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Improving health professionals' and learners' attitudes towards homeless individuals through street-based outreach

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Abstract

Objective: To identify the impact of volunteering in a street medicine programme on perceptions of and attitudes towards individuals experiencing homelessness.

Design: Prospective pre- and post-analysis using involvement in a street medicine programme as the intervention. Attitudes towards and perceptions of individuals experiencing homelessness were measured using the Health Professional Attitude Towards the Homeless Inventory (HPATHI).

Setting: Participants provided outreach to individuals experiencing homelessness across metro Phoenix in parks and in homeless encampments along the streets.

Method: Students and preceptors from numerous professions, including medicine, nursing, social work, physical therapy, occupational therapy, public health and undergraduate students, who volunteered for the street medicine programme were organised into small outreach teams. All volunteers were emailed the HPATHI to complete before and after semester-long, monthly outreach events.

Results: Volunteering in our street medicine programme demonstrated statistically significant improvements in perceptions of and attitudes towards individuals experiencing homelessness for all volunteers, regardless of profession.

Conclusion: Our findings suggest that integrating street medicine programmes into curricula for health and social care programmes can reduce the stigma towards individuals experiencing homelessness, inspire increased commitment to practising in underserved communities and meet the unmet health and social needs of the homeless population.

Keywords

Experiential learning, health professionals, homelessness, service learning, stigma, street medicine, underserved

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Homelessness is a surging public health crisis across the USA (National Alliance to End Homelessness, 2020). At the start of 2020, approximately 580,466 people experienced homelessness throughout the USA, with 110,528 of those individuals considered chronically homeless (U.S. Department of Housing and Urban Development, 2020). Over the past 3 years, the national homeless population has increased substantially, and in light of the COVID-19 public health crisis, this number will likely continue to rise (National Alliance to End Homelessness, 2020). Persons experiencing homelessness are especially vulnerable to highly communicable infections due to cramped, unhygienic living conditions. Populations historically affected by health disparities have been disproportionately hospitalised with COVID-19, and data suggest a higher prevalence of COVID-19 infection within the homeless population compared to housed individuals (Hsu et al., 2020).

Although public opinion polls spanning multiple decades indicate that the majority of US residents consider homelessness a significant issue, there is widely varied opinion with respect to methods of mitigation. A study completed in 2018 examined current public exposure and attitudes towards homelessness and found that of a total sample of 451 adults, 78% reported homelessness was a problem in their communities, 60% believed homelessness would increase in the next 5 years and 73%–80% believed the US federal government should dedicate more funding and policy-driven solutions towards improving the homelessness crisis (Tsai et al., 2019). The pervasive discrimination of and stigma towards individuals experiencing homelessness has been well characterised and documented (Weng and Clark, 2018).

In addition to the hardships presented by homelessness itself, individuals experiencing homelessness are often considered to be primarily responsible for their lack of housing (Parsell and Parsell, 2012; Skosireva et al., 2014). This form of discrimination is viewed as legitimate not only by the general public but also by those experiencing homelessness (Fiske et al., 2002). In addition, the homeless population experiences higher rates of drug dependency and mental illness, conditions which are highly stigmatised by society (Barry et al., 2014). In fact, members of this population are more likely to experience discrimination on the basis of perceived drug addiction and mental illness more so than on the basis of ethnicity or skin colour (Skosireva et al., 2014). Discrimination towards individuals experiencing homelessness has been demonstrated to negatively affect social connections and consequently, well-being (Johnstone et al., 2015). Discrimination towards this population is also not limited to just the general population. Social workers, health care providers and other ancillary service professionals have been recorded as showing discrimination towards members of this population as well (Weng and Clark, 2018).

Negative perceptions of homeless patients by health care professionals, whether intentional or subconscious, have the potential to not only alter the quality of their care but also can foster mistrust of the health care system (Van den Berk-Clark and McGuire, 2014) making individuals experiencing homelessness less likely to seek care when they need it (Song, 2014). Among the many barriers experienced in regard to health care access, the major obstacles are fear, embarrassment and presumption of poor treatment or discrimination from health care professionals (Van den Berk-Clark and McGuire, 2014). Discrimination by health care workers acts as a barrier to access to care, and stigma towards individuals experiencing homelessness impedes health care delivery, leading to worse health outcomes (Grech and Raeburm, 2019; Parkinson, 2009). Patients within this vulnerable demographic tend to present late in their disease process with acute, emergent problems that could have been mitigated with utilisation of primary care and preventive services. Ultimately, the stigma and discrimination that this population faces negatively impact their mental health, substance use severity, suicidality and overall health trajectory (Mejia-Lancheros et al., 2020).

Maintaining individual health and access to quality health care is a challenge encountered by most individuals experiencing homelessness, and street medicine programmes have been created to address this need (Withers, 2011). These programmes may provide volunteer students the

opportunity to combine their medical education with key concepts of social justice, humanism and the complexities of caring for those experiencing homelessness. They aim to sensitise students to the reality of homelessness and the unique experiences of individuals experiencing homelessness (Doohan and Mishori, 2019).

Street Medicine Phoenix is one of the over 85 street medicine programmes in the world, (Street Medicine Institute, n.d.a) 39 of which are student led (Street Medicine Institute, n.d.b). Street Medicine Phoenix is an initiative that was created in 2017 and whose mission is to meet the unmet needs of individuals experiencing homelessness in metro Phoenix, Arizona. This is accomplished by providing services including preventive health screening, wound care, vaccinations, health education, community resource referrals and more. A wide variety of professions comprise Street Medicine Phoenix including medicine, nursing, social work, public health, physical therapy, occupational therapy and undergraduate students. Faculty preceptors and student volunteers are divided into interprofessional teams and spend the entirety of the shift delivering care to patients experiencing homelessness in the field, including at community agencies, such as homeless resource centres, churches or directly on the streets.

After positively impacting the lives of hundreds of individuals experiencing homelessness in the community for almost 2 years, the Street Medicine Phoenix leadership decided to assess the impact that the programme had on its volunteers. This study measured the effect of volunteering in Street Medicine Phoenix on attitudes towards and perceptions of the homeless population. Results from this study were intended to provide quantitative evidence of the benefits provided to street medicine volunteers to support the expansion of Street Medicine Phoenix and the initiation of new programmes worldwide.

Methods

Study population and recruitment

The study population consisted of Street Medicine Phoenix volunteers who were either students or faculty affiliated with the University of Arizona, Arizona State University or Northern Arizona University and who participated in project outreach events during the study period. All outreach events took place in metro Phoenix, Arizona. Inclusion criteria limited the study population to Phoenix volunteers who had completed at least one volunteer shift. Student volunteers were enrolled in one of the following programmes: medicine, nursing, physical therapy, occupational therapy, public health, social work, or any undergraduate degree programme. Most undergraduate student volunteers were enrolled in degree programmes in the life sciences. Preceptor volunteers were licenced in Arizona and currently practising one of the following professions: medicine, nursing, physical therapy, occupational therapy or social work. Exclusion criteria included students and preceptors not affiliated with the University of Arizona, Arizona State University or Northern Arizona University, minors (<18 years of age as defined by our state) and volunteers who were unable to consent. Recruitment for the study was conducted before the first shift of each semester. All student and preceptor volunteers on the existing Street Medicine Phoenix email listserv were invited to participate via an emailed link to an encrypted REDCap® survey. The study protocol was reviewed by the Arizona State University Institutional Review Board which determined that the study should be considered exempt pursuant to Federal Regulations 45CFR46 (2) tests, surveys, interviews or observation (IRB# HRP-503a).

Study design

The study took the form of a pre-post prospective interventional study implemented between August 2019 and March 2020. The study was stopped 2 months early (prior to the end of the spring

2020 academic semester) due to safety concerns brought about by the growth of the COVID-19 pandemic. The intervention was involvement in the preexisting Street Medicine Phoenix programme. The study aimed to assess how the everyday activities and interactions of volunteers in this programme affected their attitudes towards the homeless population. Attitudes towards the homeless population were measured before and after participation in Street Medicine Phoenix to establish a baseline and determine change.

Health Professional Attitude Towards the Homeless Inventory instrument

The Health Professional Attitude Towards the Homeless Inventory (HPATHI) is a 19-item inventory that evaluates perceptions of homelessness. It consists of three major subscales: personal advocacy (items that reflect a personal commitment to care for the homeless population); social advocacy (items that reflect society's responsibility to care for the homeless population); and cynicism (items that reflect negative attitudes and futility in working with the homeless population) (Buck et al., 2005). The original 35-item version of the HPATHI was developed from a Delphi study with 16 physicians and nurse practitioners who were experts in homeless health care as determined by their membership on the National Health Care for the Homeless Clinicians' Network.

The version employed in this study was piloted by 76 third-year medical students, and the results were used to reduce the questionnaire to 23 items. The tool was validated after administration to 160 health care professionals, including primary care physicians, primary care residents and medical students, and reduction to 19 items to improve reliability. Construct validity was demonstrated through extreme group comparisons (by medical training and experience with the homeless population), item analyses and a factor analysis. There were no significant differences found by variations in medical training, but individuals with more than 1-year experience working with the homeless population scored significantly higher than participants with less than 1-month experience.

For the aforementioned three subscales, alpha ranged from .72 for social advocacy and cynicism to .75 for personal advocacy. The final 19-item version of the HPATHI reached Cronbach's alpha of .84 and test–retest reliability coefficient of .69 (Buck et al., 2005). Content validity was established using the Delphi method, a review of findings from the literature and the adoption of instrument items from the Attitudes Toward Homelessness Inventory (ATHI) (Kingree and Daves, 1997) and Attitudes Toward Homeless Questionnaire (ATHQ) (Buck et al., 2005; Lester and Pattison, 2000). In addition, the HPATHI results were correlated with results from the ATHI to demonstrate concurrent validity; Pearson's correlation coefficient between the two instruments was .68. (Buck et al., 2005; Kingree and Daves, 1997).

Each item on the HPATHI is assessed using a five-point Likert-type scale (1 = strongly disagree; 2 = disagree; 3 = neither agree nor disagree; 4 = agree; and 5 = strongly agree). Scoring for each item is based on the participant's self-reported rating. For positively worded items (#1–3, 6–8, 11–15, 17–19), a higher number indicated improvement in that specific item and more favourable attitudes towards homelessness. For negatively worded items (#4, 5, 9, 10 and 16), a lower number indicated improvement in that specific item and more favourable attitudes towards homelessness. Due to the mixture of positive and negative items, calculating an overall score for the instrument or a mean score is not valuable. Item-specific analysis is recommended (Buck et al., 2005).

Study intervention

Prior to each 4-month academic semester, volunteers were assigned to one of the four discrete teams. Each team was assigned to one 2-hour outreach event each month, totalling four shifts throughout the semester. Of note, some volunteers, both students and preceptors, served with

other teams outside of their assigned team in a given semester. Team A engaged with individuals living and sleeping on the streets outside of the city homeless shelter. Teams B and C provided outreach to individuals residing in the city homeless shelter utilising the associated resource centre. Team D cared for individuals at a local church in metro Phoenix. Each team remained together for the full academic semester. Within each team, smaller sub-teams were created consisting of three to four students from different professions. Each sub-team approached patients at the outreach location and provided services tailored to the skills of the team members and the needs of the patient. Services included providing health screening (blood pressure, blood sugar, etc.), wound care, vaccinations (e.g. flu and Hepatitis A), health education, vision screening, community resource referrals, musculoskeletal and mobility assessment, donations of hygiene supplies, clothes, backpacks and other life essentials and other specific services depending on the needs of the patient. No specific training, education or other interventions were implemented into the outreach event workflow that might affect attitudes towards the homeless population.

Data collection

Written consent was from participants was obtained at the start of the survey. After consent, demographic information, profession/programme of study and number of completed shifts were gathered and the HPATHI tool was administered. At the conclusion of each academic semester, members of the study population who completed the pre-survey were sent another encrypted REDCap survey link to complete the HPATHI tool after completing their assigned semester shifts. Participants who volunteered during both academic semesters within the time range of this study were sent the post-survey after each semester had concluded. All data were de-identified, and each participant created a unique record identifier utilising their initials and birthdate. Data gathered in the course of the investigation were stored in REDCap and access was limited to the principal investigators and the survey administrators, who consisted of four medical students and one graduate student.

Statistical analysis

Demographic and other participant characteristics were reported as means and standard deviations for continuous variables and frequencies and percentages for categorical variables. For the purposes of data analysis, volunteers who self-identified as Asian Indian and Black or African American were categorised into ‘Other’ for race due to low numbers in each sub-category. Also, participants from physical therapy, occupational therapy, social work and public health were combined into one category due to low sample size.

Since all the covariates were categorical, chi-square analysis and Fisher’s exact test were used to compare the covariates between the three shift categories (1–2, 3–4, $\geqslant$5 shifts). If the overall p value was statistically significant, pairwise comparisons were conducted, followed by the Bonferroni correction.

Items from the HPATHI tool were reported as means and standard deviations for the pre-survey and post-survey. The Wilcoxon signed rank test was used to assess whether the change between pre- and post-survey scores was statistically significant. Multivariable linear regression was used to assess the mean difference in the individual HPATHI items relative to the participant characteristics. All p values were two-sided, and $p < .05$ was considered statistically significant. All data analyses were conducted using Stata v15 (College Station, Texas).

Table 1. Student and preceptor volunteer breakdown for autumn 2019 and spring 2020 Street Medicine Phoenix events.

Semester	Number of students	Number of preceptors
Autumn 2019	26	8
Spring 2020	24	8
Autumn 2019 and spring 2020	17	4

Table 2. Demographics of street medicine students and preceptor volunteers.

Gender	
Female	65.5% (*n* = 57)
Male	34.5% (*n* = 30)
Age (years)	
18–19	9.2% (*n* = 8)
20–24	41.4% (*n* = 36)
25–29	25.3% (*n* = 22)
30–39	5.7% (*n* = 5)
40–49	16.1% (*n* = 14)
50–59	2.3% (*n* = 2)
Race	
White or Caucasian (non-Hispanic)	54.0% (*n* = 47)
Asian	23.0% (*n* = 20)
Asian Indian	11.5% (*n* = 10)
White or Caucasian (Hispanic)	6.9% (*n* = 6)
Black or African American	4.6% (*n* = 4)
Profession/Programme of study	
Medicine	32.2% (*n* = 28)
Nursing	25.3% (*n* = 22)
Undergraduate	19.5% (*n* = 17)
Physical therapy	8.1% (*n* = 7)
Social work	8.1% (*n* = 7)
Occupational therapy	5.7% (*n* = 5)
Public health	1.1% (*n* = 1)

Results

There were a total of 87 study participants consisting of 67 students and 20 preceptors. The breakdown of students and preceptors by semester is shown in Table 1. Demographic data for the study participants can be found in Table 2. The pre-survey, post-survey and delta means for each HPATHI item are listed in Table 3. All volunteers posted nearly equivalent baseline scores for each HPATHI item.

Multiple statistically significant relationships were found between specific HPATHI items and study participant profession/programme of study (see Table 4). For the item ‘Homeless people have the right to basic healthcare’, relative to the undergraduate group, the medicine group (consisting of both students and preceptors) increased by an additional 0.28 points (*SD*: 0.03, 0.52). For the item ‘Homeless people are lazy’, the undergraduate group posted the largest increase relative to the other groups (medicine; nursing; and physical therapy, occupational therapy, social work and

Table 3. Mean scores of HPATHI items pre- and post-volunteering.

HPATHI items	Pre-*M* (*SD*)	Post-*M* (*SD*)	Delta *M* (*SD*)	*p* value
1. Homeless people are victims of circumstance.	3.59 (0.87)	4.22 (0.72)	0.63 (1.06)	<.001
2. Homeless people have the right to basic health care.	4.56 (0.58)	4.85 (0.39)	0.29 (0.59)	<.001
3. Homelessness is a major problem in our society.	4.45 (0.67)	4.70 (0.49)	0.24 (0.69)	<.001
4. Homeless people choose to be homeless.	2.11 (0.82)	2.12 (0.80)	0.011 (1.02)	.003
5. Homeless people are lazy.	2.00 (0.87)	1.76 (0.69)	−0.24 (1.05)	.89
6. Health care dollars should be directed towards serving the poor and homeless.	4.01 (0.88)	4.45 (0.63)	0.45 (1.01)	.03
7. Health care providers should address the physical and social problems of the homeless.	4.26 (0.70)	4.65 (0.55)	0.39 (0.83)	<.001
8. Health care providers have a duty to care for the homeless.	3.96 (0.89)	4.44 (0.66)	0.48 (0.93)	<.001
9. Caring for the homeless is pointless since they do not follow up.	1.79 (0.84)	1.44 (0.68)	−0.33 (1.10)	<.001
10. Providing medical care for the homeless is futile.	1.94 (1.02)	1.54 (0.94)	−0.40 (1.42)	.017
11. I am comfortable working with a homeless person with a major mental illness.	3.55 (1.06)	4.02 (0.71)	0.47 (1.08)	.002
12. I feel comfortable being part of a team when providing care to the homeless.	4.31 (0.74)	4.72 (0.52)	0.41 (0.88)	<.001
13. I entered my field because I want to help those in need.	4.51 (0.57)	4.74 (0.47)	0.22 (0.67)	<.001
14. I enjoy addressing psychosocial issues with patients.	3.88 (0.89)	4.25 (0.82)	0.37 (1.07)	.002
15. I am interested in working with the underserved.	4.33 (0.69)	4.55 (0.64)	0.22 (0.75)	<.001
16. I resent the amount of time it takes to see homeless patients.	1.67 (0.77)	1.52 (0.80)	−0.15 (1.02)	.004
17. I enjoy learning about the lives of my homeless patients.	4.34 (0.58)	4.62 (0.55)	0.28 (0.69)	.10
18. I believe social justice is an important part of health care.	4.34 (0.64)	4.59 (0.62)	0.25 (0.84)	<.001
19. I believe caring for the homeless is not financially viable for my career.	2.21 (0.90)	2.01 (0.93)	−0.19 (1.10)	.005

HPATHI: Health Professional Attitude Towards the Homeless Inventory.

Table 4. Association between volunteer demographics and change in specific HPATHI item scores pre- and post-volunteering.

Variables	2. Homeless people have the right to basic health care.		5. Homeless people are lazy.		8. Health care providers have a duty to care for the homeless.		11. I am comfortable working with a homeless person with a major mental illness.		18. I believe social justice is an important part of health care.	
	Beta (95% CI)	*p* value	Beta (95% CI)	*p* value	Beta (95% CI)	*p* value	Beta (95% CI)	*p* value	Beta (95% CI)	*p* value
Number of shifts										
1–2					Ref		Ref		Ref	
3–4					0.28 (−0.12, 0.68)	.17	0.58 (0.12, 1.03)	.013	0.15 (−0.25, 0.54)	.46
⩾5					0.70 (0.21, 1.18)	.005	0.38 (−0.16, 0.92)	.17	0.44 (−0.04, 0.92)	.075
Programme										
Undergraduate	Ref		Ref							
Medicine	0.28 (0.03, 0.52)	.027	−0.68 (−1.13, −0.21)	.005						
Nursing	0.22 (−0.04, 0.48)	.10	−0.42 (−0.91, 0.07)	.09						
Physical therapy, occupational therapy, social work, public health	0.13 (−0.15, 0.40)	.35	−0.43 (−0.94, 0.09)	.10						

CI: confidence interval; HPATHI: Health Professional Attitude Towards the Homeless Inventory.

public health). However, the only statistically significant relationship was the medicine group increasing by 0.68 fewer points (*SD*: −1.13, −0.21) relative to the undergraduate group.

After controlling for other variables and selecting participants who completed one to two shifts as a reference point, participants who completed ⩾5 shifts scored 0.70 more points (*SD*: 0.21, 1.18) of improvement on the item 'Health care providers have a duty to care for the homeless'. This relationship was statistically significant. For the item 'I believe social justice is an important part of health care', participants who completed ⩾5 shifts scored 0.44 more points (*SD*: −0.04, 0.92) relative to participants who completed one to two shifts. Although this relationship was not statistically significant, it was considered to be of substantive significance. For the item 'I am comfortable working with a homeless person with a major mental illness', relative to the participants who completed one to two shifts, the group that completed three to four shifts increased by 0.58 more points (*SD*: 0.12, 1.03). However, the relative increase of 0.38 more points by the participants who completed ⩾5 shifts was not statistically significant.

Discussion

This study demonstrates the impact of volunteering in a street medicine programme on attitudes towards and perceptions of individuals experiencing homelessness. To our knowledge, this is one of the first studies to investigate this question. Our results indicated that volunteering in this street medicine programme yielded significant improvements in attitudes towards and perceptions of individuals experiencing homelessness. According to our data, this improvement was similar among all participants and, for certain HPATHI items, was affected by the number of shifts completed.

These findings are congruent with those from previous studies highlighting the positive impact that service learning experiences in homeless medicine have on attitudes towards and perceptions of the homeless population. In these studies, nursing students, medical students and internal medical residents who participated in homeless health service learning opportunities demonstrated more positive attitudes towards the homeless population than their peers who did not participate in these opportunities (Buchanan et al., 2007; Gardner and Emory, 2018; Lester and Pattison, 2000). However, our study is one of the first to include other professions, including physical therapy, occupational therapy, social work and public health, as well as demonstrate the positive effect that a homeless health service learning opportunity such as a street medicine programme can have on attitudes towards individuals experiencing homelessness. It should be noted that these previous studies have not used the HPATHI tool but instead other tools such as the ATHQ and ATHI. Future studies should compare these tools with the HPATHI to determine which tool is superior at detecting improvement in attitudes towards the homeless population.

Interestingly, our results showed that the medicine group experienced the greatest improvement in the item 'Homeless people have the right to basic healthcare', whereas the undergraduate group yielded the greatest improvement in the item 'Homeless people are lazy'. In our street medicine outreach events, the medicine volunteers generally spend the most time with patients, providing opportunities to learn the importance of health equity and expand their perspectives. The changed perception by undergraduates that the homeless population is not lazy reflects the increased compassion expressed by the general population towards individuals experiencing homelessness over the past few decades (Tsai et al., 2017).

Our results demonstrated an exposure–response relationship for all volunteers between the number of shifts completed and the belief that health care providers have a duty to care for individuals experiencing homelessness. This suggests that incremental increases in exposure to the homeless population augmented the sense of commitment to service that volunteers had for this population. These findings align with the findings of Davies and Wood (2018) that as volunteers learned more

about the challenges that individuals experiencing homelessness face when attempting to access health care, such as affordability, difficulty contacting services, medication security and transportation, they realised their role in helping this underserved population overcome these barriers.

Similarly, there was an association between the number of shifts completed and increased belief that social justice is an important part of health care. This association was considered to be of substantive significance because it highlighted that as our volunteers increasingly interacted with the homeless population, they started to understand the significance of addressing social needs to promote health equity. This is important because 'the social conditions in which people are born, live and work are the single most important determinants of good health or ill health' (World Health Organization, 2008). Based on these findings, street medicine programmes can serve as vehicles through which volunteers learn about the social determinants of health in a clinical context and expand their social consciousness.

In recent years, there has been a growing emphasis on human rights as a guiding value for outreach work targeting marginalised and underserved populations. Such a perspective focuses on developing programmes and interventions that are empowering and identifies the realisation of human rights as their ultimate goal (United Nations Population Fund, 2014). The Universal Declaration of Human Rights has detailed five categories of human rights: civil, political, social, economic and cultural (UN General Assembly, 1948). In relation to the homeless population, social rights are most relevant. Social rights are 'an adequate standard of living for himself and his family, including adequate food, clothing and housing' which are protected by the International Covenant on Economic, Social and Cultural Rights (UN General Assembly, 1966: 4). According to Eide (2006), social rights are rights which enable human beings to exist in society at a specific minimum level. Social rights, along with the other interrelated rights, are individual rights and are the birthright of every human being (Office of the United Nations High Commissioner for Human Rights, 2008). For individuals experiencing homelessness, lack of provision of housing is a human rights and social rights violation. The protection of social rights is essential to uphold human dignity (Office of the United Nations High Commissioner for Human Rights, 2008).

Although social rights may appear on the surface to be different from other human rights, the realisation of all human rights is interlinked (Office of the United Nations High Commissioner for Human Rights, 2008). For example, it is more difficult for an individual to secure employment or exercise their political rights when they are living on the street. This highlights the importance of spreading awareness about and exposing society to human rights violations to not only shift perspectives but also inspire change. In addition, Moyn (2018) has explicitly linked human rights with social justice, demonstrating that a human rights approach cannot be disconnected from broader challenges to attaining social justice.

Accordingly, street medicine programmes can be incorporated into the curricula of health care and social work programmes to ensure that future professionals in these fields acquire the skills to provide competent care and promote justice within the health care system. This will not only help reduce the stigma towards the homeless population, which may result in improved health outcomes (Gilmer and Buccieri, 2020), but also may inspire future health and social care professionals to work with the homeless population. The homeless population has a documented history of unmet health (Baggett et al., 2010) and social (Omerov et al., 2020) needs that require attention from non-judgemental professionals who will treat individuals empathetically and justly.

Health care and allied health students are uniquely positioned to observe and model the attitudes, behaviours and approaches demonstrated by preceptors during service provision allowing them to determine effectiveness of their approaches within an environmental context. Bandura's social learning theory aligns with the opportunities for professional development provided in a street medicine service learning programme. The cornerstones of Bandura's social learning theory

such as attention, retention, reproduction and motivation (Horsburgh and Ippolito, 2018) were also reflected in the progression of skill development observed in volunteers engaged in Street Medicine Phoenix outreach events.

Limitations

The results of this study should be considered in the context of several limitations. Our results are not necessarily applicable to other street medicine programmes due to variability between programmes, including differences in the professions represented and outreach settings. That being said, a commonality feature of street medicine programmes is exposure to and experience caring for people experiencing homelessness, which is likely the most impactful predictive factor, rather than the structure of the programme itself. Thus, results of our study may remain relevant and generalisable from this perspective.

Another potential limitation derives from the fact that the HPATHI tool was originally tested on and validated only for medical students, residents and physicians (Fine et al., 2013). It is not known whether the results are valid for other professions/programmes of study, such as nursing and undergraduates, who comprised most of this study sample. In addition, due to reporting bias, participants may have felt obliged to report favourable results because they were affiliated with Street Medicine Phoenix and felt loyalty to the programme.

Since there was no control group to this study, it is difficult to delineate whether the participants' improvements in HPATHI items were due to volunteering in our street medicine programme, general progress through the training programme, which sometimes provides exposure to the homeless population, or a combination of the two.

Another limitation related to variability in outreach settings and team composition. Settings included encampments on the street, a church and a homelessness shelter, which affect the dynamics of an encounter with homeless patients. In addition, the small sample size complicated the ability to perform effective sub-group analysis and to determine whether participant characteristics, such as profession, affected attitudes towards and perceptions of the homeless population.

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