 % being asked two to three times since being unsheltered, and 7 % being asked once (Table 2).

Hygiene-related health issues

Sixty-three (19/30) percent of participants reported never having experienced a UTI since being unsheltered, 7 % (2/30) reported having experienced one UTI since being unsheltered, 13 % (4/30; all female) reported experiencing a UTI two to three times since being unsheltered, and 17 % (5/30; all female) reported experiencing a UTI more than three times since being unsheltered (Table 1). No participants reported lice since being unsheltered.

Ten percent (3/30; all female) had one yeast infection since being unsheltered, 13 % (4/30; three were female) experienced a yeast infection two to three times since being unsheltered, and 6.7 % (2/30; one was female) experienced more than three yeast infections (Table 3). Twenty percent (6/30) of participants experienced a rash once, 10 % (3/30) two to three times, and 33 % (10/30) experienced a rash more than three times since becoming unsheltered (Table 2). Forty-three percent (13/30) of participants never experienced diarrhea since being unsheltered, 10 % (3/30) of participants experienced diarrhea once, 30 % (9/30) two to three times, and 17 % (5/30) experienced diarrhea more than three times since becoming unsheltered.

Additionally, of those who experienced one or more medical problems, 33 % sought professional medical care (Table 2). Barriers to care that were reported include difficulty in making an appointment, negative prior experiences with medical professionals, difficulty in finding transportation to get to the appointment, and the cost of medical bills, with the most frequently reported barrier being difficulty in making an appointment (either via phone or in person).

Relationship between restroom access and frequency of reported health issues

There were no statistically significant relationships between the proportion of those who reported being asked to leave a public restroom more than once vs. one or never and those who reported having ever had a UTI, yeast infection, rash, or diarrhea.

Differences in restroom access and health issues by gender

A statistically significant difference ($p = 0.03$) was observed between males and females and those reporting having never been removed from a restroom vs. those reporting having been removed from a restroom at least once (females: 8/14, 57 %; males: 15/16, 94 %).

A statistically significant difference ($p = 0.007$) was observed between males and females and those who reported never having a UTI vs. those reporting having a UTI at least once, with a greater proportion of females reporting having at least one UTI (females: 9/14, 64 %; males: 2/16, 8 %) (Table 3). There was a marginally significant difference ($p = 0.05$)

between females and males in proportions of those reporting never having a yeast infection vs. those reporting at least one (females: 7/14, 50 %; males: 2/16, 13 %) (Table 3).

Pilot study learnings and insights from personal experiences shared by participants

Transcription of open-ended responses in real-time for experience-based questions was challenging due to the population being marginalized and commitment to ensuring that the participants' privacy was respected. Advice from trusted community partners recommended against recording participants as there was a fear that it would cause participants to be less candid or that their words would be traced back to them. Real-time transcription of participant responses allowed for each individual to speak freely without trepidation that their identities would be revealed. However, this limited capacities for more formal qualitative analysis. We therefore share summarized information that was relayed verbally which provides extended context to the categories that were orally listed for some of the hygiene facility access and barrier questions.

Nearly all participants described extreme challenges in finding public showers that were safe and clean, and as a result, they more often cleaned themselves with wipes or wet towels in sinks of public restrooms. One participant described being asked to leave gas station bathrooms nearly every day. Another participant who resides in a public park expanded upon safety concerns regarding facility access: there is a public shower/park restroom in their unsheltered community, but not everyone at the site is allowed to use it due to concerns for violence from some members; additionally, there is only one restroom available, making the lines incredibly long. This participant explained that the park restrooms have limited open hours, forcing many to urinate or defecate outdoors outside of this time frame. A participant in a wheelchair described using diapers due to challenges in moving to restroom locations and described issues with rashes and UTIs due to not being able to change diapers as frequently as they would hope.

Another significant takeaway emerged from one participant explaining a loss of identity associated with lack of hygiene facility access, describing an inability to apply makeup as a form of self-expression. Without the ability to keep up appearances, many participants felt high levels of discrimination after being kicked out of public restrooms, which they felt was primarily due to their image since they were not causing any disturbances.

Regarding barriers to seeking medical care, many participants explained that it was hard finding somewhere to charge their phones in order to keep track of time and to find directions to their medical appointments. Other barriers included not knowing where to go, who to see, or what health concerns should have priority. Two individuals living together in a tent described some specific hygiene challenges, such as dry skin, challenges in effectively laundering limited number of clothing items that do not get clean, and feelings of isolation and misunderstanding from healthcare support.

Discussion

Key findings

Bathrooms were created to ensure privacy, safety, cleanliness, and dignity for an individual when urinating or defecating. For the unsheltered community, access to these safeguards is difficult, if not impossible. Due to discrimination and negative stereotypes, many businesses prevent unsheltered individuals from entering their buildings and using their facilities. This experience is reflected in the results of the study, which revealed that approximately 77 % of individuals surveyed have been asked to leave a restroom at least once due to their status as unsheltered. With limited access to hygiene facilities, many unsheltered individuals shower, urinate or defecate outdoors (77 % in our study, higher than that reported for open defecation in public spaces in other studies (Avelar Portillo et al. 2023)). It is likely that the capacity of homeless shelters is not adequate to meet the demands of a growing population of unsheltered individuals in Tucson, Arizona.

Arizona has a hot and dry climate, making water scant and highly important to proper health. All participants described access to water as a barrier to hygiene (Table 2), consistent with the findings of other studies of unhoused communities (Avelar Portillo et al. 2023). With no consistent income and other financial pressures, purchasing of bottled water can be a high burden (up to thousands of times more expensive than tap water (Arnold and Larsen 2006)) to maintaining hygiene and hydration. As a result, it is a major challenge for unsheltered individuals to regularly buy water to hydrate, much less wash their hands, body, or for other hygienic practices when lacking access to water in public facilities.

Unsheltered women have added difficulties and stresses as revealed by the survey. Of the 13 participants who described privacy as being a significant barrier to hygiene, 11 were women. In addition, 8 participants listed safety as a major barrier to hygiene, and 6 of whom identified as women. Statistically significant differences in both UTI and yeast infection frequency were observed in this study, with greater proportions of women reporting at least one UTI or yeast infection relative to men (Table 2). However, we did not observe a statistically significant relationship between frequency of being asked to leave a public restroom (1 time or never vs. 2 or more times) and frequency of health-related issues (having ever had UTI, yeast infection, rash, or diarrhea). More data are needed to quantitatively describe public restroom access and risks of hygiene-associated health outcomes.

Of the participants who experienced one or more health problems, only 33 % sought medical care. Participants reported a number of barriers limiting their access to medical care, including, lack of transportation, lack of access to a cell phone to schedule an appointment, negative prior experiences with health care professionals, and cost. Cost was the least pressing barrier to seeking medical care. Globally, barriers to healthcare access among unsheltered individuals have included “negative prior health care experiences” and a need for trust in healthcare providers that serve unsheltered communities (Thorndike et al. 2022; Carmichael et al. 2023). Our study and prior work highlight continued need for clinician training specific to serving those who are unsheltered. El Rio Health is aware of many of the barriers that exist for those who are unsheltered. As an example, when patients shared that transportation was a barrier to care, El Rio created a street medicine program. As part of

the street medicine program, clinicians and support staff go into the community and provide unsheltered individuals with medical care where it is accessible and convenient for them to receive care. Future work should focus on the scalability of programs like this serving those who are unsheltered.

This pilot study generated data for informing future research to serve unsheltered communities in Tucson, Arizona, and beyond. While the results of this study are in line with prior research confirming challenges with hygiene access (Leibler et al. 2017) and potential associations with negative health outcomes, it is possible results could vary through recruitment through other organizations or through other sites. Future research includes expanding through a network of community partners that serve unsheltered communities to gauge not only access to hygiene facilities, hygiene behavior frequency, and associated health outcomes, but also to gauge unsheltered individuals' knowledge of available resources and inventory barriers to accessing these resources. This will serve not only the unsheltered community but also the organizations that serve these communities in advancing programs and resources.

Limitations

This study included a small sample size ($n = 30$) and lacks generalizability, a common limitation of pilot studies. More research is needed across other geographical regions to elucidate commonly shared experiences vs. those that are geographically or culturally specific to our study population. The sample size is small, in part, due to limited volunteer access and constraints on when recruitment could occur and the nature of the pilot (i.e., no funding and limited personnel time). Despite a small sample size, it should be noted that a major strength of the study was working with a trusted community partner which has developed programming to meet the needs of the community. Local Federally Qualified Health Centers (FQHCs) have valuable insights regarding barriers and strategies for connecting with unsheltered individuals and connecting them to medical care.

The survey in this study focused on topics that are prone to social desirability bias, or the tendency to deny socially undesirable traits in an attempt to present oneself in a favorable light (Latkin et al. 2017). This bias could have resulted in an overestimation of shower frequency or underestimation in frequency of hygiene-related health problems. Continued partnership with engaged community organizations may reduce this bias by establishing trust with unsheltered individuals so they feel comfortable giving honest answers to future questionnaires.

This survey focused on experiences “since being unsheltered” but did not quantify duration of being unsheltered as it relates to these health outcomes. This may be, in part, why there were no statistically significant relationships between the proportion of those who reported being asked to leave a public restroom more than once vs. one or never and those who reported having ever had a UTI, yeast infection, rash, or diarrhea, as duration of being unsheltered could confound this relationship. For example, Gao et al. (2022) found a positive association between duration of homelessness and cardiovascular disease risk factors, but not with homelessness frequency (Gao et al. 2022). Understanding durations

of being unsheltered and patterns of temporary unsheltered status (Homelessness, Health, and Human Needs, 1988) could offer more information regarding the full disease burden of outcomes related to lack of hygiene facility access.

Conclusion

Unsheltered individuals experience a multitude of stressors, which complicate accessing various basic needs, including hygiene care. Our study demonstrated that unsheltered individuals in Tucson may frequently urinate or defecate outdoors due to lack of facility access. Additionally, lack of access to water for washing one's hands and bathing may increase risks of hygiene-related health issues. Barriers to hygiene likely increase risks for specific health issues, including UTIs, yeast infections, diarrhea, and rashes. With lack of transportation or reliable phone access, it can be difficult for unsheltered individuals to seek proper medical care. Two recommendations based on this pilot study include increased access to hygiene facilities for unsheltered individuals to promote hygiene practices, and the expansion of medical teams that provide specialized care for unsheltered individuals with components of outreach, thus removing transportation or phone barriers. More data are needed to bolster these recommendations and to evaluate the generalizability of our findings.

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Data availability statement

De-identified data and code used for data analysis are available from the corresponding author upon reasonable request.

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Table 1

Survey questions.

Demographic	Question	Question Style	Question Options (Closed-ended)/Categories for Recording Responses (Open-ended)
	What is your age?	Open-ended	-
	What is your race?	Open-ended	American Indian or Alaska Native, Asian, Black or African American, Native Hawaiian or Other Pacific Islander, White
	What is your ethnicity?	Open-ended	Hispanic/Latino; Non-Hispanic Latino
	What gender do you identify with?	Open-ended	Male, Female, Non-binary, Other
Hygiene, Health, and Homelessness	Question		
	What are some of the challenges you face in maintaining personal hygiene?	Closed-ended	1. Access to water 2. Access to soap 3. Privacy 4. Safety
	Where do you go to use the restroom or shower?	Closed-ended	1. Outdoors 2. Homeless Shelter 3. Public Restroom 4. Friend/Family House
	How often do you shower, and do you have soap available to you?	Closed-ended	1. Daily 2. Weekly 3. Monthly
	Have you had a urinary tract infection, difficulty peeing, or a burning sensation when peeing since being homeless? How many times?	Closed-ended	1. Never 2. Once 3. Two to three times 4. More than three times
	Have you had a yeast infection since being homeless? How many times?	Closed-ended	1. Never 2. Once 3. Two to three times 4. More than three times
	Have you had a rash since being homeless? How many times?	Closed-ended	1. Never 2. Once 3. Two to three times 4. More than three times
	Have you had diarrhea since being homeless? How many times?	Closed-ended	1. Never 2. Once 3. Two to three times 4. More than three times
	Did you seek medical care if you had any of these issues?	Closed-ended	1. Yes 2. No
	What are some of the challenges you face in seeking medical care for these issues?	Closed-ended	1. Difficulty making an appointment 2. Bad prior experiences with medical professionals 3. Difficulty in finding transportation to get to the appointment 4. Cost of medical bills
	Is there anything else you would like to share about personal hygiene practices or access?	Open-ended	-
	Is there anything else you'd like to share about your experience or thoughts related to how access to hygiene has affected your health?	Open-ended	-

Table 2

Summary statistics of survey findings.

Variable and categories	Participants (Mean ± SD or n/30,%)
Age (years)	47 ± 9
Race/ethnicity*	
American Indian or Alaska Native	1/30, 3 %
Asian	0/30, 0 %
Black or African American	5/30, 17 %
Native Hawaiian or Other Pacific Islander	0/30, 0 %
White	14/30, 47 %
Hispanic/Latino	10/30, 33 %
Male	16/30, 53 %
Female	14/30, 47 %
Non-binary/Other	0/30, 0 %
Barriers to maintaining personal hygiene	
Access to water	30/30, 100 %
Access to soap	16/30, 53 %
Privacy	13/30, 43 %
Safety	8/30, 27 %
Locations used to shower or use the restroom	
Outdoors	23/30, 77 %
Homeless shelter	4/30, 13 %
Public restroom	26/30, 87 %
Friend/family house	11/30, 37 %
Showering frequency	
Daily	2/30, 7 %
Weekly	16/30, 53 %
Monthly	11/30, 37 %
Number of times being asked to leave a public restroom	
Never	7/30, 23 %
Once	2/30, 7 %
2–3	5/30, 17 %
3+	16/30, 53 %
Urinary tract infections since being unsheltered	
Never	19/30, 63 %
Once	2/30, 7 %
2–3	4/30, 13 %

Variable and categories	Participants (Mean ± SD or n/30,%)
	5/30, 17 %
Yeast infections since being unsheltered	
3+	21/30, 70 %
Never	3/30, 0 %
Once	4/30, 13 %
2–3	2/30, 7 %
3+	11/30, 37 %
Rashes since being unsheltered	
Never	6/30, 20 %
Once	3/30, 10 %
2–3	10/30, 33 %
3+	13/30, 43 %
Diarrhea since being unsheltered	
Never	3/30, 10 %
Once	9/30, 30 %
2–3	5/30, 17 %
3+	10/30, 33 %
Seeking medical care	
Yes	20/30, 67 %
No	23/30, 77 %
Barriers to seeking care	
Difficulty making an appointment	16/30, 53 %
Bad prior experiences with medical professionals	22/30, 73 %
Difficulty in finding transportation to get to the appointment	
Cost of medical bills	9/30, 30 %

* Race and ethnicity were collapsed, as some Hispanic/Latino participants viewed ethnicity and race as overlapping identity components.

Table 3

Comparisons by gender and frequency of being asked to leave public restrooms.

Comparison Categories	Male Participants (n/16,%)	Female Participants (n/14,%)	p-value for comparisons between males and females*
Number of times being asked to leave a public restroom	1/16 6 %	6/14 43 %	0.03
	Never	Ever being asked since being unsheltered	
Urinary Tract Infections (UTIs)	15/16 94 %	8/14 57 %	
	Never	5/14 36 %	0.007
	14/16 87.5 %	9/14 64 %	
Yeast Infections	2/16 12.5 %	7/14 50 %	0.05
	Never	Ever had a yeast since being unsheltered	
	14/16 87.5 %	2/16 12.5 %	

* P-values from Fisher's Exact Test results in comparing proportions of males and females or those being asked to leave public restrooms.