Metabolic Monitoring of Patients Taking Antipsychotics

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Author Note

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I have no known conflict of interest to disclose.

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Abstract

Second-generation antipsychotics (SGAs) can cause metabolic side effects that result in metabolic syndrome (MetS), which reduces overall life expectancy. Metabolic Syndrome can be mitigated through appropriate monitoring per American Diabetes Association (ADA)/American Psychiatric Association (APA) guidelines. This evidence-based practice (EBP) project aimed to address this problem by improving knowledge of established metabolic monitoring guidelines. Azjen's Theory of Planned Behavior was the foundation of this project, and implementation was guided by The Rosswurm and Larabee Model for Change. The objective was to increase the metabolic monitoring rate (specifically weight collection at baseline, four weeks, and eight weeks) of patients prescribed SGAs in an outpatient mental health clinic in Phoenix. IRB exemption received from ASU. Participants included all staff members in the clinic. Participants (n=5) completed a pre/post-intervention survey. In addition, providers (n=2) completed the Metabolic-Barriers, Attitudes, Confidence, and Knowledge (M-BACK) questionnaire pre- and post-intervention to assess knowledge regarding metabolic monitoring. De-identified aggregate data collection was used retrospectively to determine the initial metabolic monitoring rate and then again to determine the post-intervention metabolic monitoring rate to assess the effectiveness of the educational intervention. Scores on the knowledge survey and M-BACK increased post-intervention. The metabolic monitoring rate increased post-intervention. Metabolic monitoring rates improve when staff have adequate knowledge of metabolic monitoring guidelines.

Keywords: Second Generation Antipsychotics (SGAs), Metabolic Syndrome (MetS), Metabolic-Barriers, Attitudes, Confidence, and Knowledge (M-BACK)

Improving Metabolic Monitoring Rates in Patients Taking Antipsychotics

Mental health disorders are prevalent around the globe. They contribute significantly to poor health and adverse psychosocial outcomes. Second-generation antipsychotics are often used to treat mental health disorders. These medications are highly effective but are associated with metabolic side effects. The metabolic side effects of these medications increase individual and global health burdens by compounding on factors already innate to those who deal with mental illness.

Problem Statement

Cardiometabolic side effects such as hypertension, obesity, hyperlipidemia, and diabetes can arise from antipsychotic use. These side effects can lead to cardiovascular disease, the leading cause of early death in patients who are mentally ill (Soda et al., 2021). Poor metabolic monitoring of patients taking antipsychotic medications occurs in many community health settings. Factors contributing to this problem include a lack of knowledge, time, and resources.

Purpose and Rationale

Antipsychotics treat a wide range of mental health problems and can improve the lives of those with mental illness. The predominant concern with antipsychotic medication is the development of metabolic syndrome, which can result in adverse health outcomes and premature cardiovascular death. Mental health disorders are generally chronic or lifelong; therefore, mental health providers must continually monitor for these metabolic effects—increased monitoring results in earlier intervention and prevention of metabolic sequelae. Addressing poor metabolic monitoring rates can help decrease overall rates of cardiovascular disease among mentally ill patients who need antipsychotic medication. Failure to address this problem will result in

increased rates of metabolic syndrome, poor medication adherence, and potential worsening of mental health. In turn, this results in a significant burden on healthcare systems.

Background and Significance

Mental health disorders can have wide-ranging social and physical implications for those afflicted. According to the National Institute of Mental Health, one in five Americans is diagnosed with a mental illness (2022). Globally, over one billion people were affected by a mental health disorder in 2016 (Rehm & Shield, 2019). Those with mental illness are more likely to experience chronic illnesses related to low socioeconomic status, barriers to receiving health care, and substance use (Garcia et al., 2016). Antipsychotics are a psychotropic medication commonly prescribed for bipolar and schizophrenia but are also used for depression, psychosis, and even behavioral disturbances (Ali et al., 2020; Garcia et al., 2016; Vallianatou, 2020). According to Dennis et al. (2020), between 2013-2018 nearly 3.8 million Americans were prescribed an antipsychotic. These medications can improve the quality of life of those with severe mental illness but also contribute to the development of metabolic syndrome (Holt, 2019). Metabolic syndrome, in turn, can cause cardiovascular disease, decreasing life expectancy and overall well-being (Holt, 2019; Soda et al., 2021).

According to Lawrence et al. (2013), patients with severe mental illnesses such as schizophrenia have lower life expectancy than the general public due to socioeconomic disadvantages and healthcare inequality. People with mental illness have higher unemployment rates, lack social support, have increased difficulty understanding or carrying out medical advice due to psychiatric symptoms, increased rates of tobacco use, a tendency to have a poor diet, and lack of exercise (De Hert et al., 2011). The burden of cardiovascular disease is immense on both an individual and a global level. According to Roth et al. (2020), cases of cardiovascular disease

have doubled in the last 30 years. In 2019 there were 523 million cases of cardiovascular disease globally (Roth et al., 2020). Cardiovascular disease is the leading cause of death in patients with severe mental illness (Ali et al., 2020).

Cardiometabolic diseases caused by antipsychotics, such as obesity, hypertension, diabetes, and hyperlipidemia, are preventable and burden healthcare systems significantly (Kearns et al., 2021). The risk of diabetes in those with mental illness is double that of the general population (Holt, 2019). By 2030, the estimated global cost of diabetes alone will soar to $500 billion (Kearns et al. 2021). The development of metabolic syndrome is mitigated with appropriate monitoring; however, metabolic monitoring rates of patients taking antipsychotic medications remain low (Bombay et al., 2021; Cohen et al., 2020; Soda et al., 2021). Rising rates of antipsychotic use make tackling this problem of key importance (Daviss et al., 2016).

Antipsychotic Medications

According to Sadock et al. (2014) and Stahl (2013), antipsychotic medications are antagonists to dopamine receptors, essentially blocking the receptors themselves, decreasing dopamine levels, and relieving symptoms such as hallucinations and delusions (Sadock et al., 2014; Stahl, 2103). Antipsychotic use results in lower rates of hospitalization and suicide related to mental illness (Holt, 2019). Metabolic syndrome diagnosis includes having three of the following: elevated fasting glucose, abdominal obesity, low HDL, high triglycerides, and hypertension (Sadock et al., 2014 & Villiantou (2020). These factors lead to the development of diabetes, coronary artery disease, myocardial infarction, and stroke (Sadock et al., 2014). The underlying mechanism for this risk in antipsychotics is not definitively known.

According to Stahl (2013), the driving factors in the development of metabolic syndrome are increased appetite and concurrent weight gain. Furthermore, Holt (2019) states that most

patients taking an antipsychotic experience more than a 7% increase in weight. Independent of weight gain, antipsychotics additionally increase resistance to insulin and triglyceride levels (Stahl, 2013). Stahl (2013) has proposed a "metabolic highway" theory of how metabolic syndrome progresses from increased appetite and weight gain to obesity and increased BMI. Obesity and increased BMI increase triglyceride levels and insulin resistance, progressing to hyperinsulinemia and beta cell failure. At this point, progression to prediabetes and then diabetes occurs (Stahl, 2103). This accumulation of cardiovascular risk factors results in cardiovascular events such as coronary artery disease, MI, and stroke, which are responsible for premature death (Cohen et al., 2020). Cardiovascular disease helps explain why the life expectancy of patients with serious mental illness is 25 years lower than that of the general public (Stahl, 2013; Pereira, 2014).

Current Practice

Guidelines for metabolic monitoring were established by the American Psychiatric Association (APA) and The American Diabetic Association (ADA) in 2004 and continue to be the standard of care (Stahl, 2013). The APA and ADA recommend baseline monitoring, including family and personal history, weight (and BMI), waist circumference measurement, blood pressure, fasting plasma glucose, and lipid profile (DeJongh, 2021). Weight should continue to be monitored monthly after that. At 12 weeks, weight (BMI), blood pressure, fasting plasma glucose, and fasting lipid profile should be reassessed. Additionally, annual monitoring should include a personal/family history, waist circumference, blood pressure, and fasting glucose. A fasting lipid profile should be completed every five years (ADA, 2004; DeJongh, 2021).

According to Ali et al. (2020), metabolic monitoring guidelines are long-established yet not extensively implemented. Metabolic monitoring rates remain low in community outpatient settings (Bombay et al., 2016). Several national initiatives are in place to correct this problem, including a collaboration between the Center for Medicaid and Medicare Services (CMS) and the Agency for Healthcare Research and Quality (AHRQ). This initiative, titled "Safe and Judicious Use of Antipsychotics in Children and Adolescents," seeks to enumerate and improve the monitoring of metabolic data to reduce cardiometabolic disease rates (Shenkman et al., 2021). Lack of resources, time, education, equipment, and staffing contribute to low metabolic monitoring rates (Ali et al., 2020; Coughlin et al., 2018).

Improved Monitoring

Improving metabolic monitoring rates will help set up roadblocks to the "metabolic highway." Disruption of the highway will allow for interventions that will reduce cardiovascular disease prevalence. The consistent and effective monitoring of antipsychotics can help prevent the acquisition of metabolic syndrome from antipsychotics. Monitoring weight, blood pressure and glucose/lipid levels alert providers to changes, facilitating earlier interventions such as medication augmentation when a risk factor is present (Cohen et al., 2020). A patient may require metformin, statins, or antihypertensive medications to control glucose levels, lipid levels, or blood pressure (Stahl, 2013). Another critical intervention is education regarding lifestyle modification. Providers can educate patients on healthy eating habits and the importance of exercise in reducing their increased risk of cardiovascular disease (Cohen et al., 2020).

Monitoring metabolic is also essential for improving medication adherence. Antipsychotics have notoriously low adherence rates because of adverse side effects such as weight gain (Garcia et al., 2016; Stahl, 2103). Weight gain can be detrimental to a patient

suffering from mental health issues. According to Sadock et al. (2014), weight gain can cause self-esteem issues, depression, and anxiety. The blood sugar changes that happen can cause mood changes and irritability. When these problems go untreated, a patient can develop a dysthymic disorder or chronic fatigue syndrome (Sadock et al., 2014). Effective monitoring of metabolic risk factors is also vital, as early weight gain while using antipsychotics predicts longer-term weight gain (DeJongh, 2021).

Barriers

According to Coughlin et al. (2018), psychiatric providers report low confidence in the interpretation and intervention of the results of metabolic monitoring. There also remains a disconnect between role expectations for psychiatric providers who sometimes assume that metabolic monitoring will occur with the patient's primary care providers. Ambiguity over the responsibility of metabolic monitoring becomes an issue because many patients with chronic mental illness do not see a medical provider and solely rely on their psychiatric provider (Coughlin et al., 2018). According to Pereira et al. (2019), a survey among 160 primary care providers in a community health setting found that close to 40% were unfamiliar with the APA metabolic monitoring guidelines. According to Cohen et al. (2020), education should be done regularly on metabolic monitoring guidelines for all providers. This education should include the importance of monitoring, the specific guidelines, and the interpretation and indications (Cohen et al., 2020). Kreyenbuhl et al. (2017) found that involving patients in monitoring metabolic can help improve monitoring compliance rates.

Evidence shows that patient education regarding metabolic monitoring results in higher compliance with labs and medical referrals (Periera et al., 2014). Additionally, Melamed et al. (2019) found that education, audit, and feedback programs are key to improving metabolic

screening rates. Proper metabolic monitoring requires a scale, BMI chart, blood pressure cuff, and laboratory services for fasting triglyceride and fasting glucose. Unfortunately, laboratory services are not available in many outpatient mental health clinics. Improving access to equipment such as point-of-care machines can help mitigate the need to refer out for laboratory services.

Another way to improve metabolic monitoring would be to use a standardized tracking sheet embedded in the EHR or a hard copy whenever the provider is evaluating a patient taking an antipsychotic (Coughlin et al., 2018). Many outpatient settings are still operating with telehealth services following the COVID-19 pandemic, which complicates obtaining metabolic data. Fixing this problem may require patients to self-monitor and report their weight, blood pressure, and glucose levels to the clinic. Patient self-reporting would need to be accompanied by patient education that conveys best practices and the importance of metabolic monitoring.

The development of cardiovascular disease from antipsychotic medications reduces life expectancy and creates burdens on societal and global levels. Monitoring metabolic data (i.e., weight, BMI, waist circumference, glucose, and lipid levels) allows providers to intervene to prevent the development or progression of serious illness. These interventions can include lifestyle education, medication adjustment, or referrals to physical health providers for adjunct medication. Many complex factors interfere with metabolic monitoring. Provider and patient education appear to be feasible and promising measures to address this problem. Improving metabolic monitoring will help decrease cardiovascular disease's enormous burden on an individual and global level.

Internal Data

An outpatient mental health clinic in the Southwest has noticed that rates of metabolic monitoring remain low. This information was self-reported by the providers within the clinic. This clinic offers mental health care services, including counseling and medication management for adults. Many patients in the clinic receive Medicaid and Medicare Services. CMS is greatly invested in improving metabolic monitoring rates, as mentioned previously. The clinic does not have lab services which means they refer out for laboratory tests such as fasting glucose and lipid panel. COVID-19 created another obstacle in obtaining metabolic data as patients moved to telehealth appointments. Telehealth makes it difficult to track waist circumference, weight (BMI), and blood pressure.

PICOT Question

In patients taking antipsychotic medications at an outpatient mental health clinic, how does improving clinic staff knowledge regarding metabolic monitoring guidelines compared with current practice affect rates of compliance with metabolic screening guidelines.

Evidence Synthesis

Search Strategy

An exhaustive review of current literature addressing the PICOT question was completed. Three databases were utilized in this search including CINAHL, PubMed, and PsycINFO. These databases were chosen because they offer a wide range of nursing, allied health research, and healthcare information which is highly relevant to the PICOT question. These databases were rigorously examined for pertinent evidence.

CINAHL was searched using the following key terms *metabolic monitoring, metabolic syndrome, antipsychotic medication, and outpatient clinic*. The search initially yielded 137 results. The search was then limited to English only, which reduced results to 134. The search

was then limited to publication dates within the last five years leading to an end yield of 44 findings.

PubMed was searched with the following key term *metabolic guidelines, antipsychotic medication, and outpatient.* This search yielded 548 results. The search was then limited to full text which reduced findings to 548. The search was then limited to publication dates within the last 5 years resulting in 138 findings.

PsycINFO was searched utilizing the key terms *metabolic monitoring, antipsychotics, and outpatient.* The initial search yielded 85 results. The search was further restricted to articles published in the last five years yielding 23 results.

The results of these database searches were scanned. Articles were scanned by titles and abstracts. Rapid critical appraisals were performed to extract the highest quality and the most relevant studies from the database findings. Fifteen articles that met the criteria of these ten are currently included in the evaluation table. Exclusion criteria included acute and inpatient settings. Grey literature was reviewed to include the National Institute of Health.

Critical Appraisal and Synthesis of Evidence

Of the many studies selected for review, ten articles were reviewed and appraised. These ten articles were chosen based on their relevance and level of evidence. The studies used addressed (a) patients taking antipsychotic medications and (b) metabolic monitoring. These studies either addressed barriers to metabolic monitoring or interventions for metabolic monitoring. There were eight quantitative studies used and two qualitative studies utilized. This review included two systematic reviews (level one), one randomized control study (level two), one cross-sectional study (level two), four retrospective chart reviews (level three), one quasi-experimental (level three), and one survey (level four).

In total the systematic reviews evaluated 51 articles regarding the metabolic monitoring of adults, including RCTs, qualitative studies, retrospective chart reviews, and observational and exploratory studies. The majority of articles are retrospective chart reviews as measuring metabolic monitoring rates inherently involves extracting data from patient charts.

The majority of the studies were completed in the United States. One study was conducted exclusively in Jordan, and another was conducted in Ireland. All ten studies identified that metabolic monitoring rates can be improved in patients taking antipsychotic medications, and all identified that barriers persist in metabolic monitoring and that new interventions are needed. Five of the studies indicated that metabolic monitoring rates remain low in patients taking antipsychotic medications. Six studies examined multiple interventions. The RCT and three other studies identified that patient education regarding metabolic monitoring guidelines improves monitoring rates. Four studies identified that EHR alerts are effective in improving metabolic monitoring rates. Three studies identified that metabolic monitoring forms improve monitoring rates. Two studies identified that provider education improves monitoring. Qualitative studies identified the following barriers to metabolic monitoring: lack of patient compliance with recommendations, role ambiguity regarding whether the primary care provider or psychiatric provider is responsible for metabolic monitoring, insufficient time and resources, and difficulty obtaining/accessing collected lab data.

Evidence Synthesis Conclusions

After an exhaustive literature search and critical appraisal of evidence, it is evident that there is a need to improve metabolic monitoring rates for patients taking antipsychotic medications. Overall metabolic monitoring in patients taking SGAs is poor. Low rates of metabolic monitoring is a multi-factorial problem that persists despite extensive research and

interventions. Antipsychotic medications help improve the lives of patients with various mental health conditions. However, these medications also have harmful metabolic side effects including hyperlipidemia, hypertension, diabetes, and cardiovascular disease. Monitoring metabolics, including weight, BMI, blood pressure, blood glucose, lipid profile, and triglycerides, is key to stopping the progression of metabolic syndrome.

The ADA has long-established guidelines on metabolic monitoring, yet monitoring rates in outpatient settings remain low. Many factors, including time, resources, and knowledge, interfere with monitoring according to guidelines. The most recent literature suggests a multifaceted and innovative approach is needed to address this problem. Various studies indicate that a wide range of interventions are effective at improving metabolic monitoring, including patient education, provider education, EHR alerts, utilization of a metabolic monitoring form, audits, and lab order sets. Despite these interventions improving monitoring rates, overall monitoring rates remain low. Thus, it is necessary to integrate multiple interventions to address this problem.

Theory/Theoretical Framework Application

Theoretical frameworks are foundational to and help guide the development of evidence-based practice projects. The Theory of Planned Behavior (see Appendix B1) was selected as the theoretical framework for this EBP project. This theory is frequently used in research that focuses on patient education, compliance, and adherence. It was developed by Icek Ajzen and aimed to explain how beliefs are related to behavior. Ajzen proposed that there are three components of behavioral intention including attitudes, subjective norms, and perceived behavioral control (1991). For this evidence-based practice project, an educational intervention would aim to affect how clinic staff, including psychiatric providers, perceive metabolic

monitoring. Improving attitudes and behavioral intention towards metabolic monitoring will be essential to motivate providers. When clinic staff and providers feel confident that they are able to manage and intervene appropriately, they will have improved intentions to do so.

Implementation Framework

The evidence-based practice (EBP) model known as The Rosswurm and Larabee Model for Change (see Appendix B2) was chosen to guide the implementation of the project. The Rosswurm and Larabee Model for Change is a six-step process that consists of (1) assessing the need for change, (2) linking the problems and interventions, (3) synthesizing the best evidence, (4) designing a practice change, (5) implementing and evaluating a change to practice and (6) integrating and maintaining a change to practice (Rosswurm & Larrabee, 1999). This model gives step-by-step guidance for practice change and has been effective in a variety of inpatient and outpatient settings. This model was chosen for this project as it guides changes from assessment of the need for change and ultimately through the process of integrating and maintaining change which is necessary for making meaningful improvements regarding metabolic monitoring.

Implications for Practice Change

Metabolic monitoring of patients taking antipsychotics is critical. Prevention and early intervention of metabolic abnormalities can improve patients' lives and take the undue burden off healthcare systems already overwhelmed by high rates of preventable disease. Clear guidelines on monitoring intervals have been long established; however, rates of monitoring remain low. Evidence from research on metabolic monitoring is abundant, and yet no single intervention stands out as a best practice. Interventions that have been shown to increase monitoring rates

include provider education, patient education, EHR alerts, lab order sets, audits, providing patients directions to laboratories, and utilizing metabolic monitoring forms.

A multifaced intervention consisting of an educational presentation for all clinic staff and the distribution of metabolic monitoring guideline cards was proposed due to feasibility and the limited timeframe of the project. An educational intervention would seek to improve knowledge regarding monitoring interval guidelines, which would then improve patient education. Metabolic monitoring guideline cards would remind staff in real-time that a patient is due for lab testing/weigh-in at specified intervals per guidelines. Initial data collection would include determining the number of patients in the clinic taking antipsychotic medications and rates of current metabolic monitoring. Determining the clinic's current metabolic monitoring data will help determine which component of metabolic monitoring is most deficient. Possible outcomes that can be measured are provider knowledge, patient knowledge, and rates of metabolic monitoring. The stakeholders for this project include nurse practitioners, nurses, staff members within the clinic, patients, and their families.

Methods

Setting/Stakeholders

This project was implemented at an outpatient mental health clinic in the Southwest that serves adults seeking mental health services. This clinic had self-reported that metabolic monitoring rates within the clinic remain low. This clinic offers mental health care services, including counseling and medication management for adults. Many patients in the clinic receive Medicaid and Medicare Services. The Center for Medicaid and Medicare Services (CMS) is significantly invested in improving metabolic monitoring rates. The clinic currently employs three psychiatric mental health nurse practitioners (PMHNP). Stakeholders include the nurse

practitioners (NPs), the medical director, and office support staff, including the medical assistant, the secretary, the case manager, the nurse, and patients and their family members. The NPs played a vital role in this project as they will be the basis of intervention and evaluation. Office support staff also played an important role because they are the ones who set up appointments and take blood pressure and weights at in-office appointments. Patients inherently were critical stakeholders as the project was aimed at improving their outcomes. The entire clinic staff and their interdisciplinary communication were critical for the success of the project.

Participants and Recruitment

The participants of the project included five staff members within the outpatient clinic. Specifically, two PMHNPS, one clinic manager, one case manager, and one support manager. Participation in the project was voluntary. Participants were recruited with posters and by word of mouth. The project intervention focused on improving staff knowledge regarding metabolic monitoring guidelines, so inclusion criteria will include all clinic staff. There were no exclusion criteria for staff to participate in this project. Clinic staff meet every Thursday for a weekly staff meeting. Therefore, the educational intervention was scheduled during this time. The intervention consisted of an educational presentation focused on improving knowledge and awareness regarding metabolic monitoring and the evidence-based research behind it. The project intervention was an open forum where staff could ask questions to the presenters and their coworkers.

Intervention

This evidence-based project evaluated the following questions: did the project improve the metabolic monitoring of patients, and did the project improve clinic staff

awareness and knowledge of metabolic monitoring? Institutional Review Board (IRB) exemption was granted from The Arizona State University IRB on 8/3/2023 (see Appendix C). The intervention took place on 9/21/2023. The first week of September involved gathering baseline data on patients prescribed SGAs. This included current compliance with metabolic monitoring guidelines, specifically weight collection (as it is the first indication of metabolic dysfunction) at initial appointment, 4 weeks after initiation, and 8 weeks after initiation. This data was pulled from the NextStep electronic health record (EHR) by the clinic and did not include identifiable information. The intervention was an educational presentation aimed at improving awareness and knowledge. First, all clinic staff completed an anonymous pre-test survey consisting of three questions. This pre-test survey asked demographic questions to include role, gender, age, and ethnicity (see Appendix D). In addition to the pre-test, providers were asked to complete the M-BACK (see Appendix F). The M-BACK is an instrument used to assess knowledge change consisting of 16 questions. It has four domains: Barriers, Attitudes, Confidence, and Knowledge, each with four questions. These domains each have four questions, with each question using a Likert scale of 1-5 (one is strongly disagree and five is strongly agree) (Watkins et al., 2017).

Next, clinic staff received a twenty-minute educational presentation on metabolic monitoring consisting of recommended guidelines for metabolic monitoring as established by ADA and APA. This educational presentation was delivered via PowerPoint presentation during the clinic's weekly staff meeting. The presentation encouraged all clinic staff to remind patients to have current weight available at every telehealth appointment. After the presentation, the clinic staff completed the post-intervention survey consisting of the same three questions asked on the pre-test assessment (see Appendix E). Again, providers were asked to complete the M-BACK post-intervention. This will assess if knowledge regarding metabolic monitoring

improved with the educational intervention. Eight weeks after the educational presentation, metabolic monitoring data will be pulled again to assess metabolic monitoring compliance of patients taking SGAs (specifically focused on weight at baseline, 4 weeks, and 8 weeks). Pre-intervention and post-intervention metabolic data will identify if metabolic monitoring rates changed, while the M-BACK will assess if any knowledge change occurred.

Data Collection Plan

There are several points of data that were collected for this evidence-based project. At the start of the project (week zero) the most recent metabolic monitoring rate was obtained from the clinic. This was aggregate data and did not contain any identifiable information. The metabolic rate was determined by focusing on the collection of weight at baseline, 4 weeks after initiation, and 8 weeks after initiation in patients who were started on SGAs in the previous six months. This information was de-identified by the clinic's IT department and sent to me on a password-protected laptop owned by the organization. Specifically, the start dates of patients who were prescribed an SGA, their sequential follow-ups, and whether the patient's weight was collected or not at each appointment.

At week 8 (end of the project), the same report was pulled in the same manner to identify if the metabolic monitoring rate (specifically of weight at baseline, 4 weeks, and 8 weeks) was affected by the educational intervention. These rates were compared to determine if a change in metabolic monitoring occurred. During the intervention a pre/post survey that included demographic data and pre/post M-BACK were completed by participants. These were printed and participants were instructed to use a unique identifier to keep results anonymous. The percentage of compliance of metabolic monitoring will be compared at week zero and again at week eight (which will be eight weeks after project implementation). The pre/post M-BACK,

pre/post questionnaire, and clinic metabolic monitoring rates at week zero and week 8 will be compared to determine if a change in awareness and knowledge of metabolic monitoring improves overall rates of monitoring.

Outcomes Measures

This evidence-based project consists of an educational intervention that is intended to increase overall rates of metabolic monitoring within an outpatient mental health clinic. The educational intervention itself is aimed at increasing knowledge and, thus, awareness of metabolic monitoring guidelines. Therefore, the key outcome measure of this project is the level of knowledge regarding metabolic monitoring. The secondary measure is if a change in knowledge affects the clinic's metabolic monitoring rate. The pre/post survey and pre/post-M-BACK will illustrate if a change in knowledge occurred.

Improving knowledge of metabolic monitoring guidelines is then likely to increase adherence to established metabolic monitoring guidelines. Increased adherence to established metabolic monitoring guidelines would then increase the rates of metabolic monitoring within the clinic. Knowledge is an important outcome measure for this project, especially considering the important role clinic staff plays in metabolic monitoring. The Theory of Planned Behavior illustrates that improved attitudes and perceived control of a situation improve the likelihood of compliance (Azjen, 1991). Therefore, increased awareness and knowledge of metabolic monitoring in this project should improve adherence to metabolic monitoring guidelines.

Instruments

Knowledge of metabolic monitoring will be measured using a valid and reliable tool known as the M-BACK (see Appendix E). The M-BACK is an instrument used to assess knowledge change consisting of 16 questions. The M-BACK has four domains: Barriers,

Attitudes, Confidence, and Knowledge each with four questions. These domains each have 4 questions with each question using a Likert scale 1-5 (1 is strongly disagree and 5 is strongly agree). The barrier domain assesses barriers to metabolic monitoring and intervention. The attitudes domain assesses attitudes toward metabolic monitoring. The confidence domain assesses confidence in implementing interventions. The knowledge domain assesses overall knowledge of metabolic health. Scores can range from 16 to 80 (80 being the highest score). The content used within the M-BACK was developed via an extensive literature review and then further clarified by an expert review panel. The reliability of this instrument was examined using test-retest reliability for each question. According to Watkins et al. (2017), test-retest reliability was done using intraclass correlation coefficients (ICC) using a two-factor mixed effects model as this is most preferred for Likert-type scale questions. Thirty-one students then completed the M-BACK on two occasions (7 days apart) and ICC scores were calculated. It was found that there was a high degree of reliability between the scores at each time.

The M-BACK was explicitly designed to be used within the nursing field. However, several participants in this EBP project are not nursing affiliated. Therefore, in addition to the M-BACK a three-question survey referred to as the pre/post survey was created by the author to determine knowledge of clinic staff. The three questions assessed what should be monitored when starting an SGA at baseline, 4 weeks, and 8 weeks appointments according to established guidelines. These questions were in multiple-choice format with five possible answers.

Data Analysis Plan

Data was obtained from questionnaires completed by staff in week zero (M-BACK/ pre-test) and then (M-Back/post-test) at week eight. The metabolic monitoring percentages for week zero and week eight will be compared to see if there was an increase, decrease, or no change in

metabolic monitoring rates over the 8 weeks. Descriptive statistics will be used to analyze the data in this project. The use of inferential statistics is not appropriate for the pre/post survey as it is not valid or reliable. While the M-BACK is a valid and reliable tool there were only two participants who completed it. Descriptive statistics will be performed utilizing Intellectus software.

Budget

The budget for this project was minimal. The direct costs of this project included office supplies estimated at $20. Another budget cost would be a subscription to Intellectus software, which is about $100. The projected total cost of the project is $120 (see Appendix G). The total projected savings from improving metabolic monitoring rates would be impossible to quantify but would benefit the clinic through improved funding and improved quality of life of patients. No direct funding was provided, and all expenses were covered by the principal investigator.

Ethical Considerations

The development of metabolic syndrome is a top concern in outpatient mental health settings. Patients taking SGAs are at an increased risk of developing metabolic syndrome and thus are at greater risk of developing diabetes, heart disease, and stroke. This mental health clinic serves a low-income population who due to socioeconomic factors are at an even higher risk of acquiring metabolic syndrome. Improving adherence to metabolic monitoring guidelines will allow for earlier detection and intervention of metabolic syndrome leading to improved patient outcomes and decreased burden on healthcare systems.

Anonymity and confidentiality were prioritized in this evidence-based project. Participants filled out surveys using a generated ID consisting of the last two digits of their phone number and the first letter of their city of birth. Survey answers were inputted into an

agency-issued and password protected computer using generated IDs. Physical copies of the questionnaires were stored in a locked cabinet at the clinic. Aggregate data was obtained from electronic health records generated reports and de-identified by the clinic to measure metabolic monitoring rates and no personal data was collected or used in this project. Participation in the project was voluntary. There was no deviation from the standards of care provided in an outpatient mental health setting. This project was granted ASU IRB exemption before implementation began.

Results

Descriptive Statistics

Descriptive statistics were used to describe the sample and outcome variables. Intellectus software was used to analyze data. The sample (n=5) were all staff at the outpatient mental health clinic.

Frequencies and Percentages

Frequencies and percentages were calculated for gender, ethnicity, professional title, and pre/post-intervention weight collection at baseline, at the 4-week follow-up, and at the 8-week follow-up.

Gender, Ethnicity, and Professional Title

The sample consisted of 60% (n=3) female and 40% (n=2) male participants. The majority of participants reported their ethnicity as Caucasian 60% (n=3). The most common professional title was PMHNP, 40% n=2. The frequencies and percentages for gender, ethnicity, and professional title are presented in Table 1.

Table 1
Frequency Table for Gender, Ethnicity, and Professional Title

Variable	*n*	*%*
Gender		
Male	2	40.00
Female	3	60.00
Ethnicity		
Caucasian	3	60.00
Hispanic	2	40.00
Professional Title		
PMHNP	2	40.00
Shared Services Manager	1	20.00
Support Manager	1	20.00
Case Manager	1	20.00

Pre-Intervention Metabolic Monitoring Rate

The average percentage of patients who had their weight collected at baseline before the intervention was 70% (n = 16). The average percentage of patients who had their weight collected at their 4-week follow-up appointment before the intervention was 78% (n=18). The average percentage of patients who had their weight collected at their 8-week follow-up before the intervention was 78% (n = 18). Table 2 presents the frequencies and percentages for the pre-intervention weight collection at baseline, 4 weeks, and 8 weeks.

Table 2
Frequency Table for Pre-intervention weight collection at baseline, 4 weeks, and 8 weeks

Variable	*n*	*%*
Baseline Weight		
Yes	16	70
No	7	30
Week 4 Weight		
Yes	18	78
No	5	22

Table 2
Frequency Table for Pre-intervention weight collection at baseline, 4 weeks, and 8 weeks

Variable	*n*	*%*
Week 8 Weight		
Yes	18	78
No	5	22

Post-Intervention Metabolic Monitoring Rate

The average percentage of patients who had their weight collected at baseline after the intervention was 100% (*n* = 5). The average percentage of patients who had their weight collected at their 4-week follow-up appointment after the intervention was 100% (*n*=5). The average percentage of patients who had their weight collected at their 8-week follow-up after the intervention was 100% (*n* = 5). Table 3 presents the frequencies and percentages for the post-intervention weight collection at baseline, 4 weeks, and 8 weeks.

Table 3
Frequency Table for Post-Intervention weight collection at baseline, 4 weeks, and 8 weeks

Variable	*n*	*%*
Baseline Weight		
Yes	5	100.00
No	0	0.00
Week 4 Weight		
Yes	5	100.00
No	0	0.00
Week 8 Weight		
Yes	5	100.00
No	0	0.00

Summary Statistics

Summary statistics were calculated for years of age, years in practice, pre-intervention survey score and the post-intervention survey score, pre-intervention M-BACK score and post-intervention M-BACK score. The pre/post- intervention surveys were created by the author. They are identical and contained 3 questions, each question was worth 1 point with a maximum score of 3 points. The M-BACK was 16 questions and used a Likert-scale (1-5) with a maximum score of 80.

Age and Years in Practice

The ages of participants ranged from 24 to 47. The average age of the participants was 35.20 (*SD* = 10.57). The number of years in practice ranged from 4 to 8 years. The average time in practice was 5.50 years (*SD* = 1.87). The summary statistics can be found in Table 4.

Table 4
Summary Statistics Table for Age and Years in practice

Variable	*M*	*SD*	*n*	Min	Max
Age	35.20	10.57	5	24.00	47.00
Years in practice	5.50	1.87	5	4.00	8.00

Pre/Post-Intervention Survey

The pre-intervention survey had an average score of 1.80 (*SD* = 0.84) points with scores ranging from 1 point to 3 points. The post-intervention survey had an average score of 2.80 (*SD* = 0.45) points with scores ranging from 2 points to 3 points. The summary statistics can be found in Table 5.

Table 5
Pre-intervention survey and post-intervention survey scores

Variable	*M*	*SD*	*n*	Min	Max
Pre-intervention survey	1.80	0.84	5	1.00	3.00
Post-intervention survey	2.80	0.45	5	2.00	3.00

Pre/Post-Intervention M-BACK

The M-BACK was completed by the providers who participated in the project (n=2). The pre-intervention M-BACK had an average score of 60.00 (*SD* = 1.41) points, with scores ranging from 59 to 61. The post-intervention M-BACK had an average score of 63.00 (*SD* = 1.41) with scores ranging from 62 to 64. The summary statistics can be found in Table 6.

Table 6
Pre-intervention M-BACK and Post-intervention M-BACK

Variable	*M*	*SD*	*n*	Min	Max
Pre-intervention M-BACK	60.00	1.41	2	59.00	61.00
Post-intervention M-BACK	63.00	1.41	2	62.00	64.00

Discussion

This project did not produce statistically significant results, given the exclusive use of descriptive statistics. The two outcome variables being measured were (1) knowledge regarding metabolic monitoring and (2) rate of metabolic monitoring. Knowledge of clinic staff was measured by the pre/post-intervention survey (n=5) and knowledge of providers was measured by the pre/post M-BACK (n=2). The results of the pre/post-intervention survey demonstrated that the intervention may have been effective. The pre/post survey was completed by all participants (n=5). The pre-survey average score was 1.8 out of 3. After the intervention, survey scores increased to 2.8 out of 3. The increase in scores may be attributed to improved knowledge regarding metabolic monitoring after the intervention; however, this is difficult to ascertain given the limited research available regarding an educational intervention for non-clinical clinic staff. Future research could investigate whether improving non-clinical clinic staff knowledge of metabolic monitoring affects metabolic monitoring rate.

The average pre-intervention M-BACK score was 60 out 80. The average post-intervention M-BACK score increased to 63 out of 80. Of the two participants, each one had an increased score post-intervention. Again, this may be attributed to improved knowledge after the

intervention. These findings would align with previous studies that have found that educational interventions improve provider knowledge. Future research on this topic could evaluate which types of educational interventions work best to improve metabolic monitoring rates.

The percentage of patients who had their weight obtained at their initial appointment when starting an SGA (baseline) before the intervention was 70% (n=16). This increased to 100% post-intervention (n=5). The percentage of patients who had weight obtained at their 4-week follow-up and 8-week follow-up before the intervention was 78% (n=18). The percentage of patients who had their weight obtained at their 4-week and 8-week follow-ups after the intervention increased to 100% (n=5). There is a clear increase in weight collection from before the intervention to after the intervention. However, it's important to note the large difference in the sample sizes. In the six months before the intervention 23 patients at the clinic were started on SGAs. In the eight weeks after the intervention, only five patients were started on SGAs. Ultimately, it does appear that improving knowledge of metabolic monitoring results in improved metabolic monitoring.

Impact of Project

In response to the increasing use of second-generation antipsychotics to treat mental health conditions and concurrent poor metabolic monitoring that occurs in outpatient mental health clinics this project aimed to increase clinic staff awareness and knowledge regarding metabolic monitoring. Metabolic monitoring guidelines for patients taking SGAs have been in place since the early 2000s and yet outpatient clinics continue to struggle to monitor patients appropriately. This project used a cost-effective and feasible educational intervention to improve knowledge among all staff in the clinic. Previous studies have only addressed the knowledge gap that exists with providers.

Clinic staff interact with patients for various reasons, including scheduling appointments, follow-up with resources, appointment reminders, and well-being check-ins. When clinic staff understand the importance of metabolic monitoring and the appropriate monitoring guidelines,

they can encourage patients to be seen in person as opposed to telehealth. They can also encourage patients to have a current weight available if their appointment needs to be done via telehealth. While the project findings were unable to be statistically proven, the educational intervention appears to have improved the metabolic monitoring rate of the clinic. The findings indicate that education regarding metabolic monitoring can improve monitoring rates. Any improvement in the rate of metabolic monitoring, regardless of clinical significance, ultimately helps the patient and improves outcomes.

Limitations

There were several limitations to this evidence-based project including a small sample size. Only five members of the staff participated in the educational intervention. Another limitation was the use of an author-created pre/post-intervention survey with no validity or reliability. This limited the statistical relevance of the findings. Another limitation of the study was the limited timeframe post-intervention. The pre-intervention metabolic monitoring rate looked at patients who started SGAs in the six months prior to intervention however, the post-intervention metabolic monitoring rate was only able to look at patients who had started SGAs in the last two months. This was because the clinic was transitioning to a new electronic health record (EHR).

Another significant limitation of the study was that weight collection was used synonymously with metabolic monitoring. While weight gain is usually the first indication of dysfunction in patients taking SGAs and most consequential, it is not the only component. Metabolic monitoring also consists of obtaining medical history, weight, waist circumference, blood pressure, fasting glucose, and fasting lipids. The EHR the clinic was using during the project did not allow for this data to be pulled efficiently. Documentation of lab results was difficult to obtain as the clinic was scanning lab orders in a separate area. This information could

not be pulled into an aggregate report as it would need to be obtained through chart review which would require informed consent from patients.

Sustainability

This project aimed to improve the metabolic monitoring of patients taking SGAs in an outpatient mental health clinic in Phoenix. The project consisted of an educational intervention to improve knowledge regarding metabolic monitoring as it relates to SGAs and, specifically, metabolic monitoring guidelines established by the ADA/APA. Each staff member at the clinic received a small, laminated card with established monitoring guidelines that will allow for quick reference of these guidelines. Metabolic monitoring per guidelines will continue as the site champion will continue monthly monitoring of metabolic data. The educational intervention material will be given to the site champion so that it can be shared with new hires. The goal of this project is to improve metabolic monitoring rates and sustain improved metabolic monitoring rates.

According to Kilbourne et al. (2019), for sustainability to occur a project must be managed internally versus being managed by external forces. The locus of control will be given to the site champion once the initial implementation is completed. The continuation of this evidence-based project will allow for realization of the desired long-term outcomes which include meeting metabolic monitoring metric for Centers for Medicare and Medicaid Services (CMS), increased patient and provider collaboration, improved physical health and quality of life for patients, increased funding for the clinic, and then ultimately reduced burden on healthcare systems.

Conclusion

Patients experiencing mental illness are at increased risk of psychosocial and lifestyle risk factors that negatively affect their health. SGAs can significantly improve psychiatric symptoms but, in turn, have troubling metabolic side effects. Appropriate metabolic monitoring can help mitigate these side effects. Despite this, metabolic monitoring rates remain low in outpatient mental health clinics. This project aimed to improve provider knowledge using an educational intervention (PowerPoint presentation) focused on improving awareness and knowledge of metabolic monitoring guidelines to improve patient outcomes. Additionally, metabolic monitoring guideline cards were disseminated to all staff.

Statistically significant results were not obtained due to the exclusive use of descriptive statistics. The results of the projects demonstrated that staff knowledge improved after the intervention and that the metabolic monitoring rate improved after the intervention. Improving metabolic monitoring of patients taking antipsychotics is critical. Prevention and early intervention of metabolic abnormalities can improve patients' lives and take the undue burden off healthcare systems already overwhelmed by high rates of preventable disease. Providing clinic staff education on the topic was a feasible option for targeting the problem of poor metabolic monitoring rates.

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Appendix A

Evaluation and Synthesis Tables

Table A1

Evaluation Table for Quantitative Studies

Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Kreyenbuhl et al., 2017. A Randomized Controlled Trial of a Patient-Centered Approach to Improve Screening for the Metabolic Side Effects of Antipsychotic Medications. **Country**: United States **Funding**: This study was funded by a U.S. Department of Veterans Affairs Health Services	The Health Promotion Model	**Design:** RCT **Purpose:** To test whether a computerized, patient-centered intervention that educated Veterans with serious mental illness about the side effects encouraged them to advocate for monitoring (compared to ETAU)	**N=** 239 **Demographics:** Mean age 54.3 (mostly male, white, and veteran) **Setting:** 2 VA clinic's **Exclusion:** 1272 people excluded. (Those less than 18 or greater than 70). Patients needed to be on an oral or injectable had at least two outpatient visits with the prescribing	**IV1:** computerized intervention (an educational program on the metabolic side effects of antipsychotic medications) was delivered in less than 15 min and could be made available to patients via kiosks in waiting areas prior to prescriber visits or alternatively, on secure websites on computers or smartphones for viewing at the	**Tools:** Chart reviews for metabolic monitoring. and BASIS-24 survey used for baseline survey to determine psychiatric symptom severity as part of demographic information **Validity/ Reliability:** Article reports BASIS-24 is an "adequate tool" with those who have serious mental illness.	**Statistical Tests Used:** Chi square or fisher's exact	The mean proportion of days adherent in the total sample was high, ranging from 0.94 to 0.97 for LDL and HDL cholesterol, triglycerides, and blood glucose/HbA1c. The mean proportion of days adherent was somewhat lower for weight (.79) and blood pressure (.81) monitoring. No significant differences were	**Level of Evidence:** II **Strengths:** randomization, non-invasive **Weakness:** may not be generalizable to public, VA clinics offer mental health and medical services making it easier to obtain labs and metabolic data **Feasibility:** This would be difficult to implement outside of VA because of lack of patient interface in most outpatient mental health clinics

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Research and Development Merit Award (IIR-07-256) to Dr. Kreyenbuhl **Bias**: No conflicts of interest directly reported but funding was received from VA			psychiatrist/NP in the past year, were deemed by the prescriber to be clinically stable to participate in the study, and had at least a fourth grade reading level **Attrition:** 38 participants did not complete the study (15.9%)	patient's convenience. **DV1:** Metabolic monitoring rates per guidelines vs ETAU (educational pamphlets) DV2: follow up rates for abnormal values. **Definitions:** ETAU=enhanced treatment as usual			found between the two treatment groups in the proportion of days adherent to monitoring guidelines for any of the six metabolic parameters. **DV1:** the intervention did not increase the proportion of days participants' care adhered to metabolic monitoring recommendations relative to a comparison group provided educational pamphlets. **DV2:** the computer intervention did not differentially impact receipt of or the results of	**Application:** A computerized educational intervention is not any more effective than standard educational pamphlets in regard to improving monitoring rates. In general, involving patients in monitoring their metabolics can help improve rates of monitoring

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
							follow up metabolic monitoring, or receipt of relevant medical services, in Veterans identified as having abnormal metabolic parameter values	
Soda et al., (2021) Systematic quality improvement and metabolic monitoring for individuals taking antipsychotic drugs **Country:** United States **Funding:** Dr. Jarskog has received research grant funding from	Health Belief Model	**Design:** prospective quasi-experimental, interrupted time-series design with data from the electronic health record (EHR) **Purpose:** To increase rates of metabolic monitoring in patients taking antipsychotic drugs in an outpatient SMI clinic	**N=** 1719 **Demographics:** Patients at an outpatient SMI clinic. Majority female, single, white, primary diagnosis of anxiety or MDD **Setting:** Outpatient SMI clinic **Exclusion:** Patients at the clinic not taking	**IV1:** QI measures- EHR alert, provider education, and patient education **DV1:** rates of monitoring for HbA1C and lipids	**Tools:** obtained data before, during, and after intervention from EHR **Validity/ Reliability:** Potential for error in transcription of data	**DV1:** rates of HbA1C and lipid monitoring significantly increased [primary outcome]: b=0.15, z=9.1, p<0.001) **Statistical Tests Used:** generalized linear mixed effects models **DV2 -** Sustainment	**DV1:** monitoring of HbA1C and lipids increased from 33% to 49% **DV2:** Sustainment of improved rates **Statistical Tests Used:** Mean of monitoring rates were compared from chart data	**Level of Evidence:** Level III, peer reviewed **Strengths:** compared data pre and post intervention from EHR, reliable **Weakness:** experiment occurred in context of one clinic with one specific EHR **Feasibility:** Providing education to providers and patient is feasible, using EHR

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Auspex/Teva, Boehringer-Ingelheim, and Otsuka and has served as a consultant to UpToDate and Bracket. **Bias:** There is inherent bias due to self-identified research grant funding from pharmaceutical companies.			antipsychotic medication were excluded **Attrition:** n/a			of improved rates (from EMR) **Statistical Tests Used:** Mean of monitoring rates were compared		notification is less feasible **Application:** This is a feasible and practical approach supported by literature to help improve metabolic monitoring rates
Melamed et al., (2019). Interventions to Improve Metabolic Risk Screening Among Adult Patients Taking Antipsychotic Medication: A Systematic Review. **Country:** USA, UK, Canada, Ireland,	Theoretical Domains Framework of Behavior Change	**Design:** systematic review of interventions that target metabolic risk screening of adult patients taking antipsychotic medication with the objective of improving screening rates to the level recommended by clinical guidelines. **Purpose:**	**N=** 30 articles **Demographics:** Varied due to methodology **Setting:** outpatient and inpatient mental health facilities **Exclusion:** Did not include studies with	**IV1:** interventions for metabolic monitoring **DV1:** assessment of articles with interventions for metabolic monitoring	**Tools:** Review of articles **Validity/ Reliability:** Date extraction criteria outlined in the Cochrane Handbook for Systematic Reviews of Interventions	**DV1:** 16 studies were rated as weak (due to uncontrolled audit cycle designs) **Statistical Tests Used** Data extraction	**DV1:** 9 interventions were identified; most interventions were successful. The median metabolic screening rates for glucose (28% to 65%), lipids (22% to 61%), weight (19% to 67%), and BP (22% to 80%) up	**Level of Evidence:** very high, PRISM guidelines followed **Strengths:** Systematic review **Weakness:** demographic data not reported, small sample **Feasibility:** Systematic reviews are time intensive.

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Malaysia, Taiwan, and Australia **Funding:** None reported **Bias:** Dr. Melamed acknowledges receipt of support from the Medical Psychiatry Alliance at the Centre for Addiction and Mental Health. Dr. Taylor reports working for Sunovion on creation of a CME event and participation on advisory boards for Novo Nordisk and Valeant		Antipsychotic use and cardiometabolic risk are correlated, guidelines for metabolic screening exist but there is a gap in the integration of this into practice. This systematic review is looking at guidelines that address the gap from guideline to practice	children. Only studies with experimental design were assessed **Attrition:** n/a- retrospective review				to 1/3rd of patients still remained unscreened after intervention	**Application:** New ideas for metabolic monitoring are needed to close the guidance to practice gap
Pereira et al., (2019). Monitoring of	Not identified	**Design:** retrospective chart review	**N=** 54	**IV1:** specified interval monitoring	**Tools:** EMR (EPIC) and Microsoft excel	**DV 1 and 2 Statistical Tests Used:**	**DV1:** 83% monitored for Weight/BMI at	**Level of Evidence:**

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
metabolic adverse effects associated with atypical antipsychotics use in an outpatient psychiatric clinic **Country:** United States **Funding:** None **Bias:** Authors deny funding or conflict of interest		**Purpose:** Identifying metabolic monitoring at recommended intervals to help identify areas of intervention	**Demographics:** female, African American, average age of 45, with diagnosis of one primary psychiatric disorder **Setting:** outpatient mental health clinic **Exclusion:** pregnancy **Attrition:** n/a	**DV1:** percentage of patients monitored according to guidelines **DV2:** percentage of patients with documented PCP	**Validity/ Reliability:** Data collected and transcribed from chart reviews	Descriptive Statistics Chart review	baseline, only 14% monitored for lipids at 12 weeks **DV2:** 63 % had PCP documented in their chart	Level III, peer-reviewed **Strengths:** feasible and generalizable **Weakness:** small sample size, short follow-up period **Feasibility:** Easily replicated **Application:** Further interventions are needed to increase monitoring rates particularly during the 4-, 8-, and 12-week intervals
Bomboy et al., (2021). Improved Prescriber Adherence to Guidelines on Antipsychotic Medication Management Through	Not identified	**Design:** Quality Improvement Project using retrospective chart review **Purpose:** assess effectiveness of implementation of a metabolic	**N=** Clinic A – 174 chart reviews Clinic B- 264 chart reviews **Demographics:** not provided	**IV1:** electronic metabolic monitoring form **DV1:** ordering of metabolic labs by providers	**Tools:** chart audits **Validity/ Reliability:** potential for transcription errors	**Statistical Tests Used:** chi-square test was performed to determine if a relationship existed between the	**DV1:** a positive relationship was found for Clinic A since the number of lab orders increased after the introduction of	**Level of Evidence:** **III, peer-reviewed** **Strengths:** **Weakness:** no demographic data provided

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Increased Access to Metabolic Monitoring Forms. **Country:** United States **Funding:** None reported **Bias:** None reported		monitoring form on the EMR	**Setting:** rural community mental health clinic **Exclusion:** Participants were voluntary **Attrition:** n/a due to design			introduction of the metabolic monitoring form and the ordering of metabolic labs by providers	the metabolic monitoring form	**Feasibility: can be easily replicated** **Application:** Increased clinical support to providers can help increase metabolic monitoring rates
Ali, R., Jalal, Z., & Paudyal, V. (2020). Barriers to monitoring and management of cardiovascular and metabolic health of patients prescribed antipsychotic drugs: a systematic review.	Phenomenology	**Design:** A protocol-led (CRD-42018106002) systematic literature review was conducted by searching Medline, Embase, and PsycINFO databases 2003 until October 2019. Cochrane, Centre for Review and Dissemination (CRD) and PRISMA	**N= 21** studies **Demographics:** not addressed **Setting:** 5 studies-community health 10 studies-secondary care clinics 2-tertiary centers 4-unspecified	**IV1:** metabolic monitoring barriers and interventions **DV1:** themes regarding barriers and interventions of metabolic monitoring	**Tools:** review of articles **Validity/ Reliability:** per authors Cochrane, Centre for Review and Dissemination (CRD) and PRISMA guidelines were followed	**Statistical Tests Used:** Data extractions	**DV1:** fragmentation of care is a key barrier to metabolic monitoring -lack of knowledge and skills regarding screening and monitoring from providers and patients	**Level of Evidence:** very high **Strengths:** strong level of evidence **Weakness:** no demographic data **Feasibility:** can be replicated, timely **Application:** barriers to monitoring, counselling and management of

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Country: America and Europe **Funding:** This work was supported by the University of Birmingham, United Kingdom. RAA is supported for her PhD by the Royal Embassy of Saudi Arabia, London, United Kingdom. The funding body had no roles in the design, conduct, analysis of data and preparation of this manuscript **Bias:** no conflict of interest disclosed		guidelines were followed Studies included: qualitative, cross-sectional, exploratory, and observation **Purpose:** investigate the barriers to monitoring and management of cardiovascular co-morbidities in patients prescribed antipsychotic medicines.	**Exclusion:** Non-english **Attrition:** N/a due to design				-lack of resources -mental health condition is a barrier	cardiovascular and metabolic health of patients taking antipsychotic medicines are multidimensional

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
Cohen et al., (2020). The effect of a computerized best practice alert system in an outpatient setting on metabolic monitoring in patients on second-generation antipsychotics. **Country:** United States **Funding:** None reported **Bias:** No conflict of interest reported	Not addressed in article	**Method:** Retrospective chart review **Purpose:** determine how a BPA is used most often (active vs. passive), who is using the alert (provider type), and for whom it is used (considering patient demographics, diagnoses and SGA used	**N=** 1112 **Demographics:** mean age was 42.6 years and 64.7% of patients were female, 86% Caucasian and 98.2% non-Hispanic. 94.3% of patients had a mood disorder diagnosis, and 83.1% were diagnosed with an anxiety disorder. Thought disorders, in contrast, made up only 22% of the patients. Nearly half of the patients had a cardiovascular (49.6%) and/or metabolic (48.8%) diagnosis. **Setting:** outpatient mental	**IV1**: BPA in EMR **DV1:** metabolic lab order rates for patients who triggered BPA	**Tools:** chart audit (EPIC) Data collected included age, gender, race, ethnicity, diagnoses, medication history, visit dates), provider variables (clinician type and their response to the alert, including which labs they ordered, if any), as well as information from the BPA (time and date of firing, number of times fired and location of BPA triggering **Validity/Reliability:** information transcribed from chart, potential for transcription errors	**Statistical Tests Used:** Multivariable logistic regression (to compare lab rates) All-pairwise post hoc testing was performed on the alert response data with a Bonferroni correction to maintain a Family-Wise Error Rate of $\alpha = 0.05$, for both the P-values and the 95% confidence interval	**DV1:** BPA was found to be an effective tool to increase metabolic monitoring in patients taking SGAs	**Level of Evidence:** III, peer reviewed **Strengths:** good sample size, peer-reviewed, no conflicts of interest **Weakness:** level of evidence, one clinic in one geographic area limits generalizability **Feasibility:** depends on EHR **Application:** BPA are important tools in increasing metabolic monitoring rates

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
			health clinic in Michigan **Exclusion:** No patients were excluded from the study **Attrition:** 0					
Kelly et al., (2022). Minding metabolism: targeted interventions to improve cardio-metabolic monitoring across early and chronic psychosis. **Country:** Ireland **Funding:** none reported **Bias:** none reported	Not identified	**Method:** Chart review **Purpose:** determine the rates of cardio-metabolic monitoring in AP (antipsychotics) treated early and chronic psychosis and to assess the impact of targeted improvement strategies	**N=** 94 (33 were FE first episode baseline, 20 first episode re-audits, and 41 were chronic psychosis) **Demographics:** FEP baseline: age 31, 27% female **FEP re-audit:** age 39, 50% female **Chronic psychosis:** Age 48, 64% female **Setting:** outpatient and inpatient setting in Dublin **Exclusions:** Patients with a primary diagnosis	**IV1:** Implementation of hard-copy evidence-based health parameter checklist, patient educational sessions, and electronic lab order set **DV1:** rates of cardi-metabolic monitoring in FEP groups and chronic psychosis group	**Tools:** EMR **Validity/reliability:** Potential for transcription errors	Fisher's exact in GraphPad was used to determine differences in the proportion of patient records in compliance with standards pre and post-intervention.	In FEP, fasting glucose (39% vs 67%, p=0.05), HbA1c (0% vs 24%, p=0.005) and prolactin (18% vs 67%, p=0.001) monitoring improved.	**Level of Evidence:** III, peer-reviewed **Strengths:** inpatient and outpatient setting **Weakness:** participants from one small geographic area, patients with certain mental health dx were excluded **Feasibility**: would depend on EMR, patient willingness to participate

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization
			of bipolar affective disorder and depression were excluded **Attrition:** No r/t design					**Application: t**argeted improvement strategies resulted in significant improvements in a limited number of cardio-metabolic monitoring parameters in early and chronic psychosis. However, monitoring remained suboptimal in both groups.

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Citation	Theoretical/ Conceptual Framework	Design/ Method/ Purpose	Sample/Setting	Variables	Measurement/ Instrumentation	Data Analysis	Results/ Findings	Level of Evidence; Application to practice. Generalization

Table A2

Evaluation Table for Qualitative Studies

Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling	Sample/ Setting	Major Themes Studied/ Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Themes	Level/ Quality of Evidence; Decision for/ Application to practice; Generalization
Abdulhaq et al., 2021. A Randomized Controlled Trial of a Patient-Centered Approach to Improve Screening for the Metabolic Side Effects of Antipsychotic Medications **Country:** Jordan **Funding:** None reported **Bias:** No conflict of interest reported	Grounded Theory	**Design:** cross-sectional survey **Purpose:** To explore the knowledge, attitudes, practices, and adherence of psychiatrists regarding published guidelines for metabolic monitoring of patients taking SGAs medications, and perceived barriers to metabolic screening.	**Sample:** (n= 91) **Demographics:** 78% were males, 63% were between 30-35 years old **Setting:** Jordanian psychiatric clinics and hospitals **Attrition:** 0	(1) How often SGAs are prescribed? (2)What factors are considered when prescribing SGAs? (3)Psychiatric assessment before and during prescribing SGAs (4)Strategies used to limit	**Data Collection:** Demographic survey and study survey **Data Dependability:** The survey took into account cultural and practice resource considerations in Jordan. It was developed and administered in English as it is the language of medical education and academic medical discourse in	SPSS, non-directional statistic tests were conducted, descriptive statistics	(1) Jordanian psychiatrists prescribe SGAs primarily for psychosis. Conditions like resistant OCD and dementia seemed also to prompt SGAs prescriptions. (2) side effects, availability, cost, and metabolic profile seemed to take high priority for consideration when prescribing SGAs.	**Level of Evidence:** VI **Strengths:** Small N; convenience sample; low level evidence; population demographic homogeneity (limits generalizability) **Weakness:** may not be culturally generalizable as Jordan has unique cultural customs and beliefs

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Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling	Sample/ Setting	Major Themes Studied/ Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Themes	Level/ Quality of Evidence; Decision for/ Application to practice; Generalization
				side effects of SGAs	Jordan. The survey was reviewed and pilot-tested by local psychiatrists.		(3) tendency to conduct assessment for blood pressure, BMI, fasting blood glucose, lipid profile, waist circumference, before starting a patient on SGA than while continuing the prescription. (4) The most commonly reported barriers were the financial burden on the family, lack of family compliance with recommendations of monitoring, and lack of patient compliance with recommendations of monitoring	regarding mental health **Feasibility:** This study involved a survey and would be easily completed by
Mangurian et al., (2019). Opinions of primary care clinicians and	Not identified	**Design:** survey **Purpose:** to compare primary	**N=** 164 PCPs and 56 psychiatrists (220 participants)	Perceived roles in	Questions were drawn from the literature and	The t tests and chi-square were	Most PCPs (66%) believed that PCPs not	**Level of evidence:** VI

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Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling	Sample/ Setting	Major Themes Studied/ Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Themes	Level/ Quality of Evidence; Decision for/ Application to practice; Generalization
psychiatrists on monitoring the metabolic effects of antipsychotics. **Country:** United States **Funding:** none reported **Bias:** Ms. Giwa is currently working as an advisory consultant at PricewaterhouseCoopers. Ms. Brosey is currently working as a Clinical Trial Associate at Aerotek, Inc. The remaining authors have no conflicting or competing interests to report. The contents and views in this manuscript are those of the authors and should not be construed to represent the views of the National Institutes of Health or any of the sponsors		care clinicians' and psychiatrists' attitudes toward metabolic monitoring and treatment of patients with SMI	**Demographics=** primary care clinicians were more likely than psychiatrists to be women (69% vs 39%) **Setting=**large urban integrated public health system.	metabolic monitoring Perceived roles of treatment of metabolic abnormalities Barriers to metabolic monitoring	expert consultation. Attitudes about roles were rated on a 5-point Likert scale. Respondents were asked to identify the 1 "top barrier" that had the largest impact on metabolic screening from 25 possibilities. The survey is publicly available online	used to determine if any clinician demographic characteristics were related to attitudes toward metabolic monitoring or treatment. Multivariate logistic regression analysis was used to examine if clinician characteristics are associated with attitudes toward metabolic monitoring and treatment. Logistic regression used to determine if clinician	psychiatrists should monitor metabolic risk (only 30% of psychiatrists agreed) Both groups believed that treatment of metabolic dysfunction is role of PCP exclusively Reported top barriers for monitoring included insufficient time, resources, and difficulty accessing lab data	**Strengths:** good sample size for design **Weakness:** primary limitation is that it relies on a single urban community safety-net health system **Feasibility**: easy to replicate this survey **Application:** The disconnect between where monitoring and treatment should occur undoubtedly contributes to the poor rates of treatment for metabolic abnormalities among this vulnerable population

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Citation	Theory/ Conceptual Framework	Design/ Method/ Sampling	Sample/ Setting	Major Themes Studied/ Definitions	Measurement/ Instrumentation	Data Analysis	Findings/ Themes	Level/ Quality of Evidence; Decision for/ Application to practice; Generalization
						characteristics were associated with perceived barriers to metabolic monitoring.		

Key: **BPA** Best Practice Alert, **DV** Dependent Variable, **IV** Independent Variable, **ETAU** Enhanced Treatment as Usual**, EMR** Electronic Medical Record**, EHR** Electronic Health Record**, RCT** Randomized Control Trial**, SGA** Second Generation Antipsychotic**, PCP** Primary Care Provider

Table A3

Synthesis Table

Study (Author, year)	Abdullhaq et al., 2021	Ali et al., 2020	Bombay et al., 2021	Cohen et al., 2021	Kelly et al., 2022	Kreyenbuhl et al., 2017	Mangurian et al., 2019	Melamed et al., 2019	Pereira et al., 2019	Soda et al., 2021
Design **LOE**	CS Level II	SR Level I	CR Level III, PR	CR Level III, PR	CR Level III, PR	RCT Level II	S Level VI	SR Level I	CR Level III, PR	QE Level III, PR
Sample										
n subjects	91		438	112	135	239	220	30	54	1719
n articles		21								
Age	30-35			42.6	39.3	54.3		39.3	45	44.4
Other	M			F, C	F	M, C, V		F	F, AF	
Setting										
Outpatient	Y	5	Y	Y	Y	Y	Y	23	Y	Y
Inpatient	Y	10			Y			7		
other	↑	6								
Interventions										
Pt centered	Ne	↑								
PT ED	Ne	↑			↑	↑		↑		
Provider ED	Ne				↑			↑		
EHR alert				↑	↑			↑		↑
Map to laboratory										↑
Met Monitoring Form			↑		↑					
Audits								↑		
Interval Monitoring					↑					
Lab order set										
Outcomes/ Themes										
Rates of abnormal metabolics					H	H				H

Key: **AF** African American **C** Caucasian **CR** Chart Review **CS** Cross-sectional Survey **E** effective **ED** Education **F** Female **H** High **LOE** Level of Evidence **L** Low **M** Male **Ne** Needed **PR** Peer Reviewed **PT** Patient **QI** Quality Improvement **RCT** Randomized Control Trial **S** Survey **SR** Systematic Review **V** Veteran **Y** Yes

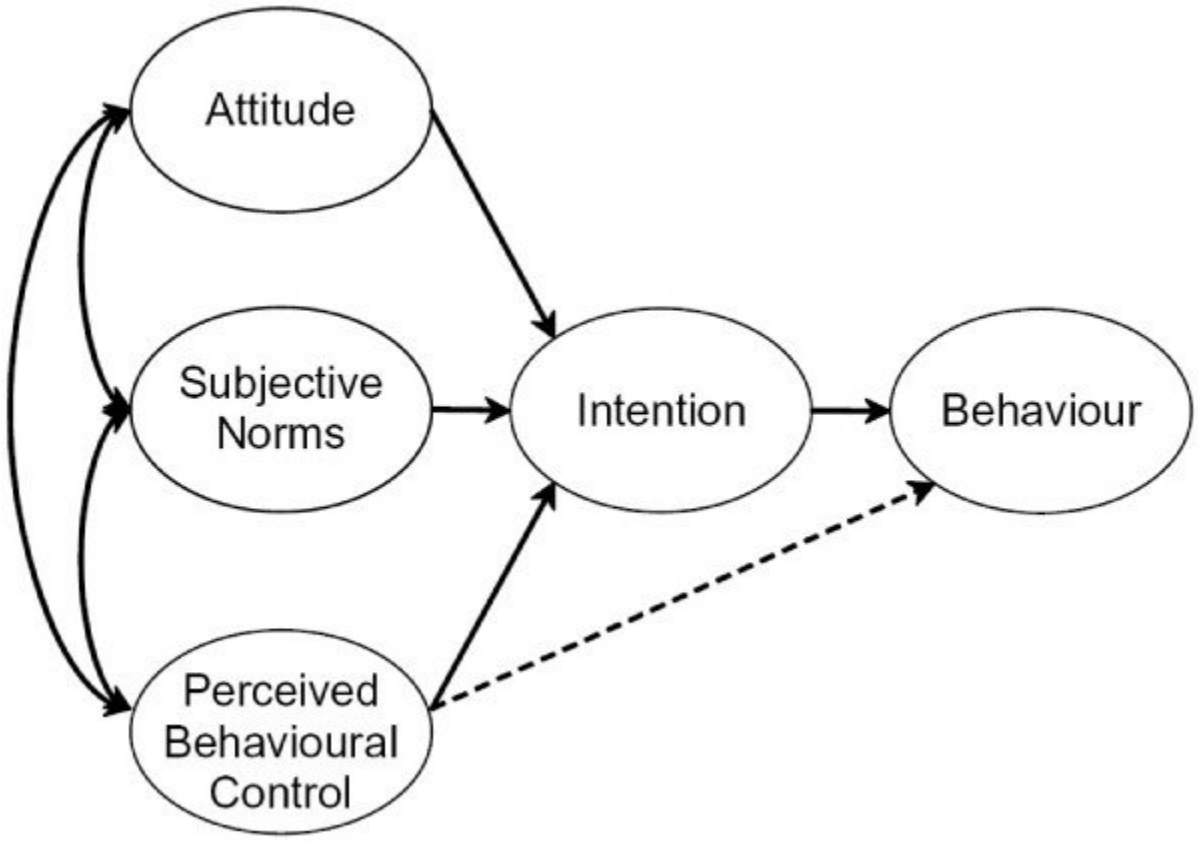
Study (Author, year)	Abdullhaq et al., 2021	Ali et al., 2020	Bombay et al., 2021	Cohen et al., 2021	Kelly et al., 2022	Kreyenbuhl et al., 2017	Mangurian et al., 2019	Melamed et al., 2019	Pereira et al., 2019	Soda et al., 2021
Rates of monitoring with intervention	L	L			L			L	L	
Barriers persist-new interventions needed	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Fragmented care		Y					Y			

Key: **AF** African American **C** Caucasian **CR** Chart Review **CS** Cross-sectional Survey **E** effective **ED** Education **F** Female **H** High **LOE** Level of Evidence **L** Low **M** Male **Ne** Needed **PR** Peer Reviewed **PT** Patient **QI** Quality Improvement **RCT** Randomized Control Trial **S** Survey **SR** Systematic Review **V** Veteran **Y** Yes

Appendix B

Models and Frameworks

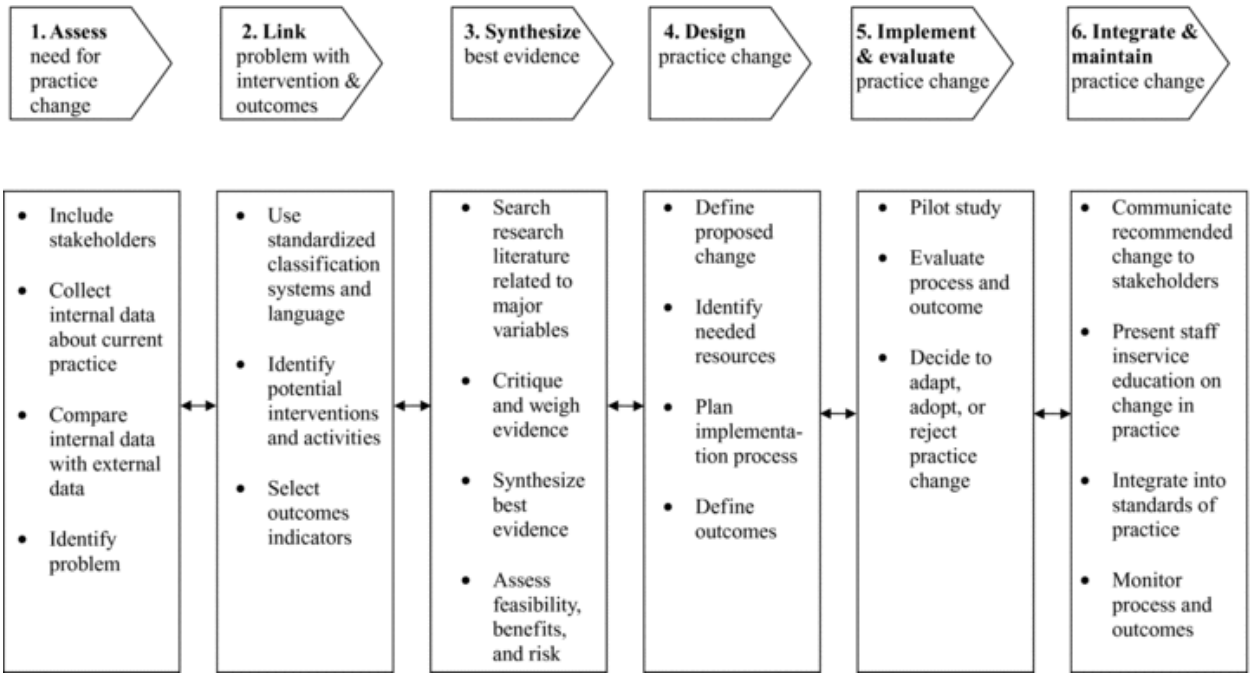
Figure B1
Theory of Planned Behavior



(Ajzen, 1991)

Figure B2

Rosswurm and Larrabee Model



(Russwurm & Larrabee, 1999)

Appendix C

ASU IRB Exemption

ASU Knowledge Enterprise Development

EXEMPTION GRANTED

Zita Schiller
EDSON: DNP
-
Zita.Schiller@asu.edu

Dear Zita Schiller:

On 8/3/2023 the ASU IRB reviewed the following protocol:

Type of Review:	Initial Study
Title:	"Impact of Educational Intervention on Rates of Metabolic Monitoring in Adults Taking Second-Generation Antipsychotics"
Investigator:	Zita Schiller
IRB ID:	STUDY00018333
Funding:	None
Grant Title:	None
Grant ID:	None
Documents Reviewed:	• CITI Training , Category: Other; • CPR Letter of Agreement , Category: Other; • CPR Notice of Privacy Practices for Protected Health Information, Category: Other; • DNP project flyer, Category: Recruitment Materials; • Educational Presentation Overview, Category: Technical materials/diagrams; • MBACK Permission , Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Post-Educational Assessments, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Pre-Educational Assessments, Category: Measures (Survey questions/Interview questions /interview guides/focus group questions); • Reminder Card for participants , Category: Technical materials/diagrams;
	• Revised Consent, Category: Consent Form; • Revised IRB Social Behavioral Protocol, Category: IRB Protocol; • Zita Schiller citiCompletionCertificate_3456569_50047263 (1).pdf, Category: Other; • Zita Schiller citiCompletionReport_3456569_50047263.pdf, Category: Other;

The IRB determined that the protocol is considered exempt pursuant to Federal Regulations 45CFR46 (2)(ii) Tests, surveys, interviews, or observation (low risk) on 7/27/2023.

When consent is appropriate, you must use final, watermarked versions available under the "Documents" tab in ERA-IRB". Since the draft HIPAA authorization will not be used, the HIPAA authorization form from ASU can be removed from the protocol.

In conducting this protocol you are required to follow the requirements listed in the INVESTIGATOR MANUAL (HRP-103).

If any changes are made to the study, the IRB must be notified at research.integrity@asu.edu to determine if additional reviews/approvals are required. Changes may include but not limited to revisions to data collection, survey and/or interview questions, and vulnerable populations, etc.

Sincerely,

IRB Administrator

cc: Erica Murphy
Zita Schiller
Erica Murphy

Appendix D

Pre-test

Pre-Educational Assessment

Participation in completing this questionnaire is voluntary and all answers will be anonymous and confidential.

Please create an ID for your questionnaire using the last three digits of your phone number and the first letter of your city of birth. For example, my ID would be: 799B.

ID_____

Demographics

First, I would like to get to know more about your please complete the following questions:

Age (years) _____

Please, place an "x" to answer the following question

Gender Male _____ Female _____ Other_____ (specify)

Ethnicity Caucasian _____

African American/Black _____

Hispanic/Latino _____

Asian

Pacific Islander

Native American

Other _____ (specify)

What is your professional title? _____

How many years have you been in practice (years) _____

Please circle the correct answer

1. **Which of the following best describes the metabolic data that should be obtained when initially starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. BMI, fasting plasma glucose, and fasting lipid profile
   b. personal/family history, weight (BMI), waist circumference, blood pressure, fasting plasma glucose, and fasting lipid profile
   c. personal/family history, waist circumference, height, heart rate
   d. weight, waist circumference, and fasting plasma glucose

2. **Which of the following metabolic data is most important to obtain at 4 weeks after starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. weight
   b. family history
   c. fasting plasma glucose
   d. temperature
   e. fasting lipid profile

3. **Which of the following metabolic data is most important to obtain at 8 weeks after starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. HgbA1C
   b. height
   c. weight
   d. heart rate
   e. fasting lipid profile

Score: ____ / 3

Appendix E

Post-test

Post-Educational Assessment

Participation in completing this questionnaire is voluntary and all answers will be anonymous and confidential.

Please create an ID for your questionnaire using the last three digits of your phone number and the first letter of your city of birth. For example, my ID would be: 799B. This should match the ID used in the pre-educational assessment.

ID_____

1. **Which of the following best describes the metabolic data that should be obtained when initially starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. BMI, fasting plasma glucose, and fasting lipid profile
   b. personal/family history, weight (BMI), waist circumference, blood pressure, fasting plasma glucose, and fasting lipid profile
   c. personal/family history, waist circumference, height, heart rate
   d. weight, waist circumference, and fasting plasma glucose

2. **Which of the following metabolic data is most important to obtain at 4 weeks after starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. weight
   b. family history
   c. fasting plasma glucose
   d. temperature
   e. fasting lipid profile

3. **Which of the following metabolic data is most important to obtain at 8 weeks after starting a second-generation antipsychotic (SGA) per established metabolic monitoring guidelines?**

   a. HgbA1C
   b. height
   c. weight
   d. heart rate
   e. fasting lipid profile

Score: ____ / 3

Appendix F

M-BACK Questionnaire

The M-BACK Questionnaire

1. My workload prevents me doing any health promotion activities with consumers.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

2. Consumers with a severe mental illness are not interested in improving their physical health.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

3. Informing clients about the possible effects medications may have on their physical health will increase non-adherence.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

4. Screening for metabolic syndrome and physical health interventions are pointless as poor physical health outcomes are unavoidable.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

5. Metabolic health screening is an important part of my role as a mental health clinician.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

6. Giving smoking cessation advice is an important part of my role as a mental health clinician.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

7. Encouraging consumers to increase their level of physical activity is an important part of my role as a mental health clinician.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

8. Discussing nutritional intake is an important part of my role as a mental health clinician.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

9. I am confident in my ability to screen for metabolic syndrome.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

10. I am confident in providing smoking cessation advice to consumers.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

11. I am confident in prescribing exercise interventions to prevent / treat metabolic syndrome.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

12. I am confident in using dietary interventions to prevent / treat metabolic syndrome in consumers.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

13. I have a good knowledge of metabolic syndrome.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

14. I understand how to screen for metabolic syndrome.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

15. I understand how to read pathology reports for lipids and glucose results.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

16. I understand the metabolic side-effect profiles of different neuroleptic medication.

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

Appendix G

Budget

Phase	Activities	Cost	subtotal	Total
Preparation	Design/email educational materials to potential audiences	$20	$20	$20
	Create educational presentation	$0	$0	$0
Evaluation	Intellectus subscription	$100	$100	$100