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Los Angeles

Increasing Adherence to Scheduled Appointments Among Underserved Population

A dissertation submitted in partial satisfaction of the
requirements for the degree
Doctor of Nursing Practice

by

Agnes Donghee Lee Choi

2022

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ABSTRACT OF THE DISSERTATION

Increasing Adherence to Scheduled Appointments Among Underserved Population

by

Agnes Donghee Lee Choi

Doctor of Nursing Practice

University of California, Los Angeles, 2022

Professor Eunice E. Lee, Chair

Background: Attending primary care appointments is the first step to getting routine health care, maintaining chronic health conditions, and preventing diseases. No-shows to scheduled appointments affect providing continuity of care that reduce morbidity and mortality as well as a financial and operational burden for organizations. The prevalence of missed appointments is high among low socioeconomic, minority ethnicity, increasing the gap in health disparities. Increasing attendance to scheduled appointments using reminder systems can prevent hospitalizations and complications of many conditions, ultimately benefiting both organizations and communities. **Objectives:** The objective of this project was to determine if additional text message reminders compared to standardized phone call reminders alone improve attendance

rates to scheduled appointments for adults aged 21 and older in a primary care setting. **Methods:** This quality improvement two-group project used a quasi-experimental non-equivalent two-group design. Pre- and post-intervention data were collected from the electronic health record to measure the project outcome. The participants in the comparison group received an automated phone call reminder 24 hours before the appointments. The participants in the intervention group received an automated text message reminder 72 hours before the appointments in addition to the phone call reminder. The outcome variable was the attendance rate. The percentage of attendance, reschedule, and cancellation was measured to further evaluate the primary outcome. Any no-show was counted as nonattendance. The subcategories of the nonattendance included resolvable and unresolvable groups to identify different factors of no-shows. Descriptive data analysis, chi-square, binomial proportion tests, Fisher exact tests, and confidence intervals were used to compare the outcomes between the two groups. **Results:** The result indicated that the attendance rate was 24.06% higher in the intervention group than that of the comparison group. The sample proportion for attendance was 0.59 for the comparison group and 0.83 for the intervention group, with a confidence interval of 95% and *p*-value less than 0.05. **Conclusion:** A combined reminder of text message and phone call reminders is a significantly effective intervention to increase adherence to scheduled appointments in underserved population. The increased adherence will provide additional benefits to both patients and organizations by allowing continuity of care and efficient use of resources.

The dissertation of Agnes Donghee Lee Choi is approved.

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2022

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CHAPTER ONE: INTRODUCTION

The prevalence of no-shows to scheduled appointments has significant effects on resource planning and delivery, continuity, and cost of health care in many health care settings (Kheirkhah et al., 2016). Attendance to a scheduled visit is the first step to get routine health care, maintain chronic health conditions, and prevent diseases. Regular visits lead to higher receipt of preventive services that reduce morbidity and mortality from preventable diseases (Edgman-Levitan et al., 2017). Parsons et al. (2021) indicate that the common reason for missed appointments is forgetfulness. Most of the patients likely to miss scheduled appointments are of low socioeconomic, minority ethnicity (Parson et al., 2021). In a retrospective cohort study analyzed in the Veteran Affairs Medical Center at Houston, Texas, administrative databases for fiscal years 1997–2008, the average no-show rate in the U.S. Veterans Health Administration was approximately 20% and as high as 80% (Kheirkhah et al., 2016). The no-shows, also known as missed appointments, place a halt in patient’s health care, impeding diagnoses, treatment, and recommendations. The missed appointments also have financial and operational consequences. The average cost of a missed health care appointment is estimated to be approximately \$200 per patient (Kheirkhah et al., 2016). The missed appointment also leads to inefficient use of clinician and staff time that limits other walk-in or last-minute appointments (Edgman-Levitan et al., 2017). These no-shows increase the gap in health disparities, such as healthcare access, which decreases the quality of life for many individuals (Office of Disease Prevention and Health Promotion, n.d.). The likelihood of missed appointments was 1.8 times higher in Black or African American patients and two times higher in Hispanic or Latino patients compared to White non-Hispanic patients (Shimotsu et al., 2016). A study by Patel et al. (2017) administered a survey for 285 participants in a primary care clinic that showed a higher number of ethnic

minorities preferred to get text message and phone call reminders as their means of health reminders. A text message is a pervasive and simple reminder that can easily be tailored to the needs of the underserved patient population (Percac-Lima et al., 2016).

The project question developed to address the problem is: In adults aged 21 and older coming in for physical exams and follow-up visits in a primary care setting (P), how do additional text message reminders (I), compared to standardized phone call reminders alone (C), improve attendance rates to scheduled appointments (O)? Increasing attendance to scheduled appointments using reminder systems can prevent hospitalizations and complications of many conditions, ultimately benefiting both organizations and communities.

CHAPTER TWO: THEORETICAL FRAMEWORK

The Iowa Model is a nursing framework widely used for implementing evidence-based practice in healthcare settings (Iowa Model Collaborative, 2017). The model provides seven steps to help navigate through this quality improvement (QI) project. The first step of identifying the triggering issue was reviewed for the clinical problem. Regular health care visits allow routine health screenings, chronic health condition management, and disease prevention. However, missed appointments can range from approximately 20% to 80% in healthcare settings (Kheirkhah et al., 2016). The second step was to determine the priority. Missing the scheduled appointments was a triggering issue that places a halt in promoting quality patient care, such as patient education, treatment, and recommendations. The third step was to form a team. The interprofessional team of administration, clinicians, and medical assistants was formed to discuss and evaluate the project. The fourth step was to assemble, appraise, and synthesize evidence. For this project, this step was taken before the team formation in order to evaluate the evidence to indicate the importance of the project implementation before the project discussion and evaluation with the team. The fifth step was to design and pilot the practice change after appraising and synthesizing evidence-based practice. The project was specifically designed for the setting with available resources, such as using a specific reminder program. The sixth step was to integrate and sustain the practice change after determining the suitability for adopting the change in the practice. The seventh step will be disseminating results. The Iowa Model helped guide through identifying clinical issues, solutions, and implementations for this project.

CHAPTER THREE: REVIEW OF LITERATURE

In order to find the most applicable articles, specific inclusion and exclusion criteria were established. For inclusion criteria, the literature had to contain quantitative data, be higher-level studies, be published within the last 10 years, be peer-reviewed, and be written in English. Higher-level studies are randomized control trials, prospective studies, or retrospective studies that indicate less bias and less risk of systematic errors. Studies that were case-controlled studies, case reports, or background information, published prior to 2011, not peer-reviewed, and written in other languages than English were excluded.

The literature search was conducted in various databases that pertained to the PICOT question: CINAHL, PubMed, and UCLA Library ArticlePlus. The key terms used were: “text message reminders,” “SMS reminders,” “phone call reminders,” “no-show,” “appointments,” and “scheduled appointments.” Filters explicitly used were: peer-reviewed, journal articles, and time frames of 0 to 10 years. The records identified in the following databases were 1,098 articles from UCLA Library ArticlePlus, 846 articles from PubMed, and 161 articles from CINAHL. After reviewing titles and abstracts, a total of 42 articles were obtained. Full-text articles were assessed for eligibility with the described inclusion criteria for ten studies. After further evaluation, a total of five higher-level studies were carefully selected to match the inclusion and exclusion criteria. Three randomized control trials, one prospective study, and one retrospective study were chosen to extract data into the Table of Evidence (see Appendix A).

A single-blinded, randomized controlled trial by Bigna et al. (2014) was conducted over a period of 3 months to assess whether text message, phone call, or concomitant reminders increased attendance to scheduled appointments for HIV infected or exposed patients in multi-

centered urban, semi-urban, and rural settings in Cameroon. A total of 242 adult-child pairs were divided into two interventions and one control groups. The text message and call group received reminders two to three days before scheduled appointments. The text message-only group and the call-only group also received reminders before scheduled appointments. The no-reminder group did not receive any reminders before appointments. A t-test compared continuous variables, and the X2 test compared binary variables. Two multivariate regression analysis was used to adjust for baseline covariates. Odds ratios (OR) with 95% confidence intervals (CI) were set for the study. The findings revealed that the most effective method of appointment reminder system was concomitant reminders of text messages followed by phone calls compared to no-reminders ($p < 0.0001$). The limitations were the inability to confirm that the automatic confirmation guaranteed patients read the messages. There was also low statistical power to detect differences between the groups and uneven distribution of some baseline characteristics despite randomization. The authors claimed there was no significant difference between the interventions. However, the study supported that the use of text message and phone call reminders improve attendance rates and suggested future research to assess the acceptability of the reminder methods for generalizability of the intervention.

Kheirkhah et al. (2016) performed a retrospective review with the U.S. Veterans Health Administration (VHA) data of 12 years. The ten outpatient clinics serve approximately 76,000 veterans. The evaluation included clinics that are primary care and various subspecialty settings. The study was to evaluate the prevalence, predictors, and economic consequences of nonattendance in health care settings. The results indicated that the no-show rate was 18.8%, which accounts for 33,098 no-shows per year. The average cost of no-show was \$198 per

patient, resulting in the marginal cost estimate for the ten clinics to be approximately \$15 million. The new phone call reminder system from October 2007 to March 2008 decreased the no-show rate from 16.3% to 15.2 ($p=0.03$). The two-way ANOVA was used to study different factor effects. The findings indicated that the no-show rate was high with significant economic costs in various health care settings. The study suggested further research using alternate methodology due to its efficacy in modestly reducing no-shows.

A randomized controlled trial by Lin et al. (2016) was conducted over a period of 7 months to determine whether text message and phone reminders increase the attendance rate in a pediatric resident clinic in Cleveland, Ohio. All participants who had scheduled appointments at the clinic were eligible except for those who did not have cell phones to receive text messages. A total of 169 participants were selected and divided into a control group of 84 and an experimental group of 85 participants. The experimental group received phone and text messages three days prior to the scheduled appointment to remind them of the appointment. The control group only received a phone message. For the validity of randomization, the participants' characteristics of the two groups were examined and were concluded to have no significant differences. The overall no-show rate was 30.8% before implementing the intervention. The no-show rate after the intervention was 23.5% for phone and text reminders and 38.1% for standard phone reminders, with a statistical significance of the p -value of 0.04. This article was selected because of the sample size and intervention protocol of sending phone call and text message reminders for scheduled appointments, directly correlated to the clinical question.

A prospective study by Liu et al. (2017) was conducted over a period of 3 months to assess whether text message appointment reminders improved patient attendance and arrival

punctuality at two outpatient radiology imaging settings in Eastern Massachusetts. All participants who had scheduled for MRI from July 2016 to October 2016 were eligible for the study. A total of 6,989 participants were selected and divided into the texting group of 3,086 participants and the non-texting group of 3,903 participants. A text message was sent one day before the appointment day supplementary to a traditional phone reminder for the intervention group. For the control group, a phone reminder was called two days before the appointment. The no-show rate for the texting group was 3.8%, and the non-texting group was 5.1% ($p=0.02$). Although the arrival punctuality did not show any significant difference, the study demonstrated that text message reminders effectively improved attendance to scheduled appointments. The study also suggested that older participants did not have mobile phone service with text message compatibility and were excluded from the study, which may be an area to evaluate to concentrate in the future study on a population of a specific age group.

A randomized controlled trial by Percac-Lima et al. (2016) conducted a study over six months to explore whether text message reminders improve primary care appointment attendance in adult patients in Massachusetts General Hospital Chelsea Community Health Center. A total of 2,618 participants were selected and divided into two groups of intervention and control group. The no-show rate was 20% at the beginning of the study. A phone call reminder was sent to both groups two days prior to scheduled appointments. A text message reminder was sent seven days and one day prior to scheduled appointments for the intervention group. The no-show rate for the intervention group at post-intervention was 13.7% compared to the control group at 20.2% (difference in proportions=6.4%, CI 3.63% to 9.36, $p=0.001$). The study limitations were including all participants regardless of possessing a cell phone or not and

having a limited comparison to previous studies due to the study not comparing text messages with phone calls. The authors suggested that future research should explore how best to tailor text message reminders to optimize outcomes. The study results indicated that text message reminders with call reminders improve attendance rates.

Synthesis of Literature Review

Multiple studies indicate that reminder systems improve attendance to scheduled appointments (Bigna et al., 2014; Kheirkhah et al., 2016; Lin et al., 2016; Liu et al., 2017; Percac-Lima et al., 2016). Nonattendance to scheduled appointments can significantly affect care delivery, cost, and resource planning (Kheirkhah et al., 2016). No show can range from 20% to 80% in healthcare settings (Kheirkhah et al., 2016). Text message and phone call reminders are cost-effective methods that can encourage patients to attend, reschedule, or cancel upcoming appointments (Bigna et al., 2014; Lin et al., 2016; Liu et al., 2017; Percac-Lima et al., 2016). A randomized control trial by Percac-Lima et al. (2016) indicates that text message with phone call reminders before scheduled appointments decreased no-show rates ($p=0.001$). Also, another randomized control trial by Bigna et al. (2014) supports that text message and phone call reminders are a more effective method of decreasing no-show rates than text message alone or no reminder ($P<0.0001$). Two randomized control trials also support that text message and phone call reminders are significantly more effective than phone call reminders alone to decrease no-show rates (Lin et al., 2016; Liu et al., 2017). The study by Lin et al. (2016) shows a significantly lower no-show rate of 23.5% for the text message and phone call group, compared to 38.1% for the standard phone call group ($P=0.04$). The study by Liu et al. (2017) with 6,989 participants shows a 3.8% non-attendance rate for the text message and phone call group, compared to 5.1% for the phone call group ($P=0.02$). The combined intervention of text message

and phone call reminders shows greater improvement than a phone call or text message reminder alone.

CHAPTER FOUR: METHODS

This QI two-group project applied a quasi-experimental non-equivalent two-group design with one group measured before the intervention implementation (comparison group: standardized phone calls) and one group measured after the intervention implementation (intervention group: text messages plus standardized phone calls). The comparison group was selected from the month prior to the intervention period. The goal of this project was to determine if additional text message reminders compared to standardized phone call reminders alone improve attendance rates to scheduled appointments for adults aged 21 and older in a primary care setting.

Ethical Considerations

This evidence-based project strictly followed the Health Information Portability and Accountability Act (HIPAA) by providing privacy, security, and breach notifications for ethical considerations. It used no individually identifiable health information. The project followed the nursing ethical principles of beneficence, nonmaleficence, autonomy, justice, and fidelity (American Nurses Association, 2015). The project was reviewed by the committee chair and determined to be a QI project that did not require UCLA IRB committee review.

Sample and Setting

The inclusion criteria were adults aged 21 and older who possessed a working mobile phone with text message and phone call capability, had a scheduled appointment in the project period, and had basic reading and writing skills in English or Spanish. The exclusion criteria were patients who did not possess a working mobile phone with text message and phone call capability, could not read or write in English or Spanish, or did not have a scheduled appointment in the project period.

Data for the comparison group was collected in January 2022, followed by data for the intervention group in February 2022. The sampling plan used the participating patients as the intervention group during the data collection period of one month. It was less common for patients to have more than one appointment in the same month. However, these patients were excluded from the project to decrease fluctuation or inconsistency. The comparison group was selected prior to the intervention period. The setting took place in a community-based clinic that serves underserved and underrepresented populations of South Los Angeles, California, with the majority of patients being Black and Hispanic with Medicaid insurance plans. The clinic had a phone call reminder in English or Spanish 24 hours before scheduled appointments as a standardized protocol to increase patient attendance rates. The no-show rate before the project implementation was approximately 30%, which was a significantly high no-show rate.

The statistical power analysis program, G*Power 3.1 by Faul et al. (2007), was used to calculate the total sample size for the project. The significance level was set to 0.05 for the probability of a Type I error. The power was set to 0.95 to detect a false null hypothesis for a Type II error probability. The hypothesis test will improve the detection of a false null hypothesis if beta, the power, is close to 1 (Melnik & Morrison-Beedy, 2019). The total sample size came out to 105 for each group ($N = 210$). The actual sample size obtained were 115 patients in the comparison group and 119 patients in the intervention group ($N = 234$).

Procedure

A pre- and post-intervention design was utilized to measure the outcome of the project. The primary outcome variable in this project was the attendance rate. Data related to the subcategories of the primary outcome, percentages of attendance, reschedule, and cancellation for each visit were also collected to further evaluate the outcome. Regardless of their indications

via call or text message reminders, any no-shows were counted as nonattendance. The subcategories of the nonattendance included resolvable and unresolvable groups. The resolvable subcategory included factors, such as outdated phone numbers, difficulty taking off work, or limited transportation. Unresolvable subcategory included factors, such as change of primary care provider or residential area, deceased, or unable to reach patient. The trained medical assistants obtained this subcategory information by following up with patients after each no-show to identify the reasons.

The demographics included four main variables that were used to make the comparison between the two groups as well as any of those variables related to the outcome variable. The age variables ranged from 21 and over. Race variables included Black, Hispanic or Latino, and other. Gender variables included male, female, and other. Reasons for visit included a physical exam, lab or follow-up, acute or episodic, and chronic disease management visits.

The electronic health record (EHR) currently utilized in the facility had a complementary function of two reminder systems that were easily accessible during and after the appointment scheduling process. The comparison group received a standardized phone call reminder 24 hours before the scheduled appointments in English. The call was sent out in Spanish automatically if Spanish was the preferred language in the patient's chart. The phone call reminder was preset to contain the clinic name, time and date, and an option to confirm, reschedule, or cancel the appointment. Patients' responses were indicated on the daily EHR schedule page.

The intervention group received automated text message reminders 72 hours before scheduled appointments in addition to a standardized phone call reminder 24 hours before scheduled appointments. The text message reminder was preset to contain the clinic name, time

and date, and an option to confirm, reschedule, or cancel in English. The message was sent in Spanish automatically if Spanish was the preferred language in the patient's chart. The patients' responses to text message reminders were also indicated on the daily schedule page. The actual attendance, reschedule, and cancellation rates of both comparison and intervention groups were obtained directly from the EHR every week.

The EHR provided reminder receipt alerts on the daily schedule page after the patients received the reminders. The patients' demographic information, such as age, gender, race, and language, were obtained from the EHR for both groups to evaluate the consistency or difference between the variables. The data were recorded electronically and analyzed by the project lead and statistician.

The interdisciplinary teamwork of an administrator, clinicians, social worker, and medical assistants was essential in implementing the project intervention. The option to use the reminder system for each appointment was readily available on the same page of the appointment scheduling system. The reminder times and methods were preset for efficiency. The medical assistants who were scheduling the appointments used the function and implemented it during the scheduling process of each visit.

The project lead provided an hour-long training to two medical assistants prior to each comparison and intervention period. For the comparison group, medical assistants were trained to confirm the patient's current mobile phone number and turn on the preset phone call reminder on the EHR when scheduling the patient's next appointment. For the intervention group, medical assistants were trained to confirm the patient's current mobile phone number and turn on the preset text message and phone call reminders on the EHR when scheduling the patient's next

appointment. They were also trained to contact the no-show patients once at the end of the scheduled appointment dates to reschedule appointments and obtain reasons for no-shows for both comparison and intervention groups. The team had regular weekly 30-minute meetings with the project lead and medical assistants to control the quality and sustain the implementation of the intervention. The meeting consisted of any questions or concerns, re-emphasis on key points, and discussion on improving project implementation. The subsequent meeting also included feedback and different viewpoints on project sustainability.

Analysis Method

For analyzing the representativeness of the comparison and intervention group, chi-square tests, binomial proportion tests, and Fisher exact tests were used. For analyzing the differences in outcome, binomial proportion tests and confidence intervals were used. The analysis was completed using the R programming language by the statistician.

CHAPTER FIVE: RESULTS

The data was collected over two months. A total of 234 patients who met inclusion criteria were selected during the time period (see Table 1). The chi-square test was used to compare if there were any differences between the intervention and comparison groups in demographics.

Table 1: *Comparison and Intervention Group Demographics (chi-square)*

Subgroups	Comparison (n)	Intervention (n)
Age ($p=0.75$)	21-29	20
	30-39	14
	40-49	19
	50-59	26
	60-69	27
	70-89	9
Race ($p=0.009$)	Black	65
	Hispanic/ Latino	37
	Other	13
Gender ($p=0.61$)	Male	36
	Female	79
	Other	0
Visit Reason ($p=0.005$)	Physical Exam	24
	Lab/ Follow-Up	29

There was no difference between comparison and intervention groups on age and gender. However, there were differences on race and visit reason between the two groups. Therefore, those two groups were stratified to find which subgroups differ in the outcomes. When the subgroups of the race were analyzed, all races, except the Hispanic or Latino subgroup, were significantly different between the comparison and intervention groups (see Table 2). When subgroups of the visit reasons were examined, all visit reasons, except acute or episodic and chronic visits, were significantly different between the comparison and intervention groups (see Table 3).

Table 2: Comparison and Intervention Group Statistical Analysis for Race

Race Subgroup	Sample Proportion		Difference	95% CI for difference		p-value for H0: p1=p2
	Comparison	Intervention		Low	High	
All	0.59	0.83	0.24	0.12	0.36	<0.01
Black	0.55	0.78	0.23	0.03	0.41	0.03
Hispanic/Latino	0.68	0.84	0.16	0.04	0.36	0.11
Other	0.54	1.00	0.36	0.11	0.80	0.02

Table 3: Comparison and Intervention Group Statistical Analysis for Visit Reasons

Visit Reasons Subgroup	Sample Proportion		Difference	95% CI for difference		p-value for H0: p1=p2
	Comparison	Intervention		Low	High	
All	0.59	0.83	0.24	0.12	0.36	<0.01
Physical exam	0.38	0.81	0.43	0.14	0.72	<0.01
Lab/Follow-up	0.66	0.95	0.29	0.07	0.51	<0.01
Acute/Episodic	0.55	0.60	0.05	-0.47	0.58	1
Chronic	0.70	0.78	0.08	-0.12	0.29	0.5

When the primary outcome of the attendance rate was examined, the outcome was 24.06% higher in the intervention group than that of the comparison group. (see Figure 1). The sample proportion for attendance was 0.59 for the comparison group and 0.83 for the intervention group, with a confidence interval (CI) of 95% and p -value <0.01. Table 4 shows the total number and rates of attendance and nonattendance for both groups. The comparison group had 115 patients with a 59.13% attendance rate. The intervention group had 119 patients with an 83.19% attendance rate. For the comparison group attendances ($n = 68$), 56 (82.4%) attended, 7 (10.3%) rescheduled, and 5 (7.4%) cancelled. The comparison group nonattendances ($n = 47$) had 42 (89.4%) with resolvable factors and 5 (10.6%) with unresolvable factors to no-shows. For the intervention group attendances ($n = 99$), 68 (68.7%) attended, 17 (17.2%) rescheduled, and 14 (14.1%) cancelled. Intervention group nonattendances ($n = 20$) had 17 (85.0%) with resolvable factors and 3 (15%) with unresolvable factors to no-shows (see Table 5).

Figure 1: Comparison and Intervention Group Attendance Rate

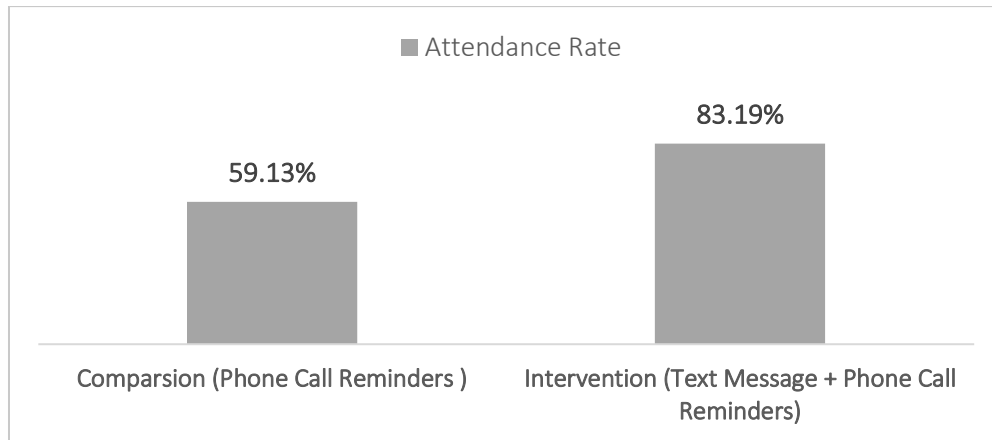


Table 4: Total Number of Patients for Attendances and Nonattendances

Groups	Total Patients (n)	Total Attendance (n)	Total No-Show (n)	Attendance Rate (%)
Comparison	115	68	47	59.13
Intervention	119	99	20	83.19

Table 5: Attendance/Nonattendance Subcategories

Subcategories		Comparison		Intervention	
		N	%	N	%
Attendance	Attended	56	82.4	68	68.7
	Rescheduled	7	10.3	17	17.2
	Cancelled	5	7.4	14	14.1
Nonattendance	Resolvable	42	89.4	17	85.0
	Non-resolvable	5	10.6	3	15.0
Total		68	100.0	99	100.0

CHAPTER SIX: DISCUSSION

This was a QI project to determine if additional text message reminders to standardized phone call reminders improve attendance rates in a primary care setting within a community of predominantly low socioeconomic, underserved patients. The strength of this project is that there was a significant difference in attendance rate, which was 24.06% higher in the intervention group than that of the comparison group. The project also addressed the subcategories of attendances and nonattendances that can further identify factors to no-shows in primary care settings. The analyses revealed that more patients were responsive to text message reminders and most nonattendances were resolvable. The resolvable subcategory included factors, such as outdated phone numbers, difficulty taking off work, or limited transportation. Clinics and clinicians can utilize this information and update phone numbers routinely, offer telehealth services, and provide other available resources. The differences between the subgroup of patients who had resolvable reasons may have a potential impact on the outcome.

Patients were more likely to attend their scheduled appointments for acute or chronic visits regardless of appointment reminder types compared to the physical exam, lab, or follow-up visits. This may indicate that the higher attendance rates for these subgroups did not reflect the significant impact of additional text message reminders. Future studies should include various demographics with larger sample sizes and focus subgroups for physical exams, lab, or follow-up visits to address the limited generalizability and efficacy of the intervention. This can decrease potential confounding variables that were shown in the project analysis. Further investigation of different barriers to nonattendances can also demonstrate diverse approaches to reducing appointment reschedules and cancellations. The suggested next step is to conduct a study on how limited resources or nonattendance factors affect attendance rates.

Limitations

The limitation of the project was the nonrandomized project design. The comparison group selection from the prior month of the intervention period could show population differences between the groups in the project. There were some differences within subgroups of race and visit reasons. The consistency of team roles had some limitations at the beginning of the project implementation. Medical assistants were forgetting or inattentive of their tasks during follow-up calls for nonattendances at the end of the day. Close monitoring and re-education were sufficient to improve the team function on all procedural steps throughout the project. Another limitation was limited language application on phone call and text message reminders, which consisted of English and Spanish. However, patients were predominantly Black or African-American and Hispanic or Latino. The project outcome was not affected by the selected language application.

CONCLUSION

The Doctor of Nursing Practice (DNP) is prepared for the integration of knowledge, use of science-based theories and concepts, and development and evaluation of new practices (American Association of College of Nursing, 2006). This DNP scholarly project focused on increasing attendance to scheduled appointments for the underserved population, translating research into practice and reflecting the discipline of nursing. The proposed project was a first step toward decreasing the gap in health disparities of low socioeconomic, underserved populations.

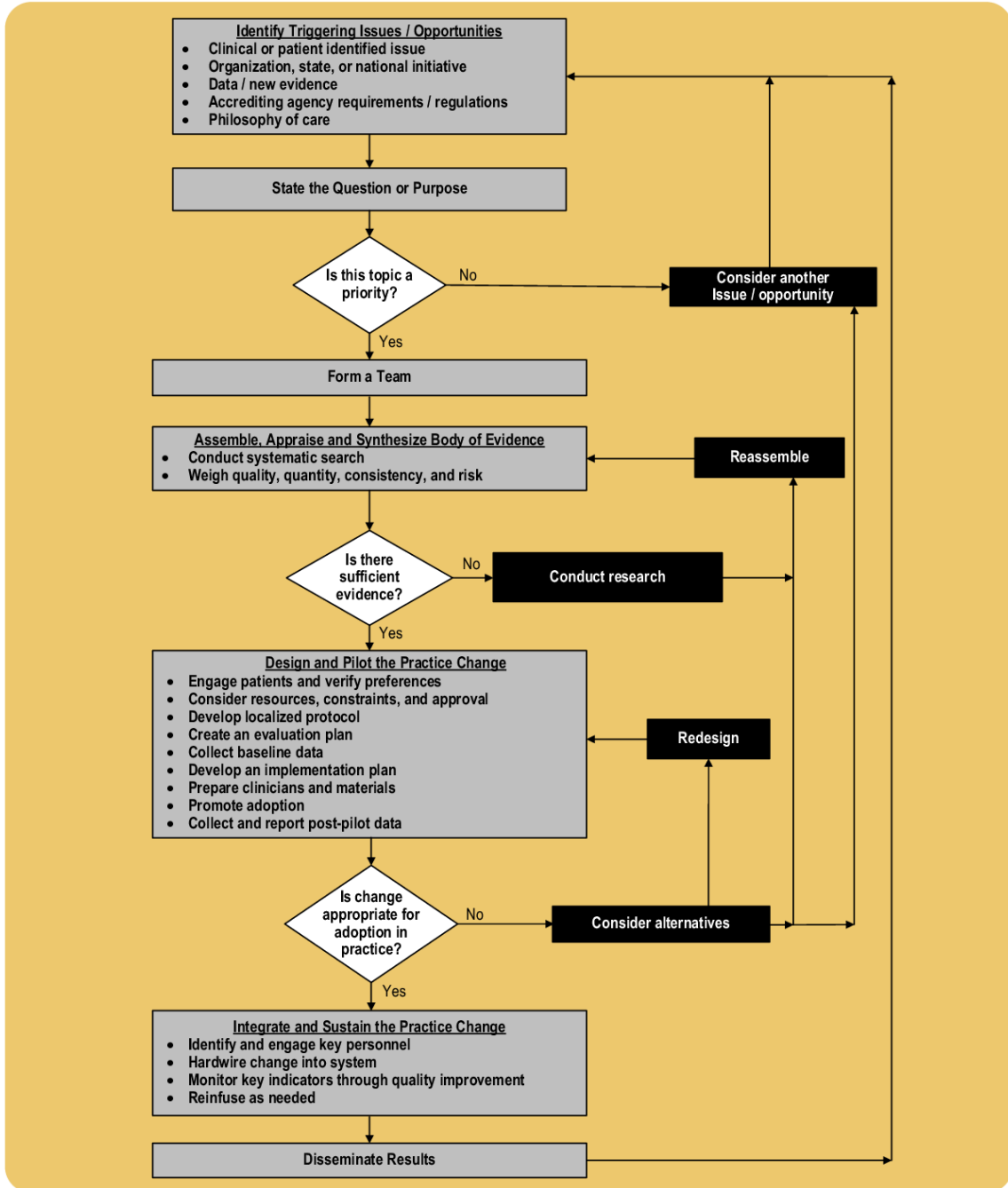
Nonattendance is a significant barrier to preventive services in the healthcare system that can provide regular care, education, treatment, and awareness of the health and wellness of the population. Reminder systems can significantly improve attendance to scheduled appointments and promote continuity of care (Bigna et al., 2014; Kheirkhah et al., 2016; Lin et al., 2016; Liu et al., 2017). Text message and phone call reminders encourage patients to attend, reschedule, or cancel scheduled appointments. Clinical leadership and practice specialization were carried out to prioritize patient-centered care that delineates the role of the DNP provider in promoting patient and community outcomes. This QI project will improve patient attendance rates, which will promote continuity and quality patient care. It will lay the foundation for future investigations in order to improve the quality of care that the patients will receive, making a healthier community that the organization serves.

APPENDICES

Appendix A

The Iowa Model Revised (Iowa Model Collaborative, 2017)

The Iowa Model Revised: Evidence-Based Practice to Promote Excellence in Health Care



◆ = a decision point

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TABLE OF EVIDENCE

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions, measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION
<p>Bigna, J. J. R, Noubiap, J. J. N., Kouanfack, C., Plottel, C. S., MD, & Koulla-Shiro, S. (2014). Effect of mobile phone reminders on follow-up medical care of children exposed to or infected with HIV in Cameroon (MORE CARE): A multicentre, single-blind, factorial, randomised controlled trial. <i>The Lancet Infectious Diseases</i>, 14(7), 600-608. https://doi.org/10.1016/S1473-3099(14)70741-8</p>	<p>To assess whether text message, mobile phone call, or concomitant reminders increase attendance to scheduled appointments</p>	<ul style="list-style-type: none"> ● Sample: 242 adult-child pairs <ul style="list-style-type: none"> ○ Age: 42.8 (12.8) ○ Gender: N/A (Adult-child pair) ○ Ethnicity: Cameroon ○ Diagnosis: HIV ● Setting: Multi-centered urban, semi-urban, and rural settings (MORE CARE study research sites in Cameroon) 	<ul style="list-style-type: none"> ● Design: A single-blinded, randomized controlled trial over 3 months ● Description: A reminder was made 2-3 days before scheduled appointments <ul style="list-style-type: none"> ○ Text message and call group ○ Text message only group ○ Call only group ○ No reminder group (control) ● Outcome: Odds ratios for improvement in the efficacy outcome ● Measure/Instrument: <ul style="list-style-type: none"> ○ Attendance rate ○ Statistical Package for the Social Sciences (SPSS) ○ Benjamini-Hochber method with WinPepi program to adjust the level of significance for groups ● Interpretation: All interventions had a positive effect on attendance 	<ul style="list-style-type: none"> ● Results: <ul style="list-style-type: none"> ○ 7.5 (95% CI 2.9-19.0; p<0.0001) for text message and call group ○ 5.5 (2.3-13.1; p=0.0002) for call group ○ 2.9 (1.3-6.4; p=0.012) for text message group ● t-test compared continuous variables ● X² test compared binary variables ● 2 multivariate regression analysis to adjust for baseline covariates ● Odds ratios (OR) with 95% confidence intervals (CI) 	<ul style="list-style-type: none"> ● Findings: The most effective method of appointment reminder system was a text message followed by a phone call to increase attendance to scheduled visits. ● Limitations: <ul style="list-style-type: none"> ○ Automatic confirmation of receipt for text messages does not guarantee reading ○ Low statistical power to detect difference between the groups ○ Uneven distribution of some baseline characteristics despite randomization ● Implications for practice: Use of text messages and phone calls to improve attendance rates ● Future research: Assess the acceptability of the reminder methods before widespread implementation

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<p>Kheirkhah, P., Feng, Q., Travis, L. M., Tavakoli-Tabasi, S., & Sharafkhaneh, A. (2016). Prevalence, predictors and economic consequences of no-shows. <i>BMC Health Services Research</i>, 16(13), 1-6. https://doi.org/10.1186/s12913-015-1243-z</p>	<p>To evaluate the prevalence, predictors, and economic consequences of nonattendance in health care settings</p>	<ul style="list-style-type: none"> ● Sample: Approximately 76,000 veterans ● Setting: 10 outpatient clinics in the Michael E. DeBakey Veteran Affairs Medical Center at Houston, Texas 	<ul style="list-style-type: none"> ● Design: A retrospective review over 12-year period ● Description: Evaluation of: <ul style="list-style-type: none"> ○ No-show rates ○ Effects of implementing a reminder system ○ Economic effects of missed appointments ● Comparison groups: <ul style="list-style-type: none"> ○ Primary care ○ Subspecialty settings ● Measure/Instruction: SAS9.2 	<ul style="list-style-type: none"> ● Results: <ul style="list-style-type: none"> ○ Mean (SD) no-show rate: 18.8% (2.4%) / average of 33,098 no-shows per year ○ Mean (SD) cost of no show: \$167 (\$67) / average cost \$195 no-show per patient ○ No-show rate difference in gender: N/A ○ Less no-show in geriatric than PCP ($p < 0.001$) ○ New phone system decreased no-show rate from 16.3% to 15.2% ($p = 0.03$) ● Two-way ANOVA to study different factor effects 	<ul style="list-style-type: none"> ● Findings: No-show rate was high with significant economic cost ● Implications for practice: Many factors affected no-show but the reminder system has a modest effect on no-show. ● Future research: Any methodology to reduce no-show should be examined

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions, measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION
<p>Lin, C. L., Mistry, N., Boneh, J., Li, H., &Lazebnik, R. (2016). Text message reminders increase appointment adherence in a pediatric clinic: A randomized controlled trial. <i>International Journal of Pediatrics</i>, 2016(8487378), 1-6. https://doi.org/10.1155/2016/8487378</p>	<p>To determine whether text message reminders improved appointment adherence</p>	<ul style="list-style-type: none"> ● Sample: 169 patients and guardians with cell phones ● Setting: A pediatric resident clinic 	<ul style="list-style-type: none"> ● Design: A randomized controlled trial over 7 months ● Description: <ul style="list-style-type: none"> ○ 85 participants received phone and text messages 3 days prior to the scheduled appointment (Text message included the name of the practice with the date and time of the appointment without any patient identifying data) ○ 84 participants received a phone message ● Chi-squared test, t-test, and Wilcoxon rank test used to randomize the group properly 	<ul style="list-style-type: none"> ● Results: <ul style="list-style-type: none"> ○ The overall no-show rate of 30.8% at the time of data collection ○ The rate of those who received phone and text reminders significant at 23.5%, compared to standard phone message at 38.1% ($p = 0.04$) ● SAS version 9.4 and chi-squared test used ● A multivariate logistic regression analysis performed to estimate adjusted OR (95% CI) for any change of appointment ● Two-sided p-value presented P value statistically significant at <0.05 	<ul style="list-style-type: none"> ● Strengths: The study focused on a pediatric, urban, low-income population. One of the first studies done in an inner-city resident clinic setting. ● Limitations: <ul style="list-style-type: none"> ○ The study setting mostly served African Americans who had Medicaid. ○ Lack of confirmation of text message receipt, which did not track how many received the text message. ○ The participants were not able to reply to the text message but had to call the practice with the provided number. ● Implications for practice: Sending a text message improve the no-show rate and increase continuity in clinic settings ● Future research: Conduct with the consideration of how limited resources affect the show rates

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions, measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION
<p>Liu, C., Harvey, H. B., Jaworsky, C., Shore, M. T., Guerrier, C. E., & Pinykh, O. (2017). Text message reminders reduce outpatient radiology no-shows but do not improve arrival punctuality. <i>Journal of the American College of Radiology</i>, 14(8), 1049–1054. https://doi.org/10.1016/j.jacr.2017.04.016</p>	<p>To assess whether text message reminders can decrease no-shows to scheduled appointments and improve arrival punctuality</p>	<ul style="list-style-type: none"> ● Sample: 6,989 patients scheduled for MRI imagine from July to October 2016 ● Age: <ul style="list-style-type: none"> ○ Texting day (mean age 52.2) ○ No texting day (mean age 52.3) ○ P value 0.88 ● Gender (%): <ul style="list-style-type: none"> ○ Female genders (texting 56.2 / no texting 57.6) ○ P value 0.31 ● Ethnicity (%): <ul style="list-style-type: none"> ○ Asian (texting 4.7 / no texting 5.0) ○ Black (texting 5.3 / no texting 6.3) ○ Hispanic/Latino (texting 1.6 / no texting 1.7) ○ White (texting 74.2 / no texting 73.4) ○ Other (texting 8.7 / no texting 8.8) ○ Unavailable (texting 5.1 / no texting 5.4) ● Diagnosis: <ul style="list-style-type: none"> ○ Outpatients scheduled for an MRI exam ● Setting: <ul style="list-style-type: none"> ○ 2 imaging facilities associated with a large academic medical center in Eastern Massachusetts 	<ul style="list-style-type: none"> ● Design: A prospective study over 3 months ● Description: <ul style="list-style-type: none"> ○ 3,086 participants received a phone call 2 days before and a text message 1 day before the appointment ○ 3,903 participants received a phone call 2 days before only ● Outcome: <ul style="list-style-type: none"> ○ A significant decrease of no-shows for the texting group ○ No significant difference in arrival 	<ul style="list-style-type: none"> ● Results: <ul style="list-style-type: none"> ○ 3.8% non-attendance rate for text message and phone call reminder group ○ 5.1% non-attendance rate for phone call reminder group ● P-value=0.02, OR 0.75, 95% CI 00.59 to 0.94 ● Pearson’s X² test ● No significant difference between the groups for arrival punctuality ● P value statistically significant at ≤0.05 	<ul style="list-style-type: none"> ● Strengths: Text message usage similar to recent reports in the U.S. ● Limitations: <ul style="list-style-type: none"> ○ No improvement for arrival punctuality. ○ Single urban academic institution – unclear generalizability. ○ External factors, such as bad weather, not eliminated ● Implications for practice: Text message reminders in additional to phone call reminders result in decreased no-show rates ● Future research: Supplementary reminder strategies for elderly patient population

CITATION	PURPOSE	SAMPLE/ SETTING	METHODS (Design, Interventions, measures)	RESULTS	DISCUSSION, INTERPRETATION, LIMITATION
<p>Percac-Lima, S., Singer, D. E., Cronin, P. R., Chang, Y., & Zai, A. H. (2016). Can text messages improve attendance to primary care appointments in underserved populations? <i>Journal of Health Care for the Poor and Underserved</i>, 27(4), 1709–1725. https://doi.org/10.1353/hpu.2016.0157</p>	<p>To explore whether text message reminders improve primary care appointment attendance in adult patients</p>	<ul style="list-style-type: none"> ● Sample: 2,618 participants <ul style="list-style-type: none"> ○ Race (Control / Intervention): <ul style="list-style-type: none"> White (29.5%/28.5%) Hispanic (58.1% / 59.2%) Black (7.2% / 7.7%) Asian (2.9% / 2.7%) Other (2.3% / 2.0%) ○ Language: <ul style="list-style-type: none"> English (45.0% / 42.9%) Spanish (45.1% / 45.4%) Other (9.8% / 11.7%) ○ Gender: <ul style="list-style-type: none"> Male (30.5% / 31.0%) Female (69.5% / 69.0%) ○ Age: <ul style="list-style-type: none"> 18-29 (15.3% / 16.7%) 30-39 (21.2% / 22.0%) 40-49 (20.2% / 17.9%) 50-59 (18.5% / 18.5%) 60-69 (12.5% / 12.8%) 70+ (12.2% / 12.1%) ● Setting: <ul style="list-style-type: none"> Massachusetts General Hospital Chelsea Community Health Center (Adult medicine practice) 	<ul style="list-style-type: none"> ● Design: <ul style="list-style-type: none"> ○ A randomized controlled trial over 6 months ● Description: <ul style="list-style-type: none"> ○ A phone call reminder to both groups 2 days prior to appointment. ○ Intervention group: <ul style="list-style-type: none"> Text message reminder 7 and 1 day prior to appointment ● Outcome: <ul style="list-style-type: none"> ○ Intervention group demonstrated improved attendance to appointments ● Measure/Instrument: <ul style="list-style-type: none"> ○ SAS version 9.3 	<ul style="list-style-type: none"> ● Results: <ul style="list-style-type: none"> ○ No-show rates: <ul style="list-style-type: none"> Intervention group (13.7%; 180/1309) Control group (20.2%; 180/1309) ○ Difference in proportions = 6.4%, CI 3.63% to 9.36%, $p=0.001$ ● Chi-square for patient characteristics ● Logistics regression models for no-show rates with the generalized estimating equations (GEE) ● $p \leq 0.05$ statistically significant 	<ul style="list-style-type: none"> ● Findings: <ul style="list-style-type: none"> ○ Participants with text message reminders had higher attendance rates. ● Limitations <ul style="list-style-type: none"> ○ Participants included regardless of possessing a cell phone or not ○ Limited comparison to previous studies due to the study not comparing text message with phone calls ● Implications for practice: <ul style="list-style-type: none"> ○ Text message may be an effective appointment reminder method in a subpopulation. ● Future research: <ul style="list-style-type: none"> ○ Further research to explore how best to tailor text message reminders to optimize individual outcomes.

REFERENCES

- American Association of Colleges of Nursing. (2006). *The essentials of doctoral education for advanced practice*.
<https://www.aacnnursing.org/Portals/42/Publications/DNPEssentials.pdf>
- American Nurses Association. (2015). *Code of ethics for nurses with interpretive statements*.
<https://www.nursingworld.org/coe-view-only>
- Bigna, J. J. R, Noubiap, J. J. N., Kouanfack, C., Plottel, C. S., MD, & Koulla-Shiro, S. (2014). Effect of mobile phone reminders on follow-up medical care of children exposed to or infected with HIV in Cameroon (MORE CARE): A multicentre, single-blind, factorial, randomised controlled trial. *The Lancet Infectious Diseases*, 14(7), 600-608.
[https://doi.org/10.1016/S1473-3099\(14\)70741-8](https://doi.org/10.1016/S1473-3099(14)70741-8)
- Edgman-Levitan, S., Shaller, D., Campione, J., Zema, C., Abraham, J. R., & Yount, N. (2017). *The CAHPS ambulatory care improvement guide: Practical strategies for improving patient experience*. Agency for Healthcare Research and Quality.
<https://www.ahrq.gov/cahps/quality-improvement/improvement-guide/improvement-guide.html>
- Faul, F., Erdfelder, E., Lang, A., & Buchner, A. (2007). GPower 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behavior Research Methods*, 39(2), 175-191. <https://doi.org/10.3758/BF03193146>
- Iowa Model Collaborative. (2017). Iowa model of evidence-based practice: Revisions and validation. *Worldviews on Evidence-Based Nursing*, 14(3), 175-182.
<https://doi.org/10.1111/wvn.12223>

- Kheirkhah, P., Feng, Q., Travis, L. M., Tavakoli-Tabasi, S., & Sharafkhaneh, A. (2016). Prevalence, predictors and economic consequences of no-shows. *BMC Health Services Research, 16*(13), 1-6. doi:10.1186/s12913-015-1243-z
- Lin, C., Mistry, N., Boneh, J., Li, H., & Lazebnik, R. (2016). Text message reminders increase appointment adherence in a pediatric clinic: A randomized controlled trial. *International Journal of Pediatrics, 2016*(8487378), 1-6. <http://dx.doi.org/10.1155/2016/8487378>
- Liu, C., Harvey, H. B., Jaworsky, C., Shore, M. T., Guerrier, C. E., & Pianykh, O. (2017). Text message reminders reduce outpatient radiology no-shows but do not improve arrival punctuality. *Journal of the American College of Radiology, 14*(8), 1049-1054. <https://doi.org/10.1016/j.jacr.2017.04.016>
- Melnyk, B. M. & Morrison-Beedy, D. (2019). *Intervention research and evidence-based quality improvement* (2nd ed.). Springer Publishing Company.
- Office of Disease Prevention and Health Promotion. (n.d.). Access to health services. *Healthy People 2030*. U.S. Department of Health and Human Services. <https://health.gov/healthypeople/objectives-and-data/social-determinants-health/literature-summaries/access-health-services>
- Parsons, J., Bryce, C., & Atherton, H. (2021). Which patients miss appointments with general practice and the reasons why: A systematic review. *British Journal of General Practice, 71*(707), E406-E412. <https://doi.org/10.3399/BJGP.2020.1017>
- Patel, S., Hemmige, V., Street, J., Viswanath, K., & Arya, M. (2017). Activating racial and ethnic minorities to engage in preventive health: Patient preferences for health reminders. *Journal of Participatory Medicine, 9*, 1-12.

Percac-Lima, S., Singer, D. E., Cronin, P. R., Chang, Y., & Zai, A. H. (2016). Can text messages improve attendance to primary care appointments in underserved populations? *Journal of Health Care for the Poor and Underserved*, 27(4), 1709–1725.

<https://doi.org/10.1353/hpu.2016.0157>

Shimotsu, S., Roehrl, A., McCarty, M., Vickery, K., Guzman-Corrales, L., Linzer, M., & Garrett, N. (2016). Increased likelihood of missed appointments (“no shows”) for racial/ethnic minorities in a safety net health system. *Journal of Primary Care & Community Health*, 7(1), 38–40. <https://doi.org/10.1177/2150131915599980>