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AUTOMATED APPOINTMENT REMINDERS AND NO-SHOW RATES
AT APPLETREE BAY PRIMARY CARE:
A QUALITY ASSURANCE PROJECT

A Project Presented

By

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to

The Faculty of the Graduate College

of

The University of Vermont

In Partial Fulfillment of the Requirements
For the Degree of Master of Science
Specializing in Nursing

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CHAPTER I: INTRODUCTION

According to the Institute of Medicine (IOM), primary care is defined as, “the provision of integrated, accessible health care services by clinicians who are accountable for addressing the large majority of personal health care needs, developing a sustained partnership with patients, and practicing in the context of family and community (Davis, Schoenbaum & Audet, 2005)”. Primary care is essential to the health and wellness of individuals, providing preventative treatment and long-term management of chronic healthcare conditions. A clinician who provides these services, also referred to as a primary care provider (PCP), can be a physician, nurse practitioner, or physician assistant. IOM defines a clinician as “an individual who uses a recognized scientific knowledge base and has the authority to direct the delivery of personal health care services to patients (Davis, Schoenbaum & Audet, 2005) “. Access to primary care is vital to an individual’s health outcomes and wellness, and to developing a trusting relationship with their PCP. Access to health services, as defined by Healthy People 2020, is “the timely use of personal health services to achieve the best health outcome (“Access to Health Services | Healthy People 2020,” n.d.)”.

Appointments in primary care are scheduled for different reasons. The three main categories of appointments are acute or new issue, follow-up (F/U) for a chronic or on-going diagnosis, or an annual physical exam (P/E). Anything which prevents individuals from accessing primary care in a timely manner can have a negative impact not only on the individual’s health and wellness, but on the health of the community and the sustainability of the practice and larger healthcare system.

Missed appointments, also referred to as “no-shows”, inhibit access to primary care. Davies et al. (2016) defined no-show patient appointments in their journal article, *Large-*

Scale No-Show Patterns and Distributions for Clinic Operational Research as “patients who neither kept nor cancelled scheduled appointments”. This creates blocks of time in a PCP’s schedule, which are usually unable to be filled with other patients waiting for an appointment due to lack of notice. The percentage of missed outpatient medical appointments in the United States annually is estimated between 23% and 34% (Crutchfield & Kistler, 2017). This is a healthcare resource inefficiency with a trickle-down effect on access to care. It causes increased wait times for patient appointments, underutilization of healthcare personnel and resources and delayed evaluation for needed care, which can lead to poor patient outcomes. Patients unable to obtain a same day appointment at the PCP office may seek care at an urgent care center or the emergency department (ED). Patients may also opt to not seek treatment at all or to wait for the next available appointment, which can have a negative effect on their health outcomes.

There are a variety of reasons a patient may not check-in for an appointment. Reasons can range from transportation failure to avoidance. Some of these situations can remain out of the patient’s control while others are choices and within the patient’s control. “Missed health care appointments are a major source of avoidable inefficiency that impacts on patient health and treatment outcomes (McLean et al., 2016)”. Various systems are used to remind patients of scheduled appointment. Emails, telephone reminders, personal reminders and short message service (SMS) are examples of the most common reminder methods used to communicate with the patient of an upcoming appointment. Telephone calls to remind patients of a scheduled appointment can reduce no-show rates (Shah et al., 2016).

Purpose of the Project

This quality assurance project is aimed to determine how effective a specific primary care office’s current method of reminding patients of scheduled appointments is in reducing the

percentage of no-shows. The retrospective data gathered from a calendar month will be evaluated to determine what percentage of patients check-in when reminded with a telephone call. Data collected will be analyzed to determine the number of scheduled appointments, the number of the scheduled patients who received reminder telephone calls, and then compared to check-ins. Demographic data will be reviewed including gender, day of the week and how many of the scheduled patients checked into their appointments. The information from this project could help to prevent such no-shows from occurring.

Theoretical Framework

The theoretical framework utilized in this project was Imogene M. King's Theory of Goal Attainment, which was developed in the early 1960's. The Theory of Goal Attainment describes "a dynamic, interpersonal relationship in which a patient grows and develops to attain certain life goals (Goal Attainment - Nursing Theory, 2016)". The seemingly simple goal of checking in to a scheduled appointment at a primary care office seems straight forward, yet up to 34% of patients do not keep appointments. King's theory guided the exploration into why these patients do not keep appointments and the evaluation of the data to be collected.

The three interacting systems in King's model, personal, interpersonal and social, can be directly applied to the problem of underutilized primary care appointments and patients who DNKA. The personal system includes self-worth, age, attitude, ideals, and values. "The self is a person's total subjective environment (Wayne, 2014)". The interpersonal system includes communication, interactions and transactions. The social system includes religion, education, influential behaviors, authority and the healthcare system. Role, stress, space and time are factors King identified which can affect goal attainment. Enlightening providers and clinical staff of these potential barriers provides an opportunity to improve communication and

interactions with the patient towards completion of the transaction, in this case, for improved action, reaction, interaction and transaction.

This theory guided this project to evaluate this basic goal of checking in to an appointment to initiate and build the PCP-patient relationship. This is essential to the therapeutic relationship between provider and patient, enabling larger goals to be possible. The role of PCP and clinical staff is to provide care to a patient seeking medical care. Including the patient as part of their own medical team encourages collaboration and solidify each person's role. In turn, this will likely improve patient healthcare outcomes and wellness along with proper utilization of primary care appointments.

CHAPTER II: LITERATURE REVIEW

A review of literature from January 2016 to present was conducted using five databases; PubMed, CINAHL, MEDLINE, Cochrane Library, and Google Scholar databases. The terms searched were primary care, access to healthcare, missed appointments, no-show, reminders, and methods. Terms searched were combined by AND or OR. Reference lists of literature that was included were also searched for further potential references.

Missed appointments create an access-to-care issue for patients. “Patients who miss appointments do not receive necessary health care services, and prevent or delay other patients from being able to schedule appointments for treatment, follow-up, or preventive care (Crutchfield & Kistler, 2017)”. The missed appointments issue is not new, but there is new research examining the various reminder methods for patients. Specifically, the new research examines the effects of phone call and text message reminders, and trends on no-show rates.

Arriving for a pre-scheduled appointment on time may seem straight-forward. Using any method to remind a patient of their appointment also seems quite routine and easy, but research reveals more complex processes which are necessary to ensure patients keep their pre-scheduled appointments. There were multiple studies on the effectiveness of different methods of reminding patients. A quality improvement cohort study of 250 primary care patients with depression indicated that phone call reminders effectively lowered no-show rates. The method of reminding the patient is relevant to the outcome. Teo et al. (2017) reported the lowest no-show rate of 3% associated with live reminders, while the rate of no-shows was 24% with the use of a message reminder. The no-show rate increased significantly, to 39%, when there was no answer to the reminder notification.

Additional research has been conducted at an academic hospital-based primary care clinic at Massachusetts General Hospital using a sub-population group with a predicted risk equal to or greater than 15% of missing scheduled appointments. Evaluation of the predicted high risk sub-population can identify challenges to appointment attendance as well as strategies to improve appointment check-ins. This study is a single-centered randomized control trial, conducted at the Internal Medicine Associates primary care clinic. Of the 20,955 patients screened for the study, 2,247 primary care patients, deemed at high risk for missing appointments, were enrolled in the study. The enrolled group was then divided into two groups; the intervention group (n=1129) and the control group (n=1118). All patients in the practice received automated telephone reminders three days prior to their scheduled appointments. In this study, the intervention group also received a personalized phone call from the practice's patient service coordinator (PSC) seven days prior to their appointments. During the call, the PSC collaborated with each patient to develop a personalized, concrete plan to ensure arrival to their appointment. The study resulted in a no-show rate of 22.8% in the intervention group and 29.2% in the control group (Shahm et al., 2016). The authors concluded that targeted interventions which engage patients in their own care improve appointment attendance among high risk patients.

With advancements in communication technology, alternative methods are now available to remind patients of scheduled appointments. The use of a text-based electronic notification method may be more effective in reaching patients with busy lives or can be a preferred method of communication for some patients. There is recent research into the efficacy of text messaging methods of communication on no-show rates. A systematic review, to determine how electronic text notifications impact appointment attendance was, conducted by Robotham, Satkunanathan, Reynolds, Stahl & Wykes (2016) and published in the British Medical Journal.

Their research article, *Using Digital Notifications to Improve Attendance in Clinic: Systematic Review and Meta-analysis*, reviewed twenty-six articles from around the globe; nine studies from Europe, seven from Asia, two from Africa, two from Australia, and one from North America (United States). A quality meta-analysis was performed comparing appointment attendance rates for when patients received electronic notifications versus when they did not. The specific results of this study revealed a pooled attendance rate of 67% for the intervention groups and 54% for the controlled groups. The pooled no-show rate of the intervention groups was 15% and the controlled groups was 21%. Overall this study revealed that multiple notifications were more effective at reducing no-show rates than a single notification. The likelihood of patients' attendance to a clinic appointment increased by 23% when an electronic notification was received. In addition, voice notifications were more effective than text notifications at improving attendance rates (Robotham et al., 2016).

In comparison, research conducted in the same year found there to be disadvantages to the use of SMS notifications due to the various levels of access to mobile telephones (McLean, et al., 2016). Although Robotham et al. (2016) stated in their research that the use of smartphones by adults in the United States nearly doubled in six months from 35% to 64%, it still cannot be assumed all patients have cell phones with the ability to receive text messages. Percac-Lima, Singer, Cronin, Chang & Zai (2016) conducted a study on the use of text messaging among its underserved populations. Their research was conducted at Massachusetts General Hospital's (MGH) Chelsea Healthcare Center in Chelsea, Massachusetts, which has a Latino population greater than 60% of its 35,000 residents. A previous analysis of Chelsea Healthcare Center's no-show rates and same day cancellations, conducted in 2012, revealed a no-show rate of 20% for

adult primary care patients, even though all patients received reminder phone calls two days prior to their appointments.

The current randomized control study published in 2016, conducted at the Chelsea Healthcare Center, provided phone call reminders to both the intervention and control groups, two days prior to their scheduled appointments, and text message reminders to only the intervention group. This study was conducted from August 1, 2013 to January 31, 2014. Prior to its initiation, patients were informed of the study with the use of multi-lingual posters displayed in the waiting and exam rooms. Patients were encouraged to update their cell phone number(s) in their medical records. Lastly, a reminder letter was provided to all study participants in their choice of Spanish or English. The letter informed the patients about the study and instructed them to respond with “OK” if they received a text message from the medical office, as consent to receive text reminders. At the initiation of the study, the intervention group was sent a text message, provided in Spanish or English, ten to twenty days prior to their first appointment within the study period. If the patient did not respond to the initial text with “OK”, two additional text messages were sent. The patients, who did not respond after the third attempt, did not receive any additional text messages due to the lack of consent (Percac-Lima, et al., 2016).

During the six-month study period, the randomly selected intervention group was sent text message reminders seven days and one day prior to their scheduled appointments, in addition to the reminder phone calls. The results of this study were that the intervention group had a 13.7% no-show rate compared to the control group no-show rate of 20.2%. Though there were improvements in the no-show rate in the study’s intervention group, the control group had the same no-show rate as the previous study from 2012. Percac-Lima et al. concluded their study

with the recommendation that text messages be used as a supplemental reminder method to phone call reminders.

Evaluating trends in no-show rates provides valuable information to identify potential high-risk (no-show) population in primary care. There are variables, other than reminder method, which effect no-show rates. Identification of these variables and trends can provide necessary information for practices attempting to improve appointment attendance. Two studies in 2016 found that gender affects no-show rates: *Prevalence, Predictors and Economic Consequences of No-Shows* and *Large-Scale No-Show Patterns & Distributions for Clinical Operational Research*. Davies et al. (2016) conducted a retrospective observational descriptive project which examined 25,050,479 Veteran Health Administration appointments over eight consecutive years (2007-2014). The study found male patients have a higher rate of no-shows than females up to the age of 65, when the no-show rates for both genders are comparable. In contrast, Kheirkhah, Feng, Travis, Tavakoli-Tabasi & Sharafkhaneh (2016) conducted a retrospective cohort study, which reviewed no-show rates for 60 months (2004-2008) in primary care and subspecialty clinics. This study determined that females had a higher no-show rate than males. The authors reflected, “This finding is unique and needs to be confirmed in another health care setting. It is likely that during the study period, women use the Women Clinic for women related health care rather than general primary care (Kheirkhah et al., 2016)”. The evaluation of traits affecting no-show rates, such as gender, age, socioeconomic level, and timing of appointment, can help to target populations in need of additional methods of reminding to reduce no-show (Kheirkhah et al., 2016).

CHAPTER III: METHODS

Overview of the Primary Care Practice

Appletree Bay Primary Care (ABPC) is the practice location of this research project. ABPC is a nurse-practitioner-led primary care practice located in the New North End of Burlington, Vermont. There are no other adult primary care practices in that area of Burlington, although there is a branch of a local pediatric practice in the New North End. ABPC has been serving residents of Burlington for more than forty years.

The current configuration, as an Advanced Practice Registered Nurse (APRN)-led clinic, was “born” on August 4th, 2014. It was designated by the National Committee for Quality Assurance (NCQA) in April 2016, as a Patient Centered Medical Home (PCMH). ABPC reports a panel of approximately 3,600 patients and cares for patients from ages twelve through death. They provide care for all acute and chronic conditions normally seen in a primary care office and health promotion, education and disease prevention for all patients. ABPC is the primary teaching site for the University of Vermont (UVM) Nurse Practitioner Program and is the practice venue for nine faculty nurse practitioners from UVM. The office is open 5 days per week (8:00 AM - 5:00 PM) with 2-3 providers available each day for appointments, as well as a provider on-call when the practice is closed. Accessibility of ABPC and the fact that all providers at ABPC are UVM faculty and understand the processes for student projects, made the practice a good choice for this project.

Pre-Data Collection Process

This is a retrospective quality assurance project to evaluate ABPC’s appointment reminder method and its effect on appointment check-ins. An initial discussion occurred between the project’s primary investigator (PI) and two of Appletree Bay’s nurse practitioners

regarding how patients are scheduled, how appointment reminders are provided, and the nature of the “no show” problem for this practice. The purposes of the project are to increase the understanding of the issue of “no-shows”, to review the current reminder system, and to explore some of the characteristics/demographics of the ABPC patients who do and do not check-in to scheduled appointments.

In order to comply with University of Vermont guidelines for student projects, all necessary forms and documents were submitted to the UVM Institutional Review Board (IRB), after completing the online tutorial module covering research ethics. The project’s PI completed the online module on October 17, 2017. The assigned research analyst for this project was contacted to discuss which specific IRB forms were necessary for the project’s approval. The Protocol Exemption Review and Determination form was obtained, completed and submitted by the PI. The completed form, along with chapters 1-3 of the project, and the sample data collection spreadsheet were submitted electronically via InfoEd on November 16, 2017 to the University of Vermont IRB for formal review. The Protocol Exemption Certificate was issued to the PI on November 20, 2017 and the data collection for the project was collected on November 24, 2017 at the ABPC office.

Data Collection Plan

ABPC’s two key systems which are vital to the data collection for this project are PRISM and TeleVox Solutions. PRISM is a product from the software company Epic and is the electronic health record (EHR) system for the practice. TeleVox is the system which places the automated phone calls to patients. It uses the patients’ phone numbers listed in PRISM for the reminder calls, which occur two days prior to appointments. Any acute appointments scheduled

for the same day or next day will not receive a reminder call (ABPC's Office Manager, personal communication, November 14, 2017).

ABPC's office manager will request a report of the automated phone call reminders placed to patients by TeleVox for scheduled appointments at ABPC between September 1 and 30, 2017. The report will be shared with the PI during a meeting at ABPC. The report will contain each patient's response to the automated phone message.

The automated phone message used by ABPC states:

“Please listen to the following options to confirm this appointment.
Press #1 to confirm your appointment.
Thank you for confirming your appointment.
Press #2 to cancel your appointment.
You have indicated you wish to cancel your appointment.
If this is correct, please press 2 again.
Please call the office during regular business hours to reschedule your appointment. Thank you.
Press #3 if you would like to replay this message.”

The system collects the following information, based on the action at the time of the automated phone call, and places into response categories.

The response categories and their definitions listed in the report are:

- Hang-up – A person answered but did not listen to the message in its entirety.
- No – A person answered and pushed #2 to cancel appointment.
- No response – A person answered and listened to the entire message.
- Repeat message – A person answered and pushed #3 to repeat automated message.
- Yes – A person answered and pushed #1 to confirm appointment.
- Answering machine – An answering machine answered.
- No answer – Nothing answered the call placed.
- Invalid number – The patient's number obtained from the EHR was not a valid number.
- Out of order – The patient's number obtained from the EHR was out of order.
- Phone busy – The phone number used was busy when the automated phone call was made.

ABPC's office manager will use her own access to PRISM for the purpose of conducting a record review. The schedule of appointments for the date range of September 1 to

30, 2017 will be selected for review. The office manager will read aloud the gender of the patient, appointment day of the week, type of appointment, and whether the patient checked in to the appointment or was a no-show as it is listed in PRISM. This de-identified data will be recorded by the PI onto the data collection spreadsheet. Next, the office manager will speak the patient's name from the appointment list for the PI to cross reference to the TeleVox report. The report groups patient names under each category, based on the individual responses to the automated phone calls. This will show if the patient received an automated reminder phone call and the response to the call. Not every patient receives a reminder phone call, so only those who are listed on the TeleVox report will have the response recorded on the data spreadsheet. No patients' names will be recorded or reported in the data collected. Lastly, the Televox report will be left at ABPC with the office manager at the end of the meeting for proper disposal.

The completed data spreadsheet will be used to look for patterns and relationships between the patient's gender and appointment day of the week in conjunction with whether they received a reminder and whether the patient checked in to the appointment. As the data is being analyzed, other patterns may be discovered and reported. The resulting data will be reported in both tabular and graphic forms, and patterns will be discussed.

CHAPTER IV: RESULTS AND CONCLUSION

Evaluation

A total of 586 appointments were scheduled at ABPC for the month of September 2017. Of these appointments, 58.4% (n=342) were for female and 41.6% for male patients. The month studied had 20 days of scheduled appointments out of the 30 days in the month. The office was closed on all Saturdays and Sundays, and one Monday, September 4th, for Labor Day. Table 1 is the calendar for September 2017 with days highlighted for when the office had scheduled appointments and when the office was closed.

Table 1: Data collected for all the days in green for the month of September						
Sun	Mon	Tue	Wed	Thurs	Fri	Sat
					1	2
3	4	5	6	7	8	9
10	11	12	13	14	15	16
17	18	19	20	21	22	23
24	25	26	27	28	29	30
<p>KEY</p> <div style="display: flex; flex-direction: column; gap: 5px;"> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: lightgrey; margin-right: 5px;"></div> Office is closed </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: yellow; margin-right: 5px;"></div> Office is closed for Labor Day holiday </div> <div style="display: flex; align-items: center;"> <div style="width: 15px; height: 15px; background-color: lightgreen; margin-right: 5px;"></div> Office is open for appointments </div> </div>						

The proportion of scheduled appointments varied by days of the week. Table 2 displays the total number/percentage of patients who had appointments on each day of the week and then breaks those numbers down by gender. More than half of the appointments scheduled in the

month were on Tuesdays and Thursdays and more females than males were scheduled for appointments every day of the month

Day of the Week	Total of scheduled patients (%)	Total of male scheduled patients	Total of female scheduled patients
Monday	53 (9.0%)	19	34
Tuesday	166 (28.3%)	74	92
Wednesday	105 (17.9%)	43	62
Thursday	175 (29.9%)	79	96
Friday	87 (14.8%)	29	58
Total	586	244	342

The total number of patients who checked-in to a schedule appointment was 96.2% (n=564). Table 3 provides a summary of the gender of the patients who had appointments during the month studied, whether they checked in for their appointments, and whether they received reminders prior to their scheduled appointments. The number of patients who received a reminder call and checked-in was 66% (n=377) and the number of patients who did not receive a reminder and checked-in was 35% (n=201).

During the period studied, only 3.7% (n=22) of the patients failed to check-in for their appointments: 4.1% (n=14) of them were female and 3.2% (n=8) were male. Table 4 provides a summary of the percentage of patients who were no-show to a scheduled appointment, with and without the automated reminder call. ABPC's no-show rate is significantly lower than the average now-show rates published in recent literature noted in the literature review in chapter II.

Table 3: Total check-in rates by day of the week, gender and with/without automated reminder call

Day of the week	Total Check-ins/Total scheduled appointments (%)	Gender of patient check-in M/F	Check-in with a reminder (%)	Male patient check-in with reminder (%)	Male patient check-in without reminder (%)	Female patient check-in with reminder (%)	Female patient check-in without reminder (%)
Monday	46/53 (87%)	M=17 F=29	23/46 (50%)	6/17 (35.2%)	9/17 (52.9%)	17/29 (58.6%)	12/29 (41.3%)
Tuesday	159/166 (96%)	M=70 F=89	109/166 (65.6%)	54/70 (77.1%)	16/70 (22.8%)	55/89 (61.8%)	34/89 (38.2%)
Wednesday	99/105 (94%)	M=42 F=57	76/99 (77%)	34/42 (81%)	8/42 (19%)	42/57 (74%)	16/57 (28%)
Thursday	173/175 (99%)	M=78 F=95	122/173 (70.5%)	55/78 (70.5%)	23/78 (29.5%)	67/95 (70.5%)	28/95 (29.5%)
Friday	87/87 (100%)	M=29 F=58	47/87 (54%)	11/29 (37.9%)	18/29 (62.1%)	21/58 (36.2%)	37/58 (63.8%)
Total	564/586 (96.2%)	M=236 F= 328	377/571 (66%)	160/236 (67.8%)	74/236 (31.4%)	202/328 (61.6%)	127/328 (38.7%)

Table 4: Total no-show rates by day of the week, gender and with/without automated reminder call

Day of the week	Total of scheduled patients	Total no-shows (%)	No-show with automated reminder call	Gender of no-show M/F	Male no-show with automated reminder call	Male no-show without Reminder automated reminder call	Female no-show with automated reminder call	Female no-show without automated reminder call
Monday	53	7 (13.2%)	7/7 (100%)	M=2 F=5	2/2 (100%)	0	5/5 (100%)	0
Tuesday	166	7 (4.2%)	5/7 (72%)	M=4 F=3	3/4 (75%)	1/4 (25%)	2/3 (66%)	1/3 (33%)
Wednesday	105	6 (5.7%)	4/6 (66%)	M=1 F=5	0	1/1 (100%)	4/5 (80%)	1/5 (20%)
Thursday	175	2 (1.1%)	1/2 (50%)	M=1 F=1	0	1/1 (100%)	1/1 (100%)	0
Friday	87	0	0	0	0	0	0	0
Total	586	22 (3.75)	17/22 (77%)	M=8 F=14	5/6 (83%)	3/6 (50%)	12/14 (86%)	2/8 (25%)

Limitations

This retrospective quality assurance study was limited to a single primary care practice with a small sample size. The data analysis used descriptive statistics only. Data collected were a single month's appointments, and demographic information collected was limited to gender. With a larger sample size, it would have been possible to go beyond descriptive statistics to determine if some of the differences were or were not statistically significant. Age, ethnicity and socioeconomic status are demographics which could provide additional trends to appointment patterns within APBC's practice.

Implications for future research

The data set from ABPC shows a no-show rate much lower than the average for primary care as stated in current research. If this pattern is consistent over a longer time period, then future research should certainly explore why ABPC is so successful at getting patients to check-in to scheduled appointments. Whether the automated appointment reminder system used at ABPC (TeleVox) is the source of the success, or whether other factors are involved was not established by this project. This presents a meaningful research question for future study.

Conclusion

The aim of this project was to determine how effective ABPC's current method of reminding patients of scheduled appointments is in reducing the percentage of no-shows. The literature review led to an expectation of a no-show rate in the neighborhood of 25%. APBC's no-show rate of 3.7% was unexpected and made it difficult to meaningfully evaluate the differences based upon the utilization of the automated reminder system. Various literature reviewed stated male patients have a higher no-show rate than female. Yet the research by Kheirkhah, et al., (2016) revealed females to have a higher no-show rate than men. The results

from the project is evidence for the need of further research to clarify whether gender effects no-show rates. This quality improvement project at ABPC yielded a higher rate of no-shows for female patients than for male patients. The low no-show rate at ABPC is important to the health and wellness of their patients. With additional research, the variables affecting this practice's no-show rates may be exposed, which would provide an opportunity to share the effective methods with other primary care practices.

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