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Final DNP Practice Inquiry Project
Medication Adherence after Post Percutaneous Coronary Intervention: An Educational
Intervention

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College of Nursing

Spring 2016

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Table of Contents

Acknowledgements.....	iii
List of Tables.....	v
List of Figures.....	vi
Practice Improvement Project.....	1
Appendix A: IRB Approval Letter.....	16
Appendix B: Medication Chart.....	17
Appendix C: Phone Script/Data Collection Tool.....	18
References.....	20

List of Tables

Table 1: Strategies and No-Cost Resources.....	14
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List of Figures

Figure 1: Difference in mean knowledge scores	15
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Abstract

Purpose: The purpose of this evidenced-based education project was (i) assess current barriers and determining factors associated with medication adherence and how this coincides with health outcomes, (ii) assess whether medication adherence and hospital re-admission rates were improved with a comprehensive medication discharge educational plan.

Setting: The project took place on a 35 bed post interventional care unit (4IC) located in a 433 bed community care hospital in Central Kentucky.

Population: The population for this study was a sample of 10 acute myocardial infarction patients post percutaneous coronary intervention. Thirty percent of participants were female and 60% were male. Mean age was 63.6 years old (SD=10.5).

Inclusion Criteria: English speaking subjects who were post percutaneous coronary intervention and discharged on anti-platelet medication. Access to a phone for the 7 day post discharge phone call was a requirement for study participation.

Design and Methods: Data analysis was performed using SPSS® version 23.0 (SPSS Inc., Chicago, IL). Pre and post tests were scored and statistically analyzed to assess mean scores prior to, and following educational intervention. Data were analyzed using descriptive statistics. Paired T-tests were conducted to compare the differences in mean scores. This study considered values of $p < 0.0001$ significant for the analysis. Enrolled patients were seen on the morning of hospital discharge and the following activities occurred: A medication chart was given to patients that included anti-platelet medication name, dosage, indication, and frequency. The teach-back method was employed to assess patient understanding and retention. One week post-discharge patients were phoned to confirm discharge medications were filled as well as

assessment of understanding and timing of anti-platelet medications via the teach-back method. Patients were reminded of their 30 day clinic appointment and the importance of attending this visit. Patients were seen at their 30 day standard of care clinic visit to assess adherence at 30 days.

Results and Conclusion: Participation in this project ultimately yielded a significant increase in anti-platelet medication knowledge from pre-test to post test. Baseline mean pre-test score of 1.30 (SD=.483); participants' mean score significantly increased to 3.00 (SD=.000). There was no significant difference between 7 day and 30 day adherence rates and knowledge. Seven day mean pre-test score of 2.90 (.316) and mean post test score of 3.00 (SD=.000). 100% of study subjects were taking anti-platelet medications at 7 days and 90% of subjects were taking medications at 30 days. One study subject was seen in the emergency room within 30 days of index procedure with reports of shortness of breath and angina. A full cardiac workup concluded that the stent was patent and anti-platelet medication was changed. It was thought by the overseeing cardiology service that this subject was a poor responder to current therapy. It is unknown if this subject was adherent at 30 days because she did not attend the 30 day clinic visit.

Background

Definition

Medication adherence has been defined as the active, voluntary, and collaborative involvement of the patient in a mutually acceptable course of behavior to produce a therapeutic result (Ho, Bryson, & Rumsfeld, 2009).

Associated Costs

Medication adherence continues to be a growing concern to healthcare providers and other stakeholders because the relationship between compliance and adverse outcomes has been linked to higher costs of care. The total cost estimates as a result of medication non-adherence range from \$100 billion to \$300 billion annually (Bosworth et al., 2011). The American College of Preventative Medicine (2011) estimates that non-adherence costs average \$2,000 per patient in physician visits annually. More than forty percent of nursing home admissions are a direct result of non-adherence and this rate is expected to rise as the number of chronic diseases increase (Lau & Nau, 2009). It is estimated that for every dollar spent on adhering to a prescribed medication, medical costs would be reduced by \$9.08 (Bosworth et al., 2011).

Morbidity and Mortality

Approximately 125,000 deaths per year in the United States are due to medication non-compliance, and between 33% and 69% of medication related admissions in the United States are to due to poor adherence (Bosworth et al., 2011). While medications are effective in combating disease, their full benefits are not often realized because approximately 20%-50% of patients do not take their medications as prescribed (Brown & Bussell, 2011). Patients who filled

none of their discharge medications within 120 days after an acute myocardial infarction (AMI) had an 80% increase in chance of death; those who filled some of their medications had a 44% increase in chance of death (Jackevicius, Li, & Tu, 2008). Non-adherence can be attributed to 30%-50% of treatment failures and non-adherence leads to worsen outcomes such as increased, preventable hospitalization rates, and increased healthcare costs (Sokol, McGuigan, Verbrugge, & Epstein, 2005).

Guidelines

Currently, measurement of patient adherence to medication regimes and the incorporation of interventions to improve adherence are rarely used in clinical practice. Medication adherence has been termed the “next frontier in quality improvement” and is an important clinical issue that needs addressed (Ho, Bryson, & Rumsfeld, 2009). Given the magnitude and importance of poor medication compliance and programs to aid in this, the World Health Organization has developed evidence-based guidelines for clinicians, health care managers, and policymakers to assist in strategies to improve medication compliance (Osterberg & Blaschke, 2005).

Medications are imperative in treatment and disease prevention. It has been reported that medication use in the United States has risen from approximately 4 drugs prescribed per person from 1995 to 1996 to 5.2 drugs from 2001 to 2002 (Tarn et al., 2006). Medication non-adherence may occur at various levels in the patient’s decision-making process. It may occur at the start of therapy if a patient receives the initial prescription and fails to fill it, or it may occur after initiation of therapy and the patient fails to comply with instructions or fails to refill the prescription (Jackevicius, Li, & Tu, 2008). The misuse of medications can result in disease progression, drug overdose, hospitalizations, and increased healthcare costs. Reasons for overall

medication non-adherence are reflected in barriers to medication adherence, condition related factors, socio-economic factors, and communication (Wroth & Pathman, 2006). With the number of medication use on the rise, it is critical that patients are instructed on the proper use of prescribed medication regimens. Haskard & DiMattroo (2009) attribute communication between healthcare providers and patients regarding medication regimes as significant in predicting adherence among patients. Adherence requires the patient to believe there is a benefit to the medication prescribed and agree with the instructions on how to take it. This can be particularly challenging in the cardiovascular population due to the fact that patients may not see immediate symptom improvement.

Teach-Back Method

With the increase in the incidence of chronic disease, patient self-management has become increasingly important. For patients to effectively manage their health conditions they must effectively understand their disease process, rationales for treatments, medication regimens, and associated side effects. Jack et al. (2009) found that patients' understanding of medication at hospital discharge was approximately 15%, and of those 15%, they were unaware that a new medication had been prescribed. Additionally, only half reported sufficient understanding of specific information related to medications, including dosage, dosage schedule, and purpose.

Assessing patients comprehension and recall ability helps predict their adherence to medical management. For effective teaching and assessment of patient comprehension and recall, a patient-centered approach must be utilized. The teach-back method confirms patient understanding and can assist in closing the communication gap between the clinician and patient while enhancing patient knowledge (Ping, 2012).

Description of the Practice Inquiry Project

This practice inquiry project implemented an evidenced based, nurse-driven, multidisciplinary medication discharge process in AMI patients discharged on anti-platelet medications post percutaneous coronary intervention at a 433 bed community care hospital located in Central Kentucky. The project took place on a 35 bed post interventional care unit (4IC). A Pre/Post- test analysis was used at 3 time points to determine the educational impact on patient knowledge and adherence to prescribed anti-platelet medication.

Goals and Objectives

The objectives of this project were to: (i) assess current barriers and determining factors associated with medication adherence and how this coincides with health outcomes, (ii) assess whether medication adherence and hospital re-admission rates were improved with a comprehensive medication discharge educational plan.

Methods

Approval Process

Following project proposal development and committee approval, clearance was obtained from the Research Oversight Office at Kentucky One Health. An expedited proposal was approved by the University of Kentucky Institutional Review Board (IRB). The Chief Nursing Officer, physicians, advanced practice providers, and the 4IC nursing manger and unit staff were informed of the project via email and in person communication. Approval was obtained from the manager of the Post Interventional Care Unit Manager.

Study Setting:

The project took place on a 35 bed post interventional care unit (4IC) located in a 433 bed community care hospital in Central Kentucky. The hospital is accredited by The Joint Commission for Accreditation of Hospitals. The hospital is also a designated Society of Cardiovascular Chest Pain center.

Study Population

The target population for this study was English speaking cardiology patients who underwent percutaneous coronary intervention and were discharged on anti-platelet therapy. Eligibility in this study required access to either a land line or cell phone. A total of 12 subjects were approached for a total of 10 participants.

Procedures

A formal in-service was held with the unit staff and manager providing them with the details of the project and how this would complement their current practices. Enrolled patients were identified by screening the daily cath lab schedule. Eligible patients were approached for consent into this study, and after informed consent, seen prior to hospital discharge. No standard practices was interrupted by this project; medication reconciliation and all discharge procedures conducted by the discharge nurse took place, including assessment of financial barriers associated with medications. As part of this project, a medication chart was given to patients that included anti-platelet medication name, dosage, indication, and frequency (Appendix A). The teach-back method was employed by the study PI to assess patient understanding and retention. One week post-discharge patients were phoned by the study PI to confirm discharge medications were filled as well as assessment of understanding and timing of anti-platelet medications.

Patient understanding was confirmed via the teach-back method (Appendix B). Additionally, patients were reminded of their 30 day clinic appointment and the importance of attending this visit. Lastly, patients were seen at their 30 day standard of care clinic visit. At this visit medication adherence was assessed as well as any hospital re-admissions since their index procedure.

Data Analysis:

Data analysis was performed using SPSS® version 23.0 (SPSS Inc., Chicago, IL). Pre and post tests were scored and statistically analyzed to assess mean scores prior to, and following educational intervention. Data were analyzed using descriptive statistics. Paired T-tests were conducted to compare the differences in mean scores. This study considered values of $p < 0.0001$ significant for the analysis.

Results

Sample Characteristics

A total of 12 subjects were approached who met the inclusion criteria for the study, and 10 subjects voluntarily participated in the study. Thirty percent of participants were Caucasian females and 70% were Caucasian males. Mean age was 63.6 years old (SD=10.5). All but 1 study subject completed all required visits for a completion rate of 90%. Reason provided by the 2 subjects who declined participation was access to a reliable phone and time commitment requirement.

Study Results

Participation in this project ultimately yielded a significant increase in anti-platelet medication knowledge from pre-test to post test. Baseline mean pre-test score of 1.30 (SD=.483);

participants' mean score significantly increased to 3.00 (SD=.000). There was no significant difference between 7 day and 30 day adherence rates and knowledge. Seven day mean pre-test score of 2.90 (.316) and mean post test score of 3.00 (SD=.000) (Figure 1). One hundred percent of study subjects were taking anti-platelet medications at 7 days and 90% of subjects were taking medications at 30 days.

One study subject was seen in the emergency room within 30 days of index procedure with complaints of shortness of breath and angina. A full cardiac workup concluded that the stent was patent and anti-platelet medication was changed. It was thought by the overseeing cardiology service that this subject was a poor responder to current therapy. It is unknown if this subject was adherent at 30 days because she did not attend the 30 day clinic visit.

Discussion

Guidelines from the American College of Cardiology, American College of Preventive Medicine, and the World Health Organization recommend clinicians implement strategies to improve medication adherence. Physicians and Advanced Practice Providers play an integral role in this process. Numerous studies have demonstrated a correlation between provider trust and adherence. A meta-analysis performed by Haskard and DiMatteo (2009) on provider communication and patient adherence found there was a 19% higher risk of non-adherence among patients whose provider communicates poorly compared to those providers who communicate well. Statically, the odds of patient adherence are 2.26 times higher if the provider communicates well. This translates into more than 183 million avoidable medical visits when strong provider/patient communication is present (Haskard and DiMatteo, 2009). Time has also been identified as a barrier in provider/patient communication. Studies have shown that some

patients are interrupted by their provider after an average of 22 seconds. It has also been demonstrated that when patients are allowed to speak freely, the average patient would speak initially for less than 2 minutes (McDonald, Gary, & Haynes, 2009). By opening the lines of communication this will allow for the acceptance of new medication, adherence to medication regimes, which will ultimately lead to improvement in health outcomes (American College of Preventative Medicine, 2011).

Follow-up appointments after hospitalizations may also be a predictor of medication adherence. A study that included 20,976 patients looked at the effect of follow-up appointments in patients who were post AMI. Researchers found that at three months post AMI, one in three patients were no longer adherent to medications, including anti-platelet medications. It was also identified that patients who had their first follow-up appointment within 4-6 weeks post discharge had significantly better adherence rates at both 90 days and one year compared with those who followed-up later or did not follow-up at all (Faridi et al., 2016).

Brown and Bussell (2011) assert that while the provider has an integral role in this process, the patient must take an active role as well. It has been reported that a typical patient recalls as little as 50% of what is discussed at a medical encounter. Effective patient education must be multi-factorial, individualized, and delivered in a variety of ways outside the four walls of a hospital (Brown & Bussell, 2011). A key component of an adherence improving plan must be education. The more empowered the patient feels, the more likely they are to be motivated to manage their disease and adhere to treatment guidelines. Additional measures to ensure adherence is to actively involve the patient whenever possible in treatment decisions. By actively involving patients and offering choices, this will encourage active participation in their

healthcare and hopefully facilitate adherence to medication regimes (Garner, 2010).

Using the teach-back approach is another method of confirming understanding and actively engaging the patient. During the teach-back process, the patient makes the transition from having their disease managed by the provider to managing it themselves. When teach-back is used, providers reinforce what the patient already knows and teach them what they do not. By repeating this process as part of the interactive communication loop, this increases patients' self-care capacity abilities (Maniaci, Heckman & Dawson, 2008).

This practice inquiry project was designed to improve knowledge surrounding anti-platelet medication in the post AMI/PCI patient population. The results showed a statistically significant difference in patient knowledge and understanding from baseline pre/post test evaluation and continued retention through 30 days. Additionally, pre test data revealed that post AMI/PCI patients are not adequately being educated on anti-platelet medication use prior to hospital discharge.

Implications for Practice

Medication adherence has a tremendous impact on the healthcare system due to increased risks of mortality and hospital readmissions; it is not solely a patient problem. The results of this practice inquiry project suggest that improving patient knowledge surrounding medication regimes and encouraging self-management techniques could influence the patient's decision making process, and with further research, implement evidenced based strategies targeted at adherence interventions. This is supported by recommendations from the American College of Cardiology, American College of Preventive Medicine, and the World Health Organization. Moreover, further research is needed to explore the impact of the discharge nurse in developing a

standardized discharge process and the role this plays in medication adherence. By implementing these types of practices throughout an institution, we can ensure that patients are equipped with the necessary tools to be an active participant in their healthcare.

Implications for Future Inquiry

Future studies need to include a larger sample size and a more diverse patient population. Additional considerations may include a different study design or the addition of a control group to validate the hypothesis and a follow-up period of 1 year. The teach-back method has been demonstrated as an effective approach in increasing adherence, but there is little research with using this method in the AMI/PCI patient population. This small study utilized this method and was found to be successful in the 10 patients enrolled, but a larger sample is needed to validate this. Research has demonstrated that patients who had their first follow-up appointment within 4-6 weeks following discharge have significantly better adherence rates at 90 days and one year compared with those who were lost to follow-up. Measures to ensure follow-up appointments are made prior to discharge and then reminders sent to patients prior to scheduled appointments should be standard practice. Lastly, findings should be published in medical journals to help guide future practice and research.

Limitations

Due to a small study sample (n=10), a larger study sample is needed to adequately demonstrate effectiveness and advocate the need for practice change. The sample is also comprised of all Caucasians, so this may not be a true representation of the population as a whole, nor generalizable to a diverse set of patients. Follow-up beyond 30 days was not feasible

in this study due to time constraints; however future research should be targeted to include a larger sample size and follow-up through 1 year to gain a better understanding of contributing factors associated with medication adherence in the AMI/PCI patient population.

Conclusion

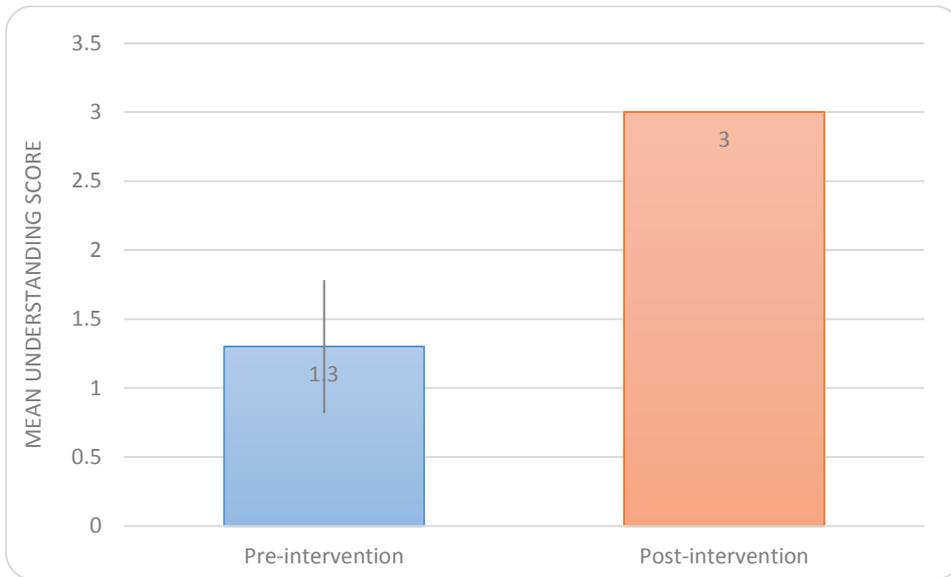
With the rising incidence of chronic disease, patient self-management is becoming increasingly important. An easy and cost effective way to assist with this is incorporating the teach-back method into practice. Using this technique can improve patient knowledge, outcomes, and self-management skills. Based on the findings from this study, evidence-based education in the form of the teach-back method was successful in improving medication adherence rates in the AMI/PCI patient population 30 days post index procedure. Due to limitations in this study, researchers were unable to demonstrate long-term effects of teach- back method in regards to medication adherence. However, a significant increase in baseline knowledge of medications made the patients feel as if they were taking an active part in their healthcare management, therefore, equipped with the necessary knowledge to make informed decisions. This is promising and warrants further investigation. Given the lack of research on this subject in the AMI/PCI patient population, further research is recommended to expand on this educational intervention in order to design, implement and evaluate programs that are effective and sustainable over time. As stated by Benjamin Franklin, “Tell me and I forget. Teach me and I remember. Involve me and I learn.”

Table 1: Strategies and No-Cost Resources

TABLE 1. Strategies and No-Cost Resources Aimed at Overcoming Barriers to Medication Adherence	
<i>Patient-related factors</i>	
Health literacy	
Teach-back method (video of real patients)	http://www.acpfoundation.org
Empowering patients to ask questions	http://www.npsf.org/askme3/
Visual, interactive video medical education	http://medlineplus.gov
Providing a pictorial medication schedule	http://www.ahrq.gov/qual/pillcard/pillcard.htm
Audio information: podcasts/radiocasts	http://healthcare411.ahrq.gov/
Health literacy universal precautions toolkit	http://www.ahrq.gov/qual/literacy/
Medication list for patients	http://www.safemedication.com
Mental health issues	
Videos from the National Institutes of Mental Health	http://www.nimh.nih.gov
Helpline of the National Alliance for the Mentally Ill	http://www.nami.org/
Patient participation	
Developing a patient-centered medical home	http://www.aafp.org/online/en/home/membership/initiatives/pcmh.html http://www.acponline.org/running_practice/pcmh/
Financial issues/access to care	
Prescription medicine financial assistance	http://www.needymeds.org/ http://rxassist.org/ http://www.pparx.org/ http://www.togetherrxaccess.org/Tx/jsp/home.jsp http://www.benefitscheckup.org/ http://www.medicare.gov/
National Council on Aging Medicare plans	
<i>Physician-related factors</i>	
Awareness	
Identification and useful tools	http://www.ethnomed.org
Rapid estimate of adult health literacy	http://www.ahrq.gov/populations/sahlsatool.htm
Rapid test of literacy	http://www.adultmedication.com/
Health literacy video of physician interviews with patients	http://www.acpfoundation.org
Communication	
Video vignettes relating to cultural competency	https://cccm.thinkculturalhealth.org/videos/index.htm
National Council on Patient Information and Education	http://www.talkaboutrx.org/
American Academy on Communication in Healthcare	http://www.aacchonline.org/
Complexity of dosing	
Medication list and helpful questions	http://www.learnaboutrxsafety.org/
<i>Health system/team building-related factors</i>	
Time constraints	
Patient-centered medical home	http://www.acponline.org/running_practice/pcmh/
American Association of Family Practice medical home	
Web site	http://www.medicalhomeinfo.org/
Patient-Centered Primary Care Collaborative	http://www.pcpc.net/
Lack of care coordination ("fumbled hand offs")	
Coordinating care among all physicians	http://www.ihl.org/ihl
Medication reconciliation	http://www.psnet.ahrq.gov/primer.aspx?primerID=1
Lack of automation	
American EHR Partners (ACP-sponsored)	http://www.americanehr.com
Electronic Prescribing Readiness Assessment	http://getrxconnected.org
Health information technology	http://healthit.ahrq.gov/
Introduction to electronic health records	http://www.centerforhit.org/ http://www.thecimm.org/

ACP = American College of Physicians.

Figure 1: Difference in mean knowledge scores (N=10)



Appendix A: IRB Approval Letter



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Initial Review

Approval Ends
February 7, 2017

IRB Number
15-1045-P2H

TO: Rebecca Shelton Thomas, RN, BSN, DNP
563 Meridian Plaza
Lexington, Kentucky 40503
Cell phone # (859)833-6546

FROM: Chairperson/Vice Chairperson
Medical Institutional Review Board (IRB)

SUBJECT: Approval of Protocol Number 15-1045-P2H

DATE: February 10, 2016

On February 9, 2016, the Medical Institutional Review Board approved your protocol entitled:

U.K. O The Effect of the Teach Back Method of Medication Reconciliation Prior to Discharge on Medication Adherence after PCI

Approval is effective from February 9, 2016 until February 7, 2017 and extends to any consent/assent form, cover letter, and/or phone script. If applicable, attach the IRB approval consent/assent document(s) to be used when enrolling subjects. [Note, subjects can only be enrolled using consent/assent forms which have a valid "IRB Approval" stamp unless special waiver has been obtained from the IRB.] Prior to the end of this period, you will be sent a Confidential Review Report Form which must be completed and returned to the Office of Research Integrity so that the protocol can be reviewed and approved for the next period.

NOTE: Please be reminded the UK IRB does not certify or approve IIRB's for other institutions.

In implementing the research activities, you are responsible for complying with IRB decisions, conditions and requirements. The research procedures should be implemented as approved in the IRB protocol. It is the principal investigator's responsibility to ensure any changes planned for the research are submitted for review and approval by the IRB prior to implementation. Protocol changes made without prior IRB approval to eliminate apparent hazards to the subject(s) should be reported in writing immediately to the IRB. Furthermore, discontinuing a study or completion of a study is considered a change in the protocol's status and therefore the IRB should be promptly notified in writing.

For information describing investigator responsibilities after obtaining IRB approval, download and read the document "PI Guidance to Responsibilities, Qualifications, Records and Documentation of Human Subjects Research" from the Office of Research Integrity's IRB Survival Handbook web page [<http://www.research.uky.edu/ori/IRB-Survival-Handbook.html#PIresponsibilities>]. Additional information regarding IRB review, federal regulations, and institutional policies may be found through ORI's web site [<http://www.research.uky.edu/ori/>]. If you have questions, need additional information, or would like a paper copy of the above mentioned document, contact the Office of Research Integrity at (859) 257-9428.

Susan Frazier, PhD, RN & Terry Malow, EdD/Ag
Chairperson/Vice Chairperson

Appendix C: Phone Script

One Week Phone Call Script and Data Collection Sheet

Hello, may I speak with Ms./Mr. X,

My name is Rebecca Thomas and I am a graduate student at the University of Kentucky. We met during your recent hospitalization at Saint Joseph Hospital. To refresh your memory, prior to discharge from the hospital we discussed your medications and you gave me permission to phone you, do you remember that? If so, do you still agree to be a part of this program?

If patient agrees proceed with the following.

I was wondering if you have a few minutes for me to go over your medications using the list we reviewed while you were in the hospital, do you have that? Also, can you bring all your medications to the phone, please? We will review them during this call. I will hold while you collect all of your medications, there is no need to hurry.

Caller (PI): Do you have all of your medications and the list in front of you now?

Caller (PI): I'm going to ask you a few questions about each one of your medications to see if there is anything I can help you with. We will go through your medications one by one.

First of all, I want to make sure you were able to obtain all of the medications you were discharged home with, did you do this? If not, why?

Next we will discuss how often you take each medication, any problems you have had and any questions you might have about them.

Let's start with the first medication on the list.

- What is the name of the medication? *If the patient is using a generic, make sure they understand that the brand and generic names are two names for the same medication.*
- What is the dosage of this medication?
- How much do you take each time?
- What do you take this medicine for?
- Do you have any problems or concerns with this medicine?
- Do you think you are experiencing any side effects with this medication?

If the patient has been prescribed any medication that the patient hasn't mentioned, ask whether or not they are taking that medication.

18

If the patient is not taking the medication, ask why not.

Caller (PI): Have you been using the medication chart that was provided to you prior to discharge?

If yes, provide positive reinforcement of this tool.

If no, suggest using this tool to help remember to take medicines as directed.

Caller (PI): What questions do you have today regarding your medicines and/or medication chart?

Appointment Reminder

Caller (PI): I want to make sure you remember to come to your appointment with Dr. X on X. You were given an appointment with your doctor when you left the hospital. Can you please tell me:

- When is your appointment?
- Where is your appointment?
- Are you able to make this appointment? *If the patient can't make the appointment, instruct to reschedule as close to the date of the originally scheduled appointment and stress the importance of attending this visit. Make sure the patient has the clinic phone number on hand.*

Caller (PI): Please remember to bring your medication chart to your scheduled appointment on XX.

Caller (PI): In addition to this call you will also receive a call from Dr. X's clinic two days prior to your appointment to remind you of the date. At that time if you are unable to attend that appointment please make sure you reschedule this visit.

Caller (PI): Do you have any questions at this time?

Caller (PI): Thank you for your time, good bye. I look forward to seeing you on xxxxx.

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