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Original Study

Increasing Patient Activation at a Student-Run Free Clinic: Effectiveness of a Health Education Intervention

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Abstract

Background: Free clinics can serve as an important source of health information among underserved populations; however, it is difficult to track the effectiveness of health education interventions for these patients. Thus, the objective of our study was to develop and assess the impact of a health education intervention in a student-run free clinic setting.
Methods: A quality improvement project was implemented in which surveys were used to assess four confidence and knowledge measures among patients who did or did not receive health education from undergraduate volunteers. Statistical significance was determined using student's t-tests.
Results: Patients who received health education from undergraduate volunteers during clinic visits reported increased confidence in their ability to manage health conditions ($p<0.01$), knowledge of their prescribed medications ($p<0.05$), and ability to manage their symptoms ($p<0.05$) after clinic visits compared to before their clinic visits.
Discussion: Dedicated health education interventions by undergraduate volunteers during free clinic visits can lead to increased patient confidence and knowledge of their health conditions. Due to their iterative nature and ease of implementation, quality improvement frameworks may be a useful way to track the efficacy of health education programs in the free clinic setting.

Introduction

Arbor Free Clinic

In the United States, free clinics offer an important avenue of healthcare for individuals who otherwise have limited access to care, and can offer a variety of services ranging from preventative care to more specialized services.[1-3] As an important access point to the healthcare system, free clinics can also represent a unique opportunity for targeted health education interventions for individuals who might otherwise have no venue to receive this information.[1,4,5] Despite this, due to the transient nature of the care given at free clinics, it is often difficult to track the effectiveness of such health education interventions on health outcomes among patients.[5]

Patient activation is defined as patients' understanding of the actions for which they are responsible regarding their own health and care.[6] Tools measuring patient activation quantify a patient's level of activation for his or her specific health condition using a developmental model of "activation" that encompasses four stages: (1) believing that their role is important, (2) having the confidence and knowledge necessary to take action, (3) actually taking action to improve one's

health, and (4) having the ability to stay the course even under stressful circumstances.[7]

Patient Activation Measure (PAM) scores have been shown to be predictive of patient satisfaction and a number of health behaviors and health outcomes for patients with chronic conditions.[8-13] For example, more activated patients have been shown to participate more regularly in health prevention screenings and in healthy behavior practices such as regular exercise and healthy diets.[12] Less activated patients, conversely, are more likely to delay medical care, go without care for unmet needs, and have higher rates of hospital utilization.[10,11] PAMs have been adopted by a range of healthcare organizations as a metric to track patient activation for patients with chronic conditions. Due to the high coefficients for precision and reliability across PAM measures, they have also been recommended for individual-level use, including in the clinic setting.[7] However, they have not yet been studied in the free clinic setting.

In this quality improvement (QI) project, an integrated training course was implemented for undergraduate health education volunteers on a variety of topics in order to improve the health education intervention component of free clinic visits. Improvement in the patient confidence and knowledge of their conditions was then tracked by using four measures tailored from existing Stage 2 PAMs (having the confidence and knowledge necessary to take action)[7] among patients who did and did not receive a health education intervention before and after their clinic visits. This represents the first time that confidence and knowledge measures adapted from the patient activation literature have been used in a QI project to assess any intervention in a free clinic setting.

Methods

Clinic Description

Arbor Free Clinic is a student-run free clinic that offers screening, preventative health, and referrals services to medically underserved, uninsured/underinsured, and/or low-income adults in Menlo Park, California. The clinic is open on Sunday and operated by undergraduate and medical students, residents, and faculty from Stanford University School of Medicine.

Health education is delivered in several ways to patients throughout clinical encounters. Residents provide generalized health education throughout the clinic visit, and the majority of patients receive an additional, tailored health education session with an undergraduate volunteer. Whether or not a patient receives a health education session with an undergraduate volunteer depends on several factors, including the number of undergraduates volunteering during the clinic shift, clinic workflow and volume of patients, and availability of undergraduate volunteers who have fully completed the health education training program. The health education program is centered around improving patients' understanding of how to manage chronic health conditions via dietary, lifestyle, and behavior modifications.

Health Education Volunteer Training

Prior to volunteering independently at Arbor Free Clinic, all undergraduate and non-medical graduate student volunteers are required to complete a training course. Topics include cultural humility and implicit bias in healthcare; free clinics in the context of American healthcare delivery; motivational interviewing and patient advocacy; role-specific training; and signs, symptoms, and lifestyle management of common chronic conditions. The course is lecture-based, with physicians as guest lecturers for ten 80-minute sessions. The curriculum includes an introductory session, three weeks of role-specific training, and six weeks of basic health education integrated with techniques in motivational interviewing and behavior change. Undergraduates first complete one seven-hour training shift during which they observe an experienced volunteer deliver health education. During their second shift, trainees are supervised by an experienced volunteer and receive feedback. Following the second shift, undergraduates are considered fully trained unless areas of growth are identified by the supervising volunteer.

In January 2017, a new health education curriculum was implemented focusing on management of the most common chronic illnesses seen in the clinic's patient population. In this course,

Figure 1. Confidence and knowledge measures administered in pre- and post-clinic visit surveys

Confidence and knowledge measures were surveyed in the domains of health management, medication knowledge, lifestyle changes, and symptom management.

undergraduate volunteers learn appropriate pathophysiology, health education, and behavioral modification recommendations for tobacco and alcohol use, diabetes, hypertension, obesity, and hyperlipidemia. Instruction is provided by faculty physicians at Stanford School of Medicine, and practice is completed using peer role-play exercises.

For patients who are heavy drinkers or smokers, undergraduate volunteers encourage cessation or use reduction.[14] For patients with diabetes, volunteers inform them about their diagnosis, disease severity, and treatment plans. They are prepared to teach patients about the difference between type 1, type 2, and gestational diabetes, and to review hemoglobin A1c, blood pressure, and cholesterol measures. For patients with hyperlipidemia, undergraduate volunteers are taught to review dietary sources, classification of fats, and complications associated with poorly controlled hyperlipidemia.

Finally, volunteers are taught to review physical activity, dietary, and exercise guidelines with patients for reduction of cardiovascular risk.

Service Delivery

Health education sessions are delivered in the time between the medical student encounter and supervising physician encounter. Volunteers are trained to ask and answer questions and provide tailored didactic information, with accompanying visual aids as needed, regarding the chronic health conditions and behaviors described above. For patients with multiple conditions, volunteers identify the educational topics that are of most interest to the patient and counsel them within the time allotted. Details of the treatment plan are provided with the resident and/or attending. For patients with limited English proficiency, on-site interpreter services are provided for Spanish and Mandarin, and telephone interpreter services are provided for en-

counters in all other languages. Printed infographics with summary information are available in multiple languages.

Confidence and Knowledge Metric Selection: The SMART Framework

To assess improvements in patient confidence and knowledge of their health conditions, metrics were created using the SMART paradigm, in which QI project managers develop metrics that are Specific, Measurable, Achievable, Relevant, and Time-bound to their project goals.[15] The identified SMART goal was to improve patient confidence and knowledge, defined via measures adapted from the PAM literature, in the four domains addressed by the education intervention (health management, medication knowledge, lifestyle changes, and symptom management) in two years following curriculum implementation.

The four measures created for the survey are shown in Figure 1. These measures were chosen because they reflect confidence and knowledge in actions and beliefs that were the specific targets of the health education intervention. Although use of the full 13- or 22- PAM questionnaires was considered, as these have been validated in the literature, doing so would have captured information in domains not relevant to the health education intervention or to the free clinic setting generally, and thus would have been inappropriate to use for QI purposes.

Administration and Collection of Survey Data

Surveys containing these four confidence and knowledge measures were administered from August 2018 to June 2019 to all clinic patients before and after their clinic visits. These surveys assessed (1) whether patients participated in the dedicated health education session and (2) the four measures on a 7-point Likert scale from "strongly disagree" to "strongly agree."

Surveys were administered through an online system to patients before and after their clinic visits. During the initial patient intaking with undergraduate volunteers, pre-clinic surveys were administered on a clinic computer with the help of an interpreter if required. At the end of clinic visit, patients were directed to additional undergraduate volunteers, who provided referrals to primary care and specialty services and administered the post-clinic survey.

Table 1. Demographics of patients seen at Arbor Free Clinic, 2017-2018

Characteristic	N (%)
Age (N=852)	
Years, mean ± SD	51.9±17.2
Years, range	20.0-88.8
Sex (N=852)	
Female	398 (46.7)
Male	350 (41.1)
Unspecified	104 (12.2)
Primary Language (N=352)	
Chinese	85 (24.1)
English	126 (35.8)
Spanish	89 (25.3)
Other	52 (14.8)
Race/Ethnicity (N=116)	
African American	2 (1.7)
Asian	64 (55.2)
Hispanic/Latino	43 (37.1)
White	7 (6.0)

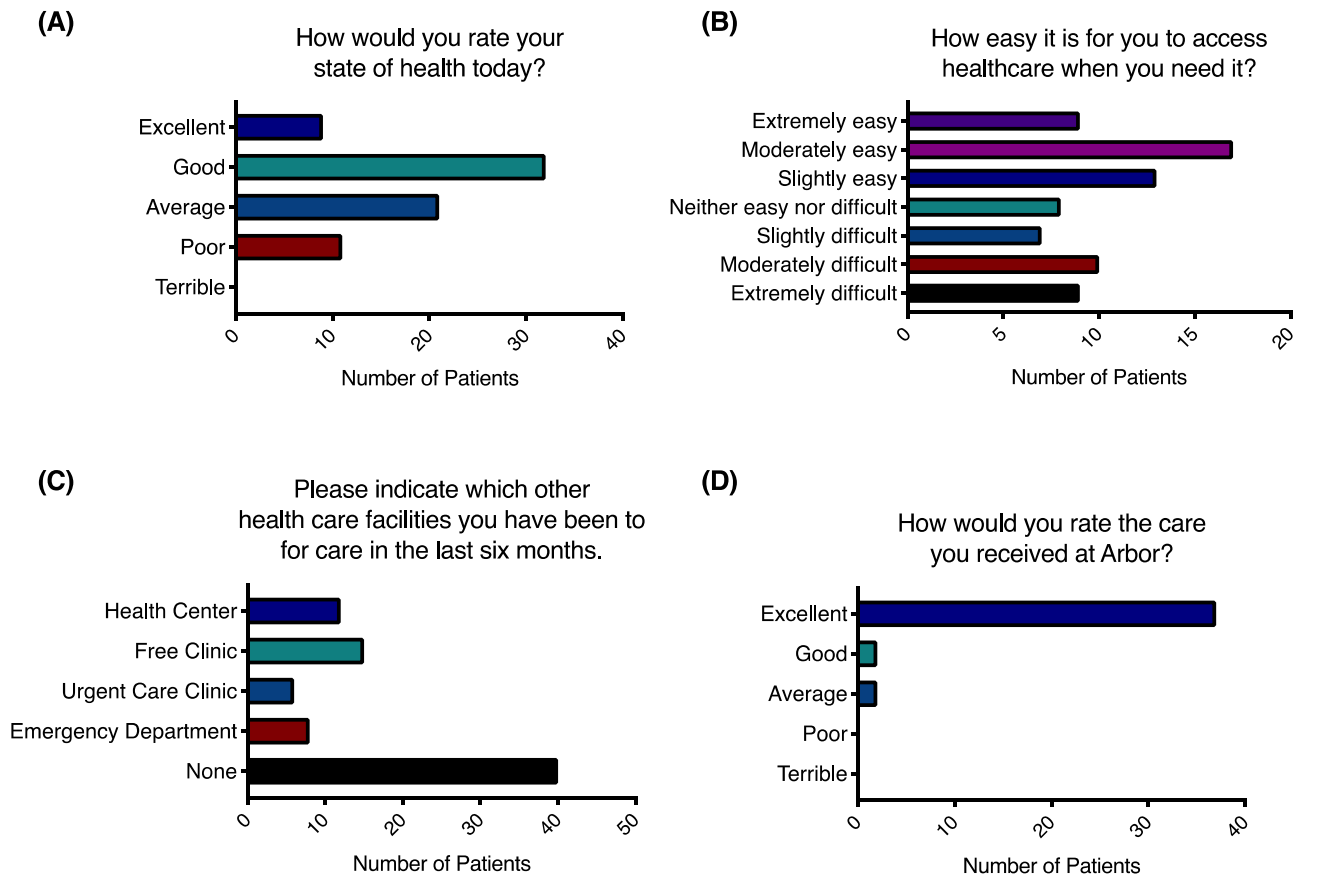
SD: standard deviation

Patient responses were coded on a scale from 0-6 as follows: 0 – Strongly disagree; 1 – Moderately disagree; 2 – Somewhat disagree; 3 – Neither disagree nor agree; 4 – Somewhat agree; 5 – Moderately agree; 6 – Strongly agree.[7] Scores were calculated by averaging the coded responses in each domain.

Statistical Analysis

Microsoft Excel (version 16.51, Microsoft, Washington) and Prism 8 (GraphPad, California) were used to perform statistics comparing PAMs among response groups before and after clinic visits. Paired student's t-test was used to define statistical significance (*$p<0.05$, **$p<0.01$, ***$p<0.001$) for the confidence and knowledge measures, as this analysis was comparing the same individuals before and after an intervention. The baseline pre-intervention differences between the health education and non-health education group were assessed using an unpaired student's t-test, as this comparison was between independent groups of individuals.

Figure 2. Self-reported health, access to care, and care satisfaction among Arbor Free Clinic patients



(A) 9 patients rated their health as "Excellent," 32 as "Good," 21 as "Average," 11 as "Poor," and 0 as "Terrible." (B) 9 patients found it "Extremely easy," to access healthcare when they needed it, 17 as "Moderately easy," 13 as "Slightly easy," 8 as "Neither easy nor difficult," 7 as "Slightly difficult," 10 as "Moderately difficult," and 9 as "Extremely difficult." (C) In the last six months, 12 patients had been to a health center, 15 to a free clinic, 6 to an Urgent Care Clinic, 8 to the emergency department, and 40 to no health care facility. Multiple responses from individual patients were tallied if they had been to >1 healthcare facility. (D) 37 patients rated their care at Arbor as "Excellent," 2 as "Good," and 2 as "Average."

Ethical Approval

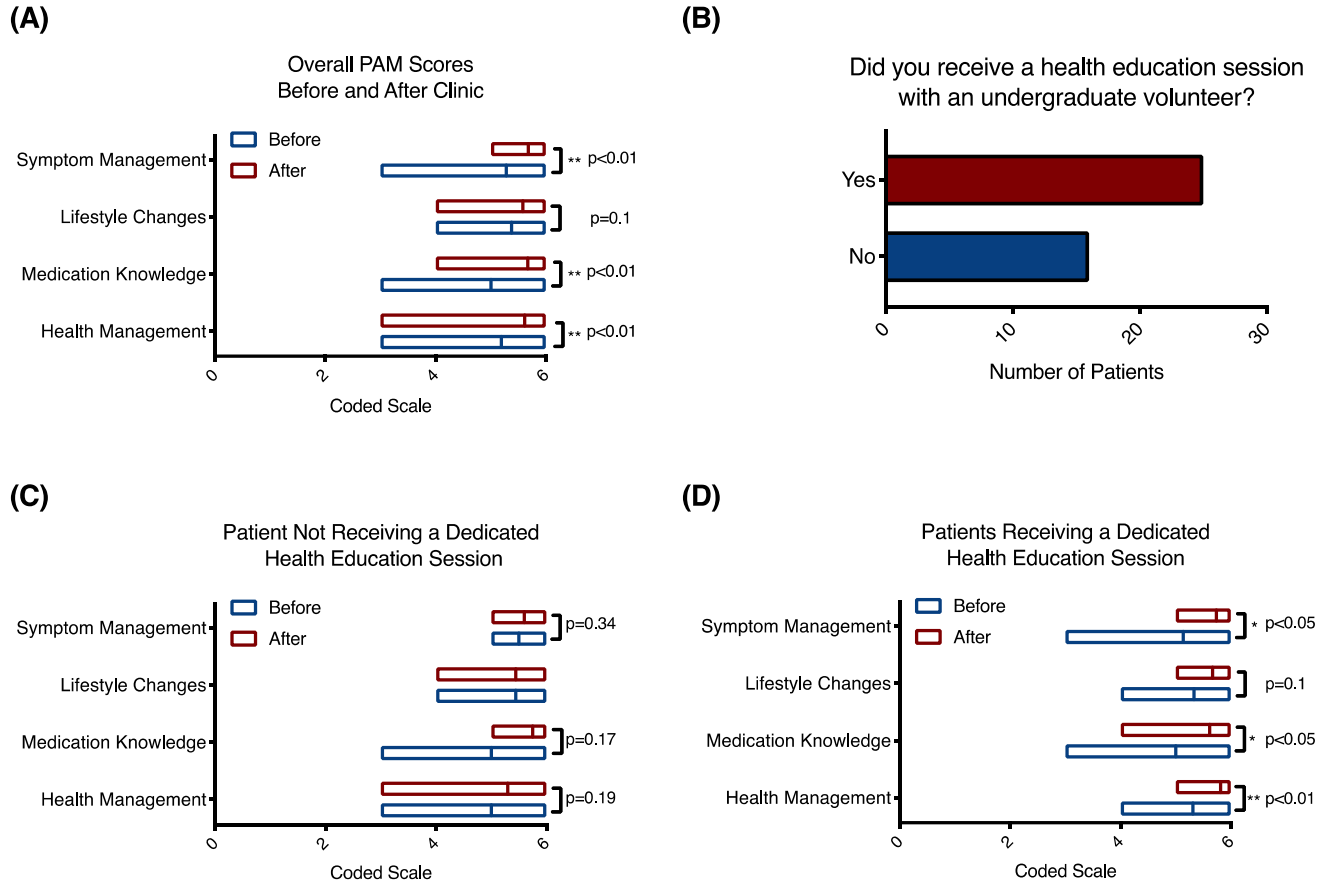
This project was submitted for review to the institution's institutional review board. Because the goal of this project was to improve the internal health education curriculum, and not to produce generalizable knowledge, it was deemed exempt from Human Subjects Research as a QI project (documentation available upon request). This is the institution's standard protocol for QI projects. It was clearly communicated to patients that the quality of care they received would not be impacted by their answers or willingness to fill out the survey, and that completing the survey was optional.

Results

Demographics

Demographics of the overall clinic's population from 2017-2018 are shown in Table 1. During the study period, 73 patients filled out the entire pre-clinic survey used to assess self-reported health and access to care, and 41 patients filled out the post-clinic survey to assess satisfaction with care. In the patient population, 38% were female, 59% were male, and 3% did not specify gender. The majority (73%) were comfortable with care being provided in English (Figure 2). Many of the patients (49%) had not visited any other health care facility in the past 6 months and 36% found it difficult to access necessary care.

Figure 3. Confidence and knowledge scores before and after the Arbor Free Clinic visit



(A) Among all patients, scores before and after the clinic visit: Health management (n=26): average 5.2 before, 5.6 after. Medication knowledge (n=21): 5.0 before, 5.7 after. Lifestyle changes (n=24): 5.4 before, 5.6 after. Symptom management (n=25): 5.3 before, 5.7 after. (B) Percent of patients who had a dedicated health education session. (C) Stratified scores among patients who did not receive health education: Health management (n=10): 5.0 before, 5.3 after. Medication knowledge (n=8): 5.0 before, 5.8 after. Lifestyle changes (n=9): 5.4 before, 5.4 after, p-value unavailable as there is no difference between groups. Symptom management (n=10): 5.5 before, 5.6 after. (D) Stratified scores among patients who received health education: Health management (n=16): 5.3 before, 5.8 after. Medication knowledge (n=13): 5.0 before, 5.6 after. Lifestyle changes (n=15): 5.3 before, 5.7 after. Symptom management (n=15): 5.1 before, 5.7 after.

Confidence and Knowledge Measures

Out of the 73 patients who filled out the pre-clinic survey and 41 who completed the post-clinic survey, 26 of these surveys were able to be matched successfully using patient initials and clinic date. Among all patients who filled out the survey, overall scores increased after the clinic visit, with significant increases in patient understanding of symptom management (5.3 vs 5.7, p<0.01), health management (5.2 vs 5.6, p<0.01), and medication knowledge (5.0 vs 5.7, p<0.01) (Figure 3A). No substantial difference was observed in the lifestyle changes domain.

Among those who completed a post-visit survey, 61% of patients indicated they received specific health education from an undergraduate volunteer (Figure 3B). There was no statistically significant difference in the baseline pre-clinic scores reported by those who received health education compared to those who did not. When further stratified by health education, no statistically significant increases in scores were observed for patients without a dedicated health education session (Figure 3C). Patients who received a dedicated health education session had a statistically significant increase in their scores for the medication knowledge (5.6 vs. 5.0, p<0.05), health (5.8 vs. 5.3, p<0.01), and symptom management (5.7 vs. 5.1, p<0.05) domains, but no change in the domain of lifestyle changes (5.7 vs. 5.3,

p=0.1) (Figure 3D).

Discussion

Compared to before their clinic visit, patients who received health education during their clinic visits were more likely to report increased confidence in their ability to prevent or minimize symptoms associated with their condition, increased understanding of how to manage their own health, and increased knowledge in their medication regimen. This suggests the health education intervention is associated with improvements in patients' overall self-reported confidence and understanding of their health, especially in the realms of symptom management, medications, and personal responsibility. In addition to continuing these health education intervention efforts, this knowledge further informs the clinic's future efforts by suggesting that QI methodology and SMART goals are an effective way to track interventions over time, providing a standardized toolkit for QI work.

This is also the first study to implement PAMs in the free clinic setting as a way to study the effectiveness of a health education intervention. The success in utilizing these measures suggest PAMs may also be useful in outpatient and free clinic settings where they have not been extensively studied. [11,13] Further studies are needed to validate their capability to monitor changes in patient behavior or health outcomes over the long-term.[13]

Prior work has demonstrated that involvement of undergraduate and pre-health students in a free clinic setting improves their understanding of the healthcare process and barriers to care for underinsured patients.[17] This study demonstrates that, with integrated and comprehensive training, undergraduate students are able to provide effective and meaningful education in a free clinic environment. Thus, this work provides an avenue to expand the role of premedical students in free clinics through delivery of health education to patients.

Limitations

This current study has several limitations. First, patients who did or did not receive health education were not randomized. However, health education intervention status was subject solely to clinic staffing availability and not on patient factors such as disease state or demographics; therefore, there is no reason to believe these groups differed from each other in meaningful ways. Second, only 26 surveys were able to be successfully matched between the pre-clinic and post-clinic surveys. It is possible that increases in patient activation may also be seen amongst those who did not receive specific targeted health education if this sample size was increased. Nevertheless, despite the limited sample size, a statistically significant improvement in PAMs was still observed within the health education patient cohort. Finally, four confidence and knowledge measures were adapted from the PAM literature. To date, PAMs have been validated using longer 22- and 13-question instruments; therefore, the adapted four-question survey may not demonstrate the same validity. However, the four metrics were specifically chosen based on their relevance to the free clinic setting and their utility in assessing the health education intervention, consistent with SMART goal methodology, and designed using the same four-point developmental model of activation as in the original PAM instrument.

Future Directions

As a result of this work, the clinic plans to expand the health education training program to include more specialized sessions regarding lifestyle modifications, as this was a domain in which a statistically significant increase was not observed after intervention. Based on prior literature, the training can be broadened to include more specific suggestions on smoking cessation, dietary recommendations, and physical activity. [18,19] The clinic will also track whether there are specific diseases or conditions in which additional health education proves to be particularly beneficial for patients. Other clinics are encouraged to implement similar interventions as part of their regular clinic visit routine, in effort to improve understanding of the effectiveness of various health education interventions in the free clinic setting.

Disclosures

The authors have no conflicts of interest to disclose.

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