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# PHARMACY STUDENT MOTIVATIONAL INTERVIEWING INTERVENTION IN HOSPITALIZED PATIENTS – A PILOT STUDY

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MASTER'S PROJECT MANUSCRIPT  
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## I. ABSTRACT

### **Purpose**

The aim of this study was to determine the feasibility of training and coordinating pharmacy students to deliver motivational interviewing (MI) education with patients who have hypertension and low medication adherence in a hospital setting.

### **Methods**

This was a pre-post pilot study with pharmacy students using MI counseling on patients with poorly controlled hypertension within Houston Methodist Hospital to compare patient's self-reported blood pressure, medication adherence, and self-efficacy level collected during hospitalization and thirty days after discharge.

### **Results**

A total of 155 patients records were pre-screened for uncontrolled blood pressure upon admission with only 28 patients (18%) consenting to participate in the study. Of those who consented, 15 patients (54%) successfully followed up by phone to provide post-intervention data on self-reported blood pressure, adherence, and self-efficacy scores. There was a trend for decreased blood pressure ( $p$  value  $<0.01$ ,  $n=12$ ) and improved medication adherence scores ( $p$  value  $<0.001$ ,  $n=15$ ) for patients with successful follow up. There was no significant difference in the proportion of patients who had poor self-efficacy before and after the study ( $p$  value  $<0.25$ ,  $n=15$ ).

### **Conclusion**

This pilot study demonstrated feasibility and reproducibility of training pharmacy students to use core MI skills to counsel patients within the hospital setting. While there was a low rate of patient consenting to the study due to allocation of student time to the enrollment process, there was a favorable trend in reducing patient blood pressure and improving the proportion of medication adherence in follow up patients post-discharge. Extending the enrollment time period, and allocating more dedicated time of study participants to the training and consenting process may improve the consent rates of future study designs.

## II. STUDY OBJECTIVES

### **Description of research problem**

Despite the strong evidence associated with improved medication adherence and health outcomes from delivering MI, traditional education and training for pharmacy students involves little or no exposure to practice effective behavioral change techniques such as MI with patients in actual clinical settings.

### **Overview of research design**

This was a pre-post pilot study with pharmacy students utilizing MI counseling on patients with poorly controlled hypertension within Houston Methodist Hospital to compare patient's self-reported blood pressure, medication adherence, and self-efficacy level collected during hospitalization and after thirty days from discharge.

### **Specific aims**

This study aims to investigate the feasibility of using pharmacy students enrolled in advance pharmacy practice experiential rotations to conduct MI with hospitalized patients. In addition, this study will describe the impact of MI on patient's self-efficacy of health management, self-reported medication adherence, and self-reported blood pressure control. Findings from this study can be used to develop more effective roles and counseling strategies for pharmacy students within the healthcare team.

### **Hypotheses**

Utilizing pharmacy students enrolled in advance pharmacy practice experiential rotations will be a feasible incorporation into the layered learning model within an inpatient pharmacy department, and also serve to improve patient's self-efficacy of health and medication adherence.

### **Public health significance**

Estimates of adherence to long-term medication regimens range from 17% to 80% and nonadherence can lead to increased morbidity, mortality, and healthcare costs. There is potential for substantial health gains at both individual and population levels through improved patient adherence to medication use by using pharmacy students, who may be an untapped member of the health care team.

### III. BACKGROUND

Hypertension affects approximately one in every three adults in America.<sup>1</sup> Adherence to antihypertensive therapy can optimize health outcomes; however, nonadherence is common among patients who take prescription medications chronically. Nonadherence often precedes hospitalization, which can incur costs exceeding \$800 million each year.<sup>2</sup> It is associated with worsening of disease, increased mortality, and greater health care costs.<sup>3-7</sup>

Motivational interviewing (MI) is a style of patient-centered counseling that is brief, and has demonstrated efficacy in addressing a variety of health issues, including medication adherence<sup>8</sup>. It is a nonconfrontational counseling style aimed at helping patients understand and resolve their ambivalence about behavior change. Some studies suggest that providing patient's feedback on their level of medication use and having them share in treatment decisions may increase adherence.<sup>9-11</sup>

The concept of self-efficacy can be defined as a patient's belief or confidence in his or her own ability to carry out a target behavior. This is an extremely powerful concept with research evidence of a strong correlation between self-efficacy and adherence.<sup>12-16</sup> In models examining self-efficacy and hypertension self-care, good self-efficacy to manage hypertension was statistically significantly associated with a higher prevalence of adherence for five of the six Joint National Commission 7 recommended self-care behaviors. In one study, adjusted results of the prevalence of adherence with medication was 1.23 times higher among those with good self-efficacy as compared to those with poor self-efficacy as measured by the H-SCALE (Hypertension Self-Care Activity Level Effects).<sup>17</sup>

Using students on an advanced pharmacy practice experiential rotation to conduct motivational interviewing may serve as an underutilized resource within the healthcare team. Modern pharmacy practice requires pharmacists to develop effective counseling skills.<sup>18-20</sup> Accreditation standards by Accreditation Council for Pharmacy Education (ACPE) require that pharmacy students develop specific patient-centered care competencies. All colleges and schools of pharmacy need to demonstrate competency outcomes with their didactic curriculum and experiential training programs.

Despite the strong evidence associated with improved medication adherence and health outcomes from delivering MI, traditional education and training for pharmacy students involves little or no exposure to practice effective behavioral change techniques such as MI with patients in actual clinical settings. Several studies have demonstrated the benefit of pharmacy student participation in a variety of clinical settings. One study examined the impact of a pharmacy student and resident-led discharge counseling program among heart failure patients, and 89% of patients receiving the intervention reported better understanding of their medication without use of MI.<sup>21</sup>

Given that about half of all treated hypertensive patients discontinue treatment by twelve months, there is potential for substantial health gains at both individual and population levels through improved adherence<sup>22</sup>. Providing pharmacy students with a brief seminar on MI during their experiential rotation to counsel patients, in addition to their traditional didactic education, may serve as a cost-effective and practical resource to promote patient adherence and other beneficial health outcomes.

This study aims to investigate the feasibility of utilizing pharmacy students enrolled in advance pharmacy practice experiential rotations to conduct MI with hospitalized patients. Findings from this study can be applied to develop more effective roles and counseling strategies for pharmacy students within the healthcare team.

## IV. METHODS

### **Study Design**

This was a pre-post pilot study where pharmacy students used MI to counsel patients with poorly controlled hypertension and low medication adherence admitted to Houston Methodist Hospital in Houston, TX. Students were trained to provide MI counseling to patients during hospitalization to collect data on blood pressure, medication adherence, and self-efficacy level. A follow up phone call was conducted thirty days after patients were discharged to collect post intervention data. The purpose of the study was two-fold: to assess the feasibility of training and coordinating MI counseling among students; and to improve patients' self-reported medication adherence, self-efficacy, and self-reported blood pressure. The study was approved by Houston Methodist Research Institute Institutional Review Board (IRB).

### **Student Recruitment**

The study coordinator selected six University of Houston College of Pharmacy students on internal medicine rotations to provide eight hours of MI training focused on hypertension and medication adherence spanning over three days during the first week of the rotation. The intention of selecting students on patient care rotations was to incorporate their MI training with the patients they cared for during their rotation. Students were surveyed to assess baseline knowledge of MI techniques that included how to respond to patients using statements that were open-ended, affirmative, reflective, or summative. At the end of the patient enrollment period, students were reassessed on their ability to use such MI techniques.

## Training

Training consisted of role play counseling sessions with pharmacists who were trained in MI and posed as mock patients. There were several different patient scenarios to provide realistic experiences of patients who were classified in different stages of change: precontemplation, contemplation, planning, action, maintenance, and relapse. Components of training content was derived from several published resources, including a crosswalk of the topics covered in a study that developed a motivational interviewing course for pharmacy students.<sup>20</sup>

### Lecture Outline

- I. Demonstration of non-MI counseling vs. effective MI counseling
  - a. Review demonstrations to identify key features of MI
- II. Define MI
  - a. MI is a collaborative, goal-oriented method of communication with particular attention to the language of change. It is designed to strengthen an individual's motivation for and movement toward a specific goal by eliciting and exploring the person's own argument for change.
- III. Impact of MI in pharmacy practice
- IV. Spirit of MI
  - a. Collaboration
    - i. Biomedical model (provider-centered)
    - ii. Sociobehavioral model (patient-centered)
  - b. Acceptance
  - c. Compassion
  - d. Evocation
- V. Stages of change (transtheoretical model)
  - a. Client makes the argument to change
  - b. Precontemplation
  - c. Contemplation
  - d. Preparation
  - e. Action
  - f. Maintenance
  - g. Permanent exit or relapse
- VI. Strengths of MI
  - a. Non-confrontational empathic style
  - b. Supported by research to improve medication adherence
  - c. Successful with different high risk populations
  - d. Successful in brief sessions
- VII. Four principles of MI – RULE
  - a. Resisting the righting reflex
  - b. Understanding patients' motivation
  - c. Listen
  - d. Empower your patient
- VIII. Four elements of MI
  - a. Express empathy
  - b. Develop resistance/values/goals
  - c. Roll with resistance – avoid argumentation
  - d. Support self-efficacy/confidence/help
- IX. Four skills of MI - OARS
  - a. Open ended questions
  - b. Affirmative statements

- c. Reflective listening
  - d. Summarize
- X. Identify change talk – DARN
  - a. Desire: want, prefer, wish, etc
  - b. Ability: able, can, could, possible
  - c. Reasons: specific arguments, why do it, what would be good?
  - d. Need: important, have to, need to, matter, got to
- XI. Responding to change talk - EARS
  - a. Elaboration
  - b. Affirming
  - c. Reflecting
  - d. Summarizing
- XII. Post-lecture demonstration of MI

#### Sample Training Schedule during Orientation Week

##### Day One (three hours)

- Provide lecture on MI
- Practice the use of OARS statements with preceptors
- Students study at home
  - Watch self-selected online videos
  - Review ACCP Pharmacotherapy Self-Assessment Program Chapter on MI
  - Review Pharmacist's Letter online questions on MI
  - Answer APhA 2015 continuing education lecture assessment questions

##### Day Two (three hours)

- Role play with preceptors who are patients in various stages of change
- Research project scope

##### Day Three (three hours)

- Process to screen, consent, and follow up patients
- Process to collect and enter data
- Learn to use the electronic health record to review patient chart
- Interview a real patient
- Review homework questions



### Pre and Post Study Assessment of Students' MI Skills

What would be your response to the following patient statements?

1. I am doing fine without taking medication. I hope you're not going to try to get me to take it.
2. I know that smoking is not good for you, but I'm just not ready to quit. I've tried before and besides, I enjoy smoking.
3. I really do not need to be here. I tested HIV positive, but that could be wrong. I keep getting sent around for help that I don't need.
4. I like being by myself. Why do people keep trying to get me to go to programs and groups? I'm fine just staying in my room or watching TV.
5. All you talk about are drugs. Don't you understand? I can't handle the stress. You don't care about me.
6. I don't drink any more than anyone else does. Everybody keeps talking about my drinking. Besides, I never get drunk, drinking is not a problem for me.

Respond with an affirmative and reflective statement.

1. I am not sure what to do about my drug use. I stop for a while and then I just keep slipping. Maybe I can't change this.
2. I am OK the way I am now. I do not know what this is all about. I take good care of myself. I don't smoke.
3. I have given this some thought and I think I'm ready to make a change. But I don't know what I will do.
4. I know the ways that alcohol and drugs make me feel better; but now I can see more than of the negative side. This is not all good and things could get worse.
5. Which stage of change does each client statement represent?

Generate three change talk statements made by clients.

Generate three sustain talk statements made by clients.

List three things you would like to change over the next few months.

## Patient Recruitment

Students and the study coordinator screened the electronic medical record daily to identify patients who met the inclusion criteria for uncontrolled blood pressure upon admission with a diagnosis of hypertension. Students then recruited patients individually to participate in this study. Students provided all participants completed written informed consent at the time of enrollment approved by Houston Methodist Research Institute Institutional Review Board.

## Patient Eligibility

### Inclusion Criteria:

- Adults 18 or older admitted to Houston Methodist Hospital
- Admitted blood pressure 140/90 mmHg or greater
- Diagnosis of hypertension
- Documented use of antihypertensive medication
- Morisky medication adherence scale score of 3 or greater

### Exclusion Criteria:

- Diagnosis of a serious mental illness
- Diagnosis of dementia
- Diagnosis of acute stroke within previous six months
- Patients who refuse or unable to provide informed consent
- Patients who cannot understand or speak English
- Patients with discharge destinations other than home
- Patients enrolled in community support group or have private caregivers
- Patients who do not have home blood pressure monitor
- Patients who do not have a phone number

## Patient Interviews

The patient interviews were conducted by the students to assess the patient's motivation for managing their blood pressure with medication therapy and to gather pre-intervention data. Students collected data on patients' medication adherence and self-efficacy level using two validated surveys.

The exposure of self-efficacy to manage hypertension was derived from a five item scale used in a study that examined the association between self-efficacy and hypertension self-care activities among African American adults.<sup>22</sup> This scale was modified from an existing validated measure to assess self-efficacy to manage disease by substituting the words "high blood pressure" for "illness." Each item begins with the phrase "How confident are you that you can..." Response options ranged from 1 (not confident at all) to 10 (totally confident). Internal consistency for the measure was good ( $\alpha = 0.81$ ). A mean score was calculated and respondents who scored a 9 or above were classified as having good self-efficacy.

Adherence was measured using the eight-item Morisky Medication Adherence Scale (MMAS-8).<sup>23</sup> The MMAS-8 is considered the most commonly used self-reporting method to determine adherence, contains eight questions with closed dichotomous answers, designed to prevent the bias of positive responses from questions asked by health professionals. The degree of adherence was determined according to the score resulting from the sum of all the correct answers: high adherence (eight points), average adherence (six to seven points) and poor adherence (zero to five points). For the purpose of this study, patients were categorized only in two categories of adherence: adherent or not adherent. Patients with scores of one to seven points were categorized as nonadherence.

Thirty days after discharge, students called patients by phone to collect patient self-reported blood pressure, self-efficacy, and medication adherence score. This information provided post-intervention data for analysis. Unsuccessful follow up was defined as three attempts to call the patient on three different days.

**Measured Variables**

Feasibility was the primary question of interest. Several measures were collected to assess this endpoint including: number of patients screened for eligibility, number of total patients receiving MI, time spent interviewing and following up with each patient, number of patients who responded to follow up after day thirty of discharge, time spent during each telephone call.

Differences in patient health outcomes was the second question of interest. The difference in pre and post measures of adherence, self-efficacy, and self-reported blood pressure were all collected for analysis.

**Sample Size & Statistics**

The data collection period was determined for six months to target a convenient sample size of fifty based on the pragmatics of recruitment and the necessities for examining feasibility. Baseline characteristics were reported. Descriptive statistics were calculated and chi-square analysis and paired t-tests were conducted to evaluate pre and post differences in self-reported adherence, blood pressure control, and self-efficacy.

## V. RESULTS

### Student Participation

There were six students on internal medicine rotations who participated in this study over a course of six weeks. No student had prior training or experience with MI. At the end of the study, students completed a written assessment to use MI skills (open ended statements, affirmative statements, reflective statements, and summary statements) in response to sample patient scenarios. They demonstrated accuracy in using the appropriate responses that comprised the core skills and embodiment of the spirit of MI.

The longest process in this study was the time to screen patients for eligibility. On average, it took approximately sixty minutes to screen through the electronic health record for admitting blood pressure eligibility for three different nursing units with an average census of thirty beds. The range in time required to complete this step was between fifteen and ninety minutes depending on the student's schedule to incorporate this step in their clinical rotation day.

The time to interview and consent also had a large variability in time. When patients were not in the room due to conflicting procedure schedules, refusal to consent due to discharge preparation, or due to a high medication adherence score making patients ineligible for the study, students recorded each encounter as five minutes of time. Time to follow up by phone was more consistent with an average of ten minutes to complete a post discharge survey of adherence and self-efficacy level.

Process Step	Average	Minimum	Maximum
Time to Screen per Day	60 minutes	15 minutes	90 minutes
Time to Interview and Consent	14 minutes	5 minutes	45 minutes
Time to Follow Up	10 minutes	5 minutes	20 minutes

### Patient Participation

A total of 155 patients records were pre-screened for uncontrolled blood pressure upon admission with only 28 patients (18%) who consenting to participate in the study. Of those who consented, 15 patients (54%) successfully followed up by phone to provide post-intervention data on self-reported blood pressure, adherence, and self-efficacy scores.

### Baseline Characteristics

Characteristic	Results
Average age	63 years (n=15)
Sex	8 males (53%) 7 females (47%)
Race	8 Caucasian 3 African American 3 Hispanic 1 Asian
Average Number of Comorbidities	3 (diabetes, heart failure, coronary artery disease)
Average Number of Antihypertensives	2

Average Number of Prescription Medications	13
Insurance	14 had coverage 1 did not disclose
Education	6 College 5 Highschool 4 Did not disclose
Household Income	9 unknown \$9K, \$85K, \$150K 2 retired 1 unemployed
Physical Activity	8 Walks sometimes 7 No activity
Regular Nicotine Use	14 No 1 Yes
Readmitted in 30 days	1

### Secondary Outcomes

There was a significant decrease in blood pressure (p value <0.01, n=12) and improved medication adherence scores (p value <0.001, n=15) pre and post intervention in patients who completed a follow up phone call. Calculation of differences in blood pressure before and after the study is reflective of the twelve patients who were able to provide a post-intervention blood pressure after discharge. Only three patients did not recall or measure their blood pressure at home. There was no significant difference in the proportion of patients who had poor self-efficacy before and after the study (p value <0.25, n=15).

Measure	Pre-Intervention	Post-Intervention	N	P-value
Average systolic blood pressure	179 mmHg	134 mmHg	12	<0.001
Average diastolic blood pressure	86 mmHg	74 mmHg	12	<0.01
Proportion of non-adherence	100%	66%	15	<0.001
Proportion of poor self-efficacy	93%	73%	15	<0.25

## VI. DISCUSSION

The target sample size of fifty patients to enroll in this study with a completed follow up phone call was not achieved. There were several unanticipated barriers that affected the enrollment rate. The most significant barrier was the time required for the students to screen, consent, and then counsel the patients on a daily basis at the end of their rotation day. Since students did not have dedicated time during their rotation to allocate to this study, most students scheduled the late part of the afternoon to interview patients. A significant portion of prescreened patients were either discharged or absent for procedures by the time students visited the patients.

The second barrier in this study was the level of motivation each student had to participate. Some students had greater intrinsic motivation in dedicating time to this study enrollment process. This was reflected in the variability in the consent rate between one student over another. The difference in consenting rates among students may also be related to the level of comfortability and competency each student possessed with using MI. One suggestion for future studies is to increase the frequency of visitations during hospitalization before asking patients to participate in the study for a follow up phone call. This may help improve patient comfort and engagement in the study process. Prior consideration to the academic time of year is also important as most students were also focusing on pursuing postgraduate residency or employment opportunities during the study enrollment period.

There were several strengths in this study. We demonstrated the feasibility of developing an on-site training program for students who have had no prior exposure to MI. Students demonstrated improvement in the use of MI skills (using open ended statements, affirmative statements, reflective statements, and summary statements) with a pre and post study assessment. Students also expressed more comfort and competency to use MI with patients outside of the study during the rotation. The post-study assessment survey demonstrated that both students and patients felt more engaged speaking with each other using MI.

With the 2016 Accreditation Council for Pharmacy Education (ACPE) standards, colleges of pharmacy have the burden to demonstrate that pharmacy students are practice ready to integrate with the health care team.<sup>24</sup> In addition, there is emphasis on demonstration of competency within the affective domain of communication skills with healthcare providers as well as patients. This study design may serve as an inpatient experiential model to support a learning opportunity that develops educational outcomes as defined by ACPE. Developing a model to train students to make effective and impactful counseling with hospitalized patients may improve not only patient experience in transitions of care, but also promote the pharmacy student's role within a health care team.

In addition, this study demonstrates feasibility and reproducibility with training future pharmacy students to use MI skills to develop more engaged counseling sessions with patients during hospitalization. There was a trend for decreased blood pressure ( $p$  value  $<0.01$ ,  $n=12$ ) and improved medication adherence scores ( $p$  value  $<0.001$ ,  $n=15$ ) for patients with successful follow up. There was no significant difference in the proportion of patients who had poor self-efficacy before and after the study ( $p$  value  $<0.25$ ,  $n=15$ ). While these results do not demonstrate causality of favorable outcomes, there is an opportunity for future, more robust studies to explore.

There were several limitations to address in this study. There is currently no standard measurement or common criteria for nonadherence. Indirect measures of adherence includes behavioral, biochemical, and clinical measures. Behavioral measures include self-reported adherence to medication regimens, pill counts, refill records, and electronic monitoring of pill taking<sup>25</sup>. Self-reports have been shown to overestimate adherence as much 200% compared with biological measures<sup>26</sup>. In this study, adherence scores were calculated by using the same survey method before and after the intervention on the same patients. This may have decreased the possibility for overestimation of self-reported adherence.

Furthermore, adherence level categories were reduced from three groups (low, medium, or high adherence) to two groups (adherent or nonadherent) for analysis. Any patient with a medium adherence score was categorized in the

nonadherent group. Thus, patients needed to have scored the full eight points in order to be categorized as adherent. Despite stricter categorization, there was a significant reduction in the proportion of patients who were nonadherent in the pre intervention measurement and became adherent in the post intervention measurement.

## VII. CONCLUSION

This pilot study demonstrated feasibility and reproducibility of training pharmacy students to use core MI skills to counsel patients within the hospital setting. While there was a low rate of patient consenting to the study due to allocation of student time to the enrollment process, there was a favorable trend in reducing patient blood pressure and improving the proportion of medication adherence in follow up patients post-discharge. Extending the enrollment time period, and allocating more dedicated time of study participants to the training and consenting process may improve the consent rates of future study designs.



## VIII. ACKNOWLEDGEMENTS

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## X. APPENDIX

### Self-Efficacy to Manage Hypertension

- 1) Having high blood pressure often means doing different tasks and activities to manage your condition. How confident are you that you can do all the things necessary to manage your high blood pressure on a regular basis?
- 2) How confident are you that you can judge when changes in your high blood pressure mean you should visit a doctor?
- 3) How confident are you that you can do the different tasks and activities needed to manage your high blood pressure so as to reduce your everyday life?
- 4) How confident are you that you can reduce the emotional distress caused by your high blood pressure so that it does not affect your everyday life?
- 5) How confident are you that you can do things other than just taking medication to reduce how much high blood pressure affects your everyday life?

Response ranged from 1 (not confident at all) to 10 (totally confident). A mean score will be calculated and respondents who scored a 9 or above were classified as having good self-efficacy.

Self-Efficacy Category	Score
Good confidence	9-10
Poor confidence	1-8

### Morisky Medication Adherence Scale (MMAS-8)

- 1) Do you sometimes forget to take your pills? Yes (1 point)
- 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 medicine? Yes (1 point)
- 3) Have you ever cut back or stopped taking your medicine without telling your doctor because you felt worse when you took it? Yes (1 point)
- 4) When you travel or leave home, do you sometimes forget to bring along your medicine? Yes (1 point)
- 5) Did you take all of your medicine yesterday? No (1 point)
- 6) When you feel like your symptoms are under control, do you sometimes stop taking your medicine? Yes (1 point)
- 7) Taking medicine everyday is a real inconvenience for some people. Do you ever feel hassled about sticking to your treatment plan? Yes (1 point)
- 8) How often do you have difficulty remembering to take all your medicine?
  - A. Never/rarely (0 point)
  - B. Once in a while (1 point)
  - C. Sometimes (1 point)
  - D. Usually (1 point)
  - E. All the time (1 point)

Adherence	Total Points
High Adherence	0
Medium Adherence	1-2
Low Adherence	3-8