

TEXT MESSAGE ALERTS TO INCREASE ADHERENCE TO PHARMACY PICK UP
RATES IN HISPANICS WITH TYPE 2 DIABETES

A Doctor of Nursing Practice Project Report

by

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This Doctor of Nursing Practice Project Report meets the standards for scope and quality of Texas A&M University-Corpus Christi College of Nursing and Health Sciences and is hereby approved.

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August 2019

DEDICATION

I would like to dedicate this work to my parents, Mark and Janice Casciato, who have provided unending support, to my amazing children, Nicholas, Jacob, Mia, Violet, and Abigail, who have had the understanding that my schoolwork took priority some days, and to my husband, Mark, who was supportive and understanding throughout this program.

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ABSTRACT

Objective: The plan of this project was to increase refill adherence in this specific population by using text message alerts to prompt medication pick-up from the pharmacy.

Background: The Be Well Clinic realized that other methods of patient communication needed to be implemented in order to increase medication refill adherence rates from pharmacies serving Hispanic patients taking oral hypoglycemic medications.

Methods: The interventions used in this project included using a text message reminder and participation in a focus group at the end of the project to obtain patient satisfaction regarding reminder systems.

Results: Data analysis revealed that the time spent implementing the text message reminder was significantly less than utilizing a phone call; however, the text message reminder did not significantly improve medication refill adherence. Responses to the focus group revealed that participants were positively satisfied with text messaging as a reminder method and both participants preferred text messaging over other reminder methods

Conclusions: Recommendations resulting from this project may help staff use less time when reminding patients to pick up their medications from the pharmacy and reduce organizational costs.

TEXT MESSAGE ALERTS TO INCREASE ADHERENCE TO PHARMACY PICK UP RATES IN HISPANICS WITH TYPE 2 DIABETES

Introduction

The task of picking up medications from the pharmacy can be a challenge to patients, resulting in non-compliance with a medication regimen can be frustrating to providers who want to support good patient health care outcomes. A meta-analysis of studies examining medication adherence of oral hypoglycemic agents in persons with type 2 diabetes (T2D) performed between 2005 and 2015 indicated that only 67.9% were adherent to their oral hypoglycemic therapy (Iglay et al., 2015). Hispanics patients have the highest rate of long-term chronic diseases, such as T2D; however, Hispanics have the lowest medication adherence rate when compared to non-Hispanic whites for all chronic diseases (Colby, et al., 2012). In adults, 18 years and older, Hispanics comprise 12.1% of the total prevalence of T2D in the United States (Centers for Disease Control and Prevention, 2017).

Text messaging is a method of communication which is quick yet does not require participants to immediately reciprocate communication and allows health care providers to exchange information with patients on a regular basis (Hardiman & Edwards, 2013). Texting is a neutral form of communication, as it can be used via personal or provider devices making accessibility to the user easy (Greene, 2012). A three-month study comparing medication refill rates revealed a text message intervention group had a 14.07% higher refill rate than participants who did not receive a text message (Prayaga, et al. 2018). These findings lend support for the use of text messaging as a communication method for patient engagement (Prayaga et al., 2018). In Hidalgo County, Texas, the prevalence of T2D is 10.3% of the population (County Health Rankings, 2019). If a patient with T2D fails to take his or her oral hypoglycemic medication,

glucose levels in the body increase and, if left uncontrolled can cause secondary complications such as retinopathy, nephropathy, neuropathy, atherosclerosis, and Alzheimer's (Mayo Clinic, 2017). In 2017, the economic impact of diabetes and diabetes-related illnesses accounted for \$327 billion in medical costs (Centers for Disease Control and Prevention, 2019). In 2015, diabetes was the seventh leading cause of death in the United States based on 79,535 death certificates in which diabetes was named as the underlying cause of death (Centers for Disease Control and Prevention, 2017).

This project took place at the Be Well Clinic in Weslaco, Texas, where the staff had been tasked with tracking and monitoring diabetes medication refill adherence in Hispanic patients. The Be Well Clinic is a family practice clinic located in Weslaco, part of Hidalgo County, and has a population of 350 patients enrolled in a South Texas Medicare Advantage Plan with Prescription Drug Coverage (MAPD). At the end of 2016, the Be Well Clinic scored a 2.0 out of a possible 5-star rating with the MAPD due to noncompliance with refill adherence in patients with T2D (Cigna Analytics Team, 2017). The purpose of this project was to increase refill adherence in this specific population by using text message alerts to prompt medication pick-up from the pharmacy. The primary outcome measured was the percentage of patients with T2D and MAPD insurance who picked up their medication within seven days from the refill date before and after the intervention. A second outcome measured was the patients' perceptions regarding the positive and negative aspects of the text message reminder. A third outcome measured was the comparison of the amount of time it took staff to implement the text messaging intervention to the current practice of telephoning patients. The Be Well Clinic realized that other alternate methods of patient communication needed to be implemented in

order to increase medication refill adherence rates from pharmacies serving Hispanic patients taking oral hypoglycemic drugs.

Diabetes and diabetes-related complications accounted for 4,549,000 emergency department visits in 2014 (Centers for Disease Control and Prevention, 2014). Poor medication adherence costs the health care system \$100 - \$300 billion each year and leads to 125,000 deaths annually supporting the need for an intervention to increase refill adherence (Johnsen, 2014). The purpose of this quality improvement project was to determine if text message reminders to patients with T2D increased oral hypoglycemic medication refill adherence percentages, increased patient satisfaction with medication reminders, and improved the efficiency of clinic processes. The clinical question guiding this project was: In Hispanic people with T2D and MAPD insurance, do text message reminders increase prescription medication pick up adherence, improve patient satisfaction with a reminder system, and decrease time spent on reminders by clinic staff when compared to current telephone reminders?

This project satisfied DNP Essential IV: Information Systems/Technology and Patient Care Technology for the Improvement and Transformation of Health Care (American Association of Colleges of Nursing [AACN], 2006). DNP Essential IV applies to this project as technology in the form of text messaging is implemented into medication management to enhance communication between provider and patient with the outcome of increasing refill adherence to improve health care outcomes. This quality improvement project also meets DNP Essential II: Organizational and Systems Leadership for Quality Improvement and Systems Thinking because the implementation of a delivery care approach was developed to meet current and future needs of this specific patient population (AACN, 2006). This project also satisfies DNP Essential III: Clinical Scholarship and Analytical Methods for Evidence-Based Practice in

that the project director (PD) designed and implemented a process to evaluate quality improvement methodologies which could promote safe, effective and efficient patient-centered care within a health care organization (AACN, 2006).

Review of the Literature

Poor communication between the patient, the pharmacy, and the provider leads to inadequate medication refill adherence, especially for patients with T2D taking oral hypoglycemic medication. This gap in communication leads to suboptimal metabolic control and poor health care outcomes (Ratanawongsa et al., 2013). At the end of 2016, the Be Well Clinic scored a 2.0 out of a 5-star rating with MAPD for the overall medication refill adherence for patients who were on oral hypoglycemic medication despite close monitoring of this metric (Cigna Analytics Team, 2017). Star ratings are based on patient and organizational performance measures. A star rating is the result of a numeric performance score of a particular metric field (Centers for Medicare and Medicaid Services [CMS], 2018). The Centers for Medicare and Medicaid Service's threshold for medication adherence is having a percentage of days covered equal to or exceeding 80% of the time (Pharmacy Quality Solutions, 2018). Medication refill adherence is continuously measured throughout the year with weekly reports from the MAPD analytics team. These ratings are dependent on patients picking up their medications from the pharmacy, and the verification of pick-up is through pharmacy claims. A study of 302 Hispanic diabetics revealed a 60% reported medication nonadherence primarily due to forgetfulness (Parada, 2012). Implementation of new communication technology methods may be beneficial in decreasing forgetfulness which contributes to medication refill non-adherence.

Text messaging is becoming a preferred method of communication to increase refill adherence among patients. A study by Nundy, Mishra, Hogan, Lee, Solomon, & Peek (2014)

revealed that satisfaction with the implementation of text reminders as a form of staff support increased by 0.3% at the end of a six-month period. Peimani et al. (2016) found the use of text messaging positively impacted self-management behavior in patients with diabetes mellitus through increased medication compliance and lowered fasting blood sugars from a mean of 172 mg/dl to 152 mg/dl and lowered A1C levels from 7.29% to 7.06%. Recently, a study done by Prayaga and colleagues (2018) measured refill adherence over different methods of communication and found that text message reminders increased refill adherence by 14% in patients on Medicare. Of those participants who refilled their medication upon receipt of a text message, 38% did so within two hours, 49% within 24 hours and 13% twenty-four hours after receiving the reminder. The implementation of text messaging can be used successfully to influence behaviors such as refill adherence and medication compliance.

Theoretical Framework

The nursing theory guiding this project was Ida Jean Orlando's Deliberative Nursing Process. Orlando's Deliberative Nursing Process Theory focuses on the relationship between the nurse and patient, the importance of recognizing needs, and the utilization of the nursing process to achieve improvement in patient health care outcomes (Faust, 2002). As nurses uses the nursing process to reach a goal, he or she makes deliberate actions to help the patient achieve an outcome (Nursing Theory, 2016).

At the Be Well Clinic, patients were not refilling their medications, leading to an increased risk of poor health outcomes. The patients needed an intervention to help them overcome this problem. The project director (PD) assessed the characteristics of nonadherent patients, taking into consideration their cultural, spiritual, and holistic needs. Clinical judgment was used to define the patient's health problems and barriers to attaining adherence goals. In the

planning stage, the issue of medication refill pick-up adherence was identified, and a goal was defined. This goal was associated with an intervention to improve pick-up adherence. Applying the theoretical concept of a deliberate act implemented by a nurse to this project, a text message protocol, was initiated to support participants to pick up their medication. Additionally, there was an evaluation of the progress of the patient toward the goals and changes as indicated.

Specific Aims

The first aim of this project was to increase medication pick up rate adherence by comparing the percentage of days covered adopted from the MAPD's adherence reports collected before and after the intervention from comparable quarters. The second aim of this project was to change the process of patient reminders to improve medication refill adherence in the Be Well Clinic by comparing the time utilized by staff members to remind patients to refill medications via phone prior to the intervention versus the time it takes to text message the refill reminder after the intervention. The third aim of this project was to explore patients' satisfaction with the text messaging system by using a focus group to obtain answers to specific questions after the completion of the intervention.

Methods

Project Design

My quality improvement project was conducted using both a one-group and two group comparative design, as well as a qualitative focus group component.

Protection of Human Subjects and Confidentiality

The focus of my project is on quality improvement. The purpose of my project was to improve care processes and patient outcomes in the Be Well Clinic using an evidence-based intervention to improve medication pick-up adherence. This Quality Improvement Initiative was

reviewed and determined to not meet the criteria for human subjects research by the Texas A&M University-Corpus Christi Institutional Review Board (see Appendix A). I collected personal health information and provided knowledge of this data collection to Dr. Melecia Fuentes, owner of Be Well Clinic, and obtained approval to collect this data. Please see Appendix B for Letter of Support from Dr. Melecia Fuentes of the Be Well Clinic. There was no need for IRB approval at the Be Well Clinic.

Participants

The target number of participants for this project was twenty-five (25) subjects. There were 35 MAPD patients at the Be Well Clinic who were on oral hypoglycemic medications. Research shows that 75% of people in the 50-64 age range are mobile phone owners who use their mobile phones to send and receive text messages (Duggan, 2013). Sixty-six percent of “Baby Boomers” (people aged 54-72) use text messaging (Lewis, 2012). Using this data, the percentages of 66% and 75% was used to determine that 23-26 of the available 35 participants should be used as a sufficient participant sample. The participant population was taken from patients of Be Well Clinic. Patients with MAPD, had been prescribed an oral hypoglycemic medication, and who had a cellular phone with text messaging capability and were established patients of Be Well Clinic were considered for participation.

The Embedded Care Coordinator (ECC) provided the PD names of patients who were below the 80% threshold deemed by the MAPD insurance group to be non-compliant. This provided the PD and the medical assistant a starting point for recruitment. Recruitment of participants was done by chart review and patient interview using the inclusion criteria during the first quarter of the year. The first quarter of the year was used as complete data could be collected and analyzed. Enrollment was performed by the PD when identified patients presented

to the office or when they were contacted via phone by clinic personnel. Their phone number were obtained from the practices' electronic health record. The potential participants were made aware of the aims and anticipated outcomes of the project. They were made aware of their level of participation in the project and the appropriate consents were obtained on a consent form. Appendix C illustrates the consent form used. Once consent was obtained the patient filled out a form with demographic information. Information gathered included gender, age, language preference, how long they had been diagnosed with T2D, the name of the oral hypoglycemic agent they were taking, the last pharmacy fill date of the oral hypoglycemic medication, and their cell phone number and preferred pharmacy. Family members who were present during recruitment were educated on ways they could assist the participant with adherence by checking their phone daily, keeping the phone in working order, and pay the bill if necessary. All data collected for this project and consent forms were kept in a notebook at the nurse's station secured in a locked filing cabinet. Enrollment of participants was completed by January 31, 2019.

Setting

The project clinic is a small, physician-owned clinic that offered health services to patients across the lifespan. The Be Well Clinic provides extended clinic hours to accommodate the working population and gives patients an alternative to utilization of pricey urgent or emergent care facilities. The Be Well Clinic has 15 staff members including one full-time physician, two full-time nurse practitioners, and one part-time physician assistant.

Intervention

The interventions used in this project included using a text message reminder and participation in a focus group at the end of the project to evaluate patient perceptions regarding positive and negative aspects of text messaging reminders and their reminder preference. The

text message reminder was sent via cellular phone at 0800 by the medical assistant seven days prior to the patients 90-day refill due date. Text messaging provides a low cost, efficient and economical option for distributing reminders to patients (Leong et al., 2006; Chen et al., 2008, Downer et al., 2008; Koshy et al., 2008). This process was repeated each morning at 0800 until the medication was picked up by the patient or the patient reached his or her 90-day refill due date. The project team called the pharmacy of the participant at 0730 each morning to see if the patient had picked up the medication the previous day. This continued until the patient either picked up their medication, or the patient had reached the ninety-day refill date. The date the medication was picked up, and the time it took (in seconds) for the project team to send each text message was recorded on the text message data sheets. Kannisto, Koivunen, and Valimaki (2014) found the implementation of text message reminders to be a favorable reminder method to improve health care outcomes.

To use as a comparison, the medical assistant selected five patients who were being called to remind them to pick up their oral hypoglycemic medications from the pharmacy. These patients were the control group. These patients were called via phone at 0800 by the medical assistant seven days prior to the patients 90-day refill due date reminding them to pick up their oral hypoglycemic medication from the pharmacy. Then the medical assistant called the patients pharmacy at 0730 to see if the patient had picked up their medication. This continued until the patient either picked up their medication or the patient had reached the ninety-day refill date. The medical assistant recorded the date the medication was picked up along with the time it took (in seconds) for her to complete her phone call, on the phone call data sheet. All data collected was kept in a notebook inside a locked filing cabinet at the nurses' station.

The project team investigated the 2018 refill dates of the oral hypoglycemic medications of the patients receiving the test message intervention. The patients' pharmacy was contacted, and the dates of medication pick up were collected for the first quarter of 2018 and recorded on the patient's demographic sheet.

Qualitative data was collected using a focus group held at the project site on Tuesday, April 30, 2019, at 4 pm. Participants were patients who received the text messaging intervention. Patients were recruited with a text message sent out each day of the week preceding the focus group inviting them to participate along with the date and time the focus group was to be held. The invitation was in English and Spanish. The focus group was held in an exam room of the Be Well Clinic with the PD leading the group and the medical assistant translating. The participants were asked three questions: “What did you think were the positive aspects in receiving a text message reminder versus a phone call?”, “What did you think were the negative aspects in receiving the text message reminder versus a phone call?”, and “What would be your preference for future reminders?” Responses were recorded in a notebook and data was analyzed using thematic analysis to discover themes and patterns in the participant's responses. Each response was sorted, and keywords, concepts, images, and reflections were highlighted and sorted into different codes. To ensure its integrity, the coding was performed by the project leader and by the medical assistant who led the focus group. The project team then sorted similar codes and grouped them into themes and subthemes. The responses were then recoded by another nurse practitioner to remove bias. The last question asked in the focus group was analyzed using frequency analysis. The project leader transformed the responses for the preference of text and the preference of phone call into percentages for comparison.

The project team consisted of the PD, the medical assistant, who volunteered to assist the project leader, and the Embedded Care Coordinator. The senior medical assistant was fluent in both English and Spanish. She was trained by the PD on how to deliver the text message and how to record the data received. She also recorded the time she spent calling patients to remind them to pick up their medications for participants for the control group. The medical assistant was also tasked with assisting the project leader with chart reviews to search for potential participants and to recruit participants into the project. The ECC was also instrumental in assisting the project director with converting data into the percentage of days covered which was used in the data analysis.

Data Collection and Timeline

Recruitment of participants was done by chart review and interviewing patients using the inclusion criteria during the first quarter of the year. The first quarter of the year was used as complete data could be collected and analyzed. Participants who met criteria were introduced to the project and willing participants were consented and enrolled in the project by January 31, 2019. Once the patient enrolled, information regarding their next medication refill data was entered into a data collection sheet. The demographic sheets were completed by January 31, 2019. The project team gathered medication refill data for each participant from the pharmacy by February 24, 2019. Between 2/25/2019 and 5/1/2019, the text message intervention was implemented, and data was collected on medication refill pick-ups dates in addition to time spent performing the intervention. Pharmacy review of the dates of medication pick up for the first quarter of 2018 for each participant was performed and the data was recorded. On April 30, 2019 the focus group was conducted at the Be Well Clinic and qualitative and quantitative analysis was completed by May 10, 2019. Table 1 explains the timeline for this project.

Context and Risk Assessment

A risk assessment was done to identify potential risks which could have impeded project success. The first risk was the possibility that participants might switch insurance companies mid-project. This risk was mitigated through encouragement and education of the staff about the services and benefits MAPD insurance provides to encourage patients to continue with MAPD. Participants changing providers at any point during the project was also a risk. Educating the participant that this project was only being done in this office with this provider helped to keep patients within the practice to benefit from the intervention. Another risk which could have affected the success of the project was if patients did not check their phone. This would lead to missed reminder opportunities which are counterintuitive towards the purpose of this project. The participants of this project were made aware that checking their phone was imperative to the project to help them achieve their health care goals. An additional risk was disconnection of phone services. One way this risk was mitigated was to reach out to family members to aid the participant in being compliant with their phone bill during the duration of the project. Lastly, if a participant had no transportation, they were not able to go to the pharmacy to retrieve their medication which translated to poor adherence. Limitations to participation were multifactorial as much of this project was dependent on the actions of the participant. This project did not encounter any of these risks. Table 2 explains the risk assessment of this project, its impact, what was done to mitigate risks, forces that helped prevent this risk, and barriers that impeded the ability to prevent this risk.

Measurement Tools

The outcomes of increased medication refill pick-up and intervention times were measured using measurement tools that were validated and reliable. The first outcome

objective, medication refill rates, were measured using the Percentage of Days Covered (PDC) calculation. Although the PDC is one of several methods to calculate medication adherence, it is the leading method used to calculate medication adherence of populations. The PDC is also supported by the Pharmacy Quality Alliance (PQA) who have tested, validated and approved of PDC as a high-quality measure of medication adherence (Centers for Disease Control and Prevention [CDC], 2015). The PDC is the Centers for Disease Control and Prevention's preferred method for calculating medication adherence in populations (CDC, 2015). The percentage of days covered is calculated by determining the days of the patient's coverage periods, in this case, it is 90. Then the number of days the patient had medication in their possession is determined. For this project, it can be 0 days to 90 days. Divide the number of days the patient had their medication by the days in the patient's coverage period and then multiply by 100 to determine the percentage of days covered for each participant (CDC, 2015). The second outcome measured was a comparison between the amount of time it takes a staff member to notify a patient to pick up their medication via phone and text. No specific tool was used, but time for both methods was recorded. Once all the times were collected, the average was calculated to determine which intervention required the least amount of time. Time logs were collected precisely to ensure that accurate analysis can take place.

Results

The data were analyzed using SPSS v. 25. Descriptive analyses and frequencies were used to compare the intervention time (in seconds) between the text group and the phone group and to describe demographics. To compare the mean percentage of days covered by medication for the sample in 2019 with the mean percentage of days covered by medication for the sample in 2018, a Wilcoxon signed rank test was used. A Mann-Whitney U was used to compare the

time spent by staff on medication refill reminders between two groups, the text group and the phone group. Qualitative focus group data was analyzed using thematic analysis to identify patterned meanings in patient responses and to identify common reasons for medication refill adherence or nonadherence. Each response was sorted, with keywords, concepts, images, and reflections highlighted and sorted into different codes. The project team sorted similar codes and group them into themes and subthemes. The last question regarding communication participant preference of text message or phone call was analyzed using frequency analysis. The project leader transformed the responses for the preference of text and the preference of phone call into percentages to represent the preferred method of communication for the group. The analysis was performed at the micro level as the Be Well Clinic serves as a health care provider to the citizens in Weslaco and represents one provider office in the Medicare Advantage network for the Rio Grande Valley.

Evaluation Plan and Framework

The framework used to evaluate the project was the Plan-Do-Study-Act cycle. Also known as the Deming Cycle/Circle, PDCA, and control cycle/circle, the PDSA cycle was developed as a modification of the original Plan-Do-Check-Act cycle by W. Edwards Deming. The PDSA cycle is a four-stage problem-solving model used to improve a process or create a change (Minnesota Department of Health, n.d.). This model consists of identifying a goal and putting that plan into action. Then the action is carried out, the results are then analyzed, and evaluation of the goal is assessed. Changes to the intervention are essential to determine modifications needed to improve the project if needed to be reproduced. These steps are cyclical and can be repeated, each time improvements can be made to strengthen the intervention to

achieve better outcomes (The Deming Institute, 2018). Appendix D describes the PDSA cycle in relation to this project.

Outcomes

Eight diabetic patients with MAPD insurance using oral hypoglycemic medications were recruited for the study ($n=8$) with a mean age of 71 ± 5.497 years (range 65-79). Four participants were between the ages of 60-69 and four were between the ages of 70-79. Twenty-five percent were male and 75% were female. Fifty percent identified with and used the English language and 50% identified with and used the Spanish language. The time since diagnosis was divided into year blocks: 37.5% had been diagnosed with Y2D for 1-10 years, 12.5% had been diagnosed with T2D for 11-20 years, and 50% had been diagnosed with T2D for more than 21 years. Table 3 illustrates the sample demographics.

The percentage of days covered for each participant was calculated using data collected for 2018 and 2019 and then the percentage of days covered for all patients was averaged. Using the Wilcoxon method of statistical analysis, the use of the text message intervention to remind patients to pick up their medications was shown to not significantly increase medication pickup rate adherence as evidenced by a slight increase in the percentage of days covered in the participants in 2019 ($M=87.50 \pm 35.355$) versus 2018 ($M= 79.50 \pm 33.05$; $p=.248$). Table 4 illustrates these results. Using the Mann-Whitney U method, the examination of time spent using a text message intervention versus a phone call intervention (for a control group) found less time was spent using the text message method ($M=2$, $sd=0$) compared to the phone message method ($M=50.40 \pm 15.07$; $p=.001$). Table 5 illustrates these results.

Qualitative data was collected from two participants ($n=2$) who took part in the focus group. In response to the first questions asked: What did you think were the positive aspects in

receiving a text message reminder versus a phone call, the common theme among the two participants was accessibility. The common subtheme was that the text messaging was “easy” to use. One participant expressed that he only had to listen for the “ring” to check his phone and the message was there. He also stated that the text message was great for when he was in Mexico and he could not receive calls, but he could still receive information relayed to him via text. Another participant said that if she misses a call, she does not get the information trying to be related; however, when she gets a text, even if she does not read it right away, the information is there to look at when she can. When asked the second question: What did you think were the negative aspects in receiving the text message reminder versus a phone call, both participants answered “nothing.” Lastly, when asked what method of reminder they preferred, both participants responded with “text.” These responses support that patients preferred text messaging over phone calls to remind them to pick up their medication from the pharmacy.

Discussion

The project outcomes do not support existing literature in that text messaging did not help patients significantly increase their adherence rates for medication pick-ups from the pharmacy; however, this data showed that text messaging was clinically significant by the increase in percentage of days covered from 2018 to 2019. One reason this result may have not reached significance was due to the small sample size and short time period for the project. This intervention provided data that supported the implementation of text messaging in the Be Well Clinic. Implementation of text message reminders might also be used with other metrics measured medications (statins, ACE/ARB) at the Be Well Clinic to widen the potential patient participation pool. Future projects could be implemented in other primary care practices that also accept MAPD insurance and are striving for a five-star rating.

The cost of this project was \$74.06 which included the cost of office supplies and the data plan for the office cell phone. The cost to implement this project in the future is \$257.97 which includes office supplies, data plan and the salary of the medical assistant using 1 minute/patient/day at a rate of 1 patient per day x 90 days with an hourly wage of \$9/hour should one be paid for their participation in this project. The projected revenue is dispersed in a monthly capitation rate and in an end of the year bonus as a result of a bonus structure dependent on the practices' star rating and size of the practices' MAPD population. Table 6 summarizes the cost to implement the intervention in the primary care setting. The cost to implement this project is justified based on the incentive bonus which is distributed to the clinic through the incentive program. The American Diabetes Association (2018) reported the total estimated cost of diagnosed diabetes in 2017 was \$327 billion, which included \$237 billion spent on direct medical costs and \$90 billion in reduced productivity due to factor such as lost wages. This dollar cost realized the financial burden of diabetes on the economy which supports the need for interventions to assist patients in controlling their T2D which helps to reduce these costs. The implementation of text messaging comes at a cost that is nominal to the provider, but its potential ability to increase patient adherence rates and improve metric standards can translate into larger bonus payout for the provider.

Summary and Relation to Other Evidence

The recruitment of individuals to the project was successful and a challenge for the project team. Patients who were approached to join the project either did so with excitement or refused. Implementation of the text message intervention was simple and efficient. Even though participants had been told that they did not have to respond to the text (a recruitment point which enticed several patients to participate) one participant did respond with a thank you.

Comparing this project to the study by Nundy et al. (2014) which revealed that satisfaction with the implementation of text reminders as a form of staff support increased by 0.3% at the end of a six-month period, we saw similar results with the analysis of our qualitative data which showed that text messaging is a preferred patient reminder method as evidenced by responses to questions regarding positive attributes of text messaging reminders. Similarly, Peimani et al. (2016) found the use of text messaging to influence self-management behavior in people with T2D increased medication adherence and lowered fasting blood sugars from a mean of 172 mg/dl to 152 mg/dl and lowered A1C levels from 7.29% to 7.06%. This project indicated that the use of text messaging at the Be Well Clinic influenced self-management behaviors in the retrieval of medications from the pharmacy within a 90 day pick up time as evidenced by an 8% increase from 2018 to 2019. A retrospective study ties these two concepts together in which increased medication adherence to metformin and sulfonylureas helped patients obtain an A1C level of below 7 by 10% and 15% respectively compared to individuals who did not reach their A1C goals (Lawrence, Ragucci, Long, Parris, Helfer, 2006).

Limitations

Several limitations affected the study. The small sample size limited the ability for the data to be significant. Power analysis revealed that 104 participants were needed to find significance. At times the text message reminder was not able to be sent at 0800 because the pharmacy had not been contacted as to whether the patient picked up their medication or not. This was due to some of the pharmacies not opening until later in the morning. This caused a delay in the text messaging, but it was still delivered to the patient in a timely manner before the end of the workday. One participant had the dosage of their diabetes medication changed which affected the medication refill time as it was a new prescription. External limitations were heavily

felt when dealing with the pharmacies. When attempting to shut off text reminders from the pharmacy, some pharmacies did it without a problem and some did not. Certain pharmacies wanted the patient to opt completely out of text messaging instead of the text messaging reminder be temporarily placed on hold. Variability in data was a limiting factor due to multiple pharmacy reporting of different medication pick up times to the project team. Sometimes the data needed to be confirmed by up to three pharmacy staff members to determine the correct information needed. The most limiting factor the project team encountered was when researching pick up dates to calculate the percentage of days covered for 2018. The project team found that the insurance portal showed pharmacy claims made for the oral hypoglycemic medication, but the pharmacy staff denied any medication claims were made for the first quarter time period the project team was using. This severely impacted the project as four of the twelve participants had to be excluded from the project as the information to make a comparison between the two time periods was incomplete.

Conclusion

Although this project did not find a significant difference to support the use of text messaging to increase medication pickup rate adherence, it did find a substantial decrease in the amount of time office staff used to remind patient to pick up their medication from the pharmacy, which is of great clinical significance to the operation of the clinic. This decrease in time spent performing patient reminders allowed staff members to complete other tasks; thus, being more efficient and effective with organizational tasks. This project also found that participants chose text messaging as a preferred reminder method. These findings have the potential to impact communication between the Be Well Clinic and the patient.

Future implications for continuing this project is to use a larger patient population. Since the Be Well Clinic had only 35 T2D patients on an oral hypoglycemic medication, this still does not represent a sufficient sample size which would give the data power. To improve clinical significance, the project team would need to include and recruit from several provider organizations and use their populations in conjunction with the Be Well Clinic. Including a longer intervention period could give the project more meaning. This project only looked at the first quarter of the year. Expanding participants responses to the intervention throughout the quarters of the year could increase the clinical significance of the project. Lastly, the use of an incentive could help increase the number of participants recruited.

Implementing a successful text messaging program not only has the potential to impact patients on a local level; but, can be the driving factor to change policies and regulation regarding information technology as a tool to promote positive health care outcomes. This impact was noted when the Joint Commission lifted a five-year ban on text messaging for clinicians in 2016. This change allowed for text messaging to take place through secure applications, such as TigerText, to help eliminate the approximate \$150 billion wasted through the use of inefficient health care systems in 2015 (Wicklund, 2016). New applications in communication, such as text messaging, allows health care systems to streamline their processes and focus on patient care.

Implementation of text messaging to encourage patients to pick up their oral hypoglycemic medications could improve health care outcomes at Be Well Clinic. A successful, continued text messaging program implemented in this clinic may promote policy changes and communication between patient and provider. Regulations under HIPAA (Health Insurance Portability and Accountability Act) have impacted changes in privacy laws as a result of text

messaging, and further use of this technology can open doors for new vendors of secured text messaging platforms to create competition among companies making this technology affordable for all practices and patients. The integration of technology into primary care practice is becoming increasingly popular. The use of electronic reminders such as text messaging to increase medication compliance and adherence was shown to be beneficial and efficient for this clinic.

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LIST OF APPENDICES

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APPENDIX 1: Determination of Non-Human Subjects from the IRB



TEXAS A&M UNIVERSITY
CORPUS CHRISTI

OFFICE OF RESEARCH COMPLIANCE
Division of Research, Commercialization and Outreach
6500 OCEAN DRIVE, UNIT 5844
CORPUS CHRISTI, TEXAS 78412
© 361.825.2497

Human Subjects Protection Program Institutional Review Board

DATE: January 2, 2019
TO: Bunny Forgione, Nursing and Health Sciences
CC: Adrienne Casciato, Student
FROM: Office of Research Compliance
SUBJECT: Not Human Subjects Determination

Activities meeting the DHHS definition of research or the FDA definition of clinical investigation and involves one or more human subjects are subject to IRB review and approval.

On January 2, 2019, the Texas A&M University-Corpus Christi Institutional Review Board reviewed the following submission:

Type of Review:	Not Human Subjects Determination
Title:	Text Message Alerts to Increase Medication Refill Adherence in Hispanics with Type 2 Diabetes
Project Lead:	Bunny Forgione
IRB ID:	NHS 49-18
Funding Source:	None
Documents Reviewed:	Casciato_ Form, Not Human Subjects Research Request Casciato_ Quality Improvement Project Casciato_ RecruitmentScript Casciato_ Textscript Casciato_ ConsentForm Casciato_ DataTable Casciato_ MasterList Casciato_ DataTablePhoneCall Casciato_ Demographic Sheet Casciato_ Letter of Support FINAL

Texas A&M University-Corpus Christi Office of Research Compliance determined that the proposed activity does not meet the DHHS definition of research or the FDA definition of a clinical investigation.

Therefore, **this project does not require IRB approval.** You may proceed with this project.

Please do not hesitate to contact me with any questions at irb@tamucc.edu or 361-825-2497.

Respectfully,

Rebecca Ballard, JD, MA, CIP
Digitally signed by Rebecca Ballard, JD, MA, CIP
Date: 2019.01.02 09:37:39 -0600

Rebecca Ballard, JD, MA, CIP
Director, Research Compliance
Division of Research, Commercialization and Outreach

APPENDIX 2: Letter of Support

October 10, 2018

Dr. Yolanda Keys
Associate Dean for Academic Programs
College of Nursing and Health Sciences
Texas A&M University - Corpus Christi
6300 Ocean Drive
Corpus Christi, TX 78412

Dear Dr. Keys,

The purpose of this letter is to provide Adrienne Casciato, a Doctor of Nursing Practice student at Texas A&M University College of Nursing and Health Sciences, support in conducting a quality improvement project at Be Well Clinic. The project, Text Messaging Alerts to Increase Medication Refill Adherence in Hispanics with Type 2 Diabetes, entails implementation of text messaging to the defined population to increase prompt pick up of medication from the pharmacy and analyzing data to determine if this form of communication is more efficient and cost effective than current organizational practices.

The purpose of this project is to determine if text message reminders to patients with type 2 diabetes can increase oral hypoglycemic medication refill adherence percentages, to determine if there is a change in patients' perception regarding medication pick-up adherence, and to improve clinic processes. Be Well Clinic was selected for this project because it provides access to the population of interest and has a need for process change to improve current practice regarding medication refill reminders. Adrienne Casciato is employed at this institution and has an interest in improving care at this facility.

I, Dr. Melecia Fuentes, MD, at Be Well Clinic, do hereby fully support Adrienne Casciato in the conduct of this quality improvement project, Text Messaging Alerts to Increase Medication Refill Adherence in Hispanics with Type 2 Diabetes at Be Well Clinic.

Sincerely,



A handwritten signature in blue ink, appearing to read 'Melecia Fuentes', is written over a horizontal line.

APPENDIX 3: Patient Consent Form

Chart # _____

Patient Consent Form

I, _____, agree to have text message reminders sent to the phone number provided on my Demographic Form, by Be Well Clinic staff to remind me to pick up my diabetes medication. I understand that data rates may apply, and I am responsible for those charges.

Signature _____ Date _____

APPENDIX 4: Plan-Do-Study-Act (PDSA) Cycle

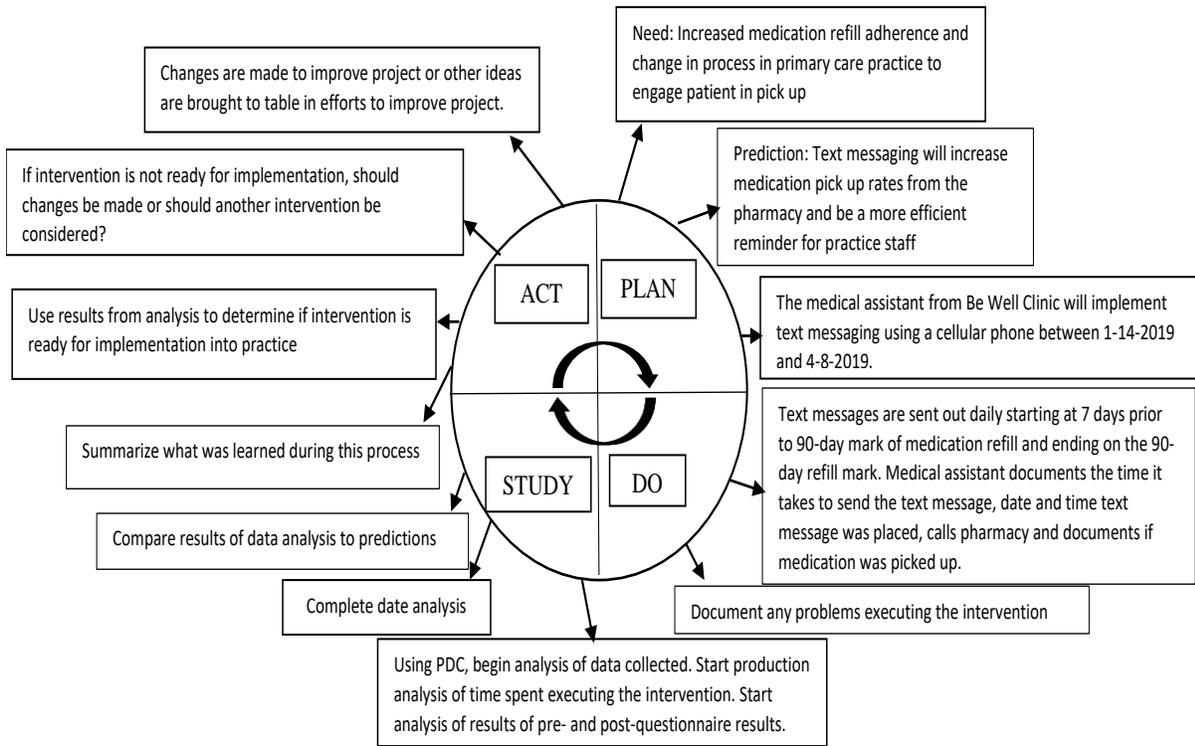


Table 1.

Timeline for Implementation of Text Messaging Reminders to Increase Medication Pick-Up

Project

Date	Accomplishment
1/23/19-1/31/19	Chart review, sample recruitment and enrollment
1/31/19	Completed demographic sheets
2/24/19	Gathered medication refill data from pharmacy
2/25/19-5/1/19	Implemented text messaging medication reminders
4/30/19	Conducted focus group
5/10/19	Data analysis

Table 2.

Risk Assessment for Implementation of Text Messaging Reminders to Increase Medication Pick-

Up Project

Risk	Impact	Countermeasure	Facilitators	Barriers
<i>1. Event/ Element that could negatively affect the project</i>	<i>How it could affect the project</i>	<i>What you can do now to mitigate this risk</i>	<i>Forces that could help you prevent or mitigate this risk from occurring</i>	<i>Forces that could impede your ability to prevent or decrease this risk</i>
1. Participant switches insurance	The participant would be excluded from the project	Encourage patients that we are implementing processes to help them lead healthy lifestyles Educate patient and families about the services offered with this insurance	Staff can check the active status on the MAPD website to ensure they are still enrolled. If they have unenrolled, staff can call them to convince them to change back	Patient has the right to change insurances at will
2. Participant changes primary care providers	The patient would be excluded from the project	Participant can be made aware that this project is being done in this facility only and they would not be able to participate if they change providers	Engaging staff of the advantages of this project has on their practice might encourage them to excite patients for participation	Patients have the right to change providers at any will, Be Well Clinic will not to accept patients back once they have transferred
3. Participant does not check their phone	The participant would not receive the text message reminder	Participants will be made aware that checking their phone is imperative to the project	Staff members will emphasize the checking of text messages. Family members will also be encouraged to remind the participant to check their text messages for the alerts.	Patients may not know how to check their text messages; patients may forget to check them; patients may not always have their phone on them at the time of the text message being delivered
4. Participants phone gets disconnected	The participant would not receive the text message reminder	Potential participants may need to be screened to determine barriers to keeping their phone connected	Family members can assist the participant in keeping their phone connected	Participants may not be able to afford the phone with text capabilities
5. Participants have no transportation to pick up medication from the pharmacy	The participant would not receive	Potential participants need to be screened for barriers to	Family members can be asked to pick up medications for the	Participants may have no familial support, no transportation, & have to rely on delivery or

	their medication	transportation and familial involvement regarding the ability to pick up medications	participant from the pharmacy.	on the adult day care to obtain meds
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Table 3.

Demographics

	Frequency (N=8)	Percentage
Age (in years)		
60-69	4	50%
70-79	4	50%
Gender		
Male	2	25%
Female	6	75%
Preferred Language		
English	4	50%
Spanish	4	50%
Time since diagnosis (in years)		
1-10	3	37.5%
11-20	1	12.5%
21+	4	50%

Table 4.

Wilcoxon Signed Ranks Test Comparing PDC for Pre-intervention to Post-intervention

	Pre-Intervention Mean-Rank	Post-Intervention Mean-Rank	Z-Score	Significance
PDC	3.2	5.0	-1.156	$p = .248$

Table 5.

Mann-Whitney U Test Comparing Phone Call Time to Text Message Time (in seconds)

	Phone Call Mean Rank	Text Message Mean Rank	U-score	Significance
Reminder Method	4.5	11.0	0.0	$P = .001$

Table 6.

Budget for Implementation of Text Messaging Reminders to Increase Medication Pick-Up Project

Cost Category	Budget	Actual	Difference	Description/Comment
PROJECT EXPENSES				
Direct Costs (project expenses)				
1 ream of paper	\$5.47 (Walmart)			Used to print consents and data sheets – Georgia Pacific Standard Paper
1 black toner cartridge	\$35			Used to print consents and data sheets – For use with HP LaserJet Enterprise 600 Printer with 10,000 yield
MA salary	\$115.97 – project cost for text messaging \$675 – project cost for phone calls			Cost for texting patients using 1 min/patient/day at a rate of 1 patient per day x 90 days with an hourly wage of \$9/hr Cost for calling patients using 5 min/patient/day at a rate of 10 patients per day x 90 days with an hourly wage of \$9/hr
Text messaging enabled phone	\$0 - gifted			Used to text patient alerts – T-mobile I-phone 6
Data plan for the phone	\$97 (Walmart)			Unlimited Talk-Text-Data card with 6GB of data
1 subject notebook	\$1.78			Used to record data - Mead
Pens	\$2.75			Used to record data – Papermate ballpoint pens – black ink, quantity of 12
Total Project Expenses	\$257.97			
PROJECT REVENUE				
Total Project Revenue				
PROJECT BENEFIT/LOSS				
Total Revenue	variable			
Less Expenses	-257.97			
TOTAL PROJECT BENEFIT/LOSS	variable			