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The Impact of Text Messaging Based Smoking Cessation Interventions in Hospitalized Adult Smokers

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THE IMPACT OF TEXT MESSAGING BASED SMOKING CESSATION

INTERVENTIONS

IN HOSPITALIZED ADULT SMOKERS

By

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Submitted for Partial Fulfillment of the Requirements

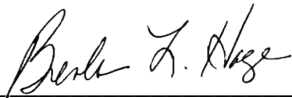For the Degree of

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Abstract

Tobacco use is the leading cause of preventable death and disease in the world (WHO, 2008). Through both primary and secondary exposure, tobacco use affects every body system and every individual to whom nurses deliver care. According to the Center for Disease Control and Prevention (2012), each year, an estimated 443,000 people die prematurely from smoking or exposure to secondhand smoke, and another 8.6 million live with a serious illness caused by smoking. Despite these risks, approximately 46.6 million U.S. adults smoke cigarettes (CDC, 2012). Tobacco abuse results in a costly burden on society. Annual smoking economic costs in the United States estimated for the years 2009–2012 were more than $289 billion, including at least $133 billion for direct medical care of adults, more than $156 billion in lost productivity, $5.6 billion (2006 data) for lost productivity due to exposure to secondhand smoke (CDC-MMWR, 2014). Quitting smoking is difficult and may require several attempts. Users often return to smoking because of withdrawal symptoms, stress, and weight gain (CDC, 2014). Stopping smoking is associated with many health benefits such as reducing the risk of lung and many other forms of cancers, reducing heart disease and reduced respiratory symptoms, and the reduction in the development of chronic obstructive pulmonary disease (COPD), (CDC, 2014). According to the CDC (2014), of the current U.S. adult cigarette smokers, 68.8% report that they want to quit completely. Starting in 2002, the number of former smokers has exceeded the number of current smokers. Smoking cessation is offered in many different options and is supported by many insurances. The purpose of this evidence

based project was to add to the current knowledge and demonstrate how the use of a smart

phone application can be translated into real world clinical practice to improve quality of care

to the adult smoker wishing to obtain cessation. The 7-day follow back count of cigarettes per

day along with the Nicotine Dependence Symptom Scale questionnaire was used to measure

the effectiveness of the intervention and the degree of dependence from the baseline data at pre-

intervention. The evidence based change project was based on the Transtheoretical Model of

Behavioral change as it guides people to act on new behaviors modifying problem behaviors to

acquire positive ones. Thirty-one potential participants were approached to participate in the

project. Six participants were identified as interested in smoking cessation and agreed to

participate. Soon only five would complete the project as one withdrew due to lack of interest.

The data completed was analyzed and outcomes demonstrated that smoking cessation

assistance through the help of a smart phone application can offer support and added

motivation to quit smoking if the participant was interested in cessation. Additional scholarly

inquiry regarding the topic is recommended.

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Chapter One: Introduction and Overview

As a quality improvement initiative, the Doctor of Nursing Practice (DNP) project was to focus on direct care of the patient populations through the evaluation of evidence based care, delivery of care, the setting of healthcare policy, and leading and managing healthcare systems, (Moran, Burson, Conrad, 2014). Through the incorporation of the DNP Essentials, the goal was to generate evidence through practice thus guiding improvements in process and outcomes of care (American Association of Colleges of Nursing, [AACN], 2006). Information technology was utilized to implement education initiatives and support practices of tobacco cessation.

The purpose of this DNP project was to assess the effectiveness of cell phone based smoking cessation intervention on hospitalized adult smokers who wish to quit smoking. Healthcare practice guidelines suggest asking, advising, and assessing for tobacco use, then assisting with adherence by arranging cessation services (Riley & Augustson, 2012). This has been a less than a feasible practice due to limited time and inadequate training of healthcare providers in the inpatient setting. The growing ubiquity of mobile phones allows for the delivery of tobacco treatment by supplementing visit based outreach, thus offering an effective method which can reach a greater population at any time throughout the day. The goal of the project was to reduce the tobacco consumption of the identified adult smokers and to enhance the likelihood for them to achieve cessation. People who stop smoking greatly reduce their risk for disease and premature death. Although the health benefits are greater for

people who stop at earlier ages, quitting is beneficial at all ages (CDC, 2014). This chapter, notes the background and significance of smoking, the direct and indirect cost of tobacco abuse, and healthcare outcomes of this population. This chapter will also discuss the improvements in health that have occurred due to the advances in information technology which have improved the delivery of information as well as communication among health care providers and patients.

Background

Tobacco use is the leading cause of preventable death and disease in the world (WHO, 2008). Through both primary and secondary exposure, tobacco use affects every body system and every individual to whom nurses deliver care. According to the Center for Disease Control and Prevention (CDC, 2015), each year, an estimated 480,000 people die prematurely from smoking or exposure to secondhand smoke, and another 8.6 million live with a serious illness caused by smoking. Despite these risks, approximately 42.1 million U.S. adults smoke cigarettes (CDC, 2015). Tobacco abuse results in a costly burden on society as annual smoking attributable economic costs in the United States estimated for the year 2013 were more than $300 billion, including at least $170 billion for direct medical care of adults, and more than $156 billion in lost productivity. (CDC, 2015, para. 3).

Smoking tobacco is strongly linked to the development of cancer. Cigarette smoking causes many types of cancer, including cancers of the lung, esophagus, larynx, mouth, throat, kidney, bladder, pancreas, stomach, and cervix, as well as acute myeloid

leukemia, (National Institutes of Health (NIH) (2015). The U.S. Environmental

Protection Agency, the U.S. National Toxicology Program, the U.S. Surgeon General,

and the International Agency for Research on Cancer have classified secondhand smoke

as a known human carcinogen (as cited in NIH, 2011). Inhaling secondhand smoke

causes lung cancer in nonsmoking adults. The U.S. Surgeon General estimates that

living with a smoker increases a nonsmoker's chances of developing lung cancer by 20

to 30 percent (NIH, 2011). Quitting smoking reduces the health risks caused by

exposure to tobacco smoke. The CDC (2015) suggests that nicotine dependence is the

most common form of chemical dependence in the United States. The addiction to

tobacco delivered nicotine can be as strong as to substances such as cocaine, heroin and

alcohol. Of the more than 7,000 chemicals in tobacco smoke, at least 250 are known to

be harmful, including hydrogen cyanide, carbon monoxide, and ammonia (NIH, 2011).

Quitting smoking is difficult and may require several attempts. Users often

return to smoking because of withdrawal symptoms, stress, and weight gain (CDC,

2014). Stopping smoking is associated with many health benefits such as reducing the

risk of lung and many other forms of cancers, reducing heart disease and reduced

respiratory symptoms, and the reduction in the development of chronic obstructive

pulmonary disease (COPD), (CDC, 2014). According to the CDC (2014), of the current

U.S. adult cigarette smokers, 68.8% report that they want to quit completely. Since

2002, the number of former smokers has exceeded the number of current smokers.

Smoking cessation is offered in many different options and is supported by many

insurances. Popular methods of quitting involve clinical intervention, counseling (individual, group or phone), behavioral therapy, and programs delivered by mobile phones (CDC, 2014). Medications for quitting can be used alone or with noted counseling services and include nicotine replacement (NRT) and prescription non-nicotine medications such as bupropion SR, and varenicline tartrate (CDC, 2014).

Significance

Tobacco use cessation provides immediate and major health benefits and is considered the gold standard in cost-effective disease prevention strategies (CDC, 2007). Newport (2013) noted, "most current smokers in the U.S. would like to give up smoking, 85% of smokers say they have, in fact, tried to quit at least once in their lifetime, including 45% who have tried at least three times"(para, 4). Smokers who are hospitalized have an opportunity to initiate cessation because U.S. hospitals are smoke free. Tobacco control standards were first established by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO) and Centers for Medicare and Medicaid, which made hospitals the first site to ban workplace smoking (JCAHO, 2007). Hospitals' quality of care standards includes tobacco measures. Hospitalization has been identified as a teachable interval, where perceived vulnerability to the damage of smoking and the motivation to quit may be high (Barta and Stacy, 2005). Hospital systems have a responsibility to reduce nicotine addiction by assisting patients with smoking cessation.

Improvements in health occurs on many levels and requires a steady growth of information and communication. Technology is often used in research and education, knowledge transfer, social media, service delivery and health promotion (Blake, 2008). Mobile technology is increasingly used in telemedicine, monitoring of patient symptoms and quality of life, and the delivery of health interventions. Mobile communication is emerging as an important medium which facilitates improved provider-patient communication. The future use of advanced communication systems in healthcare is projected to increase in use and capability. There has been a recent increase in the development of health promotion programs which involve text messaging, either as an intervention or in combination with other technology (Blake, 2008). Wireless text messaging has shown potential in delivering smoking cessation education. Rigotti, Bitton, Kelley, Hoeppner, Levy and Mort (2011) demonstrated the effectiveness of offering population-based tobacco treatment that increased the ability to deliver supplemented clinic-based care. Their easily accessible, free treatment provided nicotine replacement (NRT) and counseling via communication technology, which demonstrated high rates of self-reported short term cessation. Approaches to smoking cessation have expanded options and often required multiple attempts until cessation is achieved. The United States Department of Health and Human Services (HHS, 2000), suggests that tobacco dependence is a chronic disease in which the majority of smokers typically cycle through multiple periods of relapse and remission.

The purpose of this project was to assess the effectiveness of a text messaging method of cessation support, which was believed to result in the highest possible level of success in smoking cessation. The program can be accessed at any time the participant may need encouragement or advice. The population group received regular personalized text messages providing smoking cessation motivation, support and tips for quitting based on the participants' response to questioning. Several mobile phone apps are available depending on device. Android and iPhone are the two leading smartphone operating systems which offer a variety of selections. Multiple applications (apps) are free and can offer a personalized plan to quit smoking that involves evaluation of current smoking status, triggers, goal setting, and preferences according to needs, (smokefree.gov, 2014). Evidence builds for short message service (SMS) as an intervention for smoking cessation, although little literature is available about smartphones in public health. Specific applications have been studied and do not support one device over another, but rather agree that the most effective application for cessation is the one that supports the approach that the individual considers successful and motivating. Comstock (2012) suggested considering applications that will focus on goals, involve real time interventions, and are something that the participant can stick with for a period of time to achieve their goal. Effectiveness of these smoking cessation applications has been demonstrate in the short term. Shared decision making, collaborative goal setting, and education empower patients with tobacco abuse and dependence and allows them to successfully engage in problem solving.

Advance practice nurses (APN) are in a critical position to identify the needs of the smoker, to evaluate the trends of abuse, and identify the impact of health outcomes of continued abuse. Tobacco dependence is a chronic disease that often requires repeated intervention and multiple attempts to quit (Fiore et al., 2008). Brief tobacco dependence treatment is effective, and every patient who uses tobacco should be offered at least brief treatment by a trained clinician, such as an APN to address this need. The American Medical Association (2000) notes that primary care providers, insurers, and administrators, which are all roles now occupied by APNs, now have an unprecedented opportunity to reduce tobacco use rates in the U.S. and consequently the burden of illness, death, and economic cost resulting from tobacco use.

Problem Statement

Tobacco abuse and its resulting health problems often lead to patients' hospitalization and chronic symptom management. Multiple attempts at cessation are often noted to be a failure and it is noted that many attempts to quit smoking are often needed to be successful. Technology has made the monitoring of health and symptoms management easier and has augmented the support system for many trying to quit smoking. Strategies that reduce the tobacco consumption and promote self-efficacy for the prevention, support, and treatment of tobacco abuse are needed to exemplify how evidence based research can be rendered beneficial.

Question Guiding Inquiry

Foreground questioning, asking what intervention most effectively leads to an outcome, resulted in the question which is posed using a PICO-T format (Melnyk & Fineout-Overholt, 2011). Components of the PICO-T include, P- Population of interest, I-Intervention, C-Comparison, O-Outcome, T-Time frame. Evidence based practice (EBP) has typically guided clinical care. A well-constructed, focused clinical question outlines the steps of the EBP process.

Question Guiding Inquiry (PICO-T): The original PICO-T question guiding this scholarly inquiry for the purposes of EBP was, "In the hospitalized adult, 18 years old and above with tobacco abuse disorder, does the use of text messaging based, smoking cessation intervention, provided through a smart phone application, influence tobacco use, through a reduction of smoking, when followed for a 10 week period?"

Population (P): The population of interest for this EBP included adult inpatients, 18 to 60 years of age who were identified as smokers, and those that had mobile phone subscriptions with unlimited texting service. The inclusion criteria for further evaluation for participation included: English speaking adults over 18 years of age to 60 years of age, those owning a smart phone with unlimited texting ability, those that know how to use the smart phone, those willing to quit smoking and willing to participate, admitted to the progressive care unit (PCU) of a local community hospital in Wilkes-Barre Pennsylvania.

Intervention (I): The intervention for the EBP project involved the use of the free text message based, smoking cessation program supplied through an android or iPhone. The participant was questioned about their willingness to quit smoking. If willing, they were asked their tobacco consumption through the use of the 7-day follow back cigarettes per day count and their nicotine dependence symptom scale (Appendix H). The participant was asked to subscribe to the app at the first meeting and establish a quit date within that first week.

Comparison(C): A comparison group does not apply for the intervention. A comparison was made between the data obtained at the first encounter and those subsequent of using the smoking cessation application.

Outcome (O): The anticipated outcomes of the EBP were the reduction or cessation in smoking consumption as evident by the reduced number of daily cigarettes noted on the 7 day follow up tracking log and a reduction in dependence in tobacco as noted by a reduction in the score of the Nicotine dependence symptom scale (NDSS). These questionnaires were administered initially and at a two week interval for a 10 week period.

Time. (T): The time frame for the EBP implementation was anticipated to be 10 weeks. The final outcome measures were administered every 2 weeks following the beginning of the intervention for a duration of 10 weeks.

System and Population Impact

Tobacco abuse is a significant problem in the United States. The resultant ill effects that are created from smoking have lingering consequences that affect this population, families, communities, and the healthcare systems. There are extensive health risks to those exposed to second hand smoke. There are also psychosocial risks to members of the smoking community from chronic illnesses. Finally, the financial impact associated with chronic illness, repeated hospitalization, and loss of work are considerable at this time when health promotion and increased access to care are a major governmental focus.

Purpose, Aims, and Objectives

The results of the EBP in reducing tobacco consumption were expected to provide valuable data supporting the use of cell phone applications for the assistance in smoking cessation in this population. Smoking remains the most significantly modifiable, factor contributing to the development of many cancers and chronic diseases. With the implementation of the Affordable Care Act (ACA), most private health insurance plans are now required to cover tobacco cessation benefits as a preventive service (American Lung Association, 2014). On May 2, 2014, the U.S. Departments of Health and Human Services, Labor and Treasury issued guidance on insurance coverage of tobacco cessation as a preventive service. The plan includes screening and funding for two quit attempts per year.

The purpose of the EBP in addressing smoking cessation efforts was to demonstrate how research and new technology can be applied to the healthcare setting. This DNP project can augment the CDC's Best Practice for Comprehensive Tobacco Control Programs by integrating evidence-based guidelines that include cell phone based, smoking cessation messaging and support. This service offered to the hospitalized adult smoker, can link accessible smoking cessation interventions to the community and thus capture the patients that may not attend office based counseling. The intervention can follow the patient beyond the clinical setting and support the patient in the arenas where most cues to continue smoking are the greatest. The aim of the EBP is to reduce the individual participant's tobacco consumption or achieve cessation, which offers the potential of improving overall health and reducing the potential of developing cancers and chronic disease.

In conclusion, the need to focus on smoking cessation in the adult population and its consequences is needed in the hospital setting. The intervention that begins during a time of potential recognition of the need for change has the possibility of success. It has been recognized that new methodology for implementation of interventions can offer convenience and added support. This patient centered approach to smoking cessation offers a more complete approach to patients to quit smoking.

Chapter Two

Review the Evidence/Literature

The review of literature provides up-to-date evidence-based recommendations for improvement of the problem in practice. Analysis of significant literature assisted in the development of a framework that contributed in the development of the body of knowledge related to the topic of interest. Smoking cessation has long been an addiction proven to be linked to many cancers and chronic diseases. According to Melnyk and Fineout-Overholt (2011), finding the right information to answer the given question often depends on the source of information. This chapter will offer an overview of the most relevant data in support of the most significant and up-to-date approaches to smoking cessation. Pharmacotherapy and behavioral counseling have long been standards of treatment, this review will uncover methods to increase the appeal and utilization of standard and contemporary treatments. The following review of literature will focus on methods used to search and evaluate the literature, appraisal of the findings and limitations found within the search.

Methodology

An in-depth literature review was completed to determine the best evidence in support of the focus of interest. Recources were located using MEDLINE, Pub Med, Cochrane database of systematic reviews, Ebsco, Healthsource, Cumulative Index of Nursing and Allied Health Literature (CINAHL), and Clinical Practice Guidelines.

Search terms included: "smoking cessation", "mobile phone applications", "quit smoking", "hospitalization", "cell phone messaging", and "adults". Search strategies began with a PubMed broad search of "smoking cessation" which attained 29,091 hits. An advanced search included the key words that were added such as "mobile phone app", which resulted in 4 hits. These search words were used in combination and individually; smoking cessation AND hospitalization = 700 hits. Further search yield=Smoking cessation=16, 428; Smoking cessation AND standards=147, and hospitalization= 2; Smoking cessation AND Guidelines= 373; SMOKING CESSATION AND guidelines AND RCT= 3; Smoking cessation AND Guidelines AND Systemic reviews= 91; Smoking cessation AND Mobile phone =41, good results substantiating the use for mobile phone app, RCT noted with specific disease focus. Smoking cessation AND Texting = 30, again similar findings as above but good information Help Quit smoking=347, great articles with RCTs, some were saved and noted below. Boolean searches were used with words in combination and phrases. The use of AND, OR, and NOT were used to limit, widen and define the search.

Relevant systematic reviews and randomized controlled trials were identified within the search. Studies were found that supported the use of the internet and text message application for incorporating smoking cessation activities in varied populations. Guidelines discussed the use of 5A's as an approach to screening for tobacco abuse. Other articles were key in the evaluation of other quit smoking options and their success or failure. A newsletter from *Chest Physicians* reviewed a 6 month

follow up of several different interactive text-messaging programs, which lead to another journal article. This newsletter also suggested some shortcomings found in their review. Time frames were narrowed to articles published with dates ranging 2000-2015 with the focus on the latest available data. Publications were limited to psychological, medical, and nursing sites. Studies were limited to English speaking. Types of studies used were systematic reviews, randomized control trials, guidelines, and various scientific review articles. Bibliographies of relevant articles were also searched for discovery of additional articles. The only exceptions to the above guideline was any groundbreaking study worthy of inclusion.

The most recent data evaluating the topic of interest were searched until no new distinguishable data were discovered within the date ranges. Levels of evidence noted within the search for relevant data included: systematic reviews, randomized controlled trials, cohort or case co troll studies, journal reviews, and national clinical practice guidelines.

Findings

The vast majority of literature found, agreed that smoking cessation reduced the risk of heart and lung diseases, as well as, chronic pulmonary diseases and many cancers. The United States Public Health Service Report published a consortium representative report of *Clinical Practice Guideline for Treating Tobacco Use and Dependence* (2008) that offers recommended guidelines for smoking cessation. The aim of the guideline is to provide strategies to help smokers who are willing, to quit

smoking (CDC, 2008). The guideline developers, panel, staff, and consortium representatives are listed on the front of the report. The target users of the guideline are noted to be primary care clinicians, tobacco dependence treatment specialists, and health care administrators, insurer, and purchasers. The guideline is an updated clinical practice guideline and is a product of 18-member Tobacco use and Dependence Clinical Practice Guideline Panel, consortium representatives, consultants, and staff.

The guideline was developed based upon a partnership among federal government and non-profit organizations comprised of several agencies specializing in scientific-based methodology and expert clinical judgment to develop recommendations on the treatment of tobacco use and dependence. This resource offers system-level changes designed to promote the assessment and treatment of tobacco use. Tobacco dependence is viewed as a chronic condition similar to any chronic medical condition that warrants repeated treatment until permanent abstinence is achieved. The panel employed science-based methodology and expert clinical judgment to develop recommendations. Peer reviews were accepted and public comment invited to evaluate the validity, reliability, and utility of the guideline for clinical practice. Through the meta-analysis conducted for the guideline, the impact of treatment regarding tobacco dependence was investigated and a strength of evidence rating was assigned based upon its quantity and quality of empirical support for the recommendation (CDC, 2008). Intervention are rated and the classification are noted, A through C, in which A will denote the strongest relevant recommendations consistent with research findings. The

guideline provides information regarding areas of future research. The economic implication of guideline use was not noted. The section entitled *Hospitalized Smokers* clearly identifies the population of focus for this project. This section addresses the hospitalized smoking patient. The interventions noted within the guideline clearly follow capstone recommendations and are directly related to the target population within the PICO-T. The recommendations provided throughout the guideline were comprehensive and provided resources for varied implications. The guideline can be applied to many specialties in healthcare.

The National Center for Chronic Disease Prevention and Health Prevention of the Center for Disease Control and Prevention (CDC, 2014), established *Best Practice for Comprehensive Tobacco Control Programs* which is an evidence-based guide, an updated version, to help states develop and establish comprehensive tobacco control programs. Major goals were to promote health systems change, expand insurance coverage and utilize proven cessation treatment, as well as, supporting quit line capacity and promote the expansion of emerging technologies. The guideline developers are listed on the front cover of the guideline. The Executive Summary notes that a 2007 Institute of Medicine (IOM) report represented a blueprint for this best practice guideline. The guideline has been updated in accordance with the changes that were instituted through state funded tobacco revenues for tobacco control. Target users were noted to include; youth, the general community, and societal groups that include high

risk populations such as those in mental health facilities and those community health

centers.

The guideline was based upon research and specific details and strategies have

been modified throughout the years. The various sections did not note risks and

benefits. The recommendations note justification for interventions with representation

of state tobacco control efforts and new implementations as encouraged by

governmental funding. All references were listed following each section of

recommendations. The entire guideline is not specific to the PICO question as noted in

the previous section. There is a section, *Promoting Health System Change*, which is

directly related to the PICO question. This section notes that the goal of the healthcare

system is to ensure that every patient is screened for tobacco use. This is accomplished

through the approach summarized as the '5 A's", 'asked about tobacco use, advise to

quit, assess willingness to make a quit attempt, assist in the quit attempt, and arrange

follow-up" (CDC, 2014, p 34). No barriers to implementation were identified. No

economic implications were noted. The 5A's within this guideline are applicable to the

target population within the PICO.

The guidelines were evaluated using the AGREE instrument for critical

appraisal. The guidelines were comprehensive of the aspects of general care required

for the treatment of smoking cessation. No significant weaknesses were evident and the

guidelines provided sound evidence for decision making. The guidelines were felt to be

trustworthy and valid. The scope, purpose, clinical question, and relevant patient

population were covered upon review. Stakeholders, professional groups, and target groups were identified within the guideline. The clarity was noted as the guideline was specific and unambiguous. The guidelines had applicability to the project as it supported the framework for the EBP.

Rigotti, Munafo, and Stead (2008) in a Systematic Review, noted that smokers who were hospitalized had the opportunity to initiate smoking cessation because the United States hospitals are smoke free. The primary goal of the study was to note effectiveness of smoking counseling that began during hospitalization. The authors' methodology for data collection was noted. The researcher utilized the Cochran Tobacco Addiction Review Group's register of trials, which included results of systematic searches, updated quarterly, of MEDLINE, PsycIFO, EMBASE, and conference abstracts. Rigotti et al. (2008) note the following search words: smoking cessation, nicotine dependence, nicotine addiction, and tobacco use. The researchers used randomized and quasi-randomized controlled trials of smoking cessation interventions that began during hospitalization. They included trials that recruited hospitalized smokers regardless of their intention to quit smoking and recruited only smokers who desired to quit after discharge. Further inclusion criteria is noted interventions that were initiated during hospitalization and aimed to increase motivation to quit, assist to quit, or avoid relapse. They developed four categories of counseling and determined delivery by physician, nurse, psychologist, smoking cessation counselors or other staff. Exclusion criteria was described as secondary prevention or

cardiac rehabilitation trials that did not recruit based upon smoking history and trials in patients hospitalized for psychiatric disorders or substance abuse. The control group was offered usual care.

The review included 33 articles; 16 of 33 articles regarded sustained abstinence while 27 of 33 noted to include self-reported quitting. In the pooled analysis, the relative effect of intensive early hospital based counseling interventions for patients (OR, 1.81; 95% CI, 1.53-2.15) which was slightly higher for cardiovascular diagnosed patients (OR, 1.43; 95% XI 1.17-1.75). Limitations noted within the review suggested the need for longer follow up, assessment of the cost-effectiveness of counseling and the impact on health and healthcare utilization. Another limitation noted that counseling was more effective when provided by research staff, and not as effective when provided by an untrained respiratory therapist. This makes it difficult to compare intensity of counseling interventions. This may reduce the generalizability and effectiveness of smoking cessation counseling interventions.

This systematic review demonstrates support of the proposed intervention. It is felt that hospitalization may also increase a smoker's motivation to quit because illness, especially if tobacco related, increases a smoker's perception of vulnerability to the harms of tobacco use, thus providing a teachable moment, (Rigotti et al., 2008). Illness brings smokers to the health care setting, where identification of smoking can begin and smoking cessation interventions can be provided. The study concluded that offering smoking cessation counseling to all hospitalized smokers is effective as long as

supportive care continues for more than a month after discharge. This systematic review did include studies comprised of patients closely related to those within the proposed PICO.

Another study investigated the utility of a healthcare system adding the direct-to-patient program, which tested the effectiveness of supplemental clinic-based care with a population-based direct-to-smoker (DTS) outreach offering easily accessible free tobacco treatment. This Randomized Controlled Trial (RCT) noted by Rigotti et al., (2011), compared usual care to usual care plus DTS outreach. The population chosen was smokers among a primary care, $\geq$18 years of age, had a telephone, and had made an office visit within the study time frame. Participants were selected from the population during 1 year (July 2009-June 2010), for a total of 1486. All 19 provider participated. Those excludes were those who were nonsmokers or not appropriate to contact for telephone counseling. 1486 were stratified by health care provider. 413 remained after exclusions.

In the intention-to-treat analysis adjusted by logistic regression for age, gender, race, coronary disease, and diabetes, a higher proportion of the DTS group, compared to controls, had used NRT (11.6%vs 3.9%, OR =3.47' 95% CI=1.52, 7.92) or any tobacco treatment (14.5% vs 7.3%, OR=1.95, 95% CI =1.04, 3.65) and reported being tobacco abstinent for the past 7 days (5.3% vs 1.1%, OR =5.35, 95% CI -1.23, 22.32) and past 30 days (4.1% vs 0.6%, OR=8.25, 95% CI =1.08, 63.01), (Rigotti et al, 2011). The pro-

active offer of free NRT and counseling nearly doubled smokers' likelihood of using

support.

The study noted limitations such as offering only short term results, only self-

promising strategy to offer tobacco treatment beyond the office and influences a

healthcare system's resources to improve the health of the population it serves. The

conclusion is promising and applicable to the PICO noted population. The intervention

of using a direct-to-patient NRT and counseling to supplement office-based care notes

positive change in smoking outcomes in the short term.

The effects of digital delivered smoking cessation intervention was also

examined by Brendryen and Kraft (2008) in a two-arm Randomized Controlled Trial

(RCT) based in Norway, investigated the treatment group who received the internet and

cell phone based *Happy Endings* (HE) intervention over a 54 week period. The aim of

the study was to test the effectiveness of Happy Endings intervention verses self-help

treatment book and the addition of nicotine replacement to both groups. 93% in the

Happy Endings group used NRT and 87 % of the booklet group used NRT, the

difference was not significant (X2=3.31, p=0.07) Abstinence was measured through a

web based or telephone-based interview, and was repeated at intervals. The subjects

were recruited by means of banner advertisement in internet newspapers. Recruitment

lasted September 9-18, 2005. Those included were those willing to make an attempt to

quit smoking, were ≥18 years old, smoked 10 or more cigarettes per day and had access

to email, cell-phone, and internet on a daily basis. 750 people completed the online

questionnaire and 471 were eligible. According to power analysis, only 400 subjects were required so another 71 were rejected.

The treatment group reported clinically and statistically higher repeated points of abstinence as compared to the control group, 22.3% vs 13.1%; OR =1.91, 95% CI; 1.12-3.26, p= 0.02; intent to treat, (Brendryen et al., 2008). Among the one month abstainers, the mean number of days of NRT use was higher in the treatment group [M=5.1, SD =2.6] than the control group [M=3.9, SD =3.0; t=2.43, P= 0.02]. The Happy Endings intervention succeeded in persuading NRT users to use NRT more frequently. Pearson's r between pre- and post- cessation self-efficacy (SE) was 0.31 (p<0.001). The level of post-cessation SE was notably higher in the treatment group (M-5.10, SD -1.41) than in the control group (M=4.38, SD =1.31. t=5.18, p< 0.001). Limitations noted within the study describe the HE program as being high intensity, meaning its multiple reminders, combination of e-mails and telephone follow-ups, distribution of follow-up calls all throughout the day. This type of high intensity program may not be acceptable to all smokers. Generalizability is a main concern, due to the self-selection recruiting process. Additionally, NRT use may have influenced the representativeness of the sample. This trial demonstrated that a digital, automated interactive intervention increased quit rates, and showed psychological support can be provided effectively by means of modern mass communication technology. HE failed to persuade subjects to become NRT users, but successfully produced higher NRT

adherence. This conclusion is very applicable to the PICO question as the intervention directly involves communication technology.

A feasibility study by Riley, Obermayer, and Jean-Mary (2008) focusing on a cessation program using mobile phone text messaging to provide tailored and stage specific messages to college smokers suggested similar findings. The aim of the study was to determine if mobile phone text messaging is a potentially efficacious and easily disseminated method for providing cessation interventions to young adult smokers. 46 college students, 18 to 25 years were recruited from a public university in Washington DC. Inclusion criteria were smoking ≥28 cigarettes per day (cpd), smoking ≥ 6 days/week, desire to quit within 30 days, no current other tobacco use, no past-month nicotine replacement or bupropion use, no past-year substance abuse treatment.

Participants completed a 7-day smoking timeline follow-back (TLFB) and the Nicotine Dependence Syndrome Scale (NDSS) at determined intervals. There was significant differences between the sample in the baseline daily smoking rate (9.5 vs 14.3; t [60] =3.02. p=.004) and in the proportion of lighter smokers (32.3% vs 58.1 % smoking <10 cigarettes per day [cpd]; X_2 [1, N=62] =4.2, p=.04), with the current sample, being heavier smokers (Riley, Obermayer, and Jean-Mary, 2008). Among the continued smokers, cpd reduced from 13.6 to 8.2 (SD=7.7 and 9.0; t [13] =3.69, p=.003) and the NDSS also decreased significantly (.148[SD=0.89] to -.655 [SD =0.91], t [12] =5.05, p<.0001). Among continued smokers in the combined sample, the cpd

reduced from 11.6 to 6.1 (SD =6.6 and 6.5; t (30) =6.30, p<.0001), and the NDSS

decreased significantly (-.208 [SD =0/95] to -.962 [SD =0.89], t [32] =7.92, p<.0001).

The limitations noted with in the study were described as quit rates represented a

small uncontrolled trial group. The variations in content, timing, and tailoring need to

be further explored to determine how to optimize such a text-messaging approach.

There was a notable need to improve efficacy of this approach. Future researchers need

to consider the degree of additional support that should be provided for the smokers of

varying dependence, as noted by cigarettes per day (cpd) and varied age.

The results of the study indicated that mobile text messaging is a promising

modality for delivering smoking cessation interventions to young adult smokers. This

technology has the potential to reduce the burden on healthcare professionals,

augmenting their smoking cessation efforts, and expanding the reach of these

interventions to those who may not engage in traditional cessation programs. The study

demonstrates statistically significant outcomes related to the reduction in cpd, as well

as, decreased NDSS with the use of mobile phone text messaging for the delivery of

smoking cessation interventions.

Blake (2008) in the British Journal presented an informative article providing a

global view of the different areas of health promotion and monitoring, in which mobile

phones have been applied. The aim of the review was to examine the use of

communication technology in the delivery of health promotion. The author noted that

wireless text messages have shown promise for the delivery of smoking cessation

interventions, citing a previous evaluation of cell phone technology used to deliver smoking-cessation intervention. The individualized program was delivered by means of text messaging with assessment tools delivered using a web based program. Most research involving technologies predominantly focus on younger age groups, this application of use is similar for use with an older population. At six weeks, one fifth of the sample had quit smoking based on seven-day prevalence criteria and 43% had made at least one 24 hour attempt to quit. Another review looked at the feasibility of using mobile phones to improve access to smoking cessation counseling in low income and HIV patients. Result noted an interest by patients but some without access, thus a limitation. A double-blind RCT assessing effectiveness of regular, personalized, supportive and distraction messages against a control group receiving standard messaging. This report demonstrates text messaging intervention can have positive effect for short term, self-reported quit rates. Limitations note that more confirmation is needed to provide evidence of effectiveness on long term effects.

Abroms, Westmaas, Bontemps-Jones, Ramini and Mellerson (2013) in a journal review from the U.S., recently examined popular applications for smoking cessation for both iPhone and Android operating systems. The aim of the review was to assess the degree to which popular smoking-cessation applications (apps) adhere to established Best Practice for smoking cessation and the extent to which these applications are being used by the public.

A total of 414 smoking-cessation apps were identified for iPhone and 148 for Android. This number was limited to the top 50 most popular English-language apps for each operating system. Applications were coded on each item in the Adherence Index. Items were derived from the U.S. Clinical Practice Guideline for Treating Tobacco Use and Dependence. Two researchers independently coded each app on each item of the index. Each item was coded as 0 noting "not present at all," 1 indicating "partially present," or 2 indicating "fully present." The average Adherence Index Score for all apps in the sample was 12.9 (SD=6.8) of a possible 42 points. Analysis indicated that, on average, 28.1% (SD=27) of apps strongly followed a given guideline, with no difference between operating systems. Strength for apps included being specific to smoking (94.9%) and having interactive features (71.4%). However, several straightforward evidence-based practices were missing from the vast majority of apps and others omitted referrals to quit line. Emerging evidence indicated that quit-smoking text messaging programs on mobile phones can increase quit rates, but popular apps still lack many elements that are generally recommended for quitting smoking (Ambros, et al., 2013). Further limitations are noted to include the omission of insight into how apps are being used, if being used alone or with other cessation modalities.

Whitaker et al., (2012), in a Cochrane review examined innovative and effective smoking cessation interventions through nontraditional cessation services. Selection criteria included randomized or quasi-randomized trials. Participants were smokers of any age who wanted to quit smoking. Studies were examining any type of mobile

phone-based intervention, including those aimed at mobile phone users, using any function that can be sent via a mobile phone. Participants' who dropped out or were lost to follow up were considered to be smoking. Five studies that noted at least six months of cessation were included in the review. Three studies involve all text messaging interventions that have been adapted over the course of three studies for different contexts and populations. One study is multiple arm involved a video study of a text messaging intervention and an internet quit coach combined and separately. The final study involved a video message intervention via mobile phone. All five studies demonstrated an increase in long term quit rates compared with control programs (RR 1.71, 95% CI 1.47 to 1.99, over 9000 participants), abstinence was defined as no smoking at six months but allowing up to three lapses or up to five cigarettes. Statistical heterogeneity was substantial as I_2 statistic ($I_2 = 79$ %), all studies were similar in design, intervention, and outcome.

Despite statistical heterogeneity, the included studies were clinically homogenous, with similar design, intervention, and outcomes. At least one studies actual uptake of intervention was low, reducing the magnitude of effect size. Four out of five included studies were rated at low risk of bias.

Mobile phone-based smoking cessation interventions have been shown to assist smokers to quit. The interventions in this review are primarily text messaging interventions that provide a mixture of motivational messages, advice, and interactive messages that ask for needs, such as cravings and managing urges to smoke. These

mobile phone programs have some advantage over most current treatment services as they can be delivered anywhere at approximate times, with lower resource requirements as many apps are free. Limitations suggest that further research is needed to examine specific content of text messaging that are helpful and effective. There were no cost effective research on mobile phone smoking cessation interventions at this time. No comparison of specific applications.

Limitations

Limitations within the literature were described. For example, some articles prompted the need for longer follow up of proposed studies. One suggested there was a need to assess the cost-effectiveness of counseling and the impact on health and healthcare utilization with the proposed intervention. Another notable limitation involved the omission of insight into how apps are being used, if apps are being used alone or with other cessation modalities. Similarly, the lack of studies specifically related to mobile phone applications and their effects on the hospitalized patient for early intervention was felt to be a limitation. There was also a need to improve content, timing, and tailoring of information provided through the text messaging system. Self-reported cessation was felt to lead to bias.

Conclusion

There is a well-documented need for smoking cessation in many areas where health care can be delivered. The notion that smoking cessation education,

counseling, and support would improve attitudes and smoking cessation attempts appears to be universal. Studies from the United States, England, and Norway were represented in this literature review. The literature has clearly shown support for text messaging based smoking cessation interventions to help smokers of any age range, to quit smoking. The need and support to present hospital based interventions were noted, which was shown to be the most effective time for evoking change in smokers. Valid and reliable instruments have been identified that measure this phenomenon in the literature. The noted literature provides evidence to support provisions of cellphone based smoking cessation interventions with the intent to promote smoking cessation in adult hospitalized smokers. As cell phones are constantly in hand, they are the perfect tool to deliver personalized motivational cues and tips to break the smoking habit. Not only are cigarettes chemically addicting, the habit is also associated with daily activities. Quitting requires immediate and powerful interruptions and reminders like text messaging, which can be long enough to resist the temptation. Qualities of a successful smoking cessation process have been demonstrated and although no specific application has been reviewed, a reliable application provided by smokefree.gov offers the evidence-based smoking cessation methods and support that has been shown to help smokers quit. The Smokefree TXT application is offered through iTunes and is endorsed by the U.S. department of health and human services. It is a free smartphone application that offers a quit plan, methods of tracks cravings and moods, and monitors progress towards achieving smoke free milestones. This app helps to identify triggers,

provides emotional support, and offers useful tips during cravings. These qualities motivating behavioral changes, have demonstrated success for smoking cessation applications, which had been identified in the literature, this is the reason that the Smokefree TXT application has been chosen for this project.

Chapter Three

Conceptual Model for Evidence Based Practice Change

The conversion of research findings to evidence-based practice (EBP) continues to replace traditional standards of healthcare decision making (Porter-O'Grady & Malloch, 2008). EBP has a goal to impact health care outcomes. In doing so, healthcare professionals should be educated to practice patient-centered care as members of an interdisciplinary team that utilizes quality improvement approaches and informatics (IOM, 2001). Practitioners who continually strive for excellence in patient care will need to understand their patients' problems and apply EBP appropriately. This implementation of change is best served through a selected model that fits best with the individualized setting of care.

Conceptual Definitions

The Transtheoretical Model (TTM) of behavior change assesses an individual's readiness to act on a new healthier behavior, and offers strategies, or processes of change to guide the individual through the stages of change to action and maintenance. The model describes how people modify a problem behavior or acquire a positive behavior. The TTM was developed by Prochaska and DiClemente and the emphasis is behavioral change consisting of five stages that include: pre-contemplation, contemplation, preparation, action, and maintenance, (Koyum & Eroglu, 2014). The TTM enables the use of convenient interventions for stages of change in which

individuations are included which increases their success. The interventions are appropriate for the change phase of that individual so they don't fail or get stuck in the stage of pre-contemplation for an extended period of time.

Relationship of Model to Project

Smoking is the leading modifiable risk factor causing preventable death and disease in the world, (WHO, 2008). Smoking addiction is considered a disease according to the international classification of diseases (Koyum et al., 2014). There is a need for regular treatment due to relapse occurrence. Tobacco abuse results in a costly burden on society as annual smoking attributable economic costs in the United States estimated for the years 2009–2012 were more than $289 billion (WHO, 2008). Despite the vast array of smoking cessation programs, smoking is an epidemic. A wide array of smoking cessation knowledge, products, and counseling exist, complicating the selection of practice approaches. The EBP model provides an inclusive framework with which to organize EBP processes and approaches (Melynk et al., 2012). Each stage of the TTM offers an intervention specific to that patient, assisting them in the stages of change.

Pre-contemplation and contemplation stages of change are filled with ambivalence. The majority of the individuals who smoke both want and do not want to quit smoking. They have noted the pros and cons of continued tobacco abuse. These smokers are either aware of the problem, because of their current health status while hospitalized or they are reluctant about the behavioral change because they enjoy the act of smoking. The intervention will be to assess their readiness and willingness to quit.

This is the stage in which they are advised to quit and help is suggested through the offer to join the project. During contemplation they are encouraged to identify reasons to quit. The Smokefree TXT app asks for personal motivating reasons for change. The application also asks for conditions in which smoking has occurred, to help identify triggers for the act of smoking.

Preparation stage of change involves the development of a quit plan and resolving ambivalence identified previously. Identification of a quit date and time is important to focus on the reality of change. There is also a need for a support team or person that will encourage motivation and efforts for change. The Smokefree TXT app provides reminders of why the choice to quit is a hard but achievable option. The app suggests contacting family and friends so they are aware of the change so support can be offered.

Stage of action is the stage where individuals frequently return to their old habits. The need is great for review and affirmation of reasons for quitting. Offering distractions is helpful. The app offers options that suggest diversions, such as fast fact, contacting a friend, and playing a game, which is all done on the smoker's mobile phone. The stage of action is the time to review triggers, discuss obstacles, and explore support systems. When a participant does slip, the Smokefree TXT app offers suggestions and reasons to not give up and stay focused.

The stage of maintenance continues for a lifetime. The participant needs to reaffirm commitment to smoking cessation and accept support change efforts. The smoker needs to review and practice coping skills. Positive reinforcement and rewards

need to be provided, as well as resources for continued support. The Smokefree TXT app tracks the smoker's progress, and awards the smoker for achieving goal setting and attained.

The key concept of this quality improvement initiative is the reduction or cessation of smoking in the hospitalized adult population with the support of a smartphone based smoking cessation application, as they are followed over a 10 week period. Health care professionals are obligated to find the most convenient approach to provide healthy behaviors for individuals. An increasingly interconnected social Web provides great opportunity to shift behavior, affect health, and meet the public health challenges. Through the use of the transtheoretical model, individuals can reveal thoughts regarding when, why, and how to change their behaviors of smoking, as well as build their confidence in the process.

The logical framework offered through the use of a conceptual model supports evidence based change in clinical practice. The process of following measurable steps can help the process of clinical inquiry simplify its method. The Transtheoretical Model (TTM) of behavior change is one model that demonstrates how a comprehensible framework can guide this process, thus guiding clinical inquiry for the purpose of quality improvement.

Chapter Four: Project Design

Project Design

Research agrees that in order to adequately identify and effectively eliminate tobacco abuse, tobacco control programs must implement a number of tobacco prevention and regulatory strategies. These strategies are best implemented and participants are most likely to become engaged if an intervention for change is convenient and easy. This chapter outlines the planning process and components of the evidence-based quality improvement project (EBQI). The project design required detailed information about the implementation process and procedures to improve patient outcomes. The project involved the smoking cessation application which was developed by the US Department of Health and Human Services and can be viewed at smokefree.gov. The website and the app offer free advice for developing a quit smoking plan. The app offers reasons to quit, rewards of quitting, and tips to gain support for quitting. The project plan includes an evaluation of the effectiveness of the smoking cessation practice strategy.

The purpose of this EBQI project was to improve the smoker's chance of reducing their number of cigarettes smoked per day or achieving cessation, through the support of the cell phone based smoking cessation application. The need for practice change was identified by the existing number of adults hospitalized for smoking related illnesses. The proposed EBP project was introduced to the nurse of the progressive care unit (PCU) of a local community hospital. This setting offers a large range of adults

hospitalized for critical interventions due to an acute illness. Their length of stay was anticipated to be long enough to approach them for potential recruitment. Smokers who are hospitalized have the opportunity to initiate smoking cessation. These smokers must abstain temporarily from tobacco use while they are hospitalized, which allows them time to experience tobacco abstinence away from the common social and environmental cues to smoke. According to Rigotti et al. (2008), offering smoking cessation counseling to all hospitalized smokers is effective as long as supportive contacts continue after discharge. National practice guidelines call for physicians and nurse practitioners to advice patients on a regular basis to quit smoking, in order to modify health related behaviors like tobacco abuse. It was hypothesized that successful execution of the EBP could result in extensive implementation in the future due to the reduction of smoking rates and the potential for improved health of the identified population.

The practicality of the EBP began with a plan of action which included organizational awareness, IRB approval, and data collection phases, analysis of data, and distribution of data for the support of change in practice. A time line was created to stay on point. Initial approval was sought from Misericordia University, once the statement of the need for practice change was established. Organizational Institutional Review Board (IRB) approval was necessary for the protection of human subjects, and therefore was an important step of the planning phase of the EBQI project.

The status of the IRB application was hindered for a considerable time frame, thus assuring accuracy, confidentiality, and feasibility of the EBP project. The process involved letters of intention provided to administrators, directors, and supervisors of the medical unit and the staff encountered during the first phase of participant recruitment. Approval letters were received from a few of those noted. A presentation was made to the nursing research council seeking approval for said EBP project. Approval was also sought and received from Dr. Saul Shiffman, the author of many research studies on nicotine dependence and the co-author of the Nicotine dependence questionnaire. Finally, formal IRB approval was sought in writing and recommendations were made by the auditor. Revisions were made to the informed consent sheet per auditor's advice. Final approval was received and data collection began in July 2015.

Individuals presented to the Progressive care unit with various illnesses requiring higher levels of care. Individuals were identified by the nursing staff who met the inclusion criteria. Potential participants were identified as smokers, through the admission assessment process completed by the staff nurses. Those potential participants' interest in smoking cessation were assessed through an interview by the project coordinator and evaluated using the 5A's: ask about tobacco use, advise to quit, assess willingness to make a quit attempt, assist in the quit attempt, and arrange follow-up (CDC, 2014). Further questioning was needed to verify ownership of a smart phone, unlimited texting capability, and competency of texting. Potential participants were provided an overview of the process of and utilization of cell phone based smoking

cessation intervention. Smokers would select to participate in the smoking cessation

project or decline. If the potential participant agreed to participate, the project

coordinator reviewed the process and content of the program which introduced the use

of the cell phone application as a supportive device to assist with smoking cessation.

The investigator then reviewed the informed consent (Appendix D), assessed the

number of cigarettes per day smoked, and administered the Nicotine Dependence

symptom scale NDSS (Appendix H), which measures the important cigarettes smoked

by the participant and the times in which they smoke.

The participants were able to begin using the cellphone application while

hospitalized. The participants were educated on the use of the smoking cessation

application. They were taught how the app can be uploaded through the website or by

texting START to 47848. The participants noted that they immediately received a

welcome text that guides them through the process of establishing a quit date. They

received five messages per day offering messages of encouragement, suggestions for

mood control, and suggestions to overcome cravings. At any time, the participant was

able to get more support by texting the words Crave, Mood, or Slip and receive

additional advice. The participants were able to opt out at any time by texting the word

Quit. For their safety, participants were given a handout regarding safe cell phone use

and the Pennsylvania law regarding banned texting while driving (Appendix E).

Participants were contacted every two weeks by phone for follow up evaluation

to review the 7-d follow back and the nicotine dependence symptom scale

questionnaires. The goal was to see a reduction in the amount of cigarettes smoked and also a reduction in the participants' dependence on smoking through the support of the cell phone applications. This was measured with the participants reporting the number of cigarettes smoked and the times and situations in which they smoked. According to Shiffman and Sayette (2009), the Nicotine Dependence Syndrome Scale (NDSS) discriminates between heavy and lite smokers. The heavy smokers answered the questionnaires that consistently demonstrated significant associations with variables suggestive of dependence. As the level of dependence was reduced, the number of cigarettes reported to be smoked also was reduced. This intervention was introduced to demonstrate that the smoking cessation education program promotes knowledge, smoking cessation and health promotion. This intervention can augment health care providers' support for smoking cessation.

Data Collection Tools

Recruitment occurred at the time of admission to the hospital. Data collection was maintained by the investigator. As participants joined the project, their medical record number was used to identify them, and data was kept within the electronic medical record, which was HIPPA and password protected. A master list was kept in a locked filing cabinet. The project collected data such as; a demographic sheet, a 7-day follow back count, and the nicotine dependence symptom scale. At the end of the 10 weeks, all questionnaires and data analysis material had a code on the first page and

each participant was known as that code. As data was extracted it was de-identified and applied to a spread sheet. No further information was used.

The data collection tools and measurement devices used in this project consisted of a questionnaire (Appendix H). The demographic sheet consisted of eight questions which include social and environmental information that assesses smoking practice and attempts at achieving cessation. The Nicotine Dependence Syndrome Scale (NDSS) is a multidimensional measure of nicotine dependence, which notes multiple scores representing aspects of dependence (Shiffman and Sayette, 2009). The NDSS discriminates between degrees of nicotine dependence and was found to be a good predictor of smoking severity. Shiffman and Sayette (2009) developed and tested the NDSS and found it to be a valid tool in assessing the dependence continuum. Low to moderate nicotine dependence has been associated with a smokers who smoke less and were more likely to try to quit. Concurrent NDSS T-scores correlated with the Fagerstrom Tolerance Questionnaire (r=0.59), as well as with several dependence-relevant measures: smoking rate (r=0.37), difficulty abstaining (r=0.52), past severity of withdrawal (r=0.50) and self-rated addiction (r=0.31); the subscale "drive" showed the highest correlation with self-rated addiction (r=0.36) (Shiffman et al. 2009). Reliability is demonstrated as Cronbach's alpha for the total score of 0.84, indicating high internal consistency (Shiffman et al. 2009). The questionnaire consists of eight questions that assessed the participants' tobacco consumption, including the conditions in which they smoke, and the type of cigarettes smoked. The 7-day follow back time line is a recall

count of the amount of cigarettes smoked per day when contacted after the intervention

begin. All data was documented and maintained on a Geisinger password secured

computer that meets all standards for security of client information.

Resources Needed

Resources needed for this EBQI project included a computer for data collection

and storage, as well as, folders with pencils to house the questionnaires for participants

to use during the initial interview, as well as, the Pennsylvania safety no texting and

driving informational hand-out. Approximately 40 copies of each were prepared. Excel

was developed to collect the data from the evaluation that consists of participant

demographics, participants' code, cigarettes smoked and situations in which smokers

smoke. This was developed and maintained by the project coordinator. Information

which was included was the participant code, number of cigarettes smoked and the

subsequent times or situations when smoked. Information technology support was also

needed.

Budget Justification

This EBQI project was a low cost to no cost project. The smoking cessation cell

phone application (Smokefree TXT) was at no cost to smart phone owners and can be

used with no restrictions for those with an unlimited text plan. No funding was needed

to access participants due to the setting being a worksite. The informational "No texting

and driving" literature was provided by the state of Pennsylvania at no cost. There were

no rewards or compensation awarded to the participants. The materials were of minimal cost which were provided by the investigator.

Summary

This evidence-based project provided an opportunity for participates to engage in a new form of smoking cessation that offered education, support, and advice. Educating the adult smokers who were willing to quit smoking was expected to reduce the burden of smoking that is currently present in our society creating a heavy burden on our health care systems. Addressing the target population, creating the protocol using evidence-based guidelines for smoking cessation, and utilizing valid questionnaires provided the tools needed to design an effective evidence-based quality improvement project.

Chapter 5

Implementation, Procedures, and Processes

Nicotine dependence is the driving force behind cigarette smoking that affects

42 million American adults (CDC, 2015). In the United States, smoking causes 32

percent of coronary heart disease deaths, 87 percent of lung cancer deaths, and 79

percent of all cases of chronic obstructive pulmonary disease (COPD) (CDC, 2015).

Tobacco control and elimination strategies continue to be underused and the community

continues to be undereducated. New strategies have been proposed with the goal of

reducing or eliminating tobacco smoking. Some of these strategies may prove useful for

the United States, particularly reduction of the nicotine yield of tobacco products to

non-addictive levels (CDC, 2015). The premise of this practice change project was the

support of smoking cessation efforts by offering a mobile phone application that

proposed additional emotional and psychological support. This chapter discusses the

project setting, population, and implementation process which includes a task list and

time line of the EBP project.

The task list for the proposed evidence-based quality improvement (EBQI)

began with planning. Letters were submitted for permission to use the population in the

progressive care unit (PCU) in May, 2015. Permission was received from the nursing

director and the unit's medical director for the project to occur in the noted setting. The

nursing research council was presented with the protocol and their permission to

proceed was granted on May 18, 2015. Permission was also received on June 9, 2015,

from the questionnaire's author, Dr. Saul Shiffman for the use of the Nicotine

Dependence Syndrome Scale (NDSS). The capture of participants was deemed to be

adequate due to the setting of the project. The staff was briefed again one week prior to

implementation on the process of patient identification and anonymity.

Project Setting and Participants

The EPB project was implemented in a community hospital's progressive care

unit (PCU) in Wilkes-Barre, Pennsylvania. Intervention at the hospital level has the

potential to capture participants at a vulnerable time when learning needs can be met.

The implementation of the evidenced-based project (EBP) process occurred in four

phases following IRB approval. The implementation of all phases was completed by the

C.R.N.P. and additional supportive staff involved six nurses and a unit secretary of the

PCU. Participants that were included in the EBP change project were both men and

women patients age 18-60 years of age. Participants eligible were of all ethnicity,

needed to speak English, own and be able to operate a smart phone, and must want to

quit smoking. Participants were recruited from July 14, 2015 to August 3, 2015, who

met the inclusion criteria.

Implementation Procedures and Processes

The pursuit of the institutional IRB approval met resistance and sustained a

significant delay requiring an extension from the University IRB. Institutional approval

was not obtained until July 14, 2015. University initial requirements for implementation

began on May 6, 2015 until July 31, 2015. An extension was asked from the University until September 29 to allow for a full 10 week of data collection. The organization where the EBP protocol was conducted was well prepared for the intervention. Several meetings took place with the PCU staff, the weeks and months prior to IRB approval. The staff meetings focus was to assure familiarity with the secure process of identification and recruitment of potential participants.

The EBP improvement project was implemented in two phases as noted within the time line (Appendix A). The projection for the EBP was to recruit 30 participants and retain 20 participants for the full 10 weeks. Potential participants were identified through the admission process to the PCU by the admitting nurse. That patient was identified by their medical record number and presented to the investigator via email that was password secured. Through the evaluation process further criteria were evaluated by the investigator prior to participants' agreement. Participants needed to have and be able to use their smart phones with unlimited texting. The potential participants needed to want to quit smoking as evaluated through the five A's. Each potential participant was asked about tobacco use, advice to quit, assess willingness to make a quit attempt, assist in the quit attempt, and arrange follow-up. Through the evaluation process, some potential participants did not want to proceed or quit smoking and those were not included in the study. Some others that were evaluated had no experience with a smart phone thus were unable to participate in the study.

If the patient identified an interest in smoking cessation and was eligible by criteria, these participants received a project consent form to participate in the EBP change intervention by the investigator. The investigator reviewed the consent form with the participants and allowed time to ask questions and understand that they could stop the mobile phone application at any time, without discrimination. After signing the consent to participate in the EBP project, the participants were verbally questioned and the demographic questionnaire was completed. The 7-day follow back count identified the number of cigarettes smoked per day. The nicotine dependence questionnaire was completed with the investigator.

Once all data were obtained and confirmed the participant was shown how to obtain access of the Smokefree TXT by texting "start" to 47848 on their smart phone. A welcome return text soon followed. The application then helped the participant to establish a quit date. Each participant was asked to establish a quit date starting that Friday, this was suggested so they could experience the messaging and observe the advice. It was from this point, the participant received up to five text messages per day. Each text varied in content, fluctuating in advice or support, and asking key questions daily to assess cravings, mood, and slips, which was noted as a return to smoking. The participant was able to stop their involvement in the project by testing the word, "Quit" on his or her cell phone at any time.

The second part of the implementation phase consisted of data collection of bimonthly monitoring of cigarette consumption, mood, and support over the next ten

weeks. Participants were contacted via phone for reported results of the number of cigarettes smoked per day. If the participants noted to smoking cessation then no further questions were asked, and they continued to be followed at a two week interval until the time frame of the project was completed. If a reduction in their tobacco use was noted, the nicotine dependency syndrome scale was repeated to assess for a change in their nicotine dependence. They were asked if there was a change in the time from which they awoke that they smoked, and if they were able to give up any habits cueing their smoking, which was identified when they answered the questionnaire initially. This step allowed the participant to recognize accomplishments made through the use of the cell phone application. Blake (2008) established that the interventions offered via cell phone can have a positive effect for short-term, self-reported quit rates. The advice, support, and distractions provided by the application improve access to smoking cessation counseling. This process was completed every two weeks for the duration of the project.

Information and data regarding the participants' pre and post Nicotine dependence symptom score and number of cigarettes per day were collected and analyzed. The subsequent phase in the EBP project was to disseminate the data. Ongoing education and support for smoking cessation need to be the conduit for change. The evaluation of the EBP project was necessary to justify the usefulness of the change in clinical practice.

Chapter 6

Evaluation and Outcomes

Tobacco abuse and its ill effects are a problem in society. Research has noted a significant loss in productivity and huge health care costs for smoking related conditions. The resultant chronic diseases and disabilities caused from smoking have been well published. Smoking cessation is one of the most effective strategies for the prevention and reduction in many comorbidities. Smoking cessation methods are not as successful as providers and smokers would like them to be. The latest report from the U.S. Preventative Task Force (USPSTF) concluded that the best ways to kick the habit are behavioral interventions, self-help, and medications. Counseling and self-help materials improved smoking quit rates from 7% to 13% (Park, 2015). Smoking cessation attempts using a mobile phone application with a smart phone have been suggested to be an effective short term intervention. This evidence based practice (EBP) project sought to determine if the use of a smoking cessation mobile phone application would be an effective tool for the hospitalized adult to reduce tobacco consumption or result in smoking cessation.

The population in the EBP was followed over a ten week period. Project recruitment occurred during the time from July 14, 2015 to August 3, 2015. Thirty-one potential participants were approached to participate in the project in phase one of the EBP. Fifteen patients had refused due to not wanting to quit smoking. Six participants had cell phones that were not smart phones thus they were not considered appropriate of

project participation. Four participants did not know how to operate their smart phone

and noted that they used their phone only to speak to family members. Six participants

identified an interest in smoking cessation and were qualified to participate in the EBP.

Five women and one man, ranging in age from 27 to 57, volunteered to participate and

signed the consent form. The six participants were provided literature reviewing

Pennsylvania's law banning texting and driving (Attachment E). One participant did not

maintain communication at the first two week interval despite three unsuccessful

attempts to establish contact and was subsequently withdrawn from the study in order to

preserve the project's integrity.

The following information was obtained initially and at the described intervals.

The 7 day follow back time line is the number of cigarettes smoked per day (cpd)

according to participants recall. This tool determined the conscious amount of cigarettes

consumed at the pre-intervention phase and every two weeks by the participant until the

projects conclusion. (Table 1).

Table 1

7-Day Follow Back Timeline values

ID	cpd I	cpd w 2	cpd w4	cpd w6	cpd w8	cpd w10
1	30	10	0	0	0	0
2	3	5	5	3	5	5

3	5	0	0	0	0	0
4	10	10	9	9	9	9
5	20	15	20	25	25	25

The Nicotine Dependence Symptom Scale (NDSS) questionnaire that was used in the EBP contained eight items that measured how reliant the smoker is on cigarettes. The items assessed participating smokers' behavior such as the timing of smoking upon waking, if the smoker can refrain from smoking when needed, and if the smoker still smoked while ill. The NDSS score was the sum of the item scores, which ranged 0-15. A score of six or below indicated low to moderate nicotine dependence and thus a greater chance to reduce consumption or quit smoking. A score of seven or greater indicated high nicotine dependence and a more difficult time with cessation attempts. The majority of participants scored a six and above, indicating higher dependence on nicotine.

Table 2

The Nicotine Dependence Symptom Scale Scores

ID	NDSS I	NDSS w2	NDSS w4	NDSS w6	NDSS w8	NDSS w 10
1	12	9	0	0	0	0
2	6	6	6	6	6	6

3	9	0	0	0	0	0
4	6	6	5	5	5	5
5	11	11	11	11	11	11

Analysis and Results

The smoking cessation mobile phone application was sponsored by the United

States Department of Health and Human Services. The mobile phone application was a

free program that offered support and provided the skills that a smoker needs to get

ready to quit smoking and stay smoke free. The application offered advice and assessed

symptoms through text messaging. The Smokefree app sent up to five messages a day

that ask the participants about cravings, mood or if they slipped and returned to

smoking. The app offered suggestions such as coping skills based upon the participants'

answers. The average scores of the 7-day follow back did indicate a reduction of almost

50%. The use of the mobile phone application for the purposes of smoking cessation

may be effective in the short time frame for those individuals with a noted substantial

reduction. The NDSS also noted a reduction in scores over the 10 week period. All the

participants met the criteria of completing the trial and completed each questionnaire as

indicated. The active participation in the EBP project was indicated by the consistent

follow up. A paired t-test was calculated which indicated the 7-day follow back index p-

value of 0.957. The 95% confidence interval ranged from -11.405 to 23.405 as the mean

of the pre-test minus the post-test to 6 (Table 3). The paired t-test was also calculated

for the NDSS index, which showed a p-value of 1.731. The confidence interval ranged

from -2.657 to 11.457 as the mean of the pre and post-test minus was 4.40. Therefore,

the response rate was not statistically significant but the findings were clinically

significant (Table 4) as the intervention did influence the number of cigarettes smokes

per day. This supported that the intervention did not influence tobacco use with

statistical significance in this particular EBP and the null hypothesis could not be

rejected.

Table 3

7-day Follow Back Statistics

CPD Index	Pre-Intervention	Post- Intervention
Mean	13.80	7.80
Standard Deviation	11.100	10.330
Standard Error of Mean	4.964	4.620
Number	5	5

Table 4

Nicotine Dependence Symptom Scale Statistics

NDDS	pre-intervention	post-intervention

Mean	8.80	4.40
Standard Deviation	2.775	4.615
Standard Error of Mean	1.241	2.064
Number	5	5

Relationship of Results to Framework and Objectives

Many crippling chronic illnesses that result in loss of productivity are frequently associated with tobacco abuse and addiction. An optimal approach to smoking cessation was to intervene when a smoker was in a state of willingness to make a change. The time to quit was often at a time of illness for many smokers. Research suggests that motivation and willingness to quit smoking is needed to support change as new healthy behaviors take over. Interventions using frequent unconditional prompting are required for adherence to smoking cessation. This EBP has shown that smoking cessation through a mobile phone application was helpful for the hospitalized adult. This form of intervention should continue with each provider contact, and required interventions every 2 weeks for a 10 week period, depending on the motivation and willingness of the individual. As cigarettes per day or nicotine consumption is decreased, the participants continued to learn to modify lifestyle and reduce cues to smoke.

The participants in this evidence based practice change project were: all female gender, ranged in age 40-57 years with a mean age of 51, and had more than one attempt at smoking cessation prior to participation. Sixty percent of the EBP population

was employed. The EBP had an N= 5 and all participants were hospitalized at the time of recruitment and each received the same standards of care.

The mobile phone based smoking cessation application was initiated by each participant and utilized for a period of 10 weeks. Each participant was evaluated throughout the study. No participant received any other means of smoking cessation.

Results indicated that the (N=5), there was no significant (p=.957) improvement from baseline in the 7-day follow back, cigarettes per day count. The NDSS also noted (N=5) there was no significant (P=1.731) improvement from the pre-intervention scores over the 10 week period. The mobile phone smoking cessation application influenced only some of the participants directly, but the indirect support for the intervention was stronger. Texting was support for some and added to motivation to quit smoking. If intent to quit was not present, it did not seem to make a difference in the reduction in smoking. The data did indicate that two participants were able to quit smoking within the 10 week period and one reduced her smoking consumption. Two of the EBP participants were coincidently followed in the outpatient clinic with additional support provided.

Chapter 7

Implementations for Nursing Practice

The aim of evidence based quality improvement changes are to improve clinical

practice. The goal of moving towards smoking cessation is high on the public health

agenda. The incidence of tobacco related illness continues to rise. The population of

individuals using tobacco products needs to be engaged in cessation practices. Evidence

has indicated that a multifaceted approach to smoking cessation is necessary to support

self-management skills. The purpose of the EBP was to add to the knowledge base of

traditional smoking cessation support. The EBP project provided observational and

statistical evidence for the use of the mobile phone application for smoking cessation in

the hospitalized adult. All participants were active smokers with previous cessation

attempts and subsequent failures. This chapter will discuss the clinical implications of

this practice change project, review the implications for nursing practice, review the

project's strengths and limitations, and discuss its linkage to the DNP Essentials.

Smoking is one of the biggest threats to public health which continues to affect

the health and well-being of individuals, families, communities and the health care

systems. Smoking cessation is one of the single most important steps patients can take

to improve their health. Health care providers must ensure that patients receive the

appropriate support they need in order to make a difference in the chance of success.

Advanced practice nurses (APN) work in settings that vary from community to hospital.

APNs are afforded the opportunity to increase patients' chances of attainment of

smoking cessation as they have broad access to patient care in a variety of setting. The

APN preparation is heavily focused on innovative and evidence based practice that

better guarantee the reproduction of credible research findings. The complex leadership

role of the APN enables the facilitation of improved patient care and outcomes. This

EBP project demonstrated the positive influence the APN can have on self-management

skills.

Strengths of the Project

The EBP provided additional information that supported smoking cessation

efforts through knowledge and research for the purpose of improving quality care

practice. The analyzed observed data supported best practice guidelines. The project

was sustained by extensive research that provided the foundations for the need for

smoking cessation using varied methodology. Statistical analysis supported the

intervention and analysis of the data supported that the intervention may have aided in

smoking cessation for some participants. The frequent contact and varied reminders to

stay focused and smoke free were suspected to have made a difference in outcomes.

The NDSS questionnaire used to assess level of addiction to tobacco was noted to be a

reliable and valid tool as it has been validated in previous research and was able to

measure the ability to change.

Limitations of the Project

The project did have limitations. Major limitations included the timing and small sample size. Limited participants were obtained due to time constraints in the first phase of active recruitment. This two week time frame may have been too brief to obtain a valid sample size. The inclusion and exclusion criteria, which included a hospital setting may also have contributed to a small sample size. Surprisingly, the inclusion criteria of having and using a smart phone was a limitation in that some potential participants had the devise but were not competent with its operations. The small sample size reflected results that could not be predictive of a larger population. Other limitations included the short term follow up which was supported by research as earlier studies were completed within three to six months and had similar results. The results of the questionnaires reviewed at a frequency of every two weeks were self-reported, thus may have contributed to recall bias. Two participants were followed in the outpatient practice and therefore given additional support. This may have potentially biased the results.

Linkage to DNP Essentials

The DNP Essentials outline the framework for doctoral educational competencies through eight foundational elements. These elements are the core of the advance practice nurses role. The DNP Essentials were incorporated into the scholarly project.

Essential I: Scientific Underpinning for Practice. Analytical research and evidence based practice provided a framework for smoking cessation interventions and support. This scientific knowledge was the basis for the EBP change project. This project focused on identification for the need to make a change. An intervention was established to translate research to practice through the use of scientific information and practice theory.

Essential II: Organization and Systems Leadership for Quality Improvement and Systems Thinking. Systems and organizational leadership is critical for improving patient and health care outcomes (AACN, 2006). Doctoral skills and knowledge must be proficient in quality improvement strategies and in creating policy changes at organizational levels. Chronic care management for the smoker is a strain on the healthcare system. The needs assessment and development of practice change was guided by EBP and introduced to the organization as a cost effective organizational change in traditional smoking cessation practice for the hospitalized adult. The EBP project began after identification of need, was guided by evidenced base care and was supported by the organization as a positive change in improving patient care.

Essential III. Clinical Scholarship and Analytical Methods for Evidence-based Practice. The evidence based practice project began with a complete review of related clinical literature as the foundation for practice guidelines. Healthcare has required that the DNP integrate knowledge from diverse sources and across disciplines and apply this new knowledge to solve clinical problems and improve outcomes. A

detailed review of literature and guidelines was conducted to identify the best evidence-based practice applicable to achieve and guide smoking cessation.

Essential IV. Information System/Technology and Patient Care Technology for the Improvement and Transformation of Health Care. The DNP has the advanced ability to use and incorporate information/technology to support, improve patient care and healthcare systems, and to provide leadership within the healthcare system and academic setting (AACN, 2006). This EBP focused on the use of information and advanced technology to support the smoker in cessation efforts with the use of the participants' mobile phone application. This use of information systems provided a mechanism to apply practice information or smoking cessation support and advice as an intervention to improve patient care. Computer systems and software, electronic medical records, and excel programs were utilized according to regulatory guidelines.

Essential V. Health Care Policy for Advocacy in Health Care. Healthcare policy creates a framework for the delivery or impedance of services which can influence issues to including quality, finance, and equity of care. The DNP is prepared to make changes and influence future implications to improve practice guidelines. This EBP began with a review of the current organizational process for identifying smokers and helping them work towards cessation. The resultant information gained through the project implementation will be disseminated on an organizational level and will also stimulate a change in practice on multiple levels. Innovation intervention such as the

use of mobile phone application can reduce healthcare cost by reducing hospitalizations for smoking related illnesses. The resultant impact is valuable to the participant's perceived quality of life.

Essential VI. Interprofessional Collaboration for Improving Patient and Population Health Outcomes. The complex healthcare systems have functioned using a multidisciplinary team to approach complex care issues more comprehensively. The DNP is prepared to function as the collaborator within this team in order to overcome impedance of interprofessional practice. The DNP, as a team leader, is prepared to function as a communicator to implement practice models, create reviews and policies to create change within the complex healthcare delivery system. Collaboration with the hospital staff and peers regarding the use of mobile phone applications for the purpose of smoking cessation allows for effective communication in the development and implementation of this practice change model.

Essential VII. **Clinical Prevention and Population Health for Improving the Nation's Health.** Disease prevention with a focus on health promotion puts the DNP in a position to guide the nation in preventative services and smarter lifestyle choices. Consistent with the national call to action, DNPs must serve to direct attention to recognition and prevention of what was socially accepted behavior such as smoking. Early preventative education and appropriate management of tobacco abuse is encouraged and identified. The DNP can impact the consequences of chronic diseases by using EBP guideline.

Essentials VIII. Advanced Nursing Practice. The expertise exemplified with the terminal degree achieved by the DNP enable the practitioner to skillfully practice under the guidance of scholarly inquiry for the improvement of individual and population based health. This project was based on evidence and substantiated theory. The desire to make a change was founded in the observation of the need to address the whole person and not just the disorder. The DNP can identify the need to develop a therapeutic relationship with patients to facilitate optimal patient outcomes. This project identified the significance of the provider-patient relationship and its ability to mentor and guide the patient to a healthier lifestyle.

Conclusion

The DNP can assess, manage, and evaluate patients independently and use their highly refined skills to demonstrate management decisions that make improvements in patient care (AACN, 2006). The DNP provides quality care that is characterized by the use of holistic perspectives using therapeutic partnerships to create positive lifestyle changes and appropriate self-care (AACN, 2006). This project was inspired by the need to make a change in the patterns seen as a result of the ill effects of tobacco abuse. Transforming research into practice interventions using nursing knowledge demonstrated a positive influence on patient outcomes and established the need for further research to refine practice guidelines. The project did identify limitations which can impact and precipitate a change in the landscape of future improvement projects. Despite its limitations, it did demonstrate a positive influence on patient smoking

cessation attempts. The engagement of the AACN Essentials for this project allowed for

a patient centered project that was guided by evidence based on science committed to

quality.

Chapter 8: Summary of Project and Conclusions

Tobacco abuse results in serious chronic disease and disability. The addiction to tobacco contributes to harm in nearly every organ of the body. The lasting effects of smoking has physical, financial, and emotional consequences to individuals, families, communities, and healthcare systems. Currently, smoking affects 17.8% of all adults (42.1 million people) directly and another 58 million nonsmokers who are exposed to secondhand smoke (CDC, 2015). Trends in smoking cessation attempts have fluctuated depending on the control programs initiated. As part of CDC's National Tobacco Control Program, states are funded to work towards implementation of comprehensive strategies to increase smoking cessation, including mass media campaigns and graphic anti-smoking ads (CDC, 2015). The government has also increased taxes on tobacco products, implemented indoor smoke-free laws, and improved health insurance coverage of smoking cessation services (CDC, 2015). Despite the strategies that address smoking cessation on a public level, there is a lack of clinical attention to the topic of tobacco abuse and cessation practices. There is an absolute need to address the issue through supported education, patient empowerment, and opportunities to make lifestyle changes that fit into the individuals' lifestyle.

The question that resulted from clinical practice which exposed tobacco related hospitalizations was "In the hospitalized adult, 18 years old and above with tobacco abuse disorder, does the use of text messaging based, smoking cessation intervention, provided through a smart phone application, influence tobacco use, through a reduction

of smoking, when followed for a 10 week period?" In order to answer the PICO-T

question, an extensive literature search was conducted among the most current

information. Evidence shows that addressing smoking cessation using a convenient

mobile phone application demonstrated a reduction in cigarettes smoked per day which

advanced the person closer to being smoke free. Utilizing the findings in practice and

implementing the mobile phone application would prove to be beneficial in

demonstrating how research and new technology can be applied in the healthcare

settings.

The health issue addressed in this EBP change project was the effectiveness of

implementing standard best practices for smoking cessation augmented by the use of a

mobile phone application that added cessation support. This project provided the

opportunity to develop knowledge regarding tobacco addiction and means to reduce

smoking consumption. The EBP focused on the importance of a hospital based

intervention to initiate cessation practices in a setting that is without familiar cues to

smoke. The support continued into the outpatient setting and functioned to be a frequent

reminder of how to change behaviors. The use of the nicotine dependence symptom

scale (NDSS) served as a tool to monitor levels of tobacco addiction thus reflected

readiness and greater ability to quit smoking. This tool was valid in previous studies

thus determined to be reliable. The Transtheoretical Model of Behavior change was

used as a guide to the integration of research into daily practice. This EBP demonstrated

the need to assimilate tobacco dependence treatment into routine clinical care to help increase cessation rates.

The overall support and encouragement from the practice site and nursing staff of the progressive care unit made the project successful. After receiving support from the unit and practice site, approval was obtained from Misericordia University and later the institutions IRB. Meetings took place with staff members to secure procedure and logistics in approaching potential participants. The nursing research council was informed and also approved of the practice change project. The investigator obtained approval to use the NDSS questionnaire and literature was provided to participants regarding the state's law prohibiting texting and driving.

The investigator approached thirty-one potential participants. After inclusion criteria was met, only six participants were interested in smoking cessation and agreed to participate in the EBP. There were several reasons most potential participants were not able to participate such as no interest in smoking cessation, unable to use a smart phone, and those that did not have smart phones. The anticipated outcome of the EBP was a reduction in cigarettes smoked per day and a reduction in the Nicotine Dependence Symptoms Scale (NDSS) scores reported at two week intervals and by the completion of the project at ten weeks. The results indicated that most participants reported a reduction in smoking and a trend towards reduced addiction to tobacco. Test analysis showed a decrease in both cigarettes smoked per day (cpd) as well as NDSS

scores but results were not statistically significant as the cpd noted p-value of 0.957 and the NDSS had a p-value of 1.731.

Dissemination Plans

The dissemination of research findings have led to important medical advances and changes in practice. This sharing of information improves quality of care, promotes patient knowledge and self-care involvement, and supports health care policy changes. The circulation of knowledge occurs through many venues and allows for the varied audience members to stimulate discussions that can distribute ideas for practice change. The approach for dissemination of this EBP includes the oral defense presentation, power point presentation of findings presented to the nursing research council, facility medical staff members, nursing conferences, seminars and possible publication. It is anticipated that the project will stimulate an organizational change in smoking cessation efforts to include the utilization of technology to improve patient education and support. The hope is that every opportunity for change is taken to help influence the patients to adopt healthy lifestyles and to continue support to maintain this change.

Future ideas or next steps related to project

The application of the EBP change project to all adult smokers will significantly impact health and the healthcare system as the reduction in smoking has proven to reduce smoking related illness, direct and indirect costs for illness and the overall quality of life of the smoker. Continued collaboration with the healthcare team to

support smoking cessation efforts in and out of the hospital setting will improve patient and population outcomes and advocate for healthcare policy change (AACN, 2006). Incorporation of information systems and technology provides a mechanism to improve smoking recognition and provide early intervention, education, and treatment. Mobile phones and their applications are ubiquitous and should be used to promote better health and offer better choices. The DNP prepared nurse must use technology and all available resources and opportunities to promote EBP.

Conclusion

The EBP change project has implemented standard best care practices that include using technology in the management of the hospitalized adult smokers and has shown to be effective in offering support for smoking cessation. Findings noted in the literature were supported in the project, as research supported multiple attempts at cessation with a variety of options. Despite the small sample size, the EBP project was successful in influencing a reduction in tobacco use. The use of the mobile phone application for smoking cessation did show that the text messages offered support and added to motivation to quit but if the intention to quit was not present it seemed it did not make a difference. The EBP project using advanced technology has the ability to significantly influence a participant's involvement in self-care and can augment clinical interventions by adding continued support and education at a convenient time that is always available.

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Appendices

Appendix A

Project Implementation Timeline

Phase 1   *May 6, 2015-August 3, 2015

University and Institutional IRB approval

Staff education to assure protection of Human Participants

Approval received to use the NDSS questionnaire

Initial patient recruitment and acquisition of

informed consent

Provision of tools and instructions

Phase 2   * August 4, 2015-September 29, 2015

Administration of post questionnaire at intervals of every
two weeks for a 10 week period

Synthesis and Analysis of project data

Dissemination of project data

Appendix B

MISERICORDIA
U N I V E R S I T Y.

October 21, 2015

Charlene K. Zablotney, MSN, CRNP, DNP
Brenda Hage, Ph.D.
Nursing Department
Misericordia University
Dallas, PA 18612

Dear Ms. Zablotney and Dr. Hage:

Please be advised that your active IRB protocol *The Impact of a Text Based Messaging Smoking Cessation Intervention in Adult Smokers,* IRB number 14-15-T1. Terminated on September 29, 2015.

If this study is concluded, please submit a Type 1 End-of-Project Report form. If the study will still be in progress after the termination date, please submit the Type 1 Continuation form. IRB forms can be found under the Planning tab on e-MU, or at the link below.

http://www.misericordia.edu/page.cfm?p=782

Please send the completed form to Brenda Nowalis in the IRB office, McAuley Hall room one. If you have any questions, please do not hesitate to contact me.

Sincerely,

McKinley H. Manasco, Ph.D.
Chairperson, IRB

The Impact of a Text-Based Messaging Smoking Cessation Intervention in Adult Smokers.

Demographic sheet

Age: _____

Gender: Male_____ Female_____

Ethnicity : Caucasian/White_____ Hispanic/Latino_____ Asian _____

Black/African American_____ Native American_____ Puerto Rican_____

More than one race (specify) _:_____

Housing: Renting; _____ Own home:_____

Resides Alone: _____ Resides with others: _____

Employment Status: Actively employed:_____ Part-time employed:_____

Unemployed:_____ Retired:_____

Smoking:

Light < 10 cigarettes per day:_____

Heavy > 10 cigarettes per day:_____

Number of Attempts to quit: _____

Alternative assist to quit devices used:_____

Informed Consent/HIPAA Authorization

The Impact of a Text-Based Messaging Smoking Cessation Intervention in Adult Smokers

Research Protocol - 2015-0315

PRINCIPAL INVESTIGATOR: Adele Spegman PhD RN

SITE(S): Geisinger Medical Center

PHONE NUMBER: 570-214-5364

24-HOUR PHONE NUMBER: 570-271-6211 (HOSPITAL SWITCHBOARD)

You are being asked to take part in a research study. The research team is asking you to participate because you were identified as an active smoker. Please read this form carefully and ask any questions you may have before agreeing to take part in the project.

What the study is about: The purpose of this project is to examine the effectiveness of a cell phone text messaging application and its influence on your ability to quit smoking or reduce your tobacco use. You will need to use your cell phone to receive text messages. The texting project will send you one to five messages a day, some you can respond to, while others will offer help or praise.

This study is supported by the Geisinger Clinic, Thoracic Medicine Department and Nursing Service Line.

Who will be in this study? Participants will include approximately 20 adults who are active smokers and are receiving care on the Progressive Care Unit at Geisinger Wyoming Valley Hospital.

Expectations: If you agree to participate in this study, we will conduct an interview with you. The interview will include two questionnaires that will ask for your social information and smoking habits. The interview will take about 15 to 20 minutes to complete.

You will begin to use the application through your cell phone as soon as you are ready. The application will help you create a quit date. The program will provide supportive education, quit smoking tips, and emotional support that follows standard quit smoking guidelines.

You will be contacted, via phone, in 2 weeks to update your questionnaire and follow back your tobacco use. This will be repeated every 2 weeks for a period of 8-10 weeks. No alternative quit smoking devices, such as nicotine replacement, will be used in this study.

Risks and benefits: There is a potential risk that your information can be viewed by others not involved in the study.

There is a potential legal and physical risk with using phone text messaging while driving. Familiarity with the Pennsylvania law that bans texting while driving is required. It is recommended that you place your cell phone in a "Do Not Disturb" mode while you are driving to avoid disturbances.

There are benefits to your participation, as the texting application offers support and coaching to help make the transition to a smoke free lifestyle easier.

What other options are there? You can choose not to participate in this study and it will not impact your care.

You can talk with your physician about other approaches and interventions to assist with tobacco cessation.

Confidentiality: Efforts will be made to keep your personal information confidential. We cannot guarantee absolute confidentiality. Your personal information may be disclosed if required by law. Federal Privacy Regulations provide safeguards for privacy, security, and authorized access. To the extent practical, the study Principal Investigator and staff will provide this information in a way that does not identify you directly.

Geisinger Clinic has several departments that are responsible for making sure research is performed according to federal and state regulations. The staff members of these departments may review your medical record and research data for this study. This review will be administrative in nature and no Protected Health Information (PHI) will be sent outside Geisinger Clinic.

The Personal Health Information (PHI) that we will use for this research includes your
* Name,
* Dates of hospitalization,
* Telephone number,
* Email address, and
* Medical Record Number.

This information will be used only for the purposes of completing this research study. Your PHI will not be shared or give to anyone outside of Geisinger Clinic. Geisinger Health System is required by law to protect your health information. There is no expiration date for the use of your PHI. By agreeing to participate, you authorize Geisinger Clinic to use your health information for this research.

If you agree to participate in this research study, you give permission to Dr. Adele Spegman and her study team at Geisinger Clinic to use health information that identifies you for this research study. Although your name or Medical Record Number may be known to the study team at the time of

data collection, this information will not be included in the data file that will be used for the study analysis. Research records will be stored in a password-protected computer in a file within a secure computer network. Paper records will be stored in locked file in a locked study team member's office in a secure location. Once data is collected, all identifiers will be removed from study data. Your study data will be labeled with a study ID number.

You have the right to access your medical records.

If data or information from the research study is submitted for publication in a medical journal or is presented at a medical meeting, your identity as a research participant will not be revealed.

You may change your mind and take back this Authorization at any time. Even if you take back this authorization, The PI and Study Team at Geisinger Clinic may still use health information they already have obtained about you as necessary to maintain the integrity or reliability of the current research. To remove your authorization, you must write to: Dr. Adele Spegman, Geisinger Nursing Research MC 0403, 100 N. Academy Avenue, Danville PA 17822.

Compensation: You will be offered no compensation for taking part in the project.

Your answers will be confidential. The records of this project will be kept private. In any sort of report we make public, we will not include any information that will make it possible to identify you. Project records will be kept in a locked file or password protected computer file.; only the data collector will have access to the records.

Taking part is voluntary: Taking part in this study is completely voluntary. You may skip any questions that you do not want to answer. If you decide not to take part or to skip some of the questions, it will not affect the project. If you decide to take part, you are free to withdraw at any time, this decision will not affect your care.

If you have questions: For questions about this research study, contact Charlene Zablotney at 570-808-5770 or Adele Spegman at 570-214-5364. For questions about your rights as a research participant, contact the Human Research Protection Program staff of the Geisinger Institutional Review Board (which is a group of people who review the research to protect your rights) at (570) 271-8663.

You will be given a copy of this form to keep for your records.

Statement of Consent:

I agree to take part in this research study. By signing this consent form, I have not given up any of my legal rights.

_____   _____

Research Participant's Signature   **Date**

_____
Research Participant's Printed name

I confirm that the research study was thoroughly explained to the subject. I reviewed the consent form with the subject and answered the subject's questions. The subject appeared to have understood the information.

_____   _____
Person Obtaining Consent Signature   **Date**
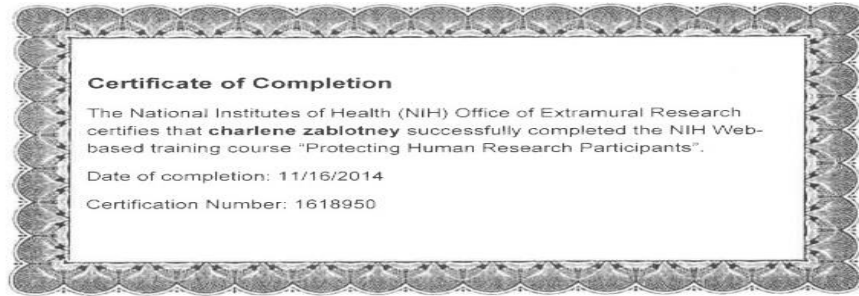

ID# _____

Anti-Texting Law Fact Sheet

What the law does

- The law prohibits as a primary offense any driver from using an Interactive Wireless Communication Device (IWCD) to send, read or write a text-based communication while his or her vehicle is in motion.
- Defines an IWCD as a wireless phone, personal digital assistant, smart phone, portable or mobile computer or similar devices that can be used for texting, instant messaging, emailing or browsing the Internet.
- Defines a text-based communication as a text message, instant message, email or other written communication composed or received on an IWCD.
- Institutes a $50 fine for convictions under this section.
- Makes clear that this law supersedes and preempts any local ordinances restricting the use of interactive wireless devices by drivers.

Information retrieved from:
http://www.dot.state.pa.us/Internet/pdnews.nsf/antiTextingLaw?readForm

Certificate of Completion

The National Institutes of Health (NIH) Office of Extramural Research certifies that **charlene zablotney** successfully completed the NIH Web-based training course "Protecting Human Research Participants".

Date of completion: 11/16/2014

Certification Number: 1618950

Charlene K. Zablotney, M.S.N., C.R.N.P.

Doctor of Nursing Practice Candidate
Misericordia University
301 Lake Street
Dallas, Pennsylvania 18612

May 23, 2015.
 shiffman@pinneyassociates.com

Dear Professor Shiffman,

I am writing to request permission to utilize the Nicotine Dependence Syndrome Scale (NDSS) in an evidence based practice quality improvement project during the pursuit of my Doctor of Nursing Practice (DNP) at Misericordia University. I am currently enrolled in the DNP Program and I am actively employed as a Certified Registered Nurse Practitioner in a Pulmonary practice. I care for a large population of patients with smoking related diseases and I am engaging in scholarly inquiry in attempts to improve quality healthcare. I accessed your publication in Drug and Alcohol Dependence Psychological Assessment, Volume 23, Number 2, pages 398-403 published in 2011. I am interested specifically in using the Nicotine Dependence Syndrome Scale to investigate the impact of a cell-phone based smoking cessation intervention on the consumption of cigarettes in the adult hospitalized smoker.

I intend to utilize and appropriately cite the Nicotine Dependence Syndrome Scale for the project entitled: *The Impact of a Text-Based Messaging Smoking Cessation Intervention in Adult Smokers.* The quality improvement project has received scrutiny and approval from my University's Institutional Review Board. I would be honored for the opportunity to use this developed scale in clinical practice and in my translational research. In the event that I am required to seek permission for use elsewhere, I would be very grateful for any contact information you can provide me.

I appreciate your time and eagerly await to hear from you. Your response to my request will be greatly valued and any correspondence or questions can be directed via email to the following address: czablotn@misericordia.edu

Respectfully,

Charlene K Zablotney, C.R.N.P.
Doctor of Nursing Practice Candidate

RE: NDSS

Saul Shiffman <shiffman@pinneyassociates.com>

Tue 6/9/2015 1:22 PM

To:Charlene Zablotney <czablotn@misericordia.edu>;

You're welcome to use it. Just cite its source when you write things up.

Best

Saul

Saul Shiffman, Ph.D.
Professor of Psychology, Psychiatry, Pharmaceutical Sciences, and Clinical Translational Medicine
University of Pittsburgh
shiffman@pitt.edu

Parts of this message may be confidential. If you receive this in error, please delete and notify me.

Nicotine Dependence Questionnaire
(Modified Fagerstrom Tolerance Questionnaire)

Please check <u>one</u> answer for each question.

1. How many cigarettes a day do you usually smoke?

      [ ] 1 - 10   0 points
      [ ] 11 – 20   1 points
      [ ] 21 – 30   2 points
      [ ] 31 or more   3 points

2. What type do you smoke?   0 points

      [ ] Low nicotine (0.9 mg or less)   1 point
      [ ] Medium nicotine (1.0 – 1.2 mg)   2 points
      [ ] High nicotine (1.3 mg or more)   3 points

3. How often do you inhale the smoke from your cigarette?

      [ ] Never   0 points
      [ ] Sometimes   1 points
      [ ] Always   2 points

4. How soon after you wake up do you smoke your first cigarette?

      [ ] Within less than 5 minutes   3 points
      [ ] Within 6-30 minutes   2 points
      [ ] Within 31-60 minutes   1 points

5. Do you smoke more during the first two hours of the day than during the rest of the day?

      [ ] No   0 points
      [ ] Yes   1 points

6. Which cigarette would you most hate to give up?

      [ ] The first cigarette in the morning   1 point
      [ ] Any cigarette other than the first one   0 points

7. Do you find it difficult to refrain from smoking in places where it is forbidden, such as public buildings, on airplanes or at work?

      [ ] No   0 points
      [ ] Yes   1 point

8. Do you still smoke even when you are so ill that you are in bed most of the day?

[ ] No   0 points
[ ] Yes   1 point

Scoring/ Interpretation

7+ points = High Nicotine Dependence
6 and Below = Low to Moderate Nicotine Dependence

MISERICORDIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
TYPE 1 CONTINUATION AND/OR END-OF-PROJECT FORM

Please check the appropriate box above

[X] Continuation [ ] Completed Project

Date: 7/21/1

Researcher Name(s): Charlene Zablotney MSN, CRNP, DNP

Department/Program: Nursing Department, DNP program

Address: Misericordia University, Misericordia University, Dallas, Pa 18612

Phone: 570-333-4131

Email Address: czablotn@misericordia.edu

Faculty Research Adviser Name (for student research): Dr Brenda Hage

Advisor's Phone Number: 570-674-6776

Advisor's Email Address: Hage@misericordia.edu

Project Title: The Impact of a Text-based Messaging Smoking Cessation Intervention in Adult

Smokers.

Number of Subjects Recruited: 40

Have there been any changes to this protocol: YES (NO)
     If yes, please complete the Change in Protocol Form.

Anticipated Data Collection Completion Date: 9/29/2015

Researcher signature(s):   Date: 7/21/15
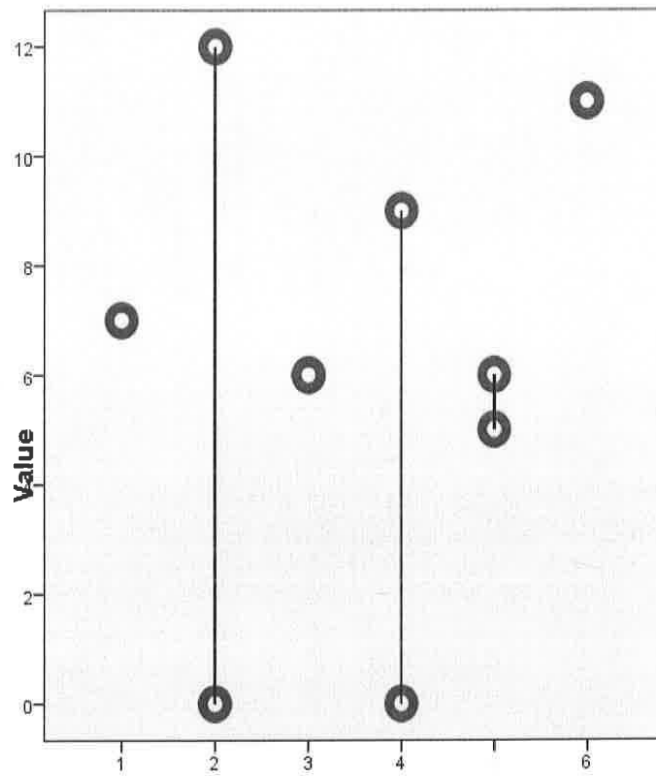
<u>For student research:</u>

Faculty Research Advisor Signature:

Date:

Approved by: _____ Date: _____

Line graph: CNDSS initial – week 10, for each participant

NDSS @ entry
NDSS @ week 10

Case Number

Charlene K Zablotney, MSC, CRNP, DNP Student

1264 Sutton Creek Rd

Dallas, PA 18612

570-333-4131

czablotn@misericordia.edu

Nancy Gattuso, Nurse Operations manager, PCU, cardiac step down, GWV

Mary Gildea, Associate AVP of Nursing, nursing administration, GWV

Marge Hennelly-Bergin, Chief Nursing Officer, GWV

Dr Kasim Kasim, PCU Director, Hospitalist Service, GWV

Dr Kenrick Maynor, Director of Hospitalist Service, GWV

Dr Gerald Maloney, Director of Systems Clinical Operations, GWV

Dr Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC

Dear Colleagues,

As one of your Specialty Clinic Nurse Practitioners, I am also a DNP Student. I am seeking your support for my project as part of my requirements for the Doctor of Nursing Practice at Misericordia University. I plan to have the opportunity to publish the findings and share the data with other venues and professionals.

Tobacco use is the leading cause of preventable death and disease in the world. Tobacco use cessation gives immediate and major health benefits and is considered the gold standard in cost-effective disease prevention strategies. Hospitals have a responsibility to reduce tobacco addiction by assisting patients with smoking cessation. Tobacco control standards were first established by the Joint Commission on Accreditation of Healthcare Organizations (JCAHO), they made hospitals the first site to ban workplace smoking. Hospitalization has been identified as a teachable moment, where perceived vulnerability to the damage of smoking and the motivation to quit maybe high.

The popularity of cell phone applications and the ease of cell phone use have made this arena a popular one for education, social support and data collection. SmokeFree TXT is a free mobile phone application that can be used with or without other forms of cessation devices to help smokers quit. This application offers support, tips for quitting and motivational messages.

The proposed capstone project will focus the solicitation of this application to promote smoking cessation in our patient population. The project will concentrate on the PCU patients. Smokers will be identified upon admission and I will be notified. The goal is that every patient is screened for tobacco use. The application of cessation interventions will begin by employing the 5A's; ask about tobacco use, advice to quit, assess willingness to make a quit attempt, assist in the quit attempt. If the patient is identified as willing to quit and subscribes to a smart phone, informed consent will be obtained and safety enforced in accordance with the PA law regarding banned texting while driving. The participant will complete an anonymous demographic questionnaire, a 7-day smoking timeline follow-back (TLFB), and the Nicotine Dependence Syndrome Scale (NDSS). Initiation of Smoke Free TXT will begin prior to discharge. The patients, once discharged will be monitored every 2 weeks to reassess their NDSS, 7-day smoking timeline follow-back, which will track their tobacco use. The project will begin once IRB approval is obtained and run for about 8-12 weeks. Benefits of the study suggests that smokers assigned to mobile phone interventions are significantly more likely to reduce consumption, or/and abstain from tobacco use.

To conclude, I seek your support for the proposed intervention. Successful smoking cessation intervention and the support that begins during an acute care event often proves to be a positive move forward as this is a time to capture the patients' willingness for change. In accordance with the Affordable Care Act, which supports the access of cessation guidance, I would like to take this opportunity to ensure that more tobacco users have access to this comprehensive tobacco cessation benefit.

Thank you for your time

Charlene K Zablotney, MSN, CRNP, DNP Student

MISERICORDIA UNIVERSITY
INSTITUTIONAL REVIEW BOARD
TYPE 1 CONTINUATION AND/OR END-OF-PROJECT FORM

Please check the appropriate box above

☐ Continuation   ☒ Completed Project

Date: 10/29/15

Researcher Name(s): Charlene Zablotney, MSN, CRNP, DNP

Department/Program: Nursing Department, DNP program

Address: Misericordia University, Dallas, PA 18612

Phone: 570-333-4131

Email Address: czablotn@misericordia.edu

Faculty Research Adviser Name (for student research): Dr. Brenda Hage

Advisor's Phone Number: 570-674-6776

Advisor's Email Address: Hage@misericordia.edu

Project Title: The Impact of a Text-based Messaging Smoking Cessation Intervention in Adult

Hospitalized Smokers.

Number of Subjects Recruited: 31

Have there been any changes to this protocol: YES   (NO)
        If yes, please complete the Change in Protocol Form.
Anticipated Data Collection Completion Date: 9/29/15

Researcher signature(s): _Charlene Zablotney_ DNPCRNP Date: 10/29/15

For student research: Faculty Research Advisor Signature:

Date:
Approved by: _____   Date: _____

                                              Date: _____