THE IMPORTANCE OF NUTRITION WITH CONCURRENT USE OF ATYPICAL ANTIPSYCHOTIC MEDICATION

by

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A DNP Project Submitted to the Faculty of the

COLLEGE OF NURSING

In Partial Fulfillment of the Requirements

For the Degree of

DOCTOR OF NURSING PRACTICE

In the Graduate College

THE UNIVERSITY OF ARIZONA

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THE UNIVERSITY OF ARIZONA
GRADUATE COLLEGE

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ABSTRACT

Purpose: The purpose of this quality improvement project is to educate Marana Health Center providers on treatment recommendations related to metabolic effects, weight gain of atypical antipsychotics, provide educational materials to increase their knowledge, intent to adopt these recommendations and materials into their treatment.

Background: Emerging in late 1980's, second-generation, atypical, antipsychotics have been used to treat a variety of psychiatric conditions such as psychotic disorders, mood disorders, and autism. These medications, however, have been linked to potential metabolic side effects such as weight gain. Author educated providers at integrated health clinic on evidenced-based intervention recommendations regarding weight gain, patient metabolic implications, and prescribed second-generation antipsychotic. Goal was to increase provider knowledge, perceived benefit, and intent to adopt these interventions into treatment planning.

Method: Design used for quality improvement project was Model for Improvement and PDSA Cycle. Recruitment for participants occurred via email to presentation educating them on recommended interventions addressing metabolic complications and weight gain in patients being treated with second-generation antipsychotics. Participants completed pretest/posttest survey to measure any change in areas of knowledge in interventions recommended for patients on second generation antipsychotics, perceived benefit of implementing these recommendations, and intent to adopt recommendations (educational pamphlet) into treatment plan.

Results: A pretest/posttest format was utilized with web-based educational in-service regarding treatments and interventions addressing weight gain in individuals prescribed atypical antipsychotics. Median scores increased in first and third statements concerning participants'

perceived knowledge about various treatment interventions to address weight gain and perceived benefit of an educational pamphlet to assist dietary goals. Second statement, which assessed participants' understanding and perceived benefit of verbal education showed no change in median score. Additional information was obtained about perceived barriers to distribution of educational tool to patients. These included patient education level, time, and accessibility to handout and resources.

Conclusion: The implementation of education was successful, as anticipated outcomes were achieved. Results show increase in provider knowledge evidence-based treatments and interventions addressing weight gain in patients prescribed atypical antipsychotics, perceived benefit of continued verbal education and introduction of an educational pamphlet for distribution to patient to assist them in better dietary choices.

INTRODUCTION

Second-generation antipsychotics (SGAs), also known as atypical antipsychotics, are used to treat an array of psychiatric conditions such as psychotic disorders, mood disorders, and autism (Maayan et al., 2010). These medicines have less potential for extrapyramidal side effects and tardive dyskinesia than first-generation antipsychotics (Jibson, 2021). The reduced risk of motor side effects led to SGAs being more desirable. Though, like any medication, SGAs are not immune from side effects. They are associated with potential metabolic side effects (hyperphagia, weight gain, central obesity, altered insulin resistance, hyperglycemia, hyperlipidemia, hypertriglyceridemia, etc.), sedation, anticholinergic symptoms (urinary retention, constipation, etc.), cardiac issues (deviations in blood pressure, arrhythmias), sexual dysfunction, cataracts, cardiomyopathies, hypotension, and hyperprolactinemia (Jibson, 2021).

These metabolic side effects of SGAs, in addition, places patients at a higher risk for increased BMI, hyperglycemia, hyperphagia, central obesity, diabetes, insulin resistance, and dyslipidemia which, collectively make up metabolic syndrome (MetS) (Singh et al., 2018). These potential outcomes may lead to further medical and psychological complications confounded on an already vulnerable individual. The subject of this project is that of the metabolic side effects of the SGA, specifically weight gain. It is estimated that weight gain and MetS affect more than 40% of individuals placed on SGAs (Singh et al., 2018). It is evident, given this statistic, that an appropriate assessment, intervention, and monitoring protocol be implemented by providers when prescribing a patient an SGA to combat potential weight gain and further health complications.

Background Knowledge and Significance

SGAs emerged in the 1980s and are used to treat a variety of psychiatric disorders (Abou-Setta et al., 2012). Among these conditions include psychotic disorders, irritability and aggression associated with autism, bipolar disorder, and adjunctly in other non-psychotic disorders (Maayan et al., 2010). Currently, there are nine U.S. Food and Drug Administration (FDA) approved SGAs available for treatment (Abou-Setta et al., 2012). Among these SGAs, quetiapine, aripiprazole, risperidone, and olanzapine are the most frequently prescribed (Abou-Setta et al., 2012). Information from the 2004-2005 United States Medical Expenditure Panel Survey estimated that there were 2 million adult patients in the United States (US) who were prescribed an antipsychotic agent, with three-quarters of these being an SGA (Abou-Setta et al., 2012).

Information regarding these medicines and their connection to weight gain emerged in 1998 in an article written by Allison et al. (1998) titled, "Antipsychotic-induced weight gain: A comprehensive research study," was the first meta-analysis completed on this subject. Allison et al. (1998) evaluated weight gain connected to first-generation antipsychotics and SGAs and found that, at standard doses, medications such as clozapine, olanzapine, sertindole, and risperidone were reported to have caused significant weight gain in subjects tested (Dayabandara et al., 2017). Subsequent studies to Allison et al. (1998) have had similar findings (Dayabandara et al., 2017). Clozapine and olanzapine were found to have the greatest potential for weight gain. Moderate risk weight gain SGAs include quetiapine, risperidone, iloperidone, and paliperidone (Mazereel et al., 2020). SGAs such as aripiprazole, ziprasidone, and lurasidone are reported to have little or less effect (Mazereel et al., 2020). In a population suffering from a mental illness,

this research is concerning. According to Correll et al. (2011), weight gain in a population already suffering from a mental illness can lead to decreased quality of life and medication non-adherence. Patients who suffer from severe mental disorders, as well, are already at a higher risk than average of developing cardiometabolic risk factors and obesity (Correll et al., 2011).

In November 2003, the American Diabetes Association (ADA) along with representatives from the American Psychiatric Association (APA), the North American Association for the Study of Obesity, and the American Association of Endocrinologists met to review the information regarding the implications of weight gain and the use of SGAs (Riordan et al., 2011). This meeting, also known as the "Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes," was an interdisciplinary approach to gather opinions from experts in obesity, psychiatry, and diabetes. This meeting also included representatives from the FDA (Riordan et al., 2011). Recommendations emerged from this meeting regarding metabolic monitoring for patients receiving SGAs. These were grounded in the idea that people receiving mental health treatment often receive inadequate healthcare monitoring when the needs are outside the mental health setting (Riordan et al., 2011). These recommendations included assessments beginning at baseline, then at four weeks, eight weeks, 12 weeks, quarterly, yearly, and every five years for arising issues with BMI, weight, personal/family history, and blood pressure (Riordan et al., 2011). Fasting plasma glucose (FPG) levels should be tested at baseline, 12 weeks, then annually and fasting lipid profile should occur at baseline, 12 weeks, and every five years (Riordan et al., 2011).

In 2004, the U.S. Food and Drug Administration (FDA) initiated a requirement that distributors add labeling to SGAs regarding the risks of diabetes and hyperglycemia (Riordan et

al., 2011). In addition, the FDA required manufacturers to send out letters to providers explaining these warnings and urging them to implement tighter glucose monitoring for patients on SGAs who have symptoms of hypoglycemia, diabetes, or are at risk for diabetes (Riordan et al., 2011).

Currently there are no standardized assessment tools to gauge-risk severity of developing metabolic complication and weight gain before the initiation of an SGA, according to Mazereel et al. (2020). Weight gain while on SGAs is potentially due to a delay in satiation signaling with associated increased appetite. The main mechanism that contributes to weight gain is antagonism at the histaminergic H1 and the serotonergic 5-HT2C receptors (Mazereel et al., 2020). As stated above, research has shown that clozapine and olanzapine have the greatest potential for weight gain. These two medications, as well, have strong binding affinity to both H1 and 5-HT2C receptors (Mazareel et al., 2020). In addition, antagonism of the H1 receptor has been linked to significant weight gain in antidepressants (Mazereel et al. 2020). Other physical factors that contribute to weight gain may include the sedative effects of the medication in relation to a decrease in caloric expenditure. In addition, dry mouth induced by the medications may lead to an increase in caloric beverages (Mazereel et al., 2020).

Genetic factors may also have a role; upwards of 60-80% of SGA induced weight gain seems to have a genetic link (Mazereel et al., 2020). Correll et al. (2011) discusses “moderators” and “mediators” of antipsychotic related weight gain. “Moderators” refers to factors representing an intermediary step between the distal cause and ultimate effect. In this case, moderators include treatment setting, patient demographics, baseline diet, activity, body composition, and past and baseline antipsychotic treatments (Correll et al., 2011). “Mediators” refers to factors that

interact with a primary causal factor and may reduce or increase its influence. In this case, mediators include medication side effects, comedications, antipsychotic dose, and changes in activity and diet during antipsychotic use (Correll et al., 2011). The overlapping of these factors leads to the patient being at greater risk for gaining weight while on SGAs.

According to the recommendations developed by the Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes in 2003, management of weight gain can be initiated and maintained through evidence-based options such as psychoeducation, individual lifestyle coaching, exercise interventions, and augmentation with topiramate or aripiprazole (Mazereel et al., 2020). Studies have shown that the addition of metformin to decrease weight is also an option, however, more evidence may be needed as the optimal dosage of the medicine is unclear and the effects with the metformin have shown to be small (Mazereel et al., 2020).

Since the Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes in 2003, there has been little movement regarding uniform clinician adherence regarding the recommendations. For example, in one-third of patients treated with SGAs, in some clinical settings, there is a lack of blood glucose or lipid testing at baseline or any time after initiation (Riordan et al., 2011). Research indicates that, even after the ADA, APA, and FDA warnings and recommendations, diabetes, and dyslipidemia screening for patients on SGAs was low and did not increase (Riordan et al., 2011). Factors for lack of monitoring adherence were suggested and include lack of awareness regarding the liability of metabolic syndrome development, availability of needed clinical resources, inconsistent training and guidance amongst psychiatrists, and the understanding of the needed guidance itself (Riordan et al., 2011).

Responsibility of monitoring was also a factor. Some view that the psychiatric provider alone is responsible for the monitoring of this concern, whereas others argue that the monitoring needs to be an interdisciplinary approach between primary and secondary care (Riordan et al., 2011).

In a study examining pharmacological and non-pharmacological interventions for weight gain in patients with schizophrenia, Faulkner et al. (2009) found that no single pharmacological agent is greater than another. In addition, his research concluded that non-pharmacological interventions such as physical activity and dietary modifications were effective in preventing weight gain in those placed on SGAs (Faulner et al., 2009).

Local Problem

According to the 2018 Pima County Community Needs Assessment, it is estimated that 18.1% of the US adult population 18 years and over suffer from a mental illness and 4.2% suffer from a seriously debilitating mental illness. Mental illness may hinder an individual from maintaining positive physical health, as physical health and mental health are closely linked (Centers for Disease Control [CDC], 2020). In 2017, it was estimated that there were 1,704 mental health providers in Pima County, with the population to mental health provider ratio 600:1 (Pima County Community, 2018). Due to this ratio, appointments with a provider may have weeks or even months in between, so each session is extremely important for positive patient outcomes.

A data assessment was conducted using the MHC Centricity database to gather information on the patient population prescribed SGAs and common diagnosis connected to SGAs. The data was evaluated between 11/19/2020 and 3/19/2021. Currently, many patients who are receiving services for medication management are assessed by the provider every three

months. By evaluating four months of data, this writer was able to gather a more robust profile. The information was taken specifically from the Marana Main Clinic between these dates. For the four months, 43 patients were prescribed or were provided a prescription refill for an antipsychotic agent, 30 females and 13 males. Three of the patients were prescribed a first-generation antipsychotic. Except for a 12-year-old and a 16-year-old, all the patients were between the ages of 21-86. The data revealed that quetiapine (Seroquel) was the most prescribed SGA, with 16 prescriptions distributed. Second most common SGA prescribed at Marana Main during this timeframe was aripiprazole (Abilify), with nine prescriptions provided. Risperidone (Risperdal) was prescribed five times, lurasidone (Latuda) four times, and Depakote four times. Thirty-eight of these individuals were diagnosed with a psychotic disorder or mood disorder. Two patients held a diagnosis of generalized anxiety disorder, two patients had primary diagnosis of major depressive disorder (MDD), and one patient was diagnosed with post-traumatic stress disorder.

An informal needs assessment with providers revealed that education regarding potential metabolic side effects and weight gain is provided during initiation of these agents, however, other referrals or interventions are at the discretion of the provider.

Intended Improvement

Project Purpose

The purpose of this quality improvement project was to increase provider knowledge on evidence-based recommendations regarding treatment interventions to address weight gain for patients prescribed an SGA.

In addition, the aim of this project was to increase the use of evidence-based treatment interventions, specifically a nutritional handout developed by the United States Department of Agriculture (USDA).

Project Question

Will a presentation on evidence-based recommendations regarding treatment interventions to address weight gain for patients on atypical antipsychotics increase provider knowledge, perceived benefit of introduced resource (nutritional handout), intent to adopt distribution of handout into their practice, and potential perceived barriers to implementation?

Project Objectives

This project included the following objectives:

1) Pretest survey assessing current provider knowledge of interventions to address weight gain and atypical antipsychotic use, current education practices for this population, and current distribution of resources.
2) Implement a brief educational in-service via WebEx with the topic of nutritional education and atypical antipsychotic use

Posttest survey assessing provider knowledge regarding evidence-based interventions, perceived benefit of introduced resource (nutritional handout), intent to adopt distribution of handout into their practice, and potential perceived barriers to implementation.

Theoretical Framework

The theoretical framework is the "blueprint" from which the DNP project is constructed. It serves as the grounding base for the literature review and the methodology, as well as the structure for rationale of the project, the purpose, problem statement, research questions, and

significance (Grant & Osanloo, 2016). The choice of the theoretical framework for the DNP project reflects the student's understandings and personal beliefs about the research and provides the structure by which the student will philosophize, analyze, and interpret the information (Grant & Osanloo, 2016).

Lewin's Theory of Change (LTC) was the chosen theoretical framework for this project. Created by Kurt Lewin, this theory is grounded in the idea that organizational change is a movement away from a present state towards a future state with better outcomes (Lunenberg, 2010). Simplistic in nature, Lewin's Theory of Change focuses on three major concepts: driving forces, restraining forces, and equilibrium (Batras et al., 2014). Driving forces refer to those that push in the direction of change. Restraining forces are those that hinder the change. Equilibrium, also known as the status quo, refers to the state when driving forces and restraining forces meet, and no change can occur (Batras et al., 2014). Equilibrium can shift by changes between the driving and restraining forces. For a change initiative to be successful, the equilibrium must be destabilized, and space must be created to implement an alternative. Once an alternative has been accepted and implemented, the environment must be restabilized (Hussain et al., 2016). This three-step model, also known as the *Unfreeze-Change-Refreeze* model, requires a research and learning element for consideration and adoption to take place (Hussain et al., 2016).

Driving forces can be external or internal. External driving forces can include government regulation and laws, labor markets, economic changes, and technology, and funders (Lunenberg, 2010). At Marana Health Center (MHC), external forces would include insurance companies, new technology, changes in funding, governmental regulation, and changes in medications and required assessments. Internal driving forces can include people problems and

administrative processes (Lunenberg, 2010). At MHC, breakdowns of administrative processes such as decision making, communications, motivational strategies, and leadership may act as pressures for change (Lunenberg, 2010). In addition, lack of self-motivation of providers or staff, inadequate communication between provider and patient, and non-existent staff motivation may reflect a need for change (Lunenberg, 2010). People problems at MHC would include perceived poor performance, negative outcomes, poor patient provider relations, and poor reviews from patients, staff, and the community.

Restraining forces, or forces resistant to change, can include concern over personal loss, dependence, trust in administration, weakness in the proposal, uncertainty, fear of change, and group resistance (Lunenberg, 2010). At MHC, these forces include provider routine, fear of change from status quo, disagreeing with the change, weakness in information presented for a proposed change, and individual ego. Individuals must be open to new information to consider a change in the status quo.

Unfreezing

The first step in Lewin's Theory of Change is unfreezing. This process involves members of the organization recognizing that the potential benefits of the change outweigh the negatives perceived from the change (Batras et al., 2014). In this project, research regarding recommended assessment and interventions to combat weight gain and metabolic in patients treated with SGAs was presented to providers. In addition, a nutritional handout was introduced to providers for purpose of distribution and education for the patient. By presenting this information and offering educational tools for the patient, providers may gain a better understanding of initial recommendations, resources, and interventions they can implement when prescribing an SGA to

a patient. This information allows the providers to reflect on what is already being done upon initiation and decide whether the presented interventions and provided nutritional handout may be beneficial to their patients. An informal needs assessment revealed that no standard process currently at MHC to address weight gain specifically in patients prescribed atypical antipsychotics. Currently, standard recommendations regarding addressing weight gain and metabolic issues in patients prescribed SGAs exist, but only a small population of providers use them as a guide to baseline assessment and treatment planning (ADA, 2004)). By increasing provider knowledge of these recommendations, as well as providing access to a research based educational handout for the individuals placed on SGAs, patients at MHC are more likely to have improved patient outcomes.

Change

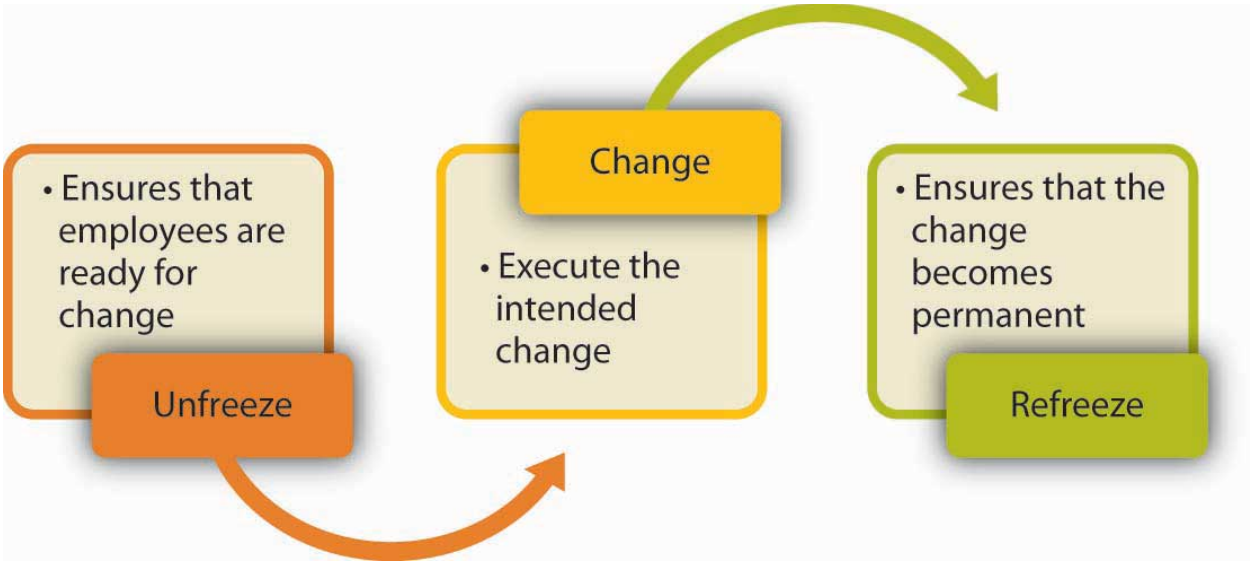
The second phase in Lewin's Theory of Change is change, also known as moving. This step is the action of the change, involving redesigning roles, relationships, and responsibilities, promoting supporters, training, and implementing. During this phase, the individual will have a better understanding about how the change will benefit them (Batras et al., 2014). At MHC, the providers will consider the benefit of change benefiting themselves as well as their clients. For this project, providers are being educated on the clinical interventions to address weight gain in patients prescribed atypical antipsychotics. In addition, providers will distribute the recommended educational handout to each patient prescribed an atypical antipsychotic with the goal to increase patient knowledge and assist them in making healthy food choices to combat potential metabolic issues and weight gain.

Refreezing

The last phase of this theory is the refreezing, or stabilization phase. During this phase, the change becomes common practice. It is the "normal" within the systems of the organization. The change can become part of the thread of the organizational policies and procedures. During this phase. those who opposed change at first come to accept and implement it (Batras et al., 2014). At MHC, this phase includes the provider distributing the nutritional handout to every patient prescribed an atypical antipsychotic to increase patient knowledge in nutrition and assist the patient in making healthy choices to combat potential weight gain.

Figure 1

Lewin's Change Theory for Addressing Weight Gain for Patient Prescribed SGAs at MHC



Literature Synthesis

A synthesis of literature refers to a summary and synthetic review of information already known regarding a specific scholarly topic. The literature synthesis aids the researcher to display evidence of preparation, express clear goals, select appropriate methods, engage in reflective

critique, and communicate accurate results when exploring a topic (Maggio et al., 2016). The purpose of the literature synthesis is to inform methodology, provide context, minimize duplicate research, maximize innovation, and ensure professional standards are being met (Maggio et al., 2016). A literature synthesis is a key component in a Doctor of Nursing Practice (DNP) quality improvement project. The goal of this project is to educate providers at a rural outpatient integrated healthcare facility in southern Arizona on recommended behavioral and educational interventions targeting weight gain in individuals taking SGAs, including the benefit of a nutritional handout for patient use.

When determining appropriate non-pharmacological interventions and education to recommend at MHC, the author initially evaluated the evidence available for recommended screening for individuals taking SGAs. The literature search yielded various evidence-based interventions and programs used in treatment to address second-generation antipsychotic-associated weight gain. Ultimately, it was determined that non-pharmacological interventions such as education about a healthy lifestyle, exercise, and moderating caloric intake could help combat weight gain associated with SGA medication (Usher et al., 2013b).

Evidence Collection, Analysis, and Synthesis

This literature search used PubMed and CINAHL. The initial search through PubMed using the key words “antipsychotic induced weight gain” yielded 1974 results. The modifiers “full text,” “within ten years,” and “clinical trials,” narrowed the findings to 103. Seven of these are relevant and selected for the DNP project. Exclusion criteria included articles where the participants in the studies are under 18 years old, studies not in the English language, and studies non-specific to SGAs.

A CINAHL search also utilized the key words “antipsychotic induced weight gain” and yielded 108 results. The findings narrowed to 57 when the modifiers “full text” and “within ten years” were added. Of these, only one was chosen for the literature synthesis. Exclusion criteria included articles where the participants in the studies are under 18 years old, studies not in the English language, and studies non-specific to SGAs. An additional CINAHL search using the keywords “weight gain antipsychotics” with modifiers “full text” and “within 10 years” yielded 125 articles. Of these, two were selected. Exclusion criteria was the same as the first CINAHL search, however, duplicate articles from the first search are also excluded.

Other sources are included: The Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes, which presents recommendations on baseline monitoring, intervention, and evaluation of weight gain and metabolic implications of SGAs; The Clinical Practice Guidelines for the Treatment of Individuals with Schizophrenia, level one evidence supported by the American Psychiatric Association (APA) (Keepers et al., 2020); and two qualitative studies. All evidence utilized for the synthesis of the literature is displayed in the literature grid (Appendix H).

Common Themes

The use of non-pharmacological interventions and education to address potential weight gain and metabolic outcomes upon initiation of an SGA can have substantial positive outcomes for the patient population (Usher et al., 2013b). Recommendations regarding monitoring and assessments at baseline and during treatment have been presented, including laboratory screenings and measurements of weight and BMI (American Diabetes Association [ADA], 2004; Keepers et al., 2020). Selected studies of moderate to high-level evidence include five

randomized controlled trials (Attux et al., 2013; Erickson et al., 2017; Ratliff et al., 2012; Sugawara et al., 2017; Usher et al., 2013b), a clinical practice guideline (Keeper et al., 2020), and a prospective comparative study (Magni et al., 2017). There are three recurring themes identified during the literature synthesis. First, individuals with a serious mental illness that require SGA intervention are at an increased risk of developing complications such as obesity, diabetes, cardiovascular disease, reduction in quality of life, and an increase in morbidity and mortality (ADA, 2004; Attux et al., 2013; Erickson et al., 2017; Magni et al., 2017; Ratliff et al., 2012); Sugawana et al., 2017; Usher et al., 2013a; Usher et al., 2013b; Thompson et al., 2011; Vazin et al., 2016; Watkins et al., 2019). Second, weight gain is the most common predictor of medication nonadherence in a population receiving SGA treatment (Attux et al., 2013; Erickson et al., 2017; Magni et al., 2017; Usher et al, 2013a; Thompson et al., 2011). Last, non-pharmacological interventions such as healthy lifestyle education, increased exercise, and nutritional intervention implemented at the initial phase of SGA treatment are the most common modalities to combat weight gain and metabolic issues in this population (ADA, 2004; Attux et al., 2013; Erickson et al., 2017; Sugawara et al., 2017; Vazin et al. 2016; Watkins et al., 2019).

Increased Risk of Complications

Findings from level one research articles conclude that individuals suffering from serious mental illnesses who take SGAs tend to have an increased risk of obesity, diabetes, cardiovascular disease, hypertension, and hyperlipidemia. These complications lead to an increase in morbidity and mortality and poor quality of life (ADA, 2004; Attux et al., 2013; Erickson et al., 2017; Magni et al., 2017; Ratliff et al., 2012), and are likely pronounced by these individuals tending to make poor nutritional choices, using tobacco, and leading sedentary

lifestyles (ADA, 2004; Attux et al., 2013; Ratliff et al., 2012). Of note, most weight gain occurs within the first three months of SGA use (Thompson et al., 2011; Usher et al., 2013a; Usher et al., 2013b). With that all said, there are certain SGAs associated with a higher risk of suboptimal metabolic outcomes. These include clozapine and olanzapine with the highest risk (ADA, 2004; Attux et al., 2013; Erickson et al., 2017; Magni et al., 2017; Ratliff et al., 2012).

Weight Gain and Medication Nonadherence

Weight gain associated with SGAs is the most common issue leading to nonadherence (Attux et al., 2013; Erickson et al., 2017; Magni et al., 2017; Usher et al, 2013a; Thompson et al., 2011). Nonadherence can lead to increased symptoms and relapse in mental illness (Erickson et al., 2017).

Effective Non-Pharmacological Interventions

There are pharmacological and non-pharmacological interventions to mitigate weight gain or potentiate weight loss. Pharmacological interventions can include metformin or topiramate (Attux et al., 2013; Magni et al., 2017; Usher et al., 2013b) Although minimal, some studies have shown this to be an effective treatment in addressing antipsychotic-induced weight gain (AIWG). These medications, however, come with a side effect profile of their own, making pharmacological choices less than ideal for many patients (Attux et al., 2013; Magni et al., 2017; Usher et al., 2013b). Non-pharmacological intervention, including but not limited to lifestyle intervention and education, dietary counseling, cognitive behavioral therapy, group exercise, and motivational interviewing has shown to be the first line of treatment in addressing AIWG (ADA, 2004; Attux et al., 2013; Erickson et al., 2017; Sugawara et al., 2017; Vazin et al. 2016; Watkins

et al., 2019). Only one study, by Erickson et al. (2017), lists bariatric surgery as an option for weight loss.

The research indicates that non-pharmacological intervention can be more effective if started during the initial phase of SGA treatment (Magni et al., 2017; Usher et al., 2013b; Thompson et al., 20171). In addition, the literature demonstrates that non-pharmacological interventions are more successful if longer term. Studies with durations of 12-16 weeks reveal minimal significance in weight loss, however longer durations indicated more sustainable success (Attux et al., 2013; Erickson et al., 2017; Ratliff et al., 2012; Usher et al., 2013b). Reasons for this included support from peers and staff and the learned behavior becoming a pattern (Usher et al., 2013a; Usher et al., 2013b; Vazin et al., 2016). Interventions included a licensed dietician, or a dietician referral were more successful for patient education and overall weight loss (Sugawara et al., 2017). In addition, interventions led by a mental health professional including psychologists, occupational therapists, nurses, and dieticians were connected to more successful nutrition education knowledge and weight loss outcomes (Attux et al., 2013; Usher et al., 2013b; Vazin et al., 2016). Although not always possible, one study revealed financial reimbursement to encourage behavioral change, in this case, purchasing healthier food, was a successful strategy (Ratliff et al., 2012). Most importantly, several studies indicate that interventions are more successful when tailored towards the mentally ill population (ADA, 2004; Vazin et al., 2016; Watkins et al., 2019).

Weaknesses and Gaps

There are several gaps and weaknesses regarding AIWG and non-pharmacological interventions to address weight gain. One limitation was the timeframe of the study (Attux et al.,

2013; Erickson et al., 2017; Magni et al., 2017; Ratliff et al., 2012; Usher et al., 2013b). While some randomized controlled trials were long term, such as 12-18 months, others were 10-16 weeks. The limitations identified for the shorter duration studies always included recommendations for a similar study with a longer timeframe. The results of the shorter studies, as well, were insignificant. While longer studies yielded significant results regarding weight loss, attitude change, and patient education. These interventions proved to be rich in content and help change the unhealthy patterns of the patients (Sugawara et al., 2017; Usher et al., 2013a; Vazin et al., 2016; Watkins et al., 2019).

In some studies, the individuals doing the interventions were staff, whereas other studies had behavioral health professionals and licensed individuals leading the interventions. Some studies had one intervention, such as lifestyle modification or nutrition education, however other studies incorporated multiple treatment modalities, making the intervention richer for the patient. Lastly, no study followed recommended guidelines from the Consensus Development Conference on Antipsychotic Drugs and Obesity and Diabetes as it was published (ADA, 2004; Thompson et al., 2017). Some studies completed an array of pre assessments and labs, whereas others just started interventions without a baseline. Lastly, in some of the studies, participants had just started an SGA, whereas some of the studies had participants on the SGA for three months or more. The inconsistency yielded some conflicting results.

Summary

Overall, current literature supports early intervention for individuals placed on SGAs as well as an immediate intervention to address weight gain caused by SGAs. There was not one specific non-pharmacological intervention that was superior to another identified, however many

interventions were successful. Future research endeavors longer-term studies on weight management specifically to develop screening tools for gauging risk severity of SGA-induced (or associated) weight gain.

METHODS

Project Design

The DNP project is a quality improvement project utilizing a pretest/posttest design. A survey was provided to assess participant knowledge, perceived benefit, evaluate provider motivation, barriers, and intent to adopt before and after the educational in-service. The pretest-posttest design in healthcare intervention is an effective evaluation tool because it includes data collection before and after an intervention to determine the strength of its effects (Alessandri, Zuffiano, & Perinelli, 2017).

The following outcomes was measured during this project:

1) Increase the knowledge about evidence-based treatment interventions to combat weight gain for those prescribed atypical antipsychotics
2) Report an increase in the perceived benefit of distributing the provided educational handout to assist the patient with nutritional food choices
3) Report barriers to increased/different recommendations or treatment interventions to this population
4) Report evaluation of educational materials presented

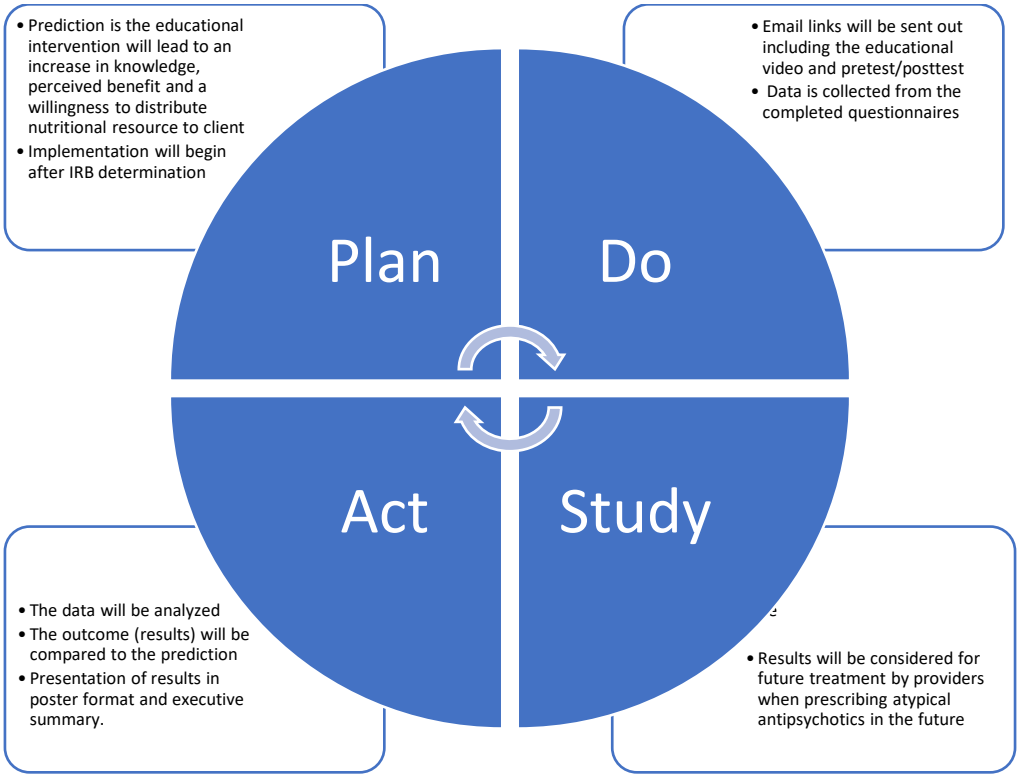
Model for Implementation

The Plan-Do-Study-Act (PDSA) cycle of the Model for Improvement (Figure 2) was utilized to navigate the implementation of this QI project. The Model for Improvement,

developed by the Associates in Process Improvement, was created to aid in accelerating projects with the goal to provide safer, more efficient, timely, effective, and equitable patient care (IHI, 2021; Donnelly & Kirk, 2015). There are two parts to the Model for Improvement. The first part addresses three questions: What are we trying to accomplish? How will we know that the change is an improvement? What change can we make that will result in the improvement? (IHI, 2021). The PDSA cycle is the second part of the Model for Improvement and helps determine if the results of the implemented change were an improvement (IHI, 2021).

Figure 2

The Model for Improvement



What Are We Trying to Accomplish?

The first question in the Model of Improvement (MFI) defines the population affected by the change and identifies the aim of the intervention (IHI, 2021). For this DNP project, the aim was to increase provider knowledge of evidence-based recommendations regarding SGAs, nutrition, and weight gain, report and increase in perceived benefit of utilizing these recommendations and increase frequency of these recommendations in everyday prescribing and practice. In addition, a handout was provided for distribution to their patients upon medication initiation to increase knowledge about proper nutrition to help combat weight gain.

How Will We Know the Change is an Improvement?

This question uses quantitative measures to determine whether the change led to improvement (IHI, 2021). For this QI project, a pretest-posttest was used to measure improvement.

What Change Can We Make That Will Result in an Improvement?

This addresses the type of change used to achieve the aim identified in the first question (IHI, 2021). In this case, the change consisted of an educational in-service on the evidence-based treatment recommendations regarding SGA use and the benefits of implementing these recommendations.

Plan-Do-Study-Act (PDSA) Cycle

Plan

The "plan" step in the PDSA cycle states the purpose of the test, makes predictions about what may happen and why, and develops a plan to test the change (IHI, 2021). For this DNP project, a pretest/posttest survey and an online in-service presentation were created. In addition, a

plan to distribute the surveys and in-service as well as a plan to collect data was created. The prediction was that the results of the in-service would increase provider knowledge of evidence-based recommendations for SGAs, perceived benefits, and intent to adopt these recommendations.

Do

The "do" step in the PDSA cycle carries out the test on a small scale (IHI, 2021). In this DNP project, this step included the distribution of the survey, implementation of the recorded in-service, and the collection of the data. In addition, this stage also included documenting any unexpected observations or problems (IHI, 2021).

Study

The "study" step sets aside time to analyze the data collected and study the results (IHI, 2020). This step includes analyzing the collected data, comparing the collected data to the predictions, and summarizing what was learned from the comparison (IHI, 20201). For this QI project, the pretest-posttest data was analyzed, and comparisons were made with the predictions from the "plan" step.

Act

The "act" step of the PDSA cycle refines the change based on the studied results and includes determining modifications needed and preparing a plan for the next test (IHI, 2020). For this DNP project, modifications will be identified. A plan for future implementation will be prepared and provided to stakeholders.

Settings and Stakeholders

The setting for the DNP project was the main campus of Marana Health Center (MHC) located in Marana, AZ. Located in Southern Arizona, nearly 10 miles north of Tucson, Marana is a rural community with a population of 46,800 people (Marana, 2021). According to the City of Marana (2021), the median age is 39.15. Ethnicity distribution in 2021 is about 66% White, non-Hispanic, 24% Hispanic, and 10% Black or others (City of Marana, 2021). The average household income in Marana is $93,654, higher than the US average of $68,703 (U.S. Census Bureau, 2021).

MHC was incorporated in 1957 and was originally created as a medical facility for local Marana residents and migratory farmers (Marana Health Center [MHC], 2021). According to MHC (2021), it is the oldest community health center in the US. It was designated a Federally Qualified Health Center (FQHC) in 1998 and began receiving federal assistance. Since then, it has expanded to include 16 healthcare centers providing medical, dental, psychiatry, mental health, physical therapy services, and women's health and maternity (MHC, 2021). MHC serves over 50,000 patients annually and employs over 500 staff members (MHC, 2021).

The psychiatric providers that serve MHC have varying credentials including Doctor of Medicine (MD), Doctor of Nursing Practice (DNP), Psychiatric Mental Health Nurse Practitioner (PMHNP), and Doctor of Osteopathic Medicine (DO). Some of these providers have specialties including geriatrics, pediatrics, and addiction medicine (MHC, 2021).

Stakeholders in a QI project can include a team lead, a clinical leader, technical experts, an executive sponsor, and an improvement advisor (Silver et al., 2016). The team lead is the person responsible for the daily management and organization of the project (Silver et al., 2016).

In this case, the author served as the team lead. Technical experts refer to those that have a more in-depth understanding of the problem addressed by the QI project (Silver et al., 2016). For this DNP project, technical experts included MDs, DNPs, and PMHNPs. The clinical leader refers to the individual who is most familiar with how the implemented change will affect the different areas of the organization (Silver et al., 2016). At MHC, this person would be the director of behavioral health services. Executive sponsors possess strong leadership skills. They combat barriers and secure resources (Silver et al., 2016). For this project, the director of behavioral health services also served as an executive sponsor.

Planning the Intervention

The intervention proposed in this QI project was developed to educate psychiatric providers on evidenced-based treatment recommendations for clients prescribed SGAs to address potential weight gain and incorporate a nutritional handout for distribution to patients placed on these medicines. Permission to conduct the DNP project was obtained from MHC's Director of Behavioral Health Services (Appendix A). The intervention will take 16 minutes total. The educational in-service took 10 minutes and each survey five minutes. The in-service took place at the bi-monthly provider meeting via WebEx at MHC to increase participation. The in-service was scheduled to take place on October 20, 2021 at 12:00 pm. The day before the intervention, a recruitment email was sent by the behavioral health director to the potential candidates describing the purpose of the DNP project and details of the intervention. The email described the voluntary nature of the intervention and include a disclosure form for the participant to sign (Appendix B). Candidates were not asked to reply to the email.

The QI project intervention consisted of a 10-minute PowerPoint presentation that provided information about recommended treatment interventions to address weight gain in patient prescribed SGAs. Providers linked into the normally scheduled WebEx meeting on October 20, 2021. The DNP candidate displayed the PowerPoint and introduced themselves and the project topic. The providers were then directed to a Qualtrics link where the three-question pretest survey was displayed. The providers took less than five minutes to complete this. The survey then prompted the participant to "stop and please place their attention on the presentation." The DNP candidate then presented the PowerPoint education to the providers. When the presentation ended, the DNP candidate honored questions or comments from the groups. Following any questions or comments, providers were directed back to the Qualtrics survey to continue with the four posttest survey questions. The providers had five minutes to complete this.

The proposed intervention included a recommended nutritional handout to be provided all patients prescribed atypical antipsychotics. Before the PowerPoint education, each provider was given 15 copies of the nutritional handout for purposes of distribution to their patients that choose in-office services. In addition, they were provided an internet link to the handout. This four-page handout, entitled "Small Changes Matter," was created by the United States Department of Agriculture, and is distributed through ChooseMyPlate.gov. It features information, pictures, and suggestions for individuals to make healthy food choices. The proposed intervention included the provider offering this pamphlet to all patients prescribed atypical antipsychotic medication. For patients in person, the provider can offer the colored, hard copy of the pamphlet. For WebEx, the recommendation is that the provider alert the medical

assistant, and an email be sent following the session with a link to the brochure. Should the patient desire additional information regarding nutrition, the MHC provider has a few options. For patients given the internet link, the Choosemyplate.gov website will offer additional information and resources for the client. For patients at the clinic, should the patient desire a nutritional consult, the provider is able to contact the primary care physician (PCP) for a referral. Many of the patients at MHC have AHCCCS and dietary consultations are a covered service if referred by a PCP. All findings will be reviewed in the final executive summary.

Participants and Recruitment

Convenience sampling was used to recruit participants. Potential candidates were recruited through email (Appendix C). The sample size was 11. Inclusion criteria for participants included being an employee of MHC, currently working as a behavioral health provider (can include MDs, PMHNP, & DOs), ability to read English, and provided consent. The PowerPoint in-service was conducted remotely via WebEx, the MHC platform.

Consent and Ethical Considerations

The DNP project was developed and implemented regarding the policies developed by the University of Arizona for privacy, informed consent, and autonomy. Participants in the DNP project were provided a voluntary consent and disclosure form (Appendix B) before participating. Communication emails include this consent form, and consent was implied throughout the intervention. To address participant autonomy, participation in the project was voluntary and a participant could remove themselves at any time for any reason. Identifiable information was removed to maintain privacy. Participant names were not attached to the pre-test or post-test surveys. Personally identifiable surveys result from participants were not accessible.

Prior to implementation, the determination of human subjects was obtained from the University of Arizona Institutional Review Board (IRB).

Data Collection

Qualtrics was used to create a Likert-style survey to assess participant knowledge about recommendations for weight gain interventions and educational material distribution for patients prescribed SGAs, their perceived benefits of implementing the interventions, and their intent to include the recommended interventions in treatment planning and medication maintenance. There were three questions on the pretest survey and four questions on the posttest survey including one text question. Pretest survey questions related to provider familiarity for interventions to address weight gain for those prescribed SGAs. They also assessed what interventions the provider is already implementing upon medication initiation. Posttest survey questions were related to their perceived benefit of implementing the intervention into treatment planning for these patients as well as their intent to adopt into practice.

At the beginning of the presentation, a link to the survey was posted for the participants. The PowerPoint presentation immediately followed the completion of the pretest. The posttest survey followed the presentation. The pretest and posttest surveys were linked; however, the provider is directed to stop, watch the presentation, then continue with the posttest survey. The student directed the participants throughout the process through the WebEx platform. The project investigator began data analysis the day following the presentation.

Data Analysis

For this project, the survey data was treated as ordinal data. It was extracted into Google Sheets for analysis. For all survey questions, frequencies of score cards were calculated. Visual

representation of score changes were illustrated through bar graphs. There was one open ended question on the posttest survey assessing potential barriers to the education resource distribution. This was presented using paraphrased wording. The data for this project was securely scored in a password-protected Google Forms file.

RESULTS

The DNP quality improvement project, *The Importance of Nutrition with Concurrent Use of Atypical Antipsychotic Medication,* was implemented using a WebEx platform on 11/3/2021 at 12:00 pm. Participants included MHC's medical doctors and nurse practitioners. There were 11 MHC staff who participated in the pretest survey, the educational intervention, and the posttest survey. All participants met the inclusion criteria of working in the MHC Behavioral Health Department and being a current employee. Consent was required in the survey before the questionnaire. Not included in the summary report was detailed demographic information as to protect patient anonymity, which was important with the small sample size.

Outcomes

This outcomes section presents the pre-survey and post-survey data analysis. Descriptive statistics for ordinal data were used to analyze Likert items. The open-ended question was used for information regarding potential future interventions. Included in Table 1 is a table listing all measured values. Included in figures 6 and 7 below are pretest and post-test mean and median results.

Knowledge

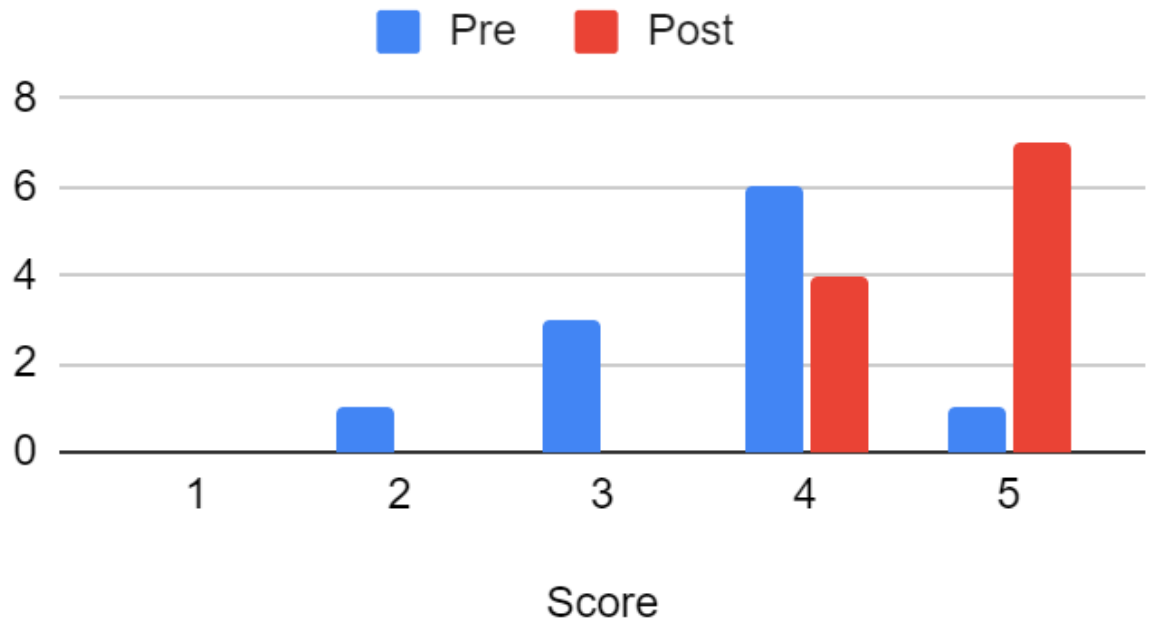
The first objective of the DNP project was to address recommended treatments and interventions to address weight gain in patients prescribed atypical antipsychotics and assess the

providers knowledge in these interventions and treatments. Education on these modalities and recommendations was done through an educational presentation provided by the project investigator. The first pretest and posttest survey statements measured this knowledge. The participants selected numbers on a Likert-style scale corresponding to their agreements on the statement. The scores on the scale ranged from ‘1’ (strongly disagree) to ‘5’ (strongly agree). Questions two and three on the pretest and posttest statements measured use of verbal education and educational handouts regarding weight gain during initiation of an atypical antipsychotic agent. These were also measured on the Likert-type scale with the same scoring.

The first question assessed knowledge of recommended treatments and interventions to prevent weight gain in individuals prescribed an atypical antipsychotic medication. This is represented in Figure 3. Pretest survey frequencies include one response of ‘2’ (somewhat disagree) (n=1, 9%), three responses of ‘3’ (neither agree nor disagree) (n=3, 25%), six responses of ‘4’ (somewhat agree) (n=6, 55%), and one response of ‘5’ (strongly agree) (n=1, 9%). The pretest survey mean score was 3.7. The median score was ‘4,’ with a minimum score of ‘2,’ and a maximum score of ‘5.’ Posttest survey frequencies include four responses to ‘4’ (somewhat agree) (n=4, 36%) and seven responses to ‘5’ (strongly agree) (n=7, 64%). The posttest survey mean score was 4.6. The posttest survey median score was ‘5,’ with a minimum value of ‘4’ and a maximum value of ‘5.’ The median score showed a one-point increase in perception about their knowledge of recommended treatments and interventions to combat weight gain in individuals placed on atypical antipsychotics. This indicated that the education presentation increased provider knowledge in these modalities.

Figure 3

Postsurvey Data: Knowledge About Treatments for Weight Gain in Patient Prescribed Atypical Antipsychotics



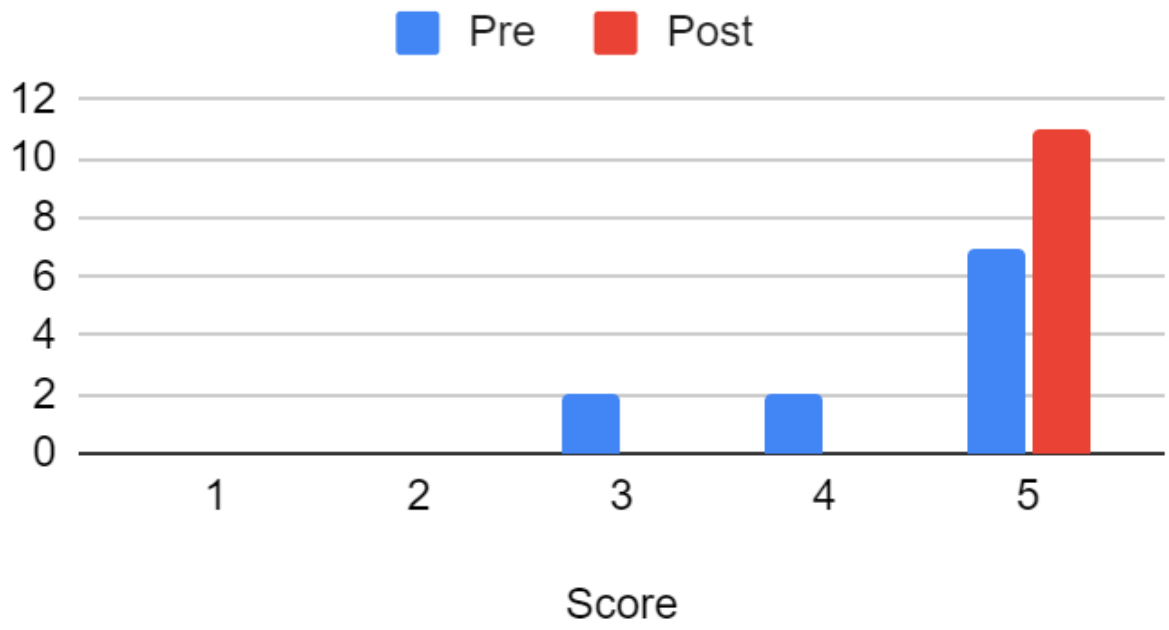
"I am knowledgeable regarding the research-based interventions and treatments to combat weight gain for individuals being prescribed atypical antipsychotic medications."

The second Likert question assessed whether providers are using verbal education to address weight gain with those prescribed atypical antipsychotics. This is represented using Figure 4. Pretest survey frequencies included two responses of '3' (neither agree nor disagree) (n=2, 19%), two responses of '4' (somewhat agree) (n=2, 19%), and seven responses of '5' (strongly agree) (n=7, 64%). The pretest survey mean score was 4.5. The pretest survey median was '5 with a minimum score of '3' and a maximum score of '5.' The posttest survey frequencies included 11 responses of '5' (strongly agree) (n=11, 100%). The posttest survey mean was '5.' The posttest survey median score was '5,' with a minimum score of '5' and a maximum score of '5.' There was no increase in the median score, however, the posttest survey

indicated that 100% of the sample felt they strongly agreed with verbal education to reach the patients regarding weight gain and atypical antipsychotic use. This shows an increase in knowledge regarding the benefit of this intervention.

Figure 4

Postsurvey Data: Use of Verbal for Weight Gain and Atypical Antipsychotics



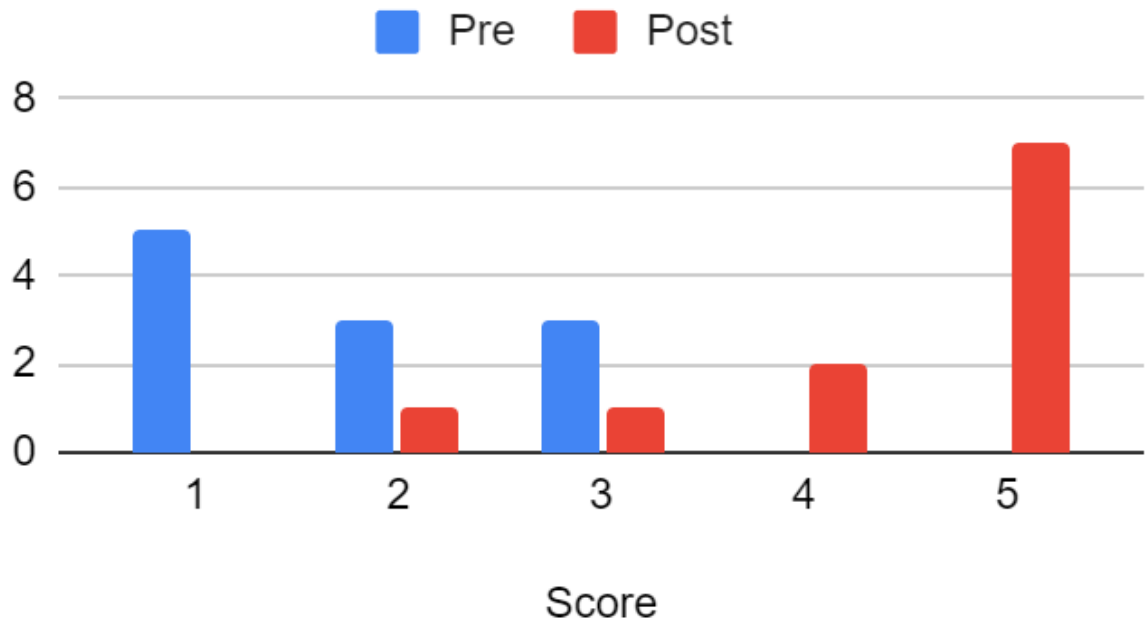
"I use verbal education when addressing potential weight gain when prescribing a patient an atypical antipsychotic agent."

The third Likert scale assessed the use of educational handouts to address potential weight gain when prescribing a patient an atypical antipsychotic medication. This is represented using Figure 5. Pretest survey frequencies included five responses '1' (strongly disagree) (n=5, 45%), three responses '2' (somewhat disagree) (n=3, 27%), and three responses of '3' (neither agree nor disagree) (n=3, 27%). The pretest survey mean was 1.8. The pretest survey median was '2,' with the minimum score of '1' and maximum score of '3.' Posttest survey frequencies

included one response of ‘2’ (somewhat disagree) (n=1, 9%), one response of ‘3’ (neither agree nor disagree) (n=1, 9%), two responses of ‘4’ (somewhat agree) (n=2, 18%), and seven responses of ‘5’ (strongly agree). The posttest survey mean was 4.4. The posttest survey median was 4.4, with a minimum score of ‘2’ and a maximum score of ‘5.’ The median response showed a 2.4-point increase, indicating that the intervention increased participants potential to distribute the educational handout.

Figure 5

Postsurvey Data: Knowledge and Intent to Distribute Handout to Address Weight Gain and Concurrent Use of Antipsychotics



“I believe an educational handout can benefit patients in addressing weight gain when prescribed atypical antipsychotic medication.”

Figure 6

Median Scores for Pre- and Post-Likert Survey Questions

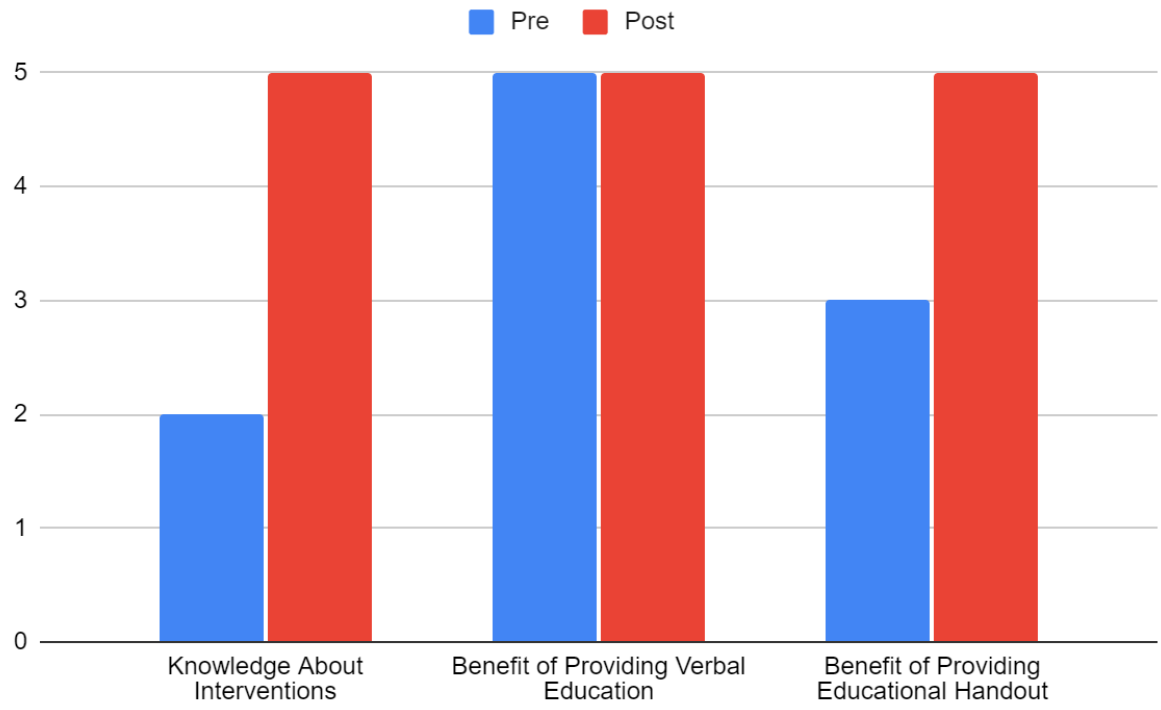


Figure 7

Mean Scores for Pre- and Post-Likert Survey Questions

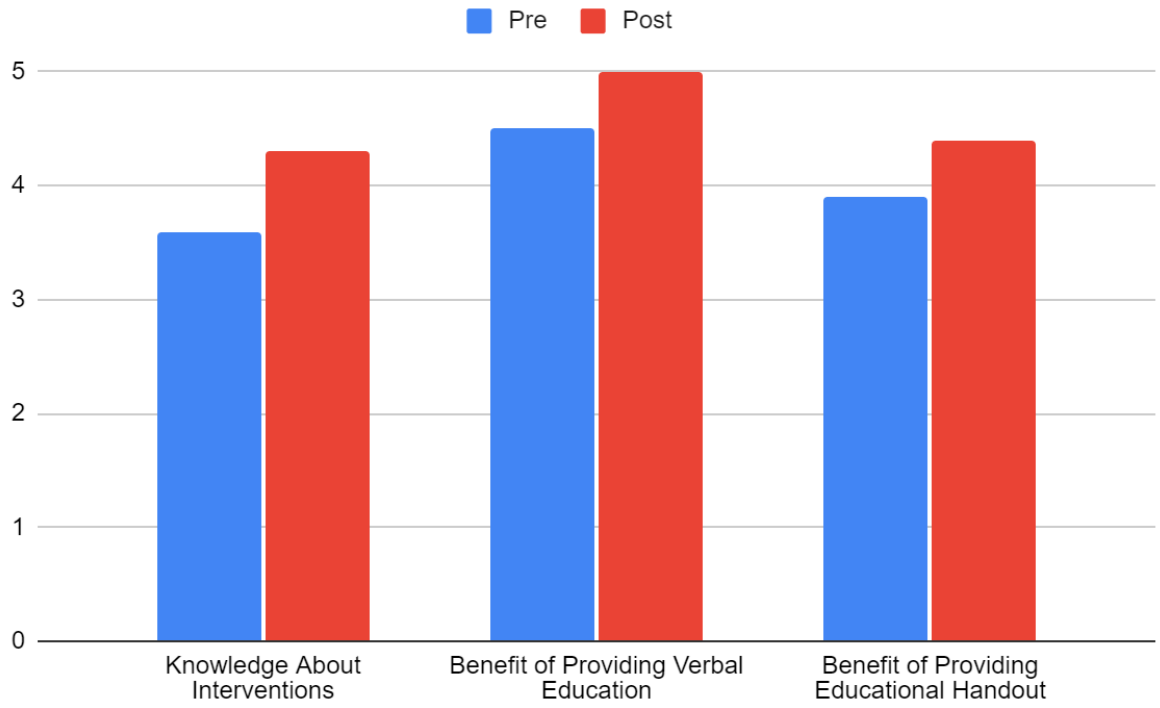


Table 1

Descriptive Statistics for Pretest and Posttest

	Pre (n=11)		Post (n=11)	
	Mean (sd)	**Median (min, max)**	**Mean (sd)**	**Median (min, max)**
I am knowledgeable about the various treatments and interventions to address weight gain when prescribing atypical antipsychotic medications.	3.7 (0.79)	4 (2, 5)	4.6 (0.5)	5 (4,5)
There is a benefit in using verbal education for addressing weight gain when prescribing atypical antipsychotics	4.5 (0.82)	5 (3,5)	5 (0)	5 (3,5)
There is a benefit in using an educational handout to address weight gain for individuals prescribed atypical antipsychotics	1.8 (0.87)	2 (1,3)	4.4 (1.03)	4.4 (2,5)

Barriers to Distribution of the Educational Handout

The DNP project also included an open-ended question evaluating perceived barriers of distributing the educational handout provided. The question, *"What are the potential barriers you see to the distribution of the educational handout?,"* was the last question on the posttest survey. Potential barriers to distribution included themes: reading level of patients, time, accessibility online, remembering to distribute, and access to healthy food. These are outlined in Table 2 below. It is important to note that two providers indicated "none" for potential barriers to distribution.

Table 2

Barriers to the Distribution of the Nutritional Handout

What are the barriers to the distribution of the nutritional handout?	
Potential Barrier	**Quote**
Patient Education	"Educational/reading level"
Time	"Time. Remembering to provide the handout" "Time, forgetful. Asking MA to really send the link to patients"
Accessibility to handout/food	"Telehealth" "I am a telemed provider" "Getting patients to access it online" "Accessibility to healthy food"

DISCUSSION

The purpose of the DNP project was to increase provider knowledge in available interventions and treatments to address weight gain in individuals prescribed atypical antipsychotics. Another aim was to encourage providers to adopt the use of an educational handout for distribution to patients when prescribed these medicines to assist them in making healthy food choices. The pretest/posttest survey format was utilized for the project. A Web-

based educational in-service was presented to providers regarding various interventions and treatment options to address weight gain for those patients prescribed an atypical antipsychotic medication. Overall, the DNP project was successful as the desired outcomes were achieved. The results of the project show an increase of knowledge regarding various interventions and treatments to address weight gain, a perceived benefit in the use of verbal education, and a perceived benefit and intent to adopt an educational handout to address nutrition choices for the patient.

The median scores were increase in the first and last statements concerning perceived knowledge regarding interventions and the use of the educational handout. The bar chart illustrating pretest/posttest score frequencies show a shift to the right (Figure 6), indicating an increase in these categories. The second statement, which assessed the use of verbal education to address potential weight gain in patients prescribed atypical antipsychotics, showed no change in the median score (Figure 6). The bar chart in Figure 7, however, shows a shift to the right indicating an increase in the mean score for the perceived benefit or intent to use verbal education when addressing weight gain with patients prescribed atypical antipsychotics. Additional information was obtained regarding barriers to the distribution of the educational handout to patients for health food choices. These are outlines in Table 2. These included accessibility for patients, education and understanding, and provider time and consistency.

Strengths

The DNP project had several strengths. The author anticipated that the introduction of "simply a pamphlet" may be too "basic" or "elementary" in nature. The author feared that the provider audience would receive the information as "simple common knowledge" and not

consider the true importance of the topic. This was not the case in that the feedback after the educational session was that of praise, thanks, and suggestions. Following the educational presentation, the medical director of MHC stated, “thank you for bringing such an important, yet overlooked, topic to light.” The topic was familiar to all providers. It is common “walking” knowledge for a behavioral health provider that there are metabolic implications including weight gain when prescribing an atypical antipsychotic. In the chaos of attempting to be thorough but time efficient, the importance of this phenomena is often overlooked. When this happens, the patient may get a brief review regarding the potential of weight gain when starting these medications. The author’s intention was to invite the provider to revisit their education and interventions when treating a patient on these medications.

The DNP project resulted in an increase of provider knowledge regarding research-based interventions and treatments to address weight gain for those patients prescribed an atypical antipsychotic. The project increased awareness of the importance of ongoing education and research regarding important topics. In addition, the project brought awareness to the importance of evaluating programs and protocols at MHC and adjusting expectations to reach optimal patient care.

Limitations

A primary perceived limitation of the DNP project was participant bias. Provider at MHC have participated in many DNP projects, some of which have done a project themselves. Because of this, the participant may want the student to do well or be effective, thus intentionally selecting responses geared towards the student success.

Another limitation was time. More time to evaluate whether the providers handed out the educational pamphlet would have been beneficial to the effectiveness of the intervention. In addition, more time would have allowed more patient care, thus allowing providers to identify barriers to distribution after the intervention is in place.

Interpretation

Overall, the questions assessing perceived knowledge and perceived benefit of various interventions demonstrated an increase between the pre- and post-survey scores. This aligned with the literature that states early intervention in the form of counseling, educational materials, dietary counseling, and exercise are the best treatments to combat weight gain in patients prescribed atypical antipsychotics. The supported the first statement of this DNP project, which was to increase the knowledge base of these evidence-based treatment and interventions. When evaluating the second objective of the project, the data showed that many providers were already implementing verbal education to patients prescribed atypical antipsychotic medication, and there was somewhat of a perceived benefit to this. The third objective was achieved by evaluating the open-ended question regarding potential barriers to distribution of the educational handout. Providers stated concerns about accessibility to resources, time, and educational level of patients. The DNP student will need to conduct further research on this to further assess intent to adopt.

Implications

Practice and Education

This project included information regarding research-based recommended interventions and treatments to address weight gain for individuals prescribed atypical antipsychotic

medications. The positive response to this presentation indicates that there is a need for ongoing education within MHC. The providers responses regarding potential barriers to distribution of educational handout reflects concerns about access to resources in web-based care, time, and provider distribution rather than benefits of the educational pamphlet itself.

Dissemination

The quality improvement project results will be shared with the Director of Behavioral Health Services, who will then share the results with the leaders from eight of the MHC behavioral health sites. The information disseminated will include the pretest and posttest survey results, the data spreadsheets and charts, and the author's data analysis and interpretation. The information will be shared with the DNP committee during the authors' final defense as well as presented to the clinical site in an executive summary.

DNP Essentials Addressed

The Essentials of Doctoral Education for Advanced Nursing Practice (DNP Essentials) were designed to outline the required curricular components that scholarly programs must meet to offer the Doctor of Nursing Practice degree (AACN, 2006). The DNP project, *The Importance of Nutrition with Concurrent Use of Atypical antipsychotic Medication,* successfully meets DNP Essentials II, III, and VII.

DNP Essential II, *Organization and Systems Leadership for Quality Improvement and Systems Thinking,* prepares the advanced practice nurse to improve patient care and healthcare outcomes by assessing and creating and creating healthcare approaches to better meet patient needs (AACN, 2006). The author worked with the behavioral health director and other providers at MHC to assess their needs and identify a meaningful project. The author worked as a leader of

change with the MHC staff for the educational presentation on nutrition, weight gain, and atypical antipsychotic use.

DNP Essential III, *Clinical Scholarship and Analytical Methods for Evidence-Based Practice*, prepares the advanced practice nurse to appraise the literature for best available practice (AACN, 2006). This essential also prepares the advanced practice nurse to design and implement QI projects and evaluate outcomes (AACN, 2006). The author of this DNP project met this essential by appraising literature for existing treatments and interventions to address weight gain in patients prescribed atypical antipsychotics, barriers to implementation of these treatments, and best practices to implement the Model of Improvement. DNP Essential III was also met with the implementation of the educational intervention and the evaluation of the projects intended outcomes.

DNP Essential VII, *Clinical Prevention and Population Health for Improving the Nation's Health*, prepares the advanced practice nurse to promote health and reduce illness and risk for individuals and families (AACN, 2006). The author of this DNP project met this essential by researching weight gain and atypical antipsychotic use locally and nationally and applying evidence-based interventions to address increased metabolic issues within this population.

Conclusions

Weight gain as a metabolic complication associated with use of atypical antipsychotics continue to cause significant physical issues and distress for the patient population in the US. A search of the literature shows that early interventions such as dietary counseling, lifestyle intervention and education, cognitive behavioral therapy (CBT), groups exercise, motivational

interviewing, and verbal and written educational resources have strong evidence for reliability and validity as modalities to combat weight gain in this population. The author conducted pretest/posttest surveys and an educational intervention to inform providers at MHC on these evidence-based treatment and interventions to increase provider knowledge, perceived benefit, and intent to adopt the interventions into practice. The author conducted a web-based in-service to educate the behavioral health director and 11 behavioral health providers on weight gain and concurrent use of atypical antipsychotic medications. Compared to the pretest survey questions, the results from the posttest show increased knowledge in treatments and interventions, perceived benefit of verbal and written education, and intent to adopt the educational pamphlet into practice.

Plan for Sustainability

Sustainability refers to a health service's ability to deliver care over time and to future generation (Mortimer et al., 2018). It is an essential part of the DNP project. The ability to maintain a quality improvement project is part of sustainability and begins before the project implementation (Silver et al., 2016). For this DNP project, the sustainability, at this time in the process, is determined by the individual providers. Due to the short time the author is a student at MHC, assessing continued barriers to pamphlet distribution will be impossible. In addition, once the provided stack of pamphlets has been distributed, it is at the discretion of the provider to print them out and continue distributions. Ultimately, whether the provider distributes the educational handout is at the discretion of the provider.

At the end of the educational presentation, the author introduced an idea for sustainability. As of now, the provider has access to information regarding the diagnosis and the

medication through the EMR. Ideally, when a patient is prescribed an atypical antipsychotic, the provider would be able to print them or email them educational information about the medication as well as the nutritional handout to help them with healthy food choices. By providing the patient with more tools, the provider can assist towards better patient outcomes.

APPENDIX A:

MHC HEALTHCARE SITE APPROVAL

MHC Healthcare
quality healthcare with a heart

September 22, 2021

University of Arizona Institutional Review Board

c/o Office of Human Subjects

1618 E. Helen Street

Tucson, AZ 85721

To whom it may concern:

Please note that Ms. Amy Kisner, a University of Arizona Doctor of Nursing Practice student, has the permission of Marana Health Center Main Clinic to conduct her quality improvement project, "The Importance of Nutrition with Concurrent Use of Atypical Antipsychotic Medication".

Ms. Kisner will conduct a brief educational in-service via Webex with the topic of nutritional education and atypical antipsychotic use. She will conduct a pretest and posttest survey. There will be no identifiable information attached to either of the surveys. Ms. Kisner's activities will be completed by December 31st, 2021.

MS. Kisner has agreed to provide my office a copy of the University of Arizona Determination of Human Subjects letter before she recruits participants and begins her project. She will also provide results of the project to providers and administration at the completion of the project.

If there are any questions, please contact my office at (520) 682-1091 ext. 7142.

Sincerely,

Jon Reardon, MBA, MSW, LCSW

Chief Behavioral Health Officer

MHC Healthcare

APPENDIX B:

CONSENT DOCUMENT (DISCLOSURE AND CONSENT FORM)

Voluntary Disclosure and Consent

Please read carefully

The purpose of this quality improvement project is to increase provider knowledge on evidence-based recommendations regarding treatment interventions to address weight gain and metabolic effects for patients prescribed an atypical antipsychotic medication. In addition, the aim of this project is to increase the use of evidence-based treatment interventions, specifically a nutritional handout developed by the United States Department of Agriculture (USDA) for patient distribution.

Should you choose to participate, you will be asked to:

1. Participate by watching a 10-minute PowerPoint presentation on research-based treatment interventions to combat metabolic side effects and weight gain in individuals prescribed second generation antipsychotics.
2. Take a pre-survey and post-survey about your knowledge, perceived benefit, and intent to implement this nutritional handout in your future practice.

It will take approximately five minutes to complete each the pre-and post-survey. Responses to both surveys are anonymous. You will receive no immediate benefit from your participation. There are no foreseeable risks associated with your participation.

If you choose to participate in this project, please be aware that participation is voluntary, and the refusal to participate will result in no penalty. You may withdraw yourself from the project at any time.

By choosing to participate in this project, you are giving consent.

For questions or concerns regarding this project, you may contact:

Amy Kisner, MS-RN, LMSW
DNP-PMHNP Student, University of Arizona
Phone: 520-548-6651
Email: akisner30@email.arizona.edu

APPENDIX C:

RECRUITMENT MATERIAL (RECRUITMENT EMAIL)

Dear MHC Employee,

My name is Amy Kisner, a student at the University of Arizona and clinical resident of Marana Health Center. I am studying to become a doctoral-prepared psychiatric mental health nurse practitioner. I am writing this email to extend an offer to volunteer to participate in my quality improvement study for my Doctor of Nursing Practice (DNP) project. The project titled "The Importance of Nutrition with Concurrent Use of Atypical Antipsychotic Medication" is designed to educate MHC staff on treatment recommendations to combat metabolic complications and weight gain for individuals prescribed second generation antipsychotics and evaluate knowledge, perceived benefit, and intent to adopt it into practice. This project aims to increase knowledge on evidence-based recommended treatment interventions and increase intent to implement this modality in the future. Participation will involve a pre-test, in-service, and post-test. The entire process will take less than 20 minutes.

Please note that participation will be voluntary. You may withdraw from participation at any point without penalty. Your survey responses will remain anonymous. Should you wish to participate in this project, please read the disclosure statement attached to this email. MHC leadership will provide a link to the pre-test, presentation, and post-test to those who wish to participate.

Sincerely,

Amy Kisner, MS-RN, LMSW
DNP Student
akisner30@email.arizona.edu

APPENDIX D:

EVALUATION INSTRUMENTS (PRE-SURVEY QUESTIONNAIRE / PRETEST AND POSTTEST SURVEY)

Pre-Survey Questionnaire

By agreeing to participate, you are indicating:

1) You are an employee of MHC currently working in the behavioral health department

2) Are over 18 years of age

3) Have the ability to read English

4) Not a patient in the behavioral health department at MHC

5) Provide consent to participate

- ○ Yes, I have read the Voluntary Disclosure and agree to participate

What is your current age?

- ○ 18-35
- ○ 36-50
- ○ > 50

What is your current specialty at MHC?

- ○ Medical Doctor
- ○ Doctor of Osteopathy
- ○ Nurse Practitioner
- ○ Physician Assistant

How many years have you been in practice?

- ○ 0-5
- ○ 6-10
- ○ >10

Link to pretest/posttest surveys:
https://qfreeaccountssjc1.az1.qualtrics.com/surveys/SV_bvKPQqJFkGl00qW/edit

Pretest Survey

Please answer how much you agree or disagree with the statement below.

	Strongly Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
I feel knowledgeable about potential preliminary interventions to combat weight gain in patients prescribed an atypical antipsychotic.	○	○	○	○	○
I currently provide verbal patient education regarding the potential risk of weight gain when initiating an atypical antipsychotic medication with a patient.	○	○	○	○	○
I currently provide handouts or other educational resources regarding nutrition to patients when prescribing atypical antipsychotics	○	○	○	○	○

Posttest Survey

Please answer how much you agree or disagree with the statements below.

	Strongly Agree	Somewhat agree	Neither agree nor disagree	Somewhat disagree	Strongly disagree
My knowledge regarding potential treatment interventions to address weight gain when prescribing atypical antipsychotic medication was increased following the presentation.	○	○	○	○	○
I plan to continue verbal education for my clients placed on an atypical antipsychotic medication.	○	○	○	○	○
I believe the nutritional handout provided during the presentation would be beneficial to my patients prescribed atypical antipsychotics and I plan to distribute it to them upon initiation of the medication.	○	○	○	○	○

What do you see as potential barriers to distribution of the nutritional handout to your patients?

Thank you very much for your participation!

APPENDIX E:

PARTICIPANT MATERIAL (POWERPOINT PRESENTATION AND FLYERS)

The Importance of Nutrition with Concurrent Use of Atypical Antipsychotic Medication

Amy Kisner, MS-RN, LMSW
2019 DNP, PMHNP Student

THE UNIVERSITY OF ARIZONA College of Nursing

Introduction

- Background
  - Second generation (SGA), or atypical antipsychotic medications were introduced in the 1980's - more desirable than 1 st generation
  - Nine FDA approved atypical antipsychotic medications currently
  - Research indicates these medications are connected to metabolic risks including weight gain
- Prevalence:
  - 40% of individuals placed on atypical antipsychotics are affected by metabolic issues including weight gain
  - Greatest potential of weight gain are found in clozapine and olanzapine
- Consequences
  - Weight gain in a population already suffering from mental illness can lead to decreased quality of life and medication non -compliance.

Background: Current Recommendations

- The Census Development Conference on Antipsychotic Drugs and Obesity and Diabetes- recommendations from APA/ADA
- FDA intervention-letters and labeling changes
- Minimal movement since APA/FDA recommendations
- Factors for lack of adherence

3

Local Problem

18.1% of the US adult population 18 years and over suffer from mental illness; 42 % suffer from seriously debilitating mental illness

In 2017, estimated there were 1,704 mental health providers; ratio of population to providers 600:1 causes longer gaps between appointments

Marana Health Center Evaluation(Main) 11/19/2020 3/19/2021- 43 patients were prescribed or provided atypical antipsychotic medications

Thirty-eight patients were diagnosed with a psychotic disorder or a mood disorder.

Education initiated by provider, however other referrals or interventions are at the discretion of the provider

4

Interventions

Themes from literature:

- Nutritional Consult
- Referrals for specific therapies
- Educational Handouts/Pamphlets

Overwhelming theme: Non-pharmacological interventions such as physical activity and dietary modifications were effective in preventing weight gain in those placed on SGAs

5

Proposed Intervention- Small Changes Matter Handout

- Intervention- providers will distribute the nutritional handout to all individuals prescribed atypical antipsychotics to address potential weight gain side effect
- Fifteen educational handouts distributed to providers for their patients in-office
- For Webex patient session, a link will be sent via email by the MA following the session
- For additional services, providers can refer to PCP and/or dietician
- Link for the nutritional handout can guide the patient to more resources
- Within ten days, assessment survey will be distributed via email

17

Small Changes Matter pamphlet

Provider Benefits

- 40 % in person services as of now, handouts for distribution
- Easy telemedicine distribution by providing internet link to "Small Changes Matter" handout

https://www.dietaryguidelines.gov/sites/default/files/2020-12/DGA_2020-2025_StartSimple_withMyPlate_English_color.pdf

Patient Benefits

- Easy to read
- Connected to more resources for nutrition and exercise
- Tangible tool for patient
- Psychosocial- patient is a part of their treatment
- Can be used as a tool while shopping and cooking

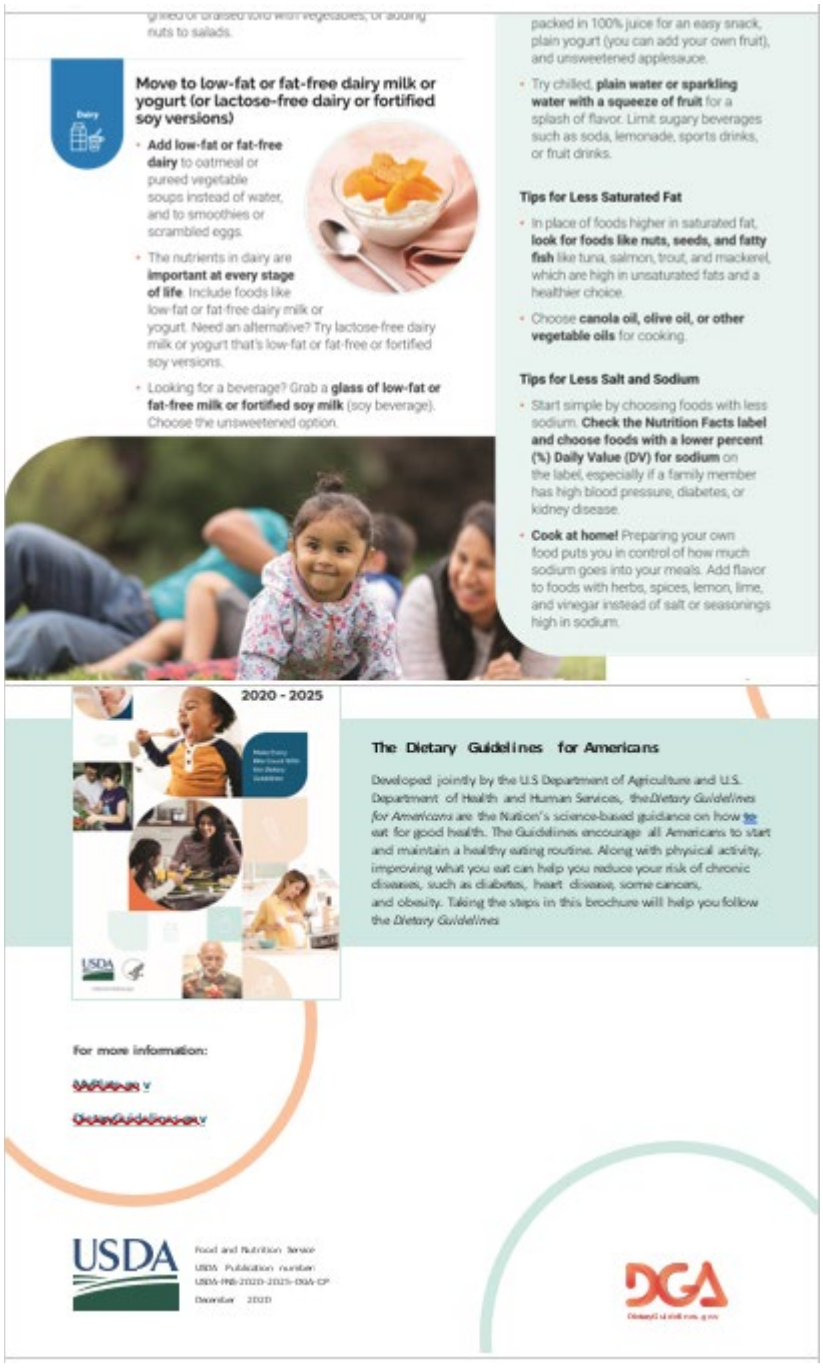
7

Thank You For Your Participation

- You will now be directed to a Posttest Questionnaire. I look forward to your feedback!

6


Small Changes Matter.
Start Simple
With MyPlate Today.
MyPlate.gov
Healthy eating is important at every stage of life.
Make half your plate fruits & vegetables.
Focus on whole fruits.
Make half your grains whole grains.
Vary your veggies.
Vary your protein routine.
Move to low-fat or fat-free dairy milk or yogurt (or lactose-free dairy or fortified soy versions).
Choose foods and beverages with less added sugars, saturated fat, and sodium.
The benefits add up over time, bite by bite.
Choose from these simple tips to help you...
Focus on whole fruits
Start your day with fruit at breakfast. Top cereal with your favorite seasonal fruit, add bananas or chopped apples to pancakes, or mix a spoonful or two of raisins into hot oatmeal.
Keep ready-to-eat fruits in the refrigerator for a quick snack.
For dinner, chop up a combination of seasonal, frozen, or canned fruits to make a quick fruit salsa to top fish or chicken. Add fruit such as orange sections, apple wedges, or grapes to a salad.
Vary your veggies
Add shredded carrots to the lettuce and tomato in your sandwich, make soup from the veggies in your vegetable drawer, and snack on raw vegetables.
Try a stir-fry with fresh or frozen vegetables for a quick meal or easy side dish.
Pick out a vegetable that the family has not tried and get a new recipe from a cookbook, website, supermarket, or friend.
Make half your grains whole grains
For breakfast, enjoy a whole-grain-based hot or cold cereal. Consider trying whole-grain puffs or flakes that are new to you—you might discover a new favorite!
Instead of sandwich bread, try a whole-grain pita, tortillas, naan or other whole-grain flatbread, sliced breads, or rolls.
Create your own trail mix with whole-grain cereal or enjoy whole-grain crackers with turkey, hummus, or avocado for a healthy whole-grain snack.



grilled or braised tofu with vegetables, or adding nuts to salads.

Dairy

Move to low-fat or fat-free dairy milk or yogurt (or lactose-free dairy or fortified soy versions)

- **Add low-fat or fat-free dairy** to oatmeal or pureed vegetable soups instead of water, and to smoothies or scrambled eggs.
- The nutrients in dairy are **important at every stage of life**. Include foods like low-fat or fat-free dairy milk or yogurt. Need an alternative? Try lactose-free dairy milk or yogurt that's low-fat or fat-free or fortified soy versions.
- Looking for a beverage? Grab a **glass of low-fat or fat-free milk or fortified soy milk** (soy beverage). Choose the unsweetened option.

packed in 100% juice for an easy snack, plain yogurt (you can add your own fruit), and unsweetened applesauce.

- Try chilled, **plain water or sparkling water with a squeeze of fruit** for a splash of flavor. Limit sugary beverages such as soda, lemonade, sports drinks, or fruit drinks.

Tips for Less Saturated Fat

- In place of foods higher in saturated fat, **look for foods like nuts, seeds, and fatty fish** like tuna, salmon, trout, and mackerel, which are high in unsaturated fats and a healthier choice.
- Choose **canola oil, olive oil, or other vegetable oils** for cooking.

Tips for Less Salt and Sodium

- Start simple by choosing foods with less sodium. **Check the Nutrition Facts label and choose foods with a lower percent (%) Daily Value (DV) for sodium** on the label, especially if a family member has high blood pressure, diabetes, or kidney disease.
- **Cook at home!** Preparing your own food puts you in control of how much sodium goes into your meals. Add flavor to foods with herbs, spices, lemon, lime, and vinegar instead of salt or seasonings high in sodium.

2020 - 2025

The Dietary Guidelines for Americans

Developed jointly by the U.S. Department of Agriculture and U.S. Department of Health and Human Services, the *Dietary Guidelines for Americans* are the Nation's science-based guidance on how to eat for good health. The Guidelines encourage all Americans to start and maintain a healthy eating routine. Along with physical activity, improving what you eat can help you reduce your risk of chronic diseases, such as diabetes, heart disease, some cancers, and obesity. Taking the steps in this brochure will help you follow the *Dietary Guidelines*.

For more information:

USDA

Food and Nutrition Service

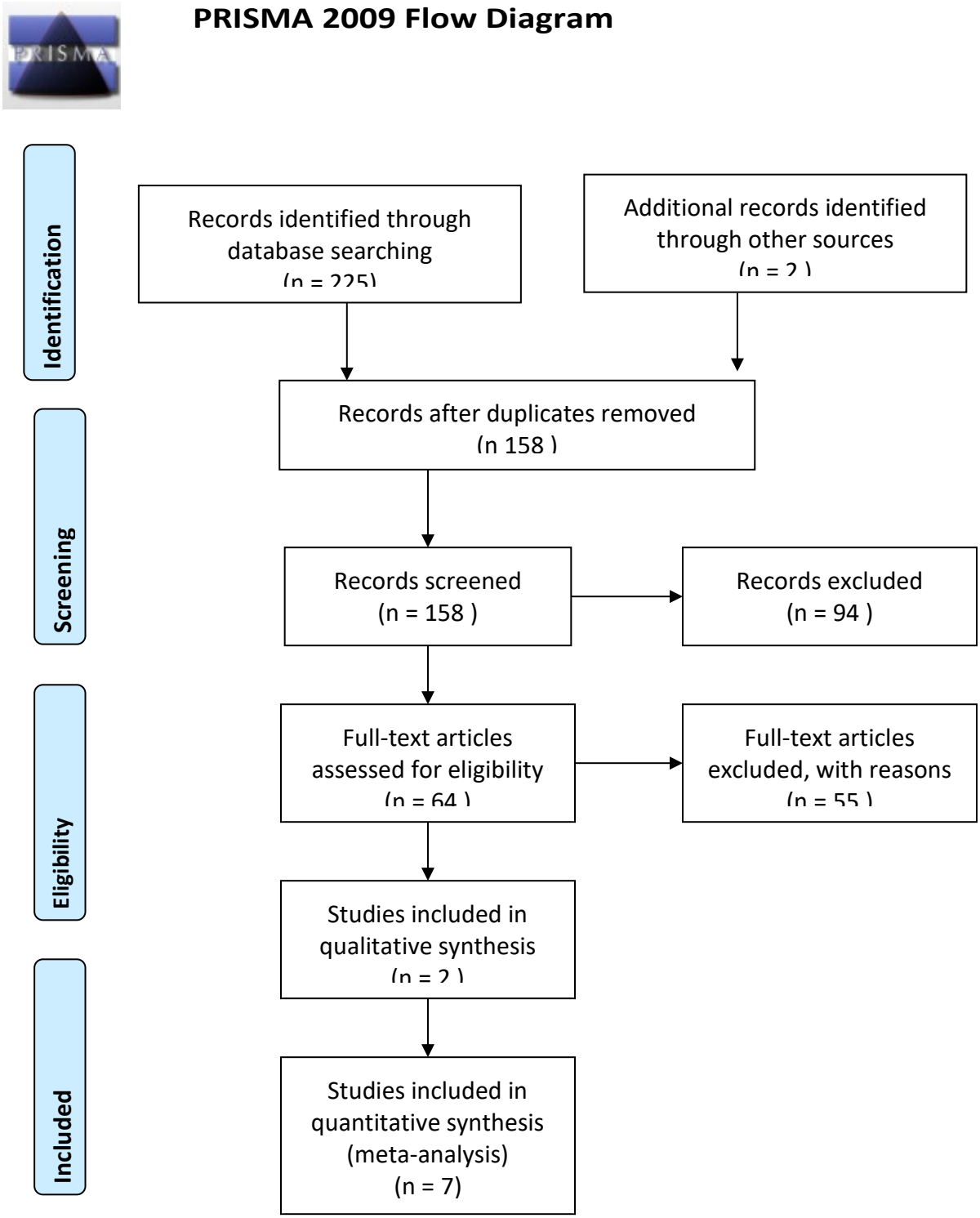
USDA Publication number:

Decembar 2020

DGA

APPENDIX F:

PRISMA FLOW DIAGRAM


PRISMA 2009 Flow Diagram
Identification
Screening
Eligibility
Included
Records identified through database searching (n = 225)
Additional records identified through other sources (n = 2)
Records after duplicates removed (n 158)
Records screened (n = 158)
Records excluded (n = 94)
Full-text articles assessed for eligibility (n = 64)
Full-text articles excluded, with reasons (n = 55)
Studies included in qualitative synthesis (n = 2)
Studies included in quantitative synthesis (meta-analysis) (n = 7)

APPENDIX G:

PROJECT TIMELINE

Completion Date	Planning	Pre-Implementation	Implementation	Evaluation
9/22/2021	Met with Chief of Clinical Behavioral Health at MHC for Site Approval Site Approval Obtained			
9/30/2021		Oral Proposal Defense		
10/14/2021	Submitted IRB Application			
10/26/2021	IRB Approval			
11/3/2021			Implemented the Q.I. Project at MHC	Disseminated Pretest and posttest questionnaires
11/3/2021			Completed Q.I. Project at MHC	Closed pretest and posttest questionnaires
11/4/2021				Data Analysis
				Final Defense

APPENDIX H:

LITERATURE REVIEW GRID

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2013; Attux et al.	A 6 Month Randomized Controlled Trial to Test the Efficacy of a Lifestyle Intervention for Weight Gain Management in Schizophrenia	Randomized Controlled Trial (Level I)	*Obese pts more likely to dc meds *At 12 weeks, no significant different in groups for weight or BMI, or other metabolic parameters * At 6 months, however, the LWP group had lost 1.15 kg and SC group had gained 0.5 kg *LWP good option- easy and accessible intervention at clinics and low cost because it can be provided by all healthcare individuals *Lifestyle interventions can be effective long-term	Study tests a 12-week Lifestyle Wellness Program as a strategy to combat weight gain in people with schizophrenia. MHC outpatient clinic-this type of intervention is possible
2017; Erickson et al.	A Randomized, Controlled Multisite Study of Behavioral Interventions for Veterans with Mental Illness and Antipsychotic Medication-Associated Obesity	Randomized Controlled Trial (Level 1)	*Both groups lost weight-even just the 8-week weekly research meeting, nutritional education, and self-help material may have been motivating * LB group significant changes in nutritional behaviors, reduce in overall caloric intake, improved caloric quality by decreasing empty calories, decreased waist circumference, uses food and activity journal for accountability. *Women most responsive to LB *Participants with BMI under 25 and over 40 most benefitted from LB- potential target population *LB participants with more insight into their mental illness and weight problem experienced t he most weight loss	Changes in nutrition overall in the program group was greater. Even weekly meetings and self-help material proved to be motivational enough for success in UC group.

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2017; Magni et al.	Super wellness Program: A Cognitive Behavioral Therapy-Based Group Intervention to Reduce Weight Gain in Patients Treated with Antipsychotic Drugs	Prospective Comparative Study (Level II)	*Brief intervention-16 weeks * 59 super wellness and 26 control *Control was individual sessions and super wellness was groups of 8 *Run by psychologist and nutritionist/nurse *Larger decrease in BMI of experimental group	*Weaker study-nonrandomized, small sample
2012; Ratliff et al.	Contingency Management for the Treatment of Antipsychotic Weight Gain: A randomized Controlled Pilot Study	Randomized Controlled Trial (Level I)	*3 different interventions- rewarding for attendance, weight, and behavior. There was a CON (control group on a waiting list) *Mean weight was reduced in all groups *Weight gained in CON *Greatest weight loss was reimbursement for healthy food-price is nutritious food impedes good choices *Increase in attendance of sessions did not equal decrease of weight, which are findings from previous studies *Very small sample size and brief duration-limitations- group motivated to lose weight-does not always allow for a differential analysis of individual antipsychotics- control group cross over to CM also a limitation (not 4 separate groups)- also there was no baseline cognitive testing * result= CM may provide sufficient motivation to help SMI patients combat antipsychotic induced weight gain	*Financial incentive effective in buying of nutritious foods, finances play a role in the purchase of nutritious choices. *CM is expensive, therefore a good option for community-based implementation *Food reimbursement (rewarding behavioral change) is most effective in this population

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
2017; Sugawara et al.	Effects of Nutritional Education on Weight Gain and Metabolic Abnormalities Among Patients with Schizophrenia: A Randomized Controlled Trial	Randomized Control Trial (Level I)	*Group C with nutritional education interventions greater decrease than A or B *The addition of educational non-pharmacological intervention can be effective to combat antipsychotic induced weight loss *Group B did not show significant changes in weight, which went against the assumption of the authors *Conclusion- nutritional education provided by a dietician was effective in promoting weight loss and reducing metabolic abnormalities in patients with schizophrenia who had obesity due to antipsychotic medications.	*Provider information alone may not be effective for weight loss with these medications. *Educational intervention through a dietician proved successful in this study.
2012(a); Usher et al.	The Experience of Weight Gain as a Result of Taking Second-Generation Antipsychotic Medications: The Mental Health Consumer Perspective	Interpretive Qualitative Study- phenomenological study	*8 participants- one man and 7 women had gained weight because of SGAs *Individuals struggled with insatiable appetite sometimes associated with the medication *Many individuals stop medications due to weight gain because they feel that they have no other alternative- weight gain impacts adherence to medications *Most weight gain occurs between 4-12 weeks of initiation of the SGA	*Individuals tried to implement strategies on their own but no success *Weight gain has a profound effect on the well-being of the patient as well as medication adherence *Strategies to combat weight gain need to be structured and implemented at initiation of the medication-early intervention can minimize weight gain
2012(b); Usher et al.	A Randomized Controlled Trial Undertaken to Test a Nurse-Led Weight Management and Exercise Intervention Designed for People with Serious Mental	Randomized Controlled Trial (Level 1)	*No significant weight change findings after 12-week educational program- healthy lifestyle, motivational interviewing, exercise	*Intervention should occur upon initiation of SGA for best result to combat weight gain

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
	Illness Who Take Second Generation Antipsychotics		*Participants has been on SGAs for a while so perhaps if they had just started the results would be different *Researcher noted that lifestyle changes occurred, however, and that participants were willing to engage * Short study-recommendation is to do similar study with longer duration	* Study potential too short- a similar study over a longer duration of time is recommended
2011; Thompson et al.	Targeted Intervention Monitoring of Antipsychotic-Induced Weight Gain and Metabolic Disturbance in First episode Psychosis		*Pharmacological and non-pharmacological interventions effective if offered early *Guidelines and evidence show that there is not one single intervention most useful but instead highlights the importance of using theoretically driven interventions appropriate to the setting *Preaudit-screenings not being done regularly *Post intervention-screening rates doubled after the intervention *A targeted implementation strategy substantially improved screening process. Guideline-concordant routine monitoring implementation successful in better monitoring practices for first time psychosis.	*This study looks recommendation and guidelines and compares them to the clinic. Intervention is implemented. Rates of assessments, screenings etc. increase after intervention and awareness.
2016; Vazin et al.	Perceptions of Strategies for Successful Weight Loss in Persons with Serious Mental Illness Participating in a Behavioral Weight Loss Intervention: A Qualitative Study	Qualitative Study of a Randomized Clinical Trial	*The ACHIEVE intervention model was used, a multicomponent high intensity intervention- this article explored what components of this model worked for the population	*because of the unique population, interventions need to be tailored *18-month program- participants developed better habits because the program was longer

Pub. Year; Author's Last Name	Title of Publication	Type of Study	Main Outcomes of Findings	Support for and or Link to Project
			* Peers and facilitator support a key element to participant perceived success *Dietary and physical activity-based weight loss strategies are helpful, social support is important, and both medical and nonmedical benefits can be achieved by such an intervention	* Group exercise program tailored towards the mentally ill population
2019; Watkins et al.	Keeping the Body in Mind: A Qualitative Analysis of the Experiences of People Experiencing First-Episode Psychosis Participating in a Lifestyle Intervention Programme	Qualitative Study	*Role of physical health in mental health-reported improved self-esteem, renewed sense of hope, improved mood, increased motivation *self-esteem- psychosis diagnosis was a source of stress *Hope- diagnosis was traumatic- the benefit of structure provided a new sense of hope *Improved mood- sense of control over health * Overcome lack of motivation- lost during mental illness * Staff interactions- importance of connection and structure	*Most lifestyle intervention programs aim to reverse weight gain and metabolic issues instead of prevention *Keeping the Body in Mind (KBIM) is a preventative approach for young people in the early stages of antipsychotic treatment.

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