Motivational Interviewing and Diabetes

Mary Beaudry

Jacksonville University

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Abstract

Type two diabetes (DMII) impacts the lives of many Americans. Unfortunately, the complications with DMII can be serious, even fatal. Some of the more serious complications include renal failure, cardiac complications, and neuropathy which can reduce quality of life. Increasing awareness for the many complications of DMII, as well as engaging in meaningful dialogue to motivate patients to implement healthier lifestyle choices, is an essential task for the nurse. Finding an appropriate method to have informative and motivational discussions is crucial. Motivational Interviewing (MI), a strategy first used in addictions counseling and mental health nursing, has assisted nurses in a variety of settings from clinics to acute care to help patients with diabetes attain a healthier lifestyle.

The main purpose of this quality improvement project was to determine if the use of motivational interviewing by nursing students who attend a regional university in West-central Michigan encouraged higher levels of physical activity, better dietary choices, improved medication compliance, and lowered HgA1c levels in patients with DMII who attend the Wellness Clinic at said university. Movement on the Stages of Change model in these patients was also analyzed, as well as students' skills in using MI while educating and treating patients with DMII.

Although the overall purpose of this quality improvement project was not met in part due to small sample size, the short time frame, and seasonal timing, several important concepts were apparent. Student confidence engaging in MI sessions improved over the span of the project. Through the use of MI, understanding barriers to change in lifestyle behaviors and the connection between poverty and DMII became apparent in student learning. It was surprising to see little or no change in patient parameters little to no change was noted in patient parameters

such as physical activity, dietary choices, and HgA1c levels, although medication compliance remained consistent. Patients who are resistant to change may need a longer time frame and more than one MI session to understand the ramifications of DMII and how it impacts their lifestyle. A longitudinal study, conducted over a longer period with more frequent MI sessions is suggested to encompass a more diverse and larger sample allowing for positive lifestyle changes.

Keywords: motivational interviewing, population, HgA1c lab value, diabetes**,** healthy lifestyle

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Dedications

This paper is dedicated to my husband, Michael and my Faculty Chair Dr..Pam Rillstone. Thanks to both of you, I can accomplish my dream! In addition: Haylie, Heather, Jack, Katlyn, Lauren, Lexi, Melanie, Meredith, Morgan, Rachael B., Rachael W., and Sarah-you all made this project fun and informative!

Motivational Interviewing and Diabetes

Approximately 7.8 million patients over age 20 are diagnosed every year with Type Two Diabetes (DMII) in the United States. Eighty-six million Americans aged 20 and over are at risk for developing DMII due to pre-diabetic conditions (ADA, 2018). These statistics are grim. Diabetes has the potential to affect every system in the body, and if not managed properly, can lead to major complications such as renal failure, blindness, cardiac complications, and skin issues. Patients with diabetes often do not realize the importance of following their plan of care to avoid these serious complications.

Treatment of DMII is a challenge because of lack of adherence to a medication regimen, dietary changes, and other lifestyle adjustments. Just over three million patients use oral or injectable diabetic medications consistently (ADA). Direct and indirect costs associated with treatment of diabetes are estimated at 245 billion dollars annually. These costs will continue to rise as more patients are diagnosed with DMII (ADA). Lack of consistency with plans of care and deviations from healthy eating and physical activity are responsible for poor outcomes with patients who have DMII (ADA). To address these challenges with patients diagnosed with diabetes, different approaches are needed to improve adherence with medication use, improved diet, and initiating physical activity (Christie & Channon, 2014).

Motivational Interviewing (MI) has been used as an intervention with patients who need to make changes in their lifestyle. This technique has been taught and implemented in a wide range of care settings. Research shows that implementing MI for patients with diabetes may be an effective approach to address the issues that arise with treating this population (Clifford-Mulimba & Byron-Daniel, 2013).

Background of Problem

Diabetes type two is a chronic condition that occurs when there is either insufficient and/or ineffective insulin production that results in abnormally high levels of glucose in the blood (Clifford-Mulimba & Byron- Daniel, 2013). The diagnosis of diabetes is increasing in our overall population, from 25.8 million Americans in 2010 to 29.1 million in 2012. Diabetes is the seventh leading cause of death in the United States (ADA, 2018).

Patients with DMII experience a multitude of sequelae ranging from vision problems to wounds that are difficult to heal. Complications can affect every system in the body. According to one study, chronic conditions such as cardiovascular disease, cancer, and respiratory conditions can be reduced up to 75% by avoiding inactivity, poor diet, and use of tobacco products (Brobeck, Odencrantz, Bergh, & Hildingh, 2014). Inactivity and poor nutrition are major factors associated with patients with diabetes. Overall quality of life is diminished for patients who have diabetes as these individuals tend to have more problems with neuropathic pain, depression, and co-morbidities such as cardiovascular disease, renal failure, and frequent infections which arise due to poor health and financial struggles related to costs associated with treatment (ADA).

Poverty and the possibility of developing diabetes go hand in hand. Low-income individuals have challenges with managing their diabetes. Diabetic medication costs are variable depending on insurance coverage. Patients with diabetes also must purchase testing supplies which involves further expense. Poverty relates to chronic illnesses such as diabetes because low-income individuals lack access to healthy food and medical care, particularly in rural areas (ADA). Insufficient income leaves very few resources for purchasing lean proteins, fruits, and vegetables which are recommended for patients with diabetes. The ability to afford medication is another challenge for patients living in poverty**.** Many must choose between medications and buying

groceries (Gittlesohn & Trude, 2018). The education and awareness levels of these patients must be brought to the forefront of diabetes care.

Patients with diabetes have medical issues such as frequent infections, neuropathic pain, and cardiovascular complications that oftentimes result in hospitalization. Because of these co-morbidities, along with diabetes, conditions are difficult to treat. Patients are often unaware of how to assess and report issues in a timely manner. Financial concerns also can be an obstacle to report conditions. However, there are patients who disregard education provided by nurses as well. As a result, hospitalizations occur due to a lack of knowledge and lack of self-care (Christie & Channon, 2014). The cycle is often repeated where nurses grow familiar with patients needing to be hospitalized due to complications with their diabetes. Derogatory terms such as "frequent flyer" or "non-compliant" are used to refer to these patients (Christie & Channon). The nurse is allowing his or her perceptions about patients to interfere with care, which can amount to less time treating and educating these patients due to an assumption that they will be hospitalized again soon. Nurses voice frustration working with patients with diabetes of all ages, from pediatrics to the elderly due to their own perceptions about chronic illness (Christie & Channon).

There is a need to find a better way to interact with these patients and improve their motivation to follow their healthcare plan. An opportunity exists to work with this population to help mitigate the disease process and improve overall health for those persons living with diabetes. One suggestion is the use of Motivational Interviewing (MI). MI is an effective tool to assist nurses to better understand and change these perceptions (Ostlund, Kristofferzon, Haagstrom, & Wadsten, 2015).

Once used exclusively for treating patients with addictions, motivational interviewing is now used in a variety of settings. Motivational interviewing is a learned technique which can result in a more effective conversation with the patient (Soderlund, Madson, Rubak, & Nilsen, 2011). Motivational Interviewing incorporates the use of five interview strategies which include open-ended questions, reflective listening, affirmations, summarizing, and eliciting patient responses. These techniques are used to build a therapeutic relationship with the patient, facilitate trust, and allow for increased patient self-disclosure (Soderlund et al.). Nurses use these techniques to help create self-awareness in their patients. Raising patient awareness can assist patients to realize that they have control over how DMII impacts their body. As a result, it is hoped that patients will be more aware of their own responsibility in changing lifestyle behaviors to address the importance of medication compliance, unhealthy relationships with food, and to understand their need for increased physical activity. These factors, once addressed in an MI session with patients with diabetes have resulted in overall improvement in health and quality of life (Song, Xu, & Sun, 2014).

An integrated review of the literature revealed that MI is instrumental in assisting patients with DMII to make lifestyle changes during the first six months after the approach has been implemented (Song, et al., 2014). Christie and Channon (2014) identified success using MI with pediatric patients with DMII, especially when parents also participated in lifestyle changes. Motivational interviewing can be used with all ages from pediatric to geriatric patients. According to Song, et al., when MI was first used with patients with diabetes, it was noted that Hemoglobin A1c (HgA1c) levels decreased, as well as dietary choices improved, exercise implemented, and medication regimen adherence increased.

MI is one way to assist individuals to move through the Stages of Change Model (SOC), also known as the Transtheoretical model, showing results in greater compliance with lifestyle adjustments (Noordman, van der Weijden, & Dulmen, 2013). The SOC model identifies the stage the patients are in regarding the motivation to make changes in their life. The stages described in the change model include pre-comptemplative, contemplation, determination, action, maintenance, and termination (Noordman et al.). For nurses, understanding which stage the patient is in can assist with individualizing and modifying the MI technique during the interview.

The counties of Lake, Mecosta, and Newaygo in West-central Michigan have a greater than average percentage of persons living with DMII. Poverty, along with unhealthy eating and little exercise contribute to an increased rate of diabetes in this area (MDHHS, 2015). For example, Lake County has the highest rate of DMII in the state and is the poorest county in Michigan. Patients living in this three-county area have higher than normal rates of obesity, smoking, and poor diet due to lower income and less access to healthcare than the rest of the lower peninsula of Michigan (MDHHS). The nearest hospital to Lake County is 25 miles away. Fewer students from Lake County graduate high school; and they often take minimum wage jobs to remain in the community. This can result in the lack of education regarding diabetes and medication adherence due to varying literacy levels. The combination of low literacy, poor dietary choices, poverty, and lack of access to clinics contributes to the increased numbers of patients with diabetes in this area (MDHHS).

Purpose of Project

The main purpose of this quality improvement project was to determine if motivational interviewing encouraged higher levels of physical activity, better dietary choices, improved

medication regimen adherence, lowered HgA1c levels, and/or movement in the SOC model in patients with DMII. Secondarily, the project aimed to determine the impact of MI performed by nursing students while educating and treating patients with DMII who attended a clinic, located on the campus of a regional university in West-central Michigan which serves patients with DMII. Students were to be evaluated on their MI skills using the MISC tool. Defining patient readiness to change is crucial and was measured using the SOC model. Changes in dietary habits, medication compliance, physical activity, and HgA1c levels were analyzed as well.

Significance of Project

As mentioned previously, diabetes has severe implications if left untreated. Lifestyle changes are encouraged as part of DMII treatment emphasizing healthy eating, physical activity, and medication compliance. Evidence supports using MI to encourage positive lifestyle changes among patients with diabetes (Brobeck et al., 2014). The hope was that the use of MI by nursing students while interacting with clinic patients who have DMII would result in improved changes in their lifestyle leading to better control of their diabetes, or at the very least positive movement in the SOC model.

Not only do student nurses perform clinical interviews at the West-Central Michigan university clinic, optometry interns, and second year pharmacy students also interact with patients with diabetes and may benefit from the use of this technique. Ultimately, using MI to have a more effective patient interview may help to empower patients with diabetes to make changes that benefit their overall lives. There were positive implications not only for patients, but also for student nurses and the clinic which are addressed in this paper.

Problem Statement

Type two diabetes is a serious health concern in the United States and especially in West-central Michigan. Type two diabetes can affect everyone regardless of age, sex, or ethnicity. Treatment of diabetes and its complications, as mentioned earlier, is expensive and places a burden on the health care system (ADA, 2018). Complications result in co-morbidities that affect the whole body. Left untreated, diabetes and its complications were responsible for over 234,051 deaths in 2010. This number does not account for those deaths where diabetes was not reported or underrepresented (ADA).

Patients with diabetes struggle with medication compliance, healthy diets, and participating in adequate amounts of physical activity (MDHHS, 2015). Other factors such as poverty, education level, and proximity to affordable health care presents additional challenges. Patients with diabetes often grow discouraged with maintaining a regimen that involves healthier eating, adequate physical activity, and medication compliance. Lake County Michigan has a higher rate of obesity at 45.6% for females, 40.9% for males compared with 36.1% and 33.8% respectively on a national level. Diabetes mortality rates are higher as well with females dying from diabetes complications at 50.3% compared to a national rate of 49.6% (MDHHS). Locally, the combination of low literacy, poor dietary choices, poverty, and a lack of access to clinics have a tremendous negative effect on the residents with diabetes in West-central Michigan (MDHHS).

Theoretical Framework

Motivational Interviewing

Motivational Interviewing is a psychotherapeutic approach to assist patients who may be indecisive or unwilling to motivate themselves to move towards a goal and make positive

decisions (Patterson, 2017). Motivational Interviewing was developed in 1983 by psychologists William Miller and Stephen Rollnick. They viewed MI as a conversation with patients to elicit responses regarding addiction and substance abuse (Patterson). They were dissatisfied with the confrontational style in which interviews were conducted with patients who had substance abuse issues at that time. Their goal was to assist the patient who was struggling with indecision or ambivalence about their condition to achieve a state of self-awareness where change was possible (Noordman, et al., 2013).

When engaging in MI, the interviewer uses an empathetic approach with the patient. This approach has been found to be very effective with those struggling with substance abuse. When the combination of an empathetic approach was used with a more patient-focused approach, remaining sober for longer periods of time was found (Miller & Rose, 2009). Patients often struggle with ambivalence, especially when considering lifestyle change which is necessary to live healthier with DMII.

Four stages are used in MI. The first is engaging, where a relationship is developed with the patient. Focusing, the second stage, is centered on the purpose of the session. It is during focusing that the interviewer guides the patient to identify and acknowledge his/her ambivalence to change. It is during this stage that the interviewer and patient collaborate to create a path of change (Miller & Rollnick, 2013). Evoking or eliciting, the third stage, is the core of the MI process. The patient now discusses the behaviors that need to be changed. It is important during this stage that the interviewer allow this to come from the patient without interjecting or providing advice (Miller& Rollnick). Lastly, with the help of the interviewer, planning takes place where reasonable and attainable goals are determined.

Motivational interviewing is a partnership between the patient and the interviewer. The interviewer addresses the patient directly, with an attempt to elicit responses from the patient that a change is necessary. The interviewer uses active listening techniques and reflective statements that validate the patient's statements (Miller & Rollnick, 2013). When a patient states that change is needed, the interviewer then facilitates a discussion to identify the next steps (Patterson, 2017). Motivational Interviewing has proven to be successful in addictions and mental health nursing and shows potential to help in the treatment of patients with diabetes (Clifford-Mulimba & Byron-Daniel, 2013). Determining the willingness of the patient to change is another facet of this project which is grounded in the Transtheoretical Model of change founded by Prochaska and DiClemente (1997).

Measuring the success of an MI session is necessary for the interviewer to recognize opportunities within the session to bring about optimal results. A search of CINHAL and Pub Med revealed few tools to evaluate an MI session, and none for student evaluation. Miller, Moyers, Ernst, and Armhiem (2008) developed a manual for motivational interviewing which incorporates the use of a Motivational Interviewing Skill Code (MISC). The MISC tool uses a series of behaviors that are identified with a two-letter code (Appendix E). These codes are then listed and shared with the interviewer after the session. The codes correspond to competency levels with level three as having attained mastery of the codes and one as recognizing open and closed questions as well as identifying the codes of specific behaviors. The observer/evaluator who is present for the interviews shares feedback with the interviewer after the patient session is over. MISC was chosen due to the scarcity of tools to evaluate MI.

Transtheoretical Theory

Conducting Motivational Interviewing using the Transtheoretical model of change (TTC), to focus on behavior change was the framework used for this quality improvement project. The model is focused on health behavior changes moving through six stages which are the stages of change (SOC). Butts and Rich (2015), identified these stages as the cornerstone of TTC. The first, pre-contemplation, indicates that patients have not thought about making a change in their health behaviors. Contemplation occurs when patients consider changes that may bring about positive results in their health. Preparation involves organization of either events or equipment to begin the change. An example of this would be a patient with diabetes purchasing a diabetic cookbook or buying a gym membership. Action is engaging in activities that promote healthy change such as engaging in exercise or preparing a low-carb meal. Maintenance can be defined as continuing to engage in health promotion activities. Termination, the last phase of the SOC model, occurs when the desired goal has been met. Interventions with the patient using techniques such as MI are more likely to assure recruitment, retention, and progress through the SOC model (Prochaska & Velicer, 1997). Successful in addictions and mental health nursing, MI shows potential to treat patients with diabetes. Determining where the patient lies on the Trans-theoretical Stages of Change model also assists the interviewer with handling resistance and/or non-adherence to a regimen.

(Google images, n.d.)

Project Objectives

The objectives of this project were to:

1. Measure the effectiveness of nursing students using motivational interviewing during routine clinic visits with follow-up in lowering HgA1c levels in patients with diabetes.
2. Measure the effectiveness of nursing students using MI on the change in patient parameters such as increased physical activity, improved dietary intake, and improved medication regimen adherence.
3. Evaluate the effectiveness of using MI by nursing students in moving patients in a positive direction using the SOC model.
4. Evaluate the nursing students in their skills in using MI with patients with diabetes using the MISC tool.

Definition of Terms

Motivational Interviewing

Motivational Interviewing is defined as a psychotherapeutic approach to assist individuals in making positive decisions and meeting goals (Patterson, 2017). The goal of MI is for patients to recognize that they have the power to change or not to change. “Motivational Interviewing is goal-centered and patient-focused to explore options and resolve ambivalence” (Patterson, para. 1). A brief MI session was conducted with each patient by nursing students. Students will be evaluated by the project manager on the use of this technique.

Population

There are two populations being evaluated in this quality improvement project. Adult patients, 18 and older diagnosed with DMII, who attend a clinic located in a university setting in

West-central Michigan is the first population. Exclusion criteria include patients who do not have DMII and are under a doctor's care for renal disease and/or cancer.

The second population consists of nursing students from a regional university located in West-Central Michigan who were trained to perform MI with patients at the clinic. The students who are in their second or third semester of the nursing program volunteer in the clinic to fulfill their service learning hours that are required each semester. These students have completed their nursing fundamentals coursework.

HgA1c Lab Value

The hemoglobin A1c lab value is defined as the amount of average glucose in the blood over a three-month period. The amount of sugar coating the red blood cells is the HgA1c. The higher the HgA1c value, the poorer the glucose control. The desirable value for HgA1c is less than 5.7% (NIDDK, 2014).

Diabetes Type Two (DMII)

Diabetes type two is defined as a higher than normal blood glucose level (ADA, 2018). The average age of diagnosis for DMII is 45 years of age (ADA). DMII is diagnosed when an individual has a fasting plasma glucose over 125mg/dl for two consecutive readings. The acceptable ranges for optimal fasting plasma glucose readings range from 70 to 100 mg/dl (ADA).

Healthy Lifestyle

Healthy lifestyle is defined as choosing healthy foods such as lean proteins, whole grains, and foods low in fat, and without added sugar or other additives (ADA, 2018). In addition to healthy eating, this lifestyle should include moderate physical activity, 30 minutes each day, five times a week such as walking, strength training, and activities throughout the day which are

recommended for patients with DMII (ADA). Medication compliance is stressed as part of a healthy lifestyle, as well and can be defined as taking medications for DMII as they are prescribed by the health care provider (ADA).

Review of the Literature

The literature search involved use of the Jacksonville University Swisher and Ferris State's Flite Libraries. CINHAL, Pub Med, EBSCO, and the Cochrane Library were employed as databases to identify possible articles. These search engines revealed several hundred articles devoted to MI. Unfortunately, at the time of the literature search, no articles were identified for evaluating nursing student use of MI. Search terms used included diabetes, motivational interviewing and diabetes, and nurses and motivational interviewing. Of these, articles were selected due to inclusion criteria such as: research conducted within the past five to six years, patients with DMII, facilities that trained healthcare professionals with the MI technique, and studies that met higher levels of evidence such as meta-analyses or random-controlled trials (RCTs).

Diabetes results in complications that reduce quality of life as mentioned previously. The Centers for Disease Control (CDC) shares frightening statistics about diabetes and the ensuing complications once a person is diagnosed (ADA, 2018). Early death, blindness, renal disease, cardiovascular complications, and poor wound healing are several of the many co-morbidities that face the patient with diabetes. An abundance of glucose in the blood can result in hyperglycemia which can progress to diabetic ketoacidosis which is potentially fatal. Patients with diabetes struggle to keep their disease under control. Maintaining a healthy diet, participation in regular exercise, and medication regimen adherence are suggested for patients with diabetes to help and/or control further complications (ADA).

Over the past 25 years, MI has been a popular strategy used to improve the health status of populations (Soderlund et al., 2011). Motivational interviewing, once exclusively grounded in treating substance abuse disorders, now reaches those patients who live with chronic illness, and have poor dietary habits (SAMSHA-NREPP, 2014). Motivational Interviewing continues to gain popularity due to a wide application in traditional treatment settings, as well as in primary care. Health care professionals report that MI is attractive to them due to the strategy of blending MI with the interpersonal skills used in routine patient care (Clifford-Mulimba & Byron-Daniel, 2013). Motivational interviewing is not a skill that is inherent with caregivers, so training is necessary to ensure that collaboration and empathetic communication take place. Once trained, health care professionals can lose or regress into prior habits if MI skills are not re-evaluated periodically (Soderlund, et al.).

The literature supports the need for MI skills to be taught to health care providers as the results demonstrate that patients are receptive to the strategy. Miller et al. (2008) stress the need for evaluating the skills of the interviewer once they have been trained. They developed a tool for public use called the Motivational Interviewing Skill Code (MISC) tool. No statistics were available about tool use among users. Specific success is found with patients who have DMII. Great strides have occurred in improving dietary choices, physical activity, and HgA1c levels when implementing MI. These results were found to have the most efficacy over a six-month time frame (Song et al., 2014).

Clifford-Mulimba and Byron-Daniel (2013) assert that while MI has promise, more research is needed. The concerns lie with the inconsistency of data and measurement tools. Standardization is needed to ensure that the outcomes are valid using a single method of evaluation. A literature review, conducted in the United Kingdom (UK), reports that MI is the

encouraged method to promote and facilitate health behaviors for patients with DMII. The authors omitted non-English studies excluding an extremely large segment of the DMII population. Four studies in the review generated positive findings such as weight loss, reduction in non-healthy foods, and a clinically significant lowered HgA1c during the six months after MI intervention. While promising, using MI must have consistent, standardized guidelines for recommendation as a preferred method for use for patients with diabetes (Clifford-Mulimba & Byron-Daniel).

Effects of MI

When using MI to encourage healthier lifestyles, evaluating the effects and data is crucial to support the strategy. Song et al. (2014) advocate for the use of MI due to the positive effects revealed during the analysis of RCTs conducted in 2014. Of the ten trials reported, eight were ultimately selected as they met the inclusion criteria. Improvements in HgA1c levels, regular exercise, foot care, and adherence to medications were noted after the patients in each study participated in MI (Song, et al.). Pediatric patients saw improvement in their health because of an MI session (Christie & Channon, 2014). Based on these studies, HgA1c levels were also reduced, especially during the first six months following a session of MI (Song et al.; Christie & Channon). This research shows that using MI results in patients with diabetes adopting healthier lifestyle changes such as improved diet, increased exercise, and medication adherence (Song, et al.).

A meta-analysis of ten trials conducted by Song et al. (2014) revealed the following: during the first six months following MI sessions, adherence to the desired behaviors was high. Efficacy decreased after the six-month period and was reduced even more after 24 months. Limitations included an emphasis on Chinese and English-speaking patients, excluding those

who spoke other languages as well as the study sizes were limited. The authors suggest that larger scale randomized controlled trials are needed to confirm these findings (Song et al.).

A study from Ireland comprised of a systematic review and meta-analysis of RCTs focused on the use of MI with conditions other than DMII resulted in a statistically significant, albeit modest improvement when using MI (Lundahl, Moleni, Butters, Tollefson, Butler & Rollnick, 2013). Safer sex behaviors, marijuana abstinence, and blood glucose levels did not show significant improvement when using MI, however, certain conditions such as monitoring health status such as viral load with HIV and body weight with cardiac conditions did improve. Body weight is often a factor with DMII, so MI strategy remains relevant per this study. As described previously, even when MI is effective for shorter periods of time such as six months or less, there is still a significant benefit for nurses and other health care professionals to use it (Song et al.). According to Noordman et al., (2013), using MI is of benefit to health care workers who are adequately trained, re-trained, and given regular feedback for improvement to assist patients with DMII.

Diverse Populations and MI

While the goal of MI is for patients to recognize that they have the power to change or not to change, age and stage of development is another consideration for use of this strategy. Adults and children with diabetes experience different emotions and perceptions living with the condition. Christie and Channon (2014) provide a summary of studies conducted between 2006-2011 describing the use of MI with 40 individuals with varying demographics who have DMI or DMII and obesity. Results for African-American and Caucasian women who participated in a group-based obesity treatment using MI were superior at both six months and 18 months as compared to a control group (Christie & Channon). Results such as weight loss and increased

physical activity were obtained by women who were middle-aged and employed. The African-American group fell behind in sustained weight loss after 18 months which suggests that MI be included throughout treatment of DMII regardless of how long the patient has lived with the disease (Christie and Channon).

Examining the success of MI with pediatric populations has had mixed success. The pediatric patient, who is under 18, must make changes such as eating a healthier diet and increasing physical activity. The family dynamic regarding change is also a factor, family members must be willing to make changes as well. After six months, children reported difficulty maintaining the changes. Adolescents, on the other hand, saw improvement over 24 months (Christie & Channon, 2014). Culture plays a role with adherence as well. Latino adolescents found no change in key measures of weight loss, physical activity, or eating patterns (Christie & Channon). The authors concluded that MI with diverse groups should be tailored to fit cultural or developmental stages when working with the pediatric population (Christie & Channon). Although this summary is an expert opinion article, the studies that contributed to it were grounded in randomized controlled trials with standardized training delivered to participating providers.

Application of MI in Primary Practice

Most patients with DMII are seen in general or family medicine practices. Jansink et al. (2013) conducted a study in the southeastern Netherlands to determine if MI used in general practice resulted in changes in HgA1c levels and lifestyle behaviors. Fifty-eight practices with 700 patients with DMII participated in the study that incorporated MI during patient consultations with one half of the patients assigned to the intervention group using MI, and the remainder being allocated to usual care standards. Nurses in the intervention group were trained

in MI to be used along with a local diabetes protocol based on national guidelines (Jansink, et al.). Results from the intervention group stayed the same or increased slightly in terms of HgA1c levels, alcohol consumption, and BMI measurements. In addition, willingness to change behaviors did not increase. One of the positive aspects of the study was that patients tended to monitor glucose levels and weigh themselves more often (Jansink et al.). A possible detractor to this study is that it was focused in a very small region of the Netherlands (Jansink et al.). The team did suggest that more research be done in countries with diverse populations and higher numbers of patients with diabetes (Jansink et al.).

Possible rationales for the disappointing results in the Netherlands' study include that diabetes care there is already very successful and more improvement with this patient population would be difficult to achieve (Jansink et al., 2013). In addition, Dutch nurses do not receive formal training on discussing lifestyle changes with patients in the nursing curriculum, so this information may be missed when interacting with the patient. Comparable studies suggest that MI is a benefit finding lowered HgA1c levels, improved diets, and adherence to medication regimens (Clifford-Mulimba & Byron-Daniel, 2013). Other researchers suggest a more personalized approach for each patient using MI for improved results (Song et al.).

Training for Health Care Workers

For successful outcomes using MI, staff training is necessary. The studies discussed were of a qualitative nature, and no studies reviewed used quantitative methods. Data focused on the results of caregiver statements and thoughts about the process. Competency levels and skill evaluations of nurses engaging in MI with their patients were not addressed (Jansink et al., 2013). A Swedish study examined the results where MI was used in general practice settings. This systematic literature review evaluated ten studies. The studies were ranked from highest in

validity to lowest using the Maryland Scale of Scientific Methods (MSSM) (Soderlund et al., 2011). This analysis used studies from the United States, Canada, Western Europe, and Scandinavia that were a mix of RCTs and single studies involving physicians and nurses. The quality of the different studies was variable ranging from not reporting drop-out rates to different statistical analyses. No clear definitions were discussed regarding the length and quality of the training. Outcomes were measured on the following: participant reaction to training, MI competence, clinical use of MI, and patient outcomes. One Swedish review had the most organization and clearest outcome identification. In the Swedish study, researchers found that as MI is used year after year, several patient outcomes improved. Patients with diabetes could maintain a healthy weight, engage in physical activity, and remain adherent with medications or treatments. Quality of life was improved for the study group (Soderlund, et al.). From a project focus, time to implement, monitor, and evaluate sessions is of utmost priority. The Swedish study does possess helpful information such as suggestions on training a team of MI nurses and motivating them during the education and when they returned to patient care. The study also suggested developing an MI project on a smaller scale (Soderlund, et al.).

A qualitative descriptive study was conducted in Sweden to capture the experiences of primary care nurses who were trained in MI. Twenty nurses were trained in MI in two county council districts (Ostlund, Kristofferzon, Haagstrom & Wadsten, 2015). Half of the nurses used MI techniques and the others relied on a standard questionnaire. Nurses stated that using MI was beneficial from both the awareness raised in the patient and the skills gained. Remaining open to the approach was a key factor in overall success as well. The nurses who used the standard method reported that they felt resistance to change could have been addressed by MI. They shared that a lack of training and support are factors in not using MI. The tasks involved in daily

care activities were also not conducive to using MI. The numbers in this study were small, so more extensive studies are needed from nurses who currently use MI. Eliciting feedback from nurses who do not use MI would be enlightening as well (Ostlund, et al.).

Ostlund, Wadsten, Kristofferzon and Haagstrom (2014), in a different study found that nurses, when interviewed about their MI experiences stated that using the technique facilitated their work as well as took their practice to the next level. Nurses report that becoming comfortable with MI requires practice to be effective (Jansink, et al., 2013). Moving to a role as an expert advisor and collaborating with the patient can be challenging. Although MI can be taught in a single session, ongoing feedback, support, and training are vital to the nurses' ability to use the skill effectively. Behavioral change in both nurse and patient are required. There are times when adequate support and training are not given due to constraints at the management level related to time and staffing challenges (Ostlund et al.). When this occurs, no one can expect MI to remain viable as a strategy to assist patients. Howard and Williams (2016), in a single study found that students who were trained in MI found it to be a transformative experience. This study was the only one identified that advocated for undergraduate nursing students to be trained in MI, yet no strategies such as role playing and evaluating the sessions were addressed.

Stages of Change Model and MI

Another study in the Netherlands analyzed MI with the Stages of Change Model. The researchers wanted to determine if MI would result in movement on the SOC model. In addition, examining nurse's ability to use the methods was of interest. Nineteen primary nurses (PNs) participated in the study where they were videotaped using the techniques with their patients (Noordman et al., 2013). Of 103 consultations, almost half of the patients interviewed were still

in the pre-contemplation or contemplation stage of the SOC model. The PNs were found to summarize more with patients who had not yet reached the action stage, so it was determined that PNs did adjust MI skills to the SOC status of the patient. In pre-contemplation or contemplation stage, more MI skills were used. This approach is interesting because it demonstrates the need for flexibility in developing MI skills. This was an early look into the use of MI and SOC. Limitations exist because patients were not asked where they felt they were in the SOC process (Noordman, et al., 2013). At risk individuals such as patients with diabetes were found by Prochaska and Velicer (1997) to be 40% in the pre-contemplation stage, 40% in contemplation, and only 20% in the preparation stage.

Summary

The review of literature had mixed results. Overall, there is strong support to use MI in the early stages of interaction with the patient as well as continued use. The literature supports that MI be used in both primary and acute care settings since most diabetes education and treatment takes place in hospitals and clinics (Christie & Channon, 2014). In addition, MI sessions with patients tend to be effective up to six months after the initial interaction. After six months, the benefits of the MI session varied (Song et al.; Christie & Channon, 2014).

Motivational Interviewing improves confidence on the part of the individual and reinforces the caring behaviors of nurses, physicians, and other health care workers who encounter patients with a variety of issues (Christie & Channon, 2014). Song et al. (2014) also advocate the use of MI as it can identify the patient's willingness to change and adopt healthier behaviors. Focus on DMII was present in much of the literature reviewed as this condition can have poor outcomes for patients affected. Researchers support the use of motivational interviewing as an effective strategy to raise awareness to consider positive changes. Even when

a study did not indicate significant change, MI was still recommended due to the confidence levels of nurses using the technique (Ostlund, et al., 2014). Based on this review, results are encouraging, yet more research needs to be conducted with MI as a strategy that can be adopted in primary and acute care settings.

Project Design

Goal of Project

The main purpose of this quality improvement project was to determine if the use of motivational interviewing by nursing students who attend a regional university in West-central Michigan encouraged higher levels of physical activity, better dietary choices, improved medication adherence, and lowered HgA1c levels in patients with DMII who attend the clinic at said university. Movement on the SOC model in these patients was also analyzed, as well as students' skills in using MI while educating and treating patients with DMII. Evaluation of the students would be captured during each MI session by the evaluator/principal investigator using the MISC tool.

The four objectives were to:

1. Measure the effectiveness of nursing students using MI during clinic visits with follow-up in lowering HgA1c levels in patients with DMII.
2. Measure the effectiveness of nursing students using MI to identify change in patient parameters such as increased physical activity, improved dietary intake, and improved medication adherence.
3. Evaluate the effectiveness of using MI by nursing students in moving patients in a positive direction using the SOC model.

4. Evaluate the nursing students in their skills in using MI with patients with DMII using the MISC tool.

Setting

The project was conducted at the clinic affiliated with a regional university in West-central Michigan which was established to address the needs of patients with diabetes. University students from pharmacy, nursing, and optometry programs work with these patients who have been diagnosed with DMII. Patients are referred to the clinic by primary care providers, as well as the optometry interns providing eye examinations. The clinic is staffed by office support persons and optometry interns during their third and fourth years, second-year pharmacy students, as well as second and third semester nursing students. All student examinations, procedures, and education are overseen by faculty from respective programs at this university. The nursing students are selected from their cohort by the nursing department chair and student interest. Volunteering in the clinic is used by university students to meet the participation requirements for academic service learning which is required in the five-semester nursing program located in West-central Michigan.

Population

A convenience sample of patients who attended the university clinic during the time this project was in progress were given the opportunity to participate. Patients who attend the clinic included retired university faculty, area retirees, and/or Medicare and Medicaid recipients from ages 18 and up in a three-county region in West-central Michigan. Patients represented all income levels, with a majority relying on Medicaid as well as food assistance. These patients also struggled with transportation to the clinic, and several were rescheduled during the study due to these issues getting to the clinic or finding a ride. The population

demonstrated limited health literacy in most cases and assistance completing the surveys was needed. Inclusion criteria were those patients 18 and over who presented with DMII. Exclusion criteria were patients who did not have DMII and were under a doctor's care for renal disease and/or cancer.

There were a total of 14 patients who agreed to participate in the project. Obtaining the original goal of 40 participants was difficult as the low number of patients with diabetes visiting the clinic during the inclusion dates was a major factor. Many of the clinic patients rely on public transportation or others to bring them for their appointments, which presented a problem. Weather in this area of Michigan was another concern, as fall snowstorms resulted in multiple cancellations during the project. On average two to three patients were seen in the clinic each Friday. A total of 14 patients met criteria and consented to participate in the project, although only 13 patients completed the follow-up interview.

Nursing students who attended a regional university in West-central Michigan were selected by the nursing program chair for both fall and winter terms to volunteer at the clinic as part of their service learning commitment. Students who expressed interest in the clinic and performed well academically were considered. Twelve students, six from each term volunteered in the clinic. The students were in their second or third semester of the nursing program. Coursework during these semesters covers chronic illnesses and patient response. Being selected to work in the clinic is sought after by students as new skills are implemented such as drawing labs for HgA1c and performing foot checks.

Timeline

The project took 36 weeks from approval by the proposal approval committee on July 14, 2017. Once approved, the project was then sent to the University Institutional Review Board

(IRB) on July 15, 2017. IRB approval was obtained on August 28, 2017. Additionally, IRB approval was required at the university in West-central Michigan where IRB submission was submitted on July 20, 2017, and approval was granted on July 28, 2017.

Motivational Interviewing training for the students in the fall term occurred on August 31, 2017. This was the evening before the clinic opened for the semester on September 1, 2017. The clinic accepts patients during the last week of August through the first week of December during the fall semester. Patients were recruited from September 1, 2017 through December 1, 2017, and initial interviews were obtained during this time. Follow-up interviews were scheduled beginning December 10, 2017 and concluded on February 9, 2018, approximately 90 days after the initial interview.

During the winter term, students were trained on MI on January 4, 2018, and patients were seen from the first week of January through the second week of February. Data was collected for a total of 23 weeks. After the last follow-up visit concluded on February 9, 2018, data analysis was initiated with the assistance of a statistician. The analysis was completed during the week of March 11, 2018. The presentation of results and data analysis was presented via an oral presentation at the Regional Ten Conference of Sigma, International Nursing Honor Society in Michigan. The final defense for the project has been scheduled for April 26, 2018.

Procedures

Second and third semester university nursing students from the fall, 2017 and winter, 2018 terms who volunteered to work at the university clinic were chosen by the department chair. Their selection was based on their interest in the population served at the clinic as well as their academic performance. Six students were chosen from each term. Participation was not mandatory, however, all 12 students eagerly participated. The researcher emphasized that

participation was voluntary, and no grades would be affected if they chose not to participate. A consent form (see appendix B), was completed by each student to participate in the MI training and engage in interviews with the patients.

A mandatory motivational interviewing training session was provided at the beginning of each term using the MI resources found on the SAMSHA website (see appendix F.) Completion of this training was required before students could use MI with the clinic patients and participate in this project. The MI training session included modules located on the SAMSHA website which were crucial to understanding the process.

The MI training consisted of completing the SAMSHA Tour of MI modules, engaging in role plays with fellow students to demonstrate use of MI, and participating in a question and answer session with the principal investigator. In addition, completion of the modules required a passing grade of 80% on each quiz, to move to the next module. Combined with these evaluations during the module completion, and feedback from the principal investigator, students then participated in role play exercises followed by a question and answer session. Due to the tight turn around with the fall semester students and the first time using the resources, the session lasted six hours. The winter session was comprised of the same elements but took only four hours to complete due to increased researcher familiarity with the SAMSHA MI resources. Students were provided with consent forms where the risks and benefits of the project were discussed. Failure to participate in the project had no bearing on grades or other assessments. They were protected during the project by using first names only. Students were not reimbursed financially for their time spent completing the training modules, but this time will be included as part of their required service learning hours. Food and drink was provided to students as they

completed the modules and worked with the session facilitator in a nursing *classroom* in the College of Health Professions building on the university's campus.

Once trained, the students rotated in groups of four while they worked in the clinic each Friday morning. Each student had an opportunity to engage in MI with a patient diagnosed with DMII, as well as gather health information such as vital signs, lifestyle indicators, and obtain blood for the lab work. Patients with DMII who met criteria were approached by the project manager to obtain interest in participating in the project. A consent form and a pre-survey were completed at that time (see appendices A & C). Patients who did not choose to participate in the project received the same routine quality care as outlined by the clinic. The pre-survey included questions about perceptions of diet, exercise as it related to their DMII, as well as demographic information and barriers to adopting healthier lifestyle habits.

Patients were called back into the exam room shortly after completing the survey where student nurses gathered vital signs, height/weight, a 24-hour food recall, an exercise recall, as well as asked dental hygiene questions, and performed a foot examination which is standard practice for the clinic. The project manager was present for the entirety of each MI session. Nursing students engaged in MI with their patients discussing health lifestyle to include health food choices exercise, and medications, to identify patient feelings about their DMII, as well as their readiness to change. After the interview was completed, a blood draw was performed by the student in the same room where the interview took place, to determine HgA1c and cholesterol levels, and results were available after five minutes. The same machine and lab equipment were used at both the initial visit and the follow-up visit. The patient's HgA1c level and cholesterol results were then shared with the patient by the student nurse. After patients were provided the lab results, they were offered additional written educational materials such as pamphlets from the

American Diabetes Association. Further education, including resources for diabetic recipes, exercise groups, dental hygiene, and community resources were shared with patients who expressed interest. Student interactions with patients were allotted approximately 20 minutes.

At the follow-up visit, patients were asked to complete a post-survey addressing the same information as the pre-survey designed to assess changes in patient perceptions about their health and lifestyle, and to determine if any movement was made on the SOC model scale. Patients who visited the clinic for follow-up also had HgA1c levels and a lipid panel drawn again to determine the efficacy of the MI intervention. The patient did not have the same student nurse during the follow up visit. On average, the students saw two to three patients from eight until noon each Friday. Students frequently sought and were given feedback from the researcher about their MI skills.

Patient data which included demographic information, vital signs, height, weight, and HgA1c, as well as lipid levels was recorded on a password-protected spreadsheet after each encounter (Appendix G). The patients were de- identified by a number for anonymity to be used by the project manager exclusively. Data was stored on a secure drive within the university portal. Access to this drive required a user name and password for access.

Initial patient interviews occurred between September 1, 2017 to December 1, 2017. This time frame allowed for the follow-up visits to occur within the timeframe allotted to this study. Follow-up visits occurred from December 10, 2018 through February 9, 2018. Fourteen patients agreed to participate, however, one patient did not return for a follow up visit. The patient that did not return received a phone call and e-mail with an attempt to reschedule. After the 13th patient follow-up visit was completed, the project moved into the data analysis phase.

To measure student MI competency, the Motivational Interviewing Skill Code (see Appendix E), was planned to be used by the project manager to evaluate student interviewers. MISC evaluated the following:

Documenting interviewer adherence to MI within clinical trial protocols

Providing detailed session feedback for interviewers in the process of learning MI,

Including specific goals for improved skillfulness

Evaluating the effectiveness of training in MI by provided post-survey data (Miller, Moyer, Ernst &Armhiem, 2008).

Early in the process of this quality improvement project, it became apparent that training for the researcher to use the MISC tool would not occur due to the turnaround time of IRB approval and MI training. The tool was cumbersome to use as well as to explain to the students during an MI feedback session. As an alternative, the researcher chose to deliver feedback to the students using formative and summative feedback. Formative feedback was delivered after the clinic saw the last patient for the day. Students met briefly with the researcher to discuss how well they felt the patient encounter went. Students were encouraged to share their feelings and acknowledge what they could do better the next time. This feedback was delivered one-on-one in a private office. Students used the suggestions made by the researcher in future patient interviews. Students also received feedback from the evaluator to identify missed opportunities, open ended questions used versus closed-ended questions, and if reflection technique was used during the session with the patient.

Summative feedback using the methods described above as well as a roundtable debriefing occurred at the end of the fall semester on December 1, 2017 and again at the end of the winter term on February 9, 2018. Students attended a clinic debrief with the medical director

and researcher. Summative feedback was then shared with the students one-on-one in a private setting. Students were asked to summarize how they felt their performance had changed over the semester and how these findings would be applied to future practice.

Fiscal Considerations

The clinic charges patients for a package of services that includes an eye examination, medication counseling, the physical exam, and an interview that is performed by nursing students, as well as all lab work. Performing the blood draw to obtain the HgA1c level is included in this routine charge. A lipid panel was obtained which is customary, along with the HgA1c sample to provide additional education opportunities during the MI session.

As mentioned previously, students were not paid for their participation. Surveys and other printed educational materials were provided to patients by the clinic at no additional charge. Funding for printing and food and drink during the training was provided by the Junior Faculty Fellows Program (JFFP), of which the project manager is a member. No costs for this project were incurred by the project manager.

Ethical Considerations

Institutional Review Board approval was obtained from Jacksonville University and Ferris State University before any student training sessions were conducted. Both students and patients were the human subjects participating in the interventions (learning MI skills and the interview process along with patient results). Consents from both students and patients were obtained and stored in a locked drawer in the researcher's office. The project was explained in detail to both students and patients before the consents were obtained. Failure to participate in the project did not impact student grades or quality of patient care. Patient confidentiality was ensured by assigning each participant a number as the only identifying factor. Patient data was

electronically secured with password protection. The project manager was the only individual who had access. After completion of the project, there will be no further access to the patient database. All data, as well as the surveys and consents will be destroyed through the university's IT department after the project defense has taken place.

Data Analysis

The analysis of data was completed by using SPSS Statistics 25 (Armonk, NY). Data was summarized using descriptive statistics for demographics, weight, blood pressure, HgA1c, lipids, and patient responses from the surveys. A t-test was used to determine differences between pre-intervention and post-intervention. Using SPSS, A t-test was the preferred method to analyze the data to evaluate efficacy of the MI intervention and changes in the HgA1c levels. An Analysis of Variance (ANOVA) test using SPSS was part of the data analysis as well. ANOVA sorted out the variability of an outcome variable into two or more components such as variances due to an independent variable and variability due to other sources (Polit & Beck, 2018).

Project Outcomes

Descriptive/Inferential Statistics

Demographics/Descriptive

A total of fourteen patients completed the initial interview and a Motivational Interviewing session with a student nurse. All patients who participated were Caucasian, which does not lend to a diverse sample of patients. One patient did not reschedule an appointment to return resulting in 13 patients who returned for a second interview combined with a follow up visit. The descriptive statistics that were used for analysis were: age, county, HgA1c, sex, race, weight, and blood pressure. A lipid reading for cholesterol was also captured as part of the lab

test. The cholesterol machine did not always work, so cholesterol levels for some patients were not captured. The chart below captures the descriptive statistics that were gathered during the initial and follow-up visits:

Table 1: Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
Age	13	31	85	65.86	14.841
Before_Weight_kg	13	58.5	117.5	92.800	19.7370
After Weight kg	13	60	118.3	92.638	20.2992
Before_Dia_BP	13	64	102	75.23	10.662
After Dia BP	13	60	98	7.777	1.7257
Before_Chol	11	118	290	184.09	52.452
After Chol.	13	122	438	191.69	79.776
Before Sys BP	13	110	150	126.00	15.447
After_Sys_BP	13	106	157	128.54	16.836
Before_HgA1c	13	6.1	12.3	7.777	1.7259
After_HgA1c	13	5.8	12.6	7.685	1.7724

(Detailed information found in Appendix H)

The majority of the 13 patients 61% (n= 8) were male and 39% (n=5) were female. Ages ranged from 31 to 85, with a mean age of 65.8. Sixty-one percent (n=8) of the patients were from Mecosta County, 23% (n=3) were from Newaygo, and 15% (n=2) were from Lake County. One patient was from Osceola County, which was not in the study area, but a neighboring county. This patient agreed to participate in the project and provided consent. All 13 participants were Caucasian.

Nine patients revealed that pre-contemplative (not considering change) best described where they were on the SOC scale at the initial visit. Four revealed that they were in the contemplative stage. At the follow-up visits, 9 patients, or 69% remained in the pre-contemplative stage, and four, or 31% remained in the contemplative stage

This analysis revealed that there was also little change based on the pre- and post-surveys which gathered statements from patients regarding diet, exercise, and willingness to make

changes in lifestyle habits. In addition, HgA1c, weight, cholesterol levels, and blood pressure showed little movement from the initial visit to the follow-up visit. It is interesting to note that 84% (n=11) patients actually gained weight, (1.34 pounds average gain), while only 2% (n=2) lost weight (1.25 pounds average loss). Fifty-three percent (n=7) of the patients saw an increase (3.3%) in their HgA1c levels, while 47% (n=6) saw a decrease (2%). Patients who both gained weight and had an increase in HgA1c was 46% (n=6). Thirty-eight percent (n=5) saw an increase in weight, but their HgA1c levels dropped slightly. Two percent (n=2) saw a decrease in weight and HgA1c. Eight patients had an increase in systolic blood pressure; and five saw a decrease. Cholesterol levels also rose by an average 17.3 mg/dl for nine patients. Three patients had their cholesterol levels decrease by an average of 6.6 mg/dl. Systolic blood pressures rose 4.9mm/hg for eight patients and fell 3.6mm/hg for five patients. Diastolic blood pressure was the only descriptive statistic in which a decease was noted overall.

Students described their feelings about MI. When the project began, students stated that they were "nervous" and "apprehensive" about interviewing patients this way. The only exposure to patient interviews before the MI training consisted of low-fidelity simulations with peers or standardized patients. This concept was new to them. As the project continued, student comments changed, and confidence grew. Several patients initially were unreceptive to answering questions about lifestyle habits; however, as the skill level of the students grew, the patients were able to engage more thoroughly. Students shared that they felt "more confident," were less "fearful" of patient encounters, and "even difficult patients warmed up to me."

Inferential Statistics

Table two summarizes data of the descriptive statistic HgA1c before the MI intervention and at the 90-day follow up appointment using the ANOVA data analysis tool. A one-way ANOVA showed that there was no significant difference between the initial HgA1c measurement and the measurement taken three months later with the variable of $p < 0.05$ in each case. Small sample size (n=13) was a factor which contributed to this lack of statistical significance.

Table 2: ANOVA		Sum of Squares	DF	Mean Square	F	Sig.
Before_HgA1c	Between Groups	6.034	3	2.011	.609	.6256
	Within Groups	29.709	9	3.301		
	Total	35.743	12			
After_HgA1c	Between Groups	2.353	3	.784	.200	.8940
	Within Groups	35.344	9	3.927		
	Total	37.697	12			

One-way ANOVA (Appendix H)

The third table summarized HgA1c using a paired t-test of difference of means for pre and post intervention. A 95% confidence interval for mean was selected. A Paired t-test of difference of means showed that there was no significant difference between the initial measurement of HgA1c and the measurement taken three months later for all the variables with $p < 0.05$ in each case. Therefore, statistical significance cannot be made. Again, low sample size was a factor in this statistical analysis.

Table 3: Paired t-test of difference of means

	Mean	N	Std.	Std. Error
Before_HgA1c	7.777	13	1.7259	.4787
After_HgA1c	7.685	13	1.7724	.4916

Paired t-test of difference of means (Appendix H).

Sample Size

The small sample size (n=13) was a concern. Typically, the clinic sees four to five patients each Friday morning. The number of patients seen during the project was about half of what has been customary in past semesters. The small sample size was attributed to numerous no-shows on the patient schedule. Transportation issues are a concern with most of the population who visit the clinic. Some do not have a vehicle or public transportation does not serve their area. Patients are given two no-shows before they are dismissed from the clinic. Several of these patients were no-shows and did not respond to calls or emails from the clinic. In addition, severe winter weather was a factor which impacted patient numbers during the project. On several clinic days, snow and ice were present. Due to the older population who attended the clinic, reluctance to travel was a reason given for not keeping the appointment.

Stages of Change

Patients who participated encountered several barriers as well. Some patients reported that they lacked discipline during this time of year due to parties, family gatherings, and treats being brought into the workplace, as well as holiday travel which can impact proper diet and exercise. Others stated that they felt "entitled" to eat inappropriately because of family and holiday celebrations. These responses were gathered when asking the patient about their 24-hour diet recall included in the patient interview. Patients verbalized that they had a right to eat what they wanted and not exercise. Metzgar, Preston, Miller and Nikols-Richardson (2015), found that patient barriers such as these and others such as pain, environmental concerns, and poor social support prevented motivation to change. Other patients expressed being content with their situation and change was not necessary. In addition, the duration of the evaluation was only 90 days which spanned the holiday season where increased eating of sugary and high carbohydrate

foods is not uncommon. A harsh winter prevented most outdoor physical exercise as well as presented an obstacle in getting to the clinic from the surrounding rural areas. The bright spot in these findings were that patients remained mostly adherent with their medication regimens which was found to be true before the project began. Patients received assistance paying for their medication when visiting the clinic.

Discussion

Final Outcomes

The first objective was to measure effectiveness of nursing students using MI during routine clinic visits with follow-up in lowering HgA1c levels in patients with diabetes. As noted HgA1c levels did not show a significant change following the initial MI sessions with the students. The second objective was to measure effectiveness of students using MI on change in parameters such as increased physical activity, improved dietary intake, or compliance to a medication regimen related to motivational levels. Again, little to no change in these parameters were noted. Medication adherence to a regimen remained strong throughout the project.

The third objective was to evaluate effectiveness of MI by nursing students in moving patients in a positive direction using the SOC model. Students analyzed patient progress reported on the questionnaires in relation to the Stages of Change Model, which showed no movement during the follow-up patient visit. The final objective was to evaluate nursing students in their skills in using MI with clinic patients using MISC tool. Initially, the MISC tool was selected to deliver feedback to the students after participating in an MI session. This goal was not met. Due to the complexity of the MISC tool, and a tight timeline due to delayed IRB approval, the tool was not used after reviewing and attempting to use it. Other methods of MI evaluation lacked simplicity to use with students and to train within a reasonable time frame. As a result, formative

feedback following each interview and summative evaluations were conducted at the end of each semester with the students by the project manager.

This study had 13 patients who participated in the full project. Transportation issues and the unusually harsh winter were contributors. In previous semesters, four to five patients came to the clinic on Friday mornings. During the study time frame, two to three kept their appointments which was much lower than normal. Patients shared with students comments such as "finding a ride was hard," "I don't have a car right now," or "it is too hard to come out in this cold weather." Several of the scheduled patients were also known for not keeping scheduled appointments which was a factor in the low number of study participants. It was also noted that the participants did not represent the diverse population in the area as all participants were Caucasian. Nine percent of the area is defined as African American (US Census Bureau, 2017) and were not represented in the study.

Lack of movement on the SOC model was disappointing, but also in line with what was found in several studies (Noordman, 2013). Statements from patients helped explain the lack of movement on the SOC scale. Statements such as, "How can I exercise when there is three feet of snow on the ground?;" "I have had diabetes all of my adult life, I know it's going to kill me, so I do what I want;" and "Why would I change my habits now, I am almost 70 years old." These statements suggested that change for the sample population was not a priority at this time.

Time of year may have played a role. The project was spread out over three holidays (Halloween, Thanksgiving, and Christmas) where food and consumption of sweets is the norm. Patients shared their lack of willpower with the researcher and the students. Interesting enough, average weight gain for patients was only 1.34 pounds, when weight gain during holidays is common. This low weight gain was an "a-ha" moment and could be considered as a positive

outcome. Patient co-morbidities such as chronic obstructive pulmonary disease (COPD), congestive health failure (CHF), and complications with diabetic neuropathy could have contributed to the lack of motivation for exercise. Patients remarked that "I eat what I want over Christmas," "How can anyone expect you to behave when there are always treats at work," and "Food is all I have for pleasure at this point."

Maintaining physical activity for patients was non-existent or minimal during the time the project was conducted. Many of these patients live in extremely rural conditions, often on un-paved roads which creates difficulty in walking or cycling. Several patients mentioned that all of their exercise was from bringing in the mail or walking the dog. These patients were from homes with very low incomes, and gym membership was not a priority when basic needs were challenging to meet. In addition, the nearest gym was over 30 miles away in some cases.

Living in poverty creates challenges to meet basic needs with food being among them. Several of the communities lacked a grocery store or relied on convenience stores for food purchasing options. Most were on food assistance and did not have sufficient resources to purchase healthier products such as lean protein and fresh vegetables. The 24-hour food recall resulted in patients revealing that they ate high carbohydrate, low-fiber, and high fat foods, many processed items as well which also tend to be less expensive. Patient eating habits have a direct effect on HgA1c and cholesterol levels. Patient eating habits did not change as patients continued to consume foods high in carbohydrates and sugar. There were no significant decreases in HgA1c and cholesterol levels or increase in physical activity. An interesting fact is that several expressed wishes to garden and grow their own produce when the weather warmed up.

Medication adherence was successful for most of the patients. In the area, local stores have basic prescriptions including metformin at an extremely low cost. By meeting with a

pharmacist at the clinic, patients were also given samples and additional resources to purchase medications at little or no cost. By coming to the clinic, patients were assured of at least getting basic medications to assist with managing their DMII.

Student feedback was also crucial in understanding these final outcomes. During debriefing discussions at the close of each semester (December and February), students shared that more training would have been a benefit to them and the patients. They revealed that in the beginning when first engaging in MI, most were very nervous and stressed thinking about the MI session. As students conducted more patient interviews, their level of confidence increased. Several shared at the debriefings that they were "just getting warmed up," or "I wish I could come back and do this again, I was getting more comfortable." From a researcher perspective, level of student confidence did increase after engaging in several MI sessions. Towards the end of the term, it was evident the students were more relaxed, comfortable, and engaged with their patients. These results were in line with what other studies found on improving staff confidence (Christie & Channon, 2014; Ostlund et al., 2014).

Although the overall purpose of this quality improvement project was not met in part due to small sample size, the short time frame, and seasonal timing, several important concepts were apparent. Student confidence engaging in MI sessions improved over the span of the project. Student feedback advocated for a longer practice time, seeing the same patient more than once, and running the project over two semesters rather than just one. Students also revealed that they have a greater understanding of the connection between poverty and DMII in this region. Understanding barriers to change lifestyle behaviors became apparent in student learning.

Sustainability

Despite not meeting all of the objectives, benefits of the project were apparent. In this inter-disciplinary setting, nursing students, optometry interns, and pharmacy students were all able to see value in using MI. Nursing students who used MI in the clinic reported less anxiety and fear when asking patients questions such as diet recall and physical activity levels. Nursing students were able to determine what patients did want and then provide them with resources to assist them in the community to obtain healthier food, reduced prices in medication (in some cases), and education about how to incorporate physical activity in a daily routine. The technique is also a low-cost alternative to create a trusting relationship with the patient and increase confidence on the part of the interviewer. With additional time devoted to learning and using MI, all the participants of the clinic may benefit by improving their patient relationships.

According to Howard and Williams (2016), baccalaureate nursing students benefit from using MI to increase confidence when interacting with patients. Nursing students vocalize fear and anxiety when interacting with patients due to uncertainty of how to respond and the inability to form a trusting relationship. Students who learned MI were able to form better relational skills with patients, engage patients, and collaborate with the patient as a partner (Howard & Williams). Decreased anxiety and better relational skills with patients while using MI was also seen in the students during this project. Using MI in a care setting is recommended to enhance collaborative care with their patients and is suggested as an addition to nursing school curricula (Howard &Williams). Additionally, learning and using MI during clinical education can be carried over into practice and transform interactions with patients to enable patients to recognize that the power to change is in their hands. Because of the quality improvement project, the patient interview was re-designed to incorporate MI techniques at the clinic and will be used

again in the coming semesters. The hope would be that as students and others become more proficient in the use of MI, that patients would benefit and in fact, be more willing to accept the possibility of change towards a healthier lifestyle.

Recommendations for Further Research/Practice

Although no statistical difference was noted with HgA1c levels in this project, positive changes in lowered HgA1 was seen in two previous studies when MI was used in nursing practice in the Netherlands and China, (Jansink, et al.; 2013; Song et al., 2014). With this noted, a change in method should be considered. More training with additional practice for students beginning in lower-level courses would better prepare them in using MI. Additional questions in regard to the patient interview such as time of diagnosis and a connection with depression could be added.

While findings showed no significant changes for the parameters in this quality improvement project, more research using MI in clinical settings should be conducted. Modifications to student training allowing for additional practice time as well as use of an evaluation tool are crucial to conducting more research. The SAMSHA tools are an excellent way to teach MI skills in a self-paced environment. Incorporating simulation time and/or role plays to student training would increase student confidence before interviewing patients in the clinic. Due to the small sample size lacking diversity and time constraints, more research is needed to evaluate the success of using MI in settings where larger numbers and more diverse patient populations are available, i.e. a large rural region such as all Western Michigan. A longitudinal study, conducted over a longer period with more frequent MI sessions could be more effective. To abandon the idea of using MI for those patients with diabetes and other

chronic conditions is not recommended; however, extensive additional research will be required to support its positive use in clinical practice.

Implications for Practice

Throughout the duration of this quality improvement project, favorable feedback was provided by nursing students, pharmacy candidates, and optometry interns. Students verbalized that using the MI technique enabled them to "speak to patients more easily, really understand where the patient was coming from, and become a partner with the patient, not just a provider." Collaborative communication approaches such as MI have value and should be included in nursing curricula based on the changes that occur when patients and nurses become partners (Howard & Williams, 2016). Nursing programs focus on the development of therapeutic relationships with patients. When adding an MI component, increased confidence, understanding, and empathy are used in a patient conversation. Adopting MI in all clinical settings shows promise when working with patients with chronic illness as well as diabetes (Christie & Channon, 2014). Adding an MI component earlier to the current baccalaureate program should be explored based on the feedback from this quality improvement project.

In this instance, more time gathering patient information was needed. Twenty minutes with each patient for the nursing assessment and MI interview was not sufficient according to student feedback. Students also indicated that they wanted to have more visits with the same patient to engage in additional sessions of MI. In addition to extending the time of the project and clinical interview to provide more data for analysis, more focus was needed on increasing the diversity of the patient sample as well. The area has some African-American population as well as Native American groups (US Census Bureau, 2017). Efforts should be made to include diverse groups in the region. Encouraging patients from outreach programs should also be

considered in the future. The transportation concerns and rural nature of the area create difficulty in traveling to a single clinic. A satellite clinic brought to the communities was also suggested to increase participation. In these clinics, diet and exercise classes, as well as how to better manage stress (at no cost to the patient) should be explored. With these factors in mind, the outcome may be very different.

Dissemination of Findings

The information was disseminated in several ways. A presentation at the Junior Faculty Fellows meeting in February of 2018 was given and was an optimal way to share an overview of the project as well as address questions from faculty. Additionally, the Sigma Theta Tau Region Ten conference in Ann Arbor, Michigan on March 24, 2018 was a vehicle to disseminate findings using a PowerPoint combined with an oral presentation in front of a multi-national audience. Response from conference attendees was favorable, yet suggestions were made to implement a project of longer duration. Submission to a peer-reviewed journal article after project defense will occur in May of 2018. The publication for submission has yet to be identified.

With the dissemination of findings to a local and regional audience, awareness of MI and its benefits were raised. With an aging population and DMII diagnoses on the rise, finding more effective methods to increase awareness is necessary. Through this quality improvement project, information supporting MI and its benefits may find their way into primary and acute care settings as a practice standard. The Wellness Clinic was an appropriate initial location where patients with DMII had an opportunity to be heard and assisted to achieve their goals with the use of MI techniques.

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Appendix A

JACKSONVILLE UNIVERSITY

Informed Consent Document to Participate in Research

You are being asked to take part in a research study. Before you decide whether to take part, please read the information below and ask questions about anything you do not understand.

PARTICIPANT'S NAME: _____

TITLE OF THE RESEARCH STUDY: Motivational Interviewing and Diabetes

RESEARCH INVESTIGATORS:
Mary Beaudry MSNed, RN 231-468-8224
Dr. Pam Rillstone – Faculty Advisor 904-610-2761
Jacksonville University, 2800 University Blvd. N., Jacksonville, FL 32211

THE PURPOSE OF THE PROJECT: The purpose of this project is to determine the impact of MI performed by nursing students while educating and treating patients with diabetes who attend a Wellness clinic.

Motivational Interviewing is a technique used to help improve patient awareness and make positive changes in lifestyle habits.

IF YOU TAKE PART: You will be asked to answer some survey questions about your health. This will take place as your blood pressure, pulse, and temperature are collected. Then, you will talk to the provider about your dietary habits, physical activity, medication, and any need for assistance managing your diabetes. Your height, weight, and blood pressure will be recorded, and a small amount of blood will be taken by pricking your finger. This is to test your HgA1c and lipid levels.

A follow-up visit will be scheduled for ninety days after this initial visit. At this time, you will be re-interviewed while assessing your blood pressure, pulse, and temperature, and have your blood redrawn to measure any changes in HgA1c and lipid panel.
If you have any questions now or at any time during the study, you can contact anyone listed under investigators section.

If you agree, you will be part of the project for about 12 weeks. About 40 adults will take part in the study.

BENEFITS OF THE STUDY: You may, or may not, benefit from being in this study. The benefits could be improved awareness of maintaining a healthy lifestyle while living with diabetes. You will also find out the results of your HgA1c and lipid levels.

RISKS OF THE PROJECT: The risk of taking part in this study is the finger prick may be uncomfortable.

COSTS / COMPENSATION: You will not be paid for being in the project. The bloodwork tests are provided at no cost to you. If the only reason that you come to the clinic for the last visit is because you are taking part in this research, you will not be billed for that visit.

ALTERNATIVE TO BE IN THE STUDY: If you do not want to be participate in the project, you will receive your normal care.

RIGHT TO PARTICIPATE OR WITHDRAW: You are free to stop taking part in this project at any time. If you decide to stop taking part in this project for any reason, you should contact Mary Beaudry at 231-468-8224. If you have any questions regarding your rights as a research participant, you may call the JU Institutional Review Board at (904) 256-7151.

CONFIDENTIALITY: Only the researchers and certain Jacksonville University officials have the legal right to review research records. They will protect the secrecy of these records as much as the law allows. Otherwise, your research records will not be released without your permission unless required by law.

CONFLICT OF INTEREST: In general, presenting project results helps the career of a scientist. The researchers may benefit by learning about motivational interviewing as it relates to care of diabetes. If the results of this project are presented at scientific meetings or published in scientific journals, your name or any other identifying factors will not be used.

CONSENT TO PARTICIPATE: You have been informed about this study's purpose, procedures, possible benefits, and risks; and the alternatives to being in the study. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

By signing this form, you voluntarily agree to take part in this study. You are not waiving any of your legal rights. You will receive a copy of this form.

Participant's Name Printed	Participant's Signature	Date

Person Obtaining Consent and Authorization:

Name Printed	Signature	Date

Appendix B

Student Consent Form

JACKSONVILLE UNIVERSITY

Informed Consent Document to Participate in Research

You are being asked to take part in a research study. Before you decide whether to take part, please read the information below and ask questions about anything you do not understand.

PARTICIPANT'S NAME: _____

TITLE OF THE RESEARCH STUDY:
RESEARCH INVESTIGATORS:
Mary Beaudry MSNed, RN 231-468-8224
Dr. Pam Rillstone – Faculty Advisor 904-610-2761
Jacksonville University, 2800 University Blvd. N., Jacksonville, FL 32211

THE PURPOSE OF THE PROJECT:

The purpose of this project is to determine the impact of Motivational Interviewing (MI) performed by nursing students while educating and treating patients with diabetes who attend a Wellness clinic.

Motivational Interviewing is a technique used to help improve patient awareness and make positive changes in lifestyle habits.

IF YOU TAKE PART: You will participate in an MI training session lasting around six hours during the last week of August at a time to be announced. You will not be compensated for your time, but the training session will count towards your Service Learning commitment. You will be evaluated on the MI session using the MISC code that the project manager will cover in training

If you have any questions now or at any time during the study, you can contact anyone listed under Investigator's section.

If you agree, you will be part of the project for about 12 weeks. About 40 adults will take part in the study.

BENEFITS OF THE STUDY: You may, or may not, benefit from being in this study. You may find that interviewing patients is easier and helping them examine changes regarding their health may benefit your clinical practice.

RISKS OF THE PROJECT: There is no foreseen risk of participation currently.

COSTS / COMPENSATION: You will not be paid for being in the project. You will receive food and refreshments during the training session.

ALTERNATIVE TO BE IN THE STUDY: If you do not want to participate in the project, you will still be able to volunteer in the clinic as usual and will not be penalized in any way.

RIGHT TO PARTICIPATE OR WITHDRAW: You are free to stop taking part in this project at any time. If you decide to stop taking part in this project for any reason, you should contact Mary Beaudry at 231-468-8224. If you have any questions regarding your rights as a research participant, you may call the JU Institutional Review Board at (904) 256-7151.

CONFIDENTIALITY: Only the researchers and certain Jacksonville University officials have the legal right to review research records. They will protect the secrecy of these records as much as the law allows. Otherwise, your research records will not be released without your permission unless required by law.

CONFLICT OF INTEREST: In general, presenting project results helps the career of a scientist. The researchers may benefit by learning about the use of motivational interviewing. If the results of this project are presented at scientific meetings or published in scientific journals, your name or any other identifying factors will not be used.

CONSENT TO PARTICIPATE: You have been informed about this study's purpose, procedures, possible benefits, and risks; and the alternatives to being in the study. You have been given the opportunity to ask questions before you sign, and you have been told that you can ask other questions at any time.

By signing this form, you voluntarily agree to take part in this study. You are not waiving any of your legal rights. You will receive a copy of this form.

Participant's Name Printed	Participant's Signature	Date

Person Obtaining Consent and Authorization:

Name Printed	Signature	Date

Appendix C
Motivational Interviewing and Diabetes
Participant Pre-Survey

Participant Survey Participant #_____

Instructions: This information is being asked to better understand the needs of patients regarding healthy lifestyle habits as they relate to a diagnosis of type two diabetes. Please circle your answers below and write down your most recent height and weight. **Your answers will remain anonymous.**

Age:

18-25 26-35
36-45 46-55
56-65 65-75
> 75

Highest Level of Education:

Some High School
Some College
High School Diploma/GED
College Degree

County:
Mecosta
Newaygo
Lake

Gender:
Male
Female

Race:
African American
Native American
Hispanic/Latino
Caucasian
Asian
Other

Weight: _____
Height: _____
Blood Pressure: ____
Temperature_____
HgA1c: _____

INSTRUCTIONS: Please read the following statements and pick the one that most closely represents your current lifestyle.

__ I am not currently doing any regular physical activity or making healthy dietary changes. I do not want to change my current lifestyle.

__ I am not currently doing any regular physical activity and/or making healthy dietary changes, but I am thinking about starting a regular exercise routine and/or changing my dietary habits to lead a healthier lifestyle. I am thinking about making some changes within the next 6 months.

__ I sometimes participate in physical activity for exercise but not regularly and/or I sometimes make healthier food choices but not on a regular basis.

__ I have started a regular exercise regimen where I get 150 minutes of moderate activity or 75 minutes of vigorous activity weekly and/or make healthy dietary choices most of the time. I have made these changes within the last 6 months.

__ I am participating in regular exercise for at least 30 minutes per day on at least 5 days per week and I make healthy dietary choices most of the time. I have been practicing healthier lifestyle habits for more than 6 months.

The above portion of this survey was adapted with emailed permission from "Using Brief Motivational Interviewing to Increase Healthy Lifestyle Habits in Overweight and Obese Adults in a Rural Family Practice Setting" DNP Quality Improvement Project (McNulty, 2017).

Instructions: Please read the following statements and circle 1 if you strongly disagree 2 if you somewhat disagree, 3 if you are neutral, 4 if you somewhat agree, and 5 if you strongly agree.

.	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
I feel my physical health is negatively impacted due to my current weight.	1	2	3	4	5
I would like to have help to improve my dietary intake.	1	2	3	4	5
It is important to me to lead a healthy lifestyle.	1	2	3	4	5
I would like to have a conversation with my provider about managing my diabetes	1	2	3	4	5
I feel my current diet and exercise plan is adequate to maintain my health	1	2	3	4	5

Challenges in my life that I feel prevent me from leading a healthy lifestyle÷ (Please list and include examples, if possible)

_____

_____

What type of support from your provider do you feel would be most helpful? (i.e. life style education such as weight loss, diet, exercise, etc.)

_____

_____

This completes the survey. Thank you for your time. Please return survey to Mary Beaudry, principal investigator.

Appendix D
Motivational Interviewing and Diabetes
Participant Post-Survey

Participant Survey Participant #_____

Instructions: This information is being asked to better understand the needs of patients regarding healthy lifestyle habits as they relate to a diagnosis of type two diabetes. Please circle your answers below and write down your most recent height and weight. **Your answers will remain anonymous.**

Age:

18-25 26-35
36-45 46-55
56-65 65-75
> 75

Highest Level of Education:

Some High School
Some College
High School Diploma/GED
College Degree

County:
Mecosta
Newaygo
Lake

Gender:
Male
Female

Race:
African American
Native American
Hispanic/Latino
Caucasian
Asian
Other

Weight: _____
Height: _____
Blood Pressure: ____
Temperature_____
HgA1c: _____

INSTRUCTIONS: Please read the following statements and pick the one that most closely represents your current lifestyle.

__ I am not currently doing any regular physical activity or making healthy dietary changes. I do not want to change my current lifestyle.

__ I am not currently doing any regular physical activity and/or making healthy dietary changes, but I am thinking about starting a regular exercise routine and/or changing my dietary habits to lead a healthier lifestyle. I am thinking about making some changes within the next 6 months.

__ I sometimes participate in physical activity for exercise but not regularly and/or I sometimes make healthier food choices but not on a regular basis.

__ I have started a regular exercise regimen where I get 150 minutes of moderate activity or 75 minutes of vigorous activity weekly and/or make healthy dietary choices most of the time. I have made these changes within the last 6 months.

__ I am participating in regular exercise for at least 30 minutes per day on at least 5 days per week and I make healthy dietary choices most of the time. I have been practicing healthier lifestyle habits for more than 6 months.

The above portion of this survey was adapted with emailed permission from "Using Brief Motivational Interviewing to Increase Healthy Lifestyle Habits in Overweight and Obese Adults in a Rural Family Practice Setting" DNP Quality Improvement Project (McNulty, 2017).

Instructions: Please read the following statements and circle 1 if you strongly disagree 2 if you somewhat disagree, 3 if you are neutral, 4 if you somewhat agree, and 5 if you strongly agree.

.	Strongly Disagree	Somewhat Disagree	Neutral	Somewhat Agree	Strongly Agree
I feel my physical health is negatively impacted due to my current weight.	1	2	3	4	5
I would like to have help to improve my dietary intake.	1	2	3	4	5
It is important to me to lead a healthy lifestyle.	1	2	3	4	5
I would like to have a conversation with my provider about managing my diabetes	1	2	3	4	5
I feel my current diet and exercise plan is adequate to maintain my health	1	2	3	4	5

Challenges in my life that I feel prevent me from leading a healthy lifestyle÷ (Please list and include examples, if possible)

_____

_____

What type of support from your provider do you feel would be most helpful? (i.e. life style education such as weight loss, diet, exercise, etc.)

_____

_____

This completes the survey. Thank you for your time. Please return survey to Mary Beaudry, principal investigator.

Appendix E

MISC Codes

There are 14 major categories of counselor behavior in MISC 2.1. Each has a unique 2-letter code. Four categories require differentiation between two subcategories, which are 3-letter codes. For these four categories, the two-letter codes (AD, QU, RC, RE) are not

alone, but must include the third (subcategory) designation. The Interviewer Behavior categories are: AD Advise Required subcategories: with (ADP) or without permission (ADW) AF Affirm CO Confront DI Direct EC Emphasize Control FA Facilitate FI Filler GI Giving Information QU Question Required subcategories: Closed (QUC) or Open Question (QUO) RC Raise Concern Required subcategories: with (RCP) or without permission (RCW) RE Reflect Required subcategories: Simple (RES) or Complex (REC) RF Reframe SU Support ST Structure WA Warn

The observer would code using the above abbreviations to provide feedback when discussing the motivational interview with the student nurse. The categories that are evaluated are:

ADP or AWP-advice with or without permission

AF-affirm

CO-confront

DI-direct

EC-emphasize control

FA-facilitate

GI-giving information

Q-question

RCP or RCW-raise concern with permission or without permission

RE-Reflect

RF-reframe

SU-support

ST-structure

WA-warn

Competency levels are defined as:

Level I competencies: Start with second-pass coding of specific behaviors. Learn how to recognize and parse utterances. Learn to recognize and code the more discrete behavior categories, such as giving information and open/closed questions

Level II competencies: Add Reflect responses and differentiate simple from complex. Learn differentials between similar response categories.

Level III competencies: Having mastered individual behaviors, include the global ratings.

*The MISC tool is available for public use on the University of New Mexico Substance Abuse and Addictions website (Miller, Moyers, Ersnt, & Armhiem, 2008).

Appendix F

SAMSHA Module Example

A Tour of Motivational Interviewing

A Tour of Motivational Interviewing: An Interprofessional Road Map for Behavior Change

Course Overview:

Motivational Interviewing (MI) is a form of collaborative conversation for strengthening a person's own motivation and commitment to change. It is a person-centered counseling style for addressing the common problem of ambivalence about change by paying 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 reasons for change within an atmosphere of acceptance and compassion (http://motivationalinterviewing.org - opens in a new window).

This course takes the learner on a tour of the essential skills used to strengthen an individual's motivation for behavior change. Descriptions, demonstrations, and learning activities introduce MI.

This course is not meant to prepare the learner to deliver this evidence-based practice with fidelity. Learning MI is a developmental process that requires a longer-term investment of time and effort. This includes repeated opportunities to practice learned skills, to receive feedback on performance from experienced MI practitioners, and to integrate this feedback into practice.

This course may be taken for a Certificate of Completion, and for a small fee, offers four hours' CE credit in your choice of NAADAC, CHES (for Certified Health Education Specialists), NASW or CNE (Continuing Nursing Education) credits.

By completing the Tour of Motivational Interviewing, the learner can make an informed decision on whether to pursue more advanced MI training.

This online course was prepared by the University of Missouri Kansas City School of Nursing and Health Studies' Mid-America Addiction Technology Transfer Center (Mid-America ATTC), under a cooperative agreement from the Substance Abuse and Mental Health Services Administration (SAMHSA) Center for Substance Abuse Treatment (CSAT) and the National Institute on Drug Abuse (NIDA).

Registration Process:

If this is your first time registering for a HealtheKnowledge.org online course:

Fill out the registration form below. You will receive a confirmation email for your registration, followed by a second email from the HealtheKnowledge.org Help Desk with your login information **approximately 1 hour after you complete registration.** You will be able to begin the course within an hour of receiving that email.

If you have taken a HealtheKnowledge.org online course within the past six months:

You will receive a confirmation email for your registration. You will be able to login and begin the course **within approximately 1 hour of registering**.

When registering, please ensure that **all characters in your email address are lower-case.**

If you don't receive a confirmation email or have any other difficulties with accessing your course, please visit the HealtheKnowledge portal (www.healtheknowledge.org) and click on the Online Course Support link at the top of the page. Our 24/7 Help Desk staff will assist you with your registration.

Internal Code:TourOfMI

When Thursday, June 30, 2016 through Monday, December 31, 2018

Where HealtheKnowledge.org
http://www.healtheknowledge.org/

- $0.00 to take the course and earn a free Certificate of Completion
- $20.00 to take the course and earn 4.0 NAADAC Continuing Education Units (CEUs), 4.0 NASW Social Work Continuing Education Contact Hours, 4.0 Hours CHES Continuing Education (for Certified Health Education Specialists), or 4.0 Hours Continuing Nursing Education (CNE) Credits

Appendix G
Patient Spreadsheet

	Sex	County	Age	Height/Cm	Weight/kg	BP	Pulse	R	Ethnicity	HgA1c	Chol.
1											
2											
3											
4											
5											
6											
7											
8											
9											
10											
11											
12											
13											
14											
15											

Appendix H
Data Analysis

Descriptives

Descriptive Statistics					
	N	Minimum	Maximum	Mean	Std. Deviation
Age	13	31	85	65.86	14.841
Height_cm	13	146.0	197.5	170.686	12.4889
Before_Weight_kg	13	58.5	117.5	92.800	19.7370
Before_Sys_BP	13	110	150	126.00	15.447
Before_Dia_BP	13	64	102	75.21	10.662
Before_Pulse	13	60	100	74.86	11.986
Before_Resp_Rate	13	14	24	17.86	3.634
Before_HgA1c	13	6.1	12.3	7.777	1.7259
Before_Chol	11	118	290	184.09	52.452
After_Weight_Kg	13	60.0	118.3	92.638	20.2992
After_Sys_BP	13	106	157	128.54	16.836
After_Dia_BP	13	60	98	75.23	1.7252
After_Pulse	13	62	98	76.46	11.523
After_Resp_Rate	13	12	22	16.62	2.755
After_HgA1c	13	5.8	12.6	7.685	1.7724
After_Chol	13	122	438	191.69	79.776
Before_BMI	13	19.21	55.12	32.2420	8.49646
After_BMI	13	19.70	55.36	32.2911	8.86421

T-Test

Paired Samples Statistics					
		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Before_Weight_kg	91.862	13	20.2153	5.6067
	After_Weight_Kg	92.638	13	20.2996	5.6301
Pair 2	Before_Sys_BP	126.85	13	15.737	4.365
	After_Sys_BP	128.54	13	16.836	4.669
Pair 3	Before_Dia_BP	76.08	13	9.699	2.690
	After_Dia_BP	75.23	13	10.663	2.957
Pair 4	Before_Pulse	74.92	13	12.473	3.459
	After_Pulse	76.46	13	11.523	3.196
Pair 5	Before_Resp_Rate	18.00	13	3.742	1.038

	After_Resp_Rate	16.62	13	2.755	.764
Pair 6	Before_HgA1c	7.777	13	1.7259	.4787
	After_HgA1c	7.685	13	1.7724	.4916
Pair 7	Before_Chol	182.00	10	54.805	17.331
	After_Chol	197.50	10	91.181	28.834
Pair 8	Before_BMI	32.0078	13	8.79624	2.43964
	After_BMI	32.2911	13	8.86421	2.45849

Previous table continues…

Paired Samples Correlations				
		N	Correlation	Sig.
Pair 1	Before_Weight_kg & After_Weight_Kg	13	.998	.0000
Pair 2	Before_Sys_BP & After_Sys_BP	13	.937	.0000
Pair 3	Before_Dia_BP & After_Dia_BP	13	.766	.0023
Pair 4	Before_Pulse & After_Pulse	13	.977	.0000
Pair 5	Before_Resp_Rate & After_Resp_Rate	13	.711	.0064
Pair 6	Before_HgA1c & After_HgA1c	13	.963	.0000
Pair 7	Before_Chol & After_Chol	10	.912	.0002
Pair 8	Before_BMI & After_BMI	13	.999	.0000

Each variable shows that there is a strong significant correlation between the initial measurement and the measurement taken three months later. $P < 0.05$ in each case.

Paired Samples Test					
		Paired Differences			
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower
Pair 1	Before_Weight_kg - After_Weight_Kg	-.7769	1.2840	.3561	-1.5528
Pair 2	Before_Sys_BP - After_Sys_BP	-1.692	5.865	1.627	-5.236

Pair 3	Before_Dia_BP - After_Dia_BP	.846	7.022	1.948	-3.397
Pair 4	Before_Pulse - After_Pulse	-1.538	2.757	.765	-3.205
Pair 5	Before_Resp_Rate - After_Resp_Rate	1.385	2.631	.730	-.205
Pair 6	Before_HgA1c - After_HgA1c	.0923	.4786	.1328	-.1969
Pair 7	Before_Chol - After_Chol	-15.500	46.971	14.854	-49.101
Pair 8	Before_BMI - After_BMI	-.28331	.40152	.11136	-.52594

Previous table continued…

Paired Samples Test

		Paired Differences	t	Df	Sig. (2-tailed)
		95% Confidence Interval of the Difference			
		Upper			
Pair 1	Before_Weight_kg - After_Weight_Kg	-.0010	-2.182	12	.0497
Pair 2	Before_Sys_BP - After_Sys_BP	1.852	-1.040	12	.3187
Pair 3	Before_Dia_BP - After_Dia_BP	5.089	.434	12	.6717
Pair 4	Before_Pulse - After_Pulse	.128	-2.012	12	.0673
Pair 5	Before_Resp_Rate - After_Resp_Rate	2.975	1.897	12	.0821
Pair 6	Before_HgA1c - After_HgA1c	.3816	.695	12	.5001
Pair 7	Before_Chol - After_Chol	18.101	-1.044	9	.3239
Pair 8	Before_BMI - After_BMI	-.04067	-2.544	12	.0257

One-Way ANOVA

Height_cm	Between Groups	857.597	3	285.866	2.443	.1244
	Within Groups	1170.060	10	117.006		
	Total	2027.657	13			
Before_Weight_kg	Between Groups	915.971	3	305.324	.736	.5541
	Within Groups	4148.209	10	414.821		
	Total	5064.180	13			
Before_Sys_BP	Between Groups	1465.958	3	488.653	2.987	.0825
	Within Groups	1636.042	10	163.604		
	Total	3102.000	13			
Before_Dia_BP	Between Groups	396.190	3	132.063	1.521	.2687

	Within Groups	868.167	10	86.817		
	Total	1264.357	13			
Before_Pulse	Between Groups	319.714	3	106.571	.688	.5794
	Within Groups	1548.000	10	154.800		
	Total	1867.714	13			
Before_Resp_Rate	Between Groups	24.214	3	8.071	.547	.6612
	Within Groups	147.500	10	14.750		
	Total	171.714	13			
Before_HgA1c	Between Groups	6.034	3	2.011	.609	.6256
	Within Groups	29.709	9	3.301		
	Total	35.743	12			
Before_Chol	Between Groups	7201.052	2	3600.526	1.418	.2971
	Within Groups	20311.857	8	2538.982		
	Total	27512.909	10			
Before_BMI	Between Groups	136.009	3	45.336	.565	.6504
	Within Groups	802.460	10	80.246		
	Total	938.468	13			
After_Weight_Kg	Between Groups	978.916	3	326.305	.740	.5542
	Within Groups	3965.974	9	440.664		
	Total	4944.891	12			
After_Sys_BP	Between Groups	1001.136	3	333.712	1.251	.3477
	Within Groups	2400.095	9	266.677		
	Total	3401.231	12			
After_Dia_BP	Between Groups	737.927	3	245.976	3.534	.0615
	Within Groups	626.381	9	69.598		
	Total	1364.308	12			
After_Pulse	Between Groups	389.707	3	129.902	.971	.4479
	Within Groups	1203.524	9	133.725		
	Total	1593.231	12			
After_Resp_Rate	Between Groups	21.363	3	7.121	.919	.4698
	Within Groups	69.714	9	7.746		
	Total	91.077	12			
After_HgA1c	Between Groups	2.353	3	.784	.200	.8940
	Within Groups	35.344	9	3.927		
	Total	37.697	12			
After_Chol	Between Groups	15531.245	3	5177.082	.766	.5413
	Within Groups	60839.524	9	6759.947		
	Total	76370.769	12			
After_BMI	Between Groups	139.354	3	46.451	.520	.6789

	Within Groups	803.537	9	89.282		
	Total	942.891	12			

A one-way ANOVA shows that there is a no significant difference between the initial measurement and the measurement taken three months later for all the variables with $p < 0.05$ in each case.

Paired Samples Test

		Paired Differences			
					95% Confidence Interval of the Difference
		Mean	Std. Deviation	Std. Error Mean	Lower
Pair 1	Before_Weight_kg - After_Weight_Kg	-.9800	.6140	.2746	-1.7424
Pair 2	Before_Sys_BP - After_Sys_BP	-2.600	8.591	3.842	-13.267
Pair 3	Before_Dia_BP - After_Dia_BP	1.200	5.020	2.245	-5.033
Pair 4	Before_Pulse - After_Pulse	-3.200	1.789	.800	-5.421
Pair 5	Before_Resp_Rate - After_Resp_Rate	2.400	3.578	1.600	-2.042
Pair 6	Before_HgA1c - After_HgA1c	-.0600	.3647	.1631	-.5128
Pair 7	Before_Chol - After_Chol	2.250	9.323	4.661	-12.585
Pair 8	Before_BMI - After_BMI	-.38843	.23131	.10344	-.67564

Previous table continues…

Paired Samples Test

		Paired Differences				
		95% Confidence Interval of the Difference				
		Upper	t	df	Sig. (2-tailed)	
Pair 1	Before_Weight_kg - After_Weight_Kg	-.2176	-3.569	4	.0234	
Pair 2	Before_Sys_BP - After_Sys_BP	8.067	-.677	4	.5357	
Pair 3	Before_Dia_BP - After_Dia_BP	7.433	.535	4	.6213	
Pair 4	Before_Pulse - After_Pulse	-.979	-4.000	4	.0161	

Pair 5	Before_Resp_Rate - After_Resp_Rate	6.842	1.500	4	.2080
Pair 6	Before_HgA1c - After_HgA1c	.3928	-.368	4	.7316
Pair 7	Before_Chol - After_Chol	17.085	.483	3	.6624
Pair 8	Before_BMI - After_BMI	-.10122	-3.755	4	.0199

A Paired t-test of difference of means for Females shows that there is a significant difference between Before_Weight and After_Weight with $p = 0.0234 < 0.05$.

A Paired t-test of difference of means for Females shows that there is a significant difference between Before_Pulse and After_Pulse with $p = 0.0161 < 0.05$.

A Paired t-test of difference of means for Females shows that there is a significant difference between Before_BMI and After_BMI with $p = 0.0199 < 0.05$.