Early Detection of Metabolic Syndrome in Patients Taking Second Generation Antipsychotics

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DNP V 767: DNP Project III

In partial fulfillment of the requirements for the Doctor of Nursing Practice

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June 22, 2022

Table of Contents

Abstract

Introduction: Second-generation antipsychotics are frequently used to treat severely mentally ill because they are more effective than first-generation antipsychotics. The usage of SGA for a long time has been associated to metabolic syndrome. Metabolic syndrome is defined by higher glucose levels, insulin resistance, elevated triglycerides, decreased high density lipoprotein, elevated blood pressure, and central obesity. Many psychiatric prescribers perform insufficient screening for metabolic syndrome or none at all. The actual implementation of metabolic syndrome screening guidelines has been unsatisfactory since they were established in 2004.

Purpose: The goal is to implement screening standards that prescribers can follow when initiating or modifying SGA in an outpatient psychiatry clinic to identify metabolic and manage metabolic disorder syndrome.

Objectives: To introduce a screening protocol for an outpatient psychiatric clinic that did not have a policy or protocol in place to detect metabolic syndrome in patients prescribed SGAs.

Methods: A quality improvement project that followed a pre and posttest design, administered before and after educational training of participants. The protocol was implemented over a five-week period. Data collection included the participants knowledge acquisition after educational training measuring the compared pre and post test scores. Statistical analysis was completed by performing a paired t-test. Participant compliance to the protocol was measured through a chart audit. The compliance was statistically measured by using a percentage of the mean with a 95% confidence interval.

Results: There was a statistically significant improvement in participants' knowledge regarding evidence-based metabolic syndrome screening when the pre and post test were compared. The screening rate was 72.0% (n = 72) of the patients after implementing metabolic screening

guidelines, indicating that the protocol was followed correctly 72% of the time.

Conclusion: The project outcomes were met and in line with the project's goal and question. This project can be expanded to additional areas of nursing by looking at the impact of metabolic screening criteria for patients of various ages, as well as other psychotropics such Depakote, Clozapine, and Lithium that require therapeutic monitoring.

Keywords: metabolic screening; nurse practitioner; second generation antipsychotic; guidelines

Abstract word count: 330

Early Detection of Metabolic Syndrome in Patients Taking Second Generation Antipsychotics

Antipsychotic medicines are the gold standard of pharmacological treatment for severe mental illness (SMI). When compared to first-generation antipsychotics, second-generation antipsychotics (SGA) have a lower risk of extrapyramidal symptoms and tardive dyskinesia. Weight gain, metabolic abnormalities, hypotension, drowsiness, anticholinergic symptoms, hyperprolactinemia, extrapyramidal symptoms (EPS), cardiac effects, cardiomyopathies, cataracts, and sexual dysfunction are all side effects of SGA. Metabolic syndrome is a worrisome side effect of SGA because it puts individuals at risk of diabetes, insulin resistance, elevated triglycerides, decreased high density lipoprotein (HDL), elevated blood pressure (BP), and central obesity (Rochlani, 2017). In 2009, an international task force recognized that metabolic syndrome plays a critical component in cardiovascular and mortality risk around the world (Krakauer, 2018). Complications from this disorder include type two diabetes, heart disease, cerebrovascular accidents, and even death (Rochlani, 2017).

The prevalence of metabolic syndrome in most countries is an estimated 20 % to 25 % of the adult population (Moreira, 2017). In contrast, metabolic syndrome in individuals with mental illness is between 37% and 44 % (Moreira, 2017). A greater functional disability and higher mortality rates have also been seen in individuals with mental illness that have comorbid metabolic syndrome (Moreira, 2017). Having metabolic syndrome drastically increases the risk of all-cause mortality by 1.5 times (Rochlani, 2017). Metabolic syndrome has been associated with a 68% increase in risk of cardiac sudden death(Kreyenbuhl et al., 2016). Since SGA use places the individual in a high-risk category for metabolic syndrome, it is imperative this population receive early and regular screenings to identify risk factors. The percentage of

individuals that develop metabolic syndrome while taking an SGA is an estimated 11.66% four months after initiation (Meena & Gautam, 2011). In patients with schizophrenia, it is estimated that approximately 34% of deaths among male patients and 31% of deaths among female patients are attributed to cardiovascular disease which is only surpassed by suicide (Burghardt, 2013) Literature supports the use of metabolic screening in all patients taking an SGA.A proposed solution to this problem locally is to initiate a screening protocol in an outpatient psychiatric clinic for adults prescribed SGA's.

Background

Many psychiatric prescribers are doing inadequate metabolic screening or no screening at all (Hamilton, 2020). Since guidelines for metabolic screening was released in 2004, the actual implementation in practice has been inadequate (Hamilton, 2020). To improve screening rates in an outpatient psychiatry clinic, the plan is to initiate screening guidelines that prescribers can follow when starting or adjusting SGA. The pathogenesis of metabolic syndrome includes acquired and genetic factors that play a role in the final pathway of inflammation that leads to cardiovascular disease. Management of metabolic syndrome involves a holistic approach that combines lifestyle modification and pharmacological interventions (Rochlani, 2017). Early detection, is important to effectively implement lifestyle modifications and decrease risk profile. The management of metabolic syndrome is focused on treating individual components of the disease with pharmacological interventions such as antihypertensives, statins, and metformin. Calorie reduction and regular exercise are also recommended to prevent and combat obesity, which in turn are beneficial to decrease factors associated with metabolic syndrome (Rochlani, 2017).

The American Diabetes Association (ADA) and American Psychiatric Association (APA) released a consensus statement in 2004 regarding metabolic screening and monitoring for patients that are initiating or changing to a new antipsychotic medication (Holt, 2004). This consensus recommends that prescribers obtain a personal and family medical history, weight, body mass index (BMI), waist circumference, blood pressure, fasting plasma glucose, and fasting lipid profile at the initial patient visit when starting an antipsychotic. It is then recommended rechecking metabolic parameters at four weeks, eight weeks, 12 weeks, quarterly, then annually(Holt, 2004). More frequent assessments can be done based on clinical presentation (Holt, 2004).

Problem Statement

The consensus statement by the APA and ADA provides a standard of care in individuals taking SGA. An extensive review of the literature revealed that metabolic syndrome is a common side effect of SGA. Clear guidelines have been set for metabolic screening however, most guidelines are not being followed by providers. In response to these findings, interventions that aim to improve metabolic risk screening will be implemented into practice. This supports the need of metabolic screening in all patients taking a SGA. The review of the literature demonstrated a gap in the identification of metabolic syndrome. Other approaches to improve metabolic screening is the posting of educational materials, auditing charts and providing feedback on monitoring practices, along with patient and provider reminders about metabolic screening (Kreyenbuhl et al., 2016).

Research supports that metabolic syndrome is a major public health concern locally and internationally (Osnat et al., 2019). Despite the evidence that is in support of metabolic screening in patients taking a SGA, a gap in care has been identified. At the current host site, there is no

guideline in place for metabolic screening. Although some providers do order labs, recommended time frames are not being followed. Many patients that have been on long term SGA have no laboratory work or inadequate laboratory work. In addition, there is a lack of weight and BMI monitoring, and no measuring of waist circumference, which are all recommendations from the ADA and APA consensus guidelines.

The project site is an outpatient mental health clinic. This clinic is utilized to treat individuals in the community with mental illness. There is no current regular screening or monitoring in place at the project site for early detection of metabolic syndrome in individuals taking SGA medications Weights are not being documented at follow-up visits, and there is no follow up after initial labs are ordered. Based on literature review, metabolic screening in this population is national issue within psychiatry. According to Kreyenbuhl et al., (2017), primary care providers that also manage mental illness are more likely to comply with APA/ADA guidelines than psychiatric providers. Failure to detect metabolic syndrome in individuals taking SGA, or delay in screening has led to negative consequences, poorer outcomes, and decreased life span (Kioko et al., 2016). The nature of the problem is lack of adequate screening by psychiatric providers prescribing SGA's in outpatient practice. The key to making a change in provider practice is adequate knowledge of metabolic screening. To successfully implement a change in screening using evidence base practice, creating a culture that promotes screening through social influences has been shown to be effective (Osnat et al., 2019). For instance, selecting a "metabolic champion," who will oversee promoting metabolic risk screening in adherence with guidelines among providers in the office (Osnat et al., 2019).

Project Question

Will the implementation of metabolic screening guidelines improve detection and early intervention of metabolic syndrome in individuals prescribed a second-generation antipsychotic in a psychiatric outpatient clinic within a five week period?

Problem – Inadequate screening for metabolic syndrome in patients taking SGA in a local outpatient clinic.

Implementation – Initiation of evidence-based guidelines for screening of all individuals taking a SGA.

Comparison-Current practice without utilization of screening and monitoring guidelines for metabolic syndrome.

Outcome-Early identification and management of patients at risk for metabolic syndrome for patients taking SGA.

Timeline-The timeline for the implementation of screening guidelines is four to six weeks.

Literature Review

Search Methods

A comprehensive search was conducted to reveal relevant studies on metabolic syndrome screening in patients taking antipsychotics. Consideration to the PICOT project question was also a factor in this search. The databases used included: Ebscohost, Cumulative Index of Nursing and Allied Health Literature (CINAHL), ProQuest, and Ovid. For relevant articles search terminology included metabolic disorder, second generation antipsychotics, guideline, and antipsychotics and yielded a total of 10,985 articles. The search was refined by selecting scholarly and peer reviewed articles. The publication dates were limited from 2011-2021,

however articles published within the last five years took priority, which then reduced available articles to 3,865. The term screening was then added to search and further narrowed results to 1,564. Titles and abstracts were reviewed for eligibility using key terms, abstracts were reviewed to include articles that had a primary focus of metabolic disorder screening for adults, and duplicates were removed which narrowed search results to 103. If metabolic screening was not included in title or abstract, it was excluded, this yielded 84 articles.

Inclusion criteria were articles limited to evidence-based practice in English. Exclusion criteria for this literary search were irrelevant titles. Articles studying individuals under the age of 18 were excluded. Articles that focused primarily on antidepressants, anxiolytics, or mood stabilizers were excluded. After inclusion and exclusion criteria, there was a total of 23 peer-reviewed articles that were included in this DNP project.

UpToDate database was also utilized to gather information regarding prevalence, themes, epidemiology, contributing factors, and clinical implications of metabolic syndrome. A search was conducted on Google Scholar to identify metabolic disorder statistics regarding, incidence, and mortality rates of individuals taking a SGA. This search also included current national guidelines for screening in patients taking SGA as recommended by the consensus development conference on antipsychotic drugs and obesity statistics regarding metabolic syndrome, which occurred in 2004. Updates to these guidelines occurred in 2009, national guidelines from the U.S. Preventative Service Task Force for each component of metabolic syndrome was conducted including guidelines from the National Cholesterol Education Program ATP III, International Diabetes Federation, and Adult Treatment Panel III.

Review Synthesis

The literature was utilized to establish guidelines for metabolic screening in outpatient psychiatry. An overview of the literature shows that metabolic disorder is a potentially fatal illness that is often associated with severe mental illness and SGA use (Melamed et al., 2019). In response to this national issue, several health authorities have established screening recommendations for United States providers (Melamed et al., 2019). Although, screening does not prevent metabolic disorder, it does assist in the early detection and treatment which yields improved patient outcomes and decreased medical cost (Melamed et al., 2019). Multiple authors have reported that guidelines are not effectively being used in practice (Mitchell et al., 2012). Themes that emerged from literature review were interventions that target providers, interventions that target patients, and interventions that target the system.

Interventions that Target Providers

Provider education, reminder systems, and metabolic monitoring tools have been shown to improve metabolic screening among providers (Abdallah et al.,; Cotes et al., 2015; Fischler et al.,2016; Kioko, et al., 2016). Adequate knowledge, education, and skills are an integral component of changing provider practice (Melamed et al., 2019). Types of education included in the literature review were staff in services, dissemination of educational materials, and interactive instruction with provider feedback (Fishcler et al., 2016; Hinds et al., 2015; Kioko, et al., 2016). Clinical reminders such as large poster boards and electronic prompts when prescribing a SGA were also noted to improve screening for provider (Fischler et al., 2016; Gill et al., 2016; Lee et al., 2016; and Kioko et al., 2016). Electronic prompts, occurred if a provider failed to order the metabolic screening panel for patients prescribed a SGA (Lee et al., 2016). After six months, a statistically significant improvement in laboratory metabolic screening was noted (Lai et al., 2015). Evaluation of metabolic monitoring tools were conducted by participants

conducting self-audits and performance appraisals. The results of self-audit was compared to other providers to benchmark performance in metabolic screening (Barnes et al., 2016; Fischler et al., 2016; Green et. Al, 2018; and Soda et al., 2020). The effects of these interventions improved metabolic screening guidelines over six months in two studies (Kreyenbuhl et al., 2017; Lai, et al., 2015).

Interventions that Target Patients

Patient empowerment, education and feedback were all discussed as interventions that promote metabolic screening (Melamed et al., 2019). Educating patients is just as necessary as provider education (Abdallah et al., 2016 , Fischler et al., 2016). The interventions targeted face to face education as well as paper based educational materials handed out to patients during visits (Krenyenbuhl et al., 2017). Education was primarily focused on lifestyle modification such as exercise and healthy diet. Self-monitoring has also been suggested for weight monitoring and signs and symptoms of metabolic syndrome for high risk patients particularly during the first few months of treatment (Abdallah et al., 2016; Barnes et al., 2015; Krenyenbuhl et al., 2017), focused primarily on patient education, that empowered patients to ask providers about their metabolic risk factors and screening (Fishcler et al., 2015; Lee et al., 2016; Soda et al., 2020).

Intervention that target Systemic Issues

Creating a culture that supports metabolic screening, through active leadership and healthcare collaboration was a primary intervention in multiple studies (Fishcler et al., 2015; Lee et al., 2016; Melamed et al. 2019). To achieve this goal, leadership needs to support providers, by persistent and sustainable involvement, endorsing education, and ensuring the working environment is conducive for metabolic screening (Cotes et al.2015; Fischler et al., 2016; Gill, et al., 2016; Green et al., 2018; Lai et al., 2015). In addition, leadership should also be aware of

metabolic screening and why it is important (Barnes et al., 2015; Cotes et al., 2015; Lee et al., 2015). Multiple studies also recommend the collaboration with primary care providers (PCP) or integration of primary care within psychiatry (Abdallah et al., 2016; Fischler et al., 2016; and Lee, 2016). Care team integration includes the psychologist, psychiatrist, nurse practitioners, nursing staff, clinical therapist, pharmacy, medical assistant, nutritionist, and management. Integration can be physical with primary care providers on site; and teleconferences has also been suggested as a means of healthcare integration (Melamed et al., 2019).

Current Management

Several studies have discussed the prevention, and early recognition, of metabolic syndrome through guidelines concordant with screenings through qualitative and quantitative data (Kioko, et al.; 2016; Mitchell, et al.; 2012; and Soda, et al., 2020). Based on findings of both randomized controlled trials and observational studies representing real-world patients, antipsychotics have been shown to be effective in preventing relapses in individuals with a SMI (Taipale, 2017). Unfortunately, a common side effect with this treatment is weight gain, dyslipidemias, glucose metabolism dysregulation, QTc prolongation and sudden cardiac death (Taiple, 2017).

Review of Study Methods

According to studies from other countries, metabolic screening is alarmingly low in people taking antipsychotics (Taiple, 2017). The majority of studies were either prospective audits that focused on metabolic screening education, patent involvement in care, or implementation of metabolic screening tools (Abdallah et al., 2016; Fischler, et al., 2016; Gill et al.,2016; Hinds et al., 2015; and Kioko, et al., 2016). Retrospective audits that targeted quality improvement on leadership, provider reminders and educational activities for patients and staff

(Barnes et al., 2015; Cotes et al., 2015; Green et al., 2018; Lai et al. 2015; Lui, et al. 2016). A randomized controlled trial conducted by Kreyenbuhl et al., (2017), targeted patients as change agents in metabolic screening, and compared them with a that received education regarding metabolic screening. This prospective quasi-experimental study demonstrated that one year after implementation of a quality improvement program focusing on electronic reminder system metabolic screening improved (Soda et al., 2020).

Significance of Evidence to the Nursing Profession

The increased use of SGA has resulted in heightened awareness of metabolic syndrome. Life-long pharmaceutical maintenance with antipsychotic drugs is the recommended treatment for individuals diagnosed with SMI. Unfortunately, antipsychotics have a wide range of adverse effects. Costs related to antipsychotics have been viewed as being outside the supports of managed care. After the ADA and APA statements regarding screening, many articles have noted that there was not a major improvement in screening rates by providers. This purpose of this QI project is to implement scholarly research to initiate a change in practice to help prescribers in the screening and early identification of metabolic syndrome. No controversies were noted in any of the studies.

Project Aims

The overarching aim of this project is to improve the quality of care by increasing metabolic screening in the project site within four weeks. To achieve this aim evidence based metabolic screening guidelines will be implemented to prescribers of SGA.

Project Objectives

To achieve implementation of metabolic disorder screening guidelines into practice, the following objectives must be met:

1. Educate participants about the evidenced based metabolic syndrome screening and management practice guidelines.
2. Improve participants' knowledge regarding evidence based metabolic syndrome, secondary diseases, and the screening and management practice guidelines with a pre- and post-education test.
3. Evaluate participants compliance with the metabolic syndrome practice guidelines by performing chart audits.

Theoretical Framework

The Iowa Model (Appendix A) is a commonly used framework guide clinical decision-making and EBP for a clinical and systems perspective by helping to translate research findings into practice (Titler & Adams, 2010). There are ten steps of the Iowa model, one of which includes, selection of a topic based on problem or knowledge focused triggers. This leads to either a practice change or to generate more research (Titler & Adams, 2010). Other steps of the Iowa model include, forming a team, evidence retrieval, grading evidence, deciding if findings support a practice change, developing pilot practice change, determine if a change is an appropriate adoption for the practice, monitor structure, process, and outcome, and disseminate findings (Titler & Adams, 2010).

Historical Development of the Theory

Iowa Model was developed by Marita G. Titler, who was the director of nursing research, quality and outcomes management, in the Department of Nursing Services and Patient Care, at the University of Iowa Hospitals and Clinics in 1994 (Dontje, 2007). The Iowa Model was first published in 2001. It was designed as a model for the implementation of evidence-based practice primarily to provide guidance for nurses un making practice decisions (Godshall, 2019). In this

model, either a knowledge-based or a problem-based trigger must be used. The Iowa Model has widespread use in clinical and academic settings (Godshall, 2019). This model was later revised in 2001 to evolve with current trends in healthcare to include different levels of evidence (Titler, 2006). The last revision of this model was completed in 2015 to include a guide for implementation into practice. Development of the IOWA model was relevant to Titler, as director of nursing research, as it assisted nurses and healthcare providers to translate the findings of research while improving patient outcomes. This model was formulated in response to assist healthcare workers improve quality of care in any setting (Doody & Doody, 2014). It also focuses on organization and collaboration as well as incorporating conduct and use of research (Doody & Doody, 2011).

Applicability of Theory to Current Practice

Providing high-quality care based on evidenced based practice (EBP) is the responsibility of all nurses. Thus, nurses are expected to make decisions based on quality evidence and research. Applying this theory allows nurses to focus on quality improvement through knowledge, questioning current practices, and identifying solutions to problems (Doody & Doody, 2011). This theory has three major tenets including, problem identification, finding the evidence, and improving practice with evidence.

Problem Identification

When identifying a problem, priority and magnitude of the problem must be taken into consideration selecting a topic for evidence-based practice. Problem-focused triggers arise from risk management data, financial data, internal/external benchmark data, process improvement data, and the identification of a clinical problem (Brown, 2014). Knowledge-focused triggers arise from new research findings, national standards/guidelines, philosophies of care, and

questions from standards committees (Brown, 2014). When selecting a topic, it is vital to consider the magnitude of the problem, including its contributions to improving care, applicability to all areas of practice, staff commitment, and availability of evidence related to the problem (Titler & Adams, 2010). Forming a responsible team that relates to stakeholders is also an essential component of implementing EBP.

Find the Evidence

After team and topic selection, a brainstorming session with staff is conducted to identify available sources and key terms to guide the search for evidence (Doody & Doody, 2011). Utilizing PICOT to formulate a research question is a critical component of evidence critique (Brown, 2014). Evidence should be peer-reviewed and retrieved through electronic databases such as Cinahl, Medline, Cochrane, National Institute of Health and Clinical Excellence (NICE) (Titler & Adams, 2010). After compiling evidence, it needs to be critiqued and synthesized by the team (Titler & Adams, 2010). After the literature is obtained and evidence is graded, the team should come together to explain rationales for EBP recommendations. According to Brown (2014), when implementing research, there should be consistent findings from numerous high-quality studies to support the change. The feasibility of the findings in practice, and the risk-benefit ratio should also be assessed prior to implementation (Brown, 2014). If most of the criteria can be met, the team should then plan to implement the intervention in a pilot practice change. If adequate research does not exist, an actual research study should be conducted (Brown, 2014).

Improve Practice

Prior to implementation, the practice change pilot will develop. In this pilot, the team will select desired outcomes, collect data, design guidelines, and implement pilot. After pilot is

implemented, the team will evaluate process and outcomes, and modify guidelines as necessary (Titler & Adams, 2010). Success of the project is dependent on support from stakeholders. Barriers need to be identified for changes to take place and barriers that could hinder its progress should be addressed (Doody & Doody, 2011). Through the pilot process, it will be determined if the proposed change is appropriate to adopt into practice; if it is not, the team should continue to evaluate the quality of care. If it is, then pilot can be implemented into practice (Titler& Adams, 2010). Once the pilot is implemented into practice, it must be monitored for structure, process, and outcomes. In this stage, baseline data will be obtained through audits and feedback to show how EBP has contributed to patient care. The final step in the Iowa model is to disseminate findings in a clear and concise manner that highlight results of the quality improvement project.

Theory Application to the DNP Project

The Iowa model is applicable to this DNP project because it provides a clear strategy for implementing change at the host site. In addition, it focuses on team formation and incorporating EBP with all team members. Utilizing this model for this quality improvement project, will improve provider utilization of metabolic screening in practice. This helps to addressing the problem focused trigger of metabolic screening being inconsistently performed. The knowledge focused trigger is that multiple evidence-based studies indicated that metabolic syndrome screening helps to prevent secondary complications from the disorder for high-risk individuals. It also allows for the pilot to be complete prior to full implementation of the project. This enables stakeholders to provide valuable input and feedback.

Setting

The project site was established in the 1970s by a psychiatrist and sold to a psychiatric mental health nurse practitioner (PMHNP) in 2012.The project site is a stand-alone practice in a

suburb of Southern California. The area is considered upper middle income relative to California, however, the city contains both very wealthy and poor people as well. The project site is categorized as a nurse practitioner led practice staffed with three PMHNP, two psychiatrist, a licensed therapist, medical assistants, and an office manager. The practice is licensed to treat children, adolescents, adults, families, and couples. Conditions treated in this practice include mood disorders, anxiety disorders, eating disorders, psychotic disorders, attention deficit disorders, and sleep disorders.

Office Ally is the electronic medical record system utilized at this clinic only for appointment scheduling and all providers utilize paper charting for patient documentation. The paper chart has a section for an initial psychiatric evaluation, problem list, subjective, objective, assessment, plan (SOAP) notes, medication orders, referrals, labs, and billing. Both the SOAP note and initial psychiatric evaluation forms include date and time of visit, reason for visit, medication, and problem list. All billing is outsourced to a private billing company. The volume of new and follow-up patients that come to the clinic is an average of 2400 per month for the last 12 months.

Population of Interest

All licensed staff are board certified, trained, and qualified to treat mental illness at this project site. Inclusion criteria for this DNP project was limited to licensed and credentialed prescribers. Licensed therapist and medical assistants were excluded because they are unable to prescribe medications due to scope of practice within their licensure. Participants included in this DNP project are board certified advance practice nurse practitioners and psychiatrists because they prescribe SGA at the project site. As prescribers of SGAs, they will be implementing the protocol. At the project site, there are two part-time psychiatrists, both that have been working

for the practice for over ten years, and two full time PMHNPs, that have been working for the practice for five to ten years. There is also one part-time nurse practitioner who covers the clinic on the weekends and has been employed with the practice for less than five years.

The indirect population of interest consists of the individuals taking second generation antipsychotics to treat a psychotic or mood disorders. Age inclusion for the indirect population is 16-60 years old with a new or continued SGA prescription that have scheduled appointments during the implementation period. Patients that do not have an appointment during the implementation period and those not prescribed a SGA will be excluded.

Stakeholders

The owner of the project site has granted permission to complete this quality improvement project in his practice and no affiliation agreements were necessary (see Appendix B). The primary stakeholders identified include the owner of the practice and chief executive officer (CEO), psychiatrists and PMHNPs. The owner of the practice is a PMHNP and is one of the full-time providers at the clinic. His other duties include hiring of staff and payroll. As a stakeholder, the owner helps to provide support for implementation of this DNP project by providing expertise in current clinic procedures and historical information. In addition, this stakeholder can facilitate change by empowering his staff. Both psychiatrists are staff, and work in their scope of practice by assessing and treating individuals with mental illness. One of the psychiatrists is also a supervising psychiatrist for the PMHNP at the project site. The PMHNPs also work within their scope of practice and assess and treat individuals with mental illness in the community and make referrals when deemed necessary. The psychiatrists and PMHNPs are stakeholders will provide valuable feedback for this DNP project. In addition, they will implement the project.

The secondary stakeholders are the patients that are prescribed SGA and their families because they are the recipients that this project will impact. Primary stakeholders have been informed about this DNP project and have been asked to share input throughout the process. Communication with the primary stakeholders will be conducted via staff meetings, email, and phone calls.

Interventions

The duration of this quality improvement project is five weeks. During the first week, a ten question pre-education test will be administered immediately prior to training. The test questions were created to measure baseline knowledge regarding metabolic screening guidelines, and the pathophysiologic link between SGA and metabolic syndrome. A PowerPoint presentation will provide an overview of SGA including pharmacology and how this class of medication puts individuals at risk for metabolic syndrome. The benefits of metabolic screening will be reviewed, as well as current guidelines for screening and recommendations for treatment. Finally, the use of the metabolic syndrome screening and monitoring tool (MSSMT) (Appendix C) will be reviewed with staff. The protocol for the use of this tool will be discussed and reviewed. Then the same ten questions will be administered following the PowerPoint presentation to measure if knowledge was gained. After all staff members have undergone training, the metabolic syndrome screening and monitoring tool will be implemented.

A chart review will be conducted one week following implementation to ensure proper use of the MSSMT form. At the end of week two, data collection will begin. In week three and four, implementation monitoring, and data collection will continue. The fifth and final week will wrap up the protocol implementation, final data will be collected, data will be compiled, and analysis will begin. Throughout the implementation process, participants will receive informal

support, feedback, and mentoring as needed. Professionalism, privacy, and rapport will be maintained through implementation.

Tools

The tools used in this quality improvement project include the metabolic screening protocol from the State of Missouri, Department of Mental Health, Metabolic Syndrome Screening and Monitoring Tool (Appendix C), protocol (Appendix D), educational test (Appendix E), PowerPoint presentation (Appendix G), chart audit tool (Appendix H), and content validity index (CVI)(Appendix I).

Metabolic Syndrome Screening and Monitoring Protocol

The MSSMT was developed to address a gap in metabolic screening for patients taking an SGA by the State of Missouri. The project lead sought permission to use this tool and permission was obtained; however, this tool is considered public information. This tool is based on the criteria set by the National Cholesterol Education Program (NCEP) Adult Treatment Panel III (ATP III). According to the NCEP ATP III definition, metabolic syndrome exists when three or more of the following five criteria are met: waist circumference greater than 40 inches (men) or 35 inches (women), blood pressure greater than 130/85 mmHg, and fasting triglyceride level greater than 150 mg/dl, fasting high-density lipoprotein (HDL) cholesterol level less than 40 mg/dl (men) or 50 mg/dl (women) (Huang, 2009). Utilizing this tool in practice will help to improve the health of individuals taking a SGA in behavioral health by detecting symptoms of metabolic syndrome earlier. This tool was selected due to its ease of use and adaptability to the project site. The MSSMT was also chosen because it accurately measures guideline criteria. This tool meets all the components needed to screen and diagnose metabolic syndrome set forth by

NCEP ATP III . A metabolic syndrome screening protocol was developed by the project lead, utilizing evidence-based recommendations from the NCEP, ATPIII.

Protocol

Medical assistants (MA) have been instructed to place the MSSMT in the progress note section of the SOAP note on follow-up charts with an active order for a SGA. The MA will record height, weight, and waist circumference and document findings on MSSMT prior to the visit with the provider. If metabolic screening has been completed, the participant will input data on form; if it has not the participant will order screening. If there is a positive screening on the tool, the participant will notify patient and referred back to primary care provider for an evaluation and treatment.

Pre and Post Test

The pre-test was designed to assess providers' baseline knowledge of evidence based metabolic syndrome screening guidelines. The tests will be administered prior to the PowerPoint presentation The tests consist of a combination of nine multiple choice questions and one true/false question. The post test will be administered following the powerpoint presentation and is identical to the pre education test. All answers to questions will be reviewed with participants after the PowerPoint presentation. The tests were developed by the project lead utilizing NCEP and ATPIIIs evidence-based national guidelines.

Content Validity Index (CVI)

The content validity index (CVI) is the most extensively used index in quantitative evaluation (Rodrigues et al., 2017). It is described as "the degree to which an instrument has a suitable sample of items for the construct being assessed and is an important technique in scale

construction." (Rodrigues et al., 2017). A CVI was completed to determine the validity of the test questions. Tools and appendices were sent to the DNP project team for review.

PowerPoint Presentation

The educational session will consist of a PowerPoint presentation, handouts, and a round table discussion regarding metabolic syndrome pathophysiology, why it is important to address now, future complications, and the link with SGAs. The PowerPoint presentation will consist of 12 to 20 slides and each slide will have bulleted pertinent information pertaining to SGA and their effect on physiology, diagnostic criteria for metabolic syndrome, and the new evidence-based protocol and how it will affect participant workflow. This presentation should take no longer than 30 minutes and then will be followed by the round table discussion to ensure understanding and address all questions and concerns. The project lead will be available for one-on-one education sessions as deemed necessary.

Chart Audit Tool

Once implementation has begun, chart auditing will be used as part of the rapid cycle evaluation phase to explore the effectiveness of this QI project (Backhouse & Ogunlayi, 2020). The purpose of the audits is to measure participant compliance utilizing the MSSMT. Chart auditing performed on a regular basis is a useful tool used for tracking and identifying trends; it will be utilized in this project to determine if the SGA/Metabolic Syndrome practice changes have been adopted (Backhouse & Ogunlayi, 2020).

Study of Interventions/Data Collection

This DNP project was developed over an eight-month period and included identifying a project site, communicating with project site staff, and identifying a quality improvement program that the project site needed assistance with. An intensive literature review was done

after the problem at the project site was identified. The project lead was able to build a plan and complete the project design using the literature. The project lead discovered the MSSMT tool, which was in line with the project's culture and methodology. Other tools were created to collect data and measure outcomes. The participants of the proposed intervention include providers working in the outpatient mental clinic at the practicum site. The variables of interest in the proposed intervention include the participant's level of awareness (knowledge and skills) and level of compliance to metabolic syndrome screening for patients taking SGAs before and after project implementation (Nakao et al., 2021). The education intervention will be undertaken during week one of the project implementation. A face-to-face PowerPoint presentation and daily 30-minute staff meetings will be utilized when undertaking the educational intervention.

Over the proposed five weeks, the participants will be required to engage in timely screening for metabolic syndrome among patients taking SGAs as per the guidelines provided (Fernández Guijarro et al., 2020). The participants will be expected to utilize MSSMT to screen patient data, which includes a medical and family history, body mass index (BMI), waist circumference, blood pressure, fasting plasm glucose, and fasting lipid that are crucial body measurements for timely recognition of the metabolic syndrome among patients taking SGAs (Swarup et al., 2021; Nakao et al., 2021). Both charts audits and a pre- and post-test will be used to assess the participants' knowledge, skills, and compliance to metabolic syndrome screening among patients taking SGAs. The proposed evidence-based intervention will be implemented in an outpatient mental health clinic, and five psychiatric health care participants are expected to be involved. During the implementation, 25 of each participants charts will be reviewed based on International Classification of Diseases 10 (ICD 10) codes related to schizophrenia, schizoaffective disorder, psychotic disorders, and bipolar mood disorders. The MSSMT form

will be placed in the SOAP note section by the medical assistant, demographics and vital signs will be completed and documented by the medical assistant. After the visit, the provider will order metabolic screening labs if indicated. The project lead will collaboratively work with the site's manager, medical assistants, and providers in implementing the proposed intervention. After a discussion with stakeholders, all participants have been mandated to participate in the proposed program, and they will not be compensated for participating.

Data Collection

Data collected from a pre- and post-test will be used to evaluate the participants' skills and knowledge about metabolic syndrome screening. The tests scores will be utilized to evaluate the participants' knowledge gained from this educational session. A pre-test will be administered before an educational intervention to collect the participants' initial scores regarding metabolic syndrome for patients taking SGAs. The same test will be administered immediately at the end of the week, and scores recorded for comparison and statistical analysis. The participants' test scores will be rated out of 10, were 0-4 (below average), 5-7(average), and 8-10 (above average). A score ranging from 8-10 will demonstrate mastery of knowledge. If the participant receives a score of less than 8, the project lead will meet with them privately and go over the questions and their rationale. During the paper tests implementation, codes will be used as a participant identification instead of the participants' personal demographic information to ensure confidentiality. The reliability and the validity of the pre and post-test have been evaluated by the project team.

The protocol implementation will begin at the project site after an educational intervention in week two. The project lead will be available during project implementation to ensure and address any concerns that may arise and ensure the implementation is being

undertaken as per the plans. The protocol implementation will continue through weeks three to five, and the project lead will ensure everything is being implemented as per the plans. Chart audits will commence in week three and a chart audit tool will be used to establish whether the participants are correctly utilizing the MSSMT tool to screen the targeted patients' crucial aspects such as BMI, family and medical history, and waist circumference. The audit tool to be used will include codes instead of the participants' demographic information to uphold confidentiality. The participants' level of protocol compliance will be rated on a scale of screening completed, or screening not completed. The project lead will provide the participants with contact information should any questions or concerns occur when the project lead is not on the premises. Data on protocol compliance will be collected via chart auditing from weeks two to five. In week six, the collected data will be compiled ready for analysis.

Lastly, Microsoft Excel will be used to record the data on participants' test scores and compliance levels among the participants to the recommended metabolic syndrome screening guidelines. Data security and participant protection are crucial factors to consider in data management (Mardani et al., 2019). The information will be stored on a personal computer secured with a password to ensure the privacy and confidentiality of the data. Also, the collected data will be kept for the project and analysis purposes and will be destroyed after one year.

Ethical Consideration

The planned intervention is considered a quality improvement project, thus, raising little ethical concerns during the project implementation (Mardani et al., 2019). Also, the project lead completed the Collaborative Institutional Training Initiative (CITI) modules and is aware of how to conduct an ethical project implementation. The project team will review all the materials, tools, and the proposal to determine the type and classify the DNP project. The project lead will

submit a project determination form that the team will sign after the evaluation. The project lead will adhere to ethical considerations such as promoting participants' autonomy, privacy, and confidentiality during project implementation (Phillips et al., 2017). For instance, the participants will be informed about the aims of the project (Mardani et al., 2019). Also, the project lead will utilize coding to avoid using actual details of the participant's personal information to enhance the confidentiality and privacy of the participants (Phillips et al., 2017). Lastly, the proposed project is a quality improvement project; thus, it does not require an Institutional Review Board (IRB) review.

The project is considered a clinic-wide practice change; therefore, all the prescribing providers are mandated to participate. However, participation in the planned project is not a condition of employment. Also, there is no compensation for participation or special consideration provided. After data collection, the information collected will be stored for one year in a personal computer secured with a password. This will assure the project lead is complying with the Health Insurance Portability and Accountability Act (HIPAA) guidelines to safeguard the information collected and promote confidentiality (Mardani et al., 2019). Only the project lead will access the computer and the data will be destroyed after one year.

Measures/Plans for Data Analysis

Analysis of the collected data will take a quantitative approach due to the nature of the project undertaken, data collected, and the need to provide succinct answers to the project questions. Based on the proposal, the analysis will seek answers to the project question to evaluate the efficacy of implementing metabolic screening protocols for timely recognition of metabolic syndrome among patients taking SGAs. The project lead will seek assistance from a qualified statistician to understand the data manipulation process.

Participants' Knowledge

To establish if the project's outcome is achieved, an independent paired t-test will be utilized (Pallant, 2020). The paired t-test will be used to assess the differences between the participants' pre and post-test scores after the project implementation (Wadhwa & Marappa-Ganeshan, 2020). Also, the paired t-test will be used to test the null hypothesis that there is no significant difference between data collected before and after project implementation (Pallant, 2020). Thus, a significant difference between the participants' pre and post-test scores will imply the project outcomes have been achieved. The paired t-test was chosen as it compares the means of two groups to determine whether there is statistical evidence that the associated population means are significantly different (Wadhwa & Marappa-Ganeshan, 2020).

Compliance with the Protocol

Compliance with protocol will be measured by chart audit utilizing the values, "yes" or "no". A paired t-test will be used to assess the difference in protocol compliance between weeks two and five. A significance in the statistical difference between the two sets of data will indicate that the participant's compliance level improved during protocol implementation.

Several assumptions are held when analyzing data using the paired t-test. Firstly, the two sets of data collected before and after project implementation will be assumed to be normally distributed and that the sample to be utilized is randomly selected and represents the population of interest (Wadhwa & Marappa-Ganeshan, 2020). Additionally, the two data sets are assumed to have homogeneity in their variance, that is, their variance and the standard deviation are approximately equal. The mean of the paired groups will be converted to a percentage with a 95% confidence interval (CI). A CI would be expected to contain the true population parameter in a fixed percentage of the samples with repeated sampling (Schober & Vetter, 2020). This

fixed percentage is known as the confidence level, which is commonly set at 95% . This means that if a random sample was taken from the same population over and over again, with a 95 percent CI calculated each time, approximately 95 percent of the CIs would contain the true population parameter (Schober & Vetter, 2020). Lastly, the statistical package for social science students (SPSS) software will be used to analyze the data.

Analysis of Results

The project objectives were as follows: educate participants about the evidenced-based metabolic syndrome screening and management practice guidelines, improve participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines with a pre-and post-education test, and evaluate participants' compliance with the metabolic syndrome practice guidelines by performing chart audits. Participants were given education and weekly support sessions on metabolic disorder screening guidelines to meet the project's first objective. Before and during the implementation period, weekly meetings provided guidance, discussed obstacles, answered queries, and reminded participants to use the metabolic disorder screening form.

Assumptions

The differences in the dependent variable should be normally distributed to conduct a paired t-test. The skewness and kurtosis for normal variables should be between -2 and +2. In the study, the skewness and kurtosis for the differences in the dependent variable were from -2 to +2 (Table 1).

Table 1

Normality

	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Std. Error
Difference	-.512	.913	-.612	2.000

Hypothesis Testing

Q1. Will the implementation of metabolic screening guidelines improve the detection and early intervention of metabolic syndrome in individuals prescribed a SGA in a psychiatric outpatient clinic?

A paired-samples t-test examined if the implementation of metabolic screening guidelines improves participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines. The paired samples t-test is most appropriate for getting the mean value of the dependent variable for pre and post-test scores. The t-test determines if there is a statistical difference between the two means. Therefore, the paired t-test is most suitable for examining if the implementation of metabolic screening guidelines improves participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines.

Before implementing metabolic screening guidelines, participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines had a mean of 74.0 ± 11.4 (mean and standard deviation) (Table 2). After implementing metabolic screening guidelines, participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines had a mean of 96.0 ± 5.47 (Table 2). There was a statistically significant improvement in participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and

the screening and management practice guidelines following the implementation of metabolic screening guidelines from 74.00 ± 11.40 to 96.00 ± 5.47 ($t(4) = -5.88$, $p = .00$, 95% *CI*, -32.38, -11.61) (Tables 2-3). Figure 1 shows how scores regarding participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines changed before and after implementing metabolic screening guidelines.

The results were statistically significant($p<0.01$) showing that the education increase participant knowledge. The results were consistent with the second objective and the project question. The second objective was satisfied because there was an increase in participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines after implementing metabolic screening guidelines.

Table 2

Paired Samples Statistics

		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Pre-Test	74.00	5	11.40	5.09
	Post-Test	96.00	5	5.47	2.44

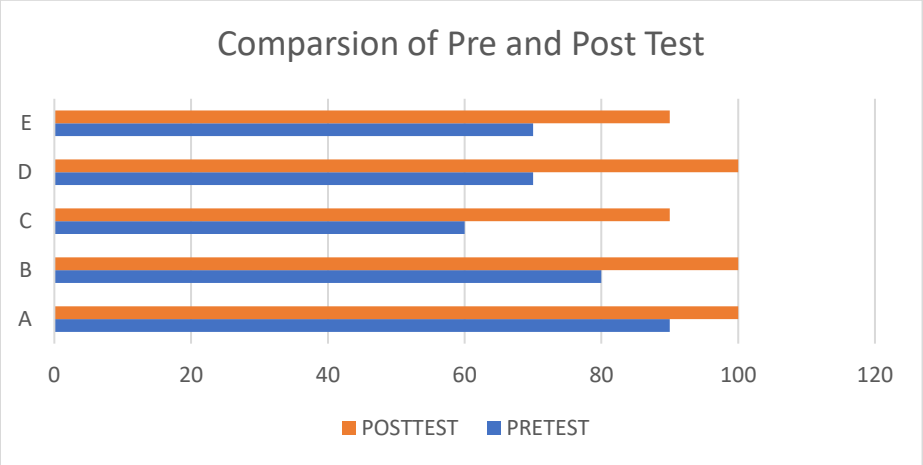
Table 3

Paired Samples Test

		Paired Differences							Significance	
					95% Confidence Interval of the Difference					
		Mean	Std. Deviation	Std. Error Mean	Lower	Upper	t	df	One-Sided p	Two-Sided p
Pair 1	Pre-Test - Post-Test	-22.00	8.36	3.74	-32.38	-11.61	-5.88	4	.00	.00

Figure 1

Comparison of Pre and Post Test



After implementing metabolic screening guidelines, a chart audit was performed to evaluate participants' compliance with the metabolic syndrome practice guidelines based on 100 records, meeting the third objective. The patient charts consisted of two categories (i.e., screened and not screened). The rate of non-screening was 28.0% (n = 28) of the patients after implementing metabolic screening guidelines (Table 4; Figure 2). The rate of screening was 72.0% (n = 72) of the patients after implementing metabolic screening guidelines, indicating that the protocol was followed correctly 72% of the time (Table 4; Figure 2).

The results supported the anticipated answer to the project question. The results were consistent with the third objective and the project question. The findings addressed and answered the project question and the third objective. According to the results from pre and post-test and a chart audit, implementing metabolic screening guidelines improved the detection and early intervention of metabolic syndrome in individuals prescribed a second-generation antipsychotic in a psychiatric outpatient clinic.

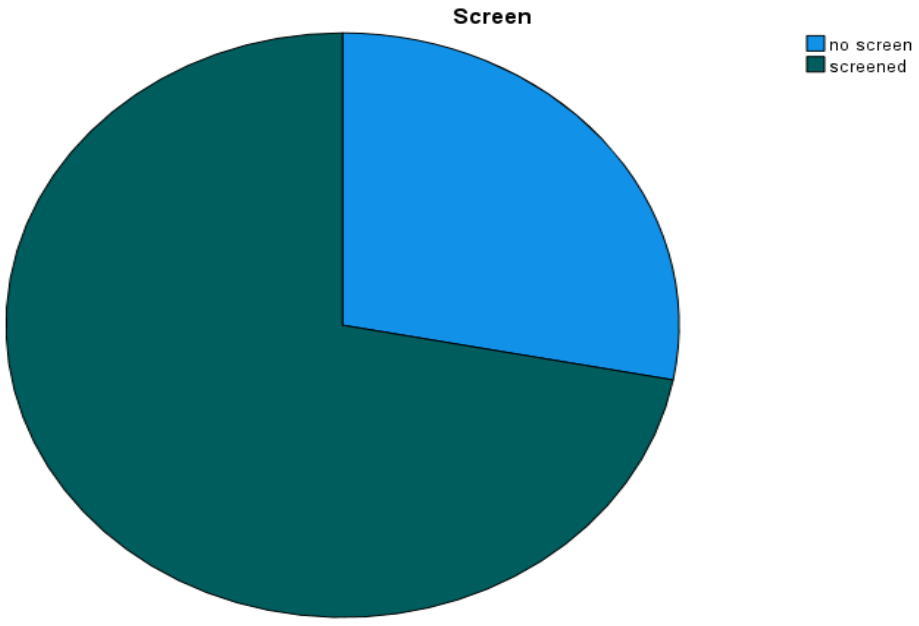
Table 4

Screen

		Frequency	Percent
Valid	No screen	28	28.0
	Screened	72	72.0
	Total	100	100.0

Figure 2

Compliance with Protocol



Discussion of Findings

The project question aimed to examine the difference in detection and early intervention of metabolic syndrome over time. The results are significantly significant, showing that an educational program provided an increase in knowledge for the participants at this project site.

After implementing metabolic screening guidelines, there was a statistically significant improvement in participants' knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines. The screening rate was 72.0% (n = 72) of the patients after implementing metabolic screening guidelines, indicating that the protocol was followed correctly 72% of the time. Reasons for noncompliance with the protocol included: failure to document, patient refusal, and failure of front office staff to place the screening in the chart for the participants.

Implementing metabolic screening guidelines improved the detection and early intervention of metabolic syndrome in individuals prescribed a SGAs in a psychiatric outpatient clinic. These findings align with the previously published literature that demonstrated that providers' education improved metabolic screening among providers (Abdallah et al., 2016; Cotes et al., 2015; Fischler et al., 2016; Kioko et al., 2016). Therefore, the study's findings are clearly connected with the previously published literature. According to Melamed et al. (2019), adequate knowledge, education, and skills are integral to changing provider practice. Clinical reminders improved screening for the provider (Fischler et al., 2016; Gill et al., 2016; Lee et al., 2016; Kioko et al., 2016). After implementing metabolic screening guidelines, there was a statistically significant improvement in laboratory metabolic screening (Lai et al., 2015).

Significance

This project fills the gap identified in the problem statement by examining how the implementation of metabolic screening guidelines improves the detection and early intervention of metabolic syndrome in individuals prescribed a SGA in a psychiatric outpatient clinic. The project advances knowledge in the discipline by implementing evidence based recommendations for the detection, and early intervention of metabolic syndrome in individuals prescribed a SGA in a psychiatric outpatient clinic. This project supports advanced practice and allows practical application by enabling healthcare providers to help individuals to safely prescribe and manage patients taking a SGA. The findings lead to positive professional change because they can help improve practice that will ultimately will benefit the nursing profession, improve healthcare outcomes, and decrease negative consequences of a second-generation antipsychotics.

Implications for Nursing

The literature supports that the implementation of metabolic screening guidelines are necessary. To obtain high quality contextually relevant patient outcomes, nurses can no longer rely exclusively on experience, pathophysiologic rationale, or opinion-based processes (Chism, 2019). The use of EBP at the project site has been increased by this project. A care gap was identified through a literature review, and practice was improved. Disease prevention a major goal in the healthcare, the DNP prepared nurse has the foundation to positively impact and improve population health. Through the findings of this project advanced practice nurses are well-positioned to assume the lead in metabolic disorder screening, monitoring, and implementation among patients with taking a SGA. Additionally, this project can be used as pilot to initiate improved practice with individuals with a severe mental illness. The implications are beneficial to nurses who want to know about evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines. Nurses can utilize the project

to examine whether the implementation of metabolic screening guidelines can improve their knowledge regarding evidence-based metabolic syndrome, secondary diseases, and the screening and management practice guidelines.

Limitations

There were several limitations regarding project design, data recruitment and collection methods, and data analysis. Time was a limiting factor due to the DNP program course parameters, which affected the sample size of this project. Additionally, COVID changed the way care was provided, some providers opted for virtual visits, while most of the patients still had to come in the office for their initial visit; not all appointments were face to face.

Project Design

A significant limitation of this DNP project was time constraints. The entire project implementation was completed in a five-week period. This brief time frame limited the amount of chart audits that could be completed leading to a smaller sample size and was only able to measure short term results.

The main limitation with this design is that there is no way of judging whether the process of pre-testing influenced the results because there is no baseline measurement against groups that remained completely untreated (Stratton, 2019). The outcome causality cannot be determined, rather associations between interventions and outcomes are made. For example, the assumption that participants would improve post test scores since the exact same test was administered immediately before and after the educational session (Stratton, 2019). A knowledge-based pre-test and post-test study may show good initial results, but without application of the knowledge gained, concepts may be lost with time unless applied on a frequent basis. This is an example of knowledge or attitude "decay" and represents another limitation of

this design (Stratton, 2019). The true test of knowledge acquisition is when the participants incorporate measures that will identify metabolic syndrome for patients prescribed SGAs within routine practice.

Data Recruitment

The limitation of the project regarding data recruitment and collection methods was as follows. Age inclusion for the indirect population is 16-60 years old. Therefore, the findings cannot be generalized to other ages. Including broader age range may lead to more robust research. Sample size issues might have affected the findings since a small sample size was used. A sample that is too small may not have enough statistical power to answer the primary research question. (Andrade, 2020). Increasing the sample size might strengthen the results.

This DNP project was conducted in one psychiatric clinic setting, with five participants, which resulted in a small sample size. A sample that is too small may not have enough statistical power to answer the primary research question (Andrade, 2020). Conducting this project at another psychiatric clinic with a larger volume of participants may have different results. When working with samples rather than populations, it is critical to ensure that the sample is appropriately sized and representative of the entire population (Hazra & Gogtay, 2016). A sufficient sample size ensures that the project will produce reliable and reproducible results (Hazra & Gogtay, 2016).

Data Collection

Only the charts of patients seen within the five-week implementation period were audited. This timeframe impacted the volume of patients seen, so the impact of the protocol was not fully explored. Another limitation was that patient prescribed a long-term injectable SGA

often did not receive screening if they were not seen by a participant. This would occur if the patient had a standing order that did not require a visit with a participant; the patient just received the injection from the medical assistant at a pre-scheduled ancillary appointment. This practice contributed to lower screening rates in this population. This issue was resolved by educating the medical assistant about screening for all individuals taking any formulation of an SGA.

Data Analysis

Other than the five week time frame, there were no limitations to the data analysis. The project lead could not analyze the long term effects of the implementation due to time constraints. All statistical measurements were appropriate for what the project lead needed to measure in this DNP project, no other limitations were noted.

Dissemination

The project has the potential for dissemination. The findings will be submitted to the International Conference on Psychiatric Nursing and Cultural Competence ICPNCC on August 09-10, 2022, in New York, United States. for a presentation, article, and poster. The project lead will submit this project manuscript to the *Journal of Psychiatric and Mental Health Nursing* for publication.

The project lead will disseminate the findings of this project to the Touro University Nevada (TUN) faculty and student peers in an oral presentation. Further dissemination includes submitting the project to the DNP repository to provide information and resources for other DNP prepared nurses and DNP candidates. A poster presentation will also be prepared for the TUN Research Day venue, where all TUN students, faculty, and guests can review this information.

Project Sustainability

After meetings with stakeholders, the project site would like to continue the metabolic disorder screening protocol as well as expand it to other therapeutic monitoring for other psychotropic medications such has clozapine. The stakeholders stated they would continue to utilize the protocol since it provided beneficial outcomes for patients. This protocol and staff education will be carried out annually for existing nursing staff and will be included in the training protocol for new hires.

This DNP project can be used as a resource for psychiatric health clinics in the early detection of metabolic syndrome in SGA users. This DNP project can be transferred not only to other psychiatric clinic settings but other outpatient practice settings that monitor patients for metabolic syndrome. The positive impact of this metabolic disorder screening protocol is that participants have noticed the transferability of the protocol to monitor patients taking other psychotropic medications. Further studies should be conducted to assess the impact of metabolic screening implementation into routine practice in a larger outpatient clinic with a more time in the implementation phase.

Conclusion

Metabolic disorder is a common side effect of SGA, if detect early, nurse practitioners can augment the treatment plan to decrease adverse effects of these medications. The DNP prepared nurse can implement guidelines for staff to follow for screening and detection of metabolic syndrome in this population. Strengthening the regular use of metabolic screening guidelines by conducting this project was a helpful link in improving metabolic syndrome detection and early intervention at this project site. The findings of this DNP project were relevant considering the apparent risks to patient safety. This project has shown that implementing metabolic screening guidelines significantly improves the detection and early

intervention of metabolic syndrome in individuals prescribed a second-generation antipsychotic. The participants seemed to positively embrace this practice change and will incorporate the screening protocol into their routine practice. This project can be expanded to other contexts by examining the effect of metabolic screening guidelines for patients of different age groups, as well as other psychotropic medications that require therapeutic monitoring such as depakote, clozapine, and lithium. The project can advance nursing practice change by reviewing the effectiveness of metabolic screening guidelines because it can assist stakeholders to secure metabolic screening guidelines as a mainstay in practice.

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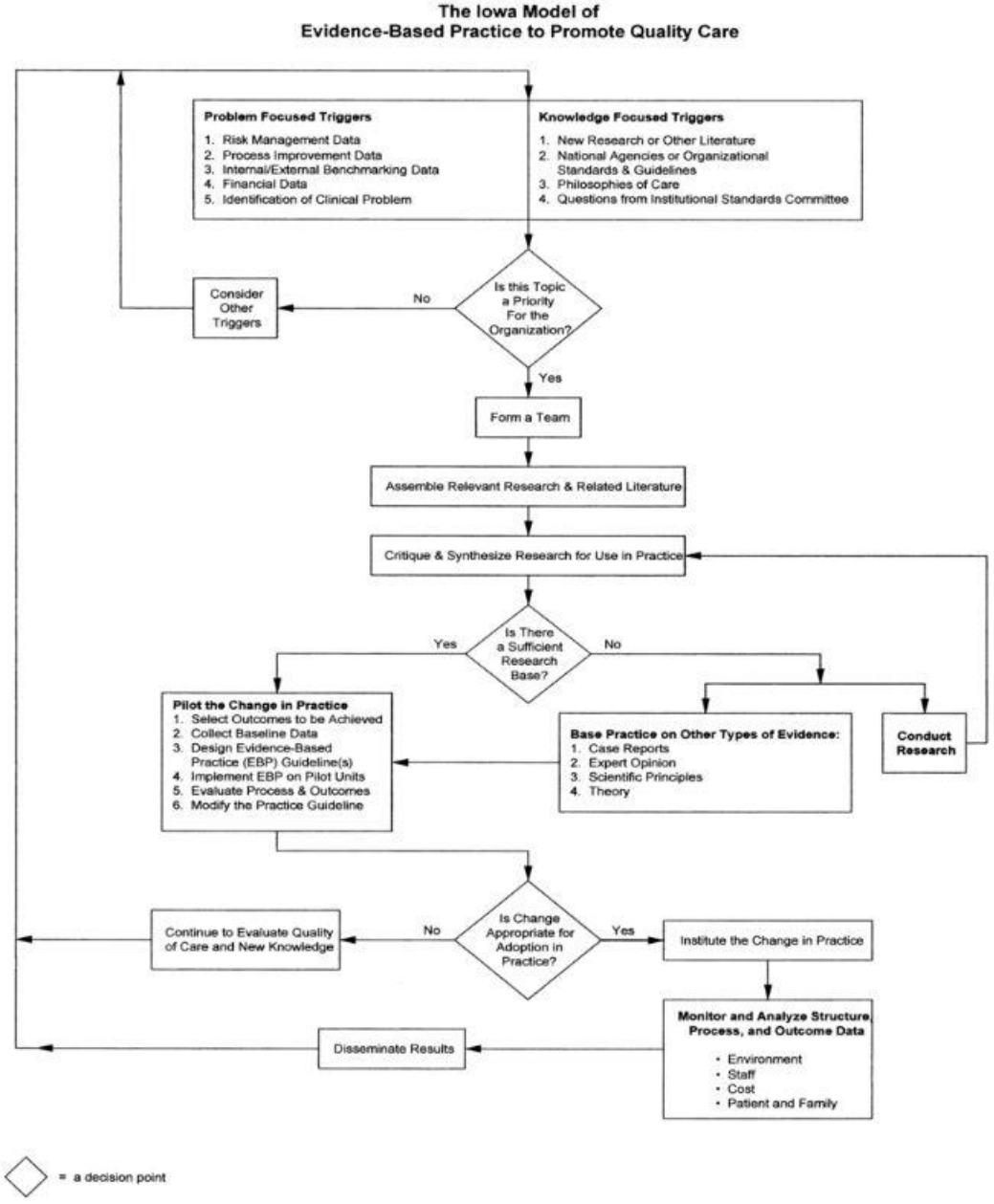
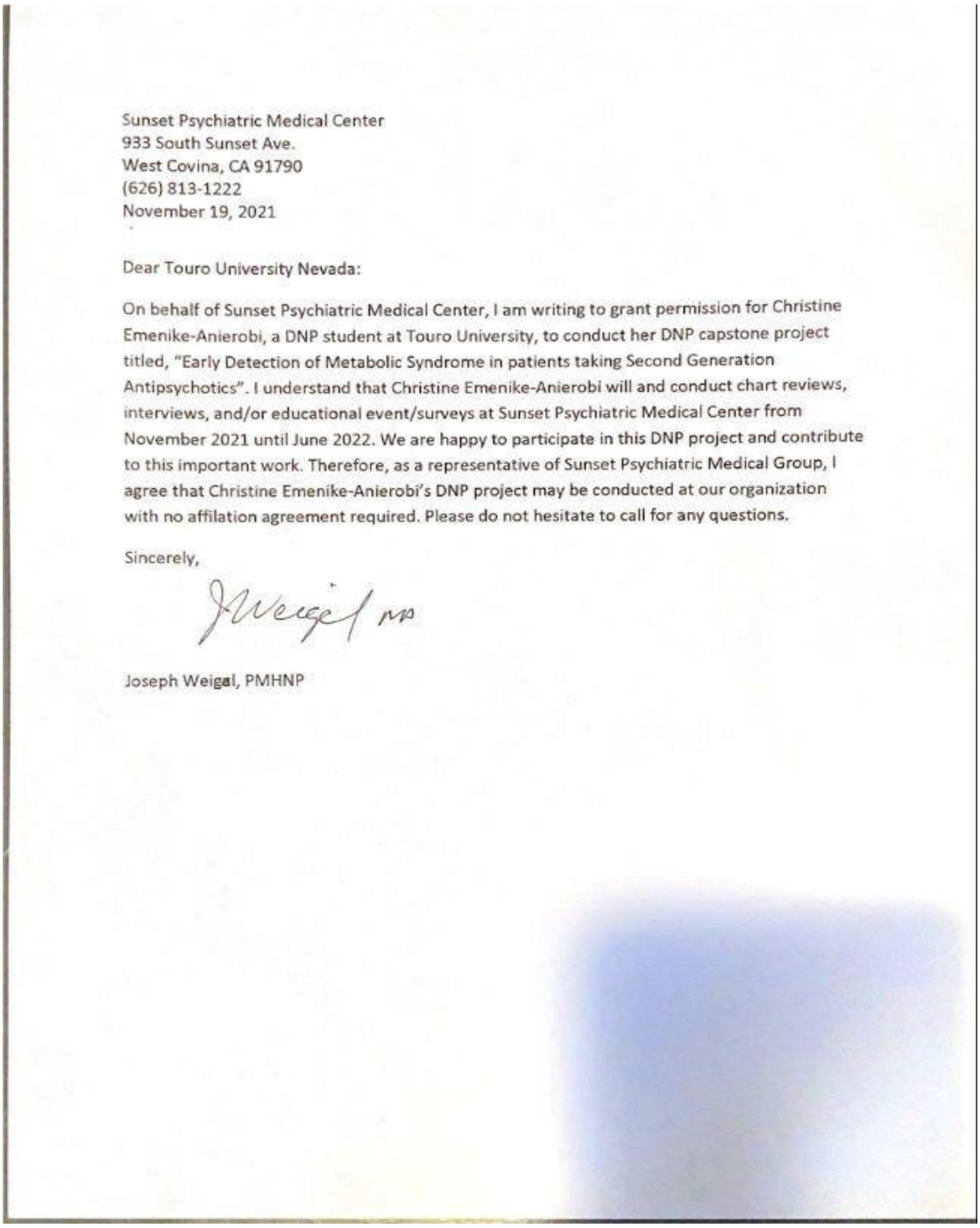
Appendix A

Theoretical Framework



Appendix B

Permission Letter



Sunset Psychiatric Medical Center
933 South Sunset Ave.
West Covina, CA 91790
(626) 813-1222
November 19, 2021

Dear Touro University Nevada:

On behalf of Sunset Psychiatric Medical Center, I am writing to grant permission for Christine Emenike-Anierobi, a DNP student at Touro University, to conduct her DNP capstone project titled, "Early Detection of Metabolic Syndrome in patients taking Second Generation Antipsychotics". I understand that Christine Emenike-Anierobi will and conduct chart reviews, interviews, and/or educational event/surveys at Sunset Psychiatric Medical Center from November 2021 until June 2022. We are happy to participate in this DNP project and contribute to this important work. Therefore, as a representative of Sunset Psychiatric Medical Group, I agree that Christine Emenike-Anierobi's DNP project may be conducted at our organization with no affilation agreement required. Please do not hesitate to call for any questions.

Sincerely,

Joseph Weigal, PMHNP

Appendix C

Pre- and Post-Test

1. Second generation antipsychotics (SGAs) have been associated with a higher incidence of what disorder
    a. Cancer
    b. Metabolic Syndrome
    c. Cushing's Syndrome
    d. Down Syndrome
2. According to the ADA/APA consensus metabolic syndrome screening should occur on what intervals?
    a. Baseline, 6 months, annually
    b. 1 month, 3 months, 6 months, annually
    c. Baseline, 3 months, 6 months, annually
    d. None of the above
3. Metabolic syndrome is a constellation of all the following disorders except?
    a. Obesity
    b. Diabetes
    c. Hypertension
    d. Hyperplasia of the pituitary
4. Given the serious health risks associated with taking SGA patients should receive appropriate baseline screening and ongoing monitoring. Which of the following is not recommended as a screening measure?

   a. Personal and family history of obesity diabetes, dyslipidemia, hypertension, or cardiovascular disease
   b. Substance abuse history
   c. BMI
   d. Blood pressure
   e. Fasting lipids and blood sugar

5. What intervals should a patient weight be reassessed when initiating or changing a SGA?
   a. 6 weeks, 12 weeks, quarterly, and annually
   b. 1 week, 4 weeks, 8 weeks, and quarterly
   c. 12 weeks, 6 months, and annually
   d. 4 weeks, 8 weeks, and 12 weeks
6. True or False: SGAs, generally have lower risk of extrapyramidal side effects and tardive dyskinesia compared with first-generation antipsychotics FGAs, but a higher risk of metabolic syndrome
7. Which two antipsychotics associated with the highest risk of weight gain
   a. Seroquel and Latuda
   b. Clozapine and Seroquel
   c. Olanzapine and Seroquel
   d. Olanzapine and Clozaril
8. Which medication would include a label warning about the risks of hyperglycemia and diabetes, and suggested regular clinical monitoring of weight, symptoms of hyperglycemia, and glucose?
   a. Lamictal

b. Zoloft

c. Latuda

d. Amantadine

9. Which blood pressure reading would put a patient taking a SGA at risk for developing metabolic syndrome?

a. 130/85

b. 129/80

c. 110/60

d. 80/45

10. Which fasting glucose reading would put a patient taking a SGA at risk for developing metabolic syndrome?

a. 65

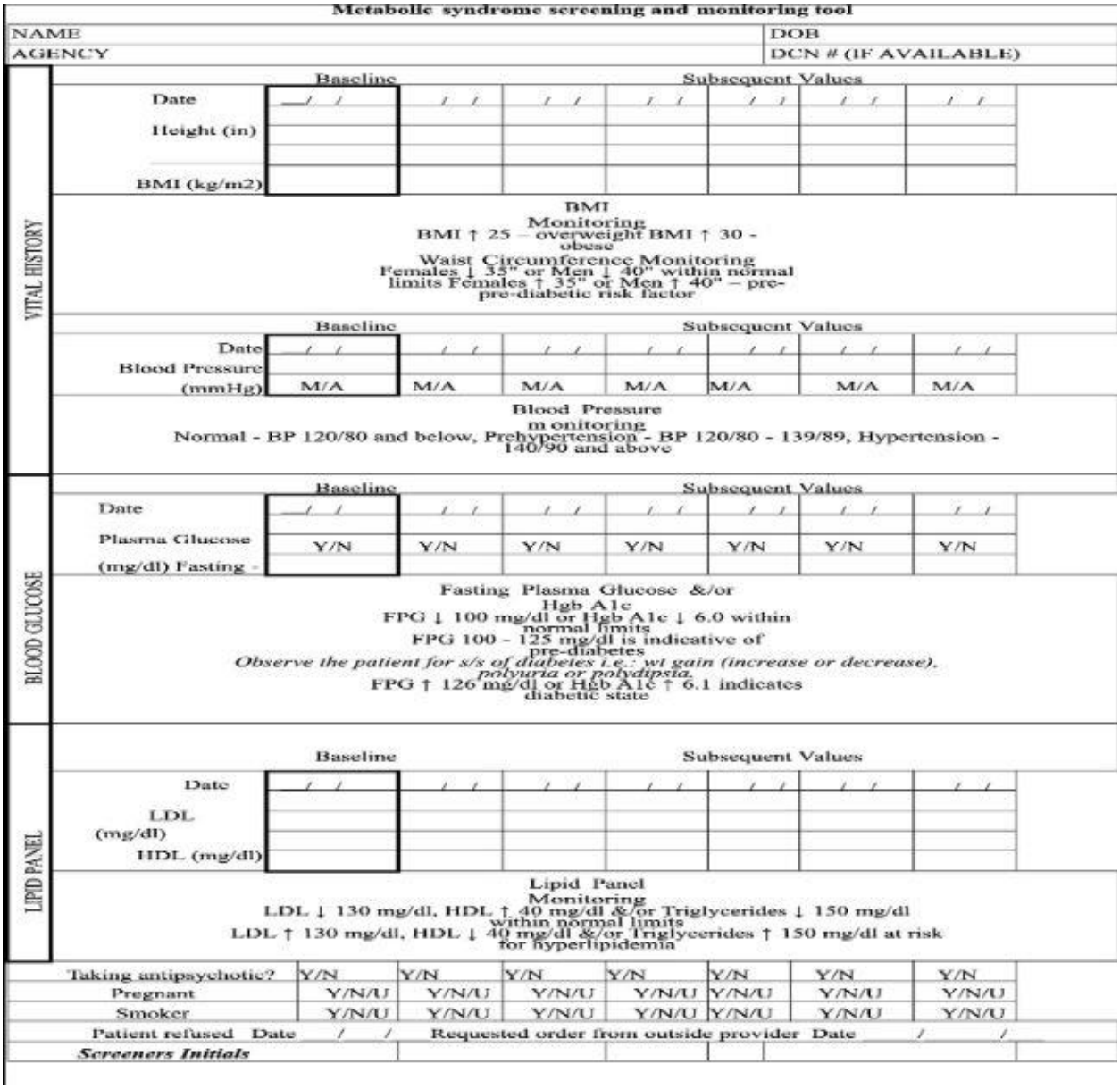
b. 89

c. 102

d. 99

Appendix D

Monitoring Tool



Metabolic syndrome screening and monitoring tool

NAME	DOB
AGENCY	DCN # (IF AVAILABLE)

VITAL HISTORY

	Baseline	Subsequent Values					
Date	__/__/__	/ /	/ /	/ /	/ /	/ /	/ /
Height (in)							
BMI (kg/m2)							

BMI Monitoring
BMI ↑ 25 – overweight BMI ↑ 30 - obese
Waist Circumference Monitoring
Females ↓ 35" or Men ↓ 40" within normal limits Females ↑ 35" or Men ↑ 40" – pre-pre-diabetic risk factor

	Baseline	Subsequent Values					
Date	/ /	/ /	/ /	/ /	/ /	/ /	/ /
Blood Pressure (mmHg)	M/A	M/A	M/A	M/A	M/A	M/A	M/A

Blood Pressure monitoring
Normal - BP 120/80 and below, Prehypertension - BP 120/80 - 139/89, Hypertension - 140/90 and above

BLOOD GLUCOSE

	Baseline	Subsequent Values					
Date	__/__/__	/ /	/ /	/ /	/ /	/ /	/ /
Plasma Glucose (mg/dl) Fasting -	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N

Fasting Plasma Glucose &/or Hgb A1c
FPG ↓ 100 mg/dl or Hgb A1c ↓ 6.0 within normal limits
FPG 100 - 125 mg/dl is indicative of pre-diabetes
Observe the patient for s/s of diabetes i.e.: wt gain (increase or decrease), polyuria or polydipsia.
FPG ↑ 126 mg/dl or Hgb A1c ↑ 6.1 indicates diabetic state

LIPID PANEL

	Baseline	Subsequent Values					
Date	/ /	/ /	/ /	/ /	/ /	/ /	/ /
LDL (mg/dl)							
HDL (mg/dl)							

Lipid Panel Monitoring
LDL ↓ 130 mg/dl, HDL ↑ 40 mg/dl &/or Triglycerides ↓ 150 mg/dl within normal limits
LDL ↑ 130 mg/dl, HDL ↓ 40 mg/dl &/or Triglycerides ↑ 150 mg/dl at risk for hyperlipidemia

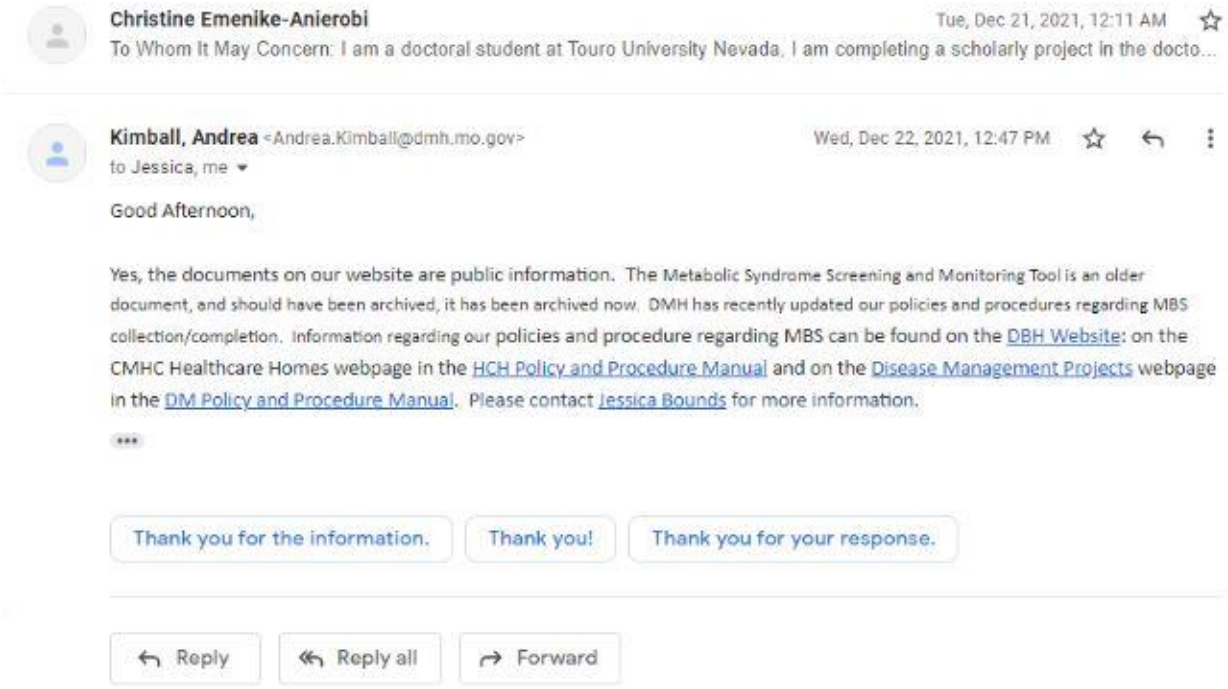
Taking antipsychotic?	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N	Y/N
Pregnant	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U
Smoker	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U	Y/N/U

Patient refused Date ___/___/___ Requested order from outside provider Date ___/___/___

Screeners Initials

Appendix E

Permission to Use Tool



Christine Emenike-Anierobi Tue, Dec 21, 2021, 12:11 AM

To Whom It May Concern: I am a doctoral student at Touro University Nevada. I am completing a scholarly project in the docto...

Kimball, Andrea <Andrea.Kimball@dmh.mo.gov> Wed, Dec 22, 2021, 12:47 PM

to Jessica, me

Good Afternoon,

Yes, the documents on our website are public information. The Metabolic Syndrome Screening and Monitoring Tool is an older document, and should have been archived, it has been archived now. DMH has recently updated our policies and procedures regarding MBS collection/completion. Information regarding our policies and procedure regarding MBS can be found on the DBH Website: on the CMHC Healthcare Homes webpage in the HCH Policy and Procedure Manual and on the Disease Management Projects webpage in the DM Policy and Procedure Manual. Please contact Jessica Bounds for more information.

Thank you for the information. Thank you! Thank you for your response.

Reply Reply all Forward

Appendix F

PowerPoint Presentation