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Remember Your MEDS: Medication Education Delivers Success

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Abstract

Background: Medication adherence is one of the largest barriers to better patient outcomes today. As pharmacists and student pharmacists expand their roles with community outreach projects, they have the potential to make a huge impact on improving adherence. **Objective:** To improve medication adherence through patient counseling and constructive resources, and to determine patient preferences of adherence tools. **Methods:** Student pharmacists partnered with a 340B pharmacy to promote the importance of medication adherence. Patients were counseled in an initial 10 minute session, and then given the opportunity to receive one or more of the following adherence tools: a pill box, timer, reminder refrigerator magnets, calendar stickers, refill reminder phone calls and/or text message reminders. A pre-survey was conducted to establish the patients' baseline medication adherence using the validated ©Morisky Medication Adherence Scale (©MMAS-8). After three months, students conducted the post-survey via the ©MMAS-8 by calling the patients and asking them questions about the helpfulness of the adherence tools as well as the effectiveness of the initial counseling visit. **Results:** Sixty five patients with hypertension enrolled in the study, and 51 patients completed both the pre- and post-surveys. Patients improved from a 6.02 (SD +/- 1.62) average pre-score to a 6.83 (SD +/-1.25) average post score ($p < 0.001$). Pill boxes, text message reminders, and calendar stickers were respectively ranked as the top 3 most helpful tools studied. The refrigerator magnets were also considered helpful by most patients who used them. The timers were ranked the least helpful, mostly due to difficulty of use. **Conclusion:** Student pharmacists can have a positive impact on medication adherence through simple counseling and offering effective adherence tools.

Introduction

Medication adherence continues to be a considerable barrier in health care that prevents many patients from achieving optimal management of their chronic diseases.¹ A report by World Health Organization found that as many as fifty percent of patients with chronic diseases do not take their medications as prescribed.² Poor medication adherence leads to poor health outcomes and has a negative economic impact on healthcare resources.³⁻⁵ Adherence issues have been reported to be the source of as many as thirty-three to sixty-nine percent of all hospitalizations in the United States.⁶ Pharmacists have demonstrated the ability to positively impact this issue through counseling patients on the importance of taking medications as prescribed and the potential benefits of supplementary adherence tools.⁷⁻⁹ Pharmacists and student pharmacists are in the unique position to improve health outcomes by initiating innovative medication adherence campaigns.^{10,11}

Despite the availability of modern technology, many

pharmacists are not actively exposing patients to adherence tools that would enable patients to improve their medication adherence. Osterberg, et al. reported that new technologies, delivered through a collaborative approach, may be the key to improving medication adherence for today's patients.¹² Another study by Krishna, et al. found that cell phone calls and text message reminders were novel tools to improve patients' adherence in chronic diseases.¹³

Hypertension has consistently been an important chronic disease in which patients struggle to maintain adherence to their medications.^{14,15} Studies suggest the primary factors contributing to this poor adherence is the lack of adequate adherence education along with patients' inability to see the benefits from taking their medications as prescribed.^{16,17} Hypertension is also one of the most common chronic diseases in the United States, with 1 in 3 adults having high blood pressure.¹⁸ Poor adherence leading to uncontrolled hypertension increases the risks of developing heart disease and stroke, respectively the 1st & 3rd leading causes of death in the United States.¹⁸

Objective

To improve medication adherence through patient counseling

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and constructive resources, and to determine patient preferences of adherence tools.

Methods

Hypertension patients were identified as being a large patient population in need of an intervention to improve their medication adherence by the Pharmacy Director at Health Partners of Western Ohio (HPWO). HPWO is a local federally qualified health center with an on-site 340B pharmacy. This health center is located in the small Midwestern town of Lima, Ohio, and it serves a generally indigent patient population. Despite the patient population's lower income status, many patients at this clinic possess cell phones with texting capabilities. It was suggested that in addition to conventional adherence interventions such as pill boxes and timers, it could be valuable to test the benefit of monthly text message refill reminders.¹⁹⁻²¹ All adherence tools and supplies used in this study were purchased with grant money attained through the American Pharmacists Association - Academy of Student Pharmacists' Project CHANCE.

Pharmacists at HPWO began recruiting patients for the study, termed Remember Your MEDS: Medication Education Delivers Success. The study was introduced to patients who came in for prescription refills for antihypertensive medications during the two months prior to the study; allowing for the recruitment of active and eligible patients. Male and female patients were selected for inclusion if they were ≥ 18 years of age, actively taking at least one antihypertensive medication, were willing to participate in the initial counseling session and committed to completing both the pre- and post-surveys. Patient consent was obtained prior to the initial counseling session. This study was approved by the Ohio Northern University Institutional Review Board.

Student members of the project committee underwent training sessions that consisted of familiarizing the students with the patient population, issue of medication adherence, and selected adherence tools. Appointments were made via telephone from the clinic throughout September 2010, and patients were given a reminder phone call the day before their appointment. Patients were enrolled in the project upon presenting to the clinic during the advertised availability of two hours in the morning and one hour in the afternoon on the four consecutive Wednesdays in October. Patients met with a trained pharmacy student to complete the © Morisky Medication Adherence Scale (©MMAS-8, see Fig. 1) to establish baseline adherence.^{22,23} The ©MMAS-8 is a survey that converts patient answers into an adherence score of 0-8 that correlates to which level of adherence best describes them. A score less than 6 correlates to a low adherence level; a score of 6 to < 8 correlates to a medium adherence level; and a

score of 8 correlates to a high adherence level. Patients were then counseled by a student pharmacist on the importance of medication adherence and given the opportunity to select, at no charge, as many of the following adherence tools that they believed would be of a benefit: AM/PM pill box, four times daily pill box, daily medication timer, reminder refrigerator magnets, monthly calendar refill stickers and refill reminder text messages. A pharmacy faculty member or pharmacist was also present during the sessions to assist in answering patient questions or concerns. Patients were personally responsible after this consultation for the implementation of their selected tools, requiring patients to weekly fill their own pill boxes and daily reset their medication timers.

After three months, pharmacy students conducted the post-survey analysis via telephone from the clinic on Wednesdays in the month of January during hours corresponding to the original appointments. The 10 minute post-survey consisted of measuring the efficacy of the intervention per the ©MMAS-8, evaluating patient preference of the various adherence tools, and identifying ways the project could be improved in the future. This post-survey was developed by a team of five student pharmacists prior to the launch of the study, and the questions were reviewed by two pharmacists. The ©MMAS-8 was utilized to assess a change in adherence from the patients' baseline scores established in the initial counseling session. Additionally, the patients were asked to rate the helpfulness of each individual adherence tool via a four point scale, in which: 1 = not helpful, 2 = slightly helpful, 3 = helpful, and 4 = very helpful. Students compiled data using Microsoft® Excel in order to evaluate which tools patients felt were the most helpful in improving adherence. Data were analyzed using PASW version 18.0 for Microsoft Windows, and a paired samples t-test was used to compare data.

Results

Of the sixty-five patients originally enrolled in the study, 51 patients completed the post-intervention survey. Fourteen patients were lost to follow-up, and 9 of these patients were initially classified as having low adherence per the ©MMAS-8 (Table 1). In the post-intervention analysis it was found that the percentage of patients scoring in the low adherence category decreased by 52.2%, and the percentage of patients in the high adherence category increased by 63.6% (Table 2). On average, overall adherence, measured by the ©MMAS-8, improved from the pre-intervention average of 6.02 (SD +/- 1.62) to the post-intervention average of 6.83 (SD +/- 1.25, $p < 0.001$). Of the 51 patients, adherence worsened in 9 patients (17.6%), adherence did not change in 12 patients (23.5%), and adherence improved in 30 patients (58.8%). AM/PM pill boxes were ranked the most helpful with a rating on the scale of 3.62, four times daily pill boxes were rated a

3.25, text message reminders were rated a 3.22, calendar stickers were rated a 3.05, and refrigerator magnets were rated 2.90. The number of devices chosen per patient and the rating on the four point scale for each device is shown in Tables 3 and 4.

Discussion

Remember Your MEDS was a voluntary program aimed at improving patient adherence to high blood pressure medications. Overall adherence was improved during the three month duration of the study in 58.8% of the study population that completed the follow-up survey. Adherence interventions were able to reflect a statistically significant ($P < 0.001$) improvement in patients' overall adherence in as little as three months. Despite an increase in adherence scoring, both the pre and post-intervention average adherence reflected medium adherence per ©MMAS-8. Further improvements in adherence interventions may be able to have a more dramatic impact on adherence.

The majority of the patients that did not participate in the follow-up survey at the study's completion were ranked as low adherence patients at baseline. These patients naturally have the greatest opportunity for improvement. Thus benefit might be gained from future studies examining methods for improving adherence in patients with very poor baseline adherence.

Pill boxes and text message reminders were the least popular adherence tools selected, but were ranked the most helpful by the patients who selected these tools. Pill boxes serve as a visual aid for patients to daily assess whether or not they have remembered to take their medication. Likewise, text message reminders monthly reminded patients about the importance of refilling prescriptions on time and taking their medications as prescribed. Text message reminder systems are growing in popularity with chain retail pharmacies, and they may further prove to be a great way to target poorly adherent patients in years to come. Nonetheless, the results of this study reflect that even simple and inexpensive adherence tools such as traditional pill boxes are still able to positively improve adherence. A small subset of patients reported that the pill boxes were difficult to open and the timer was confusing to use, which may have limited the benefits of these tools. Despite some patients' difficulty in opening the pill boxes, there was also positive feedback provided about the helpfulness of weekly pill boxes that separate the meds into different compartments based on individual medication schedules. Accordingly, a brief assessment during patient counseling of a patient's ability to use each device may be helpful for appropriate device selection. Future studies may

want to compare more patient-friendly timers and pill boxes to see if patient perceptions would be different.

Upon conducting follow-up surveys, 14 patients were lost due to an inability to be reached as a result of moving, hospitalizations, and inconsistent phone numbers. Limited availability of students may have hindered participation from patients who were not available during the appointment times offered. Whereas, an increased variety of hours and days students were available to conduct pre- and post-surveys at the clinic may have increased the number of patients who were able to participate. The clinic was only open during normal business hours which may have also limited the ability of follow-up communication with some patients who normally work during these hours. This study was designed to specifically study adherence in hypertension patients, but future projects could broaden to include other chronic disease states that could benefit from improved adherence (such as diabetes, mental health, heart failure, etc). The study did shed light on what patients seem to be looking for when it comes to adherence tools – immediate simplicity. In the future, studies could target patients with very poor adherence, use more patient friendly adherence devices, and increase student availability to better reach patients. These preliminary results justify further studies on similar interventions' long-term effects (beyond three months) on patients' adherence and health outcomes.

This project can be easily replicated by other student groups or colleges of pharmacy as a means of completing Introductory Pharmacy Practice Experiences (IPPEs) and Advanced Pharmacy Practice Experiences (APPEs). Table 5 has been included to describe the ordering sources of the tools utilized in this study for the benefit of those who may want to construct a similar adherence project. Participation in patient care projects at 340B clinics may allow students to be exposed to a culturally diverse patient population; shaping them into more culturally competent and well-rounded pharmacists.²⁴ Once patients are able to develop a routine of good adherence practices, they may continue to reap benefits for years of good control of their chronic diseases.

Conclusion

Simple and fairly inexpensive interventions by pharmacists and student pharmacists can impact patient adherence, which may improve patient outcomes. Using modern technology to develop programs offering a variety of adherence tools, including text message reminders, appears to be a promising way to target today's poorly adherent patients. This technology coupled with traditional pill boxes, timers, calendar stickers, and magnets will help a broad spectrum of non-adherent patients obtain optimal disease state management.

Future research is needed to identify strategies of improving adherence among patients with very low baseline adherence.

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Table 1 (n=65): Pre-Intervention Survey of All Patient Data*

Patient Adherence	Morisky Scale	n (%)
Low adherence	<6	32 (49.23%)
Medium adherence	6 to <8	21 (32.31%)
High adherence	8	12 (18.46%)

*Including those lost to follow-up

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Table 2 (n=51): Post-Intervention Survey

Patient Adherence	Morisky Scale	Pre-intervention n (%)	Post-intervention n (%)
Low adherence	<6	23 (45.1%)	11 (21.57%)
Medium adherence	6 to <8	17 (33.33%)	22 (43.14%)
High adherence	8	11 (21.57%)	18 (35.29%)

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Table 3: Usefulness of Selected Tools

Adherence Devices Chosen	n (%) [†]	Likert-type Scale [‡]
AM/PM pill box	35 (68.63%)	3.62
Four times daily pill box	17 (33.33%)	3.25
Timer	36 (70.59%)	2.55
Calendar stickers	34 (66.67%)	3.05
Refrigerator magnets	40 (78.43%)	2.9
Text message reminders	14 (27.45%)	3.22

[†]It is important to note that patients were able to select more than one adherence device; therefore, a total % exceeding 100% is expected. It can also be noted that one patient did not select any adherence device.

[‡]A four-point Likert-type Scale was used:

(1=not helpful, 2=slightly helpful, 3=helpful, 4=very helpful)

Table 4: Distribution of Adherence Devices

Number of Adherence Devices Chosen	n (%)
0	1 (1.96%)
1	2 (3.92%)
2	8 (15.69%)
3	12 (23.53%)
4	18 (35.29%)
5	10 (19.61%)

Table 5: Sources of Selected Adherence Tools

Adherence Tool	Ordering Source
AM/PM pill box	www.dollardays.com
Four times daily pill box	www.dollardays.com
Timer	www.dollardays.com
Refrigerator magnets	www.vistaprint.com
Calendar stickers	www.motivators.com

Figure 1: 8-Item Morisky Medication Adherence Scale (©MMAS-8)

8-Item Morisky Medication Adherence Scale (©MMAS-8)	
Item	Response
1. Do you sometimes forget to take your blood pressure pills?	Yes No
2. People sometimes miss taking their medications for reasons other than forgetting. Thinking over the past two weeks, were there any days when you did not take your blood pressure medicine?	Yes No
3. Have you ever cut back or stopped taking your medication without telling your doctor, because you felt worse when you took it?	Yes No
4. When you travel or leave home, do you sometimes forget to bring along your blood pressure medication?	Yes No
5. Did you take your blood pressure medicine yesterday?	Yes No
6. When you feel like your blood pressure is under control, do you sometimes stop taking your medicine?	Yes No
7. Taking medication everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your blood pressure treatment plan?	Yes No
8. How often do you have difficulty remembering to take all your medications?	Never/Rarely Once in a while Sometimes Usually All the time

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