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Identifying Patient Preferences in Appointment Reminders for Adults to Reduce Missed Appointments in an Outpatient Mental Health Clinic: A Quality Improvement Project

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Abstract

Background: Missed appointments or no-shows are a problem across all healthcare settings affecting service delivery, healthcare cost, and resource utilization. Effective use of clinical resources is critical in defraying costs and managing the growing demands facing healthcare providers. **Purpose**: This project aims to identify patient preferences in appointment reminders to reduce missed appointments among adults in an outpatient mental health clinic. **Methods**: A randomized convenience sampling method was utilized for participants completing a 28-item paper questionnaire to identify preferences in appointment reminders, the number of and reasons for missed appointments, technology access and usage, and demographic information. **Results**: Seventy-five adults in an outpatient mental health clinic completed a questionnaire, with a mean age of 43 (range 18-67) years: 49% Female, 51% Male, 35% White, 61% Black, and 3% Hispanic. In the past 12 months, 39% of patients missed one or more appointments. Two primary reasons for missing appointments were forgetfulness (17%) and being too sick to attend (9%). The two most preferred appointment reminder types were text messages (62%) and personal phone calls (31%). Most patients preferred a one-day before appointment reminder (57%) or a three-day before appointment reminder (35%). **Conclusion**: Patient-centered appointment reminders may improve appointment attendance by considering patient preferences and addressing why patients miss appointments. Future research is needed to determine if utilizing preferred reminders will impact appointment attendance. Identifying all possible factors underlying no-shows with appropriate mitigation strategies may help reduce missed appointments.

Keywords: missed mental health appointments, no-show appointments, economic burden of no-shows, missed appointments in mental health outpatient clinics, appointment reminders in mental health, and patient preferences in appointment reminders

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Patient Preferences in Appointment Reminders for Adults to Reduce Missed Appointments in an Outpatient Mental Health Clinic: A Quality Improvement Project

Missed appointments or "no-shows" are typical in outpatient clinics, especially in the mental health setting. A no-show is "a non-presentation at a clinical appointment or no cancellation call before 24 hours" (Tempier et al., 2021, p. 41). No-shows can impact the patient's health status by delaying diagnosis and treatment and decreasing generated revenue due to the reduction in operational capacity, which affects healthcare costs (Marbouh et al., 2020). For example, a recent study estimated that "67,000 no-shows can cost the healthcare system approximately $7 million" (Marbouh et al., 2020, p. 509). The increasing economic burden of no-shows warrants identifying the reasons why patients fail to attend appointments and strategies to improve appointment attendance.

The negative effects of no-shows impact healthcare providers and patients who miss their appointments (Marbouh et al., 2020). No-shows create costs due to unused staff time, limits on the health clinic's volume, and possible misuse of patients' time (Dantas et al., 2018). Telephone calls, mailings, transportation for patients, incentives, fees, and overbooking are several strategies used in clinics to address missed appointments (Miller & Ambrose, 2019). The efficient use of clinical resources is critical in preventing poor health outcomes and delays in diagnosis and treatment (Marbouh et al., 2020).

The Doctor of Nursing Practice (DNP) quality improvement project addresses the negative impact of missed appointments. The project identifies patient preferences in an appointment reminder system and provides recommendations for practice change. “Quality

improvement projects in healthcare encompass efforts that seek to improve services for the future" (Moran, 2017b, p. 137).

Background & Significance

Patients who do not keep clinic appointments remarkably affect service delivery, cost of care, and resource planning (Kheirkhah et al., 2016). Miller and Ambrose (2016) reviewed the literature to explore the problem of missed appointments in mental health and methods used to improve attendance. For example, 64% of patients did not attend their scheduled appointment following a psychiatric discharge in a sample of 221 patients. The percentage of patients not in attendance notably impacted productivity and healthcare outcomes. Indicators for missed appointments included having an involuntary discharge from a hospital and the absence of an established clinician. Problems related to a primary support group and the number of days from discharge to appointment time were also factors (Miller & Ambrose, 2016).

The problems with missed appointments may continue to decrease productivity, waste resources, and delay service delivery (Kheirkhah et al., 2016). Effective use of clinical resources is critical in decreasing costs and managing the growing demands facing healthcare providers. A study conducted in an outpatient medical clinic reported a 4.9% decrease in no-shows over four months by implementing a phone call reminder 24 hours before appointments. The call reminders resulted in 396 no-shows avoided, equivalent to about $79,200 in annual savings (Lagman et al., 2021). The literature review presented recommendations to consider all possible factors underlying no-shows to reduce the number of missed appointments.

Problem Statement

No-show appointments are a burden to essentially all healthcare systems, impacting

revenue, cost, and use of resources (Dantas et al., 2018). U.S. healthcare spending grew 2.7 percent in 2021, reaching $4.3 trillion or $12,914 per person, with its share of the nation's Gross Domestic Product health spending accounting for 18.3 percent (Centers for Medicare & Medicaid Services, 2022). Reducing no-show rates can diminish costs and enhance the quality of healthcare delivery (Kheirkhah et al., 2016). Improving appointment attendance can lead to more immediate access to care and better health outcomes.

Clinical Practice Question

What are patient preferences that can be utilized in appointment reminders to reduce missed appointments among adults in an outpatient mental health clinic?

Target Population

The project included adult patients 18 years of age and older, of any race or ethnicity, with a mental health diagnosis receiving services in the outpatient clinic who could read, speak, and write in English. The project excluded patients under 18 years of age and those receiving services in a setting other than outpatient mental health. The project involved no incentives or compensation. The target sample size of participants was 75. All willing participants meeting inclusion criteria presenting for a clinic appointment during project implementation were recruited through a convenience sampling method.

Setting

The DNP project was implemented at an outpatient mental health clinic in a Southeastern urban city with an estimated population of approximately 249,000 (World Population Review (WPR), 2022). The clinic offers psychiatric services on an outpatient basis to patients with varying degrees of mental illness from all ethnicities and backgrounds. The primary focus in service provision is for the indigent population, uninsured, and underinsured patients.

The overall poverty rate is 8.52%, with Hispanics most likely to be in poverty at 16.87%, Blacks at 9.42%, and Whites at 5.75% (WPR, 2022).

The clinic is a part of the Atlanta metropolitan area and includes six providers for medication management, including psychiatrists and advanced practice registered nurses (APRNs). This clinic was chosen since it is a high-volume clinic serving approximately 250 plus patients weekly. The clinic has 24 offices, a large patient waiting area, and parking in front of the clinic.

Purpose of the Project

This project aims to identify patient preferences in an appointment reminder system to reduce missed appointments among adults in an outpatient mental health clinic. No-shows or missed appointments negatively impact patient outcomes, resulting in decreased productivity for healthcare providers and delays in diagnosis and treatment (Marbouh et al., 2020). Reducing the rate of missed appointments can improve healthcare costs and outcomes by getting patients in for visits for more immediate diagnosis and treatment. Improving patient attendance can also assist with the wait time of those patients missing the opportunity and occupying slots that other patients in need of services could attend (Dantas et al., 2018). Identifying effective appointment reminder methods to reduce no-shows can decrease costs from associated fees when a missed appointment occurs (Dantas et al., 2018).

Search Strategy

A literature search was performed using Galileo. Databases used to conduct searches were CINAHL, EBSCO, and PubMed. The inclusion criteria for this search were articles from 2016 to 2021, adult patients receiving mental health services related to missed appointments or no-shows, and articles in English. The exclusion criteria for this search were children and

adolescents younger than 18 years of age and articles out of the specified date range. Searches were also conducted from the reference list of other articles included in the project.

Search key terms and phrases for peer-reviewed articles included: missed mental health appointments, no-show appointments in mental health, economic burden of no-shows in mental health, impact of no-show rates for mental health appointments, strategies to improve no-show appointments in mental health, missed appointments in mental health outpatient clinics, cost of no-shows for mental health appointments, reducing missed appointments in mental health, impact of appointment reminders in mental health, and cost of missed appointments in mental health clinics, patient preferences in appointment reminders. The literature search yielded numerous articles with filters applied from date range and duplicates. The remaining articles were reviewed further for titles, abstracts, and relevant content. The literature review includes seventeen articles.

Theoretical Framework

"A theoretical framework helps guide and inform the project" (Moran, 2017a, p. 259) The Health Belief Model (HBM) is used for implementing health-related behavioral changes. This quality improvement project utilized the framework to identify preventive health behaviors and contributing factors that impact no-show rates. The HBM was developed by Becker and Rosenstock in 1984 and aimed to explain and predict individual health behavior (Anuar et al., 2020). It involves a six-domain impact on health behavior; perceived susceptibility, perceived severity, the perceived benefits of an action, perceived barriers, the cue to action, and self-efficacy (Anuar et al., 2020). The HBM model has three parts that identify impacts on health behavior: individual perception, modifying factors, and the likelihood of action.

Modifying factors like the socio-demographic and socio-economic background can contribute to a perceived threat and the likelihood of action (Anuar et al., 2020). The HBM assisted this DNP project in addressing the importance of an appointment reminder system used in a way that accounts for individual preferences and contributing factors to missed appointments. The model guided the process of examining the patient's perception of the importance of appointment adherence, the value of setting health goals, and the actions necessary to achieve those goals. The HBM assisted with identifying perceived barriers to appointment attendance, such as patient scheduling at the most appropriate time, and addressing the likelihood of other barriers, such as transportation and the benefits of acknowledging patient preference where feasible.

Methodology

Instrument/Tool

A paper questionnaire was distributed to participants to assess patient preferences for appointment reminders. A modified version of the questionnaire by Crutchfield and Kistler (2017) was used for this project, and the author granted permission. Demographic data was also obtained from the questionnaire. See Appendix A. Pencil and pen were provided to participants for the paper questionnaire with an estimated completion time of twenty minutes. The reliability of the tool is unknown to date in the population of interest, warranting a reliability analysis.

Ethical Considerations

The Georgia State University (GSU) Institutional Review Board (IRB) provided approval on June 14, 2022, prior to beginning the project. The project proposal was introduced to leadership at the clinic, and a site support letter and permission to conduct the project were secured from the clinic site director. Participants were informed that the questionnaire was voluntary. The project's purpose was explained to the participants giving them time to ask questions. Participants were

advised of their right to withdraw from the project at any time during the process and that the questionnaires would be destroyed upon completion of the project. The GSU IRB granted a waiver of documentation of consent. The project was conducted while maintaining the privacy and confidentiality of the participants and guided by ethical standards.

Intervention and Data Collection

An explanation of the questionnaire and the purpose of the DNP project was provided to participants meeting inclusion criteria. Participants were informed that the questionnaire was voluntary. All questionnaires were distributed to willing participants and collected by the student investigator. Questionnaires were kept in a sealed envelope and stored in a locked file container only accessible by the student investigator. Data were transferred from the questionnaire and stored on a password and fingerprint-protected laptop computer only accessible by the student investigator. All data collected from participants will be destroyed upon the project's conclusion.

Analysis/Statistical Test

The student investigator analyzed and expressed data results utilizing descriptive statistics. The questionnaire was transferred to the latest version of the Statistical Package for the Social Science (SPSS) 28 for analysis. The Fisher's Exact test was the primary statistical test used to examine associations between variables. The GSU statistician, Dr. Bradley Farrell, was consulted and assisted with data analysis.

Literature Review

A literature review was conducted to identify research studies that demonstrated the effects of appointment reminders on reducing missed appointments or no-shows (NS) and to gain knowledge of existing research, current methods, patient preferences, and contributing factors

that impact no-show rates. Predictors and methods that should be considered and recommendations to improve no-show rates were identified in the literature.

Reasons for Missed Appointments

Ramluken and Sibiya (2018) conducted a quantitative descriptive survey of 182 participants at a psychiatric clinic that revealed the main reasons for missed appointments: forgetfulness, work commitments, lack of transportation, and financial constraints. These reasons were identified as contributing factors influencing NS rates, with 53.6% of participants who had missed their appointments two to three times. Anisi et al. (2018) conducted a cross-sectional study of 148,077 outpatient clinics that scheduled patient appointments over one year. The study findings also identified reasons for no-shows, which revealed that appointment lead time or length between the date the appointment is registered in the clinic's scheduler and the actual appointment date was a leading cause of NSs. The mean lead time of appointments for the study was 10.2 days, and the no-show rate was 50.1%. Strategies to consider improving appointment attendance were related to lead time, increasing the number of physicians, increasing work hours, and improving clinic efficiency. The study also presented evidence to suggest reminders via text message, cancellation policy, and nurse-led telephone triage as interventions to decrease NSs.

Dantas et al. (2018) conducted a systematic literature review of 105 studied papers dealing with determinants of no-show in appointment scheduling. The findings revealed that the average NS rate across all studies was 23%, highest in the African continent (43%) and lowest in Oceania (13.2%). The study demonstrated that the most reported factors contributing to no-shows were also high lead time, a prior history of no-shows, younger adults, lower socioeconomic status, no private insurance, and locations far from the clinic. The findings

suggested ongoing research to develop models for predicting no-show behavior and incorporating it into scheduling systems to improve organizational performance.

Factors Underlying No-Show Rates

Marbouh et al. (2020) reviewed the current literature, investigated various tools and methods to reduce NSs, and conducted a case study at a radiology department in a leading hospital. The study revealed factors underlying NSs such as forgetfulness, lack of sense of urgency, financial issues or service costs, transportation or weather issues, and appointment time. The study suggested that appropriate improvement strategies may help healthcare organizations reduce and absorb the impact of NSs. Recommendations for improvement to the scheduling process to reduce NSs included shortening lead times, adding automated reminders such as text messaging, phone calls, or emails, creating a separate cancellation phone line, and incorporating a no-show fee.

Kheirkhah et al. (2016) conducted a retrospective cohort study using administrative databases in a large medical center and estimated NS rates and costs in 10 regional hospitals, including primary care and other subspecialties. The study findings identified the effects of different factors on the NS rates that could be used to predict NSs. The mean NS rate was 18.8% in 10 main clinics, with the highest in subspecialist clinics. The NS rate in the women's clinic was higher, and the NS rate in the geriatric clinic was lower compared to the general primary care clinic. Factors that affected no-show rates included age, gender, type of clinic, time of appointment, distance from clinic, employment status, and patient health status. The study supported methods to predict and reduce NS should be considered and explored. The data from the study also indicated that implementing a reminder system only modestly reduced the NS

rate, but any methods to reduce the no-show rate should be considered, which can decrease the overall cost of healthcare.

Ruggeri et al. (2020) conducted a retrospective observational study using electronic medical record data from 11 facilities belonging to Federally Qualified Health Centers (FQHCs), including 41,495 patients. The study identified predictors of no-show behaviors and examined the effect of a reminder intervention delivering a robocall three days in advance and a text message reminder two days before the appointment. The findings revealed that appointment reminders had limited effects on NS rates, with before reminders at 41.6% and after at 42.1%. Recommendations included reducing the lag time between setting the appointment and the actual date of the appointment for patients with high no-show rates and considering individualized behavioral interventions to reduce no-shows. The strongest predictor of NS rates was whether patients were assigned to empaneled or enrolled providers and a recommendation was made to increase the use of these providers. Tempier et al. (2021) conducted a retrospective study of 5,892 patients attending mental health appointments for two administrative years. The average NS rate for the office was 46%. The study indicated that NS rates were comparable to other clinical sites but remained challenging in delivering efficient services. The study examined associations of missed appointments with demographics and patient characteristics, finding that appointments were more commonly missed by younger patients aged less than 49, singles, and females. Based on the study findings, future recommendations should be examined regarding effective practice changes for appointment reminders, considering underlying factors contributing to no-show rates and reasons for missed appointments.

Patient Preferences in Appointment Reminders

Drerup et al. (2021) conducted a prospective survey on patients seen from March through May of 2020 at a primary and specialty care clinic. The study analyzed nine commonly used satisfaction metrics, each graded on a scale of 1-5. Between March 16 and May 1, 2020, there were 155 scheduled in-office visits and 186 scheduled telehealth virtual visits. The no-show rate of in-office visits was 36.1% (56/155) compared with the telehealth visit no-show rate of 7.5% (14/186), which was highly statistically significant at $p < 0.0001$. The telehealth visit no-show rate (7.5%) was also lower than the baseline in-office no-show rate of 29.8% (129/ 433) established by appointments conducted in January and February of 2020, before the COVID-19 pandemic (Drerup et al., 2021).

Crutchfield and Kistler (2017) surveyed 251 adults using an online tool and assessed preferences toward appointment reminders using a discrete choice experiment (DCE). The survey was conducted to explore why patients miss appointments and to consider the use of a patient-centered appointment reminder. The main reasons for missed appointments provided by participants were transportation problems (28%), forgetfulness (26%), confusion over time, date, or location (14%), and problems leaving work (12%). Crutchfield and Kistler (2017) suggested that appointment reminders can improve attendance, leading to increased revenue, health outcomes, and clinic efficiency. Patient-centered appointment reminders may influence appointment attendance by addressing why individuals report missing appointments and by meeting patients' individualized needs.

Phone Appointment Reminders

Shah et al. (2016) conducted a single-center randomized controlled trial (RCT) of 2,247 patients in a hospital-based primary care clinic at high risk for no-show. Seven days before their

appointment, the intervention arm patients were placed in a calling queue to receive a reminder phone call from a patient service coordinator trained to engage patients in concrete planning. All patients received an automated phone call also. The findings demonstrated that a phone call seven days before a scheduled appointment significantly reduced NS rates and increased reimbursement among patients at high risk for NSs. The intervention led to a 22% relative reduction in the no-show rate of the intervention arm patients compared to the control patients. The study also indicated that targeted interventions need to be explored to increase accountability for population health practices.

Lagman et al. (2021) conducted a retrospective quality improvement (QI) study of 4,368 patients in an outpatient palliative clinic. A quality improvement project consisted of a telephone call made by clinic staff 24 hours before appointments. The findings indicated that the NS rate for four months in 2015 was 11.8%, but after an intervention was implemented in 2016, the rate decreased to 6.9%. This resulted in substantial opportunity costs of $79,200 in avoiding unfulfilled visits.

Miller and Ambrose (2016) conducted a systematic literature review of 764 patients in an outpatient clinic. All patients received a pre-appointment card up to 13 weeks before the appointment, and the intervention group received a brief orientation letter mailed 72 hours before the appointment, arriving 24 to 48 hours before the appointment. The literature review revealed a 7% absolute risk reduction for non-attendance in the intervention group who received the pre-appointment letter. Findings in this review conveyed that phone reminders, text messaging reminders, and pre-appointment letters have demonstrated some effect on improving

attendance. The study also indicated that missed appointments, including initial and follow-up appointments, were problematic in the mental health setting and impacted by various factors.

Teo et al. (2017) conducted a continuous quality improvement (CQI) study for a cohort of 250 primary care patients. The study aimed to determine the impact of the method of delivery of phone appointment reminders on attendance rates. The study revealed that live reminders had the lowest NS rate at 3%, message or voicemail reminders at 24%, and no answer at 39%. The study findings demonstrated that appointment attendance rates were significantly higher with live contact, and two-way reminders that ask the patient to confirm or decline the appointment may be more effective than one-way reminders.

Creps and Lotfi (2017) conducted a retrospective study of patient records from an outpatient clinic affiliated with a large university hospital. The findings conveyed that active appointment scheduling using actual patient characteristics resulted in more efficient appointment schedules, increasing clinic utilization by 6.7% through overbooking. The study revealed that phone appointments utilized in the past had improved the show rate but had no impact on the large percentage of cancellations.

Short Text Message Appointment Reminders

Berliner-Senderey et al. (2020) conducted a meta-analysis and systematic review of 161,587 members of Clalit Health Services (CHS), the largest payer-provider healthcare organization in Israel, who had scheduled outpatient clinic appointments in one of 14 CHS hospitals. Each person was placed in one of nine groups and received a pre-appointment short message service (SMS) text reminder five days before their appointment, which differed by group. The findings revealed that pre-appointment SMS reminders with specific messaging

could significantly decrease NS rates. Individuals who received messages framed to evoke emotional guilt had NS rates of 14.2% compared with 21.1% in the control group. The study showed strong evidence that even simple SMS reminders reduce non-attendance compared to no reminders. Palacios-Barahona et al. (2018) conducted a similar study, including a systematic review and meta-analysis of 116 registries with findings that also revealed the use of SMS reminders that positively impacted appointment attendance.

Davis (2021) conducted an integrative review of the literature composed of 20 studies in an ambulatory setting. The findings demonstrated that notification systems helped reduce missed appointments significantly, and many studies produced a five to 10% decrease in NS rates. The study also conveyed that there might be more cost-effective ways to reduce no-shows due to technological advancements than phone call notification systems or staff notification. The findings suggest that the mode of notification systems will vary based on the patient population, and technology has evolved to allow short messaging to be safely used in healthcare settings.

Gaps in Knowledge and Applicability in Practice

The literature review strongly recommends that studies should focus on underlying reasons for missed appointments and developing strategies to reduce no-shows based on contributing factors (Tempier et al., 2021). Studies within the literature demonstrated why appointments were missed, and predictions for no-shows should be considered in developing strategies to reduce missed appointments. The literature provides evidence for developing models to predict no-show behaviors. which may be beneficial in reducing missed appointments.

The evidence's limitations conveyed staff availability, and the necessary cost of implementing appointment reminder methods into clinical practice to reduce no-show rates will need to be considered (Davis, 2021). The implications of practice change in reducing the economic burden in healthcare warrant implementing appropriate appointment reminder methods to address delays in diagnosis and treatment, ensure ongoing provision of care, and avoid unnecessary hospitalizations and emergency room visits due to gaps in service provision. Healthcare costs can be diminished with practical strategies to improve appointment attendance (Dantas et al., 2018).

Results

Questionnaires were completed by 75 adult patients at the clinic, with a mean age of 43 (range 18-67) years: 49% Female, 51% Male, 35% White, 61% Black, and 3% Hispanic. See Table 1. Thirty-nine percent of individuals missed one or more appointments in the past 12 months, and 57% of patients reported missing no appointments. See Figure 1. Blacks led in missed appointments (76%). See Figure 2. Ninety-five percent of participants owned a working cellphone, and 67% used their cell phones primarily for texting. Participants who had missed appointments did not use their electronic calendar in 60% of cases. See Figure 3. The two primary reasons for missing an appointment were forgetfulness (17%) and being too sick to attend (9%). Seventy-eight percent of participants reported that it was very important to choose the time of day for appointments, morning or evening. The two most preferred appointment reminder types were text messages (62%) and personal phone calls (31%). See Figure 4. Most patients preferred a one-day before appointment reminder (57%), followed by a three-day before appointment reminder (35%). See Figure 5. A Fisher’s exact p-value of 0.023 showed a statistically significant association between missed appointments and the education level of

participants. Most participants were high school graduates (41%), followed by those having some college or trade school (29%), bachelor's degree or higher (14%), and less than a high school education (8%).

Table 1

Patient Preference Questionnaire Demographics

Participant characteristics (n=75)	n %
Mean age (SD)	43 (14)
Male	38 (50.7%)
Female	37 (49.3%)
Race	
Black	46 (61.3%)
White	26 (34.7%)
Hispanic	2 (2.7%)
Native American/Pacific Islander	1 (1.3%)
Education	
Less than high school	6 (8%)
High school graduate	31 (41.3%)
Some college/trade school	22 (29.3%)
Bachelor's degree or higher	11 (14.%)
Household income	
0-$14,999	52 (70.3%)
$15,000-$29,999	9 (12.2%)
$30,000-$44,999	4 (5.4%)
$45,000-$74,999	4 (5.4%)
$75,000 or more	5 (6.8%)
Employment	
Full-time	16 (19.2%)
Part-time	6 (8.2%)
Unemployed/Actively Seeking	8 (11%)
Unemployed/Not Actively Seeking	18 (24.7%)
Retired	7 (9.6%)
Other	20 (26%)
Disabled	11 (14.7%)

Abbreviation: SD, standard deviation.

Figure 1

Appointments Missed Over Past 12 Months

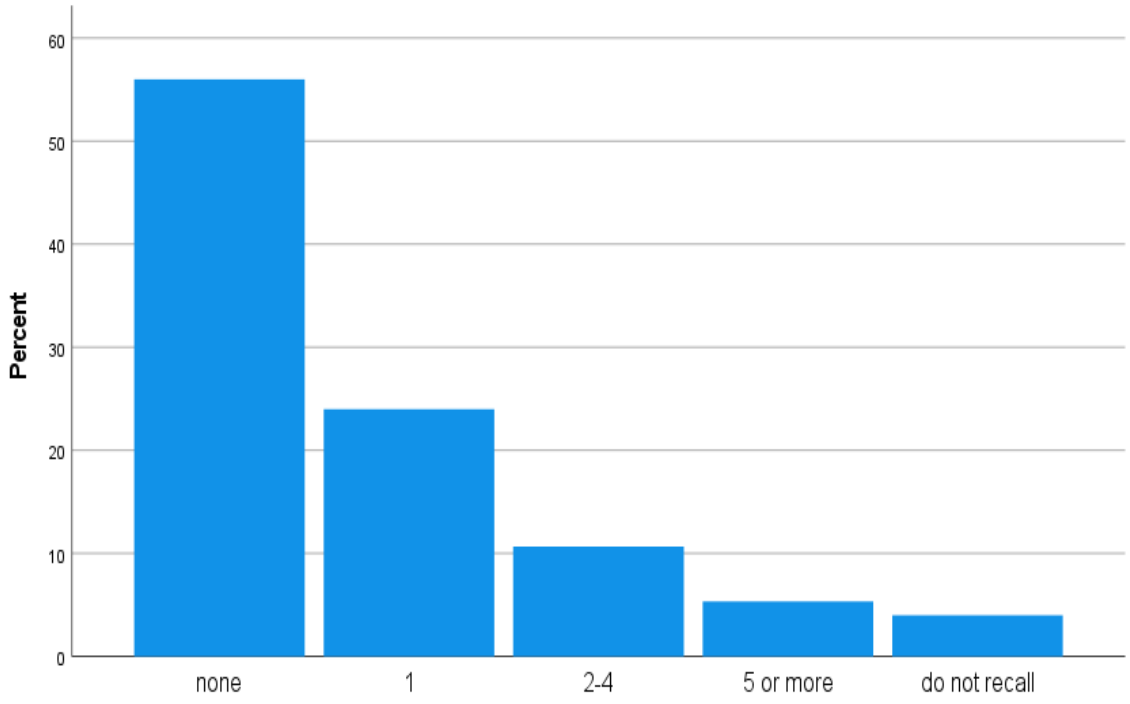


Figure 2

Missed Appointments by Race

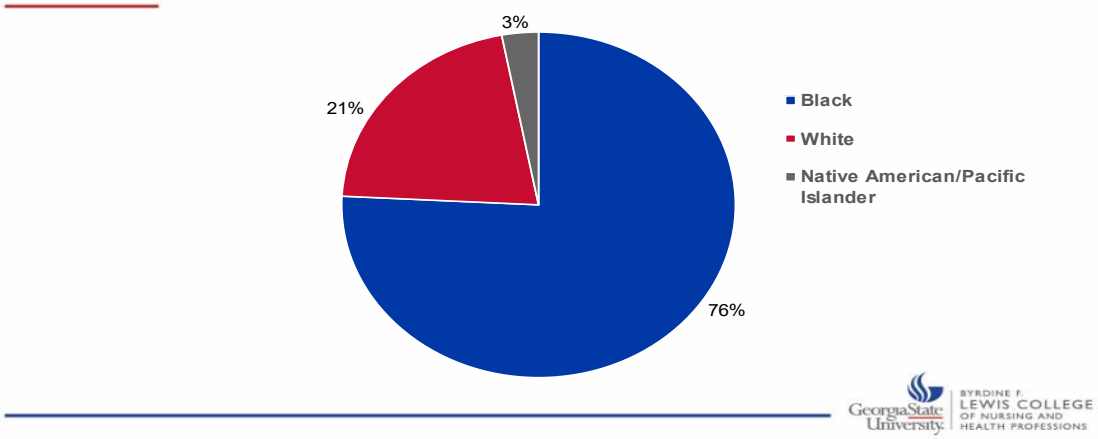


Figure 3

Missed Appointments and Electronic Calendar Use

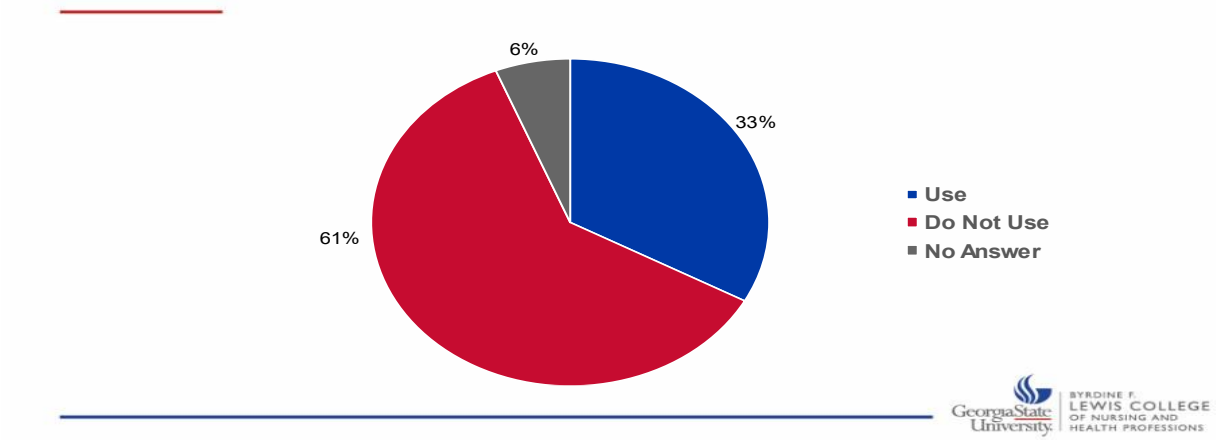


Figure 4

Type of Appointment Reminder Preferred

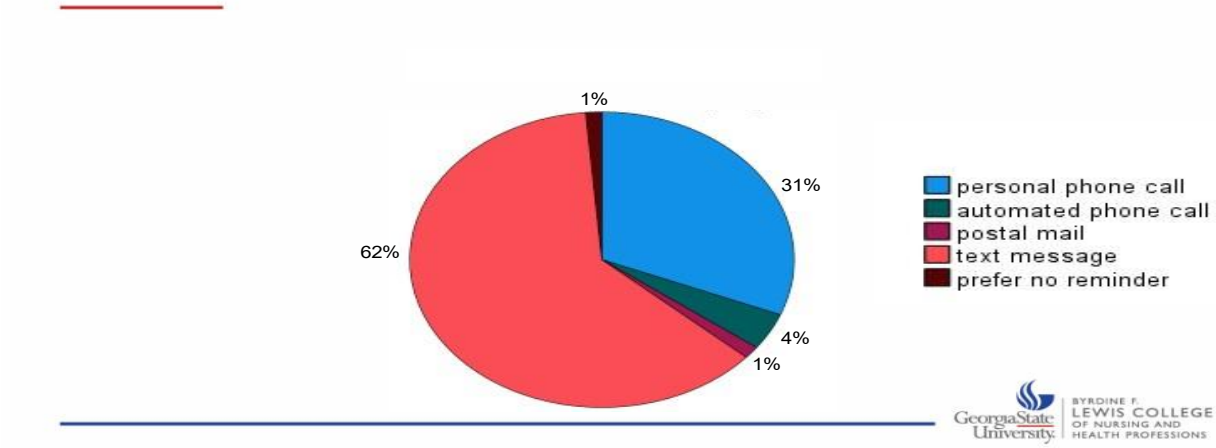
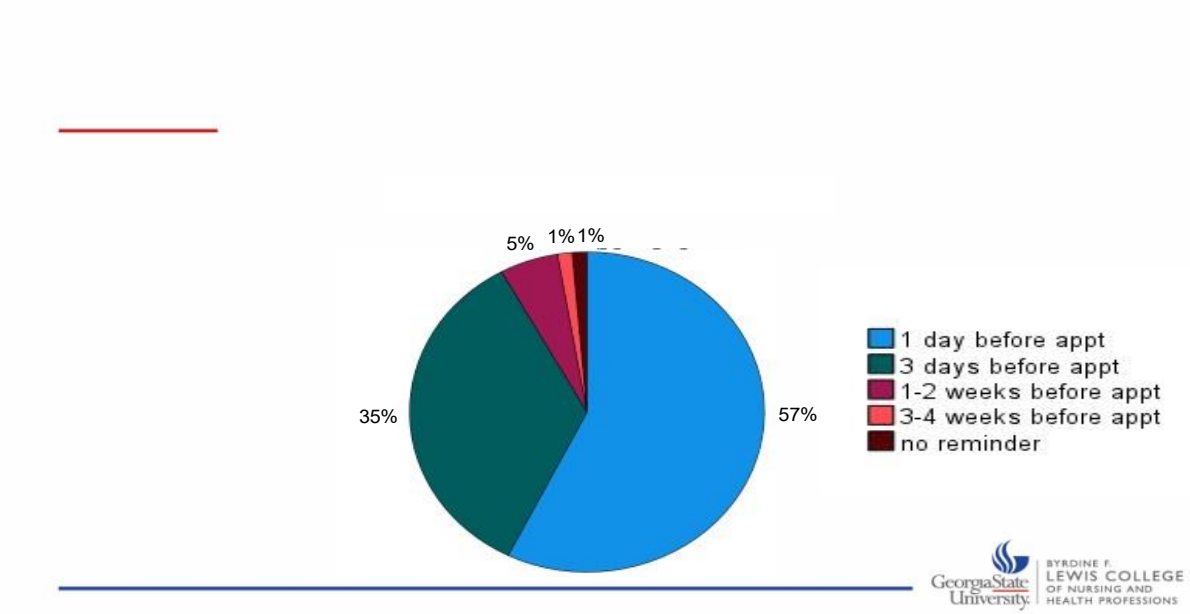


Figure 5

When Appointment Reminder Preferred



Discussion

This DNP project assessed patient preferences in appointment reminders, reasons for missed appointments, technology access and use, and demographic data. The project's results revealed reasons for missed appointments that paralleled the primary findings in existing literature, such as missed appointments due to forgetfulness or being too sick to attend and other reasons, such as transportation issues or problems leaving work or school. Participants mainly preferred text messages in appointment reminders, followed by personal phone contact. Patterns were established in the literature for the most preferred type of reminders, which also primarily supported text messaging as the main reminder type selected. This project revealed that over 50% of participants reported missing no appointments over the past 12 months, which was an unexpected finding based on high no-show rates across healthcare environments. The project

results supported an association between missed appointments and education levels where the existing evidence has reflected low socioeconomic status, younger age, prior history of no-shows, no private insurance, and locations far from the clinic associated with missed appointments.

Patient preferences in appointment reminders displayed in the project's findings, such as choosing the time of day for appointments, the type of reminder, and when the reminder is preferred, may reduce missed appointments in practice settings. In addition, patients who missed appointments were not prone to use their electronic calendars, demonstrating a need for education supporting the full use of accessible technology. Participants' missed appointments and education level showed a statistically significant association supporting focusing on the patient's individualized needs in appointment attendance. Patient preferences in appointment reminders and factors associated with missed appointments may be adopted into clinic reminder practices to improve appointment attendance. Future research is needed to determine if preferred reminders positively impact appointment attendance.

Improving appointment attendance can positively affect patient outcomes and the effective use of clinical resources. The literature supports evidence-based practice in using appointment reminders and identifying factors underlying missed appointments that may impact no-show rates. Appointment reminder preferences identified in this project should be considered in practice settings to reduce no-show rates and promote patient-centered preferences based on patient needs. Further, practice change is necessary based on wasted resources, decreased productivity, and lost revenue due to no-shows (Dantas et al., 2018). Patients who miss appointments also miss an opportunity for care and treatment and occupy an appointment slot that

another patient may have used. Healthcare providers can improve patient outcomes by utilizing patient-centered appointment reminder strategies to impact appointment attendance and create more immediate access to care.

The healthcare provider is expected to utilize research and interventions tested for implementation into practice to improve service delivery and patient care. DNP-prepared scholars are in an excellent position to perform as change agents and incorporate evidence-based research into day-to-day practice environments (McCaffrey, 2012). The advanced practice nurse educated at the DNP level is charged with becoming a leader in informatics and developing the knowledge necessary to improve technology to advance patient care, manage patient populations, and ensure patient safety. "No other group of healthcare providers has as broad an understanding of the different aspects of healthcare and the coordination that is required to maintain patient safety and satisfaction with services" (McCaffrey, 2012, p. 331).

Limitations

The limitations of this project were a self-reported questionnaire with participants responding without confirmation of the data regarding appointment attendance by accessing the clinical record. The recruitment method was convenience sampling which can introduce bias in results. The structure of the questions and answer options could have been more detailed to provide more precise data. Lastly, the questionnaire was lengthy for the chosen population of interest, which may contribute to missed or skipped questions.

Practice Implications

Utilization of patient-centered preferences in appointment reminder systems is recommended to improve appointment attendance. The literature review suggested considering

underlying and contributing factors to reduce no-show rates. Education on the effective use of technology in appointment reminders should be included to improve appointment attendance. Developing models for predicting no-show behaviors is recommended based on the literature. Further research is needed to inform future interventions tailored to specific clinic needs to absorb the impact of missed appointments. The findings of this project may be offered as a means to deliver patient-centered care by utilizing patient preferences to reduce missed appointments.

Conclusion

Missed appointments are problematic in all healthcare settings. Patients who do not keep clinic appointments affect service delivery, cost of care, and resource planning. The literature review revealed that appointment reminders effectively reduced no-show rates. Underlying factors contributing to no-shows or missed appointments should be considered for quality improvement. Patient-centered appointment reminders may improve appointment attendance in addressing reasons individuals report missing appointments and should be adopted into practices utilizing automated appointment reminder systems.

No-show history and predictions for probabilities of future no-shows should be considered in reducing missed appointments. Examining the impact of no-show rates and factors that improve missed appointments will help reduce healthcare costs and improve patient outcomes. Phone contacts, mail reminders, and text and SMS messaging were identified in the literature as contributing factors to reducing no-show rates. Future research should focus on patient-centered appointment reminder strategies and their impact on the financial stability of the healthcare system, appointment attendance, service delivery, and patient outcomes.

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Appendix A

Patient Preference Questionnaire

Please choose one answer for each question unless instructed to select all that apply. Thank you for your time.

1. Please rate the satisfaction with your current appointment reminder at this clinic.

☐ Very satisfied ☐ Satisfied ☐ Neutral ☐ Dissatisfied ☐ Very dissatisfied

2. How important is choosing the time of day for your appointments (e.g. mornings or evenings)?

☐ Very Important ☐ Important ☐ Neutral ☐ Somewhat Important ☐ Not Important at all

3. What type of appointment reminder would you prefer the MOST? (Choose only ONE)

☐ Personal Phone Call ☐ Automated Phone Call ☐ Email ☐ Postal Mail ☐ Text Messaging ☐ I prefer no reminder

4. Is transportation a problem in getting to your appointments?

☐ Yes ☐ No

5. How far do you live from the clinic?

☐ less than 5 miles ☐ 5-10 miles ☐ 10-20 miles ☐ 20 miles or more

6. When would you like appointment reminders?

☐ 1 day before appointment ☐ 3 days before appointment ☐ 1-2 weeks before appointment ☐ 3-4 weeks before appointment ☐ No reminder

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7. How comfortable are you using computers?

☐ Very Uncomfortable ☐ Uncomfortable ☐ Neutral ☐ Comfortable ☐ Very Comfortable

8. Do you have access to a computer at home that can connect to the internet or World Wide Web?

☐ Yes ☐ No

9. Do you have access to a computer at work or a public library that can connect to the internet or World Wide Web?

☐ Yes ☐ No

10. Do you have a phone that is currently working? (landline)

☐ Yes ☐ No

11. Do you own a working cell phone?

☐ Yes ☐ No

12. What do you use your cell phone for? Select ALL that apply.

☐ Talking ☐ Internet ☐ Text Messaging ☐ Email ☐ Electronic Calendar

13. Do you use an electronic calendar (Outlook, Gmail, etc.) to manage your schedule?

☐ Yes ☐ No

14. Do you have to pay for every text you send or receive through your service plan or through minutes you purchase?

☐ Yes, I have to pay for each text or with minutes ☐ No, text message is part of my cell phone service plan

☐ I do not know ☐ Other _____

15. About how often do you send and receive text messages?

☐ 1-3 times a month ☐ 1-4 times a week ☐ 5 or more times a week ☐ 2 or more times a day

16. About how often do you send and receive email (either on a cell phone or computer)?

☐ Never ☐ 1-3 times a month ☐ 1-4 times a week ☐ 5 or more times a week ☐ 2 or more times a day

17. About how often do you check your postal mail?

☐ Daily ☐ Several times a week ☐ Once a week ☐ More than once a month but not every week ☐ Once a month ☐ Other

18. How many mental health appointments have you missed in the past 12 months?

☐ None ☐ 1 ☐ 2-4 ☐ 5 or more ☐ I do not recall

19. What is the MAIN reason you missed one or more appointments in the past 12 months? (Choose only ONE)

☐ I forgot ☐ I was confused about time, date, or location ☐ I had transportation problems ☐ I had problems leaving school/work ☐ I felt better ☐ I was too sick to go to the appointment ☐ Other

20. How often do you confirm you will go to an appointment if the appointment reminder prompts you to respond?

☐ Never ☐ Sometimes ☐ Always

Demographics

21. What is your primary language spoken? (Please fill in answer) _____

22. What is your age? (Please fill in answer) _____

23. Please select your gender: ☐ Male ☐ Female ☐ Other ☐ Prefer not to answer

24. Pick ONE option that best describes you: ☐ White ☐ Black ☐ Hispanic ☐ Latino ☐ Asian ☐ Native American/Pacific Islander ☐ American Indian/Alaskan Native ☐ Other

25. What best describes your current employment status? ☐ Employed, full-time ☐ Employed, part-Time ☐ Unemployed and actively seeking work ☐ Unemployed and not actively seeking work ☐ Retired ☐ Other

26. What is your annual household income? ☐ $0 to $14,999 ☐ $15,000-$29,999 ☐ $30,000-$44,999 ☐ $45,000-$74,999 ☐ $75,000 or more

27. What is your marital status? ☐ Married ☐ Living with a partner ☐ Divorced ☐ Widowed ☐ Separated ☐ Never been married

28. What is the highest degree or level of school you have completed?

☐ less than high school diploma ☐ high school diploma or equivalent (e.g. GED) ☐ Some college but no degree ☐ Associate degree (e.g. AS, AA) ☐ Bachelor's degree ☐ Master's degree (e.g. MS, MA, MEd)

☐ Professional (MD, DDS, DVM) ☐ Doctorate (e.g. PhD, EdD)

Appendix B

Matrix Evidence Table

Author/Date	Design	Sample/Setting	Measurement	Results/Implications
Anisi et al., 2018	Cross-sectional study	148,077, outpatient clinic	independent two-sample t-test and Chi-square test; logistic regression used to analyze predictors of NS; Data analyzed using SPSS.21.	findings indicated appt lead time as main indicator of NS; strategies to reduce lead time, increasing number of physicians, increasing work hours, improving clinic efficiency can improve patient attendance; other findings suggest appt reminders via txt message; cancellation policy and nurse-led telephone triage can be expected to decrease patient NS.
Berliner-Senderey et al., 2020	Meta-analysis and systematic review	161,587, outpatient clinic	relative risk (RR) and Odds ratio (OR) of SMS messages, e-mails, phone call or MMS messages	carefully selecting the narrative of pre-appt SMS reminders can lead to a marked decrease in NS rates

Author/Date	Design	Sample/Setting	Measurement	Results/Implications
Creps and Lotfi (2017)	Retrospective study	Outpatient clinic	randomized patients to the intervention (n = 1129) or control (n = 1118). Intervention group 144 (12.8 %) did not receive phone calls prior to any appointments and 162 (14.3 %) received at least one phone call before one visit but did not receive phone calls prior to all visits	a dynamic appt scheduling procedure was developed using actual patient characteristics resulting in creation of more efficient appt schedules increasing the clinic utilization
Crutchfield and Kistler (2017)	Online Survey	251 participants		Participants preferred a single appt reminder via email, phone, or text message, arriving 2 weeks or less prior to appt. 23% of participants missed one or more appts in the past 12 mo., two of the top 3 reasons were forgetfulness and confusion over appt date, time, or location. Findings suggest appt reminders have potential to increase appt attendance which can lead to increased revenue, improved health outcomes and clinic efficiency

Dantas et al., 2018	Systematic literature review	105 papers, 727 articles	univariate and multivariate analysis; chi-squared and t-tests	average NS rate 23% being highest in African continent (43%) and lowest in Oceania (13.2%); the most common reported determinants of NS were high lead time and prior NS history
Davis, 2021	Integrative Review of Literature	20 studies, ambulatory setting	two electronic databases, CINAHL and Pubmed	Notification systems help reduce missed appts significantly; many studies produced 5-10% decrease in NS rate; phone call notification systems or staff notification may not be the most cost-effective way to reduce NS with technological advances

Drerup et al., 2021	Prospective patient survey	96 surveyed in primary and specialty care clinic	survey analyzed 9 commonly used satisfaction metrics, including convenience of appointment times, metrics graded on a scale of 1–5. The no-show rate of telehealth visits during the COVID-19 pandemic was 7.5% (14/186), lower than both the no-show rate of 36.1% for in-office visits (56/155) ($p < 0.0001$) and a pre-pandemic in-office no-show rate of 29.8% (129/433) ($p < 0.0001$); highly statistically significant at $p < 0.0001$ identified by Fisher's exact test.	Telehealth offered significant benefits for patients and providers. Telemedicine was advantageous for patient satisfaction and increasing the efficiency of health care resources by significantly reducing no shows
Kheirkhah et al., 2016	Retrospective Cohort Study	large medical center, outpatient	SAS 9.2 used for analysis, summarized descriptive statistics as mean and standard deviation, and investigated the predictive values of various factors; all statistical hypothesis test were conducted at the 5% level of significance	the effects of different factors on the NS rates can be used for the prediction of NS; any promising methodology to predict and reduce NS should consider and examine the effect of factors on prediction model; data indicates that NS imposed a major burden on the health care system and implementation of a reminder system only modestly reduced the NS rate.

Author/Date	Design	Sample/Setting	Measurement	Results/Implications
Lagman et al., 2021	Retrospective Quality Improvement Study	4368, outpatient palliative clinic	None	the NS rate for 4 mo. in 2015 was 11.8% but after the intervention of calls 24H before appt rate decreased to 6.9%; resulted in substantial opportunity cost
Marbouh et al., 2020	Literature review and case study	Radiology Dept	None	Identified possible factors underlying NSs with appropriate mitigation strategies, may help healthcare organizations to reduce and absorb the impact of NSs; recommendations provided for scheduling to reduce NSs.
Author/Date	**Design**	**Sample/Setting**	**Measurement**	**Results/Implications**

Miller & Ambrose, 2016	Systematic Review	764 patients, outpatient clinic		non-attendance at both initial and f/u appts is a problem in MH complicated and impacted by a variety of factors.

Palacios-Barahona et al., 2018	Systematic review and meta-analysis	116 registries, medical clinic	Odds ratio (OR) of SMS messages, e-mails, phone call or MMS messages	the use of SMS reminders has a positive impact on medical appt attendance

Author/Date	Design	Sample/Setting	Measurement	Results/Implications
Ramlucken & Sibiya, 2018	Quantitative Descriptive Survey	182 participants, outpatient psychiatric clinics	analysis conducted using SPSS version 23; descriptive statistics using graphs and tables; inferential statistics were applied; Pearson's chi-squared test, t-tests, ANOVA and chi-square goodness-of-fit-tests.	main reasons for missed appts included forgetfulness, work commitments, lack of transportation and financial constraints; 53.6% of participants missed appts 2-3 times
Ruggeri et al., 2020	Retrospective observational study	41,495 patients, Federally Qualified Health Centers	all analyses were conducted in R	the reminder had minimal effects on NS rates overall (before 41.6%, after 42.1%
Shah et al., 2016	Randomized control trial	2247 patients; Hospital based primary care clinic	The no-show rate was 22.8 % in the intervention arm vs 29.2 % in the control arm (absolute risk difference −6.4 %, $p < 0.001$, 95 % confidence interval [CI]	phone call 7 ds before appt significantly reduced NS rates and increased reimbursement among patients at high risk of NS. The use of targeted interventions may be of interest to practices taking on accountability for population health.

Tempier et al., 2021	Retrospective study	5,892 patients, hospital mental health clinic	4-way analysis of variance; data analyzed using IBM SPSS statistics, descriptive statistics were calculated, continuous variables presented as means and standard deviations (SD).	NS rates are comparable to other clinical sites but remain a challenge in delivering efficient services
Teo et al., 2017	Continue quality improvement study	250 patients, Veterans Health Admin, prim car	bivariate comparisons between reminder call and appt attendance, used chi-square analysis; multivariate generalized linear model; all analyses conducted in Stata, version 14.0.	Live reminders had the lowest NS rate 3% then message or voicemail reminders (24%) and no answer (39%)