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Meeting Patients Where They Are: Evaluating a Student-Run, Shelter-Based Model for Connecting Homeless Patients with a Medical Home

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Abstract

Background: Substantial barriers exist between persons experiencing homelessness and the health care system, which contributes to significant health disparities. Innovations to connect patients to long-term primary care via the 'medical home' model have had mixed results. This study evaluates the effectiveness of an innovative, student-run, shelter-based clinic model that leverages its onsite location to link patients to a medical home.
Methods: A retrospective chart review of patient visits at two shelter-based, student-run clinics between October 1, 2016 and October 1, 2017 was performed. Data collected included demographics, health risk factors, medical histories, and visit chief concerns. Patients referred to a medical home were assessed for successful follow-up at that location within 90 days. Successful medical home follow-up attendance was modeled using multivariable logistic regression with backwards elimination and a significance threshold of $p<0.05$.
Results: Within 90 days of referral, 30% of all patients referred to the medical home successfully attended a follow-up appointment, with 57% of new patients attending more than one appointment in the same time interval. Among patients who received referrals, those with a mental health related chief complaint were significantly more likely to follow-up at a medical home than those with other chief complaints ($p=0.024$). Medicaid insurance status negatively predicted successful follow-up ($p=0.041$).
Conclusions: Student-run free clinics in locations that access vulnerable populations can be effectively used to link patients to medical homes. A better understanding of these factors may provide insight into how to help patients access a medical home and establish longitudinal care.

Background

Student-run medical services often target underserved patient populations, allowing students to address unmet needs while gaining clinical skills and essential understanding of social determinants of health. As of 2017, an estimated 553,742 people in the United States (US) experience homelessness on any given night, and the prevalence of homelessness across high-income countries is still increasing.[1,2] A variety of factors, ranging from demographic characteristics and social structure to living conditions and availability of community resources, contribute to disproportionate illness burden and unmet health care needs among persons experiencing homelessness.[3-6] Additionally, persons experiencing homelessness have a 3.5 times higher age-adjusted mortality rate than persons not experiencing homelessness, with their average age of death being in the mid-50s.[7-9]

In the US, most coordinated efforts to care for

persons experiencing homelessness has been through the US Health Resources and Services Administration's (HRSA) Health Care for the Homeless (HCH) services.[10] Based on the Behavioral Model for Vulnerable Populations, these programs predominantly use the 'medical home' model of care, which consists of multidisciplinary teams providing a wide array of medical and non-medical services that are tailored to address their patient population's unique needs. This model reduces emergency department use and hospitalizations.[11,12] However, care for persons experiencing homelessness is still often characterized by higher rates of inpatient hospitalizations, longer hospital stays, and an underutilization of ambulatory care services such as primary care.[13-16]

Innovations to bridge the gap between homeless patients' lives and medical homes have produced varied outcomes.[17] One pattern that has emerged from these efforts is that establishment of longitudinal care is most likely to occur and be effective when structured systems are in place and each step is tailored to the patient populations' needs.[17-20] The unique student-driven model proposed here was designed to emphasize both of those factors in the context of persons experiencing homelessness.

In this paper, we evaluate a model of providing initial assessment and care where people experiencing homelessness already are via a student-run, shelter-based clinic. During this initial assessment and care, a system can be put in place to effectively refer patients to a more complete medical home for longitudinal care and tailored services. This study seeks both to evaluate the ability of such shelter-based, student-run free clinics to connect patients to a medical home and to better understand factors affecting successful follow-up in this population. Better understanding the role(s) student-run clinics can play in the surrounding medical landscape has the potential to improve clinics' ability to address barriers to care for their patients.

Methods

Clinical Setting

Tulane University School of Medicine operates student-run clinics at two men's emergency homeless shelters in New Orleans, Louisiana. The clinics act as intermediaries between patients and HCH of New Orleans. Care at the student-run clinics is provided by medical students and a supervising physician and includes point of care health screenings, free over-the-counter medications, prescription medications, and referrals for further care and services. Assessments and plans, including the need for referrals, are discussed with the supervising physician. When a referral to HCH is clinically indicated, the patient is counseled on HCH's services, given options for scheduling appointments, and given directions to two HCH locations nearby. Patients with phones are asked if they would like HCH to call them to schedule an appointment. Due to the retrospective nature of the study, no specific clinical criteria were used to indicate need for HCH referral.

HCH of New Orleans is a federally qualified health center (FQHC) providing primary health care services to adults in the city of New Orleans and surrounding parishes regardless of ability to pay for services. Having operated for over 20 years, HCH's role in the New Orleans community has grown with services that encompass primary care, dentistry, social work, laboratory, and pharmacy. During the study period, HCH of New Orleans had two locations near Tulane University School of Medicine's student-run, shelter-based clinics. Since the conclusion of this study, HCH of New Orleans' services have expanded to include two additional drop-in sites.

Data Collection

We conducted a retrospective chart review of patient visits at the student-run clinics between October 1, 2016 and October 1, 2017. Data was collected from the Tulane University Patient Assessment and Care Tracking (TuPACT) database, a student initiative to collect information about patient visits at student-run clinics. Following each clinic visit, the student clinic care team documented patient demographics, health risk factors, past medical history, and key objective findings and treatment plans for the encounter using REDCap (Research Electronic Data Capture) electronic data tools hosted at Tulane University.[21] REDCap is a secure, Health Insurance Portability and Accountability Act (HIPAA) compatible web application used to build and manage online surveys and databases.

This study was approved by the Tulane University Institutional Review Board.

Inclusion Criteria and Definitions

All patients who attended a clinic appointment and received medical services at either of two student-run homeless shelter clinics between October 1, 2016 and October 1, 2017 were included in the study. Patients who received a referral to HCH were followed for an additional 90 days to verify follow-up appointment attendance. "Successful" follow-up was defined as a patient attending an appointment at HCH within 90 days of receiving an HCH referral from a student-run clinic. History of prior HCH appointments before receiving a referral from the student clinic was also recorded.

Statistical Analysis

Analysis was conducted using SAS University Edition 9.3 (SAS, Cary NC). Bivariate analyses were performed using Chi-square and Fisher's exact tests with a significance threshold of $p<0.05$. Successful HCH follow-up attendance was modeled using multivariable logistic regression with backwards elimination and a significance threshold of $p<0.05$. Covariates included in this model were gender, race, ethnicity, homelessness, insurance status, past medical history, substance use, and visit chief complaint (categorized by body system). Due to incomplete data on patient history of incarceration and education level, these two variables were excluded from the model.

Results

Study Population

Our study population included 207 patients. Of these, 92.6% were male and the average age was 51.7 years. In terms of race, 58.5% of patients were Black/African American and 34.8% were White/Caucasian (Table 1). Hispanic/Latino ethnicity was reported by 2.4% of patients. Homelessness was self-identified by 91.8% of patients. A quarter of patients reported a history of prior incarceration, and a third of patients reported receiving their high-school diploma or general educational development certificate. The most common health care insurance reported was Medicaid (37.7%), while 13.0% of patients were uninsured and 13.0% did not know their insurance status.

The most common medical conditions reported were hypertension (35.7%), psychiatric conditions (24.6%), and hepatitis C (11.1%) (Table 1). Patients also reported smoking/tobacco use (47.8%), alcohol abuse (13.5%), and illicit drug use (8.4%). Of the chief complaints reported, musculoskeletal symptoms were the most common, with 25.4% reporting these symptoms. Ear, nose and throat related symptoms were also common (20.9%), followed by respiratory symptoms (11.9%). Mental health chief complaints were reported by 7.5% of patients.

Referral to Primary Care

Of all the patients evaluated, 27.0% received a referral to HCH (Table 2). Of the patients who received referrals, 21.4% had attended prior appointments at HCH. Within 90 days of referral, 30.4% of patients referred to HCH successfully attended a follow-up appointment (Table 2). Of the patients who successfully attended an appointment, 82.4% were new to HCH. Additionally, of the patients new to HCH who successfully attended a first appointment, 57% (n=8) attended two or more HCH appointments within 90 days with one patient attending five appointments in 90 days.

Factors Associated with Referral and Follow-up

We included 193 individuals in the multivariable logistic regression model. Incomplete records (n=14) were excluded. After controlling for demographic factors and comorbid conditions, patients with mental health related chief complaints had 4.50 times the odds of receiving a referral to HCH than those with other chief complaints ($p=0.045$, Table 3). Among patients who received referrals, those with a mental health related chief complaint had 26 times the odds of following up at HCH than those with other chief complaints ($p=0.024$). Those who had Medicaid had 89% lower odds of following up at HCH than those with alternate or no insurance ($p=0.041$). No other variables were found to significantly impact referral or successful follow-up.

Discussion

Tailored care via the 'medical home' model has proven to be an effective strategy to address

Table 1. Self-reported demographics, health risk factors, past medical history, and most common chief complaints

Characteristic	N*	%†
Race		
Black/African American	121	58.5
White/Caucasian	72	34.8
Other	5	2.5
Ethnicity		
Hispanic/Latino	5	2.4
Not Hispanic/Latino	155	74.9
Homelessness		
Yes	190	91.8
No	14	6.8
Insurance Status		
Medicare	29	14.0
Medicaid	78	37.7
Uninsured	27	13.0
Veterans Affairs	4	1.9
Other	15	7.2
Past Medical History		
Hypertension	74	35.7
Psychiatric conditions	51	24.6
Diabetes	17	8.2
Coronary artery disease	4	1.9
Asthma	15	7.2
Hepatitis C	23	11.1
Chronic obstructive pulmonary disease	19	9.1
Human immunodeficiency virus	3	1.4
Other	11	5.3
Substance Use		
Smoking/tobacco	99	47.8
Alcohol abuse	28	13.5
Illicit drug use	38	18.4
Chief Complaints		
Musculoskeletal	53	25.4
Ear, nose, and throat	43	20.9
Respiratory	25	11.9
Mental health	16	7.5

*N may not add up to total population size due to missing values, multiple entries per patient
† % may not add up to 100 due to missing values

Table 2. Characterization of patients that received HCH referral

Patient Categories	n	%
Overall (N=207)		
Patients referred to HCH	56	27.0
Among patients referred to HCH (N=56)		
Prior HCH appointment	12	21.4
Successful HCH attendees	17	30.4
Among successful HCH attendees (N=17)		
Those with no prior HCH appointment	14	82.4
Those with prior HCH appointments + new referral	3	17.6
Among patients who did not follow-up (N=39)		
Those with no prior HCH appointment	30	76.9
Those with prior HCH appointments + new referral	9	23.1

many factors that impact homeless patients. However, many barriers remain, making it difficult for patients to access this care. Two of Tulane University School of Medicine's student-run free clinics are in homeless shelters, placing them in ideal locations to provide access to this vulnerable population. This study sought to evaluate the effectiveness of using a student-run free clinic to link persons experiencing homelessness to a 'medical home' and to better understand factors affecting referral and successful follow-up in this population.

When referred to HCH, nearly one-third of patients successfully attended follow-up appointments within 90 days. While the follow-up rate could be improved upon, this finding was promising given the barriers that persons experiencing homelessness face. Many of these patients had never been to HCH before, suggesting that the referral from the shelter-based clinic may have contributed to presentation at HCH. Furthermore, over half of patients referred to HCH with no prior history of HCH appointments attended more than one appointment within 90 days. This suggests that new patients are successfully establishing longitudinal care at the medical home.

One factor associated with successful follow-up was the presence of a mental illness related chief complaint. This is a noteworthy finding as other studies have shown that individuals with mental illness access primary care less frequently than patients without mental illness, resulting in an increased mortality rate.[22] A study among persons experiencing homelessness found that for persons with severe psychiatric symptoms, a homeless-tailored service design was signifi-

Table 3. Characteristics associated with referral and successful follow-up

Characteristics associated with referral to HCH	**OR (95% CI)**	**p**
Mental health related chief complaint	4.50 (1.00, 19.60)	0.045
Characteristics associated with successful HCH follow-up		
Mental health related chief complaint	26.31 (1.50, 500.00)	0.024
Medicaid	0.11 (0.01, 0.90)	0.041

OR: odds ratio; CI: confidence interval

cantly associated with a more favorable primary care experience.[23] Consequently, connecting these patients with longitudinal primary care and the other tailored services at a medical home has the potential to be particularly impactful.

This finding also highlights the need for further mental health screening. History of a pre-existing psychiatric condition had no association with HCH follow-up, nor was there an association with other system-based chief complaints. Thus, acute concerns for psychiatric symptoms may be the differentiating factor increasing likelihood of follow-up. Additional research could investigate whether screening for acute psychiatric illness assists patients in establishing long-term medical care. This result further suggests that health care providers, including those at student-run clinics, need to better understand how decisions are made to refer patients to different mental health resources.

Medicaid insurance coverage was negatively associated with successful HCH follow-up. Medicaid expansion in Louisiana began in July 2016, shortly before the beginning of this study.[24] It is possible that as patients become enrolled and learn to access care options under their new coverage, they are more likely to seek care at other venues. This emphasizes the importance of tailoring referrals to each patient, which includes considering the patient's insurance coverage and which providers they already or would like to see.

Furthermore, this study provides an example of a student-run clinic model designed within the context of the larger medical landscape in which it is located. Student-run clinics operate in a variety of clinical and physical contexts, with a wide spectrum of available resources. As a result, it can be challenging to find a clinic model that best utilizes these factors while balancing the goals of patient care and medical education. The innovative model described here leverages the on-site location of shelter-based clinics to address significant barriers to care and give students the opportunity to gain essential clinical and health system navigation skills. Such a model requires limited resources and could be modified to match other clinical and physical contexts.

This study is not without limitations. Findings may not be generalizable beyond homeless shelter-dwelling men seeking care at a shelter-based clinic. The small sample size is also a limitation, as is the retrospective nature of this study which limited the completeness and scope of the data. Additionally, our data did not indicate if individuals sought care outside of HCH in proximity to the student-run clinic visit. Our regression model did not account for non-independence of observations for patients who had multiple visits with the student-run clinics. Accounting for this would increase the standard errors but would not diminish the magnitude of the effect estimates or their clinical significance.

At the time of the study, the student-run clinics had not adopted clinical guidelines or protocols to guide decisions regarding referral to HCH or other community resources. As there also was no system or structure in place to understand why clinic care teams make these decisions, confounding variables may exist. Further evaluation of these decisions and development of such processes are ongoing areas of interest with potential to improve how our model bridges the gap between the student-run clinics and medical homes. Another major component of future efforts to improve access to care involves further investigation of the barriers that exist. Over half of the patients in the study population were insured; however, despite insurance coverage, barriers to care undoubtedly still exist for these patients. A better understanding of these barriers will allow clinics to more effectively tailor interventions to improve access to a medical home.

Though further study is warranted, our results suggest that student-run clinics located in homeless shelters have a unique potential to link persons experiencing homelessness, especially those with mental-health related symptoms, to long-term medical homes. Better understanding of the role student-run clinics can play in the larger medical landscape has the potential to improve clinics' ability to address barriers to care for their patients.

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Disclosures

The authors have no conflicts of interest to disclose.

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