

Improving Outcomes for Psychiatric Patients with Metabolic Syndrome:

An Evidence Based Quality Initiative

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### **Abstract**

Patients who are prescribed second generation antipsychotic medications are vulnerable and at an increased risk for developing metabolic syndrome (MetS). Metabolic syndrome is the development of obesity, hyperlipidemia, increased waist circumference, hypertension, and elevated blood glucose. Patients prescribed second generation antipsychotic medications who develop MetS experience shortened life expectancy by approximately 10-30 years, with a 60% increase in mortality compared to the general population. Psychiatric providers are lax with regards to MetS screening, demonstrate lack of the essential knowledge required to screen for MetS, and have laissez faire attitudes and practice habits toward MetS screening. The purpose and goal of this quasi experimental evidence based quality initiative (EBQI) is to determine if education about and dissemination of a MetS screening tool will increase psychiatric providers screening rates and referral to primary care for metabolic syndrome treatment. Five psychiatric medication providers were provided with MetS screening education and screening tool dissemination as part of this EBQI project. The results showed significant increase in utilization of the MetS screening tool two months after education and screening tool dissemination, with further increases screening tool utilization four months after education and screening tool dissemination. Results indicate that further education is needed in referral of MetS screen positive patients to a primary care provider. As a result, increased MetS screening can have a positive impact on patient lifespan, quality of life, and decrease in healthcare expenditures annually.

*Keywords:* metabolic syndrome, screening, psychiatry, provider, antipsychotic

## Improving Outcomes for Psychiatric Patients with Metabolic Syndrome:

### A Quasi-experimental Study

Metabolic syndrome (MetS) is a collection of symptoms that lead to decreased life span, elevated triglycerides, hypertension, diabetes, increased waist circumference, and obesity (DeBoer & Gurka, 2017). Second generation antipsychotic (SGA) medications can increase the risk of developing MetS due to weight gain that results from an increased appetite, a side effect of the medication (DeBoer & Gurka, 2017; Romani & Schnack, 2017). Fortunately, there are screening tools for monitoring MetS development, which leads to the early identification of MetS symptoms. However, psychiatric providers who prescribe SGAs are not utilizing screening tools or properly monitoring for MetS (Kioko et al., 2016; Romani & Schnack, 2017). Appendix A includes definition of terms and key concepts applicable to the EBQI project.

### **Significance**

Prior to the early 2000s, first generation antipsychotic (FGA) medications were prescribed to treat psychosis (Romani & Schnack, 2017). Patients were experiencing adverse effects from the significant dopamine blockade associated with FGA medications, while experiencing little relief from the depression symptoms associated with schizophrenia and bipolar disorder (Romani & Schnack, 2017). Second generation antipsychotic medications were developed to reduce the dopamine blockade yet manage psychosis, with an additional component to target serotonin receptor sites to treat depression and mood symptoms (Romani & Schnack, 2017). Since the advent of SGA medications, psychosis and depression management is improved, yet the incidence of MetS has been increasing among psychiatric patients (Kioko et al., 2016). In spite of this, psychiatric providers are not routinely screening for MetS (Kioko et

al., 2016). Health promotion and disease prevention are among the responsibilities of psychiatric providers and monitoring for the development of MetS should occur in all psychiatric settings (Kioko et al., 2016). Patients who take SGAs have higher incidence and development of MetS compared to the general population (Kioko et al., 2016). Additionally, patients who take SGAs experience a 60% early death mortality rate with a shortened life expectancy of 10-30 years (Lopuszanska et al., 2014). Evidence-based practice recommends increasing MetS knowledge dissemination and the use of a MetS screening tool among psychiatric providers (Kioko et al., 2016; Lopuszanska et al., 2014).

### **Local Issue**

The state of Missouri has the tenth highest obesity rate in the United States, with 34% of the state population meeting body mass index (BMI) requirements for obesity (The State of Obesity, 2016). More than 535,000 patients are diagnosed with diabetes, 1.2 million are diagnosed with hypertension, and more than 383,000 are diagnosed with heart disease as a consequence of elevated lipids (The State of Obesity, 2016). Psychiatric provider screening for MetS would allow for early detection and intervention mitigating life-altering consequences.

### **Diversity Considerations**

The agency chosen for this evidence based practice quality improvement (EBQI) project serves patients from a large catchment area, including Independence, Buckner, Sugar Creek, and Blue Springs, Missouri. According to City-Data (2014), the population is 53% male and 46% female, median resident age is 38.6 years, and 78.6% of the population is Caucasian. Patients prescribed SGA medications represent a diverse range of culture, age, demographics, socioeconomic status, and physical health. Mental illness symptoms and incidence are not

limited to a specific gender, culture, or socioeconomic status, and the demographics of patients involved in mental health treatment are diverse (Romani & Schnack, 2017).

### **Problem and Purpose**

#### **Problem Statement**

The purpose of this EBQI project was to determine if education about and dissemination of a MetS screening tool to psychiatric providers increased the identification of MetS and referral to primary care medical treatment among psychiatric patients who are prescribed SGAs.

#### **Intended Improvements**

Historically, some psychiatric providers have not recognized the importance of co-morbid medical conditions that affect their patients (Druss et al., 2008; Maki & Bjorklund, 2012; Valek et al 2015). Psychiatric providers have indicated a lack of knowledge about screening tools, proper monitoring parameters, and poor communication between psychiatric and medical providers as the primary reasons for not screening their patients for MetS (Kioko et al., 2016; Lui et al., 2016; Valek et al., 2015). Given the current paucity of MetS screening by some psychiatric providers, and the health consequences experienced by psychiatric patients, it is imperative to provide education about and dissemination of a MetS screening tool.

#### **Facilitators, Barriers, & Sustainability**

The primary facilitators for this EBQI project were the Missouri Department of Mental Health and executive staff within the community mental health facility. Secondary facilitators were organizational support, facility desire and support for change, low cost, and the fact that project implementation utilized current staff in their current roles without increasing facility expenditures. The barriers of this project were organizational constraints, the desire to maintain the status quo, lack of motivation on behalf of psychiatric providers, difficulty in changing old

habits, lack of familiarity with MetS screening tools, and provider attitudes towards screening. It is expected that it will take time to develop new habits of screening for MetS. Long-term sustainability is optimistic as the implementation of screening becomes a new habit and a positive change, has minimal to no additional financial requirements, and receives continued support from state programs that fund Missouri community mental health agencies.

### **Review of Evidence**

#### **PICOT**

Among psychiatric providers prescribing second-generation antipsychotic medications to adult patients age 18-65, does provider compliance with the Missouri Department of Mental Health (DMH) Metabolic Screening and Monitoring Tool increase the identification of metabolic syndrome and increase referral to treatment over a 4 month span of time at a community mental health agency?

#### **Search Strategies**

A literature review for the use of screening tools for MetS among psychiatric providers was performed. Key search terms included metabolic syndrome, screening, psychiatry, provider, and antipsychotic medication. Databases that were searched included PubMed, CINAHL, Ovid, Medline, and PsycINFO. Inclusion criteria included studies from 2012-2017, with the exception of seminal studies, which dated back to the mid 2000s. The studies utilized for this project include one level I meta-analysis, four level II systematic review/randomized controlled studies, eleven level III cohort studies, three level V systematic literature reviews, two level VI qualitative and quantitative reviews, and one level VII evidence/opinion of an expert. Studies utilized for this evidence based practice project included those focused on adult patients age 18-65 with a psychiatric diagnosis of schizophrenia, schizoaffective disorder, bipolar disorder, and

major depressive disorder with psychotic features. See Appendix B for synthesis of evidence table.

### **Federal Drug Administration MetS Monitoring Statement**

Thirteen studies were evaluated for this subtopic. In 2003, the Federal Drug Administration (FDA) added black box warnings to SGAs to alert healthcare providers of the possibility of this medication increasing risk of MetS development, which led to a consensus statement recommending MetS screening by SGA prescribers (Crabb et al. 2009; Kioko et al. 2016; Lopuszanska et al. 2014; McDonnell et al., 2011; Morrato et al., 2010). The recommendations for MetS screening are that all patients prescribed a SGA should have baseline MetS screening, with repeat screening at 4, 8, and 12 week intervals, then quarterly and annually thereafter (Riordan et al., 2011).

Multiple studies indicate that despite FDA warnings and ADA/APA recommendations, psychiatric providers are still significantly deficient in screening for MetS (Crabb et al. 2009; Kioko et al. 2016; Laugharne et al. 2016; Lui et al. 2016; Morrato et al. 2010; Munshi et al. 2015; Saloojee et al. 2014; Sugawara et al. 2013). In a 2008 seminal multi-state study of more than 300,000 patients, MetS screening rates were below 30% among all patients taking SGAs during the duration of the study (Morrato et al., 2010).

### **Provider compliance with MetS screening**

Eleven studies were evaluated for this subtopic. Noncompliance among psychiatric providers MetS screening leads to a higher incidence of premature death from preventable and treatable medical conditions (Maki et al., 2013; McDonnell et al., 2011; Munshi et al., 2015; Riordan et al., 2011). Among psychiatric providers who do screen for MetS, the majority do not screen for all of the necessary MetS parameters (Laugharne et al., 2015; Lui et al., 2016;

McDonnell et al., 2011). Among 900 psychiatric providers and more than 6,000 patient charts audited for MetS screening compliance, less than 25% were screened for hypertension and obesity, less than 2% were screened for waist circumference, and less than 11% were screened for increased blood glucose or hyperlipidemia (Laugharne et al., 2015; Lui et al., 2016; McDonnell et al., 2011). Fourteen percent of providers reported they were unsure how to screen for MetS, and 52% were uncertain on how frequently they should screen their patients for MetS (Laugharne et al., 2015). Twenty seven percent of psychiatric providers reported that monitoring for MetS was not their medical responsibility (Laugharne et al., 2015; Lui et al., 2016; McDonnell et al., 2011). Laugharne et al. (2015) state that waist circumference is the simplest method to determine MetS risk, yet only 2% of psychiatric providers routinely perform this measurement.

#### **Psychiatric provider MetS screening knowledge.**

Eleven studies were evaluated for this subtopic. Despite the 2003 FDA consensus statement, psychiatric providers continue to demonstrate deficient knowledge regarding MetS screening tools (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). Education about MetS screening is not consistently provided or reinforced in psychiatric practices, leading to decreased screening and consequently, adverse health outcomes for psychiatric patients (Hor et al., 2016; Laugharne et al., 2016; Lopuszanska et al., 2014; Munshi et al., 2015).

Metabolic syndrome screening tools have lead to significantly improved screening rates; however, psychiatric providers cannot utilize an appropriate screening tool if they are not aware that the tool exists or are not educated on how to use the tool (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). More than 30% of psychiatric providers reported to have no knowledge about current screening protocol for



MetS (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). Less than 25% of patients were properly screened when MetS screening did occur (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). In three separate studies, MetS screening rates increased exponentially from 20% prior to education to as much as 89% screening rates after screening tool education was provided to psychiatric providers (Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013).

### **Barriers to Metabolic Syndrome Screening**

Ten studies were evaluated for this subtopic. Several barriers prevent mental health patients from having prompt and requisite screening for MetS, with primary barriers being psychiatric providers opting to not screen for MetS, psychiatric provider attitudes towards screening, patient barriers to MetS screening, and confusion regarding what healthcare disciplines are responsible for MetS screening (Boyd, 2005; Correll et al., 2010; Crabb et al., 2009; Kioko et al., 2016; Laugharne et al., 2016; Lui et al., 2016; McDonnell et al., 2011; Morrato et al., 2010; Munshi et al., 2015). In a seminal three-year study by Correll et al. (2010), over 10,000 psychiatric patients were evaluated in 219 separate psychiatric outpatient clinics. Results indicate that 52% of patients met diagnostic criteria for MetS and obesity, 55% met criteria for hypertension, and 51% had abnormal lipid and/or glucose levels (Correll et al., 2010). Despite study participants being under the care of a psychiatric provider, MetS screening was not previously performed prior to this independent study (Correll et al., 2010). This study remains one of the most comprehensive investigations of MetS screening performance and emphasizes that the biggest barrier to patient care is psychiatric providers not monitoring for MetS as advised by the FDA consensus statement (Correll et al., 2010).

### **Impact of Psychiatric Provider Attitude, Beliefs, and Implementation of Screening**

Six studies were evaluated for this subtopic. Psychiatric providers have assumed a nonchalant approach to MetS screening, opting to defer this important primary prevention to primary care providers (Boyd, 2005; Nash et al., 2016; Parrinello, 2012; Stanley & Laugharne, 2011). Metabolic syndrome screening is an area of psychiatry that can no longer be ignored (Boyd, 2005). Psychiatric providers should advocate for the optimal care of their patients. Screening for MetS is imperative and remains not only a standard of care among psychiatric providers, but also a preventative measure that ensures optimal patient health outcomes for a vulnerable, at risk population (Boyd, 2005). However, barriers to the provision of optimal mental health care remain. Psychiatric providers may be uncomfortable with being thrust into the role of a provider who screens for MetS (Boyd, 2005). Primary care interventions such as ordering labs are not always a typical parameter of the psychodynamic exam (Boyd, 2005).

### **Strategies to Improve MetS Screening**

Thirteen studies were evaluated for this subtopic. The 2003 FDA consensus statement and recommendations for MetS screening are still current today. Metabolic syndrome screening is an imperative and necessary health-monitoring tool for all patients prescribed SGAs, and it is the psychiatric providers responsibility to screen at FDA recommended intervals (Castillo et al., 2015; Correll et al., 2010; Crabb et al., 2009; Deuschle et al., 2013; Gardner-Sood et al., 2015; Kioko et al., 2016; Lopuszanska et al., 2014; McDonnell et al., 2011; Morrato et al., 2010; Munshi et al., 2015). Education about MetS and available screening tools has been shown to improve screening rates (Castillo et al., 2015; Correll et al., 2010; Crabb et al., 2009; Deuschle et al.,

2013; Gardner-Sood et al., 2015; Kioko et al., 2016; Lopuszanska et al., 2014; McDonell et al., 2011; Morrato et al., 2010; Munshi et al., 2015). The FDA recommendations must be reiterated regarding MetS screening. Mental health providers should be reminded of increased mortality and morbidity associated with improper MetS monitoring. Psychiatric providers should be educated that they play an integrative role in managing and monitoring all aspects of their patients' health (Castillo et al., 2015; Correll et al., 2010; Crabb et al., 2009; Deuschle et al., 2013; Gardner-Sood et al., 2015; Kioko et al., 2016; Lopuszanska et al., 2014; McDonell et al., 2011; Morrato et al., 2010; Munshi et al., 2015).

### **Lewin's Change Theory**

Lewin's change theory was the theoretical framework for this EBQI. Lewin's change theory was chosen because it focuses on the elements required for change and growth to occur (Kritsonis, 2004). In order for change to occur, the current behavior must cease, a new behavior must be implemented and finally the new behavior must be frozen as the new standard (Kritsonis, 2004). The problems addressed by this theory are recognizing that a change is needed, motivation to make a change, achieve a new equilibrium based on evaluation of the change options available, and stabilizing or refreezing equilibrium once the change is implemented and at decreased risk for resistance (Burnes, 2004; Kritsonis, 2004). This theoretical model is ideal for this EBQI project because the focus is changing current lack of MetS screening behavior, providing education and stakeholder support for the change in behavior, and refreezing the new behavior to establish equilibrium once the new MetS screening behavior is implemented and stable (Kritsonis, 2004). See Appendix C for visual representation of theoretical application.

## **Methods**

### **Approval, Ethical Considerations, & Funding**

The EBQI project utilized de-identified retrospective and prospective health record audit data. The primary Institutional Review Board (IRB) was the University of Missouri-Kansas City, utilizing human prospective data for not-human subject research. Site approval was given to conduct this project at a community mental health facility in suburban Kansas City, Missouri. Ethical considerations include benevolence, which is the desire to do good for others, and deontology, which focuses on duty and moral obligation to act in the best interest of the patient (Butts & Rich, 2015; Dictionary.com, 2016; Maron et al., 2007).

Additional ethical considerations are protection of patient information with respect to the Health Insurance Portability and Accountability Act (HIPAA). All data utilized a study case number, not name or primary identifiers. Confidentiality was maintained in a manner where chart auditing only utilized necessary information for this project. The Missouri Department of Mental Health provided funding for this project. See Appendix D for project cost table.

### **Setting & Participants**

The setting for this EBQI project was an outpatient community mental health facility located in Independence, MO. Participants were three psychiatrists and two psychiatric nurse practitioners (PMHNPs) who prescribe SGA medications to treat mental illness, in addition to five clinic nurses. For each consenting participant provider, randomized chart audits were performed pre, mid, and post educational intervention regarding the MetS screening process. Chart audit inclusion criteria were focused on patients who were age 18 or older and prescribed a

SGA. The exclusion criteria were patients aged of 17 and younger, patients not prescribed a SGA, and patients who were pregnant. The purpose of this EBQI project was to increase provider compliance with the use of a MetS screening tool. In order to measure baseline compliance with the use of the screening tool, the electronic health records at the community mental health agency were queried. Within the electronic charting program, search parameters were established to randomize a search of patients age 18 and over who were prescribed a SGA. During this search, 50 randomized charts were selected and reviewed to determine baseline screening, 50 randomized charts were randomly selected two months after the EBQI project implementation, and then 50 randomized charts were selected four months post implementation.

### **Evidence Based Practice Intervention**

The EBQI project proposed that education about and dissemination of a MetS screening tool for psychiatric providers would increase compliance with screening patients per Missouri Department of Mental Health (DMH) and FDA consensus statement guidelines. The Missouri DMH Metabolic Syndrome Screening and Monitoring Tool was not being utilized with regularity and consistency in the specified DMH funded community mental health agency. The purpose of this project was to increase compliance with usage of the DMH MetS screening tool (Appendix E).

**Intervention plan.** This EBQI project began in June 2017 with IRB submission to the University of Missouri-Kansas City, with not human subject approval. In July 2017, the student investigator (SI) performed retrospective chart audits on 50 adult patients age 18 and over who were prescribed SGAs to determine current MetS baseline screening rates. In August 2017, the SI implemented the screening tool usage and referral to primary care EBQI project into practice at the community mental health agency. Psychiatric providers were invited to participate in the

EBQI project and provided verbal consent to participate. During the August 2017 monthly provider meeting, the SI presented the literature review findings to support MetS screening by psychiatric providers along with dissemination of the DMH Metabolic Syndrome Screening and Monitoring Tool to providers who consented to participation. Evidence-based education was provided to the psychiatric providers and clinic nurses during a one-hour session. The SI offered a repeat educational session the following week to facilitate learning for providers who were unable to attend the first session. Verbal consent was obtained from each psychiatric provider and clinic nurse. The EBQI project implementation occurred over a four month time period.

The SI gathered retrospective medical record data to establish baseline utilization of the MetS screening tool at the community mental health agency. After the educational intervention for providers and nurses was complete, the SI initiated chart auditing for prospective sampling of screening and referral rates. Clinic nurses were encouraged to obtain vital signs at clinic visits and use these to initiate the MetS screening tool for patients prescribed SGAs. Psychiatric providers then completed the screening process, interpreted the results and made appropriate referrals for those patients who had positive screening results. The SI performed a second chart audit review two months after the educational intervention and screening tool dissemination. The second chart audit data collection utilized existing medical record data for a randomly selected sample of 50 adult patients receiving SGAs in an effort to identify the number of patients who received appropriate screening and referral during the project implementation period. Results of this chart audit were shared with participating psychiatric providers and nurses at the November 2017 monthly clinic meeting to provide reinforcement of the education and screening tool dissemination. At the conclusion of the four-month project implementation period, a third chart audit was performed utilizing existing medical record data for a randomly

selected sample of 50 adult patients receiving SGAs in an effort to identify the number of patients who received appropriate screening and referral during the project implementation period. The data was evaluated by the SI to determine if MetS screening rates increased during the project implementation period.

It was anticipated that MetS screening rates and referral to primary care would increase after education about MetS and screening tool dissemination. The short term goals were to increase the number of MetS screenings, increase referral to primary care to treat patients with a positive MetS screening result, increase provider knowledge about the importance of MetS screening, and increase psychiatric provider compliance with the FDA consensus statement that mandates interval monitoring of MetS among patients prescribed a SGA medication. The EBQI project implementation concluded in December 2017 and the overall project will conclude in May 2018 (see Appendix F for logic model, Appendix G for project timeline, Appendix H for intervention flow diagram, and Appendix I for participant intervention materials presented to psychiatric providers).

### **Evidence Based Practice Model and Change Process**

The Iowa Model was selected to guide the EBQI project. The sequential steps of the Iowa model parallel the EBQI project development and implementation. The early stages of the Iowa model, such as selection of a topic, forming a team, evidence retrieval, and grading of the evidence are completed (Long, 2003). The final stages of developing an EBP standard, implementing the EBP, and evaluation of the EBP occurred from August-December 2017 (Long, 2003). The change model for improved MetS screening among psychiatric providers is Lewin's change theory. Lewin's change theory focuses on unfreezing a current behavior, replacing the old behavior with a new behavior, and freezing the new behavior as a new standard of practice (Kritsonis, 2004).

### **Study Design**

A quasi-experimental retrospective pre and prospective post design was implemented to evaluate changes in MetS screening and referral to treatment among adult psychiatric patients prescribed SGAs. Comparisons were made to determine if there was a statistically significant difference in MetS screening incidence after psychiatric providers attended an educational session about MetS screening recommendations along with dissemination of the screening tool. Additional outcomes of measurement included referral to primary care for treatment of MetS and frequency of vital sign and lab monitoring after diagnosis of MetS.

## **Validity**

### **Internal Validity**

For the purpose of this EBQI project, the independent variable was MetS education provided to psychiatric providers. Prior to the initiation of this EBQI project, the MetS screening tool was not utilized in this community mental health agency. The instrument utilized for the EBQI project was the Missouri DMH Metabolic Syndrome Screening and Monitoring Tool, which was already established and no revisions or changes to the tool occurred during the project implementation period. Convenience sampling was utilized for retrospective and prospective data collection. Potential internal validity threats were provider knowledge acquisition about MetS that could alter their current views and practice, provider failure to assess all areas of MetS on the screening tool, and personal experience with MetS leading to countertransference.

### **External Validity**

The EBQI project was implemented in a community mental health agency located in Independence, MO. There were no concerns for small sample size or limited generalizability as the majority of the patients in this agency were prescribed SGAs, which was the intended patient population for the EBQI project. Cultural differences and ethnicity of psychiatric providers, the small number of psychiatric providers in the practice, the current high rate of obesity in the state of



Missouri, and the general health status of the patients in the agency can affect external validity. Results could be generalizable to other community mental health settings.

### **Measured Outcomes**

The primary outcome of the EBQI project was improved MetS screening rates documented in patient health records by psychiatric providers over a four-month span of time in a community mental health agency. Baseline MetS screening incidence was compared to the two month and four month post-implementation screening incidence data. Secondary outcomes included whether or not patients who screened positive for MetS were referred to primary care for treatment along with screening for all five symptoms of MetS.

### **Measurement Instrument**

The measurement instrument utilized was the Missouri Department of Mental Health Metabolic Syndrome Screening and Monitoring Tool. This tool includes the required MetS screening parameters indicated by the FDA and ADA for monitoring of MetS. Monitoring parameters on the DMH screening tool include weight/BMI, blood pressure, waist circumference, fasting glucose, and triglycerides. This tool has been determined to be valid and reliable by DMH for use in all community mental health agencies in the state of Missouri. The screening tool meets all FDA and ADA screening parameters.

Secondary measures were included in this EBQI. Referral rates to primary care for MetS treatment were evaluated in the prospective medical data. Screening for all five areas of MetS was also evaluated from prospective and retrospective medical data.

### **Quality of Data**

This project included three psychiatric physicians and two psychiatric mental health nurse practitioners (PMHNPs). The demographic data gathered was type of degree (physician or APRN). A total of 50 randomized charts were evaluated prior to project implementation, 50

randomized charts were evaluated two months after education and screening tool dissemination, and an additional 50 randomized charts were evaluated at the completion of the project. The Missouri DMH Metabolic Syndrome Screening and Monitoring Tool was utilized to determine the number of screenings performed by each provider over a four-month period of time. The DMH screening tool was deemed valid and reliable prior to use. Potential difficulties with the screening tool were provider data error and provider failure to screen for all MetS parameters. Permission to utilize this tool was granted as the community mental health agency is funded by DMH.

### **Analysis Plan**

The primary purpose of this EBQI project was to determine if education about and dissemination of a MetS screening tool increased MetS screening rates among psychiatric providers. A retrospective medical record data analysis was performed prior to project implementation to determine current MetS screening rates. A prospective medical record data analysis was performed two months after EBQI implementation and again after the completion of the project to determine if MetS screening rates and referral to primary care for treatment of MetS improved after MetS education and screening tool dissemination. The principal EBQI question involved a comparison of initial MetS screening rates versus post-intervention. Secondary outcomes included patient referral to a primary care provider when they screened positive for MetS, in addition to BMI screening, lipid monitoring, measuring glucose levels, and measuring waist circumference.

Three separate sets of data were analyzed, and outcomes of the independently collected samples were evaluated. The statistical test for change in rates of MetS screening was performed by chi square analysis. Chi square statistical analysis was performed to evaluate referral to primary care physicians. The ANOVA statistical test was utilized to evaluate lipid monitoring, glucose levels, and waist circumference measurement.

## **Results**

### **Setting & Participants**

A total of ten individuals participated in the EBQI project, including five psychiatric providers and five clinic nurses. The psychiatric providers were comprised of two PMHNPs, two MDs, and one doctor of osteopathy (DO). The participating clinic nurses were licensed practical nurses (LPNs). All participants had three or more years of psychiatric clinic experience. The EBQI project was performed at a community mental health agency in Independence Missouri. The implementation period for the EBQI project was from July 2017 through December 2017. All education and MetS tool dissemination were provided in the community mental health agency during monthly staff meetings.

### **Intervention Course (Actual)**

The project began in July 2017 after IRB determined that this project was a not-human study (Appendix J). Psychiatric providers were recruited from the community mental health agency, along with clinic LPN nursing staff. The intervention began with a pre-project data analysis to determine current MetS screening rates in the community mental health agency. An educational staff meeting was held in early August 2017 with all participants giving verbal consent to participate in this EBQI project. Education was provided about MetS and the need for screening by psychiatric providers. The DMH MetS screening tool was disseminated to all participants for immediate utilization. Education reinforcement and a question/answer session was provided in the two-week period following the initial meeting. Data analysis was performed two months and four months post EBQI project implementation to determine if MetS screening

rates improved. A final educational session was provided at the conclusion of the project implementation period to discuss initial impressions, results, and answer any questions to ensure ongoing utilization of the MetS screening tool.

### **Outcome Data by Subtopic**

**Primary Outcome Data.** Metabolic syndrome screening rates were evaluated as the main outcome of this project. Statistical analysis was performed utilizing chi square analysis to compare pre educational with midpoint project screening data, midpoint data to end of project screening data, and then pre educational to end of project screening data (Appendix K). Utilizing descriptive statistics, there was a statistical difference in screening rates prior to education and tool dissemination compared to two and four months post education and tool dissemination. Baseline data revealed 16 patients had screening versus 34 that did not. Two-month post education and tool dissemination chart data revealed 29 patients had screening versus 21 that did not. Four-month post education and tool dissemination chart data revealed that 41 patients had screenings versus nine that did not. Results of the two and four-month screening rates data was shared with providers to promote ongoing MetS screening. The chi square results indicated  $p = <0.0005$ , which was statistically significant. Therefore, education about and dissemination of the MetS screening tool did improve screening rates and a statistically significant difference existed with increased MetS screenings being performed after education and screening tool dissemination.

**Secondary Outcome Data.** Secondary outcome data was gathered to determine if patients were referred to a PCP when a MetS screen was positive. Additionally, data was gathered to determine lipid, body mass index (BMI), and waist circumference measurement in

the pre-educational to midpoint data, midpoint to end of project data, and the pre-educational to end of project data (Appendix L).

Chi square statistical analysis was performed to evaluate PCP referral data. Pre educational data revealed that zero patients were referred to a PCP after a positive MetS screen. Mid-project data indicated that nine patients were referred to PCP and post-project data revealed 15 patients were referred to a PCP after a positive MetS screen. Chi square analysis was  $p = <0.005$ , which was statistically significant for an improvement in PCP referral rates.

Kruskal-Wallis analysis was performed to evaluate statistical analysis for BMI measurement. There was a statistical significant difference in performing BMI measurements; chi square 14.878,  $p = 0.001$ . The mean rank score of the pre-project data was 71.04, mid-point mean rank was 93.06, and post-project mean rank was 62.40.

ANOVA analysis was performed to evaluate statistical analysis for improvement in the measurement of lipids, waist circumference, and glucose levels. There was statistical significance for improvement in lipid measurement with a  $p = 0.003$ . However, there was not statistical significance for improvement in waist circumference measurement ( $p = 0.695$ ) or glucose monitoring ( $p = 0.543$ ). Tukey post hoc test revealed no statistical significance with lipid monitoring ( $p = 1.00$ ), waist circumference measurement ( $p = 0.695$ ) or glucose measurement ( $p = 0.340$ ).

Descriptive statistics were utilized to assess provider screening tool data. Among the 150 charts audited, 79 patients, or 53% of the sample, received MetS screening services. Of these, 68% of screenings were performed by PMHNPs with the remaining 38% of screenings performed by physicians.

## **Discussion**

### **Successes**

The study was well planned and implemented with great success. There were no difficulties in providing education and dissemination of the screening tool. Clinic LPNs were eager to participate in the project. Knowledge about MetS and the importance of screening were brought to the attention of providers that prescribe medications associated with high risk for MetS.

### **Study Strengths**

There were several strengths to this study. First, education about MetS and dissemination of the screening tool increased knowledge and were supported by the PICOT question. The EBQI project provided targeted education and in turn knowledge retention per Missouri DMH screening tool protocol. Second, the SI provided ongoing continuing education for any questions that arose as the project was implemented and per the Missouri DMH screening tool recommended procedures. A presentation was given to all involved participants, positive outcomes for patients were reinforced, and the screening tool was disseminated to allow easy access to the screening method. Third, the educational opportunity and screening tool were easy to understand, targeted toward medical personnel, and time efficient for use by clinic nurses and psychiatric providers.

### **Results Compared to Literature Evidence**

Much like the literature gathered prior to the EBQI project implementation, the screening rates at the community mental health agency prior to education about and dissemination of the

MetS screening tool were paltry compared to the number of patients that should be screened to monitor for MetS risk. Studies revealed that education about and availability of a MetS screening tool as the most beneficial method to increasing MetS screening among psychiatric providers (Arms et al., 2014; Castillo et al., 2015; Druss et al., 2008; Hor et al., 2016; Khan et al., 2010; Kioko et al., 2016; Laugharne et al., 2016). The EBQI project results were parallel with the literature findings that after MetS screening education and tool dissemination, MetS screening rates improved significantly at the community mental health agency. In further agreement with literature findings, psychiatric providers are not screening for all parameters of MetS, which was evident as well in the data gathered during the pre, mid, and post intervention periods of the EBQI project (Castillo et al., 2015; Crabb et al., 2009; Deuschle et al., 2013; Gardner-Sood et al., 2015; Lui et al., 2016; Maki & Bjorklund, 2012).

### **Limitations**

#### **Internal Validity Effects**

The EBQI project had limitations that warrant consideration. First, the study utilized convenience sampling that is subject to bias. Second, the screening tool is designed to be administered by a nurse or a healthcare provider, but relies on the medication prescriber to diagnose MetS based on the screening findings. Third, the MetS screening requires several parameters to be evaluated, and incomplete screenings were noted. Psychiatric providers failed to implement laboratory orders for glucose and lipid surveillance.

A confounding factor for the EBQI project were two psychiatric providers that attended a medication conference where the metabolic effects of SGA medication were discussed, and there was potential for the information to alter the MetS screening process.

#### **External Validity Effects**

External validity was a concern for the duration of this EBQI project. First, there are practice beliefs that are individual to each psychiatric provider. Screening for MetS was inconsistent across the participating providers. Second, the measurement of lipid and glucose screening parameters. Patient noncompliance with laboratory orders as well as financial concerns about paying for lab work were concerns. Third, the small sample size of psychiatric providers in the study could significantly impact the final data.

### **Sustainability and Maintenance Plan**

The effects of the educational intervention have potential to weaken over time. In order to continue the forward momentum of increasing MetS screening, ongoing reinforcement will be needed. Monthly staff meetings can be utilized to reinforce the need for MetS screening, provide ongoing data about the number of screenings being performed, and assist with ongoing implementation of the new screening protocol. Additionally, the Missouri DMH is requiring MetS screening as part of clinic protocol, which will provide further reinforcement of improved screening rates.

### **Efforts to Minimize Study Limitations**

Efforts were made to minimize study limitations for this EBQI project. All nurses and psychiatric providers at the community health agency were invited to participate. The SI was available to answer questions as the project was in the implementation phase. Monthly staff meetings provided opportunity to reinforce MetS screening education. Data were gathered two months post implementation and the findings were shared with the clinic staff to convey the positive results as well as provide the impetus to increase screening efforts. The SI had a 1:1 meeting with the provider whose screening patterns did not change appreciably during the study



period and offered additional information regarding the physical health benefits of screening and the long-term health consequences that MetS screening can detect.

### **Interpretation**

#### **Expected & Actual Outcomes**

Participation in the EBQI project resulted in a significant increase in knowledge about MetS and utilization of the Missouri DMH MetS screening tool. Knowledge and utilization of the screening tool was retained and improved during the duration of the project, as evidenced by the four-month data revealing a significant increase in screening incidence compared to the pre and mid project data. Clinic nurses and PMHNPs performed MetS screenings with high frequency, with the lowest incidence of screenings among the physician staff.

#### **Intervention Effectiveness (Inferences)**

Increase in MetS knowledge and screening incidence is due to several reasons. First, the EBQI project was focused on educating psychiatric providers and nurses about the importance of MetS screening, and facilitated the process by disseminating the screening tool. The project participants had information at their disposal and were required to put forth little investigational effort. Accessibility to the screening tool was imperative to its utilization. Second, the project utilized a valid screening tool that was mandated for use by the Missouri DMH, who also acts as the state supervisory department for the community mental health agency. Third, the EBQI project utilized a treatment team effort that had multiple involvement points to ensure ongoing usage. Finally, the education was reinforced at each monthly meeting per FDA recommendations that MetS screening should occur for all patients taking a SGA medication.

The EBQI project conducted in the community mental health agency would be applicable to all community health settings, including other mental health agencies, primary care clinics, and specialty clinics. Screening for MetS at every patient appointment would ensure all healthcare providers monitor patients, MetS treatment is initiated, and outcomes are evaluated. This would allow for early intervention, improvement in overall patient health, and increased lifespan.

### **Intervention Revision**

The outcomes of the EBQI project were statistically significant and MetS screening rates improved; however, further improvements can be made. First, all providers who agree to participate should make a concerted effort to improve their MetS screening rates. Second, this project could be implemented at more than one site to compare the effectiveness of education and screening tool utilization between two different community mental health agencies, adding to the generalizability of the project results. Finally, chart audit data could be limited to only patients with health insurance and/or Medicaid to evaluate lab draw ordering and compliance with greater accuracy. A limiting factor to monitoring two parameters of MetS, lipid and glucose levels, are financial ability and insurance to pay for lab tests.

### **Expected & Actual Impact to System/Cost/Policy**

Overall, management and treatment of MetS needs improvement. Screening for and treating MetS improves patient health outcomes, increases life span, and decreases the healthcare financial burden associated with hypertension, diabetes, and heart disease (Correll et al., 2010; Deuschle et al., 2013; Druss et al., 2008; & Lui et al., 2016). In 2003, the FDA issued a consensus statement to mandate MetS screening in order to protect patients who are utilizing SGA medications, and utilization of this EBQI project education and screening tool

dissemination comply with this initiative (Crabb et al. 2009; Kioko et al. 2016; Lopuszanska et al. 2014; McDonnell et al., 2011; Morrato et al., 2010). The long term impact of timely MetS screening is increased physical health for all psychiatric patients prescribed an SGA medication which in turn would save the healthcare system tens of millions of dollars annually (Morrato et al., 2010).

Implementation of the EBQI project led to increased incidence of MetS screening, increased knowledge about MetS and the health consequences associated with it, and the importance of identifying MetS and referring the patient to treatment with primary care providers. While actual cost savings were not measured with this project, and the overall cost of MetS is dependent upon which screening parameters are diagnosed, and generalization of cost was evaluated. Previous census data indicated that 1.2 million Missourians were diagnosed with hypertension, 535,000 were diagnosed with diabetes, and 383,000 with heart disease associated with elevated lipid levels (CityData, 2014). Given these numbers, it is assumed that Missouri alone would save millions of dollars in healthcare expenditures to treat the consequences of advanced and untreated MetS. Secondary benefits to the EBQI project are slowed disease progression, early treatment, and increased lifespan. The Missouri DMH, the primary funding source for the community mental health agency, financially supported the EBQI project. No additional funding was required, as the screening tool was utilized as part of the nurse or psychiatric providers routine patient interaction. With ongoing education and reinforcement, long-term sustainability is limitless.

## **Conclusion**

### **Practical Usefulness**

Knowledge and practice gaps exist between the FDA consensus recommendations regarding MetS screening and the application of this evidence by psychiatric providers (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). In 2003, the FDA published practice guidelines for monitoring MetS among patients currently prescribed SGA medication (Arms et al., 2014; Khan et al., 2010; Kioko et al., 2016; Lui et al., 2016; Maki et al., 2013; Sugawara et al., 2014). Among the data reviewed, there was no indication that after the initial consensus recommendations in 2003, the FDA, ADA, APA, or any other entity has offered or recommended any form of education pertaining to psychiatric providers. This education and dissemination disparity resulted in psychiatric providers that have not received consistent MetS screening information and education throughout their careers to promote ongoing MetS screening and monitoring.

Improved quality care for patients prescribed SGA medication must become an important consideration. Failure to screen for MetS in psychiatric patients results in development of physical health complications, poor health outcomes, and decreased lifespan. The goal of the EBQI project was to increase psychiatric provider knowledge about and utilization of a MetS screening tool in order to improve MetS screening rates.

### **Further Study of Intervention & Dissemination**

Results from this EBQI project will be disseminated with the assistance of DMH to facilitate improved MetS education and screening rates among all community mental health agencies, initially in the urban Kansas City area, and eventually across the state of Missouri. Funding will be sought from DMH to provide education and dissemination of the EBQI project results. The SI will submit a request to the Missouri DMH in June 2018 to present a podium or poster presentation of the EBQI project findings at the fall 2018 Missouri Coalition of Mental

Health annual conference. The SI also submitted abstract information to the American Psychiatric Nurse Association (APNA) for poster presentation consideration at the fall 2018 APNA conference.

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### **Appendix A: Definition of Terms**

**Second generation antipsychotic (SGA):** a medication given to patients that regulates dopamine and serotonin to resolve hallucinations and delusions that occur during psychosis

**Metabolic Syndrome:** a cluster of medical conditions that occur due to obesity, and can be caused by medications that increase appetite and glucose such as SGAs.

**Psychiatric provider:** a board certified medical provider, which is either a MD psychiatrist or a nurse practitioner (APRN).

