

‘Butting’ In:

Evaluating the Effectiveness of Nurse Practitioner-Provided Smoking Cessation Education in
Cardiovascular Patients

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A Scholarly Practice Project presented to the Graduate Faculty of the
University of Virginia in Candidacy for the
Degree of Doctor of Nursing Practice

School of Nursing
University of Virginia

July 2020

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Abstract

The adverse health outcomes related to smoking are well established, yet many cardiovascular patients continue to smoke. The current standard of care for smoking cessation education is health care provider (HCP) counseling of patients. This intervention proves to be most effective on smoking cessation rates if performed frequently as one part of a multi-pronged approach. Smoking cessation is particularly important in the cardiovascular population as the associated disease processes are often exacerbated by the pathophysiological effects of smoking. Therefore, it is imperative to examine and measure the success rate of a nurse-practitioner (NP) managed smoking cessation education program in the outpatient cardiovascular setting. A multi-modal smoking cessation education program taking place for a period of one month included the use of video modules, follow-up counseling, education related to nicotine-replacement therapy (NRT), and support resources by an NP. At the completion of the program, available data supports the NP directed approach of integrating multi-modal smoking cessation education for the cardiovascular patient population in the outpatient setting. The patients who eliminated or reduced smoking for the one- month program period reported that the NP counseling in conjunction with video availability contributed to their success.

Table of Contents

Abstract.....	2
1. Introduction.....	4
Problem Statement.....	6
Clinical Question.....	6
Review of the Literature.....	6
Findings.....	9
Discussion & Gaps in Literature.....	16
2. Theoretical Framework.....	18
3. Methods.....	20
Setting.....	20
Sample.....	20
Procedures, Program Design, & Measures	22
4. Data Analysis.....	25
5. Results.....	25
6. Discussion.....	27
7. Strengths/Weaknesses.....	28
8. Conclusions.....	29
Figures.....	30
Tables.....	34
References.....	40

Cigarette smoking is one of the most important modifiable risk factors in patients diagnosed with Coronary Artery Disease (CAD) or Peripheral Artery Disease (PAD). CAD is a condition wherein vessels of the heart become damaged or diseased due to inflammation, stenosis (narrowing), plaque buildup, and blockages. PAD is a condition that contributes to vascular issues such as ischemia and claudication which can lead to amputation or other surgeries. Smoking exacerbates CAD and PAD. Yet, most literature suggests that outpatient clinics do not offer much more than an intermittent suggestion to quit smoking or a brochure containing tips on how to succeed at smoking cessation, even to the high-risk CAD and PAD populations.

In cardiovascular patients, smoking is more damaging than perhaps any other chronic disease group because smoking is, “an established risk factor for atherosclerotic vascular disease and aneurysm development and progression (Moses, et al., 2017, p. 2).” Peripheral Arterial Disease (PAD) is up to six times more likely in smokers than in non-smokers, coronary heart disease is four times more likely, and the risk of stroke is 2-4 times greater in smokers (Center for Disease Control and Prevention, 2020) than in non-smokers. Moreover, as one source aptly points out, “cardiovascular consequences, such as myocardial infarction, stroke, hypercoagulation, and peripheral vascular disease (PVD) can also occur as a result of cigarette smoking (Porter, 2013).” This evidence all suggests that the cardiovascular patient who smokes should be a prime candidate for smoking cessation education.

Despite decades of attention to the adverse side effects of smoking, tobacco continues to be the cause of one in every five deaths that occur and is the leading preventable cause of death

in the United States (Center for Disease Control and Prevention, 2019). Tobacco related deaths, “exceed the combined number of deaths from alcohol, cocaine, heroin, suicide, homicide, motor vehicle accidents, fires, and AIDS (Andrews, Tingen, & Harper, 1999).” According to the Center for Disease Control and Prevention (CDC), the increased risk of death within the smoking population is largely due to a greater incidence of cancer, respiratory disease, and cardiovascular disease (2020). In addition to an increased risk of death, smokers are sick or hospitalized more often than non-smokers. Duffy et al., reports that smokers have twice as many hospital stays, have increased lengths of hospital stays, and need more services while they are there (2008, p. 199). Furthermore, *Healthy People 2020* estimates that, “smoking-related illness costs the U.S. \$300 billion annually including nearly \$170 billion in direct medical care for adults and \$156 billion in lost productivity (U.S Department of Health and Human Services, 2020).” Meanwhile, studies demonstrate that smoking cessation aids in promoting wound healing, decreasing respiratory and cardiovascular complications, and decreasing overall mortality (Haug, Meyer, & Ulrich, 2011, p. 1369). Despite this knowledge, there is conflicting data regarding what should be considered the current standard of care as it pertains to providing cessation education and counseling. This is true even within a population more apt to be affected by smoking: cardiovascular patients.

Nurse practitioners have the background of nursing coupled with graduate-level education and training making them ideal candidates for the role of smoking cessation educator. According to one article, “NP’s teaching skills are effective and appreciated by primary care resident physicians in an outpatient setting (Porter, 2013).” Cheney and Sheriff (2012) found that patients were, “twice as likely to attempt quitting [smoking] as patients not counseled by a nurse

practitioner.” These findings suggest the benefits of an NP-driven smoking cessation program in an outpatient setting.

While smoking cessation is an expected standard of care, especially in light of the Affordable Care Acts’ push for better smoking cessation programs in healthcare, the lack of specific teaching guidelines and the clinician’s overall lack of counseling time in the outpatient setting has made patient education a secondary focus during clinic visits. With this in mind, a search was under taken to obtain relevant literature as well as any data which may inform this researcher in trying to develop an NP-driven smoking cessation program within the outpatient cardiovascular patient population.

Problem Statement

Smoking continues to be a major health concern within society decreasing the health of individuals within the community and adding cost to the healthcare system. This is especially true in cardiovascular patients whose disease burden is often increased by continued smoking. If smoking cessation education continues to be regarded as an afterthought or optional by providers, poor health outcomes for cardiovascular patients will continue to rise and contribute to the cost burden of healthcare. Continued smoking will inevitably lead to more visits, more interventions, and more people in society who are unable to contribute in a meaningful way due to disability. Understanding the effectiveness of NP-driven multi-modal smoking cessation program within the ambulatory cardiovascular setting is essential to diminishing the health concerns caused by smoking.

Clinical Question

Does an NP-driven multi-modal educational approach to smoking cessation in the outpatient adult cardiovascular patient population lead to sustained one-month cessation?

Review of Literature

In 2000 the Agency for Healthcare Research and Quality (AHRQ) published guidelines on smoking cessation education. The document was updated in 2008 in a paper titled, “Treating Tobacco Use and Dependence.” It contains ten key guideline recommendations for all populations and highlights telephone ‘quit lines’ (now available in all states) as a significant resource for smokers (Fiore, Jaen, & Baker, 2008). In addition to key guidelines, the introduction of the 5A’s (Ask, Advise, Assess, Assist, Arrange) and 5R’s (Relevance, Risks, Rewards, Roadblocks, Repetition) was introduced as a valuable intervention strategy (Malucky, 2019). A 2018 guideline issued by the American College of Cardiology also issued an, “Expert Consensus Decision Pathway” for smoking cessation. The pathway guides clinicians through various treatment options and discusses some specialized patient populations such as those who are hospitalized or perioperative (Barua, et al., 2018). Despite these high-ranking professional guidelines and for many possible reasons, it seems patients continue to receive little in the way of concerted effort from their provider regarding smoking cessation.

Several articles examined smoking cessation from the standpoint of NPs in primary care clinics or designated smoking cessation clinics. However, there is a paucity of literature regarding NP-driven smoking cessation in a specialty outpatient area such as cardiology. The review of the current literature was specifically conducted regarding NP provider smoking cessation education in the adult cardiovascular population. The search was conducted using the Cumulative Index of Nursing and Allied Health Literature (CINAHL) search platform, which

gives access to various sources. The search terms used were, 'smoking cessation' AND 'nurse practitioners' AND 'outpatient.' The initial search yielded no exact match but delivered 20 articles without the use of any limiters. The abstracts of all twenty articles were reviewed for inclusion.

A second search was undertaken using grey literature and ancestry searches which allowed for the inclusion of three more articles as well as a guideline from the American Lung Association on billing for tobacco cessation education in the outpatient setting. Two articles found related to technology and smoking cessation were also utilized from a grey literature search.

Selection of Articles

As noted above, the initial search yielded 20 results, abstracts were chosen based on relevancy to the topic and the population of interest. An ancestry search was also undertaken which led to the inclusion of 3 more articles. Duplicates were eliminated. After initial screening for duplications 16 records remained. Five of the remaining articles pertained to smoking cessation but not within the population of interest. Instead, the five included end-stage heart failure patients, those with COPD, and smoking as it pertained to fracture healing. Two articles focused on outcomes other than smoking cessation, two were irrelevant (substance use in pregnancy for example), and one article was a commentary on a study. One article referenced a poster abstract and one was from the year 2000 making much of the information irrelevant or outdated. Four articles remained and after reading each, all were included in this review of literature. Additionally, the 3 articles found in the second search were included, resulting in a total of 7 articles. However, a search of grey literature led to the inclusion of 2 additional studies

regarding the technological aspect of the smoking cessation education. Nine articles in total served as the focus of this review (Figure 1). The review examined various types of studies including mixed methods, retrospective, comparison, prospective cohort studies, as well as a QI initiative. Additionally, one smoking reduction protocol from the Cochrane Library was included in this literature review. Finally, an article published by a colleague at this institution's vascular clinic was provided to this researcher and its' findings reviewed for this program.

Findings

Seven articles proved useful in addressing this researcher's study aim. The grey literature search which was performed and narrowed by the intervention of video modules or technology utilization to provide smoking cessation education directed by nursing which yielded fewer results. Two articles addressing the use of technology with an aim to increase smoking cessation were also utilized in this review. Therefore, 9 articles serve as the focus of this literature review.

Nurse Practitioner: Provider & Educator

One comparison study examined data from the American College of Cardiology's PINNACLE registry to evaluate care delivered by doctors versus care delivered by nurse practitioners in several outpatient cardiology areas including CAD, Heart Failure, and Atrial Fibrillation (Virani, et al., 2015). After reviewing almost 500,000 patient charts, the researchers determined that there was virtually no difference in the quality of care delivered by physicians and NPs. However, NPs, "were more likely to meet the performance measures of smoking cessation among their CAD patients compared with physician providers (Virani, et al., 2015, p. 1808)." Yet, an adjusted rate ratio showed that even in this area, the NP was only 0.97 times more likely to provide smoking cessation screening and intervention to cardiovascular patients.

A prospective cohort study explored target therapy goals of patients who had suffered an MI to determine if the goals were better achieved when delivered by an NP versus usual care (Harbman, 2014). There were a total of 65 participants in this study, all of whom had suffered a heart attack and 27 of whom were current smokers at the time of the study. Fourteen participants were former smokers and 24 were never smokers. Data was obtained before hospital discharge and 3 months after discharge. The intervention of NP education delivery was done before discharge and at 1, 2, and 6 week intervals as well as at three months post discharge. The results of the study showed that, “NP delivered secondary prevention intervention can significantly improve achievement of the following target goals when compared to usual care: smoking cessation, blood pressure, cardiac rehabilitation attendance, and physical activity five days a week (Harbman, 2014).” Smoking cessation was achieved in 58% (n=7) of the NP group in this study while only 23% (n=3) achieved full cessation status in the control group. Moreover 25% of the NP group’s smokers attended a cessation clinic while no participants in the control group attended the cessation clinic. The study showed that overall secondary prevention intervention can be achieved by utilizing an NP delivery model.

A third article evaluated an NP-managed smoking-cessation clinic. This quality improvement project took place at a large, academic institution in the southeastern U.S. where smoking was deemed an important issue and a clinic dedicated solely to helping patients on their journey to cessation was developed. The hospital elicited an inter-disciplinary team consisting of an NP, psychologist, physician, nursing administrator, and physician administrator to address that only 36% of their actively smoking patients reported they were provided cessation education during their hospital stay. At that time a clinic was established to aid in increasing the rate of cessation among patients and an NP with a smoking cessation specialist certification was chosen

to run this clinic. The lead NP utilized a combination of treatment modalities. Patients were referred to the clinic by physicians within the hospital system although the most effective form of patient recruitment was via the success stories of previous patients who had quit smoking (Andrews, Tingen, & Harper, 1999). Self-referrals were also permitted to the clinic. All participants completed a Fagerstrom Test for Nicotine Dependence (FTND) questionnaire and were subsequently provided with self-help handbooks. The FTND is a 6 question survey that is frequently utilized as a measure of nicotine dependence in the smoking population during studies or clinical projects. The six question survey takes just minutes and asks question regarding the patient's preferred cigarette, preferred smoking time of day, and how many cigarettes are smoked (figure 2) .The FTND helped determine the level of dependence in this program and helped guide the dosing for nicotine replacement therapies (NRT) if the patient was interested in the modality. Psychologists were available to aid the patient sessions in developing a general plan to quit smoking within 2 weeks of the initial session. NPs and patients shared phone numbers so that the clinic could be called for questions and participants could utilize one another as a type of support network (Andrews, Tingen, & Harper, 1999). The patient was seen in follow up after two weeks to determine how their success with cessation as well as to prescribe continued NRT (which could be filled at the in-house pharmacy) and again three weeks afterwards. All visits were completed in a group setting with the NP available after the session for individual questions. The NP was also available during clinic hours by telephone. A final fourth session was performed at which patients were encouraged to call or return to clinic at a future date if needed. Of the 500 referrals, 71% of patients attended at least two sessions with cessation rates at 41% (6 months) and 36% (12 months). At the time of the article's publication, nurses and NPs were the ones who most commonly referred patients to this clinic, the hospital

rate of education went from 36% to 98% (asked about smoking, 70% were provided on education to quit). The overall prevalence of smoking was shown to have decreased in the hospital system's primary care clinics as well, dropping from 45% to 32% one year from the time of the smoking cessation QI initiative.

In one study titled, "Urgent Smoking Cessation Interventions: Enhancing the health status of CABG patients" several landmark studies were examined and served as a foundation for the methodology and design of this program which was meant specifically for smokers who underwent coronary artery bypass graft (CABG). The initial studies indicated that smoking post-CABG proved to be catastrophic and could even lead to death for some patients. These studies also noted that a multi-pronged approach was most beneficial to patients attempting to quit smoking. The study focusing on urgent smoking cessation interventions took place at a veteran's affairs medical center and utilized the initial studies to develop interventions for patients within their hospital who were undergoing CABG. Due to the risks related to continued tobacco use following a CABG, these interventions are considered urgent. A questionnaire was developed by the medical center which inquired about smoking status at time of CABG, education received, quit attempts, and current smoking status and the survey sent to 202 patients who had undergone CABG at the facility prior to 1999 (the year of this study) (Graham-Garcia & Heath, 2000). Telephone calls were also made to each patient and the overall response rate was 39.6% for a total of 80 patients. Thirteen percent of the participants were never smokers, 47% (n=38) had quit smoking at some point (whether that be thirty years before the CABG or only two-three months before surgery), and 40% (n=32) continued smoking once told they would require a heart operation. Of the 32 who continued to smoke, 13% (n=4) quit post-operatively, with one patient quitting one year after surgery with continued education from his primary care provider (PCP),

and another quit five years after surgery after attending a cessation clinic and utilizing NRT. Another patient quit smoking at the time of surgery but had 4-5 relapses since that time and the time of the study, but who had been smoke free for 3 months following education from his vascular surgeon. A final female patient endorsed quitting and restarting multiple times, even with the use of NRT, and at the time of study was recently quit. 62% (n=20) of patients continued to smoke following their CABG. The remaining 8 patients endorsed quitting without intervention at the time of CABG and all denied any relapse since that time. Of the 32 patients, 25 received provider counseling, three utilized a cessation clinic and NRT, two never received counsel or intervention, one used nicotine patch as their sole intervention and found it successful, and one reported using and failing the therapy bupropion (Graham-Garcia & Heath, 2000). As a result of this study, the medical center realized, “patients should be advised to quit at every health encounter [and] nurses are in a prime position to significantly impact the reduction of cigarette smoking (Graham-Garcia & Heath, 2000).” The study also revealed that NPs were the most likely to refer patients to the medical center’s nurse practitioner-managed smoking cessation clinic and attributed this referral pattern to the nurse practitioner’s educational background of wellness promotion. This led to nurse case managers calling patients after discharge to check-in regarding smoking cessation and led the facility to state, “the ACNP is the ideal health care member to assess for tobacco use and initiate appropriate smoking cessation interventions (Graham-Garcia & Heath, 2000).” Additionally, the article states that ACNPs should be involved in all aspects of a smoker’s care as they can be the referring provider, the pre-op, post-operative, and continuing health provider of these patients.

Effectiveness of Smoking Cessation Education in the Outpatient Setting

While some studies suggest that patients experience their most ‘ready’ state to quit smoking during hospitalization (Dohnke, Ziemann, Will, Weiss-Gerlach, & Spies, 2012), it is not unreasonable to provide and reinforce education during outpatient visits with the intent to reduce or eliminate those hospital stays altogether. In a large, mixed-methods study, four primary care clinics’ electronic health records (EHR) were examined to determine if practice improvements, including smoking cessation education efforts, were being made. All four clinics were primary care clinics in the San Francisco area. The goal of those performing this study was to improve the educational gaps of smoking cessation education receipt utilizing the health information system as a tool to that end. The EHR was used to determine if these services were received along with interviews of patients and providers for a qualitative perspective related to barriers to receiving or giving cessation education. Using the EHR and the time-frame of July 2016- April 2017, 3310 of the 13,000 clinic patients were identified as smokers and had been seen at least three times in clinic. Three types of cessation counseling were examined: medical assistant counseling, provider counseling, and behavioral assistant counseling. NRT prescription was also able to be identified using the EHR. The primary outcome assessed was smoking cessation during the study at visit two or three (as every smoker was a current smoker at visit 1). All four clinics were polled and the cessation attempt across the four was 17.6% (n= 584). Of those 584 patients, 33.8% (n=198) made an attempt to quit but had started smoking again by visit three. 66.1% (n= 386) attempted to quit by visit three or had stayed quit between visits two and three (Gubner, et al., 2019). 94.3% of all participants received medical assistant counseling, 84.7% received provider counseling, and 5.1% received behavioral assistant counseling (largely due to a lack of availability). Additionally, 22.3% were prescribed NRT. Interestingly, this study showed that older patients were more likely to receive counseling and uninsured patients less likely to

receive counseling and education. The barriers to smoking cessation care noted in this study were prescription for NRT on site, mental illness, substance use, and staff concern that they were not qualified to provide teaching or felt the provider should provide the education. NPs are well positioned to provide more equitable services for smoking cessation education and counseling in an outpatient clinic.

Effectiveness of Technology in Cessation Education

There were two technology-focused articles from the grey literature search of relevance to this program, one a study involving a smart phone app and one utilizing a video game geared at cessation. The first, a smart phone app called CureApp was included in a randomized control trial that measured the efficacy of an app which provided, “video tutorials, advice from an artificial intelligence nurse, a digital diary, and measured daily exhaled CO concentration (Nomura, et al., 2019)” in the intervention group with the control group receiving pharmacotherapy and counseling. The Japanese study included multiple Japanese medical centers, and enrolled nearly 600 participants. Results demonstrated increased continued cessation over multiple time periods versus the control group. One conflict of interest is that CurApp, a company that designs apps to aid with various medical conditions, is the primary source of funding for this study.

The second study was designed to analyze medical interventions utilizing current internet technology, and took place in Australia. Using a video game called, ‘Quittr’, users were prompted to complete a survey about their smoking habits, financial goals of quitting, and their goal related to app use. Despite being called a video game the game was an app that was available as a phone download. Users were asked to log the number of cigarettes they smoke

daily and the app had a hotline and quit tips embedded in a support page. The games provided were two-fold: one to aid in distraction from cravings and others to incentivize quitting and cessation education. For instance, one could earn coins by watching a video related to cessation (i.e. pick a quit date) and then utilize those coins to build a town. This app is currently available as a download for both Apple and Android phones, but no randomized study has been performed to determine the efficacy of the app on smoking cessation rates.

The two articles, while interesting, showed that there is a need for further quality research regarding the best ways of interjecting smoking cessation education into patient's lives while also making use of the technology available to us as a society. This is a current gap in research but future research could be informed by several quality improvement projects implementing technology into vulnerable groups such as cardiovascular patients.

Discussion and Gaps in Literature

With over 16000 articles pertaining to smoking cessation, several public service announcement (PSA) –style commercials about the importance of smoking cessation, and numerous quit resources from the American Lung Association, American Heart Association, and National Cancer Society, it is easy to think that smoking is on a downward trend. However, 40 million US adults continue to smoke and over 170 billion dollars are spent on healthcare for smokers in America every year (Center for Disease Control and Prevention, 2020).

There is still a lack of high-quality research, quality improvement, or program evaluation data to aid in establishing standardized forms of education for successful smoking cessation. Literature suggests quitting smoking is an arduous task that takes multiple attempts (Moses et al, 2017) and those attempts might yield better results with proper support and education from nurse

practitioners. Of the literature that does exist, NP-driven education programs seem to be effective and it is not unreasonable to think the implementation of current technology (such as videos and apps) may also optimize those cessation attempts. Therefore, a program that utilizes NP-driven smoking cessation education through the use of video modules and counseling could be useful in examining the most optimal way to aid patients in smoking cessation in the outpatient clinic setting. Providing this education during a time when patients are not under the emotional stress of a hospitalization and at a time when they are likely emotionally ready (due to potential health complications related to their cardiovascular system) may also aid in the effectiveness of the cessation training while contributing to long-term cessation.

The literature review also brought to light several tools that are beneficial to smoking cessation efforts. For example, the Fagerstrom Tolerance Questionnaire (Fagerstrom, 1978) was identified as a validated measure of nicotine dependence. The modified version, the Fagerstrom Test for Nicotine Dependence (FTND), though a poor tool for reliability and validity was also noted to be a worthwhile instrument for this project as it is the most commonly used tool in smoking cessation research and allowed for comparable measures of cessation in this project (note several of the above articles utilized the tool) (Korte, Capron, Zvolensky, & Schmidt, 2013). Additionally, laboratory studies that aid in the assessment of smoking cessation verification were also identified. Many studies rely on self-report for smoking cessation; a less stringent indicator of true cessation. Confirmatory laboratory testing is a more reliable method than self-report. However, not all laboratory testing is ideal. For example, serum cotinine (a nicotine by-product) can be incorporated as a measure of compliance with cessation but the use of nicotine replacement therapy (NRT), specifically nicotine patches, will skew these lab values as the patient is still receiving nicotine to the blood stream via means other than cigarettes.

Carbon Monoxide (CO), on the other hand, is a more reliable test and can be utilized as a test of compliance as well as a mouth swab which has a meter attached which checks for levels of cotinine in oral mucosa. While biochemical validation was not used in this program due to expense and NRT interference it should be considered within the outpatient clinic setting for future confirmation of reported cessation for >30 days in order to ensure robust and accurate data.

Building on this literature review, a multi-modal, NP-driven smoking cessation education program was evaluated. Best practices incorporated into this program evaluation included the use of the FTND questionnaire to determine levels of nicotine dependence, video modules accessible from home regarding smoking cessation, weekly counseling sessions with NPs via telephone for resources, support, and additional education, as well as NRT prescriptions to aid with cessation attempts.

Theoretical Framework

The theoretical framework upon which this program was based is known as the “Health Belief Model” which encompasses the patient’s perceptions of illness as well as perceived benefits of intervention. The primary concept underlying the model, first described by psychologists in the 1950s, is that a patient must believe first that they are susceptible to whatever poor outcome a health behavior may entail. For example, a smoker must believe that smoking played a role in their need to undergo assessment for a cardiovascular problem that entails lifestyle modification, medication needs, or even a procedure. All patients in this program were seeing a cardiac specialist related to some ailment that prompted a referral. That concept brings about the next phase in the model, which is that the patient must perceive a certain level

of severity, disability or even death (Changing Works, 2019). This is applicable since the patient is being seen for a cardiovascular issue that needs worked up by a specialist. This psychosocial theory, when applied to smokers, gave rationale for the use of NP-driven smoking cessation education taking place during an outpatient specialty visit.

The patient must then realize a perceived benefit to smoking cessation, whether this is improved health, more expendable income, or simply a healthier lifestyle. While realizing a benefit the patient must believe that the benefits outweigh perceived barriers. The NP and healthcare system play a key role during this phase. If a patient watches free video modules in the office or at home, talks to an NP, and garners a prescription for NRT at their visit, along with appropriate follow-up the patient may be more inclined to engage in a behavior change. Being made aware of free support groups and being celebrated for continued cessation at regular intervals may allow the patient the self-efficacy needed to succeed in lasting change.

The health belief model speaks to the structure of the smoking cessation program as it seeks to support the patients enrolled on their journey to successfully separate from nicotine use.

Sample

The sample population consisted of adult, outpatient cardiovascular patients who were current smokers or smokers who had previously quit and restarted. All participants were volunteers.

Setting

The program evaluation took place at an outpatient cardiology clinic located in the southeastern United States and associated with a large, tertiary academic medical center located

35 miles away. The clinic typically sees >200 patients per day and is staffed by 3 nurse practitioners, 3 physicians and one physician assistant.

Methods

IRB approval was given in August of 2019 and deemed exempt due to program evaluation status. Cardiovascular patients were informed of the program and asked to participate. All participation was voluntary. No coercion occurred at any time. Patient who chose to forgo smoking cessation education program continued to receive standard smoking cessation counseling as it is an expected standard of care.

As this was deemed a program evaluation, the CDC's Framework for Program Evaluation six-step method was utilized. The steps include engaging stakeholders, describing the program, focusing on evaluation design, gathering credible evidence, justifying conclusions, and ensuring use/sharing lessons learned (Center for Disease Control and Prevention, 2017). In keeping with this framework, stakeholders were identified within the clinic setting. All clinical personnel were informed of the program including front office staff, nurses, NPs, and providers. This was done via email to all providers and then disseminated individually to office staff such as nurses and front desk personnel via the clinic providers. Additionally, the office administrator and clinic coordinator were made aware of the program. Fliers were made (figure 3), laminated, and placed both in the lobby (4) and in each exam room (9). These fliers were to encourage smokers to ask their providers about cessation resources and provide several internet resources for patients who were not yet ready to discuss cessation with their provider during their clinic visit. If a patient had been marked as a smoker in their social history by the front office staff prior to appointment, or noted to be a smoker during the RN's usual intake survey, they were

asked by their provider if they were interested in smoking cessation. This also occurred for established patients who were noted to be smokers.

Interested patients were informed of the four week program and asked if they were willing to watch cessation videos and receive calls each week for one month. If agreeable to participation, patients had the option of watching 1-2 videos during their initial visit or at a subsequent clinic encounter when they were waiting for testing (i.e. a stress test). If they chose to watch videos while waiting for testing, they were provided with a tablet and the link to the smoking cessation videos. The “Stop Smoking Today” videos were highlighted as the videos of choice yet all videos were provided and promoted as appropriate. All smokers were provided the link to the institutional video clips in the patient education repository on their after visit summary (AVS) regardless of whether or not they decided to enroll in the program.

The program lead was then notified of the patient’s interest in the program and they were placed into a created “patient list” in the EHR by the lead. Once weekly, the lead placed a call to the volunteer patients and a conversation took place which included asking about continued smoking, perceived barriers to smoking cessation, NRT utilized, video modules viewed, and an offering of resources/encouragement. The responses to the questions were recorded in a Microsoft® Excel® spreadsheet and de-identified. If the FTND survey had not been administered during their initial visit, it was performed during the first phone call. This allowed the lead to determine the level of nicotine dependence and offer appropriate levels of NRT therapy.

Patients who did not answer the phone were left a voicemail. Patients were encouraged to call between weekly follow up if needed and all encounters were documented in the EHR under

“telephone encounter” which allowed for protected documentation of any information necessary (NRT use, VM, cessation, etc) without billing a patient. At the end of the four week period, patients were asked 14 survey questions which included demographic information, smoking cessation questions, as well as a qualitative question related to the efficacy of the videos as well as of the program itself.

Procedures, Project Design, and Measures

The three nurse practitioners in the cardiac specialty clinic who performed the role of provider received a short in-service on the program and their role in inquiring about a patient’s desire for smoking cessation education during their visit and follow up phone calls. Nurse champions were identified to aid with categorizing smokers during their visit. Information about the program was disseminated to nurses as well as front office staff via individual conversations with the nurse practitioners for whom they worked and scheduled respectively. Upon arrival to the clinic, four laminated fliers informing patients of the smoking cessation program were available in the waiting area for patient review while waiting for their appointment time to begin. Nurses inquired with incoming cardiovascular patients about their current smoking status and level of interest in smoking cessation at the current time. The nurses inquired as a component of the patient’s intake questionnaire, which occurred with every visit to the clinic. Smoking status was to be addressed at that time as an element of the patient’s recorded social history within the EHR. An additional time frame for this question was during the visit with the nurse practitioner who asked this question when garnering the social history of the patient.

If the patient reported an interest in smoking cessation during one of these periods, the patient was congratulated on their decision to attempt cessation and subsequently given the

Fagerstrom Test for Nicotine Dependence (FTND) questionnaire by the nurse or NP. No name was required and the survey scores were then logged in the patient's EHR. The patient was provided the opportunity to view video modules on smoking cessation at the time of the clinic visit, during a follow up procedure such as when waiting for a stress test, and the link was also placed on the patient's after visit summary (a standardized discharge form given to every patient prior to leaving the clinic (AVS)) to be viewed at their convenience. The smoking cessation videos that were incorporated into the program already exist in a video repository for patient education but initial focus group questions revealed that healthcare personnel were not familiar with them and thus less likely to suggest their use to a patient.

There are 35 smoking cessation video clips currently available in the patient education repository and 11 of those are aimed directly at ways to quit smoking. There are four videos, each less than five minutes in length, entitled, "Stop Smoking Today", which were the program videos of choice due to their general, concise education in a limited time span. Additionally, the video entitled, "Stop Smoking: Products to aid with cessation" was also recommended so that patients could identify which, if any, NRT they would like to utilize as they attempted cessation. Of the 35 videos, no video was greater than six minutes in length. There were five videos available which described various pharmacological agents or NRT that aided with smoking cessation and if the patient so chose, they requested a prescription for any one (or a combination thereof) of the drug therapies during their visit or during follow up telephone calls (which took place weekly). The patient could access the videos at any point during the one month program (and beyond) and were not required to watch them in any particular order although the four part series, "Stop Smoking Today" was highlighted as the most concise and informative group of videos in the series for patients who reported cessation readiness. The patient received weekly

follow up phone calls to determine if they watched the videos and if not, what perceived barriers prevented viewing. Videos were available as an app or on any computer in order for patients to view or review these videos from home at any time.

To facilitate follow up, a weekly phone call from the program lead to the patient was made. The weekly call provided an opportunity for coaching and teaching as well as to provide encouragement for the patient to continue in their quest to quit smoking. The patients were called weekly to inquire about smoking cessation readiness or continued cessation. If the weekly check-in revealed that they were still ‘quitters’, a series of brief questions followed which helped to determine if the patient perceived the videos as contributory to overall success. In addition, the patient was asked how many of the videos were viewed as a data point to correlate number of videos needed for optimal cessation results. Questions regarding when the videos were watched and where (home vs. clinic visit) were also asked (figure 5). The final Fagerstrom Test for Nicotine Dependence (FTND) was administered at the one month mark (Table 4).

Patients were informed of their right not to participate in the smoking cessation education program. The program lead managed all data utilizing the EHR as a folder. This ensured that sensitive patient information was not shared with anyone outside of the program while also maintaining the patient’s privacy through the use of the secured software of the EHR.

A weekly survey was developed and administered by the program lead to ensure uniformity and to measure the effectiveness of the program with success being measured largely by those with continued smoking reduction or cessation. A final Likert Survey, also developed by the lead and approved by the IRB, was utilized at the end of the one month program to evaluate the program’s success and to aid with data analysis (figure 4). The survey included 14

questions which pertained to length of time as a smoker, how much smoking was done per day, and which sort of NRT therapy might have been used by the patient.

Data Analysis

All data was de-identified and placed into Microsoft® Excel® prior to being uploaded to SPSS 25 for final analysis. This program was utilized to analyze data measuring smoking cessation rates among those cardiovascular patients who opted for the nurse-driven smoking cessation education with supplemental video modules. Other data points were ascertained using demographic data such as age group, sex, gender identity and recent cardiac procedures while survey answers were used to correlate cessation to level of dependence, community resource utilization (support groups, meetings, etc), and number of videos watched. Descriptive statistics were utilized to develop frequency tables and to measure central tendencies of the group.

Results

Demographics. A total of 11 ambulatory cardiovascular participants enrolled in the four-week program from June 1st- June 13th, 2020. Demographic data (Table 2) revealed that of the 11 volunteers, 45.5% (n=5) were male and 54.5% (n= 6) were female. The ages of the participants ranged from the 36-75 years old with largest group being in the 46-55 range (36.4%, n=4). Interestingly, 6 of the 11 were >56 years old (54.6%). Education level among the group ranged from ‘some high school’ to ‘college graduate’ with the majority being high school graduates (36.4%, n=4). All participants had smoked for >10 years with the majority of the group (36.4%, n=4) having smoked for >41 years and 54.5% (n=5) of the participants smoking 0.5 packs per day. 81.8% (n=) of the patients in this program had undergone some sort of cardiac testing or imaging during the evaluation period.

The multi-modal approach again included the FTND, video module access, weekly phone calls by the program lead/NP, and counseling. The FTND was administered before the patient began the program and again at the end of the four-week period in order to test level of dependence as a possible correlation point within data. Six patients (54.4%) of eleven responded to the initial FND survey. Of those who responded, most were moderately dependent (45.4%, n=5) with one being low to moderate with a score of 3. Of the six who answered initially, only four answered the follow-up FTND (36.4%) and all but one participant had achieved a decrease in their level of dependence (Table 4).

While all but three participants answered at least one phone call during the four weeks, just four answered every week of the four weekly phone calls (36.4%) (Table 3). Participants were asked about the number of videos completed (all, none, some but less than half, more than half, etc). Participants were also asked if any videos were reviewed in the interim between initial clinic visit and the four-week mark. Three of the participants, 27.3% watched videos during their clinic visit. 81.8% (n=9) of the program participants watched videos in the clinic or at home or in both settings. The majority of the group responded that they viewed fewer than half of the videos with 2 participants reporting having watched more than half of the videos. Questions related to the use of any community support groups was also asked and of the 6 who responded to the question none had utilized community support groups or website forums to aid in cessation attempts. Ten participants responded to the survey question, “Did you use any pharmaceutical aids to help you quit smoking”, with five patients choosing to utilize therapy (45.4%) and five choosing to forgo it (45.4%). Of the five patients who utilized NRT, Chantix (varenicline) was prescribed most frequently (40%, n= 2) and non-prescription patches were also utilized by participants (40%, n=2). Wellbutrin (bupropion) was tried by one patient in the group (Table 5).

Most participants reported interest in the ‘cold-turkey’ approach or the incremental reduction plan also described in the video repository.

At the end of the four-week program, one participant (9.1%) had succeeded in total cessation. Three participants (27.3%) reported a reduction in smoking since beginning the program and 3 participants were still smoking at the same level as they were prior to the program’s start. Four patients did not respond to the survey question. Of the 36.4% of patients who answered all four weekly calls, all of them either quit smoking or attempted to reduce their nicotine usage by starting NRT (patches, bupropion, varenicline). However, only 3 of them (75%) watched videos and all endorsed watching less than half of the available videos. Of those who watched the videos, the most often watched videos were the nicotine replacement therapy education videos. Additionally, nurse practitioners recommended the 4-module series, “Stop Smoking Today” as a place to begin if patients were unsure of which videos to view first.

Discussion

When comparing cessation education and quit rates with the studies utilized to inform this program, it appears that this program is potentially effective at increasing cessation rates among cardiovascular patients in the outpatient setting. Andrew, Tinggen, and Harper noted a 13% reduction in smoking among primary care patients after one year of NP-driven smoking cessation educational quality improvement initiative while Harbman noted a 58% (n=7) reduction in smoking in the NP group vs. 23% (n=3) in the control group of her study. This program, while limited by participants and length of follow up, showed a quit rate of 9.1% with an even greater proportion of participants utilizing incremental reduction techniques as well as nicotine replacement therapy which may indicate future success at cessation.

Strengths/Weaknesses

This program had several strengths and three primary weaknesses. The key weaknesses were the size of the patient population engaged in the smoking cessation program and the length of follow up. Time was a limiting factor for this project, especially as evidence shows that those who quit smoking for a period longer than 6 months tend to stay ‘quitters’ (Moses, et al., 2017). Furthermore, the videos could not be individualized to specific patient populations (heart failure vs peripheral vascular disease). Applying the health belief model, the ideal videos would be tailored to speak directly to the patient’s condition and situation. Lastly, the program evaluation was based upon patient self-reporting both the FTND and the survey questions. Due to expense and NRT interference, biochemical validation was not utilized in this evaluation although incorporating these methods would increase the strength of these findings.

Strengths of this program evaluation include the examination of cessation techniques that may be useful to long-term cessation in a group of cardiovascular patients that need to stop smoking in order to avoid health complications. This is particularly important as this group is more vulnerable to complications related to smoking. Additionally, the process may lead to the introduction of standard work that might be useful to other populations as well. If reproduced with similar results a standard of care could emerge. Another strength is potentially optimizing the health of the community by having less smokers in society. A byproduct of this program might be increased revenue for the clinic while utilizing cessation education ICD-10 codes and monies saved via decreased admissions. Also increased savings exist for the patient who experiences monetary savings from health bills, less time missed at work, and the weekly cost of cigarettes. This is especially true in light of the recent increase in vice taxes on cigarettes, which went into effect two weeks into this program evaluation and which were specifically mentioned

as a motivating factor for patients to quit during weekly phone calls with the nurse practitioner. This tax made it such that the average price for a carton of cigarettes in the state wherein this project was carried out is approximately \$60.00. Ultimately, decreased smoking rates in vascular patients will result in savings in health care costs across the system and the nation.

Conclusions

An NP-driven, multi-pronged, program appears to be potentially effective for attempts at reduction and total cessation. The program evaluation data suggests that this may be an effective way of helping patients reach their smoking cessation goals. This program should continue to enroll willing participants and be modified as needed for optimal success of patients in the outpatient cardiovascular specialty clinic.



Figure 1. Flow Chart for Identification of Included/Excluded Articles.

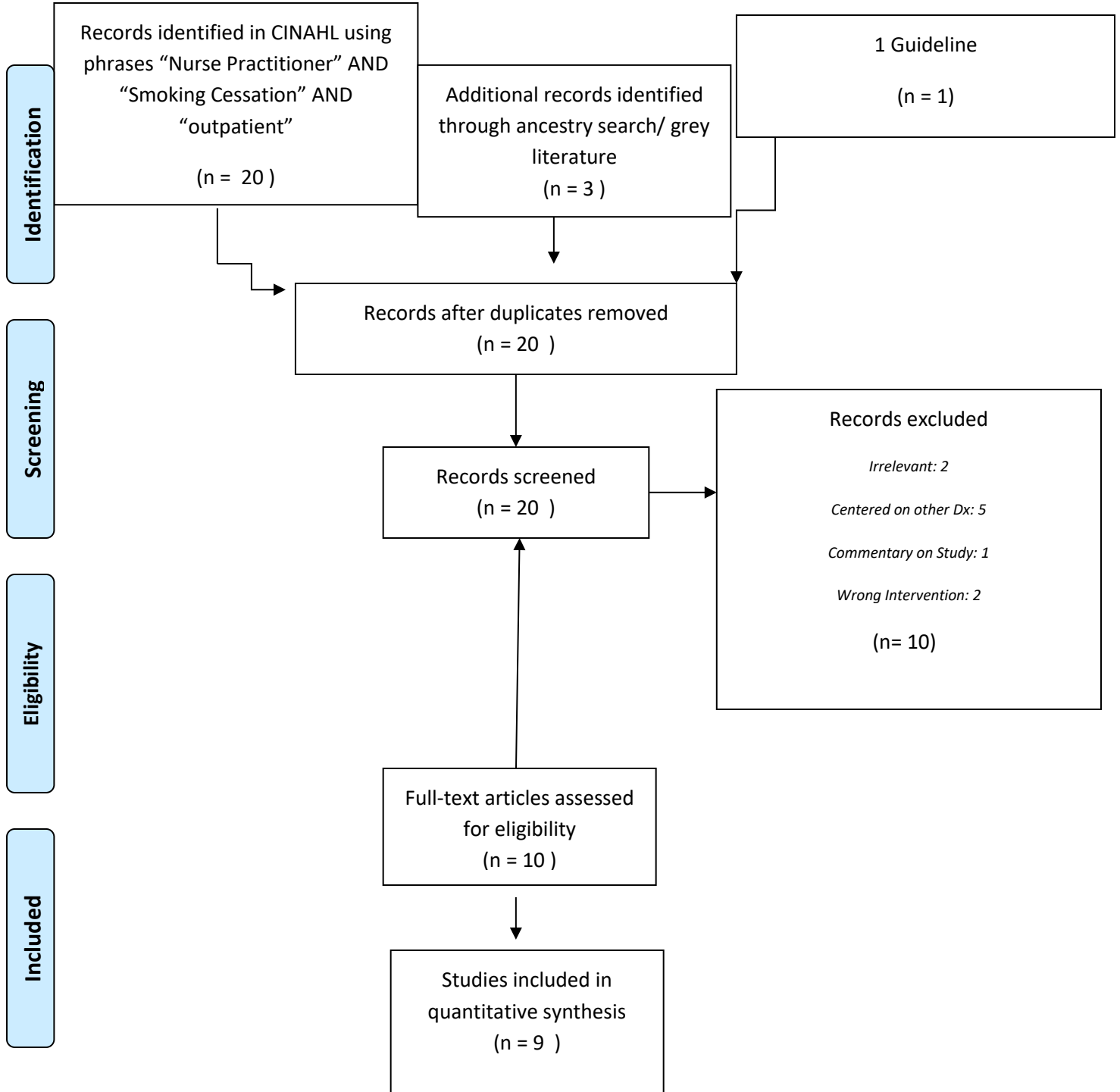


Figure 2. Fagerstrom Test for Nicotine Dependence

Fagerstrom Test for Nicotine Dependence (FTND)

Question
How soon after you wake up do you smoke your first cigarette?
Do you find it difficult to refrain from smoking in places where it is forbidden, e.g. in church, at the library, in the cinema?
Which cigarette would you hate most to give up?
How many cigarettes per day do you smoke?
Do you smoke more frequently during the first hours after waking than the rest of the day?
Do you smoke when you are so ill that you are in bed most of the day?

Figure 3. Lobby Flyer for Smoking Cessation

Want to Quit Smoking?

We can help!

We know quitting smoking can be very difficult and sometimes takes more than one try. Our nurse practitioners and providers are here to help guide you by answering questions, providing resources, and following up with you help ensure you stay a former smoker. Simply ask your clinician today during your visit if you'd like more information on quitting smoking.



Not ready to talk to someone? These websites are great resources:

<https://www.vdh.virginia.gov/tobacco-free-living/quit-now-virginia/> (telephone quitline 1-800-Quit-Now)

www.tobaccofree.org

www.lung.org (American Lung Association)

www.thetruth.com

Figure 4. Likert-Style Follow Up Survey

1. What is your gender?
Male Female M-F F-M Other _____
2. What is your age group?
18-25 26-35 36-45 46-55 56-65 66-75 76+
3. What is your education level?
Some Highschool, Highschool Graduate, Some college, College Graduate, Post-Graduate
4. How long have you smoked?
<5 years 5-10 years 11-20 years 21-30 years 31-40 years 41+ years
5. How much do you smoke per day?
.25 pack 1/2 pack 1 pack 1.5 packs 2 packs or more
6. Any cardiac procedures or testing/imaging last four weeks?
7. Did you quit during the last four weeks/beginning of this program?
Yes No I cut down, but did not quit completely
8. Did you watch the smoking cessation videos during your clinic visit?
Yes No Some of them
9. Have you watched any videos at home?
Yes No
10. How many did you watch in total?
All of them More than Half Half Fewer than Half One or two
11. Did you utilize community resources such as support groups or website forums?
Yes No
12. Did you use any pharmaceutical aids to help you quit smoking?
Yes No
13. Which aid did you use (circle any that apply)?
Chantix Wellbutrin Patches Gum Nasal Inhalant
14. If you quit smoking, are you still not smoking?
I quit smoking and I have not restarted

Is there anything you'd like to add about the videos or the process that might help us improve?

Figure 5. Video Modules watched at home and at clinic.

Videos	Clinic	Home	Total
<i>Yes</i>	27.2% (n=3)	72.7% (n=8)	81.8% (n=9)
<i>No</i>	63.6% (n=7)	9.1% (n=1)	9.1% (n=1)
<i>No Response</i>	9.1% (n=1)	18.2% (n=2)	9.1% (n=1)

Table 1. Table of studies utilized for this program.

Ref (author, year) and overall design	Subjects & Setting/ Period of Data collection	AIMS/Outcomes	Limitations

<p>Andrew, Tingen, and Harper, 1999</p> <p>quality management initiative</p>	<p>500 smokers from referral/ 12 months (2/97-2/98) of initial data collection with each smoker attending 0-4 sessions re: smoking cessation</p>	<p>The aim of this paper was to showcase NP efficacy in providing smoking cessation education to patients. Statistics compared quit rates among patients based on number of sessions attended as well as comparing quit rates with hospital quit rates prior to the opening of the smoking cessation clinic (run by NPs). A 13% reduction rate in smoking was noted in the primary care population after one year.</p>	<p>This is a one clinic study. Other interventions were also performed by the hospital system to encourage smoking cessation and thus present confounders. Patients had access to NP counsel between sessions as well, the use of which varied with each patient.</p>
<p>Graham-Garcia & Heath, 2000</p> <p>Retrospective Study/Questionnaire</p>	<p>202 CABG patients who underwent surgery at the VAMC in August, Georgia prior to March 1999 and were smokers at the time of surgery. N=80.</p>	<p>The aim of the study was to evaluate whether the suggestions of the AHRQ’s smoking cessation guidelines were being utilized within their hospital system and if so, if they were effective. Of the 80, 47% (n=38) quit smoking at some point in their lives, 40% (n=32) were still smoking at the time of their CABG and 13% (n=10) were never smokers. 32 patients quit smoking at the time of CABG and 25 of those endorsed having received provider counseling.</p>	<p>No results are given in this study of the effectiveness of NP drive cessation education as this study prompted the development of such a program.</p>
<p>Gubner, et al., 2019</p> <p>Mixed Methods</p>	<p>A mixed methods study across four clinic sites in San Francisco utilizing the EHR to determine receipt of smoking cessation services, estimate cessation attempts within the populations served, and use qualitative methods to determine barriers to the receipt of cessation care. The clinics were examined from July 2016-April 2017. N= 6310.</p>	<p>The Aim of the study was to evaluate whether patients were receiving the smoking cessation care recommended by various guidelines. This was driven by the Center for Medicare and Medicaid services “meaningful use” initiative which encourages the use of the EHR to push practice improvement forward. Qualitative data was obtained to see what barriers might exist to this care from the vantage point of staff and patients. 84.7% of people received provider counseling, 94.3% received</p>	<p>Recent cessation attempts don’t necessarily mean successful quitting, smoking status was not biochemically verified.</p>

		<p>cessation counseling from someone during their visit.</p>	
<p>Harbman, 2014. Prospective Cohort Study</p>	<p>N=65, patients in a large community hospital who suffered an acute MI at a tertiary care center with full cardiac services. Took place over one year, 2008-2009.</p>	<p>Aim was to evaluate the effects of NP care on the rate of provider implementation/patient achievement of evidence-based secondary prevention target goals (i.e. smoking cessation, blood pressure goals, cardiac rehab, exercise regimen) following an acute MI. results showed significant improvement in the achievement of target goals in patients when care was provided by an NP. 58% achieved cessation in the NP group (7) vs 23% in the control group (3). P value .11. 25% attended cessation clinic (3) vs 0 in the control group. P value .09</p>	<p>This was a single center study with one interventionalist. The study was small.</p>

<p>Virani et al., 2015 Comparison study</p>	<p>N= 883, 716 physicians and 167 APPs caring for 459,669 cardiology patients, nation wide</p>	<p>Aim was to determine whether there were clinically meaningful differences in the quality of care delivered by APPs vs physicians in a national sample of cardiology practices. The NCDR Pinnacle registry was used. Compliance with CAD, HF, Afib, were comparable but a higher rate of smoking cessation screening and intervention was found in the NP group 95% CI, 1.03 and 1.26 URR</p>	<p>. this study only analyzed the delivery of cardiac care measures, there may be other differences between providers. The results only analyze those enrolled in the PINNACLE registry which may not be generalizable enough.</p>
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Table 2

Demographic Data for Smoking Cessation Participants.

	<i>n</i> = 11	%
Gender		
Male	5	45.4
Female	6	54.5
Age (years)		
36-45	1	9.1
46-55	4	36.4
56-65	3	27.3
66-76	3	27.3
Education		
Some HS	2	18.2
HS Graduate	4	36.4
College Graduate	1	9.1
Prefer Not to Answer	4	36.4
Smoking (years)		
11-20	2	18.2
21-30	2	18.2
31-40	3	27.3
41+	4	36.4
Packs Per Day		
0.5	5	45.4
0.6-0.9	1	9.1
1	3	27.3
1.1-1.5	1	9.1
Cardiac Testing		
Yes	9	81.8
No	2	18.2

Demographic Data for Smoking Cessation Participants

Table 3

Outgoing Nurse Practitioner Led Weekly Calls with Cessation/NRT

	Week 1	Week 2	Week 3	Week 4	Total Calls	NRT/ Cessation
Patient						
1	N	N	N	N	0	S
2	Y	Y	Y	Y	4	C
3	Y	N	N	N	1	U
4	N	N	N	N	0	R
5	N	N	N	N	0	U
6	Y	Y	Y	Y	4	R
7	Y	Y	Y	Y	4	R
8	Y	N	Y	Y	3	S
9	Y	Y	Y	Y	4	R
10	Y	N	Y	N	2	S
11	N	N	N	Y	1	S

Notes: N = no; participant did not answer this call. Y = yes; participant did answer this call, C= Cessation at program’s conclusion, R= NRT use for reduction attempt during the program S= smoking, no cessation or NRT use at program’s conclusion, U=unknown

Table 4

Levels of Nicotine Dependence taken pre and post program using the FTND

Pre-Program LOD (n = 6)			Post-Program LOD (n = 4)		
n	%	Score	n	%	Score
1	16.6	7	1	25	5 to 0
4	66.6	5	1	25	5 to 4
1	16.6	3	1	25	5 to 6
			1	25	3 to 2

Notes: LOD = Level of dependence. Scoring is as follows: 1-2 = low dependence; 3-4 = low to moderate dependence; 5-7 moderate dependence; and 8+ high dependence.

Table 5

Rates of Nicotine Replacement Therapy

			<i>n = 11</i>		
Nicotine Replacement Therapy	Yes		No	Unknown	
	<i>(n = 5)</i>		<i>(n = 5)</i>	<i>(n = 1)</i>	
	<i>N</i>	%			
Chantix (Varenicline)	2	40			
Wellbutrin (Bupropion)	1	20			
Patches	2	40			

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‘Butting’ In:

Evaluating the Effectiveness of Nurse Practitioner-Provided Smoking Cessation Education in
Cardiovascular Patients

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No COI or support grants for this project

Abstract

The ill effects of smoking are clearly established yet many continue to smoke. The current standard of care for smoking cessation education is provider counseling of patients. This intervention proves to be most effective on smoking cessation rates if performed frequently as one part of a multi-pronged approach. Smoking cessation is particularly important in the cardiovascular population as the associated disease processes are often exacerbated by the pathophysiological effects of smoking. Therefore, it is imperative to examine and measure the success rate of a nurse-practitioner (NP) managed smoking cessation education program in the outpatient cardiovascular setting. A multi-modal smoking cessation education program taking place for a period of one month included the use of video modules, follow-up counseling, education related to nicotine-replacement therapy (NRT), and support resources by an NP. At the completion of the program available data supports the NP directed approach of integrating multi-modal smoking cessation education for the cardiovascular patient population in the outpatient setting. The patients who eliminated or reduced smoking for the one-month project period reported that the NP counseling in conjunction with video availability contributed to their success.

Background

Despite decades of attention to the ill-effects of smoking, tobacco continues to be the cause of one in every five deaths that occur and is the leading preventable cause of death in the United States (Center for Disease Control and Prevention, 2020). This, “exceeds the combined number of deaths from alcohol, cocaine, heroin, suicide, homicide, motor vehicle accidents, fires, and AIDS (Andrews, Tingen, & Harper, 1999).” According to the Center for Disease Control and Prevention (CDC), the increased risk of death within the smoking population is

largely due to a greater incidence of cancer, respiratory disease, and cardiovascular disease (2020). In addition to an increased risk of death, smokers are sick or hospitalized more often than non-smokers. Duffy et al., reports that smokers have twice as many hospital stays, stay in the hospital longer, and need more services while they are there (2008, p. 199). Furthermore, *Healthy People 2020* estimates that, “smoking-related illness costs the U.S. \$300 billion annually including nearly \$170 billion in direct medical care for adults and \$156 billion in lost productivity (U.S Department of Health and Human Services, 2020).” Meanwhile, studies demonstrate that smoking cessation aids in promoting wound healing, decreasing respiratory and cardiovascular complications, and decreasing overall mortality (Haug, Meyer, & Ulrich, 2011, p. 1369). Despite this knowledge, there is conflicting data regarding what should be considered the current standard of care as it pertains to providing cessation education and counseling. This is true even within a population more apt to be affected by smoking: cardiovascular patients.

Cigarette smoking is one of the most important modifiable risk factors in patients diagnosed with Coronary Artery Disease (CAD) or Peripheral Artery Disease (PAD). CAD is a condition wherein vessels of the heart become damaged or diseased due to inflammation, stenosis (narrowing), plaque buildup, and blockages. PAD is a condition that contributes to vascular issues such as ischemia and claudication which can lead to amputation or other surgeries. Smoking exacerbates CAD and PAD. Yet, most literature suggests that outpatient clinics do not offer much more than an intermittent suggestion to quit smoking or a brochure containing tips on how to succeed at smoking cessation, even to the high-risk CAD and PAD populations.

In 2000 the Agency for Healthcare Research and Quality (AHRQ) published guidelines on smoking cessation education. The document was updated in 2008 in a paper titled, “Treating

Tobacco Use and Dependence.” It contains ten key guideline recommendations for all populations and highlights telephone ‘quit lines’ (now available in all states) as a significant resource for smokers (Fiore, Jaen, & Baker, 2008). In addition to key guidelines, the introduction of the 5A’s (Ask, Advise, Assess, Assist, Arrange) and 5R’s (Relevance, Risks, Rewards, Roadblocks, Repetition) was introduced as a valuable intervention strategy (Malucky, 2019). A 2018 guideline issued by the American College of Cardiology issued an, “Expert Consensus Decision Pathway” for smoking cessation and guides clinicians through various treatment options and discusses some specialized patient populations such as those who are hospitalized or perioperative (Barua, et al., 2018). Despite these guidelines and for many possible reasons, it seems patients continue to receive little in the way of concerted effort from their provider regarding smoking cessation.

While no standardized curriculum outside of the aforementioned guidelines exist at present to teach clinicians smoking cessation education to their patients, nurse practitioners do fill a uniquely appropriate role that makes them well-suited to the task. More specifically, nurse practitioners have the background of nursing coupled with graduate-level education and the training to be providers making them ideal candidates for the role of smoking cessation educator. According to one article, “NP’s teaching skills are effective and appreciated by primary care resident physicians in an outpatient setting” (Porter, 2013) and patients are, “twice as likely to attempt quitting [smoking] as patients not counseled by a nurse practitioner” (Chaney & Sheriff, 2012). This lends credibility to the concept of an NP-driven smoking cessation program in an outpatient setting. Therefore, this paper examines a program evaluation model that is NP-driven in an outpatient setting among the population most vulnerable to the harmful effects of smoking: cardiovascular patients.

Clinical Question

Does an NP-driven multi-modal educational approach to smoking cessation in the outpatient adult cardiovascular patient population lead to sustained one-month cessation?

Methods

In keeping with the CDC's Framework for Program Evaluation, stakeholders must first be engaged and thus all clinical personnel were informed of the program including front office staff, nurses, NPs, and providers. This was done via email to all providers and then disseminated individually to office staff such as nurses and front desk personnel via the clinic providers. Additionally, the office administrator and clinic coordinator were made aware of the program and approval ensured to utilize the clinic site. IRB approval was given in August of 2019 and approved as a program evaluation. Fliers were made (figure 3), laminated, and placed by the program lead both in the lobby (4) and in each exam room (9). These fliers were to encourage smokers to ask their providers about cessation resources and provide several internet resources for patients who were not yet ready to discuss cessation with their provider during their clinic visit. If a patient had been marked as a smoker in their social history by the front office staff prior to appointment, or noted to be one during the RN's usual intake survey, they were asked by their provider if they were interested in smoking cessation. This also occurred for established patients who were noted to be smokers.

Interested patients were informed of the four-week program and asked if they were interested in watching cessation videos and receiving calls each week for one month. Patients had the option of watching 1-2 videos during their initial visit or at a subsequent clinic encounter

when they were waiting for testing (i.e. a stress test). If they chose to watch videos while waiting for testing, they were provided with a tablet and the link to the smoking cessation videos. All smokers were provided the link the video clips on their after-visit summary (AVS) whether or not they decided to enroll in the program.

The program lead was then notified of the patient's interest in the program and they were placed into a created "patient list" by the PI in the EHR. Once weekly, the lead would place a call to these patients and a conversation took place which included asking about continued smoking, perceived barriers to smoking cessation, NRT utilized, and an offering of resources/encouragement. The answers were recorded in a Microsoft Excel spreadsheet and de-identified. If the FND survey had not been administered during their initial visit, it was performed during the first phone call. This allowed the lead to determine the level of nicotine dependence and offer appropriate levels of NRT therapy.

Patient who did not answer the phone were left a voicemail. Patients were encouraged to call between weekly follow up if needed and all encounters were documented in the EHR under "telephone encounter" which allowed for protected documentation of any information necessary (NRT use, VM, cessation, etc.) without billing a patient. At the end of the four-week period, patients were asked 14 survey questions which included demographic information, smoking cessation questions, as well as a qualitative question related to the efficacy of the videos as well as of the program itself. One notable shortcoming of the program was not asking the patients which time of day was best to receive the follow up calls, which sometimes proved to a barrier in providing counsel to patients.

Results

Demographics. Eleven smokers volunteered to participate. Demographic data revealed that of the 11 volunteers, 45.5% (n=5) were male and 54.5% (n= 6) were female. The ages of the participants ranged from the 36-75 years old with largest group being in the 46-55 range (36.4%, n=4). Interestingly, 6 of the 11 were >56 years old (54.6%). Education level among the group ranged from ‘some high school’ to ‘college graduate’ with the majority being high school graduates (36.4%, n=4). All participants had smoked for >10 years with the majority of the group (36.4%, n=4) having smoked for >41 years and 54.5% (n=5) of the participants smoking 0.5 packs per day. 81.8% (n=) of the patients in this program had undergone some sort of cardiac testing or imaging during the evaluation period.

Program Evaluation Approach. The multi-modal approach again included the FTND, video module access, weekly phone calls by the NP, and a final questionnaire. The FTND was administered before the patient began the program and again at the end of the four-week period in order to test level of dependence as a possible correlation point within data. Six patients (54.4%) of eleven responded to the initial FND survey. Of those who responded, most were moderately dependent (45.4%, n=5) with one being low to moderate with a score of 3. Of the six who answered initially, only four answered the follow-up FTND (36.4%).

While all but three participants answered at least one phone call during the four weeks, just four answered every week of the four weekly phone calls (36.4%). Participants were asked about the number of videos watched (all, none, some but less than half, more than half, etc.). Participants were also asked if any videos were reviewed in the interim between initial clinic visit and the four-week mark. Three of the participants, 27.3% watched videos during their clinic visit. 81.8% (n=9) of the program participants watched videos in the clinic or at home. The majority of the group responded that they viewed fewer than half of the videos with 2

participants reporting having watched more than half of the videos. Questions related to the use of any community support groups was also asked and of the 6 who responded to the question none had utilized community support groups or website forums to aid in cessation attempts. Ten participants responded to the survey question, “Did you use any pharmaceutical aids to help you quit smoking”, with five patients choosing to utilize therapy (45.4%) and five choosing to forgo it (45.4%). Of the five patients who utilized NRT, Chantix (varenicline) was prescribed most frequently (40%, n= 2) and non-prescription patches were also utilized by participants (40%, n=2). Wellbutrin (bupropion) was tried by one patient in the group. Most participants reported interest in the ‘cold-turkey’ approach or the incremental reduction plan also described in the video repository.

At the end of the four-week program, one participant (9.1%) had succeeded in total cessation. Three participants (27.3%) reported a reduction in smoking since beginning the program. Of the 36.4% of patients who answered all four weekly calls, all of them either quit smoking or began using NRT to aid in their cessation attempt (patches, bupropion, varenicline). However, only 3 of them (75%) watched videos and all endorsed watching less than half of the available videos. Of those who watched the videos, the most often watched videos were the nicotine replacement therapy education videos. Additionally, nurse practitioners recommended the 4-module series, “Stop Smoking Today” as a place to begin if patients were unsure of which videos to view first.

Conclusions

An NP-driven, multi-pronged, individualized approach appears to be the most effective for attempts at reduction and total cessation. The program evaluation data suggests that this is an

effective way of helping patients reach their smoking cessation goals. This program should continue and be modified for optimal success of patients in the outpatient cardiovascular specialty clinic.

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