INCREASING FOLLOW UP FOR MODERATELY EFFECTIVE REVERSIBLE CONTRACEPTION IN ADOLESCENTS AT A SCHOOL BASED HEALTH CENTER

by
Yasmin Zulfiqar Bahar

A capstone project submitted to the
School of Nursing
The State University of New York
in partial fulfillment of the requirements for the degree of Doctor of Nursing Practice

December 12, 2018
DNP Capstone Project Approval Form

This is to certify that Yasmin Zulficar Bahar

(Name of Student)

successfully defended his/her Capstone project entitled:
Increasing Follow up for Moderately Effective Reversible Contraception in Adolescents at a School Based Health Center

on December 12, 2018.

(Date)

Capstone Faculty Advisor
Sharon Hewner, PhD, RN, FAAN
(Typed Name)
(Signature)

Committee Member 1*
Jennifer Guay, DNP, CNM
(Typed Name)
(Signature)

Committee Member 2*
Melinda Haas, DNP, FNP-BC
(Typed Name)
(Signature)

Committee Member 3*

(Typed Name)

(Signature)

*If applicable
Abstract

Most adolescents initiating moderately effective reversible contraceptive methods discontinue within a year. Failure to return for refill appointments results in early discontinuation of birth control. The objective was to determine how the use of text message appointment reminders sent through the patient portal might affect contraceptive refill appointment adherence in adolescents initiating birth control. Evidence is limited on the use of text message reminders for appointment adherence. Targeting the Use of Reminders and Notifications for Uptake by Populations Framework was applied. Chi-square analysis was applied to the control group and intervention group receiving text message appointment reminders. Control: All patients initiating MERC from January 2017 through March 2017 and patients initiating MERC from January 2018 through March 2018 who did not enroll for text message appointment reminders. Intervention: Patients enrolled for text message reminders initiating MERC from January 2018 through March 2018. Barriers in patient portal enrollment resulted in only 4 participants enrolled in text message group. Appointment adherence increased from 35.2% in 2017 participants to 48.6% in overall 2018 participants and 75% in the text message group. Due to the low enrollment rates, increased appointment adherence in 2018 participants cannot be attributed solely to text message appointment reminders and was likely confounded by other practice changes. The project identified barriers and proposed solutions to improve implementation of text message reminders to address the significant health concern of follow-up adherence failure resulting in unintended teen pregnancy.
Acknowledgements

I would like to thank everyone that has helped me throughout this capstone project. I would especially like to thank my faculty advisor Dr. Dianne Loomis and my capstone advisor Dr. Sharon Hewner for their incredible patience, guidance, and understanding throughout this entire process. I could not imagine having been successful in this endeavor without all your support.

I would like to give a very special thanks to my family and friends for all their support and patience in this huge undertaking. They have had to deal with my neglect in the pursuit of my profession goals and their endless words of encouragement pushed me to continue even though there were plenty of times where I considered quitting. I would like to thank my parents who believed in me when others did not, as their confidence in me pushed me to be the best version of myself that I can be. I have only wanted to make you proud. To my loved ones that have passed, I wish you could have been there with me to see this day. You provided me with security and comfort during the hardest times and I never would have made it here without your love and support. I would like to thank my boyfriend for keeping me grounded and focused until the very end. You have really been my rock and your support has meant more to me than I can ever express.

I would also like to thank my coworkers for their help. I appreciate your willingness to take on additional work on top of an already heavy caseload in order to help me achieve my educational goals. I would especially than Dr. Melanie Gold who has served as a mentor to throughout this process. I feel like the trajectory of my career completely changed after you took me under your wing and I look forward to collaborating with you on more projects in the future.
Nature of Project and Problem Identification

According to the American College of Obstetricians and Gynecologists (ACOG) (2012), 42% of female adolescents between the ages of 15 to 19 years of age have had sexual intercourse. School based health centers (SBHC) provide reproductive health services to adolescents in a setting that is convenient for the adolescent and removes many barriers to health care. SBHCs are able to dispense contraception on site. The practice at most SBHCs in New York City (NYC) is to dispense several months of contraception to the patient who will then follow up at the SBHC just prior to finishing their supply in order to obtain a refill. Continuation rates for moderately effective reversible contraception (MERC) is 44% for female adolescents between the ages of 15-19 years old (ACOG, 2017). There are many reasons why adolescents discontinue their contraceptive method and follow up is essential to address any concerns, provide reassurance, monitor for side effects, and assess the ability to adhere to their chosen method. According to the American Academy of Pediatrics (2007), “frequent follow-up is important to maximize compliance for all methods of contraception, to promote and reinforce healthy decision-making, and to screen periodically for risk-taking behaviors and sexually transmitted infections (STI)” (p. 1144).

The main purpose of contraception is to avoid unplanned pregnancies. Eighty two percent of teen pregnancies in the United States are unplanned (ACOG, 2012). An estimated 614,400 U.S. teenagers between the ages of 15-19 years of age became pregnant in 2010 with 367,700 births to teenagers that year, suggesting a large percentage of pregnant adolescents have a spontaneous or elective termination of their unplanned pregnancies (Kost & Henshaw, 2014).
The U.S. continues to have the highest adolescent pregnancy rate among industrialized countries with available data despite the fact that the birth rate among adolescents in the U.S reached a historic low in 2015.

Lack of adherence to follow up appointments is a significant problem for the Advanced Practice Nurse (APN) working with adolescents at a SBHC as it can lead to poor patient outcomes and unintended pregnancy. Inconsistent use, such as forgetting to take their contraceptive method or refill the prescription before their supply ends, leads to failure rates of 6% for contraceptive injection users and 9% for all other MERC users (Bocanegra, Bradsberry, Lewis, & Maguire, 2017). In providing comprehensive health services, follow up appointments address more than just side effects and patient concerns regarding their contraceptive method. These visits promote continuation of contraception, reinforce healthy behaviors, and are an opportunity to screen for risk-taking behaviors and provide counseling for risk reduction. The patient can also be offered a different contraceptive method during that visit if side effects are intolerable, but such opportunity would be lacking without follow up.

Adolescents tend to be technologically savvy and there are increasing numbers of studies evaluating how technology can be used to supplement reproductive health services. The use of text messaging has become increasingly popular in health care. L’Engle and colleagues (2016) conducted a systematic review to determine the effectiveness of various mobile health interventions. After a review of 35 articles that met the inclusion criteria, text messaging appeared to be more effective than other mobile technology methods. The use of cell phone calls in the adolescent population was found to have no effect. Educational and motivational text messages, on the other hand, were associated with increased adherence, decrease self reported participation in risky behaviors, increased barrier methods use, increased STI testing, and
improved oral contraceptive pill continuation (L’Engle, Mangone, Parcesepe, Agarwal, & Ippoliti, 2016).

A second systematic review found interactive text messages were associated with increased adherence (Smith, Gold, Sumpter, & Free, 2015). In a quantitative systematic review (Park, Howie-Esquivel, & Dracup, 2014), 18 out of 29 studies involving text messaging demonstrated increased adherence. The negative studies used simple repetitive text medication reminders, whereas positive studies included educational, motivational, and personalized messages.

The use of text messages appears to be effective in increasing contraceptive adherence in the adolescent population and may also be effective in increasing adherence to follow-up appointments. In a randomized control trial (Trent, Thompson, & Tomaszewski, 2015), patients who received text appointment reminders versus telephone call reminders returned closer to their scheduled appointment for the first visit. In a similar study (Bocanegra et al., 2017), patients using Bedsider e-mail or text message appointment reminders had a statistically significant increase in kept appointment rates, however, the authors did not analyze results for text versus e-mail users. Although these studies have demonstrated that text message reminders can increase adherence to appointments for contraceptive injection users, there is limited evidence on the impact of text message appointment reminders for refill appointments for other contraceptive method users.

New York Presbyterian Hospital’s (NYPH) patient portal allows patients to sign up for text message appointment reminders. One of the organization’s meaningful use goals includes having a certain percentage of patients enroll in the patient portal. The utility of the patient portal in the adolescent population, however, has not been assessed. Prior studies evaluating adherence
to Human Papilloma Virus vaccination appointments in NYPH SBHC patients found that text message appointment reminders sent to the parents were most effective at increasing kept appointment rates. Portal text message appointment reminders for contraceptive appointments were not studied in the adolescent population because notification of the parent is not a comfortable option for most patients seeking reproductive health services. Many teenagers have cell phones and would be able to receive text message appointment reminders without parental knowledge.

A needs assessment was completed by the clinic staff through the evaluation of the New York City Department of Health’s (NYCDOH) Sexually Active Patient Tracking Report. Based on the Sexually Active Patient Tracking Report provided by the NYCDOH for the 2016-2017 school year, 104 out of 148 sexually active female patients who presented to the NYPH SBHC for MERC did not follow up again at the SBHC for refills of their contraceptive method, suggesting a continuation rate of approximately 30%. Adolescent continuation rates for MERC are exceptionally low but the continuation rates at the John F. Kennedy (JFK) SBHC are below the national average of 44%. SBHCs have a “captive audience” of student patients who are present at school daily and should have systems in place to increase kept appointment rates for refills and follow up in order to address any patient needs or concerns prior to discontinuation of contraception. These findings from the Sexual Activity Patient Tracking Report indicate the need for interventions aimed at increasing patient follow up appointments. No reminder or recall system currently exists for patient follow-up at JFK SBHC.

The purpose of this research is to determine how the use of text message appointment reminders using the patient portal may influence adherence to follow up appointments. Parents of adolescents do not have access to the patient portal at NYPH. Failure to adhere to follow up
appointments for contraceptive refills is a significant problem at JFK SBHC. A secondary purpose for this research is to determine if students who have chosen to discontinue contraception have followed up with a medical provider at least once. Beginning in January 2018 the SBHC medical providers began offering to register patients for the patient portal so they can receive text message appointment reminders.

The capstone question for this pilot project is: In adolescent females between the ages of 13-23 using MERC at a SBHC, how does the use of text message appointment reminder notifications sent using the patient portal 6-8 weeks after initiation of a new birth control method compared to usual care (patient scheduled for an appointment and is responsible for remembering to follow up) influence adherence to follow up appointments? The researcher will be looking at the variables of appointment adherence, history of previous use of another MERC method with discontinuation, history of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit, history of pregnancy, and history of previous STIs. The researcher anticipates that the group that signs up for text message appointment reminders will have a higher appointment adherence rate. Previous discontinuation of another MERC method may make them more likely to discontinue their current method, however, there is no evidence of this in the literature. In a study of early predictors of contraceptive discontinuation, the researchers found no statistical significance between users and nonusers of MERC methods at 6 months based on previous hormonal contraceptive use or previous pregnancy (Maslyansyka, Coupey, Chhabra, & Khan, 2016). Lack of condom use, previous history of pregnancies and history of STIs are indicators of high-risk sexual behavior in adolescents. The researcher anticipates that patients who engage in high-risk sexual behavior may be more likely to discontinue MERC methods.
Review of Literature and Theoretical Framework

Review of Literature

There is limited evidence on the effectiveness of text message appointment reminders for adolescent contraception visits. Most studies that have evaluated the effectiveness of text message appointment reminders involve a variety of clinical settings. A quasi-experimental study in an adolescent mental health clinic had a small sample size of 48 participants (Branson, Clemmey, & Mukherjee, 2013). The text message intervention group had a statistically significant increase in attendance compared to the control group (65% vs. 49%, p < 0.05).

Narring and colleagues (2013) conducted a randomized control trial at a youth clinic in Australia. Participants in the intervention group received text message appointment reminders. The researchers found that text message appointment reminders had no statistically significant effect on appointment attendance (p=0.346) compared to the control group. The proportion of missed appointments in the intervention group was 16.5% (95%CI 13.1%-19.8%) versus 20.0% in the control group (95%CI 16.6%-23.4%) (Narring et al., 2013). The authors did note that missed appointments were particularly low for gynecology and mental health appointments in intervention group participants, but the results were not statistically significant and the study was not adequately powered to confirm this.

A systematic review was conducted to determine what brief teaching methods worked best for increasing contraceptive continuation and decreasing risky behaviors (Lopez, Grey, Tolley, & Chen, 2016). The authors found there was a lack of adequate evidence in this area. Although there was no statistically significant increase in Depo-Provera continuation rates, the authors reference one study where participants in the text message intervention group were more likely to show up for their appointments.
In a quasi-experimental study with a matched control group, participants in the intervention group were signed up for bedside text message and e-mail reminders (Bocanegra et al., 2017). The study used 365 matched pairs. They were matched by contraceptive method, time frame of index visit, age, and preference to Family Planning clinic patients. Only one clinic was able to collect data for kept appointment rates for reproductive health visits separate from the overall kept appointments at the clinic. They found that there was a statistically significant increase in the kept appointment rate at the clinic that was able to collect the needed data. Kept appointment rates increased from 81% in the baseline year to 85% in the follow up year ($z = -5.47; p < 0.001$). The no-show rate decreased significantly from 12% to 9% from before and after the intervention periods ($z = 5.16; p<.001$).

In a randomized control trial called the DepoText pilot study, participants were sent daily text messages starting 72 hours before their schedule appointment date (Trent et al., 2015). Eighty-seven percent of participants completed Depo-Provera injection cycle 1, while 77% completed cycle 2 and 69% completed cycle 3. On-time visit adherence declined over time with 51% for the first visit, 47% for the second, and 43% for the 3rd. Adolescents in the intervention group were more likely to return on time for their appointments than the control group in the first and second cycle (68% vs. 56% for the first cycle, 68% vs. 62% for the 2nd cycle) but not for the 3d cycle (73%vs. 72%). Adolescents were also more likely to return sooner after a scheduled appointment in the first cycle than their control group peers ($B= -0.75$ days $95\% CI: -1.4-0.06$, $p=0.03$).

In a follow up study, the researchers analyzed qualitative and quantitative data from the initial DepoText trial (Irons, Tomaszewski, Buchanan, & Trent, 2015). The authors analyzed data from any participant who had less than a 100% response rate during the initial study period.
They found that 78% of participants reported that the nonresponse was due to being away from the phone or having a personal conflict. Service disruption due to nonpayment was reported by 44% of participants and 28% reported losing their phone. Another 28% of participants reported a change in cell phone number. Despite these barriers to continuous service, 96% of participants reported satisfaction with text message appointment reminders and reported that they felt more connected to the clinic as a result.

A systematic review found that the rise in cell phone use and decline in landline use indicates a need to change to match the trends and that phone calls may not be the most effective method of reminder (Castano, Stockwell, & Malbon, 2013). Information regarding appointments stays readily accessible for easy reference using text message appointment reminders. The authors state that 96% of women in an oral contraceptive pill adherence text message study expressed interest in a service that would provide text message appointment reminders. Two percent of participants reported sharing cell phones. Twenty eight percent (28%) of participants in that study reported a service interruption or change during the 6 months, but it did not weaken the effect of the intervention. The number one reason for poor adherence to appointments is forgetfulness. There is no evidence on impact of timing of the text message appointment reminders on attendance.

There are a limited number of studies on the efficacy of text message appointment reminders in adolescents for contraceptive visits, however, some studies have shown text message visit reminders to be effective in this population. In a randomized control trial of adolescent patients in the Emergency Department who were diagnosed with Pelvic Inflammatory Disease (PID), the intervention group received text message reminders to visit for a follow up for PID (Wolff, Balamuth, Sampayo, & Mollen, 2016). The control group received standard care.
The study found that 15.2% of participants in the standard care group vs. 43.5% of participants in the text message group actually followed up. Patient receiving text message reminders were more likely to follow up than the control group (RR 2.9; 95%CI 1.4-5.7).

Theoretical Framework

There are several theoretical and conceptual frameworks used in other studies regarding contraceptive adherence that can be applied to contraceptive appointment adherence. A patient who is adherent to their contraception should theoretically be more inclined to show up on time for refill appointments. Coomes and colleagues (2012) describe the conceptual framework for the communication functionality of short message service. Factors influencing communication functionality of short message service includes if they are single component or multicomponent interventions, interactivity, frequency, timing, and tailoring of message (Coomes, Lewis, Uhrig, Furberg, Harris, & Bann, 2012). The conceptual model depicts how certain psychosocial factors may mediate the impact of SMS communication on health care quality and outcomes. Some of these psychosocial factors include patient involvement, social support, medication adherence, risk behaviors, health and well-being. Adherence to appointments is listed under patient involvement.

A conceptual framework for identifying the factors that contribute to intention to attend and appointment adherence is called Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP) (McLean et al., 2014). For the purpose of this project, TURNUP appears to fit best as it can help to identify factors in a text message appointment reminder study that may impact intention to attend and actual appointment attendance. TURNUP was developed by adopting aspects of health-care utilization theory, the theory of planned
behavior, the transtheoretical model, self-determination theory, protection motivation theory, rational choice theory and complexity theory (McLean et al., 2014). The six elements of TURNUP include the reminder-patient interaction, reminder accessibility, health-care setting, wider social systems, cancellation and rebooking, and distal or proxy attributes. This is depicted in Figure 1.

*Figure 1. Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP).* Reprinted from “Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP): a systematic review and evidence synthesis” by S. McLean, M. Gee, A. Booth, S. Salway, S. Nancarrow, M. Cobb, and S. Bhanbhro, 2014, Southampton (UK): NIHR Journals Library. Copyright 2014 by Queen’s Printer and Controller of HMSO.
These elements align to the current project as follows:

A. The reminder-patient interaction increases the patient’s intention to attend, reduces patient-specific obstacles to attendance, and increases patient specific enablers to attend. If the enablers outweigh the obstacles, the patient will intend to attend the appointment. In a SBHC, the text message appointment notification would address the obstacle of forgetfulness.

B. Reminder accessibility: whether or not the patient receives the reminder and is able to understand it. In this study, staff will ask the patients if they received their appointment reminder. In addition, language preference can be selected so the appointment reminders are in the patient’s preferred language.

C. The health-care setting influences patient-level obstacles and facilitators. Factors include the source of the original appointment, timing of the appointment, and service location. In addition, features of service that impact the patient experience can influence positive perception. Service factors include wait times, and whether it is a first or follow up appointment. In the SBHC, patients either miss lunch or class in order to seek health care. In some cases, students may stay after school to receive medical care. It is important that clinic staff try to adhere to the appointment times as closely as possible to increase future attendance.

D. Prevailing norms of behavior and attitudes of the wider social system can influence patient perceptions. Student’s expectations regarding the impact on wellbeing, the emotional experience, compatibility with other commitments (such as childcare), and morality influence attendance. Other commitments for adolescents can include extracurricular activities. The study protocol includes a team of peer educators who will be encouraging the entire student
body to sign up for the patient portal and the researcher anticipates this will increase the acceptability of participants.

E. Intention to attend does not always result in attendance because of additional obstacles that arise for the patient who may otherwise intend to attend their appointment. Ease of cancellation and rebooking can influence the patient’s intention to attend. Currently there is no cancellation and rebooking system. As part of this project patients will be advised that they can go to the clinic to cancel and rebook or they can call the clinic. There is a walk in policy and open schedule to reduce the barriers of waiting for a refill appointment.

F. Distal/proxy attributes refer to the fact that a range of factors can act as markers or proxies for individual factors that are enablers or obstacles to attendance. These factors help determine how the effectiveness of a particular approach varies by setting. The SBHC at New York Presbyterian Hospital have not been using the portal. Although the outpatient adolescent clinic is currently using the patient portal, SBHCs do not have the same level of staffing to successfully implement the same procedures. SBHC health care providers who are seeing the student will sign up patients for the portal.

Text message appointment reminders have been used in other settings to increase kept appointment rates. There is inadequate evidence on the utility of a text message appointment reminder system at SBHCs. Theoretically SBHCs should have a higher rate of appointment adherence than other health care settings due to the ease of access to their patients. A systematic approach is necessary to determine if text message appointment reminder notifications can increase adolescent adherence to contraceptive appointments in adolescents initiating MERC.
Methods

Design

This study was a retrospective chart audit. The control group was a convenience sample of student patients who received standard care using retrospective data from January 2017 through March 2017. The intervention group included all patients in the 2017 to 2018 school year who received the intervention from January 2018 through March 2018. Approximately 15 to 20 patients initiate contraception every month. Based on the NYCDOH’s Sexually Active Patient Tracking report, 49 student patients presented to the SBHC for MERC follow up with 27 presenting for initiation of MERC methods from January 2017 through March 2017. Because the 2017 to 2018 school year had the highest visit rate since the clinic opened, the researcher expected the number of patients presenting to the SBHC for MERC initiation to be higher than the previous year.

The setting in which this study took place was the JFK SBHC. The Health Center serves seven Public High Schools and approximately 4,000 students in the Riverdale section of the Bronx. The SBHC is run by NYPH healthcare network. The clinic has four exam rooms with two Nurse Practitioners and one Physician on staff full time who can provide reproductive health services. Clinic staff also includes a Medical Assistant, two Health Educators, three Patient Financial Advisors, a Dentist, a Dental Hygienist, a Dental Tech, and twelve Peer Educators. The participants of the study were enrolled student patients at any of the seven schools that the JFK Campus SBHC serves.

The participants selected for the study included female adolescents, ages 13 to 23 years, who presented to the SBHC to initiate MERC. The participants were not randomly selected, as the researcher expected to apply the intervention to all patients who sought reproductive health
services at the SBHC. All data was collected between January 1st and March 31st in all years. The text message reminders group was compared to a 2017 control group of female adolescents who initiated moderately effective reversible contraception during the same time in the 2016 to 2017 school year. There was a second 2018 control group of patients who initiated MERC but did not enroll in text message appointment reminders. Inclusion criteria for the 2017 and 2018 control groups includes all female patients between the ages of 13 to 23 who received usual care 6-8 weeks after initiation of a new MERC method. Inclusion criteria for the 2018 text message reminder group includes all female patients between the ages of 13 to 23 in the current school year (2017 to 2018) who received text message appointment reminders via the patient portal 6-8 weeks after initiation of a new contraceptive method. Exclusion criteria include patients who presented for continuation of MERC, condom only users, patients using MERC for secondary amenorrhea or breakthrough bleeding, long acting reversible contraception users, and those choosing abstinence.

Beginning in January 2018, during the initial visit for initiation of MERC, the medical providers at JFK began offering to sign the patient up for the patient portal. If the patient agreed, the provider would register the patient for the portal using the clinic computer. During registration patients were offered the option to receive text message appointment reminder notifications. The researcher expected that 80% of student patients would agree to receive text message appointment reminders and that the peer educators would promote use of the patient portal for text message appointment reminders. If the patient agreed, she was included in the study.

Quantitative data was collected from the patient medical record using the EMR and the OSCR system from the Office of School Health (OSH). The Sexually Active Patient Tracking
Follow up for Moderately Effective Contraception

Report from the OSH was used to identify sexually active female adolescents who presented to the SBHC for birth control. The researcher collected data from the EMR regarding date of visit, choice of MERC method, initiation or continuation of MERC, number of cycles dispensed, history of previous use and discontinuation of another MERC method, history of unprotected sex within the last 5 days of visit with request of emergency contraception at visit, previous history of STI, previous history of pregnancy, adherence to follow up visit at 6-8 weeks. Patient adherence to the recommended 6-8 week window for follow up was determined through the use of electronic medical record chart audits. If the patient showed up for her follow-up appointment or rescheduled before the contraceptive method had run out, she was marked as yes. If she did not show up or reschedule her appointment then she was marked as no.

In addition, the project included data from the OSH using the Department of Health Sexually Active Patient Tracking Report, which includes date of visit, choice of MERC, number of cycles, dispensed, expected return date, continuation of MERC method. All identifying information was removed. Data was saved in an excel spreadsheet which was on a secure computer within the clinic. The computer and data remained on site at all times. Once all the data was collected it was backed up onto a password protected jump drive and the jump drive was taken to the author’s personal computer, which has SPSS version 25 capability.

Implementation and Evaluation

The intervention in this study was patient portal use for text message appointment reminders. The dependent variable was appointment attendance during the 6 to 8-week follow up period. Once all data was collected, the responses were imported into SPSS from the original excel document. Descriptive and inferential statistics were conducted on the results. These included frequencies, chi-square test, odds ratio with a 95% confidence interval. The statistical
significance level was set at 0.05 for all results. Chi-square analysis was applied to the independent variables of appointment adherence, history of previous use of another MERC method with discontinuation, history of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit and history of previous STI. The expected sample size for this study based on the current visit rate for contraceptive initiation was between 45 to 60 participants. The researcher needed a minimum of 40 participants in the intervention group in order to have adequate power, as we needed an N of 10 for each dependent variable studied.

The timeline for this study is depicted in Table 1. Use of the patient portal is one of the organization’s meaningful use goals so providers began inviting patients to sign up for the portal in January 2018. Application for IRB approval through the University at Buffalo and NYPH began in December 2017 and final IRB approval was received from NYPH in June 2018. The researcher began the chart review as soon as approval was received. Participants for inclusion in the study included anyone who had an appointment for MERC between January and March 2018. Data analysis began in October and continued into November 2018. Final data analysis was completed through November and the final report was due in December 2018.

Table 1

*Capstone Project Gantt Chart*

<table>
<thead>
<tr>
<th>Task &amp; Person(s) Responsible</th>
<th>1/18</th>
<th>2/18</th>
<th>3/18</th>
<th>4/18</th>
<th>5/18</th>
<th>6/18</th>
<th>7/18</th>
<th>8/18</th>
<th>9/18</th>
<th>10/18</th>
<th>11/18</th>
<th>12/18</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRB approval from University at Buffalo and NYPH (Yasmin Bahar)</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data collection (Yasmin Bahar)</td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>-----------------------------</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td>---</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Data Analysis (Yasmin Bahar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final Report Due (Yasmin Bahar)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>X</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Ethical Issues and Protection of Human Subjects**

In regards to ethical considerations, the program evaluation team maintained procedural ethics by ensuring that this evaluation met standards for IRB approval and there was no risk to participants. Issues regarding the protection of human subjects included concerns that the parent may be able to access the patient’s records through the patient portal. Some parents have access to the patient portal because their children are primary care patients for New York Presbyterian Hospital, however, parents do not have access to reproductive health care information for the patient. In the SBHC, the adolescent was signed up for a completely separate account of the patient portal that their parent cannot access, and it was through this account that the clinic staff was able communicate with the patient. If the adolescent wished to grant their parent access to the reproductive health services section of the patient portal, she would need to sign a release form to allow her parent access to this section. No adolescents elected to do this during the course of this study. The researcher received IRB approval through the New York Presbyterian Hospital’s Columbia University Medical Center. Ethical considerations were addressed by ensuring that adequate protocols were established for the protection of human subjects. Ethical standards were also maintained by obtaining permission from the authors to use the TURNUP framework (McLean et al., 2014).

**Results**
Introduction

SBHCs remove barriers to health care in underserved communities by providing on site access to care for pediatric patients that is at no cost to the patient or their family. This ease of access should result in improved health outcomes, fewer missed school days for students seeking health care, and increased appointment adherence. However, appointment adherence continues to be a challenge with adolescent family planning visits. The use of text message appointment reminders may be effective at increasing appointment adherence in female adolescents at a SBHC, however, there is insufficient evidence on the matter. The purpose of this study is to determine whether text message appointment reminders can increase kept appointment rates in adolescent females initiating MERC.

Due to differences in healthcare provider preference, patients are given anywhere between 2 to 4 cycles of birth control at the initial visit. Most providers gave patients follow up appointments 6-8 weeks later, however, one provider scheduled patients for follow up appointments 4 weeks later. If patients showed up for their appointment 4 weeks later they were included in the group who adhered to their follow up appointment. Patients who presented to the SBHC for initiation for MERC for secondary amenorrhea or breakthrough bleeding were excluded from the study.

At the beginning of this project it was assumed that all patients would be invited to register for the patient portal. However, only two out of three of the providers invited patients to join the patient portal. In addition, the two providers did not consistently offer to register patients in the portal. Finally, not all of the patients who registered for the patient portal actually enrolled in text message appointment reminder. Patients reported that they had difficulty figuring out what section to go to in order to enroll for text message appointment reminders. Patient also
reported that they had difficulty changing their password or the e-mail address associated with the account after the initial invitation to register. These issues could only be resolved by contacting customer service. During the course of this study, the section in the EMR where providers were able to verify whether patients were enrolled in the patient portal in order to receive text message appointment reminders changed. The provider was previously able to see if the patient had a pending registration. This section changed during the course of the study, so verification of the patient’s registration for enrollment in text message appointment reminders would have to occur by contacting customer service. The portal customer service hours were available between 12 pm to 5 pm only, and the majority of that time frame was while students were in school. Most of the schools do not allow students to use cell phones while in school and two of the schools did not allow students to carry cell phones into the school building. It was an unexpected finding that only 6% (N=4) of participants during the intervention year had signed up for text reminders.

**Descriptive Statistics:**

Descriptive statistics were conducted on the results. These included frequencies for the variables of appointment adherence, history of previous use of another MERC method with discontinuation, history of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit, history of pregnancy, and history of previous STI. Engaging in unprotected sex, history of pregnancy, and history of STIs are indicators of high-risk sexual behavior. The results are depicted in the table below:

Table 2
FOLLOW UP FOR MODERATELY EFFECTIVE CONTRACEPTION

Across Groups Comparison of Frequencies for Risk Factors Associated with Decreased Adherence

<table>
<thead>
<tr>
<th>Risk Factors</th>
<th>2017 Control Group* (N=88)</th>
<th>2018 Participants* (N=72)</th>
<th>2018 Control Group* (N=68)</th>
<th>2018 Text reminders* (N=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appointment adherence</td>
<td>31 (35.2%)</td>
<td>35 (48.6%)</td>
<td>32 (47.1%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>History of previous use of another MERC method with discontinuation</td>
<td>43 (48.9%)</td>
<td>39 (54.2%)</td>
<td>36 (52.9%)</td>
<td>3 (75%)</td>
</tr>
<tr>
<td>History of unprotected sex within 5 days of initial visit</td>
<td>24 (27.3%)</td>
<td>17 (23.6%)</td>
<td>15 (22.1%)</td>
<td>2 (50%)</td>
</tr>
<tr>
<td>History of pregnancy</td>
<td>8 (9.1%)</td>
<td>5 (6.9%)</td>
<td>5 (7.4%)</td>
<td>0 (0%)</td>
</tr>
<tr>
<td>History of previous STI</td>
<td>20 (22.7%)</td>
<td>15 (20.8%)</td>
<td>14 (20.6%)</td>
<td>1 (25%)</td>
</tr>
</tbody>
</table>

Note: * indicates that data was collected between January through the end of March in both years of the study.

The control group for 2017 consisted of 88 patients who presented for MERC. Approximately half (48.9%) of patients had previously discontinued another MERC method. Twenty seven percent had a history of unprotected sex within 5 days of their initial visit and presented requesting emergency contraception. In this group, 9.1% had a history of pregnancy in the past. Patients with a history of STIs were at 22.7%. Thirty five percent of patients adhered to their follow up appointment. The researcher did not analyze demographic data on the patients, as this information was not collected as part of the study.

From January 2018 through March 2018, 72 patients presented for initiation of a MERC method. More than half (54.2%) of these patients had previously discontinued a MERC method. Twenty three percent had a history of unprotected sex within 5 days of their visit and presented...
requesting emergency contraception. Almost seven percent had a history of pregnancy in the past and about 21% had a history of STIs in the past. Almost half (48.6%) of patients were adherent to their follow up appointment.

**Results of Hypothesis Testing**

Inferential statistics were conducted on the results. These included chi-square test and odds ratio with a 95% confidence interval. The statistical significance level was set at 0.05 for all results. Chi-square analysis was applied to the variables of appointment adherence, history of previous use of another MERC method with discontinuation, history of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit, history of pregnancy, and history of previous STI. Between groups comparisons on adherence were applied comparing the 2017 control group to 2018 participants and the 2018 control group to the 2018 text message reminder group. Within group comparisons were applied for all groups for the variables of appointment adherence, history of previous use of another MERC method with discontinuation, history of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit, history of pregnancy, and history of previous STI.

**Between Groups Comparison for Adherence.**

The odds ratio in Table 3 shows that 2018 participants were 1.7 times more likely to be adherent to their refill appointment than the 2017 control group (p > 0.05). Although the number of participants receiving text messages is much lower than expected, their appointment adherence is more than twice the control rate in 2017 (75% compared to 35.2%) and about a third higher than in 2018 controls (75% compared to 47.1%). Interestingly, those with text
message reminders also had the highest rate of previous discontinuation of MERC (75%) and unprotected sex prior to the initial visit (50% -- nearly twice the rate in both 2017 and 2018 controls). The researcher hypothesized that discontinuation of another MERC method may make the patient more likely to discontinue their current MERC method, however, our results show an opposite pattern.

Eighty-eight patients presented for initiation of birth control from January 2017 through March 2017. There was a 35% adherence rate to follow-up appointments for birth control refills from January 2017 through March 2017. In the January 2018 through March 2018 study group, however, 72 patients presented for initiation of birth control and there was a 48.6% adherence rate to follow up appointments for birth control refills overall. The intervention group had a 75% appointment adherence, but the sample size was too small to draw any conclusions.

Table 3

**Between Groups Comparison on Adherence for 2017 and 2018**

<table>
<thead>
<tr>
<th></th>
<th>2017 Control</th>
<th>2018</th>
<th>Chi-Square</th>
<th>P</th>
<th>Odds Ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group*</td>
<td>Frequency</td>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(N=88)</td>
<td>31 (35.2%)</td>
<td>35 (48.6%)</td>
<td>2.927</td>
<td>.087</td>
<td>1.739 (.921-3.286)</td>
</tr>
<tr>
<td>Adherent</td>
<td>p = .087</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Non-adherent</td>
<td>57 (64.8%)</td>
<td>37 (51.4%)</td>
<td>2.927</td>
<td>.087</td>
<td>0.575 (.304-1.086)</td>
</tr>
</tbody>
</table>

Notes: * indicates that data was collected between January through the end of March in both
As shown in Table 4, from January 2018 through March 2018, only 4 patients successfully enrolled for text message appointment reminders through the patient portal resulting in a very small intervention group. The researcher hypothesized that patients who received text message appointment reminders would be more likely to be adherent to their follow up appointment. The results revealed a non-significant trend in the predicted direction as patients who received text message appointment reminders were more likely to be adherent to their follow up appointment than those who did not receive text message reminders. In fact, patients who enrolled for text message appointment reminders in the patient portal were 1.594 times more likely to be adherent to their follow up appointment for birth control.

Table 4

Between Groups Comparison on Adherence for 2018

<table>
<thead>
<tr>
<th></th>
<th>2018 Control</th>
<th>2018 Text</th>
<th>Chi-Square</th>
<th>P</th>
<th>Odds Ratio</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group*</td>
<td>Frequency</td>
<td>Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(N=68)</td>
<td>(N=4)</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adherent</td>
<td>32 (47.1%)</td>
<td>3 (75%)</td>
<td>1.181</td>
<td>p = .278</td>
<td>1.594</td>
<td>(.858-2.961)</td>
</tr>
<tr>
<td>Non-adherent</td>
<td>36 (52.9%)</td>
<td>1 (25%)</td>
<td>1.181</td>
<td>p = .278</td>
<td>.296</td>
<td>(.029-2.993)</td>
</tr>
</tbody>
</table>

Notes: * indicates that data was collected between January through the end of March.
**Within Groups Comparison for Independent Variables Relationship to Adherence.**

Table 5 depicts the frequencies for history of previous discontinuation of a MERC method and analysis of its effects on appointment adherence. It was noted that many of these patients had a history of self-discontinuation of the same MERC method that they were requesting to initiate. The researcher did not analyze this by method or look into how many patients discontinued the same method that they wanted to restart. The researcher hypothesized that in all groups, patients who had previously discontinued a MERC method would be more likely to self-discontinue by not adhering to their refill appointments. Since the odds ratio was less than one, this means patients with a history of discontinuation of a MERC method in 2017 were less likely (33.9%) to be adherent to their refill appointment compared to patients with no history of previous MERC.

Table 5

*Within Group Comparison of Impact of History of Previous Discontinuation of Another MERC Method on Adherence to Follow Up for All Groups*

<table>
<thead>
<tr>
<th></th>
<th>2017 Control Group* (N=88)</th>
<th>2018 Participants* (N=72)</th>
<th>2018 Control Group* (N=68)</th>
<th>2018 Text reminders* (N=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of adherence</td>
<td>n = 43</td>
<td>n = 39</td>
<td>n = 36</td>
<td>n = 3</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>1.975 (p = 0.160)</td>
<td>3.658 (p = 0.056)</td>
<td>2.717 (p = 0.099)</td>
<td>4.0 (p = 0.046)**</td>
</tr>
<tr>
<td>Odds Ratio</td>
<td>.661 (.367-.1.192)</td>
<td>1.622 (.9-2.7)</td>
<td>1.481 (.8-2.5)</td>
<td>N/A</td>
</tr>
</tbody>
</table>
The results for the 2018 participants differed from the 2017 control. The odds ratio for 2018 participants showed that they were more likely to be adherent because the odds ratio greater than one. In fact, 2018 participants who had previously discontinued MERC were 1.6 times more likely to be adherent. Furthermore, the odds ratio for 2018 control group was 1.4, showing they were also more likely to be adherent than 2018 patients who had not previously discontinued a MERC method. In the 2017 control, 2018 participants, and 2018 control, the odds ratio was not significant as the 95% confidence interval crossed one. All the patients in the 2018 text message group who previously discontinued MERC were adherent to their follow up appointment. Increased appointment adherence rates in text message recipients were statistically significant at $p < 0.05$, however, the odds ratio could not be determined to due to the low sample size.

Table 6 depicts the frequencies for history of unprotected sex within 5 days of the initial visit and analysis of its effects on appointment adherence. Students are taught in health class that they are able to take emergency contraception within 5 days of having unprotected sex. The researcher hypothesized that in all groups, patients who had a history unprotected sex within the last 5 days of the initial visit were more likely to miss their follow up appointment thereby discontinuing their method as compared to patients without a recent history of unprotected sex. The 2017 control group for patients with a history of unprotected sex within 5 days of the initial
visit were 22.2% less likely to be adherent to their follow up appointment (p > 0.05). The 2018 Control Group odds ratio showed patients with a history of unprotected sex were only 1.1% less likely to be adherent to their refill appointment (p > 0.05). The 2018 participants overall, however, were 1.12 times more likely to be adherent. Similarly, the text message group with a history of unprotected sex was two times more likely to be adherent to their follow up appointment (p > 0.05). Since the p value was greater than 0.05, the results were not statistically significant.

Table 6

*Within Group Comparison of Impact of History of Unprotected Sex Within the Last 5 days of the Initial Visit on Adherence to Follow Up for All Groups*

<table>
<thead>
<tr>
<th></th>
<th>2017 Control Group* (N=88)</th>
<th>2018 Participants* (N=72)</th>
<th>2018 Control Group* (N=68)</th>
<th>2018 Text reminders* (N=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of adherence</td>
<td>n = 24</td>
<td>n = 17</td>
<td>n = 15</td>
<td>n = 2</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>.531 (p=.466)</td>
<td>.167 (p=.682)</td>
<td>.001 (p=.975)</td>
<td>1.333 (p=.248)</td>
</tr>
<tr>
<td>Odds Ratio 95%</td>
<td>.778 (.387-1.565)</td>
<td>1.120 (.661-1.899)</td>
<td>.989 (.537-1.823)</td>
<td>2.000 (.500-7.997)</td>
</tr>
<tr>
<td>CI</td>
<td>1.899)</td>
<td></td>
<td></td>
<td>7.997)</td>
</tr>
</tbody>
</table>

Notes: * indicates that data was collected between January through the end of March in both years of the study.
Table 7 depicts the frequencies for history of pregnancy and analysis of its effects on appointment adherence. History of pregnancy in the adolescent female is also considered an indicator of risky behaviors. The researcher hypothesized that patients who had a prior history of pregnancy would be more likely to discontinue their method and not show up for their follow up appointment. Patients with a history of pregnancy were 31% less likely to be adherent to their follow up appointment in the 2017 control group (p > 0.05). Similar non-significant results were noted for the overall 2018 participants with a history of pregnancy who were 18.8% less likely to be adherent to their follow up appointment. In comparison, patients in the 2018 control group, 1.145 times more likely to be adherent to their appointment. There were no pregnancies in the text message group so chi-square and odds ratio could not be calculated for that group.

Table 7

*Within Group Comparison of Impact of History of Pregnancy on Adherence to Follow Up for All Groups*

<table>
<thead>
<tr>
<th></th>
<th>2017 Control Group* (N=88)</th>
<th>2018 Participants* (N=72)</th>
<th>2018 Control Group* (N=68)</th>
<th>2018 Text reminders* (N=4)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frequency of adherence</td>
<td>n = 8</td>
<td>n = 5</td>
<td>n = 5</td>
<td>n = 0</td>
</tr>
<tr>
<td>Chi-Square</td>
<td>.403 (p = .526)</td>
<td>.159 (p = .690)</td>
<td>.108 (p = .742)</td>
<td>N/A*</td>
</tr>
<tr>
<td>Odds Ratio 95% CI</td>
<td>.690 (.2-2.3)</td>
<td>.812 (.27-2.4)</td>
<td>1.145 (.5-2.4)</td>
<td>N/A*</td>
</tr>
</tbody>
</table>

Notes: * indicates that data was collected between January through the end of March in both
years of the study.

+ unable to calculate due to sample size

Table 8 depicts the frequencies for history of STIs and analysis of its effects on appointment adherence. Interestingly, in both the 2017 control group and the 2018 text message group, the patients with a history of STIs were more likely to be adherent to their follow up appointment. The researcher hypothesized that patients who had a previous history of STIs would be more likely to self discontinue their MERC method by not showing up to the follow up appointment for refill. The results revealed a statistically significant trend in the opposite direction. Patients in the 2017 control group with a previous history of STIs were about 2.5 times more likely to be adherent to their follow up appointment than patients without a history of STIs (p = 0.002). Similar findings were noted in the text message group where patients with a history of STIs were 50% more likely to be adherent to their appointments, but the results were not statistically significant. The opposite results were found for the overall participants for 2018 and the 2018 control group, as they were only slightly less likely to be adherent (5% and 11% respectively) than patients without a history of STIs (p > 0.05).

Table 8

Within Group Comparison of Impact of History of Sexually Transmitted Infection on Adherence to Follow Up for All Groups

<table>
<thead>
<tr>
<th>2017 Control Group* (N=88)</th>
<th>2018 Participants* (N=72)</th>
<th>2018 Control Group* (N=68)</th>
<th>2018 Text reminders* (N=4)</th>
</tr>
</thead>
</table>
Frequency of adherence

<table>
<thead>
<tr>
<th></th>
<th>n = 20</th>
<th>n = 15</th>
<th>n = 14</th>
<th>n = 1</th>
</tr>
</thead>
<tbody>
<tr>
<td>Chi-Square</td>
<td></td>
<td>10.055 (p = .002)**</td>
<td>.029 (p = .865)</td>
<td>.125 (p = .727)</td>
</tr>
<tr>
<td>Odds Ratio 95% CI</td>
<td>2.456 (1.474-4.090)</td>
<td>.950 (.520-1.735)</td>
<td>.890 (.458-1.731)</td>
<td>1.5 (.674-3.339)</td>
</tr>
</tbody>
</table>

Note: * indicates that data was collected between January through the end of March in both years of the study.

** the result is significant at p < 0.05

Our theoretical framework for the study was the TURNUP model. Table 9 aligns TURNUP criteria with specific barriers and recommendations to improve. When implementing a patient portal enrollment program, it is important to have support from clinic administration, as other staff may need to be enlisted to assist patients with enrollment. Providers found it burdensome to enroll patients in the portal during the medical visit. Identifying non-clinical staff who can assist patients in enrolling in text message appointment reminders may increase patient portal enrollment numbers. Patients also need a private place where they can register, and using the same computer that the provider uses for EMR documentation was not a feasible option for providers. Having a designated computer or tablet for patient portal enrollment may address these concerns. Customer service hours were restrictive for this patient population since many of them were not allowed to use their phones during school. Patients who requested assistance with enrollment outside of customer service hours were asked to come back during customer service hours of operation.
Table 9

*Barriers to Patient Portal Enrollment*

<table>
<thead>
<tr>
<th>TURNUP Elements</th>
<th>Barriers</th>
<th>Proposed Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reminder-Patient Interaction</td>
<td>Text message appointment reminders were difficult to sign up for</td>
<td>Enablers did not outweigh the obstacles. Patients need further assistance in enrollment and access to a computer or tablet on site may be beneficial.</td>
</tr>
<tr>
<td>Reminder Accessibility</td>
<td>Patients cannot access their cell phone during the school day for self-enrollment or to receive text messages. As a result, these patients did not receive any reminders.</td>
<td>SBHC can have systems in place to allow patients to sign up on a tablet or clinic computer. Staff should be designated to assist patients with this. Students should be able to view their appointment times on-line through the portal as they can access it through other school computers. Patients can also access e-mail appointment reminder sent through the portal.</td>
</tr>
<tr>
<td>Health-Care Setting</td>
<td>Lack of staffing puts additional strain on providers who attempt to enroll patients in the portal during their visit. Restrictive customer service hours pose additional barriers to patients who attempt to enroll for the portal.</td>
<td>Assign other non-clinical staff to assist in patient enrollment. Allow more flexible customer service hours so patients can call once they have access to their phone.</td>
</tr>
<tr>
<td>Wider Social Systems</td>
<td>Health educators did not enlist peer educators in promoting patient portal enrollment. Health educators also did not assist in patient enrollment.</td>
<td>Increase health educator engagement in process that develops a team approach to increasing patient portal enrollment for text message appointment reminders. Health educators supervise the peer educator program and can</td>
</tr>
</tbody>
</table>
Cancellation and Rebooking System

Patients were given appointment slips for with a reminder of their appointment date and time. Patients were required to come to the SBHC to cancel/rebook since they were not allowed to use cell phones in school.

Allow more flexible hours for customer service for patient portal use. Allow other methods for patients to cancel or rebook such as online using the portal.

Distal or Proxy Attribute

Utilizing providers to enroll patients in the portal was not a feasible method given the low enrollment rates.

Assign additional staff to assist in patient enrollment in the portal. Eliminate barriers for providers and increase provider engagement in a process that develops a team approach.

Summary of Key Findings

Appointment adherence increased from 35.2% in the 2017 period to 48.6% in the 2018 period. The text message group had a 75% adherence rate. Given the low enrollment rates in text message appointment reminders, the change in appointment adherence rates cannot be attributed solely to text message appointment reminders. In both the 2017 and 2018 periods, almost half of all patients who presented for initiation of birth control had previous discontinued a MERC method. Many of these patients had discontinued the same method they chose to restart. In both years, about a quarter of all patients presented requesting emergency contraception at the time of the initial visit, so initiation of birth control may not have been their priority at the time of the visit. All the patients who enrolled for the portal had a history of previous discontinuation of a MERC method so odds ratio could not be applied. None of the patients in the text message group had a history of pregnancy so chi-square and odds ratio could not be applied. In the control groups for 2017 and 2018, there was an increase in appointment adherence for patients with a
history of STIs, however, the results were only significant for the 2017 group. It is important to note that in the 2017 to 2018 school year there was a research study being conducted on patients who had been diagnosed with chlamydia. The increase in appointment adherence for this population may have been due to better follow up of these patients as part of the study.

Only four patients enrolled in the patient portal for text message appointment reminders. Text message recipients had a statistically significant increased appointment adherence rate compared to 2018 control students who were not enrolled in the patient portal. However, our ability to interpret these results is limited by the very low sample size. However, the researcher was able to make recommendations to improve implementation of text messaging to adolescents and health care providers. Based on the TURNUP model, two recommended areas for improvement were engagement of staff and administration, in addition to providers and portal redesign to facilitate enrollment.

**Discussion/Recommendations**

There were some difficulties involved in enrolling patients for the portal, and the organization could implement measures to make the enrollment process more adolescent-friendly. Patients should be able to choose to have appointment reminders at initial signing instead of having to go to a separate section. NYPH should offer more flexible hours to call customer service, as most adolescents are at school during those hours and cannot call for themselves. The portal could also be more user friendly and allow patients to view their appointment times on-line. NYPH could also consider assigning support staff to assist patients in enrolling for the patient portal. Allowing patients to select text message appointment reminders during check-in or at time of registration for clinic services, may be more effective than having the provider sign them up, as times constraints led to lower sign-up. A qualitative study of
barriers to patient portal enrollment may be beneficial in identifying further issues that adolescents may have with the patient portal system.

Although providers were trained on how to enroll patients in the portal, it is important to note that it was not standard practice for providers to give patients follow-up appointments prior to the implementation of this project. In order for text message appointment reminders to be sent out, it was necessary for providers to give the patient an appointment date and time for their follow-up visit and this may have contributed to poor provider compliance with the policy.

The study results were limited due to sample size. Although health center administrators supported a patient portal enrollment program, they were not able to engage staff or providers. Health educators and peer educators did not provide as much assistance in promoting patient portal enrollment as initially expected. The study was tested in only one setting and in this setting only two out of three providers were scheduling patients for appointments. Lack of provider engagement in patient portal enrollment contributed to the low enrollment numbers. One provider did not enroll patients in the portal or provide patients with appointment slips. The other two providers who were enrolling patients in the portal were also giving patients appointment slips stating their appointment date and time. This was a change from past practice, so the increase in appointment adherence could be due to that since the low enrollment rate in the patient portal cannot completely account for the increase in adherence. This may be a confounding factor and offer a potential explanation for the difference in appointment adherence between the 2017 and 2018 groups. Provider scheduling of appointments may have resulted in increased adherence.

Providers reported that they found it time consuming to enroll patients in the patient portal and that they lacked the knowledge on how to assist patients when they ran into issues
with enrollment. Providers or other assigned clinic staff should be granted privileges to troubleshoot problems with password resetting or e-mail address changes. Patients also verbalized challenges with utilizing the patient portal and signing up for text message appointment reminders. Restrictive customer service hours prevented providers from helping some patients in real time if the visit was outside of the customer service hours. Call center hours were at inconvenient times for the patient as they were during school hours where students were not allowed to use their cell phones. Patient who needed assistance with changing their information on the portal could only do it during the hours of 12 to 5pm. More research is needed to identify barriers in patient portal use.

**Strengths and Limitations**

There were both strengths and limitations to this study. The researcher was able to reinforce the importance of the problem of appointment non-adherence resulting in early discontinuation of birth control. There was a clear need for improvement given the appointment adherence rate for the SBHC was below the national average. Although the researcher was unable to recruit as many people as expected, they were able to identify issues to address in implementing text message reminders and develop suggestions for future implementation. The appointment adherence rate did increase considerably despite low patient enrollment rates in the text message reminders.

There were several limitations to the study. Local procedures for IRB approval led to delays in data collection and staff were not able to receive prompt feedback on the effectiveness of the intervention. There were concerns with the IRB regarding whether approval would also be needed from the board or education and the office of school health prior to data collection due to
use of the sexually active patient tracking report. Any data obtained from the sexually active patient tracking report was data that was collected by clinic staff and reported to the department of health. Upon review of the charts, it became clear that the sexually active patient tracking report did not list all the sexually active patients who presented during the research period. It only listed the last visit for the school year. As a result, the researcher was required to audit all the charts by hand. The SBHC screens all patients for sexual activity and recent unprotected sex. Because of this protocol, patients who present for non-MERC related reasons may be offered birth control and emergency contraception. The researcher was not able to filter out charts for audit by chief complaint and had to review every chart for female adolescents presenting to the SBHC during the study period.

The study was also limited by low enrollment rates. As a result, this study was not able to determine if text message appointment reminder notifications can increase adolescent adherence to contraceptive appointments in adolescents initiating MERC. The increase in appointment adherence rates were most likely confounded by the change in practice where providers began giving patients appointment slips with their appointment date and time. This study looked at retrospective data so the researcher was not able to study why patients failed to enroll or adhere to their appointment. There was also a likely overlap of subjects as patients in the 2017 control may have presented for initiation another MERC method in the following school year and enrolled for text message appointment reminders.

**Implications for Nursing Education**

Future nurse practitioner students need to understand the importance of follow up in primary care and barriers that patients may have. Strategies to improve adherence to follow up
appointments should be evidence based and those strategies should be tested on their population to determine whether they’re effective. It is important to have doctorally prepared nurse practitioners that are trained in implementation science. If an intervention is put in place that is supported by evidence, it cannot automatically be assumed that this intervention will just work. The researcher has demonstrated that many components need to be addressed before successfully implementing a text message appointment reminder program.

Implications for Nursing Research

Many of the patients chose to restart the same method they previously discontinued. Further research would need to be conducted to determine why this may be. A qualitative study with surveys given to the patient prior to restarting the method may be beneficial in understanding this phenomenon.

There was a considerable increase in appointment adherence in the 2018 period. Enrollment in the text message system cannot account for this, but the change in practice where two out of three of the providers began giving patient appointments slips may be contributing factors. This raises further questions as most primary care practices have the receptionist schedule appointments. Would this same increase in adherence be found in patients who were scheduled for the appointments by the receptionist versus the medical provider? Further research would need to be conducted to better understand this. It is the role of the doctorally prepared nurse practitioner to use a scientific approach in applying evidence into practice.

Implications for Practice
Patient portal use is a meaningful use goal for many health care organizations but how meaningful can the use of the patient portal be if patients have difficulty signing up for it? There were several barriers to enrollment in the patient portal and enrollment in text message appointment reminders. Further barriers were imposed by the limited customer service hours.

Administrative support and engagement from other clinic staff and providers are also important in implementing quality improvement projects and ensuring everyone’s goals are aligned. Information technology is particularly vulnerable to this as although it is an organizational goal to increase patient enrollment in the portal, key stakeholder acceptance of this can impact enrollment. Ensuring stakeholder engagement can be difficult because there are so many diverse disciplines involved. Only two out of the three providers gave patients follow up appointments for birth control refills. Engagement from all providers might have resulted in a higher appointment adherence rate. Although other studies have found text message appointment reminders to be beneficial in increasing appointment adherence, it’s efficacy in this population still needs to be studied further. Our expectations that the health educators would promote patient portal enrollment did not happen. Further exploration is needed to determine why this occurred. School policies restricting cell phone use can impact accessibility to this form of appointment reminders. The researcher plans on presenting the findings of this study to the medical director and plans to have a team meeting to see if they can address these barriers in order to have more patients enroll in text message appointment reminders.

**Role of the APN**

It is the role of the APN to provide leadership to improve patient outcomes and use a scientific approach to apply evidence into practice. They should assess whether existing
processes are effective. They serve as a leader in quality improvement and quality assurance processes and promote interprofessional collaboration.

**Conclusion**

Text message appointment reminders may be a valuable tool in increasing appointment adherence, but it has not been adequately studied in the adolescent population. School policies may impact the adolescents’ ability to view these messages and any reminders set on their phone. Interventions to increase appointment adherence should be based on evidence. Further research is necessary to determine if text message appointment reminders can increase refill appointment adherence in adolescent females on MERC in a SBHC.
References


doi:10.1097/GRF.0b013e3182988a3b


<table>
<thead>
<tr>
<th>Subject Code</th>
<th>Date of Visit</th>
<th>MERC Method (OCP=1, Patch=2, Ring=3, Depo=4)</th>
<th>Initiation or Continuation (I=1, C=2)</th>
<th># of cycles dispensed</th>
<th>History of previous discontinuation of another MERC method (1=yes, 2=no)</th>
<th>History of unprotected sex within the last 5 days of visit with request for EC (1=yes, 2=no)</th>
<th>History of pregnancy (1=yes, 2=no)</th>
<th>History if STI (1=yes, 2=no)</th>
<th>Adherence to follow up visit at 6-8 weeks (1=yes, 2=no)</th>
<th>Enrollment in Text Message Appointment Reminders</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Dear Yasmin,

Thank you for your email and apologies for the delay in responding.

I can confirm that permission to reproduce material from Journals Library reports is covered by the UK government's non-commercial licence for public sector information.

This means that it is fine for you to use the material from the report provided that suitable acknowledgement is made and the reproduction is not associated with any form of advertising.

Please note that we have also contacted the corresponding author of the report; https://www.journalslibrary.nihr.ac.uk/hsdr/hsdr02340/#/abstract

This email correspondence will suffice as permission but if you require anything further, please let us know.

If you have any further queries, please do not hesitate to get in touch.

Best Wishes

Elizabeth Roquier

Administrator - Portfolio Insight and Publications | NIHR Evaluation, Trials and Studies Coordinating Centre (NETSCC)

On Tue, 27 Nov 2018 at 00:24, Yasmin Bahar <yasminbahar@gmail.com> wrote:

Good Morning,

My name is Yasmin Bahar and I am a Doctor of Nursing Practice student through the University at Buffalo - State University of New York. I am writing to request an approval letter to use copyrighted material as part of a capstone project for the Doctor of Nursing Practice program. The citation for the publication is:


I would like to reproduce Figure 2 on page 11 entitled Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP) conceptual framework. The publication states that it was copyrighted by Queen’s Printer and Controller of HMSO 2014. This will be used as part of a capstone project for a doctoral program and will be distributed and made available to students and faculty from the program. This material will not be sold. If you are unable to grant me an approval letter I would appreciate it if you could direct me to someone who will be able to assist me in this matter. My contact information is listed below. Thank you for your time and consideration in that matter.

Sincerely,

Yasmin
You are encouraged to use and re-use the Information that is available under this licence freely and flexibly, with only a few conditions.

**Using information under this licence**

Use of copyright and database right material expressly made available under this licence (the ‘Information’) indicates your acceptance of the terms and conditions below.

The Licensor grants you a worldwide, royalty-free, perpetual, non-exclusive licence to use the Information for Non-Commercial purposes only subject to the conditions below.

This licence does not affect your freedom under fair dealing or fair use or any other copyright or database right exceptions and limitations.

**You are free to:**

- copy, publish, distribute and transmit the Information;
- adapt the Information;
- exploit the Information for Non-Commercial purposes for example, by combining it with other information in your own product or application.

**You are not permitted to:**

- exercise any of the rights granted to you by this licence in any manner that is primarily intended for or directed toward commercial advantage or private monetary compensation.

**You must, where you do any of the above:**

- acknowledge the source of the Information by including any attribution statement specified by the Information Provider(s) and, where possible, provide a link to this licence;

If the Information Provider does not provide a specific attribution statement, you must use the following:

*Contains information licensed under the Non-Commercial Government Licence v2.0.*

If you are using Information from several Information Providers and listing multiple attributions is not practical in your product or application, you may include a URI or hyperlink to a resource that contains the required attribution statements.

- ensure that any onward licensing of the Information – for example when combined with other information – is for Non-Commercial purposes only.

These are important conditions of this licence and if you fail to comply with them or use the Information other than for Non-Commercial purposes the rights granted to you under this licence, or any similar licence granted by the Licensor, will end automatically.

**Exemptions**

This licence does not cover the use of:
• personal data in the Information;
• Information that has not been accessed by way of publication or disclosure under information access legislation (including the Freedom of Information Acts for the UK and Scotland) by or with the consent of the Information Provider;
• departmental or public sector organisation logos, crests, military insignia and the Royal Arms except where they form an integral part of a document or dataset;
• military insignia
• third party rights the Information Provider is not authorised to license;
• other intellectual property rights, including patents, trade marks, and design rights; and
• identity documents such as the British Passport.

Non-endorsement

This licence does not grant you any right to use the Information in a way that suggests any official status or that the Information Provider and/or Licensor endorse you or your use of the Information.

No warranty

The Information is licensed ‘as is’ and the Information Provider excludes all representations, warranties, obligations and liabilities in relation to the Information to the maximum extent permitted by law.

The Information Provider is not liable for any errors or omissions in the Information and shall not be liable for any loss, injury or damage of any kind caused by its use. The Information Provider does not guarantee the continued supply of the Information.

Governing Law

This licence is governed by the laws of the jurisdiction in which the Information Provider has its principal place of business, unless otherwise specified by the Information Provider.

Definitions

In this licence the terms below have the following meanings:

‘Information’
means information protected by copyright or by database right (for example, literary and artistic works, content, data and source code) offered for use under the terms of this licence.

‘Information Provider’
means the person or organisation providing the Information under this licence.

‘Licensor’
means any Information Provider which has the authority to offer Information under the terms of this licence or the Keeper of the Public Records, who has the authority to offer Information subject to Crown copyright and Crown database rights and Information subject to copyright and database right that has been assigned to or acquired by the Crown, under the terms of this licence.

‘Non-Commercial purposes’
means not intended for or directed toward commercial advantage or private monetary compensation. For the purposes of this licence, ‘private monetary compensation’ does not include the exchange of the Information for other copyrighted works by means of digital file-sharing or otherwise provided there is no payment of any monetary compensation in connection with the exchange of the Information.

‘Use’
as a verb, means doing any act which is restricted by copyright or database right, whether in the original medium or in any other medium, and includes without limitation distributing, copying, adapting, modifying as may be technically necessary to use it in a different mode or format.

‘You’
means the natural or legal person, or body of persons corporate or incorporate, acquiring rights under this licence.
About the Non-Commercial Government Licence

The National Archives has developed this licence as a tool to enable Information Providers in the public sector to license the use and re-use of their Information under a common non-commercial licence. The National Archives invites public sector bodies owning their own copyright and database rights to permit the use of their Information under this licence where licensing under the default Open Government Licence is not appropriate.

The Keeper of the Public Records has authority to license Information subject to copyright and database right owned by the Crown.

This is version 2.0 of the Non-Commercial Government Licence. The National Archives may, from time to time, issue new versions of the Non-Commercial Government Licence. If you are already using information under a previous version of the Non-Commercial Government Licence, the terms of that licence will continue to apply.

Further context, best practice and guidance can be found in the UK Government Licensing Framework section on The National Archives website.

Go to the Welsh version of the licence.

Go to the version 1 of the licence.
July 1, 2018

Yasmin Bahar
709900X - NYP GENERAL

Protocol Number: IRB-AAAR8973
Title: Increasing follow up for moderately effective reversible contraception in adolescents at a school based health center
Approval Date: 06/22/2018        Expiration Date: 06/21/2019
Event Identifier: New Protocol (Y01M00)

The above-referenced event was reviewed by Columbia University IRB Exp.

Level of review and outcome: Approved by Expedited review

To view a list of documents that were included in this approval (if applicable) and all other currently approved documents for this study, please refer to the Print Menu for this Event in Rascal. It is important to confirm the status of each document, e.g., active, stamped, etc. Only stamped, active documents can be used with research participants.

Consent Requirements:
A waiver of some or all elements of informed consent has been granted

HIPAA Authorization:
Waiver of Authorization has been granted

Electronically signed by: Santos, Rafael
Researcher Responsibilities:

Any proposed changes in the protocol must be immediately submitted to the IRB for review and approval prior to implementation, unless such a change is necessary to avoid immediate harm to the participants.

Any unanticipated problems that involve risks to subjects must be reported to the IRB in accordance with the Unanticipated Problems: Reporting to the IRB of Unanticipated Problems Involving Risks policy. All submissions for modifications and unanticipated problems must be submitted through Rascal.

Renewal applications should be submitted 60 days before the expiration date of this study through Rascal. Failure to obtain renewal of your study prior to the expiration date will require discontinuance of all research activities for this study, including enrollment of new subjects.

You must file a Closure Report in Rascal when your study has been completed.
INCREASING FOLLOW UP FOR MODERATELY EFFECTIVE REVERSIBLE CONTRACEPTION IN ADOLESCENTS AT A SCHOOL BASED HEALTH CENTER

by
Yasmin Bahar, DNP(c), FNP-BC
Fall 2018

Purpose
To determine how the use of text message appointment reminders using the patient portal may influence adherence to follow up appointments for refills of moderately effective reversible contraception (MERC)

PICO Question

Population:
Adolescent females between the ages of 13-23 using MERC at a School Based Health Center (SBHC)

Intervention:
Use of text message appointment reminder notifications sent using the patient portal 6-8 weeks after initiation of a new birth control method

Comparison:
Usual care (patient scheduled for an appointment and is responsible for remembering to follow up)

Outcome:
Adherence to follow up appointments

In adolescent females between the ages of 13-23 using MERC at a SBHC, how does the use of text message appointment reminder notifications sent using the patient portal 6-8 weeks after initiation of a new birth control method compared to usual care (patient scheduled for an appointment and is responsible for remembering to follow up) influence adherence to follow up appointments?
Background and Significance

- 42 percent of adolescents between the ages of 15 to 19 years of age have had sexual intercourse (ACOG, 2012)
- Continuation rate for (MERC) is 44% for adolescent females between the ages of 15-19 years old (ACOG, 2017)
- Frequent follow-up is important to maximize all methods of contraception, to promote and reinforce healthy decision making, and to screen periodically for risk taking behaviors and STIs (AAP, 2007)
- In SBHCs a 2-3 month supply of contraception is dispensed to the adolescent seeking to initiate MERC. They are set up with a follow up appointment in 6-8 weeks after initiation where they will be dispensed a refill of their MERC method. However, the majority of these patients do not show up for their f/u appointment suggesting early discontinuation of the MERC method.

Background and Significance

- Eighty two percent of teen pregnancies in the United States are unplanned (ACOG, 2012)
- Inconsistent use such as forgetting to take their contraceptive method or filling their refill before their supply ends leads to failure rates of 6% for contraceptive injection users and 9% for all other MERC users (Thiel de Bocanegra, Bradberry, Lewis, and Maguire, 2017)
- An estimated 514,400 U.S. teenagers between the ages of 15-19 years of age become pregnant in 2010 with 367,700 births to teenagers that year, suggesting a large percentage of pregnant adolescents have a spontaneous or elective termination of their unplanned pregnancies (Kost & Henshaw, 2014)
- The U.S. continues to have the highest adolescent pregnancy rate among industrialized countries with available data despite the fact that the birth rate among adolescents in the U.S. reached a historic low in 2015

Background and Significance

- Literature:
  - L’Engle, Mangone, Paroceres, Agarwal, & Ippoliti, 2016
  - Smith, Gold, Sumpier, & Free, 2015
  - Park, Howe-Expuita, & Dracup, 2014
  - Trent, Thompson, & Tomaszewski, 2015
  - Bocanegra, Bradberry, Lewis, and Maguire, 2017
  - Limited evidence on the impact of text message appointment reminders for refill appointment in other contraceptive method users

Background and Significance

- Lack of adherence to follow up appointments is a significant problem for the Advanced Practice Nurse (APN) working with adolescents at a SBHC as it can lead to poor patient outcomes and unintended pregnancy.
- New York Presbyterian Hospital’s (NYPH) patient portal allows patients to sign up for text message appointment reminders. One of the organization’s meaningful use goals includes having a certain percentage of patients enroll in the patient portal.
- The utility of the patient portal in the adolescent population has not been assessed.
- Human Papilloma Virus vaccination study at NYPH
Needs Assessment:
- New York City Department of Health's (NYCDOH) Sexually Active Patient Tracking Report
- In the 2016-2017 school year, 104 out of 148 sexually active female patients who presented to NYUHl's John F. Kennedy (JFK) SBHC for primary care did not return again at the SBHC for refills of their contraceptive method.
- MERC continuation rate of approximately 30% at the JFK SBHC compared to the national average of 44%.

**Background and Significance**

**Theoretical framework**

**Targeting the Use of Reminders and Notifications for Uptake by Populations (TURNUP) Framework**

**Application of Theoretical Framework**

**Reminder–Patient Interaction**
- Forgetting
- Reminder Accessibility
- Receipt of text message
- Language preference

**Health-Care Setting**
- SBHC
  - Missing lunch or class for appointments

**Wider Social Systems**
- Peer educators

**Cancellation and Rebooking System**
- No cancellation or rescheduling system in the SBHC

**Distal or Proxy Attribute**
- SBHC vs. Outpatient Adolescent Clinic
- Staffing
- Resources
Methods

Setting
- John F. Kennedy School Based Health Center
- Seven public high schools and approximately 4,000 students in the Riverdale section of the Bronx.
- The SBHC is run by NYUH healthcare network.
- Four exam rooms
- Two Nurse Practitioners and one Physician on staff full time who can provide reproductive health services. One Medical Assistant, two Health Educators, three Patient Financial Advisors, a Dentist, a Dental Hygienist, a Dental Tech, and twelve Peer Educators.

Methodology

Sample
- The participants of the study were enrolled student patients at any of the seven schools that the JFK Campus SBHC serves.
- Female adolescents, ages 13 to 23 years, who presented to the SBHC to initiate MSHC

Methodology

Design
- Retrospective chart audit
- 2017 Control group: Student patients who received standard care from 1/1/2017 - 3/31/17.
- 2018 Control group: Student patients who received standard care from 1/1/2018 - 3/31/18.
- Text message group: All patients in the 2017 to 2018 school year who signed up for text reminders from 1/1/2018 - 3/31/18.
Methodology

Inclusion Criteria:
- Control group: All female patients between the ages of 13 to 23 who received usual care 6-8 weeks after initiation of a new MERC method from 1/1/2017 - 3/31/2017 or 1/1/2018 - 3/31/18.
- Text message group: All female patients between the ages of 13 to 23 who received text message appointment reminders via the patient portal 6-8 weeks after initiation of a new MERC method from 1/1/2018 - 3/31/18.

Exclusion Criteria:
- Continuation of MERC
- Using MERC for secondary amenorrhea or breakthrough bleeding
- Condom only users
- Long acting reversible contraception users
- Abstinence

Methodology

Independent Variables:
- Patient portal use for text message appointment reminders.
- History of previous use of another MERC method with discontinuation.
- History of unprotected sex within 5 days of initial visit and requesting emergency contraception at time of initial visit.
- History of pregnancy.
- History of previous STI.

Dependent Variables:
- Appointment attendance during the 6 to 8-week follow up period

Data Analysis:
- Descriptive Statistics
- Frequencies
- Inferential Statistics
- Chi square
- Odds ratio 95%CI

Protocols
- IRB approval through Columbia University Medical Center.
- All identifying information was removed.
- Data was saved in an excel spreadsheet which was on a secure computer within the clinic.
- The computer and data remained on site at all times.
- Once all the data was collected it was backed up onto a password protected jump drive and the jump drive was taken to the author’s personal computer, which has SPSS version 25 capability.
Results

Descriptive Statistics

<table>
<thead>
<tr>
<th>Category</th>
<th>2017 Control</th>
<th>2018 Participants</th>
</tr>
</thead>
<tbody>
<tr>
<td>Series 1</td>
<td>n = 88 patients who presented for MERC</td>
<td>n = 72 patients who presented for MERC</td>
</tr>
<tr>
<td>Series 2</td>
<td>35% adherence to follow up appointment</td>
<td>48.6% adherence to follow-up appointment</td>
</tr>
<tr>
<td>Series 3</td>
<td>•</td>
<td>•</td>
</tr>
</tbody>
</table>

Difference in Adherence 2017-2018

2018 participants were 1.739 times more likely to be adherent to their refill appointment than the 2017 control group, but the result was not statistically significant (p > 0.05).

Difference in adherence in 2018 groups

Only 4 patients successfully enrolled for text message appointment reminders.

Hypothesis: Patients who received text message appointment reminders would be more likely to be adherent to their follow-up appointment.

Text reminder group was 1.594 times more likely to be adherent to their follow-up appointment for birth control (p > 0.05).
Relationship between adherence and previous discontinuation of a MERC method

Hypothesis: In each of the four groups, patients who had previously discontinued a MERC method would be more likely to self-discontinue by not adhering to their refill appointment.

All the patients in the 2018 text message group who previously discontinued MERC were adherent to their follow-up appointment but the odds ratio could not be calculated due to the low sample size.

Table 1

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.

Table 2

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.

Relationship between adherence and history of unprotected sex

Hypothesis: In all groups, patients who had a history of unprotected sex within the last five days of the initial visit were more likely to miss their follow-up appointment thereby discontinuing their method as compared to patients without a recent history of unprotected sex.

Table 3

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.

Relationship between adherence and history of pregnancy

Hypothesis: In all groups, patients who had a prior history of pregnancy would be more likely to discontinue their method and not show up for their follow-up appointment.

There were no pregnancies in the text message group so chi-square and odds ratio could not be calculated for that group.

Table 4

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.

Relationship between adherence and history of STI

Hypothesis: In all groups, patients who had a previous history of STIs would be more likely to self-discontinue their MERC method by not showing up to the follow-up appointment for refill.

Patients in the 2017 control group with a previous history of STIs were about 2.5 times more likely to be adherent to their follow-up appointment than patients without a history of STIs (p = 0.05).

Table 5

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.

Table 6

<table>
<thead>
<tr>
<th>Group</th>
<th>Adherent</th>
<th>Non-Adherent</th>
<th>Chi-Square</th>
<th>df</th>
<th>p-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group 1 (n=10)</td>
<td>8/10</td>
<td>2/10</td>
<td>0.001</td>
<td>1</td>
<td>0.94</td>
</tr>
<tr>
<td>Group 2 (n=15)</td>
<td>10/15</td>
<td>5/15</td>
<td>0.123</td>
<td>1</td>
<td>0.72</td>
</tr>
<tr>
<td>Group 3 (n=20)</td>
<td>14/20</td>
<td>6/20</td>
<td>0.032</td>
<td>1</td>
<td>0.86</td>
</tr>
<tr>
<td>Group 4 (n=25)</td>
<td>18/25</td>
<td>7/25</td>
<td>0.009</td>
<td>1</td>
<td>0.91</td>
</tr>
</tbody>
</table>

**Note:** All groups were calculated based on the full cycle of 12 months.
Barriers identified using the theoretical framework

Reminder Accessibility
- Patients cannot access their cell phones during the school day for self-enrollment or text reminders. A check list for patients did not ensure access.

Health Care Setting
- Lack of written or additional email reminders to patients during the visit or follow-up visit.
- Electronic health record reminders were not sufficient to encourage patients to sign up for text reminders.

Social System
- Health educators did not enlist peer educators in promoting patient portal enrollment.

Consultation and Referral System
- Patients were given appointment slips for only a completion of their appointment randomized. Patients would be contacted in the EMR once the appointment was made and text reminders were sent. A cell phone was needed to receive text reminders.

Team or Proxy
- Involvement of providers to enroll patients in the portal was not a feasible method given the low enrollment rates.

Discussion

Recommendations based on theoretical framework

- Need for adolescent friendly patient portal
- Customer service hours
- View appointment times online
- Designated staff
- Enrollment for text reminders at registration for clinic services
- Key stakeholder buy in
- Change in practice and confounding factors
- Qualitative study

Strengths and Limitations

Strengths:
- Reinforcement of importance of problem
- Identify causes to address in implementing a text message reminders

Limitations:
- Delays in data collection
- Sexually active patient tracking report
- Low enrollment rates
- Confounding factors
- Retrospective data
Implications for Nursing

Implications for Nursing Education
• APNs trained in implementation science

Implications for Nursing Research
• Increase in adherence
• Using a scientific approach in applying evidence into practice

Implications for Nursing Practice
• Identification of areas to improve
• Consider a qualitative study

Role of the DNP
• Provide leadership to improve patient outcomes and use a scientific approach to apply evidence into practice
• Assess whether existing processes are effective
• Serve as a leader in quality improvement and quality assurance processes
• Interprofessional collaboration

Conclusions
• Text message appointment reminders may be a valuable tool in increasing appointment adherence, but it has not been adequately studied in the adolescent population.
• School policies may impact the adolescents' ability to view these messages and any reminders set on their phone.
• Interventions to increase appointment adherence should be based on evidence.
• Further research is necessary to determine if text message appointment reminders can increase refill appointment adherence in adolescent females on MERC in a SBHC.

References


References

