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Evaluating an Employee Health Smoking Cessation

Program for Enhanced Success

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Introduction

Tobacco smoking is the number one cause of preventable death in the United States (US) (CDC, 2017). Cigarette smoking causes more than 480,000 deaths each year in the US, which is roughly one-fifth of all deaths (CDC, 2016). Cigarettes contain about 7,000 chemicals, many of which are deleterious to health and 70 of which have been linked to cancer. Smoking is responsible for more fatalities than HIV, illegal drug use, alcohol use, motor vehicle accidents, and firearm injuries combined (CDC, 2016).

Smoking is directly linked to an increase in coronary artery disease, stroke, and lung disease. In cardiovascular disease, as few as five cigarettes a day has been linked to signs of distress. The act of smoking destroys blood vessels by causing hypertrophy and stenosis, leading to tachycardia and hypertension as well as the potential for thrombosis and cerebral ischemia. Overtime there is reduced blood flow to the extremities, leading to peripheral vascular disease (CDC, 2016).

In smoking-related respiratory disease, major airways and alveoli are damaged. These physiologic changes can lead to chronic obstructive pulmonary disease (COPD) and asthma as well as trachea, bronchus, and lung cancer. However, smoking is also linked to many other cancers. These cancers include bladder, blood, cervical, esophagus, kidney, ureter, larynx, colorectal, stomach, liver, oropharynx, and pancreas (CDC, 2016). Additionally, smoking negatively affects fertility, pregnancy outcomes, dental health, and increases the risk for diabetes and rheumatoid arthritis (CDC, 2016).

Total population estimates of tobacco smoking in the US are 18.8% for men and 15.1% for women (Mozaffarian et al, 2016). According to California statistics from 2014, 11.6 % of adults identify as smokers statewide and 12% identify in San Diego County

(California Department of Public Health, 2016). Although the number in San Diego County is at the Healthy People 2020 goal of 12% (Healthy People, 2016), it is crucial to note that any amount of long-term smoking increases the risk of all-cause mortality when compared to non-smokers (Inoue-Choi et al, 2016).

It is also essential to review the many benefits of tobacco smoking cessation. After just 12 months, risk for myocardial infarction decreases significantly, and between two to five years, chances of a stroke drop to that of a non-smoker (CDC, 2016). Furthermore, after several years, a past smoker's rate of mouth, throat, esophagus and bladder decline by 50% (CDC, 2016). At the ten-year mark, rates of lung cancer decrease by 50% as well (CDC, 2016).

Additionally, the cessation of tobacco smoking has been linked to many more benefits. In the respiratory system, coughing, wheezing, and shortness of breath are reduced and in the reproductive system, there is a decreased risk for infertility and of having a low birth weight child. Although it is better to quit when younger, the positive effects of cessation on the body are substantial no matter the age (CDC, 2017). One positive trend to note is that there are now more former smokers than current ones, and of adults who smoke in the US, 68% reported a desire to stop entirely in 2015 (CDC, 2017).

Implementing a smoking cessation program within a workplace has many proven benefits. The average person spends one-third of their day at the workplace, which indicates a prime opportunity to engage patients (Cahill & Lancaster, 2014). Additionally, worksites often contain large numbers of people who are consistently present at regular time intervals, making them potentially reliable patients (Cahill & Lancaster, 2014). Employee health clinics are also an opportunity to enlist young,

healthy, individuals who would otherwise not see a health care provider for preventive care (Cahill & Lancaster, 2014). Furthermore, engaging in smoking cessation at an employee health clinic does not usually require a patient to take time off of work or travel long distances for initial or subsequent visits (Cahill & Lancaster, 2014).

This project aimed to evaluate the overall success of the tobacco cessation program at the employee health clinic, identify strengths, and recommend improvements for enhanced success.

Methods

The evidence for this project was obtained using a search of the Cochrane, PubMed, and Cinahl databases as well as extensive searches of clinical guidelines from the Centers for Disease Control and Prevention (CDC), Up-To-Date, and the National Guideline Clearinghouse. After a careful assessment of the data, it is clear that an approach that combines both behavioral modification support and pharmacological augmentation, when appropriate, has been proven most efficacious.

Larzelere and Williams (2012) reviewed the American Association of Family Physicians (AAFP) guidelines for smoking cessation. Four interventions were given an evidence rating of A, which was defined as consistent, high-quality, and patient-centered. The first recommended intervention is routinely screening for tobacco usage. Secondly, all patients who have a positive screen need to be advised to quit at each clinic encounter. Next, if a patient is not ready to quit smoking, motivational techniques should be employed. Lastly, in order to improve rates of cessation, pharmacological interventions should be used when appropriate.

These recommendations are echoed by the United States Preventive Services Task Force (USPSTF) guidelines by Sui (2009). With an evidence level of A, the USPSTF guidelines instruct that clinicians inquire about the smoking status of all patients, recommend smokers quit, and that providers assist smokers with both behavioral and Food and Drug Administration approved pharmacotherapies.

To incorporate all these guidelines, which recommend a combination of both behavioral and pharmacological interventions, in a busy clinical practice, the 5 A's framework is specifically recommended to improve cessation rates by both the AAFP and USPSTF. The 5 A's framework is a thorough and proven strategy of engaging patients for behavior change (Glasgow, Emont & Miller, 2006). According to Quinn et al (2009), smokers who were surveyed reported that they were more likely to quit if they were offered counseling, which included the 5 A's or offered pharmacotherapy, rather than advice to quit alone.

The first A, Ask, suggests that smoking status should be asked about and documented for each visit. Repeated exposure to quit advice has been shown to improve satisfaction, including in patients not ready to stop (Larzelere & Williams, 2012).

In the second A, Advise, a provider should advise a patient to quit smoking and outline the benefits of cessation. Specifically, the advice to quit should be transparent, compelling, and personalized to each patient's health goals (Larzelere & Williams, 2012). If a patient is reluctant at this point, it is recommended to suggest a follow-up before moving forward to the next A.

For the third A, Assess, the practitioner should assess a patient's willingness to quit, smoking history, current amount of smoking, previous attempts to quit, and a

projected timeline for cessation. It is noted that no particular timeline is greater than another at producing long-lasting results (Larzelere & Williams, 2012).

Furthermore, the five stages of behavioral change align well with the 5 A's framework and may be consulted to determine where the patient lies within the cessation process. The stages include pre-contemplation, contemplation, preparation, action, and maintenance. In pre-contemplation, a patient does not plan to quit in the next six months, contemplation is consideration of cessation in the next six months, preparation is a plan to take action in the next month, and maintenance is greater than six months of successful behavior change (Prochaska & Velicer, 1997; Larzelere & Williams, 2012).

Although directive conversations regarding cessation to an ambivalent patient are not productive, motivational interactions look deeper into those barriers. One such way to explore ambivalence effectively is through the 5 R's, which include relevance, the reasons a patient should consider cessation, the risks of further smoking to themselves and others, rewards of quitting, including financially and to their health, roadblocks the patient sees in their way, and lastly, repeat the process at each clinical encounter (Larzelere & Williams, 2012).

The fourth A of the 5 A's framework, Assist, is assisting with the patient's plan for cessation by offering support, including providing materials on additional support systems and laying out plans for dealing with common pitfalls such as withdrawal, depression, and weight gain.

In the last A, Arrange, follow-up should be arranged and established prior to, but also close to, the patient's quit date if one has been stated. This allows for the patient to be further encouraged and congratulated on their decision to move smoking out of their

life. Follow-up can be done either by phone or in-person. If cessation is not accomplished, the patient should be reassessed and additional interventions should be considered (Larzelere & Williams, 2012).

It is important to note that even brief behavioral counseling sessions as short as three minutes improve cessation rates. Furthermore, the number of smoking cessation counseling sessions is crucial, with four or greater being the number for which to aim. Counseling can and should be delivered via in-person meetings, telephone or with personalized self-help materials. When considering who will provide this information to patients, the evidence suggests counseling administered by a primary care provider, nurse, psychologist, social worker, or cessation counselor is most effective (Sui, 2015).

Regarding smoking cessation in the employee health setting, Cahill and Lancaster (2014) performed a Cochrane review in order to present a guideline for clinics. As in the guidelines outlined by both the AAFP and USPSTF, a combination of behavioral and pharmacological interventions is recommended. These interventions have been shown effective in the employee health environment, producing similar rates of cessation as in a primary care office (Cahill & Lancaster, 2014).

Therefore, to mitigate the adverse effects and risks of tobacco smoking, it is essential to both utilize what is known and to find new methods in which to reach out to smokers. A highly evidence-based intervention for engaging a patients that during an office visit is with the 5 A's framework (Rigotti, 2016). This model is effective at following patients that smoke through the entire process of cessation. It is clear from the evidence that a combination of both behavioral and pharmacological intervention is the most beneficial and utilization of the 5 A's framework is one evidence-based manner in

which to accomplish this recommendation (Siu, 2015; Larzelere & Williams, 2012). This approach allows clinicians to address both the psychological and physical dependence associated with nicotine addiction.

Sample

This project took place at an employee health clinic within a large financial institution employing approximately 1600 people. Throughout the organization there are many departments, including human resources, information technology, accounting and a call center. The average age of an employee is 39. The target population included all employee-patient smokers, regardless of age or amount smoked who also visited the employee health clinic. The determination as to whether a patient smokes was made by patient self-identification. During this evidenced-based project, 25 smokers seen in the employee health clinic were identified each month over two years, 2015 and 2016. The year 2015 was prior to implementation of the clinic's smoking cessation program and 2016 was post implementation.

Design

This evidence-based evaluation project was guided with the assistance of the Stetler Model for evidence-based implementation. This model was developed Cheryl Stetler in 1976 and revised several times, until its current version was put into use in 2009. It uses a systematic approach to research, planning, and implementation. As a practitioner-oriented model concentrated on critical thinking and use of evidence by a single provider, such as a nurse practitioner (NP), it supports the approach of dissemination of evidence by the skilled practitioner to patients and other staff members. It also asserts the notion that if a skilled practitioner is not there to assist with leading the

implementation, protocols can become task-oriented, mindless, and thus, non-evidenced based (Melnyk & Fineout-Overholt, 2015).

This model incorporates evidence that is both external and internal.

In the context of this project, external evidence came from a detailed literature review and internal evidence was obtained from clinic experts, specifically, the nurse practitioner (Melnyk & Fineout-Overholt, 2015). Utilizing this model is a five-step process that builds upon itself (Melnyk & Fineout-Overholt, 2015). The first step is preparation, which is when the clinic's need was determined and both external and internal evidence was gathered. The second step is validation, where each piece of evidence was systematically reviewed and summarized. For the third step, a decision as to which evidence was best for the project and its needs was made. In the fourth step, application of the evidence into practice was completed. Lastly, in the fifth and final step, evaluation of how the project implementation was completed and whether or not project goals were accomplished was completed (Melnyk & Fineout-Overholt, 2015).

The current smoking cessation program at the employee health clinic consists of a team-based approach, where the medical assistant triages patients prior to a visit with the NP. The medical assistant inquires about smoking status and then the NP follows-up regarding usage, utilizing the 5 A's framework as either a formal or informal intervention. The NP must manually open the tobacco cessation template with free-text fields in order to continue the conversation and decide the patient's need for further behavioral or pharmacological interventions.

Interventions are based largely on patient preference as well as individual risk profiles. If a pharmacological intervention is initiated, a two-week follow-up is

suggested. Success for a patient is defined as complete cessation or continued attempts to quit. Overall, the current goal for the program is to have employees quit, as it is important for the health of employees and for decreasing future health care associated expenses.

During the initial implementation of the smoking cessation program in January 2016, no baseline data was collected due to time and technological limitations. Since implementation, no evaluation system had been instituted to review assets and barriers to success. Clinic leadership had identified these issues as program weaknesses and was welcoming of a project to remedy these shortcomings as well as guide future practice.

Intervention

In October 2016, the Doctorate of Nursing Practice (DNP) student presented an evidence-based project proposal to key stakeholders based on reported clinic needs. In December 2016 and January 2017, patient data was collected using the electronic health record (EHR). Information collected included rates of tobacco use and progress through the 5 A's framework for each self-identified smoker. In February and March 2017, the final data was organized and analyzed. In April 2017, the data compilation and conclusions were presented to both key stakeholders at the financial institution and conference attendees at the Western Institute of Nursing Conference in Denver, Colorado.

Measures

Chart reviews took place over the course of two years, from January 2015 to December 2016. Each month 25 patients were selected by the NP for review, for a total of 600 charts. The first goal of the project was to determine how many employee clinic patients were smokers and whether the implementation of an official smoking cessation

program in January 2016 decreased the rate of smoking. The secondary goal was to determine whether the 5 A's framework was being utilized effectively throughout the two years. In evaluating the benefits of the smoking cessation program, success was determined to be having fewer smokers and having higher utilization of the 5 A's framework in 2016 versus 2015.

Data Analysis

After a two-year evaluation of the number of employee-patients who smoke, no statistically significant trend showing the smoking cessation program decreased the rate of smoking was evident. As demonstrated by the QI Macros developed control chart (See Figure 1), for 23 of the 24 months reviewed, 99.7% of the patients who were smokers fell within three standard deviations of the mean, which was 2.083, a number that was exactly the same over the course of two years. The one clinically significant undesirable trend in the average occurred in January 2016, where there were seven patients identified as smokers, five above the average. Interestingly, this was the same month that the official smoking cessation program was introduced, which may have aided in the smoker identification process. From January 2016 onward, there also appears to be a clinically insignificant cyclical trend in the number of smokers reported, with spikes coinciding with the beginning of each financial quarter, January, April, July and October. Given this information, it is possible to conclude that employees were more likely to address their health and consider smoking cessation when the quarter was beginning, a time when workload is often decreased.

Next, smokers were each evaluated as to how far they progressed through the 5 A's framework intervention (see Figure 2). As evidenced by figure 2, all patients were

asked whether they smoked, 68-79% were advised to quit, 52-70% were assessed, 24-42% assisted, and 0% were clearly aided in arranging follow-up. However, it is important to note that 20-21% of those who were documented as not assessed and 12-33% not assisted through the 5 A's framework were due to patient choice. Patient reasons for declining or deferring services for smoking cessation were not always clear from chart review but included both time restriction and lack of readiness to quit. It is also crucial to note that in 2016 versus 2015, these numbers indicate moderate improvement in the advise, assess and assist categories, suggesting a possible uptake in 5 A's utilization since the adoption of the official smoking cessation program in January 2016.

Results

When contrasted with non-smoking employees, smoking employees have a greater amount of lost productivity and cost of health and life insurance claims due to illness (CDC, 2017). Nationwide, at least \$156 billion is lost due to reduced productivity, which includes \$5.6 billion losses due to secondhand smoke exposure (CDC, 2017). Some estimates of US loss of productivity go up to \$300 billion (Weintraub, Daniels, & Burke et al, 2011). In 2009, California reported spending \$18.1 billion, \$9.8 billion of which was for healthcare costs related to smoking, a 13% increase since 1999 (Max, Sung Shi, and Stark, 2016). This means each Californian, whether or not they themselves are a smoker, represents \$487 spent towards tobacco smoking related costs. If the cost is limited to only smokers, the cost is \$4,603 each, including healthcare costs and lost productivity related to morbidity and mortality (Max, Sung, Shi, & Stark, 2016).

Given that there are approximately 1600 employees within the organization, and an estimated 8% of employee smoke, the number of smokers is roughly 128. Since the

predicted cost for each of these employees annually is \$4,603 (Max, Sung, Shi, & Stark, 2016), the estimated yearly cost for all 128 employees to the healthcare system and the company combined is \$589,184. With a decrease of smoking employees from 8% to 5%, the healthcare and lost productivity burden of these employees would decrease by \$220,944 each year. Given this large number, it is reasonable to conclude that improving the success of the smoking cessation program is beneficial not only to the US, California, and the employees themselves, but also to the organization as a whole. This is especially valid when smoking employees receive health benefits through the company.

Discussion

After reviewing patient charts over two years, it is clear that both asking and advising patients to quit smoking is being completed reliably but there is room for improvement in the assess, assist, and arrange categories of the 5 A's framework. The greatest weakness of the smoking cessation program is in the arrange category, which refers to follow-up. Interestingly, follow-up was also noted as the biggest weakness in the evaluation of nine health maintenance organizations using the 5 A's framework (Quinn et al, 2009). It reported that while a majority of patients were offered advice to quit, less than 50% of patients were offered proven counseling and assistive medications, which have been shown to double the chances of cessation in smokers (Quinn et al, 2009).

Several practice improvement suggestions may be considered. A survey should be administered, and staff then educated, regarding use of the pre-existing 5 A's template within the EHR. The clinic should also implement the 5 R's (relevance, risks, rewards, roadblocks, and repetition) for patients who decline help during the Assess stage of the 5 A's (Larzelere & Williams, 2012). Lastly, with stakeholder collaboration and results of

the evaluation of barriers, updates to the clinic policy regarding smoking cessation program requirements, roles, and follow-up protocol should be made. Given current need for improvement, it is clear that further evaluation is needed to ensure the future success of the smoking cessation program.

Limitations

There were many limitations of the smoking cessation program at the site. These included a change in staff. In the last part of 2016, a new lead nurse practitioner was placed within the clinic, with the previous one staying on one day a week, and the lead medical assistant left before the end of 2016. Overall, although patients were being asked regarding their smoking status and advised to quit reliably, the conversation often ended at that point according to documentation within the chart. This does not mean that discussions pertaining to a patient's quit plan and follow-up were not completed but they were not documented with consistency. Additionally, there were several areas that stuck out as reasons why employees chose not to pursue continued cessation support at the clinic, which include but are not limited to, time constraints, rapport with a primary care provider outside the clinic, and lack of knowledge regarding the purpose and scope of the employee-health clinic.

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Figure 1. Number of Smokers Pre and Post Smoking Cessation Program

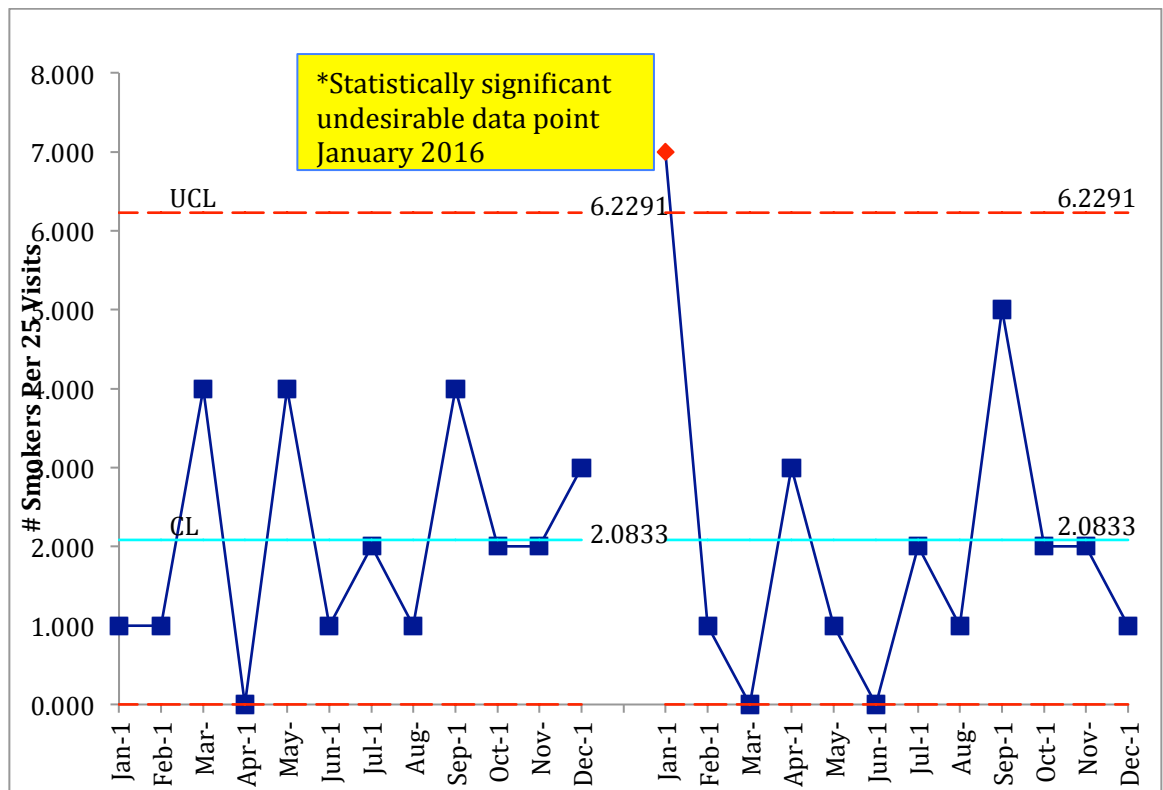


Figure 1. Rates of smokers from 2015 to 2016 stayed exactly the same at 2.0833.

Figure 2. 5 A’s Implementation for Smoking Cessation in an Employee Health Setting

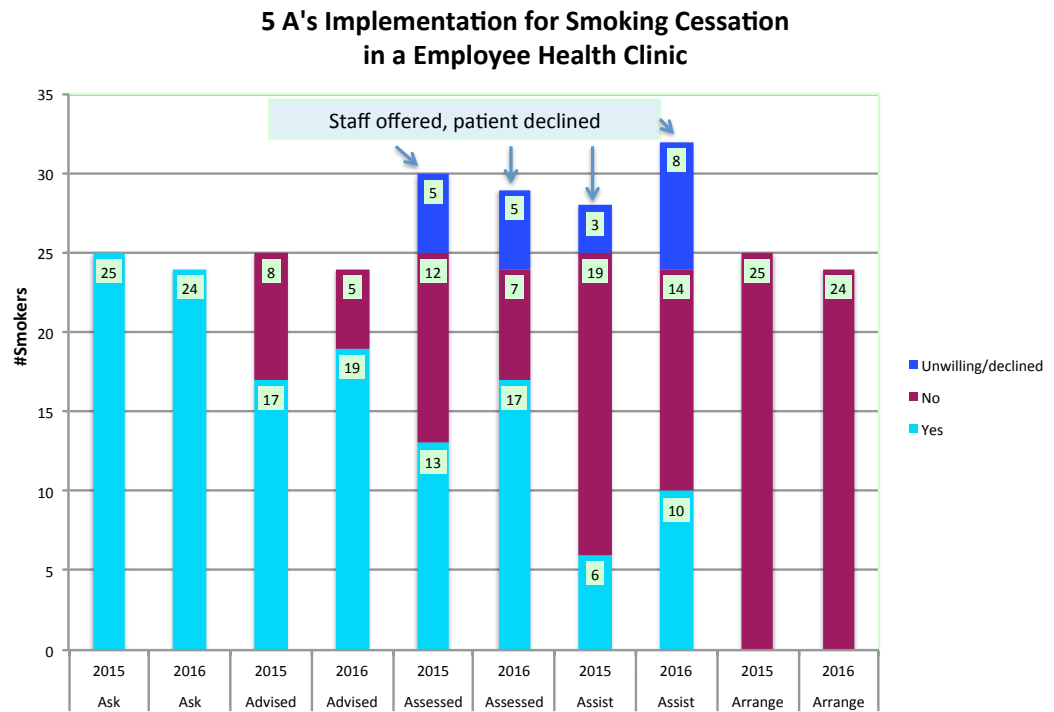


Figure 2. Evaluation of the effectiveness of the 5 A’s framework utilization in an employee health clinic from January 2015 to December 2016.