Journal of Student-Run Clinics
Original Study

Promoting Oral Health through Manager Training and Dental Referral at a Student-Run Homeless Shelter Clinic

Tu Bui[1]; Tiffany B Kindratt, PhD, MPH[1,2]; Sumanth Reddy[3]; Patti Pagels, MPAS, PA-C[4]

[1]Department of Physician Assistant Studies, University of Texas Southwestern School of Health Professions, Dallas, Texas, USA
[2]Department of Kinesiology, College of Nursing and Health Innovation, University of Texas at Arlington, Arlington, Texas, USA
[3]University of Texas Southwestern Medical School, Dallas, Texas, USA
[4]Department of Family and Community Medicine, University of Texas Southwestern Medical School, Dallas, Texas, USA

Corresponding Author: Tiffany B Kindratt, PhD, MPH; email: tiffany.kindratt@uta.edu

Published: August 19, 2019

Abstract

Background: There is a need for oral health awareness among future clinicians and for dental services for homeless men. This quality improvement project aimed to: 1) improve oral health knowledge among physician assistant (PA), medical, and undergraduate student clinic managers; 2) determine the oral health needs of homeless men; and 3) establish a dental referral program for patients at a student-run free clinic.
Methods: The project was conducted at a student-run free clinic embedded in a men's homeless shelter in Dallas, Texas. Student managers underwent a training program that included a PowerPoint presentation and practice oral exams. Pre- and post-tests were used to assess their knowledge of different oral health topics. Patients of the clinic were surveyed for dental concerns at intake, and oral exams and referrals to a student-run dental clinic were done if indicated.
Results: Student clinic managers (N=16) demonstrated improved knowledge on the recognition and treatment of some but not all dental conditions. Of the patients surveyed (N=13), most reported a history of dental caries (77%), had loose or missing teeth (62%), and brushed their teeth <2 times per day (69%). Although 65% of patients were referred to the dental clinic, only 9% went to their appointment.
Conclusions: The manager training provided additional information and experience for clinic managers around oral health. The increased awareness made it easier for clinic managers to refer appropriate patients to the dental clinic. The newly implemented referral service provided a resource for the clinic to send patients that warrant higher level of dental care.

Introduction

Poor oral health can affect nutritional status, social, and physical well-being.[1-3] In 2000, severe periodontal disease affected 14% of adults ages 45-54 and 23% of adults ages 65-74.[1] Up to 22% of adults have experienced some type of oral pain within the past 6 months.[1] To provide patients with comprehensive medical care, oral health must be on the radar for medical providers. Many adults who suffer from these issues can also face negative social and financial effects that decrease their quality of life.[4] According to the Surgeon General Oral Health report in 2000, over 164 million hours of work are lost each year due to dental disease or dental visits.[3] Dental caries are common among all age groups in the United States and are largely preventable with good oral hygiene and routine dental care.[3] An underserved population that needs more access to good oral health and dental care is the homeless population in Dallas, Texas.[5]

In their 2016 point-in-time count, the Dallas Commission on Homelessness found that there were 3,810 people experiencing homelessness in the Dallas area.[6] Several of these individuals went to Union Gospel Mission for temporary housing. Calvert clinic is a student-run free clinic that is

attached to Union Gospel Mission shelter and addresses acute health care concerns. In addition to providing acute medical care to patients, the student-run free clinic serves as a practical learning environment for volunteer students.

Several patients that were seen at the student-run free clinic had oral health concerns and needed more comprehensive dental care. There was no formal system set in place to assess the need for dental services among the shelter population. There was also no structured dental referral program set in place for the patients at the clinic. There was a working relationship with another student-run dental clinic, but patients just received a referral with little follow up on whether they showed up at the dental clinic. And, there were limited abilities for medical and physician assistant (PA) student volunteers to diagnose these issues and make the appropriate referrals. PA students received two hours of training during their first year and medical students received five hours of training disbursed throughout their didactic curriculum.

Literature shows that including an oral health curriculum can increase students' knowledge and attitudes towards oral health.[4,7,8] For example, Berkowitz and colleagues evaluated the effectiveness of an oral health curriculum led by faculty, a dental fellow, and a dental student on improving PA students' knowledge and skills.[4] The curriculum included a 1-hour lecture on an overview of oral health concepts and a 1-hour clinical skills session in a clinical simulation setting.[4] PA students completed pre- and post-tests of knowledge and a post-test evaluating their oral health examination skills.[4] Statistically significant improvements were found in PA knowledge scores ($p<0.0001$) and the mean score on the skills examination was high (95%).[4] Forbes and colleagues also implemented the Smiles for Life curriculum with PA students, which included eight 45-minute online PowerPoint presentations.[8] In addition to assessing knowledge, they evaluate whether the Smiles for Life curriculum was effective at improving self-efficacy in performing exams and students' attitudes towards incorporating brief oral exams in their future practice.[8]

However, there is a gap in the literature on interventions designed to improve PA and medical student knowledge of oral health and referral systems for homeless men to receive dental/oral health services.

Through student education and a dental referral program, this project aimed to bridge primary care and dental care for the patients at Calvert clinic. Our objectives were to educate PA and medical student managers about common oral health diseases through a didactic presentation and physical training, assess oral health needs in homeless men, develop a referral system to a local student-run free dental clinic, and evaluate the outcomes of these interventions.

Methods

Design and Setting

The project was conducted at a clinic embedded in a men's homeless shelter managed by medical and PA students with a certified PA medical director. The shelter housed over 335 residents at capacity, with residents staying a minimum of one day to years. Residents had the option to stay longer if they joined a fellowship program, which allowed them to stay up to two years. The clinic was open every Tuesday from 5 pm to 8 pm with an average of 8-15 patients coming to the clinic for care. Two student clinic managers, either medical students or PA students, managed clinic flow, and two undergraduate clinic managers worked the front office. The rest of the volunteers were medical students of all years, one pharmacy student, and PA students.

Intervention

A quality improvement project was designed using a Plan-Do-Study-Act model with two distinct cycles in the project timeline (Table 1). Two student clinic manager training sessions were conducted on March 20, 2017 and October 29, 2017. The dental screenings and referral system started on December 12, 2017 and is still ongoing.

The first phase was a training session for all student clinic managers. The training included a 30-minute PowerPoint presentation as well as a skills session teaching the student clinic managers how to perform an oral exam. Dental mirrors and gauze squares were purchased for student managers to practice with during the training and use for future oral exams. A certified PA faculty member was present to monitor and critique

Table 1. Pilot Project Timeline

Phase	Date	Activities
Manager Training	March 20, 2017	1st pre-test & Oral Health Workshop for student managers
	April 3, 2017	Start of oral health screenings in the clinics
	May 20, 2017	1st post-test sent out to assess student manager oral health knowledge
Patient Survey & Referral	May 23, 2017	Preliminary data collection to determine prevalence of referrals to North Dallas Shared Ministries (NDSM) dental clinic
Manager Training	September 2017	2nd pre-test sent out
	October 9, 2017	2nd Oral Health Workshop for 2018 student managers
	November 2017	2nd post-test sent out
Patient Survey & Referral	December 2017-February 2018	Data collection from patient surveys and track referrals. Analyze 2017-2018 data

the student managers on their exam. The curriculum was developed based on the Smiles for Life Curriculum "Adult Oral Health" training module and the National Commission on Certification of Physician Assistants (NCCPA) oral health resources.[9] The PowerPoint presentation included the following three sections: 1) importance of oral health in primary care; 2) oral health training; and 3) an overview of the oral health program at the shelter clinic. Student clinic managers learned about the prevalence of dental caries, gum disease and oral cancers as well as the lack of oral health training currently given to health care providers.[1,2] Student clinic managers were also introduced to the Surgeon General Report, Oral Health in America.[3] The oral health training included pictures and descriptions of topics such as basic dental anatomy (major components of teeth), common dental conditions (dental carries, gingivitis, periodontitis, gingival hyperplasia, dental erosions, and dry mouth), lesions, fungal infections and oral cancers. A video was shown which demonstrated how to conduct an oral health exam. The oral health program overview provided information to the student clinic managers on how to screen and refer patients to the dental clinic.

The second phase was patient intake surveys and patient referrals to the North Dallas Shared Ministries (NDSM) dental clinic, staffed by the Texas A&M School of Dentistry. NDSM has a student-run free dental clinic that operates on a first come, first served basis. Undergraduate clinic managers from the University of Texas at Dallas administered and collected paper patient surveys at the front desk. After completion of the surveys, patients were seen by medical or PA student managers, who performed oral exams. All patients received a dental supplies package, which included a toothbrush, toothpaste, floss, and bottles of mouthwash. Dental packages were distributed from the front desk. If patients were deemed to have more complex oral health issues, they received a referral form for the dental clinic. Eventually, an appointment system was set up that reserved a specific day and time for patients from the shelter to attend the dental clinic at NDSM. Bus passes were provided for patients who needed transportation. An administrator at the shelter gave bus passes to patients with a referral form. Upon completion of their appointment, patients had to bring back their signed referral form as proof of visit and sign in at the front desk of the shelter.

Measurements

Student clinic managers' understanding of common oral health presentations was assessed with 10 multiple choice questions developed using the NCCPA dental continued medical education curriculum measured before and after the intervention (Appendix 1).[9] The questions were entered into a Google form, and managers were sent a link to the evaluation in an email. The pre-test was given 3-4 weeks prior to the manager training. The post-test was sent out a month after the manager training.

The patient surveys assessed topics such as brushing frequency, tooth pain, and missing or loose teeth.

Table 2. Oral Health Pre- and Post-Knowledge among Clinic Managers

Questions	Pre-test Correct, N=18, n (%)	Post-test Correct, N=16, n (%)	*p*
If left untreated, gingivitis can result in which of the following?	14 (77.8)	14 (87.5)	0.317
Answer: Periodontitis			
What is the function of the periodontal ligament?	14 (77.8)	16 (100)	0.083
Answer: It is a fibrous connective tissue structure rich with neural and vascular components that attaches the teeth to bone			
What is the most common disease of childhood	9 (50.0)	14 (87.5)	0.025*
Answer: Dental caries			
Which area of the tongue is most cancer prone?	7 (38.9)	8 (50.0)	0.654
Answer: Lateral borders			
A 28-year-old patient presents with the following pattern on his tongue. He complains of occasional burning and soreness along the indentions. What is the appropriate treatment?	2 (11.1)	7 (43.8)	0.102
Answer: No treatment advised			
A 30-year-old patient reports using smokeless tobacco for the past 6 years. Given this history, what part of the oral cavity should you examine closely?	10 (55.6)	9 (56.3)	0.781
Answer: Buccal mucosa			
What patient population is at risk for the following condition?	7 (38.9)	8 (50.0)	0.479
Answer: A&C (Newborns and immunocompromised patients)			
During an oral examination, you encounter the following bilateral, bony growths on the patient's mandibular surface. The growths have not been painful but have been fluctuating in size over the past few years. What is the appropriate treatment recommendation?	5 (27.8)	14 (87.5)	0.002*
Answer: Recommend return to clinic if growths become painful or affect normal mouth and tongue movement			
You are performing an oral exam on a 43-year-old woman when you notice the following pattern on her tongue. There are similar plaques on her buccal mucosa. If untreated, what will these plaques progress to?	7 (38.9)	13 (81.3)	0.008*
Answer: Squamous cell carcinoma			
What is the cause of dental erosions?	9 (50.5)	15 (93.8)	0.008*
Answer: Gastric acid due to GERD, bulimia, or methamphetamine use			

**p<0.05, McNemar test; GERD: gastroesophageal reflux disease*

Data Analysis

Frequencies and percentages were used to summarize results from patient surveys. McNemar tests were used to compare correct responses on the clinic managers' pre- and post-tests. Wilcoxon signed-rank tests were used to evaluate changes in managers' attitudes towards performing an oral exam and overall confidence in diagnosing patients. A threshold of $p<0.05$ was used to determine statistical significance. All data analysis was conducted using STATA 14.0 (StataCorp, College Station, Texas).

This pilot project was deemed a quality improvement project and non-regulated research by our Institutional Review Board.

Results

In the first phase, two manager training sessions were held (N=18 pre-surveys; N=16 post-surveys). Results from the surveys demonstrated an increase in scores after the manager training session and oral exam practice. After the training, managers were better able to identify the most common childhood disease as cavities (p=0.025), a common cause of dental erosions as gastric acid (p=0.008), and identify torus mandibularis (p=0.002) and precancerous plaques (p=0.008). The complete results of the manager evaluations can be viewed in Table 2.

In the second phase, 13 completed patient surveys were collected (Table 3). The patient surveys

Table 3. Patient Survey Results and Referral Outcomes (N=13)

Survey Questions	**Yes (%)**
Do you brush your teeth less than 2 times a day	9 (69)
Do you floss less than 1 time per day	11 (85)
Do you smoke cigarettes	8 (62)
Have you ever had a cavity	10 (77)
Do you have tooth pain	4 (31)
Do you experience pain along the gums of your teeth	3 (23)
Do you notice bleeding when you brush or floss your teeth	5 (38)
Do you have any loose or missing teeth	8 (62)
Referral Outcomes	**n (%)**
Number of patients referred	11 (85)
Number of patients completing referral	1 (9)

revealed that 69% of patients brushed their teeth less than twice a day, 85% flossed less than once a day, 62% smoked cigarettes, 77% had a history of dental caries, 31% had tooth pain, 23% had gum pain, 38% noticed gum bleeding with brushing or flossing, and 62% had loose or missing teeth. Most (11 of 13 patients) were referred to the dental clinic, and one patient made their appointment time. The number of oral exams performed by clinic student managers was not recorded.

Discussion

The goals of this pilot project were to evaluate and improve the oral health knowledge among the student clinic managers, assess the need for dental care among the patient population at a homeless shelter, and create a dental referral program. Our manager training appeared to be effective in increasing knowledge about oral health conditions even after a month. To our knowledge, no similar interventions have been conducted in student-run free clinics, but our results are similar to findings from prior studies. Berkowitz evaluated the impact of an interprofessional oral health curriculum on students at the Boston School of Medicine.[4] Their study showed that a dental curriculum increased long-term knowledge retention by 14% from baseline at 8 months.[4] The curriculum was integrated into the PA program during the first-year and included a compilation of classroom lecture, skills lab, and observation in a dental clinic, and results showed an increase in satisfaction among students after participating in the dental curriculum.[4] Another study by Nicely demonstrated a significant overall increase in attitude and knowledge of oral health among PA students after completion of a comprehensive oral health curriculum.[7]

Our results also demonstrated a need for dental services with 31% of patients with tooth pain and 77% of patients with a history of cavities. However, our initial referrals process had several limitations, resulting in only one completed visit.

Strengths and Limitations

A strength of this pilot project was the new screening protocol implemented for patients seeking further dental care among two cohorts of student clinic managers. The training program exposed managers to dental training and gave them more experience with oral health exams. Another strength was having consistent volunteers who had complete knowledge of the dental program and could educate patients. They also served as a point of contact for patients, and questions could be directed to them. Finally, a major strength of this project was the use of a nationally recognized oral health curriculum, Smiles for Life, designed to train primary health care providers how to complete basic oral health exams and make appropriate referrals.[9] Smiles for Life was developed in 2005 by physicians, dentists and educators has been endorsed by several national organizations, including the Society of Teachers of Family Medicine, the American Dental Association, and Physician Assistant Education Association and the National Interprofessional Initiative on Oral Health.[9]

Four limitations may have affected our results. First, the main limitations of this study were barriers to our referral process. Only 1 patient (8%) was able to complete the referral process during the project period. At the beginning of this pilot, we experienced problems with communication between the off-site dental clinic and the homeless shelter patients, staff, and student-run clinic volunteers. A major barrier was appointment availability at the student-run dental clinic. The student-run dental clinic operates on a first come, first served basis. It was difficult for our

patients to figure out the bus schedule to get in line early enough for an appointment slot. To remove this barrier, we recently set up an appointment system through e-mail and a Google document shared with the dental clinic. Three appointment slots are reserved on Thursdays at 1 pm for homeless shelter patients. Since we implemented this process, 18 patients have been referred and appointments have been set up at the dental clinic. Among those patients, there were seven patients that did not attend their appointments. The changes made improved the proportion of completed referrals from 8% to 39%. We will continue to monitor and adjust the referral process as needed. Second, we did not have a dental professional on our team. The collaboration we established with the NDSM dental clinic for our referral process has opened the doors for future collaborations with dental students and other oral health professionals. Third, we also realized that there was some fear and anxiety that patients had about going to the dentist. Some of the patients that we referred to the dental clinic refused due to fear of pain from dental procedures. Moving forward, we plan to include a section for dental anxiety on the patient survey and ways to address patient fears in the student clinic manager training. Fourth, we were not able to track the number of oral exams performed by clinic student managers or the completion rate of patient surveys. This will be considered for all future program evaluation efforts at the clinic.

Despite these limitations, the pilot program was successful in improving student clinic mangers' knowledge about oral health and resulted in the implementation of a new referrals process.

Disclosures

The authors have no conflicts of interest to disclose. This project was conducted to fulfill capstone/graduate project requirements for the Master of Physician Assistant Studies degree at University of Texas Southwestern Medical Center, School of Health Professions.

References

1. Dye B, Thornton-Evans G, Li X, Iafolla T. Dental Caries and Tooth Loss in Adults in the United States, 2011-2012. NCHS Data Brief. 2015 May;(197):197. LINK
2. Gift HC, Reisine ST, Larach DC. The Social Impact of Dental Problems and Visits. Am J Public Health. 1992 Dec; 82(12):1663-8. LINK
3. Oral Health in America: A Report of the Surgeon General [Internet]. Rockville (MD): United States Department of Health and Human Services; 2000. Available from: https://profiles. nlm.nih.gov/ps/access/NNBBJT.pdf. LINK
4. Berkowitz O, Brisotti MF, Gascon L, Henshaw M, Kaufman LB. The Impact of an Interprofessional Oral Health Curriculum on Trainees. J Physician Assist Educ. 2017 Mar;28(1):2-9. LINK
5. An Equitable, Healthy and Safe Dallas County [Internet]. Dallas (TX): Dallas County Health and Human Resources; 2016. Available from: dallascounty.org/Assets/uploads/docs/hhs/dcha/. LINK
6. Dallas Commission on Homelessness, Final Report [Internet]. Dallas (TX): Dallas Commission on Homelessness; 2016. Available from: dallascityhall.com/government/citymayor/. LINK
7. Nicely SL. Effects of a Comprehensive Oral Health Curriculum on Knowledge, Behavior, and Attitude of Physician Assistant Students. J Physician Assist Educ. 2016 Jun; 27(2):73-6. LINK
8. Forbes J, Sierra T, Papa J. Advancing Oral Health Knowledge and Attitudes of Physician Assistant Students Using the Smiles for Life Oral Health Curriculum. Fam Med. 2018 Nov;50(10):775-778. LINK
9. Douglass AB, Gonsalves W, Maier R, Silk H, Stevens N, Tysinger J, et al. Smiles for Life: A National Oral Health Curriculum for Family Medicine. A Model for Curriculum Development by STFM Groups. Fam Med. 2007 Feb;39(2):88-90. LINK

Appendix 1. Pre- and Post-test Survey

	Questions**	Possible Answers
1.	If left untreated, gingivitis can result in which of the following?	A. Cavities B. Cracked Teeth C. Periodontitis* D. Apthous ulcers
2.	What is the function of the periodontal ligament?	A. It is a fibrous connective tissue structure rich with neural and vascular components, that attaches the teeth to bone* B. Carry blood to the root of the tooth C. Bond the enamel of the tooth to the dentin D. Bond the pulp of the tooth to the dentin
3.	What is the most common disease of childhood?	A. Asthma B. Ear infections C. Dental caries* D. Depression
4.	Which area of the tongue is most cancer prone?	A. Sulcus terminalis B. Vallate papillae C. Lateral borders* D. Inferior surface
5.	A 28-year-old patient presents with the following pattern on his tongue. He complains of occasional burning and soreness along the indentions. What is the appropriate treatment?	A. Prednisone B. Erythromycin C. No treatment advised* D. NSAIDs
6.	A 30-year-old patient reports using smokeless tobacco for the past 6 years. Given this history, what part of the oral cavity should you examine closely?	A. Buccal mucosa* B. Sublingual mucosa C. Tonsils D. Posterior tongue
7.	What patient population is at risk for the following condition?	A. Newborns B. Tobacco users C. Immunocompromised patients D. All of the above E. A&C (Newborns and immunocompromised patients)* F. B&C (Tobacco users and immunocompromised patients)
8.	During an oral examination, you encounter the following bilateral, bony growths on the patient's mandibular surface. The growths have not been painful but have been fluctuating in size over the past few years. What is the appropriate treatment recommendation?	A. Refer for biopsy and probably removal B. Antibiotic therapy for minimum of two weeks C. Surgical irrigation and debridement D. Recommend return to clinic if growths become painful or affect normal mouth and tongue movement*
9.	You are performing an oral exam on a 43-year-old woman when you notice the following pattern on her tongue. There are similar plaques on her buccal mucosa. If untreated, what will these plaques progress to?	A. Squamous cell carcinoma* B. Lentigo Maligna C. Basal cell carcinoma D. Lichen Planus
10.	What is the cause of dental erosions?	A. Bacterial destruction of enamel and dentin B. Gastric acid due to GERD, bulimia, or methamphetamine use* C. Periodontitis D. Bruxism (teeth grinding)

**Correct Answer.*
***Adapted from NCCPA Smiles for Life and AAPA curriculum.*