DEVELOPMENT AND EVALUATION OF A NURSE PRACTITIONER-DIRECTED APPOINTMENT INITIATIVE FOR VETERANS IN AN OUTPATIENT PRACTICE

An Evidence-Based Scholarly Project

Submitted to the College of Health Professions

In Partial Fulfillment of the

Requirements for the Degree

Doctor of Nursing Practice

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Wilmington University

February 2021

Wilmington University
College of Health Professions
Doctor of Nursing Practice Program

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Title: Development and Evaluation of a Nurse Practitioner-Directed Appointment Initiative for Veterans in an Outpatient Practice

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Annually, between 23% and 34% of scheduled outpatient appointments are missed (Crutchfield & Kistler, 2017). It is a significant deterrent to efficient health care delivery, and it leads to inefficiency in practice. The reasons for missed appointments vary from forgetfulness, age, distance to the appointment, and appointment lead time. A review of the literature supported that the use of a reminder system improves patient appointment attendance. Four hundred and forty veterans scheduled for outpatient physical exam participated in the pre-intervention group and 403 in the intervention group. A phone call and text message reminders were sent to veterans a day before their scheduled appointment. The outcome measure was a reduction in the current no show rate from 30.5% to 19.5% after six weeks of intervention. The DNP student utilized the Health Promotion Model (HPM) and Lewin's change theory as a theoretical framework to guide this project. Findings showed 11% increase in the rate of appointment attendance.

Keywords: missed appointment, no show, veterans, Veterans Health Administration, appointment attendance, appointment lead time

ACKNOWLEDGEMENTS

First of all, I thank God almighty for taking me through this program. I wish to acknowledge my children, John, Ema, Nsikan, Uduak, and Sona, for their perseverance while taking ample time off to focus on my studies. My special thanks to one of my sons, Nsikan Umoh, who served as my personal information technology person serving all my technical needs throughout the program. To my project advisor, Dr. Joanne Fletcher, for her unrelentless effort in assisting me through the project. I also acknowledge Dr. Kamara, my project team member, for her time and assistance. Finally, I acknowledge the love of my life, my beloved husband, Samuel Mukwele, who is the biggest driving force behind my success. He encourages and strengthens even when I'm about to give up. To all, who have contributed in one way or the other towards my doctoral program, I thank you.

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ABBREVIATIONS

CITI	Collaborative Institutional Training Initiative
DNP	Doctor of Nursing Practice
EBP	Evidence-Based Practice
HPM	Health Promotion Model
HSRC	Human Subject Research Committee
JHNEBP	John Hopkins Nursing Evidence-Based Practice
LHI	Logistics Health Incorporated
MSLA	Medical Support of Los Angelis
NP	Nurse Practitioner
OTM	Organizational Transformation Implementation Model
PDSA	Plan–Do–Study–Act
PICOT	Population, Intervention, Comparison, Outcome, and Time
PET	Practice question, Evidence, Translation
QTC	Quality, Timeliness, Customer Service
RCT	Randomized Control Trial
SMS	Short Message Service
SORT	Strength of Recommendation Taxonomy
SQUIRE	Standards for Quality Improvement Reporting Excellence
VA	Veterans Administration
VES	Veterans Evaluation Services
VHA	Veterans Health Administration

CHAPTER ONE. INTRODUCTION

Problem Description

Patient no-shows or a missed scheduled appointment is a common problem in the healthcare system that permeates every specialty and practice in the United States (Adams et al., 2017; Chong & Fantl, 2017; Kheirkhah et al., 2016). A missed appointment is widespread, and the rate varies from one institution to the other. However, several studies have shown no-show rates as low as 3% and as high as 80% (Crutchfield & Kistler, 2017; Kheirkhah et al., 2016; Samuels et al., 2015). In the Veterans Health Administration (VHA) system, the rate of appointment no-shows in the fiscal year 2008 was 18% (Kheirkhah et al., 2016). In a retrospective study of ten clinics within the VHA system in 2016, the authors revealed that no-shows represent 31.1% of overall scheduled appointments among 45,000 patients per year in a large family practice. In a community hospital setting, the rate of no-shows is approximately 62 missed appointments per day, with an estimated $3 million annual revenue loss (Kheirkhah et al., 2016). According to Hwang et al. (2015), appointment no-shows are a reliable indicator for the high utilization of resources and suboptimal care in screening, preventing, and managing chronic diseases.

Davies et al. (2016) conducted a retrospective study to examine appointment attendance rates within the United States Department of Veterans Affairs for eight years, from 2007 to 2014. Findings from this study showed that the veteran's gender, appointment lead time, and type of appointment (new versus established) all played a role in missed appointments or no-shows. Starnes et al. (2019) conducted a similar study and noted that missed appointments are a combination of patient and environmental factors.

The study identified patient factors, such as health beliefs, demographics, socioeconomic status, educational level, and previous no-shows. Environmental factors were identified as the day of the week, time of the day, appointment lead time, and reason for the visit.

The consequences of no-shows result in wasted healthcare resources, increased cost of care, provider dissatisfaction, inefficiency, lost time, and revenue (Adams et al., 2017; Chong & Fantl, 2017; Crutchfield & Kistler, 2017; Goffman et al., 2017; Kheirkhah et al., 2016; McLean et al., 2016; Ruggeri et al., 2020; Triemstra & Lowery, 2018). It further states that no-shows are a significant hindrance to cost-effective healthcare delivery and patient safety. Patients who do not show up for scheduled appointments prevent or delay others from being scheduled for an appointment for treatment or follow-up care (Crutchfield & Kistler, 2017; McLean et al., 2016). No-shows lead to increased waiting times and a backlog of patients waiting to be seen. Also, many providers do not get compensated for patient no-shows; therefore, a missed appointment is a missed opportunity to the provider (Crutchfield & Kistler, 2017). As a result, providers incur an estimated 3% to 4% annual shortfall in revenue (Kheirkhah et al., 2016). Due to the inherent consequences of no-shows, many providers have devised several means to curb this problem, which has resulted in a comprehensive study of no-shows in the healthcare system.

Samto Medical Services is a small family practice in Newark, Delaware. The primary patient population within this practice is the United States veterans. Between 2016 and 2020, the facility has served over six thousand active, reserved, and retired men and women of the United States military. Providing outpatient service to veterans was in response to part of the programs to reform the Veterans Health Administration, which

authorized the completion of disability exams by civilian providers (Liermann, 2019). The primary goal for outsourcing was to increase the capacity of veterans seen within a specified period and to improve the veteran's experience (Liermann, 2019). The program began in 1996, and as of 2016, it expanded from ten to fifteen VHA regional offices (Liermann, 2019). In 2017, for the 1.3 million veterans who received their compensation and disability exam, contractors outside the VHA system provided 45% of these exams at the cost of $765 million (Liermann, 2019).

Similarly, 1.4 million veterans received compensation and a pension exam in 2018, of which the VHA contractors provided 60% for $986 million. It is worth noting that the physical exam is an essential part of the disability claim process, which determines the presence or absence of the claimed medical or mental condition. Therefore, a physical exam must be completed before the veteran can receive their earned benefits, including medical care. However, if the veteran fails to show up for the exam, the claim can be denied, reduced, or the veteran may completely lose an established benefit (Liermann, 2019).

The contributing factor to the increase in no-shows at Samto medical services is the lack of a standardized system in the referral process between the VHA and the contracted medical exam provider. Currently, the veteran is referred by the VHA contractor to the contract medical exam provider. The scheduled appointment information is forwarded electronically to the medical exam provider's scheduling portal, including the veteran's demographic information and complete medical records. There is no specific lead time for scheduling the appointment. The lead time or appointment age is when the veteran is scheduled for the exam and when the provider sees the patient.

According to Adams et al. (2016), appointment lead time is linked intrinsically to no-show rates; The more prolonged the appointment time, the higher the incidence of no-show rates. Generally, the veterans are scheduled by the VHA contractor anywhere between three weeks to two days before the appointment date. The scheduling process starts with a VHA contractor's call to the veteran regarding the appointment, followed by a letter concerning the appointment through an overnight courier. In this standard practice, the contract medical examiner's office waits for the veteran to either show up or miss the appointment. Consequently, between 2017 and March 2020, this provider's office has experienced approximately 40% no-shows or missed appointments daily (Provider's Office Daily Intake).

The purpose of this study was to examine the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. The degree of no-shows at Samto substantially affects patient outcomes, a drop in revenue, and provider dissatisfaction. To alleviate the financial burden placed on the provider due to missed appointments, the DNP student proposed the development and implementation of a reminder system. The project is relevant to nursing practice because the nurse is accountable for delivering safe, quality, and equitable care to patients under its care by addressing any healthcare dilemma that may affect such care (Chism, 2019). To complete this project, the DNP nurse utilized the health promotion model (HPM) and Lewin's change theory as a theoretical framework to provide a platform to assess and evaluate the efficacy of phone call and text message reminders on no-shows.

Rationale

DNP Essential I emphasized that DNP graduates utilize science-based concepts, nursing theories, and theories from other disciplines as the basis for practice (Chism, 2019). Further, this theory sets the framework and establishes a platform for which the nurse can conceptualize. The nurse uses HPM for planning care in the clinical setting. It considers the individual personal attributes, such as biological, psychological, and sociocultural factors that may affect care (Zaccagnini & White, 2017). One of this model's focus is the healthcare personnel's initiation of action that will influence health-promoting behavior, making this model suitable for this project (Zaccagnini & White, 2017). For example, a literature review supports that a simple text message can promote healthy preventative behavior, such as appointment attendance (Househ, 2016). Using this model, the DNP nurse assesses the patient's needs and when to intervene to engage the patient in health-related behaviors.

The HPM has three distinct features: individual characteristics and experience, behavior-specific cognitions and affect, and behavioral outcomes (Pender, 1975). It further notes that the person's unique personality and skills affect subsequent behavior, and a person engages in behavior from which they anticipate to benefit. For example, a patient is likely to attend a healthcare appointment if access to care is proven to reduce the severity of a medical condition, promote health, prevent illness, and reduce disease burden (Pender, 1975). This concept aligns with the DNP Essential VII, which emphasizes that the DNP graduates should participate in activities that promote health, prevent illness and reduce risks for the individual, family, and population (Chism, 2019). Further, perceived barriers or situational factors can influence or pose a constraint and

hinder commitment to actions that promote health-related behaviors. In the case of no-shows in the clinical setting, forgetfulness, and confusion over time and appointment days reportedly pose significant appointment attendance barriers (Germain & Godin, 2016).

The health promotion model further states that the health professional is part of the complex interpersonal environment with power and authority to initiate actions to influence the person's commitment to engage in health-related behavior to promote health and prevent illness (Pender, 1975). Such action is developing phone call and text message reminders to veterans to enhance and encourage health-related behaviors (appointment attendance) to improve health, improve quality of life, and functional ability (Pender, 1975). This concept aligns with the DNP Essential III, which supports that the DNP prepared nurse analyzes and evaluates existing literature and other research studies to determine the best evidence for practice (Chism, 2019). Moreover, the DNP nurse should develop best and relevant practice guidelines and methods to improve quality care and promote efficient and effective patient-centered care. Using this model as a guide, the DNP student assesses the patient and the environment to determine the source of the problem (personal or environmental factors), collect data related to prior behavior, and evaluate the patient's perception of the problem (Zaccagnini & White, 2017). Based on the data collected, the nurse and the patient agree and develop plans to promote health-related behaviors. In the case of no-shows or missed appointments in outpatient clinics, the DNP nurse incorporated a reminder system, such as text messaging and human phone call a day before the scheduled appointment.

Also applicable in the assessment of no-shows was Lewin's change theory (see Figure 1). This theory recognizes change as a necessity achieved by creating a balance between driving and opposing forces (Zaccagnini & White, 2017). Driving forces is the facilitator of change by pushing the person towards the direction that will result in a positive transition and a shift towards change; whereas, opposing forces is a deterrent to growth by inhibiting change and shifting the balance towards factors that opposes change (Zaccagnini & White, 2017). Lewin identified three distinct stages of this theory: unfreezing, changing or movement, and refreezing.

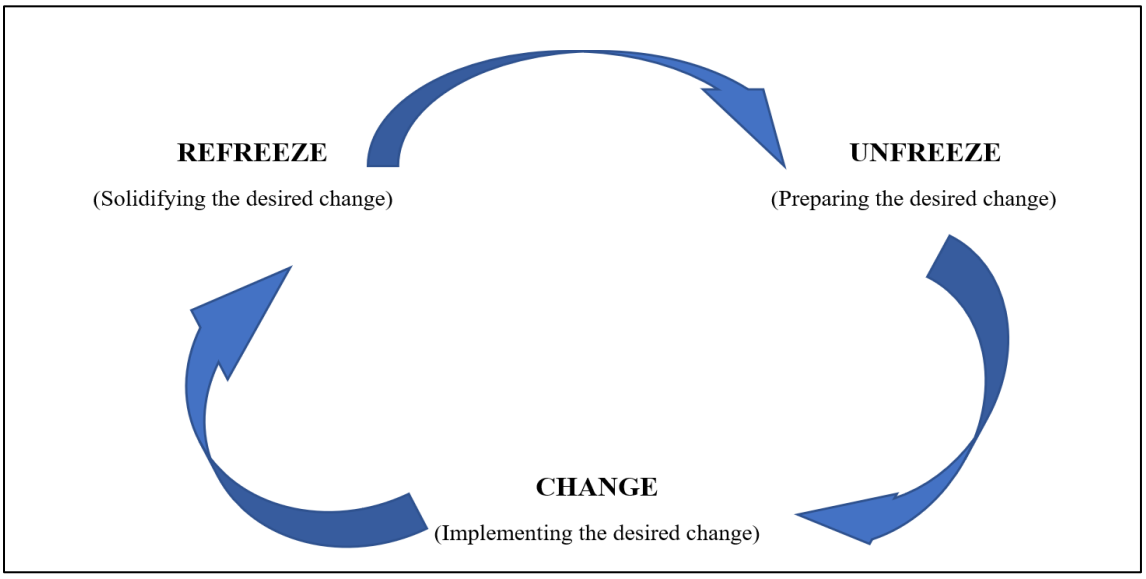

Figure 1. Lewin's change theory. Adapted from "Lewin's Change Model: Why It Still Matters After 70 Years," by S. Sharma, 2021, Taskworld. Retrieved from https://taskworld.com/blog/lewins-change-model-why-it-still-matters-after-70-years/

Unfreezing is the first step and the beginning stage of the theory. In this stage, the person identifies a situation as a problem and perceives that change is necessary to mitigate the current situation (Zaccagnini & White, 2017). Once it is apparent that a

problem exists, it is imperative to assess the organization's need and prepare self and others to recognize the need for the change (Zaccagnini & White, 2017). Unfreezing could be achieved through education, motivation, and collaboration. Also, the time frame for the planned change and the feasibility is specified during this stage.

Changing or movement is the second phase of this theory. This stage is when the change takes place, and it involves continued empowerment of the staff through education and feedback to adopt the proposed change (Zaccagnini & White, 2017). Moreover, after implementing the change, it must be stabilized, sustained, reinforced, and refreeze. Overall, this model sets the platform for the nurse to assess (unfreezing), develop (change or movement), and implement (refreezing) intervention methods that will remediate no-shows or missed appointments in an outpatient clinic.

Specific Aims

The overall aim of this project was to implement live phone calls and text message reminders to veterans to promote access to care and reduce the current no shows.

PICOT Question

This project aimed to answer the PICOT question: Among veterans scheduled for outpatient exams, how do reminder phone calls and text messaging compare to no reminder phone calls and text messaging affect no-show rates in six weeks? This project's goal was to implement live phone calls and text message reminders to veterans to promote access to care.

Definition of Terms

The following conceptual and operational definition of terms were used throughout the project:

Lead time. Lead time or appointment age is defined as when the veteran is scheduled for the exam and when the provider sees the patient (Peng et al., 2016)

Missed appointments or no show. Missed appointment or no show is defined as patients who do not show up for scheduled appointments (Davies et al., 2016)

Summary

Many healthcare organizations continue to face the challenges pose by patients not attending their scheduled appointment. As a result, various studies have been conducted to assess reminder systems' effectiveness, including phone calls, text messages, and email. The project aimed to promote access to care by implementing phone call and text message reminders. The next chapter will address the available knowledge and evidence-based practice to support phone call and text message reminders.

CHAPTER TWO. LITERATURE REVIEW

Introduction

Providing outpatient service to veterans was in response to part of the program to reform the Veterans Health Administration, which authorized the completion of disability exams by civilian providers. The primary goal for outsourcing was to increase the capacity of veterans seen within a specified period and to improve the veteran's experience. This project's goal was to implement live phone calls and text message reminders to veterans to promote access to care. The purpose of this study was to examine the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. This chapter discusses the literature gathered, analyzed, and synthesized from research articles, research reports, seminal books, institutional reports, and historical documents related to this project's purpose and research questions.

Search Strategy

A comprehensive search of the electronic database was conducted to gather evidence regarding no-shows and telephone-based reminders. The literature search was limited to peer-reviewed and full-text journals written in English and published between January 2015 to 2020. The search was performed using Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medical Literature Analysis and Retrieval System Online (MEDLINE), PubMed U.S. National Library of Medicine, and the Cochrane Database of Systematic Reviews. Journals from gray literature were also added manually. Search terms that were used included *text messaging OR SMS AND missed appointments OR no-shows*; *phone call reminders AND missed appointment OR no-shows*; *phone call reminders AND appointment attendance*; *SMS reminders, AND appointment attendance*;

veterans or military or soldiers and missed appointment OR no-show; *veterans or military or soldiers and outpatient appointment*; and *veterans AND nonattendance*. The search strategy was limited to no-shows and the reminder system within the clinic setting or healthcare institutions. Studies were excluded if it was performed on reminder systems involving other businesses outside the healthcare system.

All articles retrieved were initially screened on titles and abstracts that resulted in 1,683 articles. After duplicates were removed, records were 452, which was further screened, and 229 articles were excluded. One hundred and fifty-one (151) full-text articles were assessed for eligibility. The full-text articles were also screened to exclude articles that were not related to the focus of the project, such as phone call reminders, text message reminders, and outpatient appointments. Out of 151 articles, 40 were reviewed and included in this manuscript, including 11 randomized control trials (RCT), 8 systematic reviews with or without meta-analysis, 12 retrospective study, 4 prospective cohort study, 4 quasi-experimental studies, and 1 cross-sectional survey (A flow diagram of the literature search is included in Appendix F). Full-text articles that met the inclusion criteria were further organized on John Hopkins Nursing Evidence-Based practice individual evidence summary tool using the Strength of Recommendation Taxonomy (SORT). Evidence-based quality was appraised using grades A to C (high to low), and all C grade evidence-based articles were eliminated from the study. According to Ebell et al. (2004), SORT is used to grade review articles based on consistency, quality, and patient-oriented evidence. It is also used clinically to assess patient-oriented evidence measures outcomes pertinent to the patient, such as improvement in symptoms, morbidity, mortality symptoms, cost reduction, and quality of life.

EBP Model

Evidence-based practice (EBP) is a practice-driven model that involves a rigorous use of best evidence from research to make a clinical decision regarding an individual's care (Zaccagnini & White, 2017). However, a gap exists between evidence-based practice discovery and implementation or application into clinical practice, and the reason for the breach is complex (Malterud et al., 2018; Zaccagnini & White, 2017). The core emphasis of EBP is the translation of best evidence into clinical practice to improve patient outcomes (Zaccagnini, 2017). Furthermore, evidence relies mostly on data from science, case reviews, empirical observation, and other sources. These core principles can be accomplished through "formulating the clinical question; identifying the most relevant articles, research, and other best evidence; critically evaluating the evidence; integrating and applying the evidence; and reevaluating the application of evidence and making necessary changes" (Zaccagnini & White, 2017, p. 71). Moreover, through EBP, the provider's experience is linked to the patient's values through theory, observation, and research.

Similarly, the Johns Hopkins nursing evidence-based practice (JHNEBP) model is one of the EBP models that guide the clinician in clinical decision making to ensure that the latest research findings and EBP are integrated into patient care (Dang & Dearholt, 2017). The model uses a three-tier process called PET, which is an acronym for practice question, evidence, and translation. Using this guide, the Doctor of Nursing Practice (DNP) student identifies the problem that affects current clinical practice, develops an evidence-based question, and meets with stakeholders involved in making the necessary changes. In the evidence phase, the DNP student searches for evidence (database search),

both internal and external, that support the EBP (Dang & Dearholt, 2017). Therefore, such evidence is appraised for quality and strength sufficient to promote the development and recommendation of the EBP. The translation is the last phase in this model. It involves creating an action plan, implementing, evaluating outcomes, reporting the outcomes to stakeholders, and disseminating the findings to other clinical settings (Dang & Dearholt, 2017).

Available Knowledge

Several studies conducted within the United States and abroad showed that the cause of no-shows is multifactorial. Factors, such as forgetfulness, day of the week, the month of the year, age, gender, visit related specialty, miscommunication, confusion over appointment time and date, transportation, and work/school problem may affect appointment attendance (Crutchfield & Kistler, 2017; Kheirkhah et al., 2016; Penzias et al., 2019; Samuels et al., 2015). In response to this problem and to promote access to care by getting patients to attend their scheduled appointments, providers have adopted several strategies, such as appointment reminders, overbooking, and penalties (Goffman et al., 2017; Marcolino et al., 2018). However, appointment reminders improve no-shows in all health care settings and different populations compared to no reminder systems (Crutchfield & Kistler, 2017; McLean et al., 2016). Therefore, the appointment reminder should be tailored to meet the population's needs based on personal characteristics, such as homeless, veterans, cancer patients, and patients with human immunodeficiency virus (Goffman et al., 2017; Marcolino et al., 2018). Moreover, the healthcare setting or the type of appointments, such as primary care, mental health, community clinic, family

practice, and extensive teaching hospital are other factors to consider when setting up a reminder system.

The patient's personal preference and the timing of the reminder have a significant impact on appointment attendance. Though inconsistent studies exist regarding patient preference for a reminder system, generally, patients prefer a single reminder transmitted via an email, text message, or phone call (Crutchfield & Kistler, 2017). Still, a comparison of the reminder systems among different studies shows that telephone calls are more effective in reducing no-shows compared to automated calls or no reminders (Chong & Fantl, 2017; Kiran et al., 2018; Marcolino et al., 2018; Nielson et al., 2018; Penzias et al., 2019; Shah et al., 2016; Wegrzyniak et al., 2018; Zangalli et al., 2016). Contrary, an RCT study by Nielson et al. (2018) did not show any difference between live phone calls plus automated and automated reminder calls only. The study did show that patients of Hispanic origin had a preference for automated phone calls only.

In a study conducted by Wegrzyniak et al. (2018), approximately 51% of millennials reported short message service (SMS) text messages as their preference compared to 22% of baby boomers. In this retrospective case study of 1193 appointments, there was an improvement in no-shows with appointment reminders, with telephones being the highest, followed by emailing then SMS text messages with 3.49%, 2.68%, and 1.90%, respectively. The study ranked reminder preferences as email (53.6%), SMS text (38.3%), and phone calls (8%). However, other studies ranked patient reminder preferences as phone calls with 41% and SMS text messages with 27% (Nelson et al., 201) Similarly, a study by Kumthekar & Johnson (2018) noted that 76.7% of the

participants preferred a reminder phone call to keep their appointment. Overall, the SMS text message is the most frequently used reminders for education, prevention, and attendance and has a similar impact to phone call reminders but providers may want to allow patients to choose their reminder method to decrease no-shows (Boksmati et al., 2016; Marcolino et al., 2018; Mayer & Fontelo; 2017; Tofighi et al., 2017; Wegrzyniak et al., 2018; Zallman et al., 2017).

Electronic devices (gadgets), such as smartphones, mobile phones, personal digital assistants, phone plus app, MP3, and medical devices, are connected to the phone by a cord or wireless to make or receive calls and generate text messages to patients (Marcolino et al., 2018). SMS text messages can readily receive and send time-sensitive messages through a handheld device (Hamine et al., 2015). McLean et al. (2016) reported a successful contact rate of between 97% to 99% with SMS text messages. In their literature review, Marcolino et al. (2018) indicated that text message reminders to patients to show up for exams resulted in significant improvement in attendance rate, health behavior changes, and a substantial improvement in clinical outcomes. Moreover, patients with chronic conditions, such as diabetes, hypertension, and cardiovascular diseases reported significant improvement in symptoms due to improved access to care.

In an RCT study by Tofighi et al. (2017), patients in the intervention group received an SMS text reminder 7, 4, and 1 day(s) before their scheduled office-based buprenorphine program follow-up appointment. Among the 93 participants, all reported that text messages were beneficial and felt that all the program patients should receive them. Sixty-three percent of the participants indicated that the SMS text reminder helped them to keep the appointment. Ninety-one percent of the participants stated a preference

for text message reminders compared to 3% with telephone reminders, but approximately 6% were amenable to telephone or text message reminders.

Steiner et al. (2018) conducted an RCT study in which patients were randomized to receive either text messages or live phone call reminders. This study was a three-arm study in which one group received a text message or a phone call reminder three days before the scheduled appointment. The second group received a text message or a phone call reminder one day before the appointment date, and the third group received a text message or a phone call reminder both one and three days before their scheduled appointment. This study showed that text messages and telephone calls were equally effective in reducing appointment nonattendance. The rate of missed appointments for those who received text messages was 5.6%, 4.9%, and 4.2% for the three days, one day, and both days, respectively, compared to 4.8%, 4.4%, and 3.8% ($p < 0.0001$) among those who received phone calls. However, text messages or phone call reminders three and one days before scheduled appointments were more effective than a single reminder system. Similarly, a pooled analysis from meta-analysis supports that SMS text messages effectively reduce no-shows in the clinical setting (Boksmati et al., 2016; Mayer & Fontelo, 2017).

Lockhart et al. (2017) conducted an integrative literature review, which was mostly RCTs. In this review, all, except two studies, reported that text messaging reminders effectively got patients to attend their scheduled appointments. Besides, text messaging is cost-effective, user friendly, and acceptable than other forms of reminders. In an RCT study conducted by Arora et al. (2015), patients discharged from the emergency room were to follow up at the Los Angeles County Health Care system

between 3-and 30-days following discharge from the county emergency room hospital. Patients in the intervention group received automated personalized text message appointment reminders at 7, 3, and 1 day before their scheduled follow-up appointments. However, patients in the control group did not receive any reminder text message. The result showed a significant improvement in the group's appointment attendance rate that received an automated text message reminder compared to the group that did not receive any reminder. The attendance rate for patient in the intervention group was 70.2% compared 62.1% in the control group (difference between groups = 8.2%; 95% CI = -1.6% to 17.7%; $p = 0.100$).

Regan et al. (2017) conducted an RCT to study the impact of text message reminders on appointment attendance. In this study, high-risk patients, such as the elderly, children, and women eligible for a free vaccination, were randomized into two groups to receive an SMS (intervention) or no SMS (control group). The parents' mobile phone number received the reminders for children's appointments. During the study period, 12% ($n = 769$) in the intervention group and 9% ($n = 548$) in the control group received vaccination. Overall, patients in the intervention group who received SMS text were 39% more likely to receive influenza vaccination than people in the control group ($R^2 = 1.39$, 95% CI, 1.26- 1.54). Moreover, people in the intervention group had a shorter time in seeking health-promoting behavior (median of 10 days [IQR = 4-24 days]) versus people in the control group with a median of 16 days ([IQR = 7-30 days], z =4.92, $p < 0.001$). Children whose parents received a reminder SMS text were 2.4 times more likely to receive at least one influenza vaccine dose than children whose parents did not receive

any SMS (R^2 = 2.43, 95% CI, 1.79 – 3.29). The study concluded that SMS text reminder improves appointment attendance.

Research also showed that a reminder system provides an opportunity for the patient to cancel or reschedule an appointment (McLean et al., 2016). While appointment cancellation may not be the aim of a reminder system, it does open a slot for other patients waiting to schedule an appointment for follow-up or treatment. Studies showed that patients who received telephone reminders are 17% to 26% more likely to reschedule than no reminder (McLean et al., 2016). Furthermore, clinics can re-assign between 27% to 40% of the canceled appointments to other patients. Even for unfilled slots, appointment cancellation due to a reminder system gives the clinic an informed awareness of an open position. It prepares the provider mentally for efficient utilization of the vacancy. In addition to cancellation, appointment reminders permit contact with the patient and answer any question about the appointment.

Shah et al. (2016) noted that cancellations and rescheduling occur in patients that receive reminder calls in addition to appointment attendance. An RCT study by Andreae et al. (2017) reported that of the 475 patients in the phone call reminder group, 275 kept their appointment as scheduled while 84 canceled the appointment during the reminder call compared to 31 of 478 in the control group. The study concluded that patients who receive reminder calls are more likely to cancel than fail to attend.

A live phone call increases appointment attendance and improves overall health outcomes. For example, a study by Kheirkhah et al. (2016) noted that implementing a centralized phone call reminder in 10 clinics within the VHA system in Texas resulted in an average drop in the no-show rate from 16.3% to 15.2% in all ten clinics. In an RCT by

Zangalli et al. (2016), diabetic patients in the intervention group received a live telephone call in addition to the usual letter and diabetic brochure to schedule a follow-up appointment. The study showed that patients in the intervention group were more likely to schedule an appointment ($p < 0.0001$) than the usual group without a reminder call. Also, patients in the intervention group were 58% more likely to attend the appointment, with an absolute difference of 18%. In a similar study, Teo et al. (2017) examined appointment attendance in the VHA system when a reminder system is not directly delivered. Findings from this study showed that live reminders (3%) had the lowest no-show rates compared to leaving voice messages (24%) or no answer without the ability to leave a voice message (39%).

In a prospective study, Penzias et al. (2019) examined the impact of a phone call reminder on no-shows in an adolescent/young adult practice. In this study, the clinic staff made a reminder call to all patients a day before their scheduled appointments. The intervention outcome showed a decrease in missed appointment rate from 25.0% to 22.4% ($p < 0.001$) and from 14.7% to 13.1% ($p = 0.04$) among primary care specialty patients. Moreover, telephone call reminders to this group improved appointment attendance amongst patients who had public or private insurance, males, females, Blacks, Hispanics, and patients ages 20 years and older. A similar RCT study by Shah et al. (2016) indicated a significant increase in appointment attendance amongst patients who received a reminder phone call seven days before their scheduled appointment. The no-show rate for patients in the intervention group was comparatively lower (22.8%) than the no-show rate for patients in the control group (29.2%).

Kiran et al. (2018) conducted an RCT study to compare the effectiveness of a phone call versus mailed letter reminder for patients overdue for cancer screening. The result showed that phone calls were more effective in improving attendance for cervical, breast, and colorectal cancer screening among women. Similarly, among men, 28.8% of those in the phone call group compared to 24.8% in the letter group showed up for the colorectal screening. In a similar study, Nuti et al. (2015) conducted a systematic review of the literature to examined the impact of appointment reminders on clinical outcomes for patients with diabetes. Although this study's findings were conflicting, overall, the study found a reminder system to improve clinical outcomes and appointment attendance. For example, patients who received phone call reminders to schedule appointments for follow-up care with the primary care provider had a significant improvement in glycemic control reported by reduced HbA1c. An outreach call to non-compliant patients resulted in a substantial improvement in the percentage of provider visits and HbA1c, phone call to patients to reschedule an appointment after no-show resulted in a significant increase in attendance rate and improved blood sugar.

Kumthekar and Johnson (2018) conducted a quasi-experimental study to assess the effect of phone call reminders and appointment attendance in an underserved lupus clinic in Bronx, NY. The study retrospectively looked at appointment attendance from November 1, 2013, to June 30, 2014, before implementing a phone call reminder two to three days before a scheduled appointment. The result showed an improvement in the appointment attendance rate with phone call reminders, and the difference in the no-show rate before and after the intervention was 58.8% versus 74.8% ($p = 0.0062$). A similar RCT study by Andreae et al. (2018) reported that out of the 475 participants in the group

that received a phone call reminder, 275 attended scheduled appointments compared to 249 of 478 in the control group (R^2 1.89, 95% CI [1.42, 1.42]). According to this study, patients who received a reminder call in their language were more likely to show up for a scheduled appointment.

In a prospective cohort study conducted by Goffman et al. (2017), 880 scheduled patients received a reminder call for a follow-up appointment at the VHA system in Pittsburgh Healthcare System. During the three-week study, the overall no-show rate for the call group was 12.16% compared to 53.8% (874 patients) in the group that did not receive a reminder phone call. The no-show rate was lower (9.9%) in the group that received reminder calls 24 hours before their scheduled appointment compared to those called 72 hours (15.89%) before their scheduled appointment. Patients in the 24 hours call group had a higher cancellation rate of 20.77%, with the average rate as high as 18.41%. A similar study was performed by Clouse et al. (2017) in an outpatient mental health clinic in the south. In this study, the nurse practitioner made a telephone call to new patients two weeks after the patient scheduled an initial consultation. The initial call was to ensure that the patient was aware of the scheduled exam, encouraged follow-through, obtained consent, and discussed the patient's telephone engagement protocol. The initial call also gathered any data that was not collected initially during the referral process. The second phone call was completed a day before the scheduled appointment to remind the patient to show up for the exam. This study's findings show a 7% improvement in the no-show rate during the three-month intervention period compared to a 26% no-show rate in the previous year.

Garnier et al. (2018) conducted a single prospective study to examine the effect of telephone calls and SMS text reminders on appointment attendance in an ambulatory surgical center. In this study, patients were grouped into either SMS or live phone call groups. Patients in the call group received a live phone call a day before their scheduled appointment, while patients in the SMS text group received a text message reminder two days before the scheduled appointment. Patients received messages in the call group that did not answer, while a repeat text was sent a day before the scheduled appointment to the patients in the SMS text group that did not respond the first time. Findings from the study indicated that the attendance rate and the absence of dysfunction in the SMS text group was 75% compared to 61% in the call group. The study concluded that the use of SMS text reminders resulted in better compliance with preoperative instruction.

In an RCT study, Mugo et al. (2016) assessed the effect of phone calls and SMS text reminders on patients with HIV infection in Kenya. In this study, the standard procedure consisted of instruction to the patients to return to the clinic two weeks after enrollment visit plus an appointment card with the appointment date. The intervention procedure involved the standard appointment plus a phone call and text message reminders a day before the scheduled appointment. The fieldworker made an in-person reminder to the participant's workplace or home two to four days before the scheduled appointment for those without a phone. This study's findings showed a substantial improvement in the show rate in the intervention group compared to the control group's show rate. The attendance rate was 59% (117 out of 199 scheduled appointments) in the intervention group and 41% (85 out of 2017 scheduled appointments) in the control group.

The results contrast with the RCT study performed by Chong and Fantl (2017), who found no statistical difference in the no-show rate between the group that received a phone call reminder and the group that did not receive the call. In this study, the combined no-show rate between May 2015 through August 2016 ($N = 91$) was 17.6%, with a no-show rate of 18.4% in the control group and 16.7% in the intervention group, $p = 0.83$. This study also showed that no-shows accounted for 40% of scheduled appointments during the winter regardless of pre-appointment phone reminders. Muñoz et al. (2017) conducted a similar RCT study to examine the impact of phone calls on an online depression prevention study's follow-up rate. This study used an online survey for the participants to complete the questionnaire. Participants in the intervention group received a reminder call to complete the survey, while participants in the control group did not receive a reminder call. The result showed a slight increase in the reminder call group, but the difference was insignificant.

In an RCT study, Bishop et al. (2016) examined the effect of a telephone call on patients with chronic diseases. In this study, patients from twenty practices with a lapse in care were randomized into two groups. Patients in the intervention group received a reminder phone call from the clinic staff requesting the patient to schedule a follow-up appointment with the physician. Patients in the control group did not receive any reminder call. The study results showed no significant difference in the attendance rate between patients in the control group versus patients in the intervention group. Among patients in the intervention group, 21.0% (95% CI: 20.2, 21.7) had an office visit within three months of receiving phone calls compared to 20.7% (95% CI: 19.7, 21.8) in the control group.

Summary

The database search for evidence-based practice literature to improve no-shows in the outpatient setting resulted in 40 peer-reviewed articles included in this study, of which 11 were RCTs. These studies' results were somewhat conflicting but, in most part supported that live phone calls and text messages improved appointment attendance compared to no reminder. In addition to improved attendance, evidence showed that phone calls and text messages resulted in cancellations, rescheduling, and improved health outcomes. This chapter also looked at the Johns Hopkins nursing evidence-based practice (JHNEBP) model, which aids the clinician in clinical decision-making and ensures that the latest research findings and EBP are integrated into patient care. The next chapter discusses the organizational structure, a description of the project design, analysis, budget, and ethical considerations.

CHAPTER THREE. METHODOLOGY

Context

The project took place at Samto Medical Services, a nurse practitioner run family practice in Newark, Delaware. The office was opened in March 2016 to provide primary care to patients in all age groups. However, the direction soon changed due to the increased need for primary care providers to offer physical exams to the United States Veterans. In September 2016, the office began to provide health services exclusively to veterans in response to part of the programs to reform the Veterans Health Administration (VHA), which authorized the completion of disability exams by civilian providers (Liermann, 2019). The primary goal for outsourcing was to increase veterans' capacity seen within a specified period and improve their experience (Liermann, 2019).

This provider office is contracted to four of the five major VHA contractors to include Veterans Evaluation Services (VES), Logistic Health Incorporated (LHI), Medical Support Los Angeles (MSLA), and Quality, Timeliness, Customer service (QTC). The purpose of this study was to examine the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. The office staff includes two full-time Nurse Practitioners (NP), a receptionist, two medical assistants, and a bookkeeper. The VHA contractor sends other NPs and medical doctors to use the space on a per diem basis. However, the key stakeholders are the two NPs and the chief executive director who operates outside this facility. Between 2016 and 2020, the facility served over six thousand active, reserved, and retired men and women of the United States military. The office is opened from Monday to Friday from 9:00 a.m. to 5:00 p.m. The average daily schedule per NP is 14 veterans, and the office sees approximately 560

veterans per month. The VHA contractors reimburse the office without any financial contribution from the veteran.

During the initial phase of any project, it is essential to identify possible barriers and hindrances that may affect the project's development and implementation and overcome such challenges (Sullivan et al., 2018). The authors used the organizational transformational implementation model (OTM) to examine the program's implementation in the Veterans Administration (VA) setting between 2010 and 2013. The model identified five drivers of implementation: the impetus or drive for the change, the leadership commitment, staff engagement, integration of the performance across the traditional organizational boundaries, and the alignment of the improvement effort with the corporate resources' priorities. The study identified six challenges that influence long-term support for improvement projects: staffing and human resource, infrastructure capability, marketing/referrals, team dynamics, resource allocation, and leadership perspective (Sullivan et al., 2018). Of the 59 VA noninstitutional long-term services and supports interviewed, on average, each site faced two to three challenges during the development and sustainability. In most cases, these challenges result in the closure of an improvement project after funding ended (Sullivan et al., 2018).

Many organizational strengths contributed to the successful completion of this project. First is the organization's small size without any third party or corporate office approval for any part of the project. The project did not require additional staff or equipment, and staff training to facilitate the project was smooth without any hurdles. The communication flowed freely between members and the DNP student without any hindrance or interruption. The organization uses a Citrix system for scheduling, which

stores the data in the computer. Not only was the system accessible as needed, but it was also easy to retrieve stored information to gather data without going through any third party. This project was void of any hindrance or obstacle from the organizational or administrative standpoint. However, with the current COVID-19 outbreak, there was a fluctuation in the number of veterans seen per day. Each veteran was pre-screened by the VA during scheduling, and any veteran with flu-like symptoms or a veteran under quarantine was not eligible to be scheduled. Upon arrival for the exam, the veterans underwent further screening, and a hand full of veterans did not meet the screening criteria for the appointment. It was also challenging to reach the veterans via a telephone call to confirm the appointment. However, since the project involved two interventions, phone calls, and text messaging, veterans not reached by phone calls did acknowledge receipt of text messages.

Currently, the documented prevalence of no-shows within this facility is 40% (clinic daily intake). There is a recorded history of staff dissatisfaction, income loss, and healthcare resources wasted due to the high no-show rates. According to Liermann (2019), veterans who do not show up for their scheduled appointment may be denied a benefit or completely lose an established claim. Therefore, the project's successful development and implementation with a reduction in the current no-show rate from 40% to 20% should, without any doubt, improve income and increase providers' satisfaction. On the other hand, veterans will receive their benefits, including medical care and financial incentives for a disability. As a result, this project is of great significance both to Samto Medical services and the veterans.

Sample

This study contained a single cohort of patient samples who had scheduled a physical exam during the quality improvement project's time frame. Participants were selected based on availability to accept phone calls and text messaging reminders. The study's inclusion criteria included veterans who were 18 years and older and had a scheduled appointment at the clinic during the project's implementation. Exclusion criteria included those veterans who had no access to cell phones or opted out of the reminder call or text message and those who had more than one scheduled appointment during the study's time frame. Cancellations and late appointments were not considered no-shows; however, they were excluded from the study. The DNP student served as the project leader, and she had a central role in the development and implementation of the project, which included staff training and obtaining organizational approval. Supervision of the staff during the implementation of the project was also within the DNP student's realm. Fortunately, the DNP student has been an employee of this facility for the past four years and is very knowledgeable about its dynamics and operations. Being an employee provided an added benefit to the flawless implementation of this project.

The project took place at Samto Medical Service, an outpatient clinic located in Newark. DE. This facility performs a physical exam for the United States Veterans. Pre-intervention data collection started on August 17, 2020, to September 28, 2020, for six weeks. Demographic data and other variables were collected to include the date appointments were made (referred to as appointment lead time), appointment date, age, gender, ethnicity, appointment time, and appointment type (initial vs follow-up).

There were 440 veterans scheduled during the pre-intervention period. Data collected was similar to the intervention period from October 1, 2020, to November 13, 2020, which lasted six weeks. An additional tool was not needed to complete this project. Demographic information and other variables were retrieved from the clinic's existing scheduling portal. Phone calls and text messages were sent using the clinic's existing lines. A data collection tool was developed via an excel spreadsheet and approved by the project advisor and the course instructor. Both pre-intervention and intervention data were displayed on the data collection tool. While the project's time frame was relatively short of provoking any change, the number of participants in this project (196 veterans) was significant enough to determine the implementation process's efficacy or failure.

Interventions

Several studies showed the effectiveness of a reminder system on no-shows; however, a phone call and text message reminders were more effective in improving no-show rates in the outpatient clinics (Kumthekar & Johnson, 2018; Wegrzyniak et al., 2018). This study was approved by the Wilmington University Human Subject Review Committee (HSRC). The committee waived signed consent since this quality improvement project did not involve more than average risk.

The first step of the project involved educating facilitators about the project. The medical assistants, receptionist, and bookkeeper received eight hours of training before the implementation. Topics included in the teaching were when to make the calls, adherence to the scripted text, and how to respond to anticipated questions from the veterans. During the implementation, the two medical assistants made phone calls and sent text messages to the veterans. The first phone call occurred immediately after the

facility received the referral. This call alerted the veteran of the impending appointment; however, the call's timing could not be determined due to the nonspecific lead time for the referral process.

The second phone call was made to the veterans a day before the scheduled appointment, followed by a text message reminder. For veterans that were not reached during the first phone call, the assistants made a second phone call before 5:00 p.m. Each veteran received a maximum of two phone calls. The office did not leave a phone message for veterans who could not be reached; instead, the office sent a text message to every veteran regardless of their ability to be reached by phone. Calls were made Mondays through Thursdays from 9:00 a.m. to 5:00 p.m., and for veterans scheduled for a Monday appointment, calls were made on Sundays between 12 noon to 5:00 p.m.

The DNP student developed a standardized script that was approved by Wilmington University HSRC. The medical assistant followed the script during the implementation period. The text message reminder script read:

> Your compensation and pension exam are scheduled for tomorrow at --- o'clock. Please call this office if you have any questions or need to reschedule.

Phone call reminders also followed a standardized script as indicated below:

> Caller (My name is ….. calling from Samto Medical Services). This is a reminder phone call for your appointment tomorrow at Samto Medical Services (specify the location, date, time, and purpose of the appointment) and answer the veteran's questions as needed.

At the end of each week, the DNP student collected data from the CITRIX system for all the veterans scheduled for an appointment. The data was tabulated on an excel spreadsheet that was later used for data analysis.

Study of the Interventions

Data collected for this quality improvement project measured the practice changes within the veteran's health population. The approach to evaluating an intervention was carefully selected to measure the intervention's outcome (Zaccagnini & White, 2017). The literature review showed that a researcher could use either a quantitative or qualitative methodology to measure the intervention's outcome. A quantitative evaluation method identifies how much or how many, while qualitative identifies what worked for the participants. In any case, the selection of the evaluation method should occur before implementing the project, and it should be valid and reliable (Zaccagnini & White, 2018). This study utilized a quantitative methodology since it involved comparing veterans who did not receive reminder phone calls or text messages versus veterans who received reminder phone calls and text messages to show up for a scheduled physical exam. Both the pre-intervention and intervention groups assessment occurred within six weeks. The outcome measure is a change in the no-show rate in the dependent group (veterans who received a phone call and text messaging reminders) compared to the independent group, without any intervention.

Measures

This study examined the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. The study's outcome was measured by comparing the no-show rate before the implementation and the no-show rate after

implementing phone calls and text message reminders. The dependent variable was the rate of veteran's appointments kept after receiving a reminder phone call and text message. The independent variable was the rate of veteran's appointments kept without receiving a reminder phone call or text message. Patient responses to the reminders and repeated reminders were secondary independent variables. The data collection for both phases of this project were from a sample of 400 veterans who scheduled an appointment for a physical exam. All participants were United States military personnel (active, retired, reserves), male and female, English speaking, 18 years of age and older, and scheduled a physical appointment during the six weeks of pre-intervention and six weeks of the intervention phase. Demographic variables were collected to describe the sample included age, measured on an interval, gender, ethnicity, and exam type.

According to Zaccagnini and White (2017), data collection and effectiveness should reflect the DNP's role. Some projects may require a measuring instrument, such as a questionnaire to answer the operational questions. The measuring tool's validity and reliability is the ability to measure what it is designed to measure accurately (Zaccagnini & White, 2017). However, this project did not require any measuring tool, so the organizational approval for such an instrument was waived. Data regarding the veteran's demographic information, such as age, gender, and ethnicity, were retrieved from the veteran's electronic medical records secured within the scheduling portal. An excel spreadsheet displayed the demographic data and other variables, such as appointments kept, the number of phone calls made to the veterans, and the number of calls answered. The displayed data provided clear, overt, and transparent information, especially during the project's implementation.

Analysis

The data analyses included Pearson chi-square ($\chi 2$) tests to compare the pre-intervention and intervention rates, as well as frequencies (*f*) and percentages (%) to summarize nominal demographic variables and means. The data analysis for veterans' age and interim days and whether or not appointments were kept included mean and standard deviations (SD). A chi-square test measured the statistically significant difference between the two categorical variables, making it suitable for this project (Shih & Fay, 2017). The calculation of a Pearson chi-square test of independence determined the reduction in the primary outcome variable (no-show rate) since the patients in the pre-intervention period were different from the patients in the intervention period. A chi-square statistical analysis method has been consistently used in similar quality improvement projects to compare two independent groups (Bishop et al., 2016; Chong & Fantl, 2017; Clouse et al., 2017; Germain & Godin, 2016; Wegrzyniak et al., 2018; Zangalli et al., 2016).

Similar studies used descriptive statistical analysis, chi-square, and t-test of proportions, but most studies used chi-square to measure the implementation (Arora et al., 2015; Clouse et al., 2017; Germain & Godin, 2016). According to Xu et al. (2017), a paired t-test compares the mean scores measured at two different times for the same group. The independent samples *t*-test calculated the comparison of the age of the veterans. Percentage calculations for pre-intervention and intervention rates were based on the total sample analyzed and the type of ratio measure. Several versions of the rates were computed based on different samples (final intervention versus pre-intervention; patient response to the reminders, yes versus no; and repeated reminders, yes versus no).

Budget

The budget created for this project included overhead expenses, patient care expenses, payroll, rent, and patient care supplies usually utilized in this office. The primary researcher created a three-year budget from the current year extending through the next two years. The current year's budget included actual data collected from the company's financial records (Quick Books). The extended budget for the next two years was projected based on the past four years. The project did not require funding from the government or non-governmental bodies, and, therefore, no additional or unexpected expenses occurred. We utilized the existing phone lines, computers, and cell phones for this project. Staff training and project implementation occurred during regular working hours. Calls and text messages to veterans scheduled for a Monday exam were made on Sundays by the DNP student to prevent additional costs. In doing so, it deterred the office from being opened on Sundays for this purpose. See Appendix E for a copy of the project budget.

Ethical Considerations

The DNP student received approval from the Chief Operating Officer of Samto Medical Services to conduct this project at its Newark, DE office (see Appendix A). This project was approved by the Wilmington University Human Subject Review Committee (see Appendix B). The Wilmington HSR committee waived the project's signed consent form as it did not pose more than minimal risk to the participants. Before the Wilmington University institutional board's approval, the DNP student participated and completed the training on protecting human research participants through the National Institute of Health. The certificate of completion for this online Collaborative Institutional Training

Initiative (CITI) is in Appendix D. Data for this project included collecting demographic information from all veterans scheduled for a physical exam during the project. These data are electronically stored, and the system is password secured. Access to the portal was granted to the people directly involved with veterans' care, including the provider, receptionist, and medical assistants, to protect the veterans' privacy and personal information.

Summary

This chapter covered the contextual activities and events surrounding the project implementation from intervention, the study of the intervention, and measures. It identified key stakeholders and organizational structure including barriers and facilitators from the organizational standpoint. The statistical method used to analyze the data, ethical considerations, and budget were also crucial factors discussed in this chapter. The next chapter will address the sample characteristics and the findings from the study.

CHAPTER FOUR. RESULTS

Introduction

The purpose of this study was to examine the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. This chapter discusses the results of this project for pre-implementation and after the intervention.

Patient Characteristics

The project participants were veterans scheduled for an outpatient physical exam during the project period from August 17, 2020, to November 13, 2020. Veterans were included in the project if they were English speaking, ages 18 years and older with access to a phone, and willing to receive a phone call or text message reminders. Exclusion criteria included veterans without a phone number, veterans who opted out for a reminder, or veterans scheduled more than once during the project's implementation. In the pre-intervention phase, 82.2% (387) were Male and 12% (53) were Female. Out of which were 62.7% (276) White, 27.5% (121) Black, 8.2% (36) Hispanics, and 1.6% (7) Asians. Veterans scheduled for an initial exam were 49.1% (216), 50.9% (224) were seen for a follow-up exam, while none (0%) were seen for both initial and follow-up. Age range for the veterans were 20 – 30 (n = 50), 31 – 40 (n =82), 41 – 50 (n = 88), 51 – 60 (n = 104), 61 – 70 (n = 81), 71 – 80 (n = 34), and 81 – 90 (n = 1) (see Table 1).

A total of 403 veterans were scheduled for a physical exam during the intervention period. However, 196 participants were included in the final intervention after the exclusion of veterans that did not meet the inclusion criteria. Veterans were excluded if contact information was not available (n = 125), cancelled by the VA before the appointment date (n = 28), and veterans that were contacted without any response (n

= 54). Intervention participants included 84.6% (341) Male and 15.4% (62) Female. Out of these participants, 62.8% (253) were White, 29.3% (118) were Black, 6.7% (27) were Hispanics, and 1.2% (5) were Asians. The age range for the veterans were 20 – 30 (*n* = 65), 31 – 40 (*n* = 92), 41 – 50 (*n* = 56), 51 – 60 (*n* = 69), 61 – 70 (*n* = 65), and 71 – 80 (*n* = 56). The exam type included 54.8% (221) initial exam, 40.7% (164) follow up, and 4.5% (18) were seen for both initial and follow up (see Table 1).

Results

Information regarding appointments made and kept was collected for 843 patients. A total of 440 pre-implementation patients were tracked prior to initiation of the reminder by phone and text intervention. The initial intervention sample included 403 patients. Of the initial sample, 207 patients were excluded from the final intervention sample (see Figure 2) where 125 patients did not provide contact information, the VA canceled appointments for 28 patients, and 54 patients did not respond to the intervention phone calls and/or texts. The final intervention sample included 196 patients.

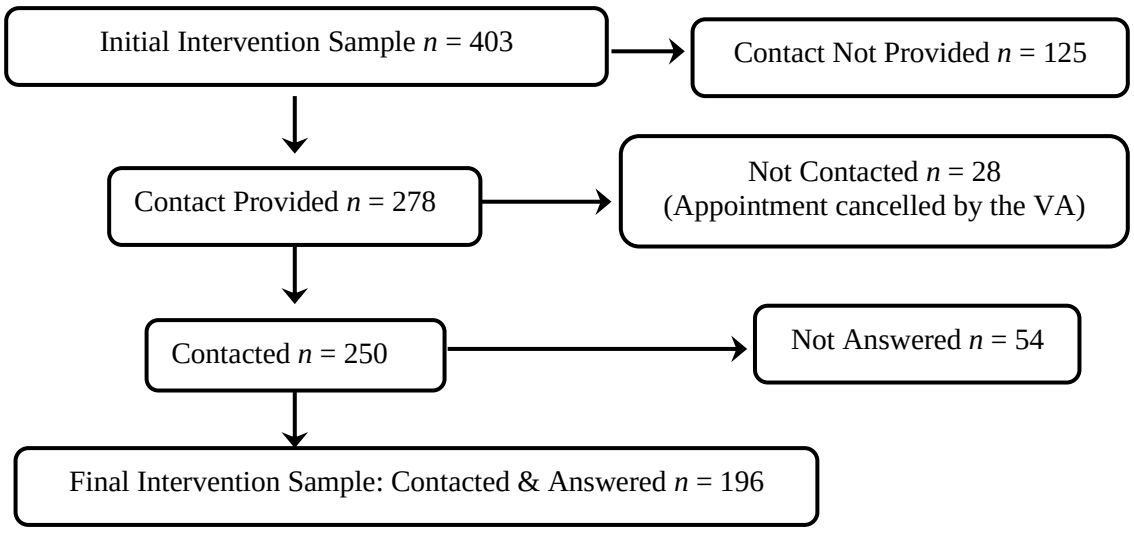

Figure 2. Flow chart for initial and final intervention sample.

Demographic characteristics of the pre-intervention, initial, and final intervention samples are summarized in Table 1. The majority (over 80%) of the veterans in the pre-intervention, initial, and final intervention were male, and the largest ethnic group represented was White (over half), followed by Black (over a quarter). The average age was 49-50 years, although the final sample's average age was slightly younger (46.2 ± 16.3). In the pre-intervention sample, patients were approximately evenly distributed with regard to the type of exam scheduled. In contrast, slightly more patients in the intervention samples were scheduled for initial exams than follow-ups or a combination of initial and follow-up exams.

This project aimed to answer the PICOT question: Among veterans scheduled for outpatient exams, how do reminder phone calls and text messaging compare to no reminder phone calls and text messaging, affect no-show rates in six weeks? The project's overall goal was to implement live phone call and text message reminders to veterans to promote access to care.

Table 1

Demographic Characteristics of the Sample

		Pre-intervention		Initial Intervention		Final Intervention	
		n = 440		*n* = 403		*n* = 196	
		n	%	*n*	%	*n*	%
Gender							
	Male	387	88.0%	341	84.6%	161	82.1%
	Female	53	12.0%	62	15.4%	35	17.9%
Ethnicity							
	White	276	62.7%	253	62.8%	114	58.2%
	Black	121	27.5%	118	29.3%	64	32.7%
	Hispanic	36	8.2%	27	6.7%	14	7.1%
	Asian	7	1.6%	5	1.2%	4	2.0%
Exam Type							
	Initial	216	49.1%	221	54.8%	105	53.6%
	Follow-up	224	50.9%	164	40.7%	81	41.3%
	Both	0	0.0%	18	4.5%	10	5.1%
Age							
	20-30	50	11.4%	65	16.1%		
	31-40	82	18.6%	92	22.8%		
	41-50	88	20.0%	56	13.9%		
	51-60	104	23.6%	69	17.1%		
	61-70	81	18.4%	65	16.1%		
	71-80	34	7.7%	56	13.9%		
	81-90	1	0.002%	0	0.0%		
		Mean	*SD*	Mean	*SD*	Mean	*SD*
	Age	49.60	14.38	49.15	16.46	46.27	16.30
	Interim days	8.46	3.96	8.57	5.23	9.96	4.73

Note. Interim days = number of days from date appointment was made to date of appointment.

The intervention's effect on reducing no-shows was calculated using a Pearson chi-square analysis between the pre-intervention sample and the final intervention sample (see Table 2 and Figure 3). Significantly more of the patients who received and responded to text and phone reminders kept their appointments compared to those in the pre-intervention sample ($\chi 2 = 7.63$, $p = 0.006$).

Table 2

Intervention Effect on the Rate of Appointments Kept

	Pre-intervention		Intervention			
Appointment Kept	*n*	%	*n*	%	$\chi 2$	*p*
Yes	306	69.5%	157	80.1%	7.63	0.006*
No	134	30.5%	39	19.9%		
Total	440	100.0%	196	100.0%		

Note. *Level of significance $p < .05$.

Table 3

Veterans Contacted but Did Not Answer

	Pre-intervention		Intervention			
Appointment Kept	*n*	%	*n*	%	$\chi 2$	*p*
Yes	36	66.7%	157	80.1%	4.34	0.037*
No	18	33.3%	39	19.9%		
Total	54	100.0%	196	100.0%		

Note. Out of the 196 veterans contacted, 54 did not answer the calls. *Level of significance $p < .05$.

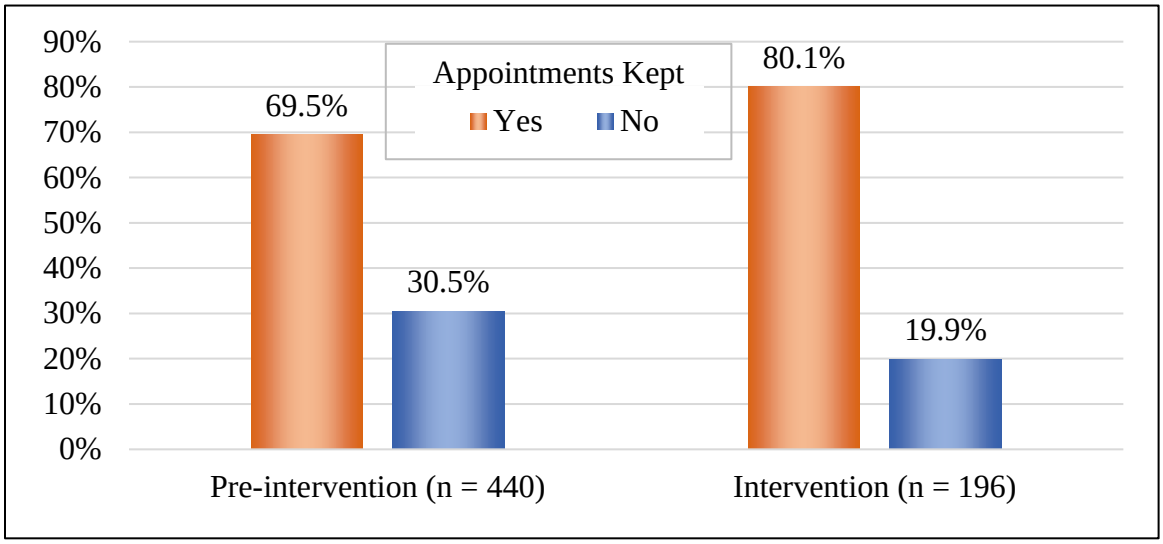

Figure 3. Increase in the rate of kept appointments after text and phone reminder intervention

A comparison was made to determine if repeated reminders had an effect on the rate of appointments kept. The extent of the interventions is shown in Table 4. Chi-square analysis indicated that the patients who received more than one phone call in addition to a text message were no more likely to keep their appointments compared to those who received one phone and one text reminder, or just one text ($\chi 2 = 0.45$, $p = 0.502$). The results are shown in Table 5.

Table 4

The Extent of the Interventions

Intervention	*n*	%
One phone call, one text	112	44.8%
Two phone calls, one text	135	54.0%
One text	3	1.2%
Total	250	100.0%

Table 5

Effect of the Extent of the Interventions on the Rate of Appointments Kept

	Interventions					
	One phone call and/or one text*		Two phone calls and one text			
Appointment Kept	*n*	%	*n*	%	χ^2	*p*
Yes	91	79.1%	102	75.6%	0.451	0.502
No	24	20.9%	33	24.4%		
Total	115	100.0%	135	100.0%		

Note. *Only 3 patients received one text, and no phone calls.

Additional analyses were conducted to determine if demographic factors or how long in advance the appointment was made had any significant impacts on whether or not patients kept their appointments. These comparisons employed the full study participants of 843 patients.

Before conducting the comparisons, the number of interim days was computed between the date the appointment was made and the date of the appointment. The normality assumption underlying the t-test was assessed for this variable and patient age using *z*-scores formed by dividing skewness by the standard error of skewness. A *z*-score within ± 3.29 is indicative of a normal distribution (West et al., 1995). The results are presented in Table 6. As shown, age was normally distributed, while the number of interim days exhibited substantial skewness. Therefore, age was compared using an independent samples *t*-test, while the number of interim days was compared using a nonparametric equivalent test, namely, the Mann-Whitney *U* test.

Table 6

Summary Statistics for Interim Days and Patient Age

Variable	Mean	*SD*	Skewness	*SE*	*z*
Interim Days	8.51	4.61	0.70	0.08	8.31
Patient Age	49.39	15.40	0.03	0.08	0.33

Note. Interim days = number of days from date appointment was made to date of appointment.

Patient age was compared between those who kept their appointments and those who did not. As shown in Table 7, the mean age of patients who kept their appointments was slightly higher (50 ± 16 vs. 47.8 ± 15), but the difference was not statistically significant (t (841) = 1.94, p = 0.052).

Table 7

Patient Age Compared by Whether or Not Appointments Were Kept

Appointment Kept			Appointment Not Kept					
N	Mean	*SD*	*N*	Mean	*SD*	*t*	*df*	*p*
592	50.1	15.7	251	47.8	14.7	1.94	841	0.052

The rate of kept appointments was compared by gender, exam type, and ethnicity using Pearson chi-square tests. Eighteen patients who had one appointment with both initial and follow-up exams were excluded from the exam type comparison. Ethnicity was analyzed by comparing each ethnicity to all other ethnicities (see Table 8). No

significant differences in the rate of appointments kept were observed between genders or by exam type. Patients of White ethnicity were significantly less likely to keep their appointments ($\chi 2 = 12.28$, $p < .001$), and patients of Black ethnicity were significantly more likely to keep their appointments ($\chi 2 = 14.98$, $p < .001$). No significant differences were observed in the rate of appointments kept by Hispanic or Asian ethnicities.

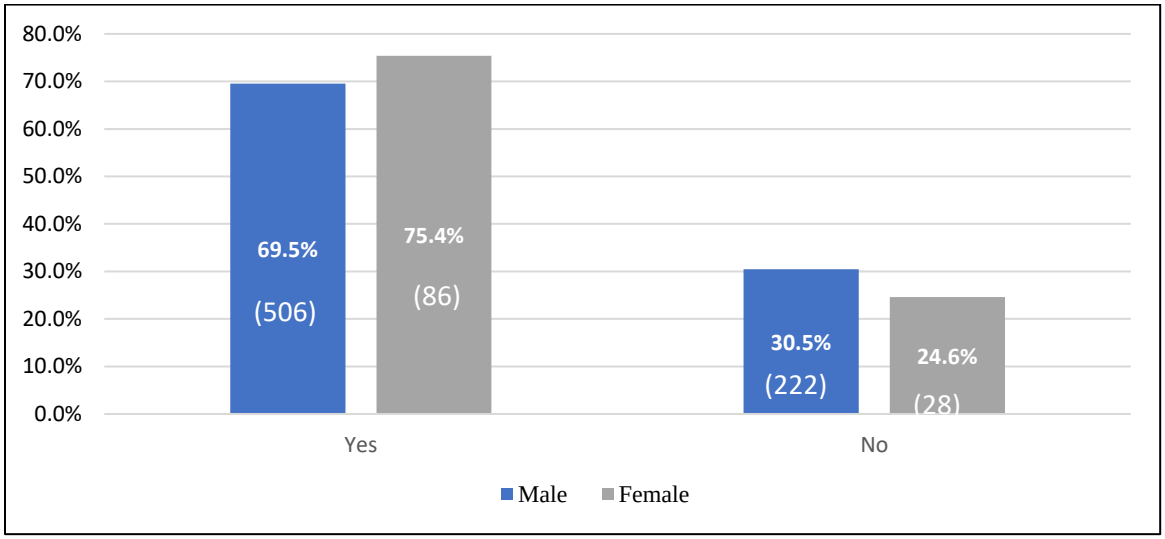

Figure 4. Appointments kept or not kept by gender.

Table 8

Gender, Exam Type, and Ethnicity Compared by Whether or Not Appointments Were Kept

	Appointment Kept					
	Yes (*n* = 592)		No (*n* = 251)			
Demographic	*n*	%	*n*	%	$\chi 2$	*p*
Gender						
Male	506	69.5%	222	30.5%	1.66	0.197
Female	86	75.4%	28	24.6%		
Exam Type						
Initial	317	72.5%	120	27.5%	3.27	0.071
Follow-up	259	66.8%	129	33.2%		
White ethnicity						
Yes	349	66.0%	180	34.0%	12.28	< .001*
No	243	77.4%	71	22.6%		
Black ethnicity						
Yes	191	79.9%	48	20.1%	14.98	< .001*
No	401	66.4%	203	33.6%		
Hispanic ethnicity						
Yes	43	68.3%	20	31.7%	0.13	0.722
No	549	70.4%	231	29.6%		
Asian ethnicity						
Yes	9	75.0%	3	25.0%	0.13	0.716
No	583	70.2%	248	29.8%		

Note. *Level of significance is $p < .05$.

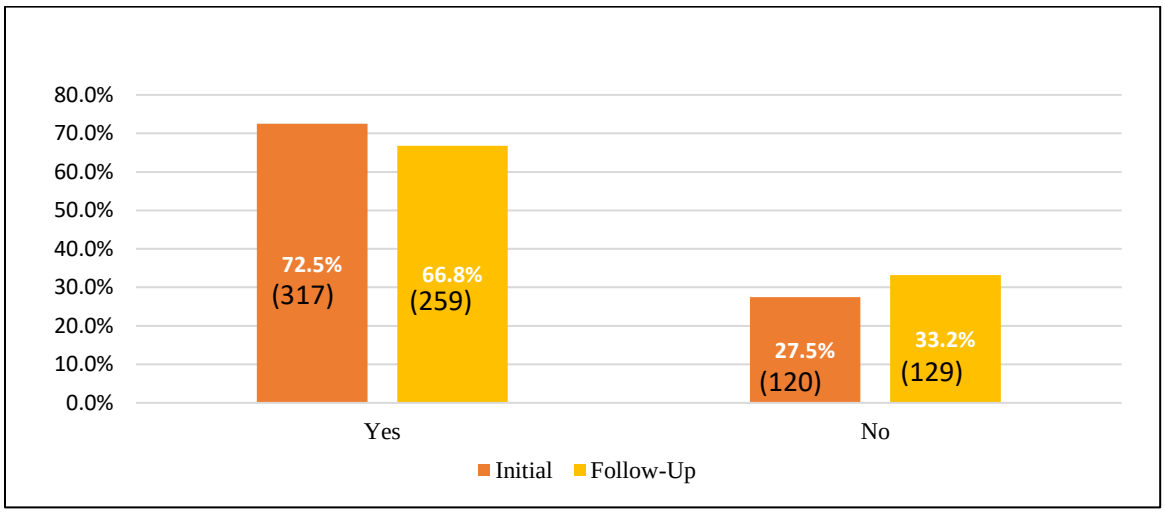

Figure 5. Appointments kept by exam type.

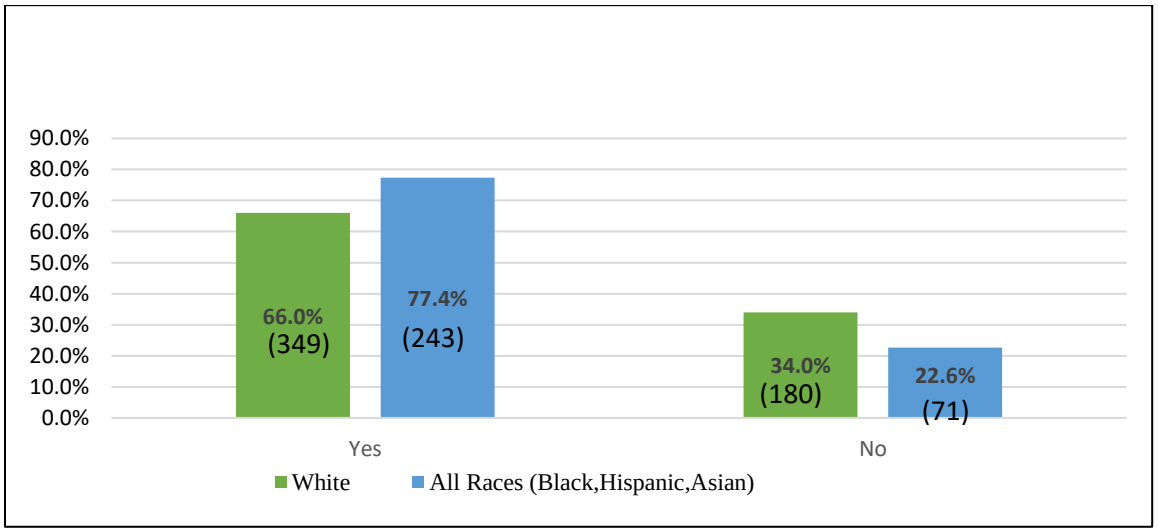

Figure 6. Appointments kept by Whites Compared to all other races.

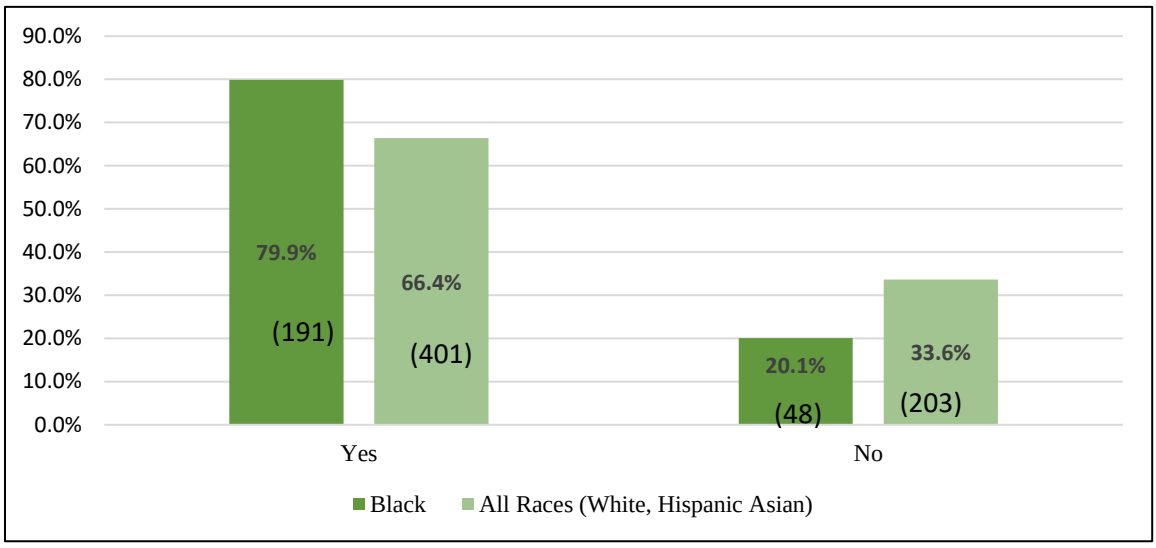

Figure 7. Appointments kept by Blacks compared to all other races.

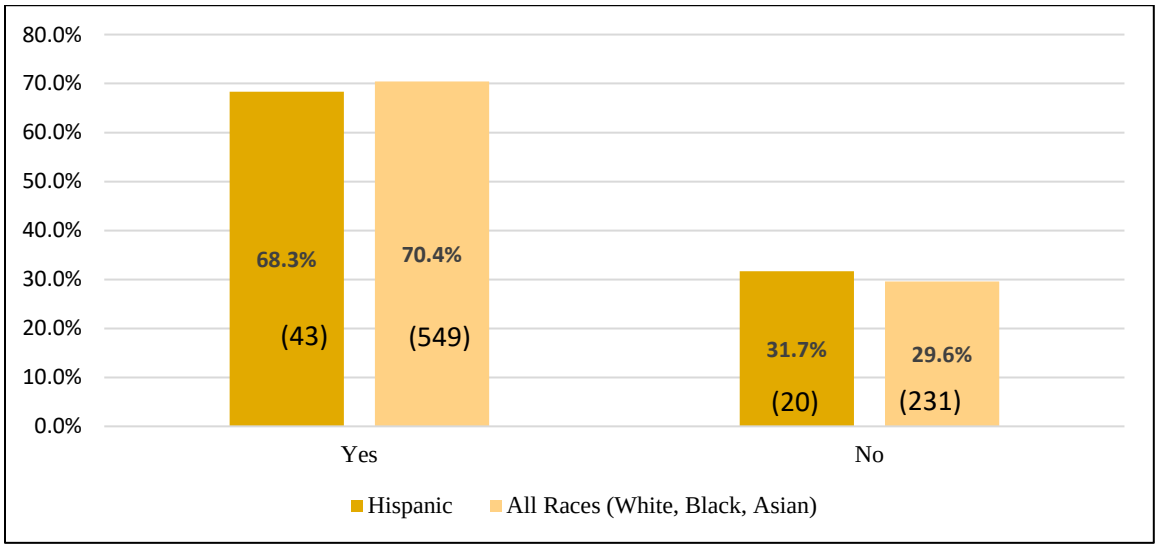

Figure 8. Appointments kept by Hispanics compared to all other races.

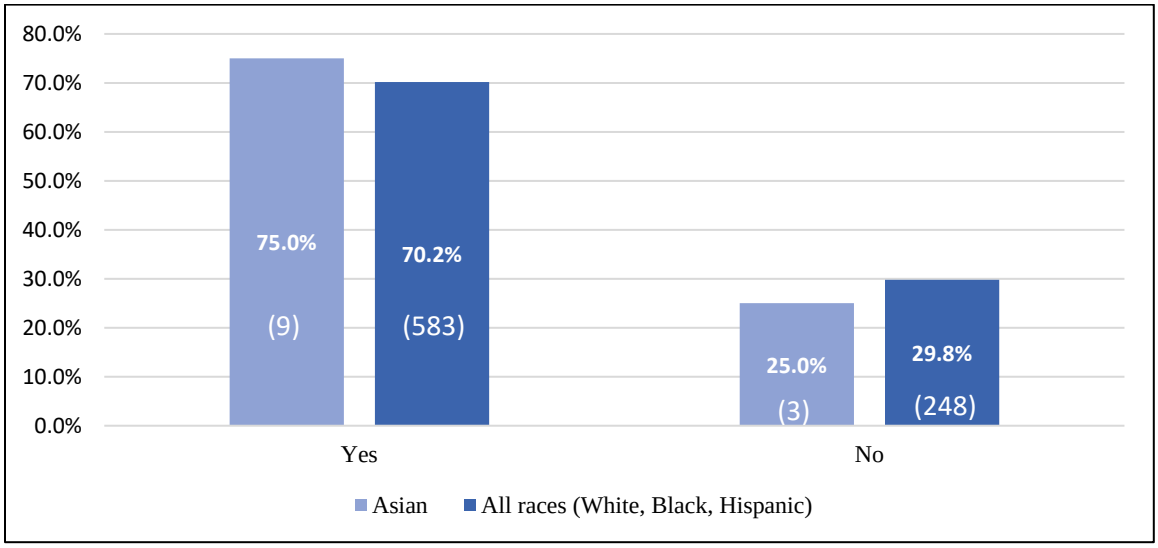

Figure 9. Appointments kept by Asians compared to all other races.

The amount of time that elapsed between the date the patients made appointments and the actual date of their appointments (interim days) was compared between the pre-intervention sample and the final intervention sample, separately, since appointment reminders were expected to have a substantial impact on this variable (Table 9). In fact, during the pre-intervention period, the interim period was significantly shorter for patients who kept their appointments (z = -3.35, p = 0.001), whereas, during the intervention period, there was no significant difference (z = -0.16, p = 0.876). These results indicate that while it may be less likely for patients to keep appointments if they are made farther in advance, reminder messages may have a substantial corrective effect.

Table 9

Interim Days Compared by Whether or Not Appointments Were Kept

	Appointment Kept			Appointment Not Kept				
Sample	*N*	Mean	*SD*	*N*	Mean	*SD*	*z*	*p*
Pre-intervention	306	8.0	3.8	134	9.4	4.1	-3.35	0.001*
Final intervention	157	10.1	4.9	39	9.5	4.2	-0.16	0.876

Note. Interim days = number of days from date appointment was made to date of appointment; *z* = standardized Mann-Whitney *U* test; and *Level of significance $p < .05$.

Summary

In this chapter, participants' characteristics in the pre-intervention and intervention period included gender, ethnicity, and exam type. The result to assess the impact of a single phone call and text messaging reminders on appointment attendance within the United States veteran population was analyzed. The next chapter includes a discussion of the results, limitations, implications, and plan for sustainability.

CHAPTER FIVE. DISCUSSION AND IMPLICATIONS

Introduction

The purpose of this study was to examine the efficacy of phone call and text message reminders on appointment attendance in an outpatient clinic. This chapter includes a discussion of the results of this project for pre-implementation and after the intervention.

Interpretation

This improvement project aligned with similar studies performed within the United States, which found no-show rates as low as 3% and as high as 80% (Crutchfield & Kistler, 2017; Kheirkhah et al., 2016; Samuels et al., 2015). The baseline no-show rate at Samto Medical Services was 40%, and the goal was to reduce the no-show rate by 20%. However, the no-show rate during the pre-intervention period from August 17, 2020, to September 28, 2020, was 30.5%. The variation in the rates could have been due to the current COVID-19 outbreak, which caused a significant reduction in the daily scheduled appointments. However, the no-show rate decreased from 30.5% to 19.9% after the six-week reminder system's implementation.

Findings from this project are consistent with several studies performed in the past, which shows an improvement in the no-show rate with a reminder system. Goffman et al. (2017) utilized a reminder call for patients scheduled for a follow-up appointment at the VHA system in Pittsburgh Healthcare System. The project's findings showed a no-show rate of 12.16% compared to 53.8% that did not receive a reminder phone call. A similar study by Shah et al. (2016) indicated a significant increase in appointment attendance amongst patients who received a reminder phone call seven days before their

scheduled appointment with a no-show rate of 22.8% in the intervention group compared to 29.2% in the control group. Steiner et al. (2018) conducted an RCT study in which patients were randomized to receive either text messages or live phone call reminders. The project's findings showed that both text messages and live phone call reminders were equally effective in promoting patient appointment attendance. A study by Arora et al. (2015) showed an improvement in the attendance rate from 62.1% to 70.2% for patients who received automated personalized text message appointment reminders at 7, 3, and 1 day before their scheduled follow-up appointment.

A study by Regan et al. (2017) showed that parents who received text message reminders to bring their children for vaccination were 39% more likely to be vaccinated than children without reminder text messages. A prospective study by Penzias et al. (2019) examined the impact of a phone call reminder on no-shows in an adolescent/young adult practice showed a decrease in missed appointment rate from 25.0% to 22.4% ($p < 0.001$) and from 14.7% to 13.1% ($p = 0.04$) among primary care specialty patients. Kumthekar and Johnson (2018) implemented a phone call reminder 2 to 3 days before a scheduled appointment to assess the effect of phone call reminders and appointment attendance in an underserved lupus clinic in Bronx, NY. The result showed a decrease in no-shows from 74.8% to 58.8% ($p = 0.0062$). A similar study by Andreae et al. (2017) reported that out of the 475 participants that received a phone call reminder, 275 attended scheduled appointments compared to 249 of 478 in the control group (R^2 1.89, 95% CI [1.42, 1.42]).

This quality improvement project analyzed the efficacy of a single phone call versus two phone call reminders and attendance. Findings showed a 79.1% (91) show

rate and 20.9% (24) no-show rate with a single phone call and one text message reminder. Comparatively, 75.6% (102) show rate and 24.4% (33) no-show rate in the group that received two phone calls and a single text message reminder. Overall, there was no significant improvement in the show rate for veterans who received one phone call versus veterans with two phone call reminders. This finding is consistent with the studies performed by Crutchfield and Kistler (2017), which showed that patients prefer a single reminder transmitted via an email, text message, or phone.

Further analysis assessed the effect of age, gender, ethnicity, and appointment lead time (assessed by the number of days from the date appointment was made to the date of appointment). Comparison analysis showed that veterans of White ethnicity were significantly less likely to keep their appointments ($\chi^2 = 12.28$, $p < .001$), and patients of Black ethnicity were significantly more likely to keep their appointments ($\chi^2 = 14.98$, $p < .001$). No significant differences were observed in the rate of appointments kept by Hispanic or Asian ethnicities. The results also indicated that while it may be less likely for patients to keep appointments if they are made farther in advance, reminder phone calls and text messaging may have a mitigating effect for veterans to show up for scheduled appointments. These findings are consistent with a study by Davies et al. (2016), which showed that the veteran's gender, appointment lead time, and type of appointment (new versus established) all played a role in a missed appointment or no-show.

Starnes et al. (2019) conducted a similar study and noted that a missed appointment is a combination of both the patient and the environmental factors. The study identified patient factors, such as health beliefs, demographics, socioeconomic

status, educational level, and previous no-shows. Environmental factors were identified as the day of the week, time of the day, appointment lead time, and reason for the visit. According to Adams et al. (2017), appointment lead time is intrinsically linked to a no-show rate; the longer the appointment time, the higher the incidence of no-show rate.

There were 28 of the possible 278 veterans contacted that had their appointments canceled by the VA before their appointment date. Cancellation by the VA is a standard procedure, but the reasons for the cancellations were unknown. Thirty-nine veterans whom the DNP student successfully contacted did not show up for their scheduled exam. Out of the 39 veterans, 13 (33%) canceled their appointments during the phone call. The reason for the other 26 (66.6%) no-show veterans were unknown. Though cancellation is not the aim of a reminder system, a reminder system provides an opportunity for patients to either cancel or reschedule their appointment. A study by McLean (2016) showed that patients who received telephone reminders are 17% to 26% more likely to reschedule than no reminder. However, the clinic can re-assign between 27% to 40% of the canceled appointment to other patients. A similar study by Shah et al. (2016) noted that a reminder system provided an opportunity for cancellations and rescheduling in addition to appointment attendance. A study by Andreae (2017) noted that a patient who receives reminder calls is more likely to cancel than fail to attend.

The six weeks implementation of this project was short, but the number of participants (196) coupled with a 10.6% ($p = 0.006$) reduction is significant to initiate a change in clinical practice. The project will positively affect both the clinic and the veterans. Before this project, the facility's no-show rate was 40% (clinic daily intake). There is a recorded history of staff dissatisfaction, income loss, and waste of healthcare

resources. Liermann (2019) noted that veterans who do not show up for their scheduled appointment might be denied benefits, including financial and medical care. An increase in the show rate from 69.5% to 80.1%, means an increase in revenue for the clinic, ultimately resulting in staff satisfaction. Similarly, veterans will receive their disability benefits, including medical care, and earn financial incentives.

Limitations

Several limitations exist in this quality improvement project. First was the variation in the sample size. There were 403 veterans used in the pre-intervention group, while 196 participated in the intervention group. The primary reason for the variation was the lack of contact phone numbers for 125 veterans, which significantly affected data analysis and negatively impacted the outcome of the result. Using an equal sample size for both the pre-intervention and intervention phases might change the outcome of the findings.

The second limitation was the time the appointment was made. The mean interim days (number of days from the date the appointment was made to the date the veteran was seen) was 8.46 and 9.96. The analysis showed that the longer the appointment time, the less likely it was for the patients to keep their scheduled appointments. Unfortunately, the VA controlled the appointment lead time and cannot be changed.

Thirdly, calls were made on weekdays between 9 a.m. and 5 p.m., and no messages were left for veterans who could not be reached. Most of the veterans are working class and may have been at work during these times. Extending the call times to the late evening might be helpful to mitigate this problem. This quality improvement

project took place in an exclusively veteran served clinic, and the result may not apply to other settings.

Implications for Advanced Nursing Practice

As the advanced practice nurse's role expands, the DNP leaders become the change agent within the healthcare system (Zaccagnini & White, 2017). Therefore, such roles are accomplished by taking action, observing the outcome of the action, and making the necessary adjustment. Rather than take a reactive stand that lays blames without room for discussion for improvement, the DNP nurse should take a responsive stand that will set a platform for discussion of the problem and possible resolution that will benefit the system at large (Zaccagnini & White, 2017). Moreover, the DNP nurse should understand the organization's culture and structure, observe behaviors and patterns that may result in problems, and devise a means to effect a positive change.

Providing safe, high-quality, and evidence-based care to patients can be achieved mainly by implementing evidence-based practice in the clinical setting (Braithwaite et al., 2020). Such implementation may include introducing new medication, new medical equipment, new testing, or changing the clinical setting's operational paradigm. The goal of the implementation of evidence-based practice is to improve outcomes. For example, the initiation of a reminder phone call and text messages to the United States veterans to show up for scheduled appointment resulted in a 10.6% increase in the show rate from 69.5% to 80.1%. The implementation with the resulting outcomes of this project is relevant to nursing practice because the DNP nurse is accountable for delivering safe, quality, and equitable care to patients under its care by addressing any healthcare gaps that may affect such care (Chism, 2019). From the veteran's standpoint, appointment

attendance permits healthcare access and establishing a disability claim for financial incentives.

Plan for Sustainability

Current evidence shows that most research findings are lagging and not implemented in the clinical setting; even after implementation, the project is not sustained (Cowie et al., 2018). Despite the effort, time, and money invested towards implementing a quality improvement project in the healthcare setting, many do not progress beyond the implementation phase due to the lack of plans for sustainability (Braithwaite et al., 2020; Cowie et al., 2018; Proctor et al., 2015). Failure to sustain any healthcare intervention can lead to failure in delivering evidence-based practice, waste of resources, and may dampen the practitioner's motivation for future implementation (Cowie et al., 2018). Factors, such as fiscal constrain, multiple stakeholders, organizational culture, and adaptability of the program in the real-world setting pose significant challenges to sustaining a project beyond it implementation phase (Braithwaite et al., 2020). Proctor et al. (2015) recommended that the sustainability plan have a clear concept and rely on theory and conceptual framework to set the study's question platform. Also, the project should have an operational definition with clear measurement guidelines. It should have more robust analytical methods and designs for testing. Additionally, such practices as organizational practices, training, organizational management, or stakeholders and financial practices should be considered in sustaining any healthcare intervention.

Evolution is one of the methods that will be utilized to sustain this project after implementation. According to Braithwaite et al. (2020), the evolution of the program is

necessary for continued sustainability. Evolution means the program's adaptation, which can be achieved by dedicating a team to monitor the program and make the necessary adjustments (Braithwaite et al., 2020). However, it may not be necessary to maintain the initial program in its entity, but a component of the program should be maintained for continued sustainability. Staff at Samto Medical will continue to make phone calls and text message reminders to veterans before their scheduled appointment.

Visual management is another method that will be utilized to sustain this project. Visual management permits the staff to quickly recognized and differentiate abnormal from normal (Silver et al., 2016). Process control gives a visual representation of the amount of work required compared to the work completed, requiring updating the information in real-time on the process control board ((Silver et al., 2016). For example, it requires updating the database for veterans scheduled for a physical exam, the ones that have been reached via phone calls and text messaging, and the ones that are yet to be completed. Process control creates transparency and permits other staff members to swing into action to call or text veterans that have not been reached (Silver et al., 2016). However, the performance board communicates improvement or the outcome of the quality improvement projects (Silver et al., 2016). Daily, weekly, monthly, or quarterly results will be displayed in rows on top of the board in the staff lounge. The board provides direct feedback to staff on the quality improvement project, and any variations or deviation can then be managed (Silver et al., 2016).

The last method for sustainability of this project is improvement huddles. According to Silver et al. (2016), improvement huddles require holding meetings with all the staff to review current performance. However, regular meetings should occur daily to

weekly to maintain the dynamic and the strength of the quality improvement project. Such meetings allow problems to be captured on time and proactive in preventing future problems. To align with this recommendation, the clinic will hold a monthly meeting with the two medical assistants responsible for making the reminder calls and sending text messages to the veterans. The meetings will be held the first Monday of every month from 9:00 a.m. to 9:30 a.m. for 30 minutes. The DNP nurses will direct the meetings and include topics for discussion, such as a review of the quality improvement project, weekly performance review, review of overall performance to date, and process control review.

Application of the AACN DNP Essentials

The mastery of the eight DNP Essentials was a crucial part of completing the DNP program (American Association of Colleges of Nursing [AACN], 2006). The DNP nurse utilized these Essentials to guide the quality improvement project, which assessed the efficacy of live phone calls and text message reminders to the United States veterans to show up for scheduled appointments.

DNP Essential I: Scientific underpinnings for practice. Essential one focuses on the principles and laws that govern the human experience's patterning (AACN, 2006; Chism, 2019). Moreover, it prepares the DNP nurse to utilize the findings from science and other research studies to implement evidence-based practice that would result in a positive change and status of the affected population. Such change is the development, implementation, and evaluation of a live phone call and text message reminders to the United States Veterans to show up for their scheduled appointment. Evidence shows that patient appointment attendance improves revenues, increases providers' satisfaction,

decreases waste, and improves health (Boksmati et al., 2016; Mayer & Fontelo, 2017; Steiner et al., 2018). The implementation resulted in a 10.6% decrease in the no-show rate, positively impacting revenue and increasing provider satisfaction.

DNP Essential II: Organizational and systems leadership for quality improvement and systems thinking. This essential prepares the DNP student to be accountable for providing safe and quality healthcare and manage ethical dilemmas to patients under their care (AACN, 2006; Chism, 2019). Such accountability can be achieved by utilizing evidence from research to develop and implement a care approach that will meet patients' needs. For example, implementing a phone call and text message reminders resulted from the gap in practice at an outpatient clinic with a baseline no-show rate of 30.5%. Liermann (2019) reported that veterans who do not show up for their scheduled appointment might be denied benefits, including medical treatment and financial incentives. The findings provoked the DNP student to explore arenas to mitigate the problem, hence implementing the intervention, which resulted in a 10.6% decrease in no-show rates within six weeks.

DNP Essential III: Clinical scholarship and analytical methods for evidence-based practice. One of the DNP nurse's core roles is to translate research into practice, which can be achieved by critically analyzing existing literature for evidence-based practice (AACN, 2006; Chism, 2019). Based on the evidence, the DNP nurse can develop, implement, and evaluate practice guidelines to promote care delivery and improve care outcomes (Chism, 2019). Such development and implementation involve designing a database, data collection, interpreting, and analyzing the data (Chism, 2019). The DNP student collected pre-intervention and intervention data during the projects'

implementation to align with this Essential. Post-implementation, the DNP student utilized statistical tests, such as the Pearson chi-square ($\chi 2$) test to compare the pre-intervention and intervention rates, standard deviations (SD) to analyze the age of veterans, frequencies (f), and percentages (%) to summarize nominal demographic variables and means. These statistical tests analyzed the implementation's efficacy, which showed a 10.6% decrease in the no-show rate.

DNP Essential IV: Information systems-technology and patient-care technology for improvement and transformation of healthcare. Accomplishing this essential was through the efficient use of the electronic medical system throughout the DNP program, during the development, implementation, and evaluation of the project. Samto Medical Services uses an electronic medical system where the attendance rate is securely stored. To explore the system requires the skills and knowledge necessary to operate an electronic system. The DNP student used the electronic system to design a data collection tool for the project, which was electronically stored to collect both pre-intervention and intervention data. Data were transferred between the statistician and the DNP student electronically, and communication between the DNP student, project advisor, and mentor was communicated electronically via telephone or email. Moreover, efficient use of the cell phone was essential in sending text messages to the veterans.

DNP Essential V: Healthcare policy for advocacy in healthcare. Paramount to this project is Essential V, which prepares the DNP student with the knowledge and skills necessary to influence healthcare policy in various healthcare settings (AACN, 2006). It equips the DNP nurse to recognize the factors that might influence policy development in different healthcare settings (Chism, 2019). This knowledge positions the DNP nurse to

address several issues faced in the healthcare system, such as health disparities, access to quality care, healthcare financing, equity, and justice (Chism, 2019). At Samto Medical, dissatisfaction in practice by the healthcare providers was evident due to the high level of no show. Through this essential and after review of the existing literature for evidence-based practice, the DNP nurse instituted a phone call and text message reminders to the United States veterans to show up for their scheduled appointment. The goal of the project was to increase access to care in this population. The veterans will be approved for their earned benefit by attending their scheduled appointment, including medical care and financial incentive. The DNP student fulfilled this essential by acting as an advocate for the population of veterans.

DNP Essential VI: Interprofessional collaboration for improving patient and population health outcomes. It was crucial to collaborate with all parties involved, including the project advisor, mentor, statistician, stakeholders, and other academic and healthcare members, to successfully complete the DNP program and the DNP project (AACN, 2006). For example, once it was evident that no-show was a significant gap in this clinic, the DNP student initially collaborated with the clinic's Chief Executive Officer (COO) regarding the need to develop a reminder system within the clinic. Upon approval by the COO, the DNP student presented the project idea for approval by the academic advisor and the project instructor. The DNP student then collaborated with the two medical Assistants who assisted in making phone calls and text messages to the veterans. Before implementing the project, the DNP student collaborated with an Information Technology Technician to design a data collection tool suitable for this specific project. The project advisor provided guidance during the development,

implementation, and post-implementation of the project. Mentoring throughout each phase of the project was provided by the mentor.

Essential VII: Clinical prevention and population health for improving the nation's health. Essential VII prepares the DNP student to participate in activities that promote health, prevent illness, and reduce risks for individuals, families, and populations in different settings (Allan et al., 2004; AACN, 2006). Moreover, it provides a platform for interpreting pertinent data that will improve the population's health status. It is common knowledge that health disparity and limited healthcare access by specific populations are known deterrent to optimal health promotion and prevention. The DNP student fulfilled this essential through the implementation of a reminder system to promote access to care. This study's findings showed a 10.6% improvement in show rate around the same time the previous year.

DNP Essential VIII: Advanced nursing practice. The nursing profession has several different specialties, and the eight DNP Essentials prepares the DNP student to become a leader in its specialty (AACN, 2006). Essential VIII focuses on implementing and evaluating therapeutic interventions using evidence-based practice in nursing and other science (AACN, 2006; Chism, 2019). It also emphasizes that the DNP nurse establishes a therapeutic relationship with healthcare members and patients to promote care outcomes. The DNP student is an Advanced Practice Family Nurse with four years of clinical experience in this specialty. During her years in family practice, the DNP student has identified no-shows as a significant deterrent to meeting the patients' healthcare needs. Based on the identified gap in clinical practice, the DNP student developed and implemented a reminder system that has resulted in a significant drop in

no-show rates in this clinic. The DNP student has accomplished all the Essentials during each component of the DNP project.

Conclusion

This project assessed the efficacy of phone calls and text message reminders to veterans scheduled for outpatient appointments. This project took place over a six-week period during which the DNP sought approval from the clinic's COO, the university human resource, and collaboration with the stakeholders and other team members. The DNP student also completed CITI training for the protection of participants. During the implementation, the DNP students made two phone calls and a single text reminder to veterans a day before their scheduled appointments. This project was essential in getting veterans to attend their scheduled appointment to receive their earned benefits, including medical treatment and financial incentives. From the provider's standpoint, increase access to care increases revenue, reduces or eradicates lapse time, and promotes provider's satisfaction.

Findings from this project showed a 10.6% improvement in appointment attendance within six weeks of implementation. With this rate, coupled with the clinical significance, Samto Medical Services has adopted a scheduling policy change to include phone calls and text message reminders. The project was completed successfully without a need for sponsorship; therefore, sustainability is not questionable. The DNP student utilized the company's existing phones and computer system without any additional gadgets or equipment, and there was no additional staff necessary to complete this project. Samto Medical staff will continue to make phone calls and text message reminders to veterans a day before their scheduled appointment.

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APPENDIX A. SAMTO PROJECT APPROVAL

Executive Approval for Research at Samto Medical Services

Utonne Mukwele, a student of Wilmington University presented a proposal to this office to complete a project as part of her doctoral program. I have evaluated the research plan as presented by Utonne Mukwele and hereby grant permission for the project to be performed at Samto Medical Services in Newark, Delaware.

John Umoh	COO
Printed Name	Title
John Umoh	6/26/2020
Signature	Date

Contact Information

For more information, the following individuals may be contacted:
Researcher: Utonne Mukwele, FNP-C, MBA
utonne@yahoo.com

Faculty Advisor:
Print name: Dr. Joanne Fletcher, EdD, RN, ACM
joanne.f.fletcher@wilmu.edu

University Human Subjects Review Committee:
Aaron M. Sebach, PhD(c), DNP, MBA, AGACNP-BC, FNP-BC, CEN, CPEN, FHM
aaron.m.sebach@wilmu.edu

APPENDIX B. WILMINGTON UNIVERSITY HSRC APPROVAL

July 14, 2020

Utonne Mukwele

Dear Utonne,

Wilmington University's Human Subjects Review Committee (HSRC) is pleased to inform you that your Doctor of Nursing Practice project proposal *Development and Evaluation of a Family Nurse Practitioner-Directed Live Telephone Call and Short Message Service (SMS) Appointment Reminders to Veterans to Improve No Show in an Outpatient Practice* was reviewed on *July 4, 2020.* The project was categorized as ***Exempt*** and meeting the requirements of a quality improvement intervention. Your signed HSRC form is attached.

Now that your DNP project has been approved by the HSRC, there are multiple elements with which you must comply. Wilmington University adheres strictly to these regulations:

1. You must conduct your DNP project exactly as it was approved by the HSRC.
2. Any additions or changes in procedures must be approved by the HSRC before they are implemented.
3. You must notify the HSRC promptly of any events that affect the safety or well-being of subjects.
4. You must notify the HSRC promptly of any modifications to your DNP project or other responses that are necessitated by any events reported in items 2 or 3.
5. Your approval is provisional if you require Institutional Review Board approval from your organization. Once organizational approval has been obtained, please submit your signed approval and completed IRB application to DNP Administrative Assistant via email.

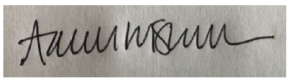
The HSRC may review or audit your project at random or for cause. In accordance with Wilmington University policy, the HSRC may suspend or terminate your DNP project if your project has not been conducted as approved and/or if other difficulties are detected.

While not under the purview of the HSRC, DNP students are responsible for adhering to US copyright law when using existing scales, survey items, and other works in the conduct of research/DNP projects.

In conclusion, you have developed an interesting evidence-based practice project aligned with the AACN DNP Essentials (2006). This is an important project for healthcare practices now and in the future. Best wishes for continued success.

Sincerely,

Angela Herman, DNP, RN
HSRC Committee Representative
Chair, Health Sciences Program
Assistant Professor
College of Health Professions



Aaron Sebach, PhD, DNP, MBA, AGACNP-BC, FNP-BC, FHM
Chair, DNP Program
Associate Professor
College of Health Professions

APPENDIX C. DNP PROJECT COURSE COMPLETEION AGREEMENT

WILMINGTON UNIVERSITY

DNP Project Course Completion Agreement

The Doctor of Nursing Practice (DNP) program at Wilmington University requires completion of three DNP project courses: DNP 8000, DNP, 8001, and DNP 8002. Completion of all requirements within each course is critical. By signing below, you acknowledge your understanding that all requirements for DNP 8000 must be completed prior to progressing to DNP 8001, all requirements for DNP 8001 must be completed prior to progressing to DNP 8002, all requirements for DNP 8002 must be completed by the established deadlines in order to be eligible for graduation, and that all work must reflect doctoral-level standards. I acknowledge that failure to complete course requirements within the designated timelines and/or not producing doctoral-level work products will result in my inability to complete the DNP program as originally scheduled.

I also understand that in order to be successful, I must communicate regularly with my DNP Project Chair and Team Member. Recognizing the contributions made by my DNP Project Chair and Team Member, I understand that my DNP Project Chair and Team Member will need to be listed as second and third authors on any scholarly presentations or publications related to my DNP Project.

DNP Student: UTONNE S. MUKWELE Cohort: 15

DNP Student Signature: Umukwele Date: 5/5/2020

APPENDIX D. CITI CERTIFICATE

CITI PROGRAM

Completion Date 08-May-2020
Expiration Date 08-May-2023
Record ID 36528776

This is to certify that:

UTONNE MUKWELE

Not valid for renewal of certification through CME. Do not use for TransCelerate mutual recognition (see Completion Report).

Has completed the following CITI Program course:

Human Subjects Research (Curriculum Group)
Health Professions - Human Subjects Research (Course Learner Group)
1 - Basic (Stage)

Under requirements set by:

Wilmington University

CITI
Collaborative Institutional Training Initiative

Verify at www.citiprogram.org/verify/?w4815d966-948d-4e88-9c12-444dec6414d1-36528776

APPENDIX E. FINANCIAL BUDGET

Samto Medical Services, LLC
Proposed Budget
For Years Ended 2020-2022

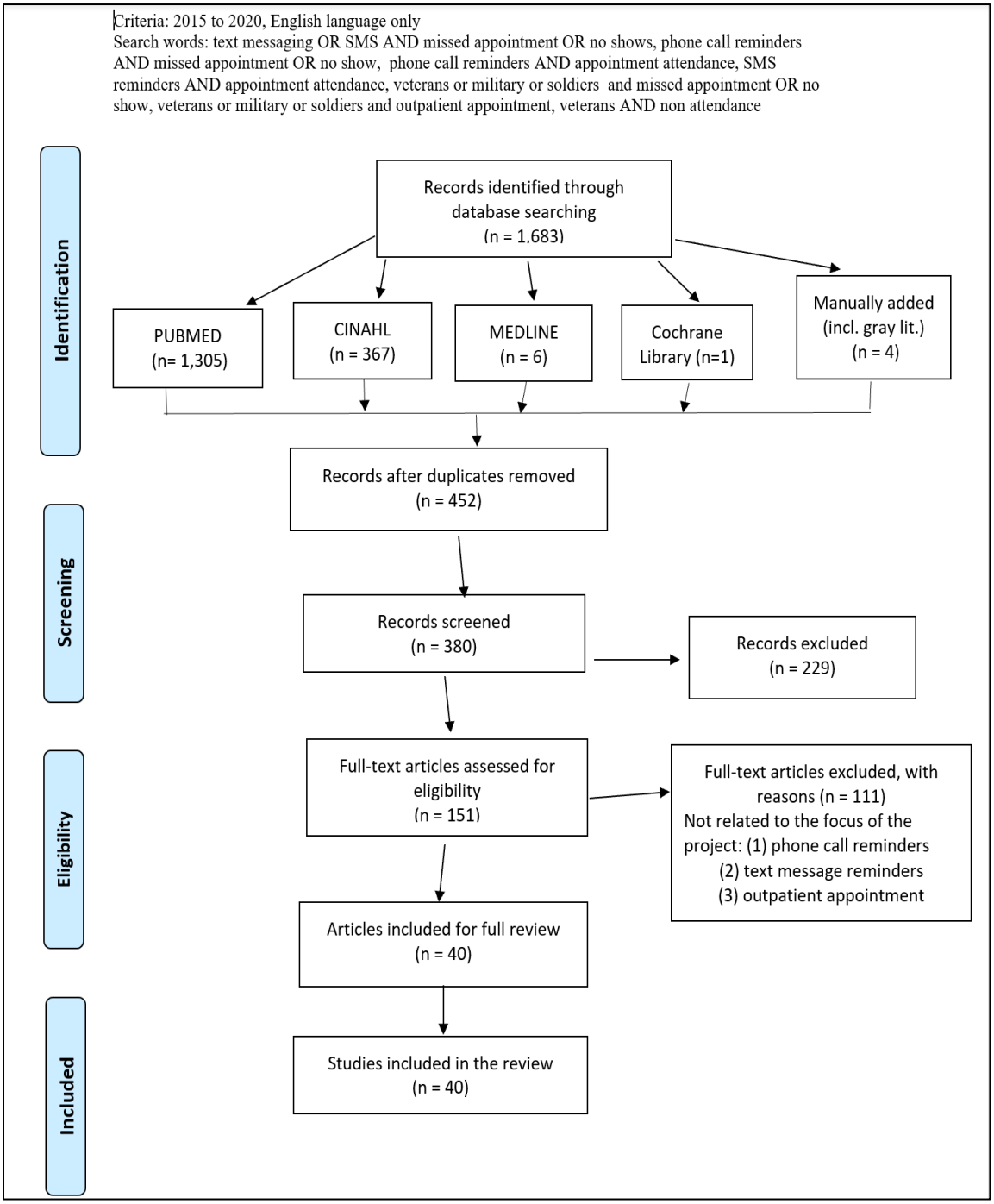
Income

Item	Per Unit	Proposed 2020	Proposed 2021	Proposed 2022
Level I Patient (1000 visits)	$ 260.00	$ 260,000.00	$ 260,000.00	$ 260,000.00
Level II Patient (200 visits)	$ 430.00	$ 86,000.00	$ 86,000.00	$ 86,000.00
Level III Patient (100 visits)	$ 540.00	$ 54,000.00	$ 54,000.00	$ 54,000.00
Level IV Patient (50 visits)	$ 740.00	$ 37,000.00	$ 37,000.00	$ 37,000.00
Total Income	$ 1,970.00	$ 437,000.00	$ 437,000.00	$ 437,000.00

Expenses

Item	Per Unit	Proposed 2020	Proposed 2021	Proposed 2022
Nurse Practitioner (one)	$ 9,583.33	$ 115,000.00	$ 115,000.00	$ 115,000.00
Medical Assistant (two)	$ 2,080.00	$ 24,000.00	$ 24,000.00	$ 24,000.00
Bookkeeper (one)	$ 1,500.00	$ 18,000.00	$ 18,000.00	$ 18,000.00
Printing Supplies	$ 200.00	$ 12,000.00	$ 12,000.00	$ 12,000.00
Rent	$ 2,250.00	$ 2,250.00	$ 2,250.00	$ 2,250.00
Miscellaneous Expenses	$ 300.00	$ 3,600.00	$ 3,600.00	$ 3,600.00
Telephone/Internet	$ 470.00	$ 5,640.00	$ 5,640.00	$ 5,640.00
Data Guard - Paper Shredding	$ 59.00	$ 708.00	$ 708.00	$ 708.00
QuickBooks Subscription	$ 120.00	$ 1,440.00	$ 1,440.00	$ 1,440.00
Liability insurance/year	$1,600	$1,600	$1,600	$1,600
Total Expenses	16,562.33	$ 184,238.00	$ 182,638.00	$ 182,638.00
Total Profit (Loss)	$ (14,592.33)	$ 252,762.00	$ 254,362.00	$ 254,362.00

APPENDIX F. SEARCH STRATEGY



APPENDIX G. SUMMARY OF PRIMARY SOURCES OF EVIDENCE

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
1.	Kheirkhah, P., Feng, Q., Travis, L., Tavakoli-Tabasi, S., & Sharafkhaneh, A. (2016).	Retrospective cohort study.	*N* = 76,745 data reviewed from ten clinics within the Veterans Health Administration (VA).	During the study, the mean, standard deviation for no show rate was 18.8% (2.4%) in the 10 clinics.	The study used a centralized phone reminder system to remind veterans of upcoming appointment in 10 clinics within the VA system.	The study did not identify the demographic information of the participants (age, sex, language).	II, A
			Sample: United States Veterans	Reduction of no shows from 16.3% to 15.8% after six months of implementation of phone call reminders.			
			Setting: The Michael E. DeBakery VA Medical Center (MEDVAMC), Houston, Texas.	Primary care had the highest number of visits, an average of 185,945, and, consequently, the highest number of no show (average 33,098 per year).			
			Attrition: None				

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
2.	Crutchfield, T., & Kistler, C. (2017).	Cross sectional survey	Sample size *N* = 251	23% reported missing one or more appointments within the past 12 months.	Using field surveys, participants were asked to respond to demographic questions, appointment reminder habit, and to complete a discrete choice experiment.	The study test only a limited number of attributes, such as education level, income, age, sex, etc.	III, A
			Sample: adults with a mean age of 43 (18-83) years and 51% were female.	Forgetfulness accounted for 26% of missed appointment; confusion over time, date or location accounted for 14% of a missed appointment		The result used a standard method by Sawtooth software, but other methods could give a better representation of the attributes used in the study.	
			Setting: Online survey	Findings suggest that appointment reminders have the potential to increase appointment attendance. The most preferred reminder types were a single reminder via mail, phone, or text messaging that arrives weeks or less before the scheduled appointment.		Participants were drawn from an online pool who are highly educated and mostly white, which may limit generalization of result to other population.	
				Two primary reasons given for missed appointments include transportation (28%) and forgetfulness (26%).		The study could not evaluate the state of health for an individual participant. Also, it could not be determined if health or illness impacted appointment reminder preference.	

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
3.	McLean, S., Booth, A., Gee, M., Salway, S., Cobb, M., Bhandbhro, S., & Nancarrow, S. (2016).	Systematic Review	Sample size *N* = 43 out of 466 potential articles, of which 31 were RCTs.	Findings showed that all reminder systems are effective at improving appointment attendance across all range of healthcare settings and patient population compared to no reminder system.	Review of quantitative and qualitative evidence to include 11 systematic reviews and 31 randomized controlled trials.	Systematic review generally seeks an answer to a focused question and must have a high degree of homogeneity around the five elements of the PICOT question. However, this review included a wide range of population types, intervention, comparison, and outcomes within the RCTs that were identified.	II, A
			Sample: Patients who missed their medical appointment.	Reminder systems also increase cancellations and rescheduling of unwanted appointments (17% to 26% vs. 8% to 12%) in patients without appointment reminders.	Reviews explored the role of information technology on a patient care pathway and reminder systems.		
			Setting: Healthcare setting.	Successful telephone contact rate was between 30% to 60%.			
				Successful contact rate for text messaging was between 97% to 99%.			

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4.	Samuels, R., Ward, V., Melvin, P., Macht-Greenberg, M., Wenren, L., Yi, J.,Massey, G., & Cox, J. (2015)	Quasi-experimental design	*N* = 386 out of 1,537 possible patients.	Findings showed that 27.2% of the patients did not show up for an appointment because they forgot. The surveyed population had a median no show rate of 33% (interquartile range = 25-50).	A convenience sample of 1,537 Spanish and English-speaking patients was called within one week of their missed appointment and asked if they would complete a survey.	Spanish patients (92 vs. 221 African Americans) were under-sampled due to a language barrier.	II, A
			Sample: Patients who missed appointments with a mean age of 7.6 years.	African American had a significant no show rate of 70%.	443(29%) contacted completed the survey but 57 were excluded because they had less than 3 visits within the year prior to missed appointment.	Reporter bias of who could be reached to complete the survey was noted.	
			Setting: Large, urban academic pediatric medical center	Approximately 29% of the no show patients were reached with only two phone call attempts		Calls were limited to patients who missed their appointment between July 1, 2011, and June 30, 2012, without a comparison group of patients who did not miss appointments.	
			Attrition: 1,151			The result from the academic inner-city population may not be generalized to other types of practices.	

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
5.	Wegrzyniak, L., Hedderly, Chaudry, D., & Bollu, P. (2018).	Retrospective case study	Sample Size *N* = 1193, of which 634 reminders by e-mail, 473 by text messaging, and 86 by phone calls.	Findings showed no significant difference for no shows between phone calls (3.49%), texting (1.90%) and email (2.68%) with *p* =.826.	The study gathered six months of data from 2015 in a single office location of a multi-office private orthodontic clinic for patients who chose one of three reminder methods (phone call, text messaging, or e-mail) for appointment reminders.	There was a lack of control over the person that receives an appointment reminder to the person that brings the patient for the appointment.	II, B
			Sample: Orthodontic patients.	The study also ranked phone call reminders as the least preferred method by patients with 8% compared to 53.6% for e-mail and 38.3% text messaging.	There were 634 (53.1%) appointment reminders by e-mail, 473 (39.6%) by text messaging, and 86(7.2%) by phone calls.	The study was conducted in a single office location and may not be generalized to other settings.	
			Setting: private orthodontic practice.	Overall, no show rate for 1193 appointments was 2.43%.		Ages of the subject were not indicated in the study.	

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6.	Chong, W., & Fantl, J. A. (2017).	Retrospective cohort study.	Sample size *N* = 91, *N* = 49 did not received reminder phone calls and *N* = 42 received reminder phone calls.	The study showed no statistical difference between the two groups with an 18.4% no-show rate in the control group compared to 16.7% in the intervention group.	A total of 91 records were reviewed that were categorized into two groups.	The small sample size and geographic limitation of the study limit its generalization to other practice settings and populations.	II, B
			Sample: Female patients in Urogynecologic clinic.	The combined no-show rate during the study period between May 2015 through August 2016 was 17.6% (*N* = 91).	Group one consisted of 49 patients scheduled at the clinic between May 2015 through January 2016 who did not receive reminder calls.	Retrospective design of the study precludes the ability to identify the specific reason for the missed appointment.	
			Setting: Urogynecologic clinic.		Group two had 42 patients that received reminder phone calls a day prior to the scheduled appointment.		

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7.	Zangalli, C. S., Murchison, A. P., Hale, N., Hark, L. A., Pizzi, L. T.,Dai, Y., Leiby B., & Haller, J. (2016).	RCT	Total Sample Size: $N = 522$, $N = 260$ in the control group and $N = 262$ in the intervention group.	The attendance rate in the intervention group was 48% compared to 30% in the control group ($p < .0001$).	The usual group consisted of patients that received the usual reminder letter to make an appointment 1 month prior to the recommended follow up.	The study baseline data, including insurance status, were obtained from the EMR system and may not be current.	I, A
			Sample: Adult diabetic patients with a mean age of 61 years.	105(40%) of patients in the control group scheduled an appointment compared to 166(63%) in the intervention group ($p < .0001$).	Patients in the intervention group received a personalized letter with a one-page brochure regarding diabetic retinopathy, then a phone call two weeks after the letter was mailed and a reminder phone call a day before the scheduled appointment.	A number of patients could not be reached due to inaccurate or outdated phone number.	
			Setting: Tertiary ophthalmology clinic in urban setting.				
			Attrition: 1				

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8.	Tofighi, B., Grazioli, F., Bereket, S., Grossman, E., Aphinyanaphongs Y., & Lee, J. D (2017).	None Randomized Prospective Cohort Study.	Sample size *N* = 93 out of 110 patients approached.	91% of participants preferred text messaging reminders compared to 3% with phone calls, and 6% were amenable to either phone call reminder or text messaging.	A text message reminder was sent to patients 7,4, and 1 day(s) prior to their scheduled appointment with a phone number to call if needed to reschedule.	Patients who were unable to pay for text messages and lack of working mobile phones were excluded from the study.	I, A
			Sample: Opioid-dependent adults with a mean age of 48 years.	Confusing appointment times account for 5% of a missed appointment.	A feasibility survey was also sent to the participants concerning mobile phone use and text messaging.	There was no way to assess if the messages were actually delivered.	
			Setting: office-based buprenorphine treatment (OBOT), Bellevue Hospital, New York.			Participants were predominantly male (80%), white (41%), which may affect the generalization of the findings.	
						Due to the small sample size and a single site for the study findings may not be generalized to a similar population.	
						The reliability and validity of the survey instrument were not assessed.	
						The study did not compare the cost and burden to healthcare providers associated with operating a telephone versus text messaging.	

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9.	Penzias, R., Sanabia, V., Shreeve, K. M., Bhaumik, U., Lenz, C., Woods, E. R., & Forman, S. F. (2019).	Prospective cohort study	Sample size: *N* = 14,985 visits out of the 24,292 appointments scheduled between February 1, 2017, to January 31, 2018.	Forgetfulness accounted for 39.2% of missed appointments, followed by conflict at work/school (11.0%).	During a 12 months intervention period, administrative staff called patients the day before scheduled appointments to remind them of the date, time, and location of the appointment.	The timing of calls to patients was from 9 am to 3 pm. This timing may conflict with the patient's work/school schedule, thus impacting the outcome of the study.	I, B
			Sample: Adolescent/young adult practice.	Overall decreased in missed appointment from 23.3% to 20.8% ($p < 0.0001$).	Also, during the study period, patients who missed their appointment between February 01, 2017, and January 31, 2018, were called to ask the reason for the missed appointment.	The study was done in one urban adolescent/young adult practice in the Northeast, and the result may not be generalized to other populations.	
			Setting: Primary specialty care in the Northeast.	Missed appointment among primary care decreased from 25.0% to 22.4%.	The study used Plan-Do-Study-Act intervention to analyze data to compare missed appointment	Other factors or clinical changes may have affected or impacted the kept appointments, such as time of the day, time of the year, weather, availability of parking space, and health status of the patients.	
				In specialty care, missed appointment decreased from 14.7% to 13.1%.		Patients who had confidential appointments such as mental health, HIV/STI testing or counseling were excluded from this study, and therefore, the missed appointment rate is not reflective of the entire population.	

				The intervention was effective for patients who identified as black or Spanish with age greater than 20 years, but ineffective for patients who identified as white with age less than 20 years.		Patients who had a Monday appointment were called on Fridays, three days before the scheduled appointment, as supposed to a day prior. This may affect the findings of the study.	

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10.	Marcolino, M. S., Oliveira, J., D'Agostino, M., Ribeiro, A. L., Alkmim, M., & Novillo-Ortiz, D. (2018).	Systematic review with meta- analysis.	Sample Size: *N* = 23 (371 studies and more than 79,665 patients).	Text message reminder improved appointment attendance in healthcare compared to no reminders (RR 1.10; 95% CI 1.03 - 1.17) (7 studies, 5841 participants).	A systematic review of studies published between 2009 and 2016 to assess the impact of telehealth (mobile phones, smartphones, personal digital assistants, MP3, phone plus app, a medical device connected to phones) in health care delivery service.	Studies assessing mobile health intervention does not include an assessment of risk and consumer satisfaction.	II, A
			Sample: Patient with a chronic and non-communicable disease.	Reminder phone calls improved appointment attendance in healthcare (RR 0.99%, 95% CI 0.95 - 1.02) (3 studies, 2509 participants).		None of the reports reported security and confidentiality.	
			Setting: Healthcare delivery service.	Test messaging plus postal reminder improved appointment rate compared to postal reminder alone (RR 1.10, 95% CI 1.02 – 1.19) (1 study, 291 participants).			
				The pooled effect from 8 studies on appointment attendance using text messaging versus no reminder was RR 1.06 (95% CI 1.05- 1.07)			

				The study also showed that the cost of text messaging was less at 55% per attendance compared to 65% for phone call reminders			

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11.	Nielson, C. M., Rivelli, J. S., Fuoco, M. J., Gawlik, V. R., Jimenez, R., Petrik, A. F., & Coronado, G. D. (2018).	RCT	Sample Size: *N* = 427, *N* = 218 in the control group *N* = 209 in the intervention group.	The effectiveness of the intervention differed among Spanish and English-speaking patients. Among Spanish speaking, the return rate of return for the fecal immunochemical testing was higher in the automated only group than the automated plus live call group at 62% vs. 39%.	The control group received up to 6 automated phone reminders.	The control group had 218 participants compared to 209 in the intervention group. This variation in sample size may affect the outcome of the study.	I, B
			Sample: Adults colorectal patients ages 50 to 75 years.	Contrary, there was no difference in the return rate noted among English preferring patient (32% vs. 34%).	Patients in the intervention group received a combination of automated and live phone reminders for a total of six calls.		
			Setting: Two western Washington clinics of the sea Mar Community Health Centers.	Older participants prefer phone calls over other methods of reminders.			

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
12.	Shah, S. J., Cronin, P., Hong, C. S., Hwang, A. S., Ashburner, J. M., Bearnot, B. I., Richardson, C. A., Fosburgh, B. W., & Kimball, A. B. (2016).	RCT	Sample size: *N* = 2,247 out of 20,955 screened with 1,129 in the intervention group and 1,118 in the control group.	The no -show rate in the intervention group was lower at 22.8% (absolute risk difference -6.4%, $p <$ 0.01, 95% CI [-9.8 to 3.0] compared to 29.2% in the control group.	The usual practice involves sending automated phone calls to all patients 3 days prior to the scheduled appointment.	The study focused on patients predicted to be at high risk for no- show vs. the entire patient population.	I, A
			Sample: Adults patients ages 18 years and older	Cancellation and rescheduling in the intervention group occurred in advance (mean difference, 0.35 days; 95% CI [0.07 – 0.64]; P=0.01).	In addition to automated phone reminders, patients in the intervention group received live phone call reminders 7 days before scheduled appointments.	Since the study was conducted in a single hospital-based primary care practice, the findings can only be interpreted in this context and may not be generalized to other settings.	
			Setting: Internal Medicine Associates, an academic hospital-based primary care	The intervention improved access to primary care.		Only 79% of patients in the intervention group received phone calls before visits, which may underestimate the effectiveness of the intervention.	
			clinic at Massachusetts General Hospital.				

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13.	Muñoz, R. F., Leykin, Y., Barrera, A. Z., Brown, C. H., & Bunge, E. L. (2017).	RCT	Sample size: *N* = 95 with 63 English speaking (*n* = 29 in the intervention group, *n* = 34 in the control group) and 32 Spanish speaking (*n* =18 in the intervention group and *n* = 14 in the control group).	Among Spanish participants, the call yielded a 63.2% follow up rate compared to 51.0% for no calls.	The study used an online survey for persons screened positive for high risk for major depression.	In the intervention group, 29 of the English speaking and 18 of the Spanish speaking participants did not provide the correct phone number; hence they could not be reached.	I, B
			Sample: Adult patients at high risk for major depression ages 18 years and older.	Among English speakers, the follow-up rate for the intervention group was 38.9% vs. 21.4% for the control group.	Participants in the intervention group received phone call reminders up to ten times to complete the survey by phone.	The sample size was too small to make generalizations.	
			Setting: Online survey		Participants in the control group did not receive any reminder call.	Only persons with access to the internet were included in this study which may affect the overall outcome.	
						Variation in sample size with 63 English participants and 32 Spanish participants may affect the study findings.	

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14.	Kiran, T., Davie, S., Moineddin, R., & Lofters, A. (2018).	RCT	Sample size: *N* = 5270, (3733 female and 1537 male) *n* = 2635 letter intervention and *n* = 2635 phone call intervention.	Overall, phone call reminders were more effective than mail for follow up screening exams	Patients were randomized 1:1 to receive either mailed letters or phone calls.	Patients without phone numbers on file were excluded from the study.	I, B
			Sample: Patient overdue for cancer screening exams.	Compared with letter reminder, women in the phone call group were more likely to screening exam (8.6%; 95% CI; 5.0% -12%, $p < 0.1$).	Among women, 33.0% allocated to receive a reminder letter and 41.2% allocated to receive a reminder phone call to received at least 1 screening test for which they were due (absolute difference, 8.1%; 95% CI, 5.1%–11.2%, $p <$ 001).	Physicians determined which patients were eligible for the outreach call which can cause selection bias.	
			Setting: St. Michael's Hospital Academic Family Health Team, a large primary care organization serving more than 40,000 patients in 6 clinics in Toronto, Canada.	Among men, 24.8% in the letter group and 28.8% in the phone call group received screening exam.	Among men, 24.8% of those in the letter group and 28.8% of those in the phone call group received screening for colorectal cancer (absolute difference, 4.1%; 95% CI, 0.4% to 8.5%, $p < .073$).	Lost to follow up resulted in a significant sample size variation with 2059 participants who received a letter compared to 1407 that received a phone call. This variation may affect the outcome of the study.	

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15.	Kumthekar, A., & Johnson, B. (2018).	None Randomized Prospective Cohort Study	Sample size: *N* = 283 out of 378 scheduled appointments.	The most common reason for the missed appointment is forgetfulness (45.5%), and 14% reported that they did not receive the appropriate appointment.	A phone call reminder to patients 2-3 days before the scheduled appointment.	The study was performed in an underserved lupus clinic, and the result may not be generalized to other population.	I, B
			Sample: Adult Lupus patients.	The reminder phone call was the preferred intervention (76.74%) that helped the patients kept their appointment.	A patient survey was implemented to assess the effect of phone calls on clinic show rate.	Other issues beyond reminder phone calls such as the perception of the illness, socio-economic, weather condition and among other factors can affect the rate of no-shows.	
			Setting: Bronx, New York.	Out of the 378 appointments that were made during the intervention period, 283 visits were completed.			
				The difference in the no show rate before and after the intervention (58.8% vs. 74.8%).			

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16.	Andreae, M. H., Nair, S., Gabry, J. S., Goodrich, B., Hall, C., & Shaparin, N. (2017)	RCT	Sample size: N = 953, n = 475 experimental group, n = 478 control group.	In the experimental group, 275 patients showed up for a scheduled appointment, 84 canceled, and 116 did not show up.	In the intervention group, a phone call reminder was made to patients a day before their scheduled appointments.	This study can only be interpreted in the context of African American and Spanish patients and may not be generalized to other populations.	I, B
			Sample: African American and Spanish adult patient with chronic pain.	In the control group, 249 patients showed up to their scheduled appointment, 31 canceled, and 198 failed to attend.	Patients in the control group did not receive any reminder call.	There was no comparison between phone call reminders and other methods of reminders to ascertain the effectiveness.	
			Setting: Inner-city academic chronic pain clinic at Montefiore Pain Center, Bronx, New York.	Human phone reminders in the preferred language increased appointment adherence (RR 1.89, CI95% [1.42, 1.42], ($p < 0.01$).	Spanish speaking phone calls were made by either a native Spanish speaker or has received credentials certifying their ability to communicate in Spanish.	Calls were restricted to patients with initial visits, excluding all patients with follow-up care. The outcome might be different if all the patients were included in the study.	

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17.	Steiner, J. F., Shainline, M. R., Dahlgren, J. Z., Kroll, A., & Xu, S. (2018).	RCT	Sample size: *N* = 54,066, *n* = 18,135 for 3 days, *n* = 18,029 for a 1 day, *n* = 17,902 for both 1 and 3 days.	Two automated reminders were more effective in reducing missed appointment than one reminder.	Patients from 27 primary care clinics were assigned to one of three groups, 3 days, 1 day or both 3 days and 1 day prior to the scheduled appointment.	The study was conducted in a single integrated health system with a low baseline rate for missed appointments and, therefore, may not be generalized.	I, A
			Sample: patients at primary care clinic.	Overall, 5.2% of appointments were missed, 15.2% were canceled, and 79.7% were completed.	Of the 54,066 patients, 18,135 were randomized to receive a 3-day reminder call, 18,029 to receive a 1-day reminder call, and 17,902 to receive both 3-day and 1-day reminders.	Only individuals who completed their appointment were included in the satisfaction survey. So it could not be assessed if those who missed their appointment had other reminder preferences or reason for the missed appointment.	
			Setting: Kaiser Permanente, Colorado.	Those that received both 3 and1 day calls had the least rate of missed appointment ($p < 0.0001$).	Text messages were sent to 41,339 individuals (76.4%).	Patients who made appointments online were distributed equally among the three arms of the study, which means that they received three reminder system.	
				The rates of missed appointments among those who received text messages were 5.6%, 4.9%, and 4.2% for the 3-day, 1-day, and both-days, respectively.	Interactive voice response calls were made to 8038 (14.9%).		
				Among those who received calls, the rates of missed appointment were 4.8%, 4.4%, and 3.8% ($p < .001$) for the 3, 1, and both days of intervention.	4689 (8.7%) could not be reached by either modality.		

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18.	Partin, M. R., Gravely, A., Gellad, Z. F., Nugent, S., Burgess, J. F., Jr, Shaukat, A., & Nelson, D. B. (2016).	Retrospective study	Sample size: *N* = 27,994 from 69 facilities within the Veterans Health System.	Out of the 27,994 patients scheduled in a colonoscopy clinic during the follow-up interval between August 1, 2009 and September 30, 2011 17,294 (61.78%) completed (range, 43.3%–84.7% across facilities), 9197 (32.85%) cancelled (range, 12.2%–54.9% across facilities), and 1503 (5.37%) missed (range, 0%– 13.6% across facilities).	This study examined patients scheduled for colonoscopy between August 1, 2009, and September 30, 2011, for individual factors that contributed to a missed appointment.	The veteran's health administration is a unique organization, characterized by a predominantly male, low-income population with high rates of mental health and substance abuse diagnoses. Therefore, findings from this study may not be generalized to other populations.	II, B
			Sample: predominantly white (66%) men (96%) scheduled for a colonoscopy.	The majority of canceled appointments (n ¼ 7099, 77%) were canceled by the patient; 2098 (23%) were canceled by the clinic. The result showed no significant association between facility region, preparation education method or appointment reminders and missed appointment or cancellation.	Factors such as age, race, sex, marital status, residence, drive time to nearest specialty care facility, limited life expectancy, comorbidities, colonoscopy in the past decade, referring facility type, referral month, and appointment lead time were examined.	The study could not verify that the scheduling and procedure dates were for colonoscopy procedures.	
			Setting: Veterans Health Administration facility.	Several factors within the VHA clinic control can be targeted to reduce missed appointment, such as opt-in scheduling and reduction in appointment lead time could improve both missed appointment and cancellations.	Also, organizational factors such as facility region, complexity, appointment reminders, scheduling, and prep education practices were examined.		

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19.	Nuti, L., Turkcan, A., Lawley, M. A., Zhang, L. Sands, L., & McComb, S. (2015).	Systematic Review	Sample size: *N* = 77 of which 35 were RCT	Phone reminders and mail were the intervention most studied to facilitate patient appointment attendance with positive clinic outcomes.	A systematic review of studies published between 1987 and 2013, and 46 published after 2006.	The search terms used in the literature search might have missed some publications that would have met the inclusion criteria for this study.	II, A
			Sample: Diabetic patients ages 19 years and older	Phone call reminders to patients regarding provider visit for lab testing resulted in improved HbA1C levels. One study showed that a monthly phone reminder to the patients for lab testing resulted in a significant decrease in HbA1c levels, and improved systolic blood pressure.	The review evaluates diabetic interventions, their effectiveness and healthcare outcomes with focus on how to get the patient to their routine provider visit and laboratory work.	Only studies published in English was included in this study with a potential for bias.	
			Setting: Outpatient clinics. The studies represented a wide variety of countries with 43 studies from the United States, 15 from Korea, 4 from the Netherlands, 3 from the United Kingdom, 3 from Canada, 2 from Australia, 1 from France, 1 from Finland, 1 from Iran, 1 from Italy, 1 from Norway, 1 from Taiwan, and 1 from Turkey.	Two studies showed that patients that were given a reminder call by the medical assistants a day before their scheduled appointment had a significantly lower level in HbA1C and LDL levels. Letter reminders in combination with phone call reminders of the date and time of the appointment resulted in improved outcome. Letter reminder alone for appointment attendance was not as effective as phone call reminders or phone call reminders in combination with letter reminders.	In the reviews, interventions such as phone call reminders have been used to remind diabetic patients to schedule provider appointments or laboratory tests. In one of the RCT, a reminder letter was mailed to the patient prior to their birthday with self-care handbook and preventative care checklist reminding them of routine screening and monitoring.	Some of the reviews were dated as far back as 1987. Most current interventions and recent studies may prove otherwise. Due to inconsistencies and a wide range of outcomes from several of the literature, a meta-analysis of this review was not done.	

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20.	Zallman, L., Bearse, A., West, C., Bor, D., & McCormick, D. (2017).	Quasi - experimental studies	Sample size *N* = 793 out of 1096 that were invited to participate.	The result showed that 95% of participants reported having access to text messaging.	Research assistant verbally administer a face-to-face survey with the participants at the hospital emergency room department to determine their preferences for text message reminder.	The study investigated the preference for receiving text message reminders but does not examine the efficacy of the approach.	II, A
			Sample: Patients, ages 18 to 64 years seeking care in three hospital emergency departments at a larger safety net institution.	Text messaging (53%) was preferred over e-mail (16%), phone calls (23%), and letters (9%) for communication.		Low income and minority populations are more likely to experience cell phone interruptions due to either change in cell phone numbers or unpaid bills, which may limit the utility of phone usage during those times.	
			Setting: Emergency department at a larger safety net institution in Massachusetts.	78% of the respondents wanted appointment reminders. Participants mostly required reminders regarding an appointment and expired insurance.		Although this study was performed in a larger hospital setting, it may not be a true representation of a larger population and patients who do not require emergency care.	

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21.	Boksmati, N., Butler-Henderson, K., Anderson, K., & Sahama, T. (2016).	Systematic review with meta-Analysis	Sample size, $N = 28$ studies including 13 RCT, 5 of which were single-blinded, and 15 studies were observational, five of which had concurrent controls while the other ten had historical controls.	The heterogeneity of the observational studies (94%, p<0.001) and all studies (95.21%, $p <$ 0.001) was high, which did not permit a summary estimate.	A systematic review of studies published between 2005 to 2015 that compared the attendance rate for patients who received text message reminder versus patients who did not receive any reminder text message.	None of the studies reported if staff received feedback from participants about receiving reminder SMS and if such intervention prompted them to attend, cancel, or reschedule a forgotten appointment.	II, A
			Sample: Studies published between 2005 and 2015 for patients scheduled for an outpatient healthcare appointment.	The heterogeneity of the RCT was moderate (60.83%, $p = 0.002$).		Patients were not asked if receiving an SMS reminder was a positive or negative experience.	
			Setting: Hospital outpatient clinic, primary care clinic, red cross blood clinic.	The pooled effect of the RCT produced a positive effect for SMS reminders vs. control group with an OR of 1.62(1.35 – 1.94).		The timing of the reminder, the content of the message, and if one or more SMS reminders made any difference to the participants were not discussed.	
			Also, the studies represented a wide variety of countries with 6(21%) of studies conducted in England, 4(14%) in Australia, 4(14%) in Scotland, and 4(14%) in the United States.	There were no significant differences with respect to the participant's age, the timing of the SMS, rate or type, setting or specialty detected.		The impact of SMS reminders on culturally and linguistically diverse participants were not discussed.	

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
22.	Clouse, K. M., Williams, K. A., & Harmon, J. M. (2017).	Quasi-experiment	Sample size, *N* =18 out of 39 patients.	Only 15 subjects received both calls with 12 (80%) of those attending the first visit and 3(20%) was a no show.	An advance practice nurse made a telephone call to patients that were scheduled for initial mental health exam two weeks after the appointment was completed to make sure that referral forms were received.	The sample size was too small to generalize this study to similar population.	II, A
			Sample: Adults psychiatric patients ages 19 years and older including 22% male and 78% female.	A total of 5 subjects did not show up for the exam with a total no show rate of 28% and 3 of these subjects only received one call without a reminder call.	The second call was made two days prior to scheduled appointment to remind the patients of their appointment time and to bring completed forms to the appointment.	There was no control group for comparison.	
			Setting: Outpatient mental health clinic in the South.	Overall, the telephone call resulted in a 7% improvement in no show compared to the same time the previous year with no show rate of 26%.		The clinic experienced phone line failure during the study as well as failure of the patient's cell phone service. Due to the phone failure, patients could not be reached.	
				During the study, of the 39 patients referred for treatment, 19 (48%) resulted in no shows.		During the three months study period, the clinic was closed on several accounts due to severe weather and poor driving condition.	
				A one-sample chi-square test that examined the correlation between receiving both calls and attendance showed a weak and insignificant correlation (r[1] =.388, $p >$ .05).			

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
23.	Mayer, J. E., & Fontelo, P. (2017).	Meta-Analysis	Sample size, *N* = 34 articles of which 29 were RCT.	Text messaging reminder resulted in reduced rate of none attendance (OR, 0.66; 95%CI, 0.48-0.92; *p* = .01; 1^2 = 52%).	A study was conducted using a meta-analysis of literature relating to HIV patients and appointment attendance, text message reminders, physiologic measures, and medication adherence.	The study had a high rate of meta-analysis, which could result in a type 1 error.	II, A
			Sample: HIV patients receiving outpatient care	Text messaging reminder resulted in a substantial increase in medication adherence (SMD, 0.87; 95% CI, 0.06 1.68; *p* = .04; I^2 = 99%).		The study gave the same weight to an RCT as a non-RCT.	
			Setting: Outpatient clinic.	Text messaging reminder resulted in a significant improvement in physiologic measures (SMD, 1.53; 95% CI, 0.52– 2.55; *p* = .003; I^2 = 99%).			

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24.	Arora, S., Burner, E., Terp, S., Nok Lam, C., Nercisian, A., Bhatt, V., & Menchine, M. (2015).	RCT	Sample size, *N* = 374 out of 2365 that was screened. *N* = 146 in the intervention group and *N* = 182 in the control group.	The overall appointment adherence rate was 72.6% in the intervention group compared to 62.1% in the control group (difference between groups = 8.2%, 95 CI = -1.6% to 17.7%, *p* = 0.100).	Patients in the intervention group received personalized text message reminder, 7, 3, and 1 day before the scheduled appointment to follow up at the Los Angeles County health system.	Unequal sample size (146 in the intervention group vs 182 in the control group) could affect data analysis and the result of the study.	I, A
			Sample: English and Spanish speaking adults 18 years and older that received emergency room care with a referral for outpatient follow up visit.	The attendance rate for primary care was significant in English speakers compared to Spanish speakers (58% in the intervention group vs 46% in the control group.	The control group only received written follow up instructions without any text message reminder.	This study was conducted at a single location, low income, and predominantly Spanish (70%) and may not be generalized to other populations.	
			Setting: Emergency department at the University of Southern California Medical Center.	The attendance rate for specialty care was higher for English speakers compared to Spanish speakers (84% in the intervention group vs. 61% in the control group).		Not all emergency departments have the capacity to set up a follow-up appointment; therefore, this study may not be generalized.	
				Forgetfulness was one of the major reasons for no show.		Some of the patients that did not show up for the scheduled appointment may have followed up with their primary care provider, which may not be considered a no show but may affect the result of the study.	

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25.	Lockhart, T., Gillespie, G. L., & Grant, V. (2017).	Systematic Review	Sample size, *N* = 9 out of 122 articles.	The primary outcome for each study was appointment compliance measured by assessing the impact of text messaging reminder on attendance.	An integrative review of nine literature regarding text message reminders to promote timely medical surveillance.	According to the authors, none of the studies addressed the limitation of text messaging in terms of confidentiality, data usage, and outdated cell number information.	II, A
			Sample: Adults ages 18 years to 59 years.	Except for 2 studies, all studies found text messaging reminder as an effective way to improve patient attendance, improved cost, user friendly, and widely acceptable by patients.		According to the authors, the reviews lacked published studies testing medical surveillance examinations and text messaging reminders.	
			Setting: Adult primary care or outpatient clinics.	Attendance rates for text messaging ranged from 59% to 70.2% (median = 64.5%) compared with 48% to 62.1% (median = 54%) without a reminder system.			
				In these reviews, forgetfulness was the most common reason for the missed appointment. Some of the studies showed that text messaging was cost-effective, acceptable, user friendly with a high level of patient satisfaction.			
				The average timing of the reminders was 7, 5, 3, 2, and 1 day before the scheduled appointments.			

				Most studies used several platforms to deliver appointment reminders (text messaging (phone call reminders, live phone call reminders, web-based reminders, and letters).			
				Text messaging reminders were compared to other types of reminders such as e-mail or phone calls.			

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26.	Househ, M. (2016).	Systematic Review	Sample size: *N* = 13, *N* = 8 studies published in a peer-reviewed journal and *N* = 5 studies from the Cochrane library.	The finding showed that SMS can increase clinic attendance by 50% compared to none-reminder in both primary care and hospital settings.	A systematic review of studies published in English between January 1990 to June 2013 regarding the impact of SMS technologies within the healthcare setting.	Many of the articles focused on the applications as opposed to how they were evaluated during the intervention.	II, B
			Sample: Only a systematic review of studies published in English between January 1990 to June 2013 regarding the impact of SMS technologies within the healthcare setting.	SMS appointment reminders are effective when sent by a healthcare professional compared to automated text messaging via a computer.	Three reviews assessed the role of text message reminders and appointment attendance in the healthcare setting.	Some of the studies identified language barrier, network fluctuations, finances, privacy, mobile phone turnover and timing of the messages.	
			Setting: Healthcare setting.	Reminders being sent out one week prior to scheduled appointment is more appropriate.	Two systematic reviews examined the impact of SMS on disease prevention and preventive healthcare.		
				The authors note that the cost of sending text message reminders is less compared to the cost incurred from no show	Two reviews assessed the use of SMS to promote healthy behavior.		

Article Number	Author and Date	Evidence Type	Sample, Sample Size, Setting	Findings That Help Answer the EBP Question	Observable Measures	Limitations	Evidence Level, Quality
27.	Germain, M., & Godin, G. (2016).	RCT	Sample Size: *N* = 3454 of which *N* = 1778 (51.5%) were women and *N* = 1676 (48.5%) men	The overall effect of the reminder system was statistically significant (x^2=11.42, $p < 0.005$).	Patients who were scheduled for blood donation were randomly assigned to three groups of reminder system, phone only, e-mail only and phone plus e-mail.	Qualified participants were excluded due to the lack of e-mail address.	I, A
			Sample: Patients ages 18 to 70 years scheduled for blood donation.	The combine effect of phone call and email resulted in a significant greater proportion of donors (18.45%) compared to phone call reminder alone (15.73%; x^2=3.95, $p < 0.005$) as well as compared to email alone (13.20%; x^2= 10.91, $p < 0.0001$).	578 (43.5%) males and 598 (33.6%) females were assigned to mail the only group.	Variation in the assigned group can affect the outcome of the study.	
			Setting: Mobile drives at Quebec, Canada.	There was no difference between the e-mail and phone call reminder (x^2=2.00, $p = 0.16$).	525 (31.3%) male and 566 (31.8%) females were assigned to e-mail only group 573 (34.2%) and 614 (34.5%) female assigned to phone plus e-mail group.	Fluctuation in the participant's phone and none functioning phone number may affect the outcome of the study.	
				Men responded more to the interventions (x^2 = 7.66, $p < 0.05$).			

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28.	Bishop, T. F., Ryan, A. M., Chen, M. A., Mendelsohn, J., Gottlieb, D., Shih, S., Desai, P., Wolff, E. A., & Casalino, L. P. (2016).	RCT	Sample Size: *N* = 16,886 with *N* = 11,409 in the intervention group and *N* = 5,477 in the usual care.	Patients in the intervention group who were successfully contacted were more likely to schedule an office visit within 3 months of randomization compared to patients in the usual care (24.8% [95% CI:22.8, 26.9] VS. 20.7% [95% CI: 19.7, 21.8], $p < 0.001$).	Panel managers called patients in the intervention group with lapses in care to schedule an appointment.	Two-thirds of the patient randomized into the intervention group and one third to the usual group. This variation could affect the outcome of the study.	I, A
			Sample: Patients with mean age of 53.5 (SD:16.4) and 49.2% male with uncontrolled chronic diseases such as diabetes, hyperlipidemia and hypertension, and lapse in care.	Also, patients in the intervention group were more likely to have an office visit within one year of randomization compared to patients in the usual care group (45.6% [95% CI: 22.8. 26.9] VS. 38.1% [95% CI: 36.8, 39.3], $p < 0.001$.	Patient in the usual care did not receive any call.	Less than a third (1,676) of patients in the intervention group were contacted.	
			Setting: Primary care practices in New York City Department of Health and Mental Hygiene.			Findings from this study may only be limited to patients in an underserved and disadvantaged neighborhood.	

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29.	Davies, M. L., Goffman, R. M., May, J. H., Monte, R. J., Rodriguez, K. L., Tjader, Y. C., & Vargas, D. L. (2016).	Retrospective Observational Studies.	Sample Size: *N* = 25,050 appointments.	Findings showed that the overall no show rate decreases with age until 75 -79 years when it slightly increases.	The study examined pattern of no show for six individual service lines (primary care, mental health, specialty medicine, rehabilitation, surgery, and other) in the United States Veterans Health Administration for eight years between fiscal year 2007 to fiscal year 2014.	Findings from this study may be limited to the veteran's population without generalization to the general civilian healthcare.	II, A
			Sample: Patients within the United States Veterans Health Administration.	No show rate is higher among males than females until age 65 years when males exhibit and females exhibit similar rates.	It examined the relationship between no show and patient age, gender, appointment age and type of appointment requested.		
			Setting: Veterans Health Administration facilities located on Pittsburg, Tampa, and Houston.	No show rate increases as appointment age increase with male and female showing similar rates.			
				There is an increase in no show rate for established patient compared to new patients across all age group.			
				Males had a higher no-show rate in the medical, primary care, and surgery service lines, while a higher no show rate for females above age 74 years was noted in mental health and rehabilitation.			

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30.	Mugo, P. M., Wahome, E. W., Gichuru, E. N., Mwashigadi, G. M., Thiong'o, A. N., Prins, H. A. B., Rinke de Wit, T. F., Graham, S. M., & Sanders, E. J. (2016).	RCT	Sample Size: *N* = 410 participants with *N* = 211 to standard group and *N* = 199 to intervention group.	Result showed 41% 85 out 207 participants) in the standard group and 59% (117 out of the 199 participants) in the intervention group for a relative risk of 1.4[95% CI, 1.2-1.7].	Participants in the standard group received verbal instructions plus appointment card to return to the clinic for treatment on a specific date.	There is a variation in the number of participants in the standard group, 211 vs. 199 in the intervention group. Though insignificant, these differences may affect the overall outcome of the study.	I, B
			Sample: Adult patients ages 18 – 29 years old evaluated for acute HIV infection.	Higher attendance was associated with appointment reminders, older age, study site and transactional sex in the previous month.	Participants in the intervention group received standard appointment plus phone call and text messaging reminders or in-person reminders at the participant's place of work or home for participants who did not own a phone.	Findings from the study may only be limited to this group or setting.	
			Setting: Health facilities and five community pharmacies in Coastal Kenya.	Lower attendance was associated with reporting multiple (>1) sex partners in the past two months.	An in-person reminder was performed two to four days before the scheduled appointment date.	Text messages were sent in the local language (Kiswahili) only; therefore, participation was limited to patients who could speak the local language, excluding English speaking participants.	
					Reminder phone calls and text messaging were done a day before the scheduled appointment date.		
					For participants that missed the appointment, a missed appointment text message was sent a day after the scheduled appointment, a phone call on the third day and in-person reminder or physical tracing four to seven days after the missed appointment.		

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31.	Amankwaa, I., Boateng, D., Quansah, D. Y., Akuoko, C. P., & Evans, C. (2018).	Systematic review and meta-analysis	Sample Size: *N* = 13 RCTs and *N* = 2 cohort and quasi-experimental studies.	Eleven RCTs were included in the meta-analysis which showed that SMS had a significant effect on adherence to ART (OR, 95% CI; 59; 1.27-1.98).	The study reviewed literature, including RCTs and quasi-experimental studies that examined the effectiveness of mobile phone-based (voice calls, short messages, service, and interactive voice response) intervention with antiretroviral therapy.	Most of the studies in this literature review used scheduled SMS exclusively as a reminder to improve adherence.	II, B
			Sample: HIV patients receiving antiretroviral therapy (ART), irrespective of age, gender or clinical stage.	The two quasi-experimental studies also reported beneficial adherence outcomes.	Mobile phone-based interventions were compared with existing standard interventions such as self-monitoring, reinforcement, counseling, and psychological therapy.	Access or ownership of a phone was one of the cited criteria for inclusion in the study. Therefore, people who were otherwise eligible for the study were excluded due to the issue of phone ownership.	
			Setting: Primary care, community, and hospital settings.	Four studies involving 1194 participants (602 in intervention arms, 598 in control arm) were analyzed, and it showed a positive effect of mobile phone intervention on viral load (OR, 95% CI; 1.29, 0.99-1.68; *p* = 0.06).		Privacy is an issue in delivering care via SMS to HIV patients.	

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32.	Ruggeri, K., Folke, T., Benzerga, A., Verra, S., Büttner, C., Steinbeck, V., Yee, S., & Chaiyachati, K. (2020).	Retrospective study	Sample Size: *N* = 53,149 visits for 41,495 unique patients.	The no show rate prior to reminder was 41.6%, and 42.1% after the reminder was implemented.	Data from an electronic medical record from 11 facilities belonging to FQHC network was collected between June 15, 2017, and April 30, 2018, to access the effectiveness of reminders.	Intervention such as reminders have uneven effect for different population.	II, B
			Sample: Patients receiving care from any of the 11 facilities belonging to New York City-based Federally Qualified Health Centers (FQHC). The sample includes 41% Hispanic, 37% African Americans, 12% White, 4% Asians, and 45% did not report race.	Changes in now show rate in each individual facility range from a decrease of 3.0% to an increase of 5.6%.	Analysis of the effectiveness of a reminder was conducted for the individuals with scheduled appointments before and after the reminder was implemented.		
			Setting: New York City-based Federally Qualified Health Centers (FQHC).	The no show rate declined from 47.6% to 45.6%, X^2 = 5.7, $p < 0.05$ for the 5,569 individuals that had an appointment both before and after the implementation of reminder.			

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33.	Garnier, F., Sciard, D., Marchand-Maillet, F., Theissen, A., Mohamed, D., Alberti, C., & Beaussier, M. (2018).	Prospective study	Sample size: *N* = 599 patients with *N* = 298 in SMS group and *N* = 301 in the call group.	The use of SMS was statistically associated with better compliance with preoperative instruction (Odd ratio = 1.90 [1.48-2.42]; $p < 0.0001$).	Patients were divided into two groups to receive calls for the first 10 weeks and then SMS for the next 10 weeks.	Patients with mobile phone dysfunction, lack of mobile phone or unable to answer the phone were excluded from the study.	I, B
			Sample: Patient scheduled for ambulatory surgery to include dental, digestive, and orthopedic.		In the call group, the call was made by a caregiver a day before the scheduled procedure.		
			Setting: Ambulatory Surgical Center at Saint- Antoine University Hospital, Paris.		In the SMS group, the text message was sent two days before the scheduled procedure.		

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34.	Regan, A. K., Bloomfield, I., Peters, I., & Effler, P. V. (2017).	RCT	Sample Size:12,354 with *N* = 6,177 in the intervention group and *N* = 6,177 in the control group.	Twelve percent, (*n* = 769) of in the intervention group compared to 9% (*n* = 548) in the control group showed up for vaccination.	Patients in the intervention group received an SMS reminder for a free vaccination, but patients in the control group did not receive any reminder.	A 2% (n = 121) text message transmission failure was noted during the intervention period, which resulted in a reduction in the number of participants in the intervention group.	I, A
			Sample: Patients ages between 6 months to 65 years eligible to receive vaccines.	Children in the intervention group were 2.4 times more likely to receive at least I dose of vaccination compared to children in the control group without SMS reminder (RR=2.43; 95% CI, 1.79-3.29).	SMS reminders for children were sent to the parent's mobile phone number on record.	Overall, the percentage of failed messages ranged from 0% to 11%.	
			Setting: Ten practices in Western Australia.	SMS reminder resulted in a significant increase in vaccination uptake (RR = 1.44; 95% CI, 1.23-1.69).		On average, 2,720 patients (IQR=1,949-3, 132) at each location were eligible for the study, but only 75.5% (IQR= 70.3% to 82.9%) had mobile telephone numbers in their electronic medical record.	
				There was a 39% relative increase attributable to the SMS (RR = 1.39; 95% CI, 1.26 -1.54).			
				There was no significant effect of SMS reminder among pregnant women aged 18 to 44 years (RR = 0.90; 95% CI, 0.53-1.54; RR = 1.32; 95% CI, 0.87 -2.00, respectively).			

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35.	Teo, A. R., Forsberg, C. W., Marsh, H. E., Saha, S., & Dobscha, S. K. (2017).	Quasi-experimental study	Sample Size: *N* = 250 patients.	Live reminders were associated with the lowest no show rate of 3%.	A total of 250 patients with depression were included in this study of which *n* = 158 received live phone reminder, *n* = 79 had message reminder, and *n* = 13 could not be contacted.	Veterans who were otherwise eligible to participate in this study were excluded if they had severe hearing impairment, lacked regular access to a phone, or had diagnosed of bipolar disorder, psychosis or a neurocognitive disorder (specifically dementia) in the prior two years.	II, B
			Sample: Primary care patients with depression at the Veterans Health Administration health care system. Mean age was 55.8 + or -14.4 (M+ or – SD) years old, an average.	No show rate was 39% in the group that could not be contacted and 24% in the message reminder group.		The number of patients in each group varies which may affect the overall outcome of the study.	
			Setting: Veterans Health Administration health care system in the Pacific Northwest.	Compared with live reminders, message reminders (RR = 7.4, $p < 0.0001$) and no answer (RR = 13.9, $p < 0.0001$) had a significantly lower attendance rate.		The study outcome may not be generalized to other population due to the sample size and variation in the number of participants in each group.	

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36.	Starnes, J. R., Slesur, L., Holby, N., Rehman, S., & Miller, R. F. (2019).	Retrospective Study	Sample Size: N = 13,499 appointments of which 9,347 were completed.	Appointment show rate is affected by day of the week (OR 1.20; $p <$ 0.0001), automated reminder (OR 1.40; $p <$ 0.0001), snow in inches (OR 0.33; $p < 0.0001$) and high ambient temperature in degrees (OR 1.01; $p < 0.0001$).	A total of 13,499 appointments scheduled between January 1, 2010 and December 31, 2015 were analyzed to examine the factors that affected no show and how these factors can be used to predict no show in the future.	Data for the study were limited data present in the scheduling software which may not contain all the factors that affect no show.	II, B
			Sample: All patients scheduled for an appointment in a primary care clinic between January 1, 2010, and December 31, 2015.		Patients that were predicted for no show were targeted for intervention with a phone call reminder.	Using the data to predict future appointment may not be applicable to new patients.	
			Setting: Shade Tree Clinic, Middle Tennessee.			Implementation of a reminder system was implemented midway through 2014.	
						The clinic was only opened on Tuesdays and Saturdays, which prevented analyses of whether the difference in show rate is due to the difference in a specific appointment day or weekday versus weekend appointment.	
						This result can only be interpreted in the context of this study and may not be generalized to other population.	

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37.	Hwang, A.S., Atlas, S.J., Cronin, P., Ashburner, J. M., Shah, s. j., He, W., & Hong, C. S (2015).	Retrospective study.	Sample: Primary care patients who visited a network practice between January 01, 2005, through December 31, 2009.	Findings showed that patient with a high propensity for no show (*n* = 14,081) was more likely compared to patients with low propensity for no show to have incomplete preventative cancer screening (for colorectal aOR 2.41 [2.19-66], for cervical aOR 1.85 [1.65-0.08], and for breast aOR 2.93 [2.62 -3.28]).	Using a 5 years (2005 to 2009) Massachusetts General Hospital practice-based research network, the authors calculated the no show propensity factor for patients in the outpatient care clinic.	The study can only be interpreted within the context of this healthcare system and may not be generalized.	II, B
			Sample size: 140,947 adult patients.	Patient with a high propensity for no show had suboptimal control of chronic diseases (HbA1C, aOR 2.64 [2.22 -3.14], for LDL aOR 1.39 [1.15 - 1.67].	The study was performed to test the hypothesis that patients with a high propensity to no show for appointments have worse clinical and acute care utilization outcomes compared to patients with low propensity.		
			Setting: Large academic primary care network comprising of 15 primary care practices in Massachusetts General Hospital.	Patient with a high propensity for no show had increased rates of utilization of acute care (aRR 1.37 [1.31 – 1.44] and emergency department visits aRR 1.39 [1.35 - 1.43]).	The outcome measure for this study was patients that completed colorectal, cervical, and breast cancer screening. Additional measures include HbA1c, low-density lipoprotein levels at one year follow up, hospitalization, and emergency department visits three years after.		

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38.	Adams, S., Scherer, W., White, K., Payne, J., Hernandez, O., Gerber, M., & Whitehead, N. (2017).	Prospective study	Sample: Synthetic data generated from the Veterans Health Administration.	Findings showed that using geo-location data can decrease the number of unused appointment blocks by reallocating the canceled position to other patients waiting to be scheduled.	The study used synthetic data to develop a dynamic scheduling system that utilized mobile computing via geo-location data to estimate the likelihood that a patient will show up for a scheduled appointment.	Although similar studies have been validated using real-world taxi-cab data, by using synthetic data for this study, findings cannot be generalized to other clinical settings.	I, B
			Sample Size: 110 possible appointments per day.		The probability that the patient will arrive at the clinic at or before the appointment time is calculated using a gamma distribution.	There is concerned for privacy by using a GPS system to track the patient.	
			Setting: Veterans Health Administration.		The dynamic scheduling proposed that a patient should be canceled once the probability for arrival falls below a certain threshold and the slot can be assigned to other patients.		

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39.	Goffman, R., Harris, S., May, J., Milicevic, A., Monte, R., Myaskovsky, L., Rodriguez, K., Tjader, Y., & Vargas, D. (2017).	Prospective cohort study.	Sample: Adult patients within the Veterans Healthcare System.	The overall no show rate for patients who were successfully contacted was 12.6% (n = 800) compared to 53.8% (n = 874) for patients who could not be contacted.	All patients within the clinic received the standard automated reminder call.	Calls were limited to patients that were predicted to have a higher no-show propensity.	I, A
			Sample Size: 880 out of 1,754 patients were successfully contacted.	The no show rate was lowest for patients who were contacted 24 hours in advance (9.9%) and highest for the group that received a reminder call 72 hours in advance (15.89%).	Patients with a predicted risk of no show of at least using 0.20 were given additional live call reminders 72, 48, and 24 hours in advance.	The population of patients in the Veterans Health Administration is predominantly male and older. Therefore, this study may only be interpreted in the context of the Veterans Health Administration System only.	
			Setting: Pittsburgh Healthcare System between July 30, 2012, and August 17, 2012.	The average patient cancellation rate in the call group was 18.41% with the highest cancellation noted in the 24 hours live call reminder (20.77%).			

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40.	Triemstra, J. D., & Lowery, L. (2018).	Retrospective study	Sample: Adult patient at adolescent and young adult medicine clinic.	Findings showed an annual billing loss of $170,100 and reimbursement loss of $51,289.	The study retrospective identified 765 missed appointments from the electronic medical records for the visit period between November 2016 through October 2017.	The data for the study was obtained from a single institution in Grand Rapids, Michigan, the United States; therefore, the result of this study may only be interpreted in the context of this setting.	II, A
			Sample Size: 765 of 3,583 missed appointments were identified on from the electronic medical record.	On average, each missed appointment cost $292.70 of billing charges and a loss of $92.24 of reimbursement revenue.	During the study period, methods to decrease no shows were automated phone calls and text message reminders a day before the scheduled appointment. For Monday appointments, the calls were placed the previous Friday.	The study did not include a control group of patients who did not miss their appointment.	
			Setting: Adolescent and Young Adult Medicine Clinic at Helen Devos Children Hospital, Grand Rapids, Michigan.	Of the patients who missed appointment, 77% (n = 585) were publicly insured, 17.8% (n = 135) were commercially insured and 5.2% (n = 40) were not insured.	The study aimed to examine the prevalence, predictor, and the financial impact of missed appointment in an academic adolescent clinic.	This study omitted certain demographic information that was collected in similar studies such as gender, family, income, and distance from the clinic.	
				Established patients or patients scheduled for follow up visits were more likely to miss appointment 74.3% (n = 565) compared to new patients 4.3% (n = 33).	The cost of a missed appointment was determined by the average cost of an encounter and the average cost of reimbursement for each visit type and insurance at the clinic.		
					Total yearly reimbursement lost was determined by the summation of all missed appointments.		