METABOLIC SYNDROME SCREENING IN SERIOULSY MENTALLY ILL PATIENTS:

A QUALITY IMPROVEMENT PROJECT

By

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Abstract

Seriously mentally ill patients who are taking second-generation antipsychotics have a high risk of metabolic complications, including obesity, diabetes mellitus type II, hypertension, and hyperlipidemia. Guidelines to screen for metabolic syndrome were established by the American Diabetes Association, American Psychiatric Association, American Association of Clinical Endocrinologists, and North American Association for the Study of Obesity (Clark, 2004). Compliance with implementing the guidelines to screen and monitor for metabolic syndrome vary from regular monitoring to little or none. This quality improvement project provided an educational intervention on screening and monitoring for metabolic syndrome in patients who were seriously mentally ill. The educational interventions were attended by 21 psychiatric-mental health nurse practitioners. After the educational intervention was completed, there was significant improvement in provider knowledge as well as motivation to screen and monitor patients taking second-generation antipsychotic medications for metabolic syndrome. Education may motivate mental health providers to increase the use of metabolic screening guidelines for patients taking second-generation antipsychotic medications potentially improving long term outcomes for this patient population.

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Metabolic Syndrome in Seriously Mentally Ill Patients: A Quality Improvement Project

In recent years, there has been a growing concern regarding the negative impact of metabolic syndrome on the general health of the seriously mentally ill (SMI) population (Parrinello, 2012). SMI has been defined as having "a mental, behavioral, or emotional disorder that results in serious functional impairment currently or within the past year" (National Institute of Mental Health [NIMH], n.d.). Metabolic syndrome is defined as a "combination of medical conditions including at least three of the following: abdominal obesity, hypertriglyceridemia, low-level high-density lipid proteins, hypertension and high fasting plasma glucose level" (O'Toole, 2013, p.1127). Metabolic syndrome has been further defined by the National Institute of Health [NIH] (2016) as "a combination of risk factors that puts the individual at risk for cardiovascular disease" (NIH, 2016). In the United States, cardiovascular disease is the leading cause of premature death (NIH, 2016). The occurrence of metabolic syndrome is significantly higher (55%-60%) in individuals diagnosed with serious mental illness (Arms, Bostic, & Cunningham, 2014) compared to the general population (34%) (American Heart Association [AHA], 2014).

The SMI population has been found to have the same risk factors for developing metabolic syndrome as the general population. Risk factors include an unhealthy lifestyle with poor eating habits, a sedentary life or lack of exercise, and smoking. SMI patients who are prescribed second-generation antipsychotic (SGA) medication have an additional risk factor of weight gain, which can contribute to elevated risks of developing metabolic syndrome. Consequently, people with SMI have a higher risk for obesity, cardiovascular disease, and type II diabetes (Castillo, Rosati, Williams, Pessin, & Lindy, 2015). The SMI population diagnosed with cardiovascular disease has an increased chance of dying at nearly twice the rate of the general

population (DeHert, Schreurs, Vancampfort, & Winkel, 2009). People with SMI are usually

prescribed SGA drugs, because these medications are successful in managing symptoms of their

psychiatric illness. Unfortunately, these drugs lead to a higher chance of developing metabolic

syndrome. Metabolic syndrome, along with the cardio-metabolic diseases, is the biggest

contributor to death in the SMI population when compared with suicide and injury (Castillo et

al., 2015).

Background and Significance

According to Stahl (2013), SGA medications can cause an increase in appetite and weight

gain. These symptoms are the start of metabolic syndrome. Weight gain often leads to obesity,

insulin resistance, and dyslipidemia. Obesity increases the risk for developing diabetes, which

has been shown to lead to cardiac disease. Some SGA medications (such as ziprasidone

[Geodon]) cause an increase in triglyceride levels and insulin resistance in a way that is

independent of weight gain (Stahl, 2013). For example, a person who starts taking SGA

medications shows a rapid increase in triglyceride levels without significant weight gain, and,

upon stopping the medication, the triglyceride levels decrease rapidly. The pharmacologic

mechanism for these occurrences is not known. It is clear that some SGA medications can

significantly increase triglyceride and insulin resistance that can lead to cardio-metabolic risks in

some patients (Stahl, 2013).

The primary adverse effect of taking SGA medications is weight gain leading to

increased risk for metabolic syndrome, heart disease, and diabetes. These medications include

olanzapine (Zyprexa) and, clozapine (Clozapine), which can cause the greatest weight gain.

Risperidone (Risperdal) and quetiapine (Seroquel) are considered most likely to cause

intermediate weight gain, and ziprasidone (Geodon) and aripiprazole (Abilify) cause the least

amount of weight gain (Muench & Hamer, 2010). Increased weight gain leading to an overweight condition or eventual obesity can lead to serious medical problems. According to Werneke, Taylor, & Sanders (2013), about one-third of people with schizophrenia who were treated with SGA medications develop metabolic syndrome; up to 15% had increased risk for developing type II diabetes. Their studies have shown that 70% of individuals treated with SGA medication have elevated serum lipids for their age (Werneke et al., 2013). The United States Food and Drug Administration (2004) requested all manufacturers of SGA medications to include a warning statement with the medication about the increased risk of hyperglycemia and diabetes. There is potential to reduce the morbidity and mortality for people with SMI by implementing initial health screenings and monitoring of patients on SGA medications.

Literature Review

Advanced Nurse Practitioner Role

In 2004, the American Diabetic Association (ADA) and the American Psychiatric Association (APA) established a strong link between SGA drugs and a higher risk of developing metabolic syndrome. At that time, the ADA, APA, American Association of Clinical Endocrinologists and North American Association for the Study of Obesity recommended healthcare providers screen patients who are on SGA medications for early signs and symptoms of metabolic syndrome (Clark, 2004). Unfortunately, the advent of these metabolic monitoring guidelines has not always led to consistent implementation of these guidelines by healthcare providers (Cohn, 2013). Parrinello (2012) found significant variation in the metabolic screening practices of SMI patients as the screening ranged from early screening to monitoring of SMI patients on SGAs to little or no monitoring of these patients. The screening and monitoring of metabolic syndrome in a psychiatric setting by psychiatric providers has been reported to be

inadequate. Additionally, it has been found that people with SMI who were screened for metabolic syndrome received referrals to primary care less often than people without mental illness (Parrinello, 2012).

Metabolic syndrome, when undertreated or not diagnosed, can lead to severe outcomes, including heart attacks and/or strokes. One primary role of nursing is the prevention of disease and the management of medical complications (American Nurses Association [ANA], 2004). The role of the Advanced Nurse Practitioner (ANP) is to provide leadership and expertise in nursing practice to systematically improve standards of health care and outcomes (ANA, 2004). Consequently, ANPs need to be aware of the prevalence of metabolic syndrome in SMI patients who take SGA medications (McDaid & Smyth, 2015). As healthcare providers for a vulnerable population who are at high risk for metabolic syndrome, ANPs need to screen SMI patients for metabolic syndrome.

Guidelines for Metabolic Monitoring

Psychiatric-mental health (PMH) NPs need to be aware of metabolic screening guidelines. Therefore, it is important that PMH-NPs implement the practice of monitoring metabolic parameters at initial SMI patient screening and throughout the course of care. According to the metabolic monitoring guidelines, minimal baseline screening should include: the patients' own and family medical history, patients' weight and height, the body mass index (BMI), waist circumference, blood pressure, fasting glucose (hemoglobin A1C), and fasting lipids before prescribing SGAs or immediately after the start of SGA's (Clark, 2004). The metabolic monitoring guidelines recommend repeating the measurements of patients' weight and calculating body mass index (BMI) in four weeks and in the next eight weeks. During week twelve, the metabolic monitoring guidelines recommend monitoring the patients utilizing the

same parameters evaluated in the initial metabolic screening. Afterwards, the metabolic monitoring guidelines recommend monitoring patients' BMI every three months (Clark, 2004). Finally, the metabolic monitoring guidelines recommendation is to check all patients' metabolic parameters annually (Clark, 2004).

Identifying metabolic syndrome includes monitoring for increased abdominal girth (male greater than 40 inches and female greater than 35 inches waist circumference), elevated blood glucose levels (fasting glucose greater than or equal to 110 mg/dl), high triglyceride levels (fasting triglycerides greater than or equal to 150 mg/dl), high blood pressure (blood pressure greater than or equal to 130/85 mm Hg), and low levels of high-density lipoprotein cholesterol (male greater than 40 mg/dl and female less than 50 mg/dl) implementing the adult treatment panel III criteria for metabolic syndrome (National Institute of Health: National Heart, Lung, and Blood Institute, 2001). If patients with SMI meet any three of these five risk factors mentioned above they can be at risk for metabolic syndrome according to the adult treatment panel III criteria (National Institute of Health: National Heart, Lung, and Blood Institute, 2001). The mental health provider should make a referral to a primary care provider for further treatment.

Barriers to Screening and Monitoring

A review of the current barriers can be broken down into three main groups as to why screening and monitoring for metabolic syndrome in SMI patients varies. The barriers are directly related to the patient, providers, and the system (McDonell, Kaufman, Srebnik, Ciechanowski, & Ries, 2011). Understanding the current barriers to metabolic screening and monitoring compliance are important aspects of process improvement and will be addressed at the patient, provider, and system level.

Patient barriers. The main barriers to patients' participation in metabolic screening are a lack of resources and alterations in cognition level related to their psychosis or chronic psychiatric illness (McDonell et al., 2011). Additionally, SMI patients are less able to recognize physical symptoms and less able to seek medical help (De Hert et al., 2011). Furthermore, SMI patients will not continue with their medical care because of impaired judgment caused by their chronic psychiatric illness.

Providers' barriers. McDonell et al. (2011) reported that the main barriers to mental health providers' implementation of the metabolic monitoring guidelines (Clark, 2004) are lack of adequate training for treating metabolic syndrome and not having enough time to perform the required screenings and assessments. Mental health providers need to develop basic metabolic syndrome knowledge and incorporate this metabolic information into their practice (Cohn, 2013). The mental health provider must be able to recognize who needs the initial screening such as patients who currently prescribed or likely to be prescribed antipsychotic medications (Cohn, 2013).

Lack of appropriate equipment in the mental health provider's office and lack of time have been issues along with consistency in measuring abdominal girth. Studies have shown that waist circumference is rarely measured (DeHert et al., 2011). Therefore, mental health providers must have an appropriate weight scale, blood pressure cuff, and a tape measure for measuring waist circumference in their offices to screen for metabolic syndrome.

Another main barrier for primary care providers is reported to be fear of treating patients with SMI and attitudes that these mental health patients are not within their scope of practice. Frequently, primary providers report the expectation that mental health providers should handle metabolic care (McDonell et al., 2011). In one study, the primary providers (100 of 154) stated

that it is the mental health provider's responsibility to monitor for metabolic risk factors

associated with SGAs (Mangurian, Giwi, Shunway, Fuentes-Afflick, & Perez-Stable, 2013).

Ideally, once a patient's metabolic risk factors have been recognized, the mental health

provider then needs to make the appropriate referral to the primary care provider. It has been

reported that communication between the primary care and mental health providers is often poor

(Cohn, 2013). The ultimate care goal of SMI patients, who are a vulnerable population, is to give

them psychiatric and health care in a comprehensive manner, which is a present-day challenge

(De Hert et al., 2011). McKnight, Maudlin, Hatipoglu, and Citrome (2011) believe the standard

of mental and primary health care is to practice continuous and precise clinical monitoring for

effective long-term treatment.

System barriers. The main system barriers include the idea that SMI patients have to see

a mental health provider and primary care provider separately. The separate payment and

qualification status means that some providers might not take Medicaid, for example, which

causes some SMI patients to not pursue any additional health care. Another reason SMI patients

may not interact regularly with the health care system is due to their insurance; Medicaid

patients, for example, have a limited number of health care providers, which can increase the

time spent waiting for appointment availability.

The patient is often shuffled between the mental health and primary care systems. More

often, the SMI patient has more contact with the mental health provider than the primary care

provider. The mental health providers usually do not feel comfortable assessing for metabolic

syndrome or they lack of up-to- date knowledge on metabolic syndrome. Since patients with

SMI are more likely to be seen by mental health providers, these providers need to recognize

risks for metabolic syndrome and then screen and monitor for metabolic syndrome (Cohn, 2013).

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The rate of treatment for patients with SMI for metabolic syndrome is low compared to the general population. According to McDonell et al. (2011), in a large study of schizophrenic adults, who were treated with SGA medications for specific psychiatric diagnoses, the SMI individuals were not treated for medical (physical) diagnoses and illnesses. This study revealed that at least 30% with diabetes, 62.4% with hypertension, and 88% with abnormal cholesterol were not adequately treated with medications (McDonell et al., 2011).

Documentation barriers. Despite the creation of metabolic monitoring guidelines (Clark, 2004), screening for metabolic syndrome continues to be a challenge to mental health providers and to treating metabolic syndrome. Tracking the adverse effects of SGA medications is the responsibility of the mental health provider. The provider should screen and monitor for metabolic syndrome and make needed referrals for pertinent abnormal findings as a result of screening (Brunero & Lamont, 2009).

Implementing a metabolic screening tool based on the metabolic monitoring guidelines (Clark, 2004) is imperative for mental health providers to monitor patients on SGAs. Mental health providers who practice the metabolic monitoring guidelines achieve best practice standards that ensure the best outcomes in psychiatric care (Parrinello, 2012). Therefore, if the patient meets the criteria for the minimal number of metabolic risk factors, an appropriate medical referral can then be made.

Purpose

The purpose of this quality improvement project was to provide information on metabolic screening for patients with SMI based on current guidelines to PMH-NPs. Participants will demonstrate:

1. Increased knowledge of metabolic screening guidelines.

2. Increased intention to implement metabolic screening guidelines.

3. Satisfaction with the metabolic screening tool and toolkit.

Educational Intervention using an Evidence Based Practice Model

The educational intervention on screening and managing metabolic syndrome in SMI patients was to help PMH-NPs incorporate metabolic screening into their daily practices. Another aim of the educational approach was to increase adherence of metabolic screening in PMH-NPs' practice so metabolic syndrome can be identified earlier along with the implementation of timely treatment in the event that a referral is needed. The National Health Service states that short educational interventions are a common way to engage nurse practitioners in thinking about ways to change their practice to improve health outcomes for patients (White, Hemingway, & Stephenson, 2014). The plan should include information on metabolic screening, monitoring, and basic treatment guidelines in SMI patients who are taking SGA medications.

The educational intervention followed the Plan-Do-Study-Act (PDSA) model as a framework for this quality improvement project. The PDSA is a scientific method where an idea can be implemented on a small scale leading to improvement (AHRQ Healthcare, 2013). The PDSA model was used to develop an educational approach to managing metabolic syndrome in SMI patients. The PDSA model began with four basic ideas:

1. Plan- identify the problem and proposed implementations

2. Do- implement the educational intervention to participants and collect the pre-and post-design

3. Study- looks at the data analysis and interprets the pretest and posttest results along with the review feedback to see if objectives were met.

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4. Act- make changes to the educational intervention based on the feedback and post

survey where a new PDSA cycle begins. Educational intervention will be used in the

future for more educational offerings.

Methods

Design

This quality improvement project used a non-randomized one-group pretest-posttest

quasi-experimental design (Burns & Grove, 2005). The educational intervention was held at

Providence Alaska Medical Center (PAMC) and Girdwood, Alaska. The participants consisted

of a convenience sample of 21 PMH-NPs from Anchorage, Alaska. The educational intervention

compromised of five multiple-choice questions, about a one-hour educational intervention along

with post evaluation survey.

Ethical Considerations

This project consisted of an educational intervention provided to PMH-NPs where there

were no risks to the participants attending the educational intervention. The participants had a

choice to participate in the educational intervention and to complete the pretest and posttest and

survey of the educational intervention. The return of their completed tests and survey implied

consent. The test was anonymous and only one question had a participant identifier in regards to

their specialty area.

The project was approved by the University of Alaska Anchorage Institutional Review

Board (IRB) (Appendix H). The educational sessions were held at PAMC; therefore, the project

was also approved by the Providence Alaska Medical Center IRB and approved as no human

subject research (Appendix I).

Measures

A short multiple-choice survey (Appendix B) used in a prior study (Arms et al., 2014) measured participant knowledge of metabolic screening guidelines before and after the intervention. Permission from Tamatha Arms, DNP, PMHNP-BC, NP-C to use the survey is shown in Appendix C. The Arms et. al. (2014) survey was used for both the pretest and the posttest measure. The surveys consisted of five multiple-choice questions. The test score was based on how many questions the participants' answered correctly. If the participants' answered all five questions correctly, then that equated to a score of 100%. The post survey included four close-ended questions with one open-ended question where the participants could answer with their personal response. A metabolic syndrome toolkit along with metabolic screening tool was provided to the participants based on the evidence- based practices and literature search on metabolic screening guidelines. The post survey questions were developed by the principal investigator and shared with the committee chair to establish face validity.

Plan

During the planning phase an educational intervention was planned based on literature search and best evidence-based practices. The important points of the literature search reported there was a lack of knowledge, time, and an efficient way to document data when screening for metabolic syndrome as well as collaborative care. A metabolic syndrome intervention (Appendix A) was developed incorporating the important points from the literature search and best evidence-based practices for managing metabolic syndrome in SMI patients taking SGAs. Before the presentation, a short multiple-choice test was given to the participants before and after the intervention. A post survey focusing on the educational information as well useful metabolic screening handout materials were provided to the participants after the intervention. The

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principal investigator reviewed the posttest responses and any suggestions considered for the next metabolic syndrome intervention.

Do

In the Do phase, post-evaluation questions for the educational intervention were completed (Appendix D). Flyers (Appendix E) were distributed at PAMC and at other local mental health facilities in Anchorage, Alaska. The supervisor and nurse educator of the Mental Health Unit at PAMC prepared reminder announcements for the Mental Health Department one day before the educational intervention was presented. The metabolic syndrome toolkit (Appendix F) was created to provide participants with a handout on critical information in the metabolic syndrome intervention. The participants were recruited by advertising the intervention at PAMC and local mental health facilities in Anchorage, Alaska.

Before starting the educational interventions on April 14 and 15 at PAMC and April 16 in Girdwood, Alaska, the principal investigator provided the participants with a pretest, which took about five minutes to complete. Once the pretests were collected, the principal investigator presented the educational intervention via a Power Point presentation. This presentation took approximately 30 minutes followed by a 15-minute question and answer period. The principal investigator provided the participants with a "toolkit" for screening and managing patients with metabolic syndrome along with a metabolic syndrome-screening tool (Appendix G). Afterwards, the principal investigator provided the participants with a posttest and post survey of the intervention to complete. The principal investigator was interested to receive feedback from the participants if the educational intervention was presented accurately and motivate them to increase metabolic screening in their practice. The educational material will be used for a larger more diverse audience in the future.

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Study

      In the study phase, the principal investigator reviewed the results of the data collected

from the educational intervention pretests and posttests. Paired *t* tests were used to analyze the

tests. The pretest average score of 21 participants was 52.3 percent with a *SD* of 16.0. The

posttest average score of 21 participants was 93.3 percent with a *SD* of 9.6. Please see Figure 1:

Pretest and Posttest Scores.
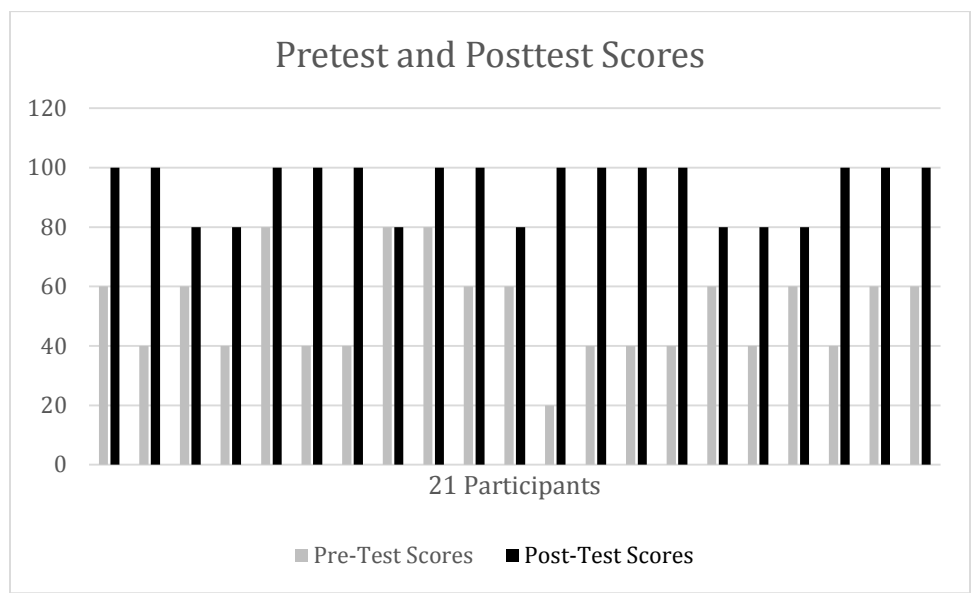
Figure 1. Test scores: pretest scores are shown in gray and posttest scores are shown in
black.

      Analysis included computing the percent correct for each question. Seven participants

answered the first question correctly. This question asked what "the National Institute of Health

defines metabolic syndrome as a combination of risk factors for..." The answer was

cardiovascular disease. Five participants answer the second question correctly. This question

asked what "the most significant factor of metabolic syndrome is…" The answer was central

adiposity. Twenty participants answer the third question correctly. This question asked what

"early identification of metabolic syndrome is critical in…" with the answer being "avoiding

progression to chronic disease and mortality". The fourth question was answered correctly by all

of the participants. This question asked what "The Clinical Antipsychotic Trial of Intervention

Effectiveness study showed which relationship between antipsychotic medication and weight

gain?" The answer was antipsychotic medications cause weight gain. Only two participants

answer the fifth question correctly. This question asked, "An outcome from the educational

intervention was found to be…" The answer was improved interprofessional collaboration.

The posttest results showed a significant improvement in the responses to the questions.

All of the participants answered questions 1, 3, and 4 correctly. Sixteen participants answered

question two correctly. Eighteen participants answer question five correctly. Please see Figure 2:

Comparison of Pretest & Posttest Questions.

Comparison of Pretest & Posttest Questions

Question 3 — Post-Test 100%, Pre-Test 95%
Question 4 — Post-Test 100%, Pre-Test 100%
Question 1 — Post-Test 100%, Pre-Test 33%
Question 2 — Post-Test 81%, Pre-Test 24%
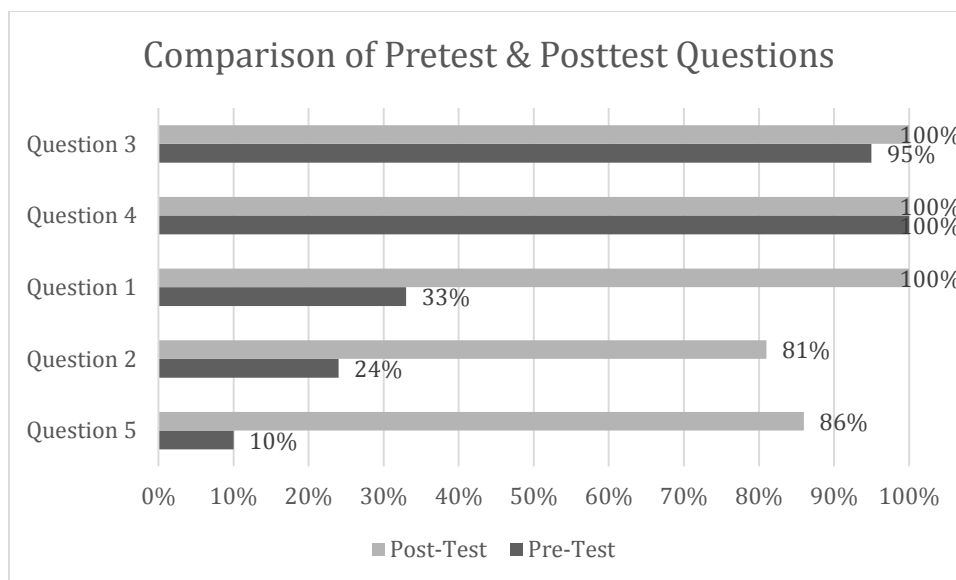Question 5 — Post-Test 86%, Pre-Test 10%

■ Post-Test ■ Pre-Test

Figure 2. Questions (1-5) in percentages. Pretest questions (1-5) in black. Posttest questions (1-5) in gray.

SPSS statistics version 21 was used to analyze the data. The final analysis with a paired sample *t* test demonstrated that the participants' posttest score (*M*=93.3, *SD*= 9.6) was higher compared to the pretest score (*M*=52.3, *SD* = 16.0), $t(20) = -9.168$, $p < .01$.

The post survey feedback for Questions 1-4 was consistently answered yes with some additional comments from the participants. Question 1 asked, the metabolic screening information presented clearly? Question 2 asked, do you think metabolic management content was presented clearly? Question 3 asked, did the lecture motivate you to increase metabolic screening in your practice? Question 4 asked, did the lecture increase your knowledge on screening and monitoring for metabolic syndrome? Some participants made additional comments such as: "plan to practice metabolic screening including waist circumference", "plan to use the screening tool," and "plan to practice". Most participants stated "no" or "none" on question 5, which asked for any other suggestions for this educational lecture on metabolic syndrome? Other comments from the participants included: "fantastic job", "great work", "I really liked the tool

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kit!" "informative", "more time", "thank you for the metabolic toolbox", "good information",

and "wonderful, thank you".

Act

Changes to the educational intervention were implemented. The major change that was

identified was the original test given on separate pieces of paper which made difficultly in

distinguishing to whom the pretest and posttest belonged. Therefore, these test results were not

used in this study. From this experience, the principal investigator developed a numeric system

and assigned a number to each participant's test. The numeric system proceeded smoothly and

left no confusion as to which test belonged to which participant. Afterwards, the principal

investigator started another cycle of the PDSA model. This was done after the principal

investigator reviewed the test on one paper with the pretest on one side and the posttest on the

other side. The findings have been shared with the management team and the Nurse Educator on

the Mental Health Unit at PAMC. Implications for practice based on positive outcomes of this

study where that the participants' increased their knowledge in metabolic screening and

expressed motivation to implement metabolic screening guidelines for the SMI patient. The

educational lecture will be used for future presentations locally and hopefully in a more diverse

population.

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Dissemination

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This quality improvement project was presented through a Power Point presentation at

PAMC, Anchorage and Girdwood, Alaska. A poster presentation of the Metabolic Screening

Project with the results of the study will be presented at the Alaska Nurse Practitioner conference

in Anchorage, Alaska, in September 2017 and the Alaska Psychiatric Association in Girdwood,

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Alaska, April 2017. A poster presentation was also planned for staff meetings at local mental health facilities in Anchorage.

Significance to Nursing

Metabolic syndrome, when undertreated or not diagnosed, can lead to severe outcomes, such as cardiac disease. PMH-NPs need to be aware of the prevalence of metabolic syndrome in SMI patients who take SGA medications (McDaid & Smyth, 2015). As providers for a vulnerable population who are at high risk for metabolic syndrome, ANPs need to screen SMI patients for metabolic syndrome in accordance with the guidelines. In one study where metabolic syndrome screening was done on 141 participants with SMI in New York, 53% were diagnosed with metabolic syndrome. Only nine participants in this study had no risk factors (Castillo, Rosati, Williams, Pessin, & Lindy, 2015). This project was able to improve knowledge of metabolic screening in this population as well as motivate PMH-NPs to implement metabolic screening in their practice.

Limitations

There were several limitations in this study including, small sample size, posttests given immediately after the educational intervention, and the post survey. In regards to a small sample study of 21 Alaskan participants, further studies with a larger PMH-NPs group in Alaska would be beneficial. The posttest was given immediately after the educational intervention. A further study can be done with having PMH-NPs taking the test later (after one month) to determine if they retained the material taught in the educational intervention. Also, the post survey feedback questions were closed-ended questions with the exception of the last question which was an open-ended question. Having more open-ended questions could have provided more richness in the responses and provide more meaningful feedback from the participants. The researcher could

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have used a Likert Scale for the post evaluation questions to obtain more accurate data. This small sample study of 21 Alaskan participants demonstrated motivation to use metabolic screening and monitoring in their practice. Further studies can be done on the Alaskan PMH-NPs' experiences implementing metabolic syndrome screening in SMI patients.

Summary and Conclusions

Metabolic screening has the potential to make a difference in SMI patients and improve their healthcare outcomes and quality of life. Unfortunately, there are barriers as to why metabolic screening is not practiced by providers specifically PMH-NPs. Despite metabolic monitoring guidelines (Clark, 2004), there is still a gap in providing metabolic screening in at-risk populations for SMI patients taking SGAs.

In conclusion, Alaskan PMH-NP participants demonstrated significantly improved knowledge and reported they were motivated to increase metabolic screening in their practice. They reported their knowledge was enhanced by this educational intervention. They also found the metabolic toolkit and screening tool were helpful for their practices. Education may improve guideline compliance and improve the health of those with SMI who must take medications that cause metabolic complications. This practice improvement project reflects the positive implications that education and user-friendly practice tools can have on improving patient outcomes.

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METABOLIC SYNDROME

Appendix A

Educational Intervention

Goal of this Learning Activity: Is to provide nurse practitioners (NP's) with knowledge on metabolic screening and monitoring of seriously mentally ill (SMI) patients who are at high risk for metabolic syndrome while taking second-generation antipsychotic (SGA) medications. The importance of collaboration with a primary medical provider will be addressed.

Target Audience: PMH-NP's who work with the SMI population.

Learning Objectives:

1. Describe the significance of early metabolic screening for SMI patients who are prescribed second-generation antipsychotic medications for the first time or who are already on antipsychotic medications.

2. Describe the national metabolic monitoring guidelines for metabolic screening and monitoring of patients with SMI who are taking SGAs.

3. List the risk factors and the metabolic syndrome parameters that need to be considered for patients with SMI who are taking SGA medications.

4. Identify barrier to monitoring patients with SMI who are taking SGA medications.

5. Implement and use the metabolic monitoring tools according to the American Psychiatric Association/American Diabetic Association and other associations' guidelines (2004).

6. Make appropriate referrals to medical providers for treatment of metabolic syndrome in patients with serious mental illnesses.

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Script Planned for the Intervention

The prevalence of metabolic syndrome in SMI patients taking SGA is rising (estimated to be double) in comparison to the general population. The SMI patients on SGA medications have an increased risk for metabolic complications like central obesity and insulin resistance. Theses metabolic abnormalities increase the risk for Diabetes type II and cardiovascular disease. Metabolic syndrome is a group of risk factors that occur together, which include abdominal obesity, hypertension, diabetes type 2, and dyslipidemia. Metabolic syndrome is clinically identified if at least has any three of the following five risk factors implementing the Adult Treatment Panel III (2001):

- Central obesity (Male > 40 inches' waist circumference and female > 35 inches' waist circumference)

- Fasting triglycerides ≥ 150 mg/dl

- HDL cholesterol (Male < 40 mg/dl and Female < 50 mg/dl)

- Blood Pressure ≥ 130/85 mm Hg

- Fasting glucose ≥ 110 mg/dl

Patient with SMI like schizophrenia have an increased morbidity and mortality due to cardiovascular disease. The risk factors for these patients are: genetic disposition, lifestyle choices poor diet, lack of physical activity, smoker, and drug/substance abuse, chronic illness like diabetes mellitus, and effects of SGA medications. Patient with SMI are more likely to be overweight, smoke, and have increased rates of diabetes, hypertension, and abnormal lipid serum levels.

Second-generation antipsychotic medications have a higher risk for metabolic syndrome because of the adverse effect for weight gain. Weight gain in SGA medications usually occurs

during the drug therapy and usually associated with increased risk for diabetes mellitus and dyslipidemia. Second generation antipsychotic medications commonly used are olanzapine (Zyprexa), clozapine (Clozaril), risperidone (Risperdal), quetiapine (Seroquel), ziprasidone (Geodon), and aripiprazole (Abilify). SGA medications are more commonly prescribed than first generation antipsychotics because of less extrapyramidal effects. Olanzapine and clozapine have a high weight gain, high dyslipidemia, and high rate of diabetes mellitus (DM) type II. Risperdal and quetiapine have a moderate weight gain, low for dyslipidemia and DM type II. Ziprasidone and aripiprazole are low weight gain, low dyslipidemia, and low DM type II.

The ADA/APA and other associations developed guidelines in 2004 to screen and monitor for clients who are taking SGA medications. Mainly to help clinicians screen for at-risk clients by doing an initial screen and continue to monitor the client while still prescribed a SGA medication. To screen for metabolic syndrome must first do a baseline of personal and family history, weight (BMI), waist circumference, blood pressure, fasting glucose/hemoglobin A1C, and fasting lipids. Then based on the metabolic monitoring guidelines (2004) will continue to monitor for metabolic syndrome.

Abdominal obesity is the most accurate parameter to measure correctly for the presence of metabolic syndrome. Increased glucose levels are more specific parameter to identify for metabolic syndrome presence. When these two parameters are measured usually 100 percent of these clients are identified with metabolic syndrome. Need to meet there of the five identified risk factors.

At baseline assessment consider the modifiable risk factors like overweight, obese, tobacco, alcohol and drug abuse, sedentary lifestyle, and poor dietary habits. Also consider other medications that can be liable for increased weight gain. Keep in mind that glucose and lipid

METABOLIC SYNDROME

abnormalities can occur without weight gain. When prescribing SGA medications be considerate of the client's risk factors and current metabolic state, the antipsychotic metabolic rate, and avoid usage of other medications that can cause weight gain.

First-line interventions are lifestyle modifications to decrease cardiovascular risks in patients with metabolic syndrome. Usually the focus is dietary interventions, smoking cessation, and increased physical activity. Educate the patients on possible side effects of the medications, the signs and symptoms of diabetes, and the patient's illness. Provide safe ways to weight reduction for overweight/obese patients like heart healthy diet, smoking cessation or reduction for tobacco users. Safe ways to increase physical activity in their life. Referrals are made if patient has elevated glucose levels, lipid abnormalities, and hypertension. Also, can make a referral to see a nutritionist if overweight or obese.

Continue to monitor patients based on the metabolic monitoring guidelines for metabolic syndrome. If metabolic syndrome is identified then review modifiable risk factors, encourage the education given on modifiable risk factors, and refer the patient for evaluation and treatment of the identified risk factors or abnormal lab values to primary provider. Also can refer the high risk clients with severe obesity to dietitian.

The goals for metabolic monitoring according to the guidelines is early identification of diabetes, dyslipidemia, and hypertension. Also to identify the patients who are at high risk for metabolic syndrome and to provide preventative measures like increasing physical activity and promoting health. Health professionals like NP's, need to recognize metabolic syndrome is a risk marker for patients with SMI treated with SGA's. To prevent metabolic syndrome or identify early metabolic risk factors must collaborate care: mental health providers with primary care providers and other specialized clinicians.

Appendix B

Pretest/Posttest

Specialty Area: Please circle the one specialty that most identifies you professionally.

Psychiatric-Mental Health NP   Psychiatric-Mental Health RN   Educator

1. The National Institute of Health defines metabolic syndrome as a combination of risk

   factors for:

   A. Hyperglycemia
   B. Hyperlipidemia
   C. Digestive disease
   D. Cardiovascular disease

2. The most significant risk factor of metabolic syndrome is:

   A. Hypertension
   B. Hyperlipidemia
   C. Central adiposity
   D. Atherosclerosis

3. Early detection of metabolic syndrome is critical in:

   A. Avoiding progression to chronic disease and early mortality.
   B. Determining doses of antipsychotic medications.
   C. Determining psychotherapy strategies.
   D. Limiting progression to acute disease and the risk of hospitalization.

4. The Clinical Antipsychotic Trial of Intervention Effectiveness study showed which

   relationship between antipsychotic medication and weight gain?

   A. Inconsistent relationship.
   B. Antipsychotic medications cause weight loss.
   C. Antipsychotic medications cause weight gain.
   D. There is no effect on weight.

5. An outcome from the educational intervention was found to be:

   A. Resistance from counselors to assess BMI.
   B. Reluctance of primary care practitioners to accept patients with mental illness.
   C. Improved interprofessional collaboration.
   D. Identification of the scarcity of preventative health care for this patient population.

(Permission granted to use questions from Tamatha Arms, DNP, PMHNP-BC, NP-C)

Arms, T., Bostic, T., & Cunningham, P. (2014). Educational intervention to increase metabolic
    syndrome in patients at community mental health centers. *Journal of Psychosocial
    Nursing*, *52*(9), 32-36.

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Appendix C

Approval Letter

From: Arms, Tamatha E. [mailto:armst@uncw.edu]
Sent: Wednesday, April 13, 2016 3:12 AM
To: Annabel K Moreno <amoreno@uaa.alaska.edu>
Subject: Re: Request to use questions

Annabel,

I'm glad to hear that you will be doing DNP work around this area as well.
You can use the questions as long as you cite the reference please.

Tamatha (Tammy) Arms, DNP, PMHNP-BC, NP-C
Nurse Faculty Leadership Academy scholar
UNCW CHHS School of Nursing
McNeil office 2034A
910-962-7192
armst@uncw.edu

From: Annabel K Moreno <amoreno@uaa.alaska.edu>
Sent: Wednesday, April 13, 2016 2:00 AM
To: Arms, Tamatha E.
Cc: jpn@healio.com
Subject: Request to use questions

To whom it may concern,

My name is Annabel Moreno & I am a graduate student (Psychiatric-Mental Health NP) at University of Alaska Anchorage seeking permission to use your CME questions on your article. I am only using 5 questions. Please let me know if that is ok to use in my graduate project on Metabolic Syndrome Screening in Serious Mental Ill Patients.

Thank You for your consideration,

Annabel Moreno, BS, RN, Psychiatric-Mental Health NP-student
University of Alaska Anchorage

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Appendix D

Post Survey

1. The information on metabolic screening was presented clearly?

2. Do you think the content on metabolic management was presented accurately?

3. Did this lecture motivate you to increase metabolic screening in your practice?

4. Did the lecture increase your knowledge on screening and monitoring for metabolic syndrome?

5. Any other suggestions for this educational lecture on metabolic syndrome?

Appendix E

Flyer

JOIN US
METABOLIC SYNDROME SCREENING IN
SERIOUS MENTAL ILLNESS
PATIENTS

Presented by Annabel Moreno, UAA Psychiatric-Mental Health NP-Student

APRIL 14, 2016
4-5 PM

MENTAL HEALTH UNIT (4TH FLOOR), PROVIDENCE ALASKA
MEDICAL CENTER

You are invited to participate in educational offering (1 hour) that will focus
on metabolic syndrome screening evidence-based information & guidelines
to PMH-NPs

Appetizers and Refreshments will be provided!

FOR MORE INFORMATION CONTACT: ANNABEL MORENO @ 907.727.2291

Appendix F

Toolkit

Rationale for early screening & monitoring of metabolic parameters when the SMI patient is on antipsychotics:

- Increase life expectancy in SMI patients.
- Antipsychotics have serious metabolic effects on the SMI patient.
- As psychiatric-mental health nurse practitioners we can play a primary role in the prevention of disease and management of medical complications.

Main References:

American Heart Association, 2014, March 14). Metabolic Syndrome. Retrieved from heart.org/HEARTORG/Conditions/More/MetabolicSyndrome

National Institute of Mental Health (n.d.). Serious mental illness among U.S. adults. Retrieved from nimh.nih.gov.
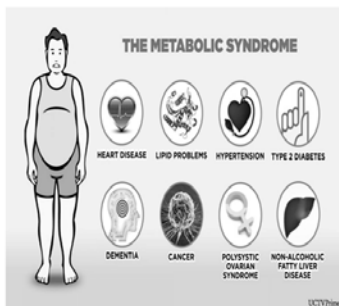
Metabolic Syndrome Toolkit

By Annabel Moreno, UAA Psychiatric Mental Health NP-Student

UAA School of Nursing
UNIVERSITY of ALASKA ANCHORAGE

Mental Health Awareness

Fitness · Professional Healthcare · WELLNESS · Nutrition · Attitude

METABOLIC SYNDROME

THE METABOLIC SYNDROME

HEART DISEASE | LIPID PROBLEMS | HYPERTENSION | TYPE 2 DIABETES

DEMENTIA | CANCER | POLYSYISTIC OVARIAN SYNDROME | NON-ALCOHOLIC FATTY LIVER DISEASE

UCTV/hine

Defined

- "As a combination of risk factors that puts an individual at risk for cardiovascular disease" (National Institute of Health [NIH], 2011).
- Cardiovascular disease is the leading cause of premature death in the United States (NIH, 2011).

Background

- In 2004 the ADA & APA established a strong link that second-generation antipsychotic (SGA) medications cause increased weight gain.
- Leads to obesity, insulin resistance, and dyslipidemia.
- Some SGA's increase triglyceride levels without significant weight gain (once med is stopped the levels decrease) [Stahl, 2013].

Stahl, S. (2013). *Stahl's essential psychopharmacology: Neuroscientific basis and practice applications* (4th ed.). New York, NY: Cambridge University Press.

ADA/APA Guidelines

- Early identification of metabolic syndrome can help to prevent chronic illness like DM, cardiovascular disease, obesity, and hypertension.
- Medical history includes family and personal history.

Prevalence

Increased prevalence in Serious Mental Illness (SMI) patients:

- 55% to 60% higher (Arms, Bostic, & Cunningham, 2014).
- 34% is for general population (American Heart Association, 2015).

Arms, T., Bostic, T., & Cunningham, P. (2014). Educational intervention to increase metabolic syndrome in patients at community health centers. *Journal of Psychosocial Nursing*, 52(9), 32-36.

Table 1 – Metabolic monitoring parameters based on American Diabetes Association/ American Psychiatric Association consensus guidelines[F]						
	Baseline	Week 4	Week 8	Week 12	Every 3 Months thereafter	Annually
Medical history*	X			X		X
Weight (BMI)	X	X	X	X	X	X
Waist circumference	X			X		X
Blood pressure	X			X		X
Fasting glucose/hemoglobin A1c	X			X		X
Fasting lipids	X			X		X

*Personal and family history of obesity, diabetes, hypertension, and cardiovascular disease.

Risk factors for Metabolic Syndrome

- Criteria for identifying those patients at risk for metabolic disturbances (Psychiatric Times. 2013).
- Recognizing the characteristics of metabolic syndrome is helpful to see if the client meets criteria for metabolic syndrome.

Table 3 – Metabolic risk markers	
Prediabetes[18]	Criteria
Impaired fasting glucose	100 - 125 mg/dL (5.6 - 6.9 mmol/L)
Impaired glucose tolerance	2-hour plasma glucose 140 - 199 mg/dL (7.8 - 11 mmol/L)
Prediabetic hemoglobin A1c	5.7% - 6.4%
Metabolic syndrome (any 3)[18]	Criteria
Waist circumference	Men > 40 inches; women > 35 inches
Fasting triglycerides	≥ 150 mg/dL
Fasting HDL cholesterol	Men < 40 mg/dL; women < 50 mg/dL
Fasting glucose	≥ 100 mg/dL or medication treatment
Blood pressure	≥ 130/85 mm Hg or medication treatment
Obesity[20]	Criteria
Class 1	BMI 30 - 34.9 kg/m²
Class 2	BMI 35 - 39.9 kg/m²
Class 3 (severe obesity)	BMI ≥ 40 kg/m²

HDL, high-density lipoprotein; BMI, body mass index: wt(kg)/ht(m²).

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Appendix G

Metabolic Syndrome Screening Tool

Patient Name: _____

Date of Visit: _____

Height (inches): _____

Metabolic Syndrome considered positive for MS if 3 or more (*) risk criteria present

Measure	Risk Criteria	Baseline	__/__/__	__/__/__	__/__/__	__/__/__	__/__/__	__/__/__
*Waist Circumference	Men > 40 inch Women > 35 inch							
*Blood Pressure	>130/85 mmHg							
Weight	N/A							
BMI	BMI > 30							
Measure	Risk Criteria	Baseline	__/__/__	__/__/__	__/__/__	__/__/__	__/__/__	__/__/__
*Fasting Plasma Glucose	> 100 mg/dl							
*Fasting Triglycerides	> 150 mg/dl							
*Fasting HDL Cholesterol	Men < 40 mg/dl Women < 50 mg/dl							
Fasting LDL Cholesterol	> 100 mg/dl							

Table 1 – Metabolic monitoring parameters based on American Diabetes Association/ American Psychiatric Association consensus guidelines'						
	Baseline	Week 4	Week 8	Week 12	Every 3 Months thereafter	Annually
Medical history*	X			X		X
Weight (BMI)	X	X	X	X	X	X
Waist circumference	X			X		X
Blood pressure	X			X		X
Fasting glucose/hemoglobin A1c	X			X		X
Fasting lipids	X			X		X
*Personal and family history of obesity, diabetes, hypertension, and cardiovascular disease.						

METABOLIC SYNDROME

Appendix H

UAA IRB Waiver

UAA UNIVERSITY *of* ALASKA ANCHORAGE

INSTITUTIONAL REVIEW BOARD REQUEST FOR DETERMINATION OF HUMAN SUBJECTS RESEARCH

	Yes/No Not sure
Consider your activity (research project, thesis, study, task, assignment) and the data (information) you, a member of your research team, or a collaborator, plan to collect, when responding to these questions. Activity Examples: surveys, questionnaires, focus groups, interviews ⑩ passive observation of public behavior (in physical or online environments, including social media) ⑩ experiments using electronic equipment or gaming techniques ⑩ the use of instruments or devices, including phones, to collect or monitor or influence behavior ⑩ diet, nutrition studies, or taste tests ⑩ physical or biomedical procedures, such as imaging, scanning, blood collection, anthropomorphic procedures ⑩ studies examining individuals' responses to manipulation of their physical or online environment ⑩ studies examining effectiveness of educational tools or curricula ⑩ pilot studies and other preliminary studies ⑩ any other activity that involves observation of, or interaction with, individuals to gather information for research.	
Enter a response for each question, complete Section B on Page 2 and send to simumaw@uaa.alaska.edu	
Is all of the data (information) being obtained about deceased people? (If No, skip the next question and go to RD**1**)	No
In addition to information about the deceased people, are you also collecting information from living persons about their recollections of the deceased people? (If No, stop here and go to RD **2**)	
RD**1**) Does your project only involve existing data, information, documents, or samples that you will obtain from a publicly available source that does not require permission to access the data? (If Yes, stop here and go to RD**2**.)	Yes
Does a funding source (federal, state, or local), either directly (direct funder) or indirectly (secondary, or pass-through funder) require IRB review? (If Yes, stop here and go to RD**3**)	
Is any of the data (information) being obtained about individuals who are, or could be, living now?	
Is any of the data (information) being obtained, directly or indirectly, from living individuals?	
Are you observing people, directly or indirectly, to collect your information?	
Are you interacting (face-to-face, through telephone, electronic media or documents) with people?	
Is the data collected by intervening (taking measurements, samples, images) with people, or observing an intervention carried out by another person?	
Does the data/information you are collecting only center on things, quantities, or other questions about what item, process, or procedure is used? (If Yes, stop here and go to RD**2**)	
Does the data/information you are collecting include the opinions, characteristics, or behavior of individuals?	
Does the data/information you are collecting include any information that could identify the individuals?	
Does the data/information you are using to recruit people for your project include any information that could identify the individual?	
During the process of collecting data, will you or any research team member, be able to identify the individuals?	
Will the data or information you are collecting examine, for example, the function of culture, expression of gender, or political views of members of the population in the study?	

METABOLIC SYNDROME

Could the results of this evaluation be used to make a general conclusion about the data/information you will collect?	
Is this evaluation connected to individual or group outcomes?	
Could the results of this evaluation impact the future use of similar programs, services, or public policy?	
Can this evaluation affect the development or implementation of other programs of a similar nature?	

Project Description: The purpose of this project is to provide a class on guidelines to Psychiatric Mental Health Nurse Practitioners (PMH-NP's). To improve PMH-NP adherence to screening for metabolic screening and monitoring of SMI patients taking second-generation antipsychotics (SGA's). An educational class will be provided to voluntary participants.

Population: The population of interest is Psychiatric Mental Health Practitioners because they mainly prescribe second-generation antipsychotic medications.

Plan: The class will focus on national guidelines for SMI patients on SGA's. A pre and posttest will be given to participants who attend the educational class. Only demographic information will be provided to the participants where they will not be individually identified.

All research conducted by University of Alaska Anchorage faculty, staff, or students, which involves human subjects must be reviewed by the Institutional Review Board (IRB). To determine if your project involves human subjects or is research under UAA IRB definitions, complete this form and send it to the UAA Research Compliance Officer, simumaw@uaa.alaska.edu.

For help, contact the Office of Research Integrity & Compliance (ORIC): (907) 786-1099.

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If you answered Not Sure for any question, briefly explain why you are uncertain. Briefly explain here.
RD**2** – Your work is most likely not human subject research and you do not need to complete the rest of the first section. Complete Section B and return the Request for IRB Determination form for a final confirmation.
RD**3** – Your work must be reviewed by the IRB. Go to IRBNet and complete a UAA IRB Proposal and all additional documents for IRB review.

Section B – Instructions, tab to each box and complete the information.

Name: Annabel Moreno   Today's Date: 2/9/2016

Affiliation with UAA (If this project will be used for class credit, complete the next two lines. If not, skip to Faculty/Staff):

Student Level: Graduate   Course Number: Individual Scholarly Project NS 696

        Faculty Advisor: Cindy Jones, ANP-PMH   Department: Nursing/UAA

Faculty   or   Staff ☐   College or School: UAA   Department: Nursing

            Center, Program, or Institute: Psychiatric-Mental Health Nurse Practitioner Program.

Project Title: Metabolic Syndrome Screening in Serious Mental Illness Patients: A Quality Improvement Project

METABOLIC SYNDROME

For Office of Research Integrity & Compliance Use Only

Final Determination: HSR   Not HSR

Statement of Findings: Will interact with participants, conducting a pre/post-test, which would normally be considered HSR,
But class is free and informational only, not for credit or required for a program, therefore project is not HSR.

METABOLIC SYNDROME

Appendix I

Providence IRB Waiver

WIRB

Global Leader | Proven Expert
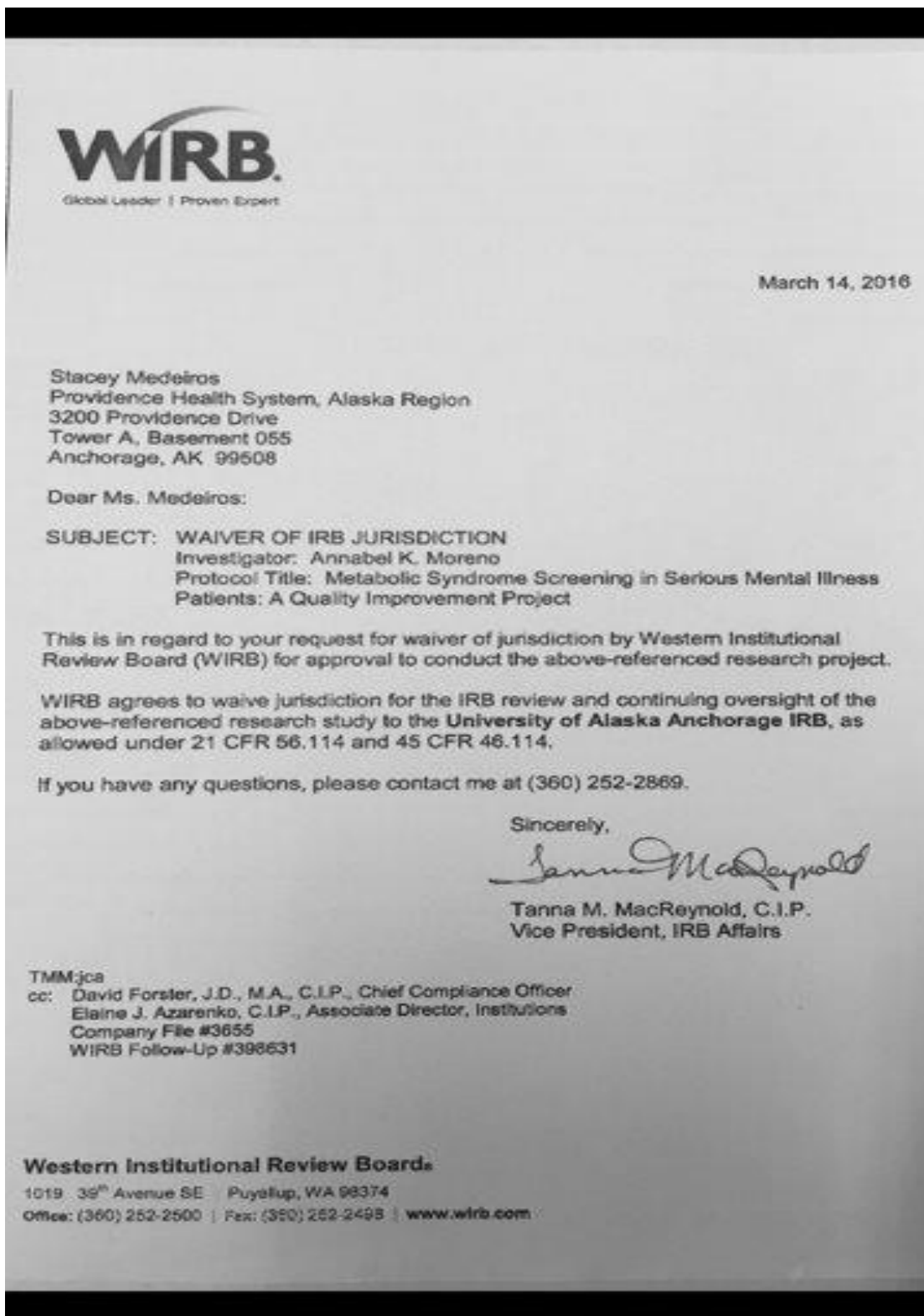
March 14, 2016

Stacey Medeiros
Providence Health System, Alaska Region
3200 Providence Drive
Tower A, Basement 055
Anchorage, AK 99508

Dear Ms. Medeiros:

SUBJECT: WAIVER OF IRB JURISDICTION
   Investigator: Annabel K. Moreno
   Protocol Title: Metabolic Syndrome Screening in Serious Mental Illness
   Patients: A Quality Improvement Project

This is in regard to your request for waiver of jurisdiction by Western Institutional
Review Board (WIRB) for approval to conduct the above-referenced research project.

WIRB agrees to waive jurisdiction for the IRB review and continuing oversight of the
above-referenced research study to the **University of Alaska Anchorage IRB**, as
allowed under 21 CFR 56.114 and 45 CFR 46.114.

If you have any questions, please contact me at (360) 252-2869.

Sincerely,

Tanna M. MacReynold, C.I.P.
Vice President, IRB Affairs

TMM:jca
cc: David Forster, J.D., M.A., C.I.P., Chief Compliance Officer
   Elaine J. Azarenko, C.I.P., Associate Director, Institutions
   Company File #3655
   WIRB Follow-Up #396631

Western Institutional Review Board.
1019 39th Avenue SE   Puyallup, WA 98374
Office: (360) 252-2500 | Fax: (360) 252-2498 | www.wirb.com