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Strategies to Implement the Use of Supplements versus Psychotropics in a Pediatric and Adolescent Population: A Quality Improvement Project

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Strategies to Implement the Use of Supplements versus Psychotropics in a Pediatric and Adolescent Population: A Quality Improvement Project

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By

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Abstract

Background: Mental health disorders in pediatric and adolescent ages are exceedingly prevalent yet continue to go undertreated. Although mental health treatment is generally more accepted today, unfortunately there is still a stigma associated with it (Radez et al., 2020). While this is one of the central issues as to why there is a lack in seeking mental health care, there are several other obstacles such as perceived confidentiality, cost, building rapport with a stranger, and availability of providers (Radez et al., 2020). It is unsettling that one out of every seven young individuals meet the criteria for a mental health disorder. When mental health disorders are left untreated, issues often escalate socially and academically. Suicidal ideations, substance abuse, and self-harm are a few issues that may occur (Radez et al., 2020). Mental health disorders commonly first manifest throughout pediatric and adolescent ages. Since the prevalence rates at this age for disorders such as depression, anxiety, and eating disorders is estimated to be roughly 17 to 50%, the pediatric and adolescent ages are an important target group (Pfeiffer & In-Albon, 2022).

Purpose: This quality improvement project was aimed to overcome hindrances while seeking mental health treatment in a pediatric and adolescent population by educating providers at an outpatient private psychiatric clinic. This project had a focus on two of the most common mental health disorders: anxiety and depression. Educational materials were created for providers to improve knowledge on treatment utilizing supplements versus psychotropics for anxiety and depression in this vital population.

Methods/practice: An educational program was designed and delivered in person at the clinical site using a Keynote presentation. Pretest and post-tests scores were compared and evaluated for their statistical significance. The goal of the educational information that was presented to the

providers at the clinical site was to improve their knowledge regarding implementing supplements in their young patients seeking care for anxiety and depression. A literature review was conducted, and fourteen (n=14) studies were selected.

Conclusions: Results from this literature review showed that there are many obstructions for treating mental health disorders in a young population, including the hesitancy from parents to utilize a pharmaceutical to aide in their child's mental health treatment. In addition, the search revealed that several supplements have been trialed to treat mental health disorders and their outcomes were successful.

Implications for practice: There is an opportunity for providers to learn about options other than pharmaceuticals to treat anxiety and depression. Alternates should be explored and offered to patients for treatment, especially in mental health where there is already a tremendous stigma associated with care. Ultimately, the target was to improve provider's knowledge to in turn decrease the stigma associated with mental healthcare, as well as to provide cost efficient options for patients and enhance positive outcomes.

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Acknowledgements

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Introduction

Problem Identification

Mental health disorders in pediatric and adolescents are exceedingly prevalent but remain undertreated. These disorders often manifest in early childhood and adolescent years (Pfeiffer & In-Albon, 2022). When mental health disorders go untreated in children and adolescents, there is an association with adverse health, academic, and social outcomes. There is also a link between increased drug abuse, self-harm, and suicidal behavior that is exacerbated into adulthood (Radez et al., 2020). Poor mental health in a young population is significantly related to substance use, violence, abuse, and lower educational achievements. Investigation of this delicate population is not only important because it is a key age to identify and treat mental illness, but this age group also differs from adults in several aspects. The fact that adults have increased maturity and responsibility can impact vulnerability and their response to their own mental wellbeing (Pfeiffer & In-Albon, 2022).

Search Strategy

To effectively explore the issue surrounding the treatment of mental illness, a subset of literature was selected based on its relevance to the topic. A literature review was completed utilizing the following databases: FIU Libraries, Open Athens, Cumulative Index to Nursing and Allied Health (CINAHL), PubMed, MEDLINE, World Health Organization (WHO), and Google Scholar. The following keywords were used: "*anxiety*", "*depression*", "*pediatrics*", *"mental health"*, *"mental illness"*, "*adolescence*", "*outpatient setting*", "*education*", "*supplements*", "*vitamins*", and "*treatment*." The concluding search generated 27 articles (n=27). Thirteen articles were omitted after considerable screening of title, abstract, sample size, research approach, and methodology. This resulted in the review of 14 full-text articles. Some limitations

that led to exclusion were language, when research was conducted, and availability of full text articles. The literature review displayed compelling evidence that treating anxiety and depression with supplements is effective in reducing signs and symptoms of mental illness as well as improved patient outcomes.

The purpose of this quality improvement project was to enhance mental health providers' knowledge regarding supplement use for anxiety and depression in pediatric and adolescent ages. Adolescents particularly are in a pursuit of autonomy and often opt to solve their own issues, which leads to feeling ashamed for asking for help or even denying their problems. Although, children have a desire for autonomy, their parents are still impactful in their journey towards mental health care. There is typically increased willingness to pursue care when it is backed by a parent's support (Pfeiffer & In-Albon, 2022). Generally, dietary supplements are widely used by the general population and the interest for them continues to grow. Psychiatric illnesses are sometimes treated with dietary supplements. The mental health disorders treated the most with supplements are anxiety and depression (Hoffmann et al., 2019). The goal of this literature review is to gain knowledge of evidence-based research and to educate mental health providers on the use of supplements for treatment of anxiety and depression in the pediatric and adolescent population.

Summary of the Literatures

A literature review was conducted in an effort to obtain journal articles and reports relevant to the topics regarding supplements and their treatment, as well as prevalence of anxiety and depression. The search was limited to full-text articles published in English between the years of 2007 and 2022. The articles included the use of supplements for the treatment of anxiety and depression, the implementation of supplements versus pharmaceuticals, barriers

affecting mental health treatment, mental health treatment in the youth, and mechanism of action of specific supplements. The purpose of this literature review was to gain an understanding of the difficulties in mental health treatments, specifically in a pediatric and adolescent age group, to expand the knowledge of supplement use and how supplements impact mental health, and to understand the feasibility of utilizing supplements to treat depression and anxiety. This literature review also encompassed the stigma associated with seeking treatment, socioeconomic inconsistencies, and cultural aspects that impede the treatment of prevalent mental illnesses such as anxiety and depression. Lastly, the implementation of supplements suggested by the studies was explored in regard to how practical it is to substitute a pharmaceutical for a supplement; and to address the delicate topic of mental health and improve patient outcomes.

Background

Clinical Classification of Anxiety and Depression

According to the American Psychiatric Association (APA), anxiety is defined as worry that is excessive. It must occur more days than not for a minimum of 6 months and must occur about numerous activities or events such as work or school. The individual will find it difficult to control worrying. The anxiety and worry are associated with the following symptoms and must include three of the symptoms: restlessness or feeling on edge, easily fatigued, mind going blank or difficulty concentrating, feelings of irritability, muscle tension, or sleep disturbance (APA, 2013). The symptoms must cause significant distress or impairment in important areas of functioning such as social or occupational. The anxiety or worry must not be attributed to physiological effects of another medical condition or substance use. Lastly, it should not be better explained by another mental disorder (APA, 2013).

Major Depressive Disorder (MDD) is defined as having five or more symptoms that must be present during the same 2-week period and are a change from previous functioning. At least one symptom must be with depressed mood or loss of pleasure or interest (APA, 2013). The following are the additional criteria to meet the diagnosis requirement: depressed mood most of the day, diminished interest, or pleasure in all or nearly all activities, most of the day, nearly every day. Additionally, weight loss that is significant when not dieting, or weight gain; insomnia, or hypersomnia almost every day, fatigue or loss of energy, feelings of excessive guilt or worthlessness; decreased ability to think or concentrate or being indecisive, and recurring thoughts of death. The symptoms must cause impactful impairment or distress in important areas of functioning and the incident may not be attributable to the effects of another medical condition or substance use (APA, 2013).

Significance of Depression and Anxiety

One of the central issues with mental health treatment at this delicate age is parents' hesitation to put their child on medication. There are several reasons parents are reluctant to their child taking psychotropic medications. One main reason is that there are many side effects related to psychotropic medications and some even impact growth and development, as well as have an alarming black box warning for increased risk for suicide (Firth et al., 2017). Another reason is the stigma associated with psychotropic medications and mental health. However, there are few side effects related to supplements, unlike psychotropics. For example, vitamin E side effects were observed in a small amount of people. The side effects experienced were minimal flu-like symptoms and some gastrointestinal discomfort (Firth et al., 2017). Supplements are a better option because they have decreased side effects, less stigmatization, and increased compliance.

The use of supplements and alternative medicine is on the rise. A National Health Interview Survey reported in 2002 that 36 percent of adults in the United States (U.S.) use some type of supplement. As the use of supplements as remedies continues to increase, there is a need for healthcare providers to be familiarized with the side effects, risks, and contraindications of the more commonly used supplements (Niv et al., 2009). An estimated 21.4 percent of adults are affected by a mood disorder at some point in their life. Mood disorder pathogenesis is complex, and a wide variety of biological, psychological, and social factors contribute to the formation. Dietary and lifestyle factors may play a key role in mood disorders by impacting levels of stress, reuptake or metabolism of neurotransmitters, the release of neurotransmitters, or by providing substrate for production of neurotransmitters (Mueller, 2020).

Pathology of Mental Health Disorders

Neurotransmitters that influence the biochemical pathways of mood disorders are serotonin, γ-Aminobutyric acid (GABA), epinephrine, norepinephrine, and dopaminergic pathways. These neurotransmitters are found in various parts of the body, but one important place they are found in is the human brain. Therefore, the neurotransmitters in the brain modulate functions such as mood, appetite, sleep, and cognition. Dopamine, norepinephrine, and epinephrine are excitatory neurotransmitters and act on both the pre- and post-synaptic adrenergic and dopamine receptors. Thereby, influencing mood, intellect, cognition, and motivation. GABA is an inhibitory neurotransmitter, and in the brain, it influences one's mood. These neurotransmitters are a target of many pharmaceutical interventions for mood disorders. However, variation in dietary patterns and behaviors have also been identified as modulators of mood in numerous studies (Mueller, 2020).

While a pharmaceutical approach has shown achievement of a moderate decrease in mental illness, there is still more room for improvement. As life expectancy continues to increase, indicators point to an increase in worldwide mental illness as well. The World Health Organization (WHO) indicated that major depression will eventually be the second most cause of incapacity following ischemic heart diseases (Martinez-Cengotitabenga & Gonzalez-Pinto, 2017).

Prevalence of Mental Health Disorders in Young People

The prevalence of mental health disorders in children are widespread and alarmingly undertreated. Less than two-thirds of young people access any professional health for their mental health. This is related to several issues such as cost, stigma, embarrassment, and a general fear of a young person receiving medications as a method of treatment (Radez et al., 2020). In order for the topic of mental health treatment to be better understood, it is necessary for individuals to be thoroughly educated on it and recognize that supplements may also be utilized for mental health disorders. In turn, this will eliminate the fear of seeking treatment, and eradicate the idea that only psychotropic medications will automatically be prescribed. This enlightenment may potentially help decrease the gap in care. As young people take a more active role in pursuing help, it is important to help overcome their fears of seeking treatment (Radez et al., 2020). While the world continuously becomes more developed and economies emerge, some individuals do not meet the minimum daily requirements of various nutrients that are essential for the brain and body to function at a normal level. Furthermore, these deficiencies combined with sleep altercations, consumption of alcohol, tobacco, drugs, and insufficient physical activity often lead to health deficits, specifically mental health deficits (Martinez-Cengotitabenga & Gonzalez-Pinto, 2017).

Nutrition affects mental health by diverse mechanisms. Psychonutrition, which is the impact diet has on mental health, is an emerging topic. Depression has been associated with inflammatory responses, therefore a diet with a low dietary index may be influential for depressive symptoms (Fond et al., 2020). Additionally, modifying microbiota and probiotic supplementation may also be beneficial in treatment of depression. One mechanism is the high metabolic rate the brain encompasses; it uses an increased portion of nutrients and energy. Secondly, the brain requires an adequate supply of nutrients in the form of amino acids, vitamins, fats, minerals, and other micronutrients (Martinez-Cengotitabenga & Gonzalez-Pinto, 2017). There is also a role of an antioxidant defense system that functions alongside support of cofactors and phytochemicals that are consumed. Therefore, scientific evidence shows that supplements and overall diet is an added factor, as well as a factor that is a significant approach to mental illness (Martinez-Cengotitabenga & Gonzalez-Pinto, 2017).

Depression and anxiety continue to be worldwide challenges with global public health concern. Depression alone influences 300 million people throughout the world and is expected by 2030 to be the principal contributor to the burden of diseases (Abiri, Sarbakhsh, & Vafa, 2021). Anxiety is the most experienced psychiatric symptom. Approximately one out of every three people experience debilitating anxiety. It is often comorbid with other psychiatric illnesses, most commonly depression. The symptoms experienced often cause quality of life to decrease and mortality to increase (Su et al., 2018). There is also an association of high morbidity and mortality in addition to negative socioeconomic influence due to the related functional disabilities. Antidepressant medications and psychotherapy are treatment options that have shown effectiveness. However, more than 50 percent of these pharmaceuticals are faced with side effects, which can lead to the discontinuation of treatment. There is an urgent need for new

treatment approaches that exhibit high effectiveness and minimal side effects (Abiri, Sarbakhsh, & Vafa, 2021).

It is estimated that worldwide, between 10 to 20 percent of children suffer from mental health disorders, with more than half of all disorders having an onset prior to 15 years of age, and roughly 75 percent before 25 years old. Despite the alarming number of children and young adults impacted, and this major effect it has on their lives, access to quality and timely services remains to be a problem and many needs are left unmet (Zifkin et al., 2021). There are also a rise of mental health related emergency room visits by children and young adults ages 5 to 24. This situation is one the requires an in-depth investigation of availability of mental health services, how they are perceived, and how they are accessed. Some adolescents experiencing issues such as emotional regulation, personality disorder features, attachment disorders, or oppositional behavior face difficult challenges when attempting to access care. Parents often have a fear of being judged or blamed for their child's difficulties. Some parents also feel discriminated against and are not taken seriously when seeking services for their children (Zifkin et al., 2021).

Clinical Supplement Utilization

There are a vast number of supplements currently available that impact mood, sleep, cognition, and many other factors that impact people's daily lives and level of functioning. There is increasing evidence that nutrients play a major role in mental health, as well as an increased interest in a more holistic approach-especially at a delicate age such as pediatrics and adolescence. When one has an adequate intake of nutrients, overall health and mental health are improved (Martinez-Cengotitabenga & Gonzalez-Pinto, 2017). While there are hundreds of supplements that are currently available, specific supplements that are most widely used for the treatment of anxiety and depression will be discussed. Patients are becoming increasingly

interested in methods to treat illness using a more holistic approach. Therefore, it is imperative for providers to be familiarized with several of the most used supplements in order to deliver optimal care for patients and improve outcomes.

Herbal Remedies/Dietary Supplement Treatment for Mental Health

Niv et al. (2009) conducted a study of participants from the Community Tracking Study (CTS), which is a nationally representative study of the United States' civilian population to determine the use of herbal medicines and dietary supplements (HMDS). The purpose of this study was to examine the relationship between HMDS use and mental health characteristics. The CTS sample was divided into categories of psychologically distressed versus not distressed. This was determined by the participant's responses to two mental health items from a 12-item Short Form Health Questionnaire (Niv et al., 2009).

All participants that reported mental health service us or psychological distress were sampled in addition to a random sample of non-distressed, non-mental health service users. Niv et al. (2009) found that participants with a psychiatric disorder were significantly more likely to use supplements such as St. John's Wort and melatonin, however the effectiveness is uncertain due to little evidence availability at the time of the study. Further investigation may be beneficial to see what supplements participants were choosing, exploring why they chose them, and their resources utilized.

Implications of L-Theanine

L-Theanine is an amino acid that is becoming increasingly popular for mental illness treatment because of its calming effects. The mechanism of action of L-Theanine is that it blocks that L-glutamic acid to glutamate receptors within the brain which in turn reduce stress and anxiety. It has been shown to increase certain neurotransmitters that are associated with calmness

and relaxation such as GABA and serotonin (Kimura et al., 2007). Green tea has become well known in recent years for its health benefits. L-Theanine began becoming a focus of attention as it is one of the major amino acids contained in green tea. Several studies have identified L-theanine as having a neuroprotective effect suggesting a functional role in brain dynamics. Some studies have also shown that L-Theanine may have a positive impact on sleep quality due to its anxiety and stress relieving properties (Kimura et al., 2007).

Administration of L-Theanine has also been shown to reduce blood pressure and inhibit the excitatory effects of caffeine. L-Theanine may also have a positive impact on cognitive function, including memory and attention. This is likely due to L-Theanine's ability to increase alpha brain waves, which are associated with mental alertness and relaxation. It is known that emotional and physical states of humans are modulated by neurotransmitters and L-Theanine may influence physiological states (Kimura et al., 2007). Studies have also shown that L-Theanine may have antipsychotic-like features as well as antidepressant-like effects. L-Theanine clinical trials suggest that at 200 to 400mg daily dosing for 4 to 8 weeks as an adjunctive therapy improves anxiety, depressive, and psychotic symptoms with limited side effects (Yuan et al., 2021). Overall, L-Theanine is a safe and effective supplement that may help to treat anxiety related symptoms as well as overall wellbeing.

Effects of L-Theanine on Stress and Anxiety

Kimura et al. (2007) conducted a double-blind study that involved the impacts of L-Theanine on psychological and physiological stress responses. Twelve participants were involved in four different trails. The first group took L-Theanine at the start of the study, the next group took L-Theanine midway, and there were two control groups that either took a placebo or took nothing (Kimura et al. 2007). The results indicated that consumption of L-Theanine resulted

in reduced heartrate and salivary immunoglobulin A (IgA) responses to an acute stress task in comparison to the placebo group. The reduction in heartrate and IgA were attributed to the lessening of the sympathetic nervous system activation. This study suggested that the consumption of L-Theanine orally may have anti-stress effects through the inhibition of the cortical neuron excitation (Kimura et al. 2007). This study may be expanded by testing the time of day in which L-Theanine works best and a further investigation on not only the impact it has on stress, but a focus on the anxiety component as well as symptoms of anxiety that are comparable to stress.

L-Theanine Effects on Motor Cortex Excitability

Yuan et al. (2021) investigated the effects of L-Theanine in the motor cortex. This study was a randomized double-blind crossover study that was placebo controlled. It consisted of 10 healthy adults. In a random order, all subjects received both conditions: 4 received L-Theanine and 6 received a placebo on the first visit. The participants were randomized to receive 400mg or a single oral dose of L-Theanine or a placebo on two separate occasions with a minimum of 72 hours apart (Yuan et al, 2021). While the study size was small, no adverse side effects from L-Theanine were observed. The study concluded that L-Theanine is a substance to consider to be therapeutic for anxiety, affective and psychotic disorder on brain excitability (Yuan et al, 2021). This study may potentially be enhanced by adding an additional supplement to compare results.

Implications of Kava Kava

Kava, known for its relaxing and calming properties, is another complementary or alternative therapy that is on the rise in the United States (U.S.). It is an herb that is extracted from the roots of the plant Piper methysticum that has been used for centuries in traditional medicine for its ability to promote sleep, enhance mood, and reduce anxiety. Studies have

investigated the effects of the herb with generalized anxiety disorder (GAD) and the symptoms associated such as excessive worrying, headaches, insomnia, fatigue, and tension. Its calming effects have been shown to alleviate symptoms of many anxiety-related conditions. Kava also has sedative properties that may alleviate insomnia and promote restful sleep (Smith & Leiras, 2018).

Kava has anxiolytic and muscle relaxing effects due to the properties of its kavalactones. Since Kava promotes a feeling of calmness, it is used in treating anxiety disorders. Furthermore, Kava has mood enhancing properties that may help relieve the symptoms of depression. Kava works by increasing the levels of dopamine in the brain, which is the area associated with reward and pleasure. Increased blood flow to the brain has been seen when one takes Kava, which can improve cognitive function, including attention and memory. Increased blood flow to the brain not only can improve overall brain function but can also decrease mental fatigue. Although most studies do not show many adverse effects of Kava, it is associated with hepatotoxicity (Smith & Leiras, 2018).

In the past, Kava samples contained high levels of ethanol extracts which is a variability that warned for the risk for hepatotoxicity. There have now been aqueous and non-polar extraction methods that have been shown to decrease the concentration of the kavalactones that are considered toxic. Furthermore, extracts are now made using non-alcoholic extraction techniques to decrease the amount of toxic kavalactones that cause adverse effects. In more recent research, there is also a genetic variability that was shown to have a role in Kava induced liver failure. Based on current research, hepatitis induced by Kava is considered a rare event. In studies comparing Kava to anxiolytic drugs, Kava showed effectiveness in treating anxiety and

showed that a pharmaceutical approach is not always necessary or needs to be a first-line treatment (Smith & Leiras, 2018).

Kava for Generalized Anxiety Disorder

In this study, Sarris et al. (2020) conducted a randomized, double-blind, placebo-controlled study to investigate the effects of Kava on reduction of anxiety during a short-term administration period. The trial was 16 weeks and explored the effects of aqueous extract of dried Kava root that was administered twice daily in a tablet form (Sarris et al., 2020). The standard dose was 120mg of kavalactones twice per day. To qualify, the 171 participants had to currently be non-medicated with a diagnosis of generalized anxiety disorder. Participants reported that Kava was overall well tolerated with some side effects such as shakiness. The study also conducted liver function tests and while abnormalities were more frequent in the Kava group, none of the participants met criteria for Kava-induced hepatic injury. In conclusion, the research found that Kava is best utilized for situational anxiety compared to general anxiety (Sarris et al., 2020).

Implications of Vitamin D

Vitamin D is known to have an important role in several bodily functions, such as bone health, neuromuscular function, immune system functions. Research has shown that vitamin D may also have a significant impact on mental health. Vitamin D plays a role in regulating neurotransmitter function. When neurotransmitters are imbalanced, there have been links to various mental health conditions such as anxiety, depression, and schizophrenia. Vitamin D is a group of fat-soluble micronutrients that helps to regulate the levels of neurotransmitters, which may improve mood and alleviate some of the symptoms one may experience with a mental health condition. When one is deficient in vitamin D, there are many health risks associated, such

as autoimmune diseases, macrophage dysfunctions, colorectal cancer, multiple sclerosis, cardiovascular diseases, and type 1 diabetes mellitus. Vitamin D plays also plays a vital role in bettering mental disorders, especially with schizophrenia and depressive disorders since it involves the regulation of neuroinflammation (Anuroj, 2022).

Vitamin D can influence greater than 200 genes in various tissues, proving its credibility amount the fat-soluble vitamins. Since vitamin D does have such a crucial role in the body, clinicians recommend a large intake of vitamin D in their patients' diets to prevent any significant clinical conditions (Khan et al., 2022). Furthermore, inflammation has been linked to several mental health conditions and vitamin D has been shown to have anti-inflammatory properties. Research has also suggested that vitamin D may assist in regulating the body's stress response, which can significantly impact mental health. When stress load is reduced, vitamin D may support to help to improve mood and alleviate symptoms of depression and anxiety (Khan et al., 2022).

Throughout the world, vitamin D deficiency exists. Deficiency exists in various populations, in both males and females, pregnant and lactating women, and in those who often avoid sunlight. Individuals with darkly pigmented skin are more likely to suffer from vitamin D deficiencies than others. Unfortunately, food offers a limited source of vitamin D, therefore food alone will not be sufficient to overcome deficiency. Research has shown that vitamin D levels are noticeably low in individuals with mood disorders, and its mechanism of action has been recognized in causing depression (Khan et al., 2022). In those with fair skin, vitamin D synthesis is rather fast and shows significance even after a few minutes of sunlight exposure. Evidence has shown that fair skin that is exposed to sunlight in the summer can produce 20,000 IU of vitamin D in roughly 30 minutes. Vitamin D also plays a critical role in normal brain development, as

well as regulating immune responses of peripheral and central nervous systems (Khan et al., 2022). While more research would be beneficial to fully comprehend the relationship between vitamin D and mental health, evidence has suggested that it could have an important role in promoting better mental health.

Vitamin D also notably regulates the gene expression for one of the most essential enzymes involved in the synthesis of dopamine and norepinephrine, which is Tyrosine Hydroxylase. Both neurotransmitters play a notable role in depression and mood disorders. Standard vitamin D levels are between 100 and 150 nmol/L. Furthermore, vitamin D stimulates the areas of the brain that are concerned with regulation of emotion and behavior, such as the cortex, the limbic system, and cerebellum (Khan et al., 2022). There is a clear relationship between vitamin D levels and the impact it has on mental health.

Vitamin D and Correlation to Depression

Khan et al. (2022) studied the correlation of vitamin D to depression. The role of vitamin D is important in the human body and directly impacts several clinical conditions such as cardiovascular diseases, diabetes, and autoimmune disorders. However, it also has a pivotal role in mood disorders, such as depression (Khan et al, 2022). Vitamin D blood levels were drawn on a total of 200 subjects: 100 healthy subject and 100 depressed subjects. The participants were then broken down into three groups based on their ages. Initially, depressed and healthy participants were identified by assessing subjects for their mood and history. The depressed participants were screened using the Beck Inventory Depression (BDI) scale. Results of the study showed that vitamin D deficiency was more prominent in females compared to males. The study did conclude that depression was common in the subjects that had a vitamin D deficiency (Khan et al, 2022).

Vitamin D Deficiency and Depression During COVID-19

During the corona virus disease (COVID-19) peak of the pandemic, many preventative measures were taken. This included decreased time outdoors, causing limited sunlight exposure, which is a primary source of vitamin D. In this study, Anuroj (2022) explored the prevalence of vitamin D deficiency in a group of medical students to determine if there was an association with depression. The students involved had no previous diseases associated with vitamin D deficiency and had not taken a vitamin D supplement within the past year. In an average adult, the vitamin D requirement is 400 IU per day (Anuroj, 2022). Exposure of the arms and face to the sun for anywhere between 5 to 30 minutes, depending on skin pigmentation and location, is typically adequate when done twice a week. Sunlight is a major source of vitamin D as few foods contain it, making it difficult to intake this vital nutrient via diet alone (Anuroj, 2022).

This study consisted of 63 female and 36 male medical students. Their depressive symptoms were assessed using the Patient Health Questionnaire (PHQ). Other demographics were also noted, such as sex, age, family income, current and past history of mental illness, underlying disease, substance use, social support, and grade point average. Serum vitamin D levels were drawn on all students to determine levels (Anuroj, 2022). The results displayed a prevalence of vitamin D deficiency in the medical students, likely due to the lack of sunlight exposure during the pandemic. The researcher suggested there was not a direct relationship identified with depressive symptoms, owing it to the small study size as well as delayed onset of depressive symptoms (Anuroj, 2022). Furthering this study by including a larger study size and possibly an additional supplement to test such as magnesium or omega 3 perhaps may enhance future studies.

Implications of Magnesium

Although there are many factors that contribute to depression, and it may be difficult to pinpoint exact culprits, several dietary factors such as caffeine consumption, fish consumption, certain types of fruits and vegetables, and dietary fiber are known to have an association with the risk of depression (Sun et al., 2019). However, there are not many studies that investigate the associations between mineral intake and depression. In the human body, magnesium is a vital mineral thar regulates biochemical processes in numerous organ systems (Abiri, Sarbakhsh, & Vafa, 2021). Magnesium is an element in the human body that is essential, and it is a co-factor to over 600 additional enzymes. Studies in animals and humans involving the supplementation and depletion of magnesium show that it is useful as an adjunctive therapy for depression (Sun et al., 2019).

There is a linear relationship between depression and magnesium intake. Studies have shown that when there is an increased consumption of foods rich in magnesium such as green vegetables, nuts, and whole grains, they may be beneficial for decreasing depression symptoms (Sun et al., 2019). The exact relationship between magnesium and depression is unclear, however, magnesium does demonstrate strong anti-inflammatory effects. Magnesium is known for its calming effect on the nervous system, which can assist to reduce the symptoms experienced with anxiety and promotes relaxation. Furthermore, magnesium plays an important role in the production of serotonin, which assists to regulate appetite, mood, and sleep. In mental health, good sleep quality is essential because it promotes a regulation of mood, cognitive function, and general well-being (Sun et al., 2019).

When magnesium intake is increased, evidence has shown that markers of inflammation such as C-reactive protein (CRP) and its interleukin precursors were lowered with the incidence

and severity of depression. Furthermore, magnesium has a positive effect on the hypothalamic-pituitary-adrenal (HPA) axis. When the HPA system is dysregulated by the corticotropin releasing hormone (CRH), the levels of stress hormones are changed, such as cortisol and catecholamines, which are associated with stress (Sun et al., 2019).

Vitamin D and/or Magnesium Supplementation on Mood and Inflammation

Depression is a worldwide public health concern impacting millions of people daily. Individuals affected by depression often experience decreased quality of life and sadly, a reduced life expectancy (Abiri, Sarbakhsh, & Vafa, 2021). The focus of the randomized study conducted by Abiri, Sarbakhsh, & Vafa (2021) was to evaluate the effects of magnesium and/or vitamin D supplementation on mood, serum levels of brain-derived neurotrophic factor (BDNF), Sirtuin 1 (SIRT1), and inflammation in obese woman exhibiting mild to moderate depression symptoms (Abiri, Sarbakhsh, & Vafa, 2021).

This study consisted of 108 obese women with depressive symptoms that were randomly placed in four groups: a co-supplementation group that received magnesium and vitamin D, a vitamin D and magnesium placebo group, and a control group that received both magnesium and vitamin D. Vitamin D was administered weekly, and magnesium was administered daily (Abiri, Sarbakhsh, & Vafa, 2021). The study concluded that vitamin D plus magnesium supplementation in the subjects did display benefits that influenced mood, BDNF levels, inflammation, and SIRT1 (Abiri, Sarbakhsh, & Vafa, 2021).

Dietary Magnesium Intake and Risk of Depression

Magnesium is an essential element in the human body and has a link to depressive symptoms if insufficient. Sun et al. (2021) recognized that depression is a significant issue in public health and investigated the association of dietary magnesium intake as it relates to the

disorder. This study was done nationally and consisted of 17,730 adults. Data was gathered from the National Health and Nutrition Examination Survey from 2007 to 2014. Magnesium was specifically assessed utilizing 24-hour recalls. Levels of depression were determined by the Patient Health Questionnaire-9 (Sun et al., 2021).

In this study, there was a direct link found between magnesium intake and depression. Foods that are rich in magnesium may be used to combat depressive symptoms. There is also a strong association with magnesium and its anti-inflammatory effects (Sun et al., 2021). When the body is in a state of depression, anxiety, or stress, hormones such as cortisol are released in response and have an inflammatory effect on the body, potentially exacerbating symptoms. Magnesium may counteract this (Sun et al., 2021). While the study did find an association between magnesium intake and depression in all age groups, it was more prevalent in women compared to men (Sun et al., 2021).

Implications of Omega 3

As depression and anxiety have become more common, reoccurring, and debilitating illnesses, the exploration of omega 3 polyunsaturated fatty acids (PUFAs) as a possible treatment has sparked interest (Deacon et al., 2015). The central nervous system has the highest concentration of lipids, and among these are PUFAs, which have substantial attention drawn to them regarding brain diseases, anxiety, and depression (Larrieu & Laye, 2018). PUFAs are a part of a group of fatty acids that are crucial for the development and function of the central nervous system (Deacon et al., 2015). PUFAs are not only beneficial for anxiety and depression but have shown improvement in patients with coronary heart disease and pregnant women (Su et al., 2018).

Recent research shows that a deficiency of PUFA may be a contributor to the development of mood disorders, and supplementation may be a treatment option (Deacon et al., 2015). Omega 3 fatty acids make up a component of cell membranes responsible for maintaining fluidity and flexibility of the membrane. This is important for the transmission of signals between the nerve cells and regulation of mood. Antidepressant medications are typically the first line for the treatment of depression. These medications are designed to increase monoamine transmission by inhibiting neuronal reuptake or by inhibiting degradation. Adjuncts to medication are typically added in the form of therapy such as psychotherapy and cognitive behavioral therapy, which is considered by some providers as first line treatment (Deacon et al., 2015).

However, despite the advances in psychotherapies and pharmaceuticals, it is projected that less than 50 percent of patients achieve full remission. This has led to the exploration of other routes of treatment such as PUFAs. Dietary intake of PUFA has drastically declined in the last century, causing a rise in mood disorders to be recognized (Deacon et al., 2015). Several studies now suggest that the change in intake of PUFA is associated with not only the development of depression, but an increase in suicidal tendency in patients with a prior diagnosis of depression. Several studies have found that PUFAs may reduce anxiety under high stress scenarios (Su et al., 2018). PUFA deficiency also showed a disturbance in behavior that led to increased depression and anxiety (Larrieu & Laye, 2018). An overwhelming number of studies have indicated that PUFA is typically well tolerated in children and adults. The only adverse effects reported were mild gastrointestinal upset, such as loose stools (Deacon et al., 2015).

Omega Levels in Depression and Anxiety

PUFAs are fatty acids in foods consumed daily such as fatty fish and various seafoods, as well as various nuts and seeds. Some previous studies have shown that N-3 PUFAs are beneficial in preventing inflammatory illnesses and cardiovascular diseases. The anti-inflammatory property can help to decrease inflammation in the brain, which is linked to mental health disorders, including anxiety and depression. However, N-6 PUFA is associated with contributing to chronic inflammatory diseases, obesity, Alzheimer's disease, and rheumatoid arthritis (Thesing et al., 2017). When levels of N-3 are low and N-6 is high, there has been a link to neuropsychiatric disorders such as depression and anxiety. Thesing et al. (2017) conducted a cross-sectional study on serum levels of N-3 and N-6 PUFAs as the relation to anxiety and depression.

This study compared controls with current comorbid participants with depression and anxiety. The results indicated that patients that were currently experiencing a depressive episode, especially with more severe cases had lower N-3 PUFA levels than participants in remission and healthy controls. Results were unable to determine any relationship with N-6 PUFA levels (Thesing et al., 2017). Based on the results, it may be inferred that supplements such as omega 3 may be beneficial in the treatment of anxiety and depression as deficient levels were seen in participants experiencing symptoms. For future studies, a test group should be included for participants that were suffering from anxiety and depression. This will confirm the author's hypothesis that some PUFAs would be beneficial to treatment.

Implications of Ashwagandha

Anxiety is the most common mental health disorder, and it can be extremely debilitating to many people that suffer from it. It is often accompanied by stress, which is a physiological

response to physical or mental threats (Pratte et al., 2014). While brief anxiety or stress exposure is considered a beneficial coping mechanism, long-term symptoms can negatively impact overall health and wellbeing. Currently, alternatives to highly addictive benzodiazepines that are used to treat anxiety are being investigated, and ashwagandha is one alternate that has become well known for its effectiveness (Pratte et al., 2014). Ashwagandha is a shrub that is part of the Solanaceae family, known to have adaptogenic properties, meaning it can help the body adjust to stress (Lopresti et al., 2019).

Ashwagandha, also known as Withania somnifera, is grown in areas of Asia and Africa and was used in an ancient Hindu system called Ayurveda. Traditionally, ashwagandha has been used to promote youthfulness by enhancing endurance, muscular health, and overall health. It has been confirmed through pharmacological studies that ashwagandha has antioxidant, anticancer, anti-inflammatory, anxiolytic, and immune effects (Lopresti et al., 2019). Ashwagandha has also been shown to have an influence of endocrine, neurological, and cardiovascular activity. The studies of ashwagandha in animal stress studies showed it has anxiolytic, antidepressant, and neuroprotective effects. Many studies have found that ashwagandha can decrease cortisol levels, which alleviates symptoms of stress and anxiety (Lopresti et al., 2019).

Increased levels of neurotransmitters such as GABA and serotonin, which are involved in regulation of mood, have been seen with the used of ashwagandha. Additionally, ashwagandha may have a positive effect on cognitive function. It has been studied that it may enhance attention, memory, and the rate in which information is processed. Ashwagandha has been proven in various studies to be well tolerated with minimal adverse side effects (Lopresti et al., 2019). More research is needed on the effects of ashwagandha, but there is significant evidence that it is a natural remedy that can be used to improve mental health.

Stress Relieving Pharmacological Effects of Ashwagandha

Ashwagandha is an herb that is gaining popularity for its anxiolytic, stress reducing, and enhancement of overall wellbeing. Lopresti et al. (2019) aimed to add to current evidence by exploring the antistress effects, mood enhancing effects, and safeness of ashwagandha root extract in a population of adults experiencing mild stress. This study consisted of a 60-day, randomized, double-blind, placebo-controlled study. The researchers were particularly interested in the influence that ashwagandha has on steroidal hormones. They examined morning cortisol, dehydroepiandrosterone sulfate (DHEA-S), and testosterone levels (Lopresti et al., 2019).

The participants of this study consisted of 60 people that were randomly administered a placebo or 240mg of ashwagandha extract daily. There were no adverse events reported in this study. When compared with the placebo, there was a significant reduction in the feeling of stress (Lopresti et al., 2019). Morning cortisol levels were also decreased in the participants that were given ashwagandha. Testosterone levels increased in male subjects but not in females. This result was found to not be significantly crucial over time. The researcher suggest that the stress relieving effects experienced from ashwagandha may be due to its moderating effects on the HPA axis, but further investigation is needed (Lopresti et al., 2019). In the future, larger and more diverse sample sizes may be utilized to further support the findings.

Implications of N-Acetylcysteine

N-Acetylcysteine (NAC) is a type of amino acid with an antioxidant precursor to glutathione, which is a powerful antioxidant naturally produced in the body. NAC has been used in conditions such as cystic fibrosis, chronic obstructive pulmonary disorder, and nephropathy (Ooi, Green, & Pak, 2018). More recently, it has been explored as a therapy for some psychiatric

illnesses. It is an inexpensive nutritional supplement that is typically presented as a potent antioxidant that helps with brain function. NAC has also been used in young populations as a potential preventative therapy for psychiatric conditions (Ooi, Green, & Pak, 2018).

Evidence has shown that NAC may be beneficial in mood disorders, schizophrenia, obsessive compulsive disorders (OCD), and in substance abuse. It is suggested that NAC may work to increase levels of glutathione in the brain, causing reduction in inflammation and oxidative stress. NAC may reduce OCD symptoms because it is believed that symptoms are caused by abnormalities in glutamate signaling. Some studies have suggested that NAC may help decreased compulsive behaviors seen in OCD and lead to a better quality of life. Oral NAC is considerably safe and is well tolerated without any significant side effects (Ooi, Green, & Pak, 2018).

Current evidence shows that a recommended dosage is between 2000 to 2400mg per day. NAC has shown to lessen the dysregulation of dopamine and glutamate. It was also shown to considerably enhance dopamine receptor binding and neuron survival. Furthermore, NAC is thought to assist with the modulation of inflammatory pathways. In patients suffering from depression and other mental illnesses, elevated levels of cytokines such as C-reactive protein, interleukin-6, and necrosis factor alpha are evident. NAC may play a role to reduce the inflammatory markers implicated in these disorders (Ooi, Green, & Pak, 2018).

Oral NAC Treatment in Hospitalized Covid-19 Patients

While Covid-19 and psychiatric disorders are significantly different, there is a commonality in the effects of NAC. In severe forms of Covid, there is a cytokine storm as well as an imbalance of oxidative stress. Izquierdo et al. (2022) hypothesized that since some antioxidants can restore immune cell response, NAC would help improve cellular immunity that

was compromised by illness. This study consisted of hospitalized Covid patients that were given NAC in doses of 600mg every 8 hours and compared the results with a group of Covid positive patients that did not receive NAC. This study took place for approximately 10 months (Izquierdo et al., 2022).

The results showed that patients with Covid that were treated with a high dose of oral NAC were associated with a decreased morality, despite old age and greater comorbidities (Izquierdo et al., 2022). In this study, NAC worked to reduce cytokines in Covid patients, similarly to how it works in patients with psychiatric disorders that have increased cytokines. Evidence has shown that NAC is a versatile supplement with anti-inflammatory and antioxidants effects. Further investigation in this study may have possibly included a group that continued NAC after hospitalization to broaden the knowledge of the impacts of NAC.

Impacts of L-methylfolate in Depression

Papakostas et al. (2012) investigated the effects of L-methylfolate augmentation in the treatment of individuals with major depressive disorder (MDD), who had a partial response or no response to selective serotonin reuptake inhibitors (SSRIs). The study was conducted applying two multicenter sequential parallel comparison design trials to investigate effectiveness. In the initial trial, 148 outpatients with SSRI resistant MDD were enrolled in a 60-day study that was divided into two 30-day increments (Papakostas et al., 2012). Participants were randomly assigned in a 2:3:3 ratio to receive L-methylfolate for 60 days. During the first 30 days, participants received 7.5mg per day and in the following 30 days, the dose was increased to 15mg per day.

The second trial included 75 participants; the design was the same as the first with the exception that the L-methylfolate dosage was 15 mg per day during both 30-day periods.

Papakostas found that there was no significant difference in the first trial group outcomes (Papakostas et al., 2012). However, in the second trail, adjunctive L-methylfolate at 15 mg per day showed significantly greater efficacy compared to continued SSRI use and a placebo. Adjunctive L-methylfolate at an increased dose of 15mg per day may represent an effective, safe, and well tolerated treatment strategy in patients with MDD who have partial or no response to SSRIs (Papakostas et al., 2012). Looking into how L-methylfolate may benefit as an initial treatment for MDD may further expand knowledge of this supplement, and emphasizing the positive impact it has on anxiety may serve a purpose for future studies.

Purpose

The purpose of this quality improvement project was to enhance mental health providers' knowledge on supplement use for anxiety and depression in pediatric and adolescent ages.

PICO Question

P: Pediatrics and Adolescents with anxiety and/or depression.

I: Educating providers (Therapists, Nurse Practitioners, Psychologists, and Physicians) on supplemental options and uses for treating anxiety and depression in an outpatient setting.

C: Knowledge on treating anxiety and depression with supplements versus initiating treatment with pharmaceuticals.

O: By educating providers, they will be more well versed on options that are available besides medications to treat abundant mental health issues such as anxiety and depression.

The following PICO question was formulated to guide a literature review for an educational evidence-based solution: Would evidence-based staff education on supplements for anxiety and depression at an outpatient clinic improve staff knowledge on non-psychotropics for treatment initiation?

Definition of Terms

Key Terms	Definitions
Supplements	A product that contains a 'dietary ingredient' that is intended to add additional nutritional value to the diet (Garthe & Maughan, 2018).
Adolescent	An adolescent is in the phase of life between childhood and adulthood. Age ranges from 10 to 19 years old (WHO, 2022).
Pediatric	Pediatric age range is the phase of life between 2 and 12 years old (FDA, 2022).
Depression	Five or more symptoms present during a 2-week period and show a change from previous functioning. One symptom must include depressed mood or loss of interest or pleasure. Other symptoms include depressed mood most of the day, weight loss, insomnia/hypersomnia, psychomotor agitation, fatigue, feeling worthless or guilt, decreased ability to concentrate, thoughts of death (APA, 2013).
Anxiety	Excessive anxiety or worry, occurring more days than not for a minimum of 6 months. The patient will find it hard to control the worry, in adults three of the following six symptoms need to be present for diagnosis but only one is required for children: restlessness or on edge, easily fatigued, difficulty concentrating, irritability, muscle tension, and sleep disturbance (APA, 2013).

Conceptual Underpinning and Theoretical Framework

To guide this project, Jean Watson's theory of human caring will be implemented. The goal of this project is to improve patient outcomes by enhancing the knowledge of the providers for the overall betterment of patients. This topic relates to Watson's theory because the purpose of her theory was to refine the caring behavior of nurses and patient satisfaction to improve the

quality of nursing. In this concept, caring includes to care for and to care about patients (Pajnkihar, Stiglic, & Vrbnjak, 2017).

This theory is appropriate as it focused on enhancing the outcomes of the patients by initially addressing the providers. Watson's theory will consider the components identified as strengths and weaknesses for analysis and allow them to be analyzed for improved outcomes. According to Watson's theory, education plays an important role in the acquisition, as well as the advancement of caring attributes. When caring behavior is demonstrated, satisfaction and well-being are improved (Pajnkihar, Stiglic, & Vrbnjak, 2017). When applied to this project, this theory will support patients and providers in building a strong rapport, to in turn enhance treatment options and overcome mental healthcare barriers.

Methodology

Setting and Participants

This project took place in an outpatient clinic located in Coral Gables, Florida that specializes in the mental health treatment in a pediatric and adolescent population. While this office sees patients with various mental illnesses, anxiety and depression are two of the most common complaints from its patient. This approach at this practice is a holistic and to minimalize medication use. Participants included 10 therapists and psychologists, nurse practitioners, and medical doctors. There was a total of 10 (n=10) participants invited to the study.

Sample

A convenience sampling method was used to recruit participants and access data. The sample size of this study consisted of ten participants. Participants of the project included pediatric and adolescent mental healthcare providers such as medical doctors, nurse practitioners,

licensed mental health counselors, and psychologists in a psychiatric outpatient clinic located in Coral Gables, Florida.

Inclusion Criteria

Mental healthcare providers that participated in this quality improvement project consisted of individuals that currently work in the psychiatric and mental health field at the outpatient clinic in Coral Gables, Florida. The participants consisted of only mental healthcare workers that provided care to pediatric and adolescent aged patients.

Exclusion Criteria

Mental healthcare providers that do not provide care to pediatric and adolescent aged patients were not included in this quality improvement project. Healthcare providers who did not work for this specific outpatient psychiatric clinic in Coral Gables, Florida did not participate in this quality improvement project. Additionally, healthcare providers without an advanced degree did not qualify to participate in this project.

Project Procedures and Protection of Human Subjects

After receiving clearance from the operations team, participants were recruited via email as well as through Ring Central, a messaging system the office uses for communication. Flyers were posted in common areas describing the purpose of the project, as well as how to participate. Reminders were sent via email and messaging. An initial pretest was sent via email to assess the participants baseline knowledge. Following the pretest, education was provided via PowerPoint presentation to the participants. Finally, a posttest was administered after the educational session was completed to assess providers' current knowledge and determine if education was effective at increasing their baseline knowledge. Testing was conducted anonymously, and this was

expressed to the participants. Since testing was anonymous, participants did not have to enter any personal information on Survey Monkey to further ensure protection and privacy.

An informed consent form was utilized to inform participants of the quality improvement project's purpose and for permission to use the data collected for the project. This project did not include any patient information or demographics. This project was low risk for participants, and they were informed about the purpose of this project. The benefit of this project was to improve provider knowledge to expand treatment options for this specific patient population. The method of study was to employ both a quantitative and qualitative analysis. The actual results from pretesting and post testing exhibited quantitative results as answers will be either right or wrong and compared to initial results.

Data Collection

Prior to data collection, this researcher obtained approval from Florida International University (FIU) Institutional Review Board (IRB). Permission was also granted from the managing partner/owner of the outpatient clinic in Coral Gables, Florida. This researcher invited participants to take part in the study via email. In the initial email to the potential participants, this researcher outlined the purpose and objectives of this project.

Data was collected and analyzed after pretesting and post testing questionnaires were administered to the participants. Questionnaires were administered via Survey Monkey. Participants had access to a Keynote presentation after education was presented to them. Since this office is rather busy, educational sessions were held multiple times over a 2-week span. Immediately after the educational session was completed, a posttest link was sent to the provider.

After all data was collected and analyzed, it was available for all participants to view. Survey Monkey ensures confidentiality and safety by implementing password features. A

checklist was created with participants' names, and they were checked off after the educational session was completed to ensure everyone received the same education. Surveys were only available to the individuals that agreed to participate and consented to the study. Microsoft Office was used to perform inferential statistics to produce quality improvement metrics.

Data Management and Analysis Plan

Responses received from both the pretest and posttest were kept anonymous. Results were password protected and kept confidential. Viewing of initial results was only allowed by the researcher and mentor. After all responses were received, results were transferred to Microsoft Office to analyze and to create tables and charts that displayed the results. The researcher's email address and phone number were provided to participants to address any questions or concerns that may have arisen at any time during the project. Survey Monkey has several privacy and security measures in place such as encryption and password protection to prevent unauthorized users from accessing data, and to prevent hackers from breaching information. By administering testing anonymously, participants did not have to enter any personal information when testing, reducing risk of compromise. Additionally, all data was kept on a password protect laptop. After the project was concluded, all questionnaire information was discarded from the Survey Monkey server, as well as the password protected laptop.

Implications to Advanced Nursing Practice

When a provider is well versed on how to identify an illness and how to treat it, they can more accurately assess patients' mental health status, as well as identify any underlying issues that may be present. This assists with proper diagnosis, treatment plans, and better outcomes. Providers can used evidence-based practice to establish a unique care plan that addresses the patient's needs. They can also provide education and support not only to the patient, but to their

parents or guardians. Being well versed also allows for improved collaborative efforts with other healthcare providers for a comprehensive, thorough approach. Additionally, advanced providers can help prevent mental health issues from arising or lessen the burden by encouraging healthy behaviors, educating on risk factors, and providing support.

To overcome the numerous barriers that are associated with pursuing mental health care, educating and training providers is foundational to successful outcomes. Interprofessional education has shown to strengthen collaborative efforts among healthcare professionals. Additionally, it improves their willingness and ability to work effectively. Patients suffering from mental illnesses often require a multitude of support systems to provide quality care (Pauze & Reeves, 2010). One of the many barriers faced is the fear of a negative or judgmental relationship with a provider. Providing education and training to the providers may supply additional knowledge to enhance the patient's experience and in turn, develop a trusting rapport between patient and provider, which will enhance outcomes.

Significance in Advanced Nursing Practice Research

To conquer the numerous obstacles that are associated with pursuing mental health care, educating and training providers is crucial for successful outcomes and lowering barriers. Interprofessional education has shown to strengthen collaborative efforts among healthcare professionals. Additionally, it improves their willingness and ability to work effectively. Patients suffering from mental illnesses often require a multitude of support systems in order to provide quality care (Pauze & Reeves, 2010). One of the many barriers faced is the fear of a negative or judgmental relationship with a provider. Providing education and training to the providers may provide additional knowledge to enhance the patient experience and in turn, develop a trusting rapport between patient and provider, enhancing outcomes.

This quality improvement project helped mental health providers improve and enhance their knowledge on alternative treatment in a pediatric and adolescent population suffering from common mental health disorders, such as anxiety and depression. Although this tool only served to educate providers in a mental health setting, it can be used in any healthcare settings to further knowledge. In nursing, it can help ease the knowledge gap and create awareness for young people. Nurses may also use this quality improvement project to further studies using additional mental health disorders, increase the number of providers educated, and expend this information to hospitals, urgent cares, and outpatient primary care clinics. It is imperative to increase awareness of the prevalence of mental health disorders, especially in this vulnerable population, and to be able to provide options to overcome the stigma of seeking care. In turn, this will improve outcomes in the young population.

QI Project Results

The purpose of this quality improvement project was to increase mental health providers' awareness on the topic of supplement usage versus pharmaceuticals in order to treat anxiety and depression in the pediatric and adolescent population in an outpatient psychiatric clinic, located in Coral Gables, Florida. A descriptive, cross-sectional, pre and posttest study design was implemented to conduct this quality improvement project. The sample size included ten participants. To collect the data from the project, Survey Monkey was used. Data was analyzed through Survey Monkey's survey analysis, Microsoft Word, and Microsoft Excel. The researcher utilized a t-test to show significant findings for the pre and posttests. The demographic data and findings for the project in relation to the clinical PICO question will be provided in the sections below.

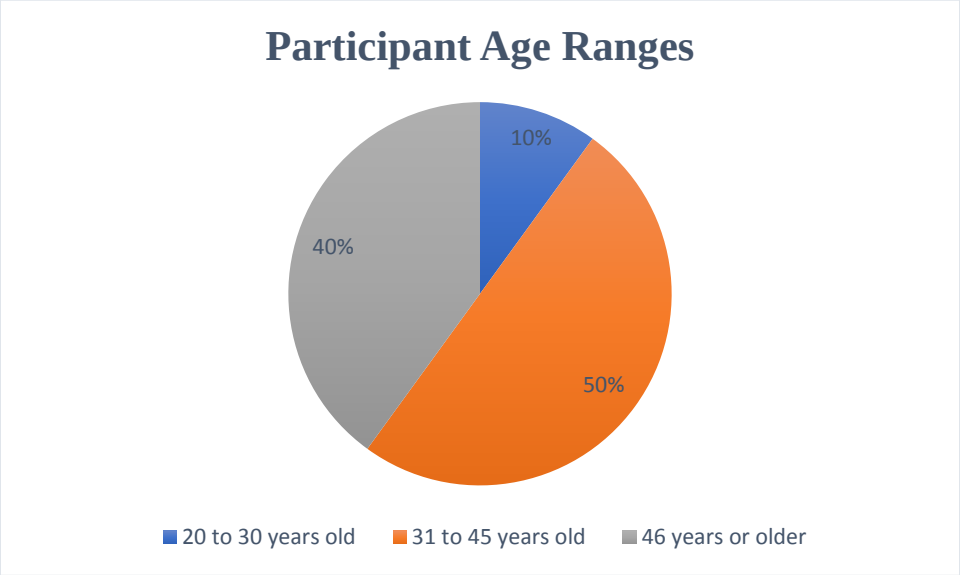
There was a total of N=10 mental healthcare providers that participated in this quality improvement project. A majority of the participants were between 31 to 45 years old and only one participant was in the ages of 20 to 30 years old, see Table 1 and Figure 1 below.

Table 1

Age Distribution Among Mental Healthcare Providers at an Outpatient Psychiatric Clinic (N=10)

Age	Frequency	Percentage
20 to 30 years old	1	10%
31 to 45 years old	5	50%
46 years or older	4	40%
Total	10	100%

Figure 1



The gender of the participants was classified as male, female, or other. All the participants were female. See Table 2 below.

Table 2

Gender Distribution Among Mental Healthcare Providers in an Outpatient Psychiatric Clinic (N=10)

Gender	Frequency	Percentage
Male	0	0%
Female	10	100%
Other	0	0%
Total	10	100%

The participants' level of education ranged from master's degrees to doctoral degrees. While participants were not specifically asked about their particular degree, participants either attained a Master of Science in Nursing degree, Doctor of Nursing Practice degree, a medical degree, a Master of Science in Mental Health Counseling degree, or a Doctor of Psychology degree. The results indicated that most of the participants had master's degrees and 30 percent of participants had doctoral degrees, see Table 3 below.

Table 3

Level of Education Among Mental Healthcare Providers in an Outpatient Psychiatric Clinic (N=10)

Level of Education	Frequency	Percentage
Master's degree	7	70%
Doctoral degree	3	30%
Total	10	100%

Participants were asked how many years of experience they had. These answers were collected and categorized into four categories: 0 to 4 years of clinical experience, 5 to 10 years of clinical experience, 10 to 15 of clinical experience, or more than 15 years of clinical experience. The results of this category varied quite closely, however most participants had 0 to 4 years of

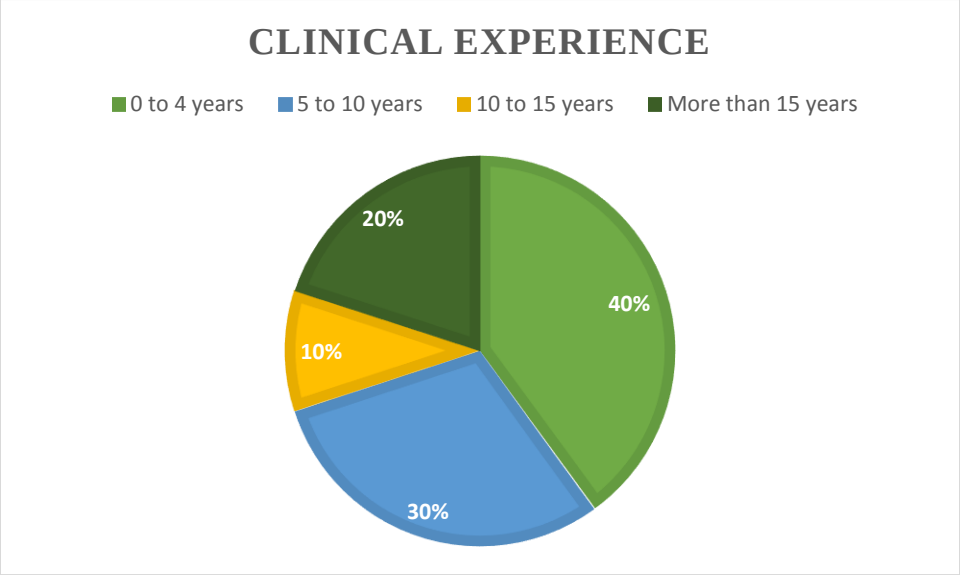
clinical experience and only 20 percent had over 15 years of clinical experience, see Table 4 and Figure 2 below.

Table 4

Participants Years of Clinical Experience Among Mental Healthcare Providers in an Outpatient Psychiatric Clinic (N=10)

Years of Clinical Experience	Frequency	Percentage
0 to 4 years	4	40%
5 to 10 years	3	30%
10 to 15 years	1	10%
More than 15 years	2	20%
Total	10	100%

Figure 2



Self-perceived knowledge among the participants was asked on the pretest questionnaire. Participants were asked if their baseline knowledge on supplement use for anxiety and depression was a competent level, proficient level, or expert level. None of the participants

believed that their knowledge was expert level, most of the participants evaluated themselves at a proficient level, see Table 5 below.

Table 5

Perceived Knowledge on the Project Topic Among Mental Healthcare Providers in an Outpatient Psychiatric Clinic (N=10)

Perceived Knowledge of Topic	Frequency	Percentage
Competent	6	60%
Proficient	4	40%
Expert	0	0%
Total	10	100%

PICO Clinical Question

The PICO clinical question for this quality improvement project was: Would evidence-based staff education on supplements for anxiety and depression at an outpatient clinic improve staff knowledge on non-psychotropics for treatment initiation? The alternative hypothesis in relation to the PICO question was: There is a significant difference when comparing pretest and posttest scores among the mental healthcare providers in the outpatient psychiatric clinic, following an educational session related to utilizing supplements to treat anxiety and depression in a pediatric and adolescent population. The results discovered that after the educational session, there was an increase in awareness among the mental health providers regarding alternates for pharmaceuticals, such as the use of supplements for anxiety and depression. The pretest and post-test results will be discussed in the following paragraphs.

A total of ten participants (N = 10) completed the pretest. The pretest was scored using True or False answers or multiple choice; all answers had one correct answer. According to Tables 6 and 7, participants scored the highest on questions 1, 3, and 10, which were the

following questions: *It can be dangerous to take supplements or herbs with some prescription medications (True or False), Vitamin D is not only important in bone health and proper brain development, but deficiency can lead to which of the follow psychiatric illnesses? (Multiple choice), and Omega 3 supplements are associated with reducing symptoms in depression and in mood disorders (True or False).* Participants scored the lowest on question 2, which was the following question: *Liver toxicity is one of the most common side effects of Kava Kava (True or False).*

Table 6

Pretest Results Among Mental Healthcare Providers in an Outpatient Psychiatric Clinic (N = 10)

	Pretest
Question	**Correct Answers**
1	9
2	1
3	10
4	7
5	8
6	7
7	6
8	5
9	8
10	10

Table 7

Pretest	
Mean	7.1
Standard Error	0.849182614
Median	7.5
Mode	10
Standard Deviation	2.685351208
Sample Variance	7.211111111
Kurtosis	2.213761533
Skewness	-1.294473919
Range	9
Minimum	1
Maximum	10
Sum	71
Count	10
Confidence Level (95.0%)	1.920984532

The posttest was also completed by the ten mental healthcare providers (N = 10). The posttest was scored in the same manner as the pretest in which the questions consisted of True or False answers or multiple choice. All answers had one correct answer. Participants scored the highest on questions 3, 4, 7, 9, and 10. The questions that had the highest scores were the following: *Vitamin D is not only important in bone health and proper brain development, but deficiency can lead to which of the follow psychiatric illnesses? (Multiple choice), Supplements are only effective for depression and anxiety in conjunction with therapy and/or pharmaceuticals such as an SSRI, SNRI, or Anxiolytic in newly diagnosed patients (True or False), Approximately 70% of all mental health disorders can be diagnosed prior to age 25 (True or False), Magnesium is a supplement identified to be safe for pediatric and adolescent ages (True or False), and Omega 3 supplements are associated with reducing symptoms in depression and in mood disorders (True or False).* The questions participants scored the lowest on were questions

1, 2, 5, 6, and 8: *It can be dangerous to take supplements or herbs with some prescription medications (True or False), Liver toxicity is one of the most common side effects of Kava Kava (True or False), L-theanine is a supplement known for its calming effects. Which of the following neurotransmitters are impacted by L-theanine? (Multiple choice), Since L-theanine has a calming effect, it should only be taken at night (True or False), and Ashwagandha is an herb that is gaining popularity for its uses in promoting youthfulness by enhancing endurance, muscular health, and overall health. It can be effective in mental health for reducing which of the following? (Multiple choice).* Although participants scored the lowest in these questions, the overall score on was 90 percent. When compared to the pretest, there was a significant improvement in participants who answered these questions correctly, see Tables and 9 below.

Table 8

Posttest Results Among Mental Healthcare Providers at an Outpatient Psychiatric Clinic (N = 10)

	Posttest
Question	Correct
1	9
2	9
3	10
4	10
5	9
6	9
7	10
8	9
9	10
10	10

Table 9

Post test	
Mean	9.5
Standard Error	0.166666667
Median	9.5
Mode	9
Standard Deviation	0.527046277
Sample Variance	0.277777778
Kurtosis	-2.571428571
Skewness	0
Range	1
Minimum	9
Maximum	10
Sum	95
Count	10
Confidence Level(95.0%)	0.377026194

The results of this quality improvement project showed significant improvement when comparing pretest and posttest questionnaire results. When comparing mean scores of both tests, the posttest mean score was higher than the pretest mean score. A two-tailored t-test was completed to assess whether there was a statistically significant difference between the mean scores of the pretest and posttest, $t = 2.26$, with a $p = 0.007$, ($p < 0.05$). Based on the analysis of the data, there is a significant difference when comparing pretest and posttest data among mental healthcare providers in an outpatient clinic at Coral Gables, Florida, following an educational session regarding utilizing supplements for anxiety and depression in a pediatric and adolescent population versus pharmaceuticals, see Tables 10, 11, and 12 below.

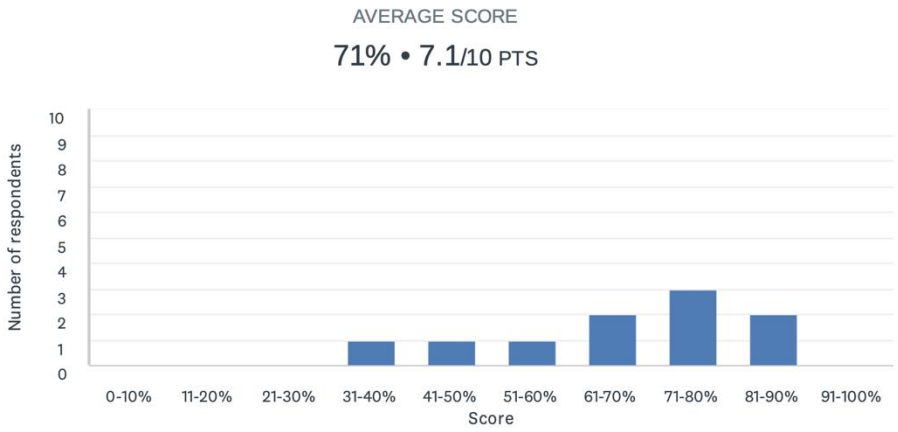
Table 10

t-Test: Paired Two Sample for Means

	Variable 1	*Variable 2*
Mean	7.1	9.5
Variance	7.211111111	0.27777778
Observations	10	10
Pearson Correlation	0.43178777	
Hypothesized Mean Difference	0	
df	9	
	-	
t Stat	3.031746916	
P(T<=t) one-tail	0.007103223	
t Critical one-tail	1.833112933	
P(T<=t) two-tail	0.014206446	
t Critical two-tail	2.262157163	

Table 11

Pretest Results Among Mental Healthcare Providers at an Outpatient Psychiatric Clinic (N = 10)



STATISTICS		
Lowest Score	Median	Highest Score
40%	75%	90%
Mean: 71%		
Standard Deviation: 17%		

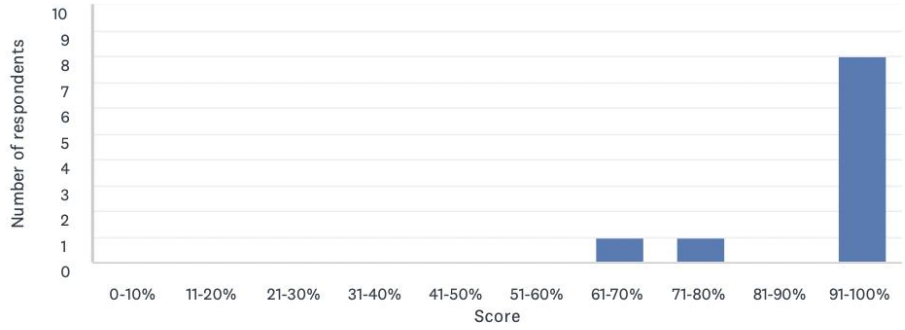
Table 12

Posttest Results Among Mental Healthcare Providers at an Outpatient Psychiatric Clinic (N = 10)

Quiz Summary

AVERAGE SCORE

95% • 9.5/10 PTS



STATISTICS		
Lowest Score	Median	Highest Score
70%	100%	100%
Mean: 95%		
Standard Deviation: 11%		

Complications of Child Mental Health Access

Zifkin et al. (2021) recognized there are many barriers that are faced in obtaining mental health care such as discrimination, judgement, blame, poor access, and provider's acceptance. They also recognized the prevalence of mental health problems in the youth. The aim of this study was to examine the experiences of adolescents and their parents surrounding mental health care access (Zifkin et al., 2021). This study was conducted over a four-month period in a mental health clinic that specializes in adolescents who experience difficulties with emotional regulation, such as anxiety and depression. Results indicated that there were significant obstacles in access care (Zifkin et al., 2021).

The obstacles observed were lack of information, knowledge, guidance, long wait times, and stigma. Once the patients gained access to care, they had social support, a point of contact, and developed rapport with their providers. The emphasis on this study is the importance of timely mental services for adolescents. This investigation provided insight for the enhancement of service accessibility (Zifkin et al., 2021). Time is of the essence in a young population with mental health issues. Once that they had access to care, there were improvements seen in the patients. Investigating further into to the outcomes after access to care was achieved would be beneficial.

Barriers to Mental Health Treatment

There is a significant discrepancy between the prevalence of mental health illnesses in adolescents and the actual treatment rates. It is imperative to gain an understanding of what prevents this age group from seeking care (Pfeiffer & In-Albon, 2022). Roughly one in seven young people meet diagnostic criteria for a mental health disorder. About half of lifetime mental health problems begin by the age of 15 and about three quarters by 18-years-old. This creates a substantial burden on global socioeconomics. Early detection and prompt intervention is crucial to reduce negative outcomes (Radez et al., 2020). When it comes to mental health, there are several barriers that stand in the way of pediatrics and adolescents accessing help from professionals for their mental health problems.

The first barrier is simply knowledge. Patients and their parents lack awareness surrounding mental health care and do not know how to seek help properly. Secondly, there is a perceived social stigma and embarrassment when it comes to mental health, especially at a young age. There are commonly negative beliefs and attitudes associated with seeking care for mental health care. People often have a fear of being ostracized or judged. Next, building rapport

is difficult. It is difficult for young people to gain a trust in a therapeutic relationship, especially with older professionals. The ability to trust an unknown person may be challenging to accomplish. There is also a fear of seeking help due to a lack of trust in the healthcare system in general or past negative experiences. Another issue is cultural and language barriers. People who speak languages other than English may find it more challenging to find a provider that speaks their language. The same issue may arise when understanding different cultures (Pfeiffer & In-Albon, 2022).

Lack of access to care is another common problem. Some people face limited healthcare coverage, and many individuals in rural or low-income areas have limited access to mental health care. There is also a shortage of mental health professionals, which often leads to long wait times and patients losing hope. Lastly, situations that are out of one's control come into play, such as financial costs associated with services, logistical barriers, and the availability of care (Radez et al., 2020). Unfortunately, mental health care can be costly and not all insurances plans cover it or not all providers accept insurance. This can be a significant barrier for many individuals that simply cannot afford to pay out of pocket fees. Adolescents have reported issues such as self and public stigma, fear of interacting with a provider, and a fear of being confronted with their own emotions. Interventions that increase knowledge about mental health care need to be established to lower these barriers and improve access to care (Pfeiffer & In-Albon, 2022).

Barriers to Seeking Psychotherapy in Adolescents

The prevalence of mental health disorders in adolescents is high, estimated at roughly 17 to 50 percent. There is a dissociation between the prevalence of mental illness in this age group and those who seek treatment. When seeking care, specifically for mental health, there are several barriers faced such as stigma, fear of being vulnerable, cost, and fear of the unknown.

Pfeiffer & In-Albon (2022) identified the gap in care with adolescents and mental health care. Their aim was to assess barriers in an adolescent age group for seeking psychotherapy. Mental illnesses typically first manifest in childhood and adolescence. Therefore, the researchers found it significant to utilize this age group to identify barriers in pursuing treatment (Pfeiffer & In-Albon, 2022).

The participants in this study included 288 adolescents between the ages of 12 to 21 years old. A qualitative approach was used in this study with open-ended questions on the barriers for commencing psychotherapy as well as attitudes toward people with mental illnesses (Pfeiffer & In-Albon, 2022). They then utilized a quantitative design that included a questionnaire about barriers to psychotherapy and information on psychotherapy. Some of the barriers identified were stigma, dealing with emotions, fear of a negative interaction with the psychotherapist, lack of trust, a negative association to people with mental illness, and lack of accessibility (Pfeiffer & In-Albon, 2022). To further this investigation, there should have been an additional study on the outcomes and views after education on psychotherapy. It also may be beneficial to separate groups that have been diagnosed with a mental illness or are experiencing symptoms versus a control group. Additionally, it would be interesting to ask the participants about perception of medication use for mental health treatment.

Summary and Discussion

The intention of this quality improvement project was to improve the knowledge and awareness on alternatives of pharmaceuticals for treatment of anxiety and depression in pediatric and adolescent ages. The purpose was to educate mental health providers, in an outpatient psychiatric clinic in Coral Gables, Florida, about implementing the use of over-the-counter supplements to treat anxiety and depression. To achieve this goal, a descriptive, cross-sectional,

pretest and posttest study design was used. The participants of this study consisted of ten mental health care providers, including therapists, psychologists, nurse practitioners, and physicians at an outpatient psychiatric clinic in Coral Gables, Florida. Survey Monkey was used to anonymously collect data. The software used to analyze the data was Survey Monkey, Microsoft Word, and Microsoft Excel. Results of the study concluded that participants scored higher on the posttest questionnaire after participating in an educational intervention. There was a statistically significant difference between the mean scores of the pretest and posttest, $t = 2.26$, with a $p = 0.007$, ($p < 0.05$).

Results and Discussion

Overall, the results of the quality improvement project concluded that there was an improvement in knowledge awareness among the mental health providers. The findings suggested that after the mental health providers participated in an educational session, their knowledge increased significantly. Furthermore, the mean results of the pretest were 71 percent with a standard deviation of 17 percent. Results of the posttest, after the mental healthcare providers participated in the educational intervention, led to a mean score of 95 percent and a standard deviation of 11 percent. As indicated above, participants scored the lowest on question 2, which was the following question: *Liver toxicity is one of the most common side effects of Kava Kava (True or False).* The mean score was significantly higher for posttest results when compared to pretest results.

Furthermore, a two-tailored t-test was completed to assess whether there was a statistically significant difference between the mean scores of the pretest and posttest, $t = 2.26$, with a $p = 0.007$, ($p < 0.05$). These findings suggest that the results of this quality improvement project can compare to most studies within current literature. The pretest results indicated that

there was an opportunity to educate mental healthcare providers about implementing the use of supplements for depression and anxiety in a pediatric and adolescent population. After comparing the posttest results to the pretest results following an educational intervention, the results indicated significantly higher scores suggesting an increase in knowledge.

Limitations of the Quality Improvement Project

The limitations of the project were:

- A small sample size of ten participants was used for this project. Having a small sample size decreases the generalizability of the project. The outpatient clinic used for this project did not have a significant number of staff to participate.
- The method of the study did not use any sort of randomization. A convenience sampling method was implemented to recruit participants and analyze data. A power analysis was not used for the t-test analysis.
- Participants were given access to the educational Keynote presentation and were not monitored during testing.
- The type of provider was limited to only mental healthcare providers. Future researchers should consider a variety of providers such as nurses, providers in primary care or other settings, physician assistants, nursing assistants, and medical assistants.
- The clinic used for this study was in a wealthy area of Miami. Future researchers should consider studies in lower income areas.
- There was difficulty in obtaining all results, as the testing was done anonymously. Therefore, the researcher did not know which participants completed all parts of the study.

Recommendations

For future studies, there should be a larger sample size. Although having ten participants was convenient, it would be beneficial to triple or quadruple the number of participants for improved data analysis. It would also be beneficial to use different design studies, other than a descriptive, cross-sectional, pretest and posttest study. As mentioned in the limitations of the study, future studies should branch out into different healthcare settings where there is more of a lack of mental health care, such as primary care settings, community clinics, or hospitals. Doing so will further improve knowledge and outcomes. Future studies should also attempt to reach all income levels. There should also be a better balance of providers. There was only one medical doctor eligible to participant in this study, and if there was a better balance of knowledge awareness, another variable would have included more of a variety. Additional types of providers should also be added such as medical assistants, physician assistants, and certified nursing assistants. The type of study could also be adjusted to include randomized control trails to assess the improvement of knowledge.

Conclusion

The pediatric and adolescent age is the prime time to recognize and treat mental health disorders. When discussing mental health care, there is already a stigma and various barriers associated with treatment. In this age range, there is a great deal of hesitancy in parents to seek mental health care for their child. There is a stigma associated with medications and an uncertainty with young people receiving them, as well as side effects. However, if providers are educated on the array of supplements that are available over the counter to help with symptoms of anxiety and depression, it may lead to less hesitancy in seeking care. This will also lead to

better outcomes and confidence in therapists, residents, nurse practitioners, and physicians that treat this age group in an outpatient setting.

There is substantial evidence that an array of issues cause barriers in treatment for pediatrics and adolescents suffering from mental health disorders. Some of the main reasons presented were lack of access to care, the stigma associated with seeking care, lack of trust in providers, hesitancy with the association of pharmaceuticals, side effects of medications, lack of awareness, cultural barriers, and cost. The evidence addressed solutions to these barriers is by suggesting a noninvasive, cost efficient, alternate to pharmaceuticals. It is crucial to address mental health issues when they begin to prevent them from furthering into more complications. If providers are well versed on these alternates, it will lead to increased trust in providers, cost efficient options with minimal side effects, and improved results in patients.

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Appendices

Table of Evidence

Author/ Date	Theoretical/ Conceptual Framework	Research Question(s)/ Hypotheses	Methodology	Analysis & Results	Conclusions	Implications for Future research	Implications For practice
* Niv et al. (2009).	*None	*The goal of this study was to examine the relationship between herbal medication and dietary supplement use with mental health symptoms.	*This study was conducted utilizing a short questionnaire to assess history of psychological distress with questions regarding supplement use.	*Participants with a psychiatric disorder were significantly more likely to use supplements such as St. John's Wort and melatonin, however the effectiveness is uncertain due to little evidence availability at the time of the study.	*The study did show that people with mental illnesses were more likely to use supplements but there was not enough information for a solid backing of the findings.	*More specific interviews and questionnaires should be done. *Participants may benefit from education on supplement use.	*There is a possibility that use of supplements may improve outcomes of patients with mental illnesses.
* Papakostas et al. (2012).	*DSM-V criteria was used to assess patients and determine eligibility. *Hamilton Depression Rating Scale (HAM-D) was used to measure response.	*The aim was to study the effect of l-methylfolate in the treatment of major depressive disorder.	* A two multicenter parallel comparison design was used to compare the results of l-methylfolate use.	*In the initial trial, 148 outpatients with SSRI resistant MDD were enrolled in a 60-day study that was divided into two 30-day increments. * The second trial included 75 participants; the design was the same as the first with the exception that the L-methylfolate dosage was 15mg per day during both 30-day periods.	* There was no significant different in the first trial group outcomes. * In the second trail, adjunctive L-methylfolate at 15mg per day showed significantly greater efficacy compared to continued SSRI use and a placebo.	*It may be beneficial to include serum tests in future studies. *The participant groups were uneven and rather large; it may be helpful to break them down into smaller groups with more subcategories.	* L-methylfolate has minimal adverse side effects and may be useful in the treatment for depression on its own or as an adjunct to medication therapy.
Kimura et al. (2006).	*The Stress-Trait Anxiety Inventory (STAI) was used to measure the state of anxiety and consists of 20 items to gain an overall idea of the perception of stress.	*This study investigated the psychological and physiological stress responses with the consumption of L-Theanine.	*Double-blind study with counterbalanced order. *Subjects consisted of 12 male undergraduate students not suffering from any illness and not taking any medication.	*Results showed L-Theanine reduced heartrate and salivary IgA responses to acute stress tasks. *This was contributed likely to the attenuation of the sympathetic nervous system (SNS).	*The results of this study suggested that oral intake of L-Theanine may in turn cause anti-stress effects through the inhibition of cortical neuron excitation.	*Further study on other immunoglobulins *The impacts of L-Theanine on the SNS.	*A method to consider for stress reduction, dealing with difficult tasks, and reducing anxiety. *Possible first-line treatment for acute stress.
Yuan et al. (2021).	*DSM-V: neuropsychiatric disorders.	*To investigate the effects of L-Theanine on the motor cortex in how to affects psychotic symptoms and anxiety.	*Placebo-controlled, randomized double-blind study. *10 subjects (5 males, 5 females. * Participants were randomized to receive 400mg or a single oral dose of L-Theanine or a placebo on two separate occasions with a	* No adverse side effects from L-Theanine were observed. *L-Theanine may be a substance for consideration to be therapeutic for anxiety, psychotic and	*This study laid the groundwork for future studies on L-Theanine and the effects it has on anxiety and other psychiatric disorders as the study, although small showed therapeutic effects.	*A larger study with more participants would be beneficial. *Expansion of the effects on the motor cortex	*There is therapeutic interest of L-Theanine for treatment of anxiety and other psychotic disorders.

			minimum of 72 hours apart.	affective disorder on brain excitability.			
Sarris et al. (2020)	*The Hamilton Anxiety Rating Scale was used to determine level of anxiety. *Mini-International Neuropsychiatric Interview (MINI) was used to diagnose DSM-V GAD and screen for other disorders.	*If the use of Kava would decrease the symptoms associated with GAD	*Randomized, double-blind, placebo-controlled study over 16 weeks *Analysis of 171 subjects that were currently non-medicated and suffering from GAD *Aqueous extract of dried Kava was given twice per day in tablet form *120mg Kava twice a day	*The study concluded that Kava does help with anxiety, but it helps more with situational anxiety compared to GAD	*Kava helps to decrease situational anxiety. *There were minimal side effects expressed in participants. *LFT showed no Kava induced hepatic injury	*Further studies on the hepatic effects of Kava. *Include subjects that are on medications and study Kava as an adjunct therapy.	*Evidence shows that Kava may be helpful for situational anxiety *May replace a PRN pharmaceutical used for situational anxiety.
*Khan et al. (2022).	*Beck Depression Inventory Scale was utilized to assess depression severity in participants.	*The aim of this investigation was to determine the correlation that vitamin D has to depression.	*200 participants: 100 healthy and 100 depressed. *Vitamin D levels were drawn after consent was obtained to determine if there was a relationship with deficiency and depression.	*Results shows that females were more commonly Vitamin D deficient than males *There was a relationship with the participants with low Vitamin D levels and exhibiting depression signs and symptoms.	*Deficiency in Vitamin D levels does show a direct relationship with depression. *There is a likeliness that if the participants that exhibited depression signs and symptoms did not have a vitamin D deficiency, they may not be depressed.	*There could be an additional group added that is supplemented with vitamin D then tested to see if it helped with their depression signs and symptoms.	*Baseline vitamin D levels blood draws should be a standard in mental health treatment, specifically with depression.
*Anuroj (2022).	*The Patient Health Questionnaire was administered to assess levels of depression in the students.	*The goal of this study was to assess if vitamin D deficiency during the pandemic lead to depression in a group of medical students.	*63 female and 36 male medical students participated with no diseases associated with vitamin D deficiency and had not taken a supplement within the past year. *Serum vitamin D levels were taken on all participants.	*The study showed that there was a prevalence in vitamin D insufficiency and attributed it to the lack of sunlight during the pandemic. *There was not enough evidence to say that vitamin D deficiency is linked to depression.	*Lack of sunlight does contribute to vitamin D levels and was referenced as the reason the participants were notable deficient.	*Since there is a delayed onset of depressive symptoms, these participants could have been followed up with at a later time to possibly link depressive symptoms with vitamin D levels. *A larger study size and different population as medical students are typically under a lot of stress in general and may exhibit depressive symptoms as a result.	*Education and recommendation on the importance of sunlight as a main source for vitamin D. *Recognizing the impact vitamin D has on overall general health in addition to mental health.
*Abiri, Sarbakhsh, & Vafa,(2021).	*The Beck Depression Inventory II was used to assess level of depression and determine eligibility for study.	*This study's goal was to evaluate the effects of magnesium and/or vitamin D supplementation on mood, serum levels of brain-derived neurotrophic factor (BDNF), Sirtuin 1 (SIRT1), and inflammation in obese woman exhibiting mild to moderate depression symptoms	*Randomized, double-blind, placebo-controlled trial. *102 obese women ages 20-45 years old with mild to moderate depressive symptoms.	*Results indicated vitamin D plus magnesium supplementation in the subjects did display benefits that influenced mood, BDNF levels, inflammation, and SIRT1	*Vitamin D and magnesium are both beneficial to help with mood, depressive symptoms, as well as inflammation in the body that may exacerbate symptoms.	*A group without depression may be tested. *Include a group of non-obese women with and without depression.	*Baseline labs are important in the clinical setting such as CRP, Vitamin D, and Magnesium levels. *Supplementation of vitamin D and magnesium may be beneficial to improve depressive symptoms.
* Sun et al. (2021).	*The Patient Health Questionnaire-9 was administered to determine levels of depression in the participants.	*This study investigated the association of dietary magnesium intake as it relates to depression.	*17,730 adults from the National Health and Nutrition Examination Survey from 2007 to 2014. * Magnesium was specifically assessed utilizing 24-hour recalls.	* The study found an association between magnesium intake and depression in all age groups, it was more prevalent in women compared to men	*Magnesium intake via diet may have benefits for depressive symptoms.	*The study group was huge. *Results were based on participant recall and may not have been accurate. *The participants were generalized and not specific.	*Education on diet is important especially if a patient has depressive symptoms as it may be a simple fix such as adjusting diet,
* Zifkin et al. (2021).	*Participatory hermeneutic ethnography to gain perspective of the people who experience the processes.	* The aim of this study was to examine the experiences of adolescents and their parents' surrounding mental health care access.	*Participants were ages 12 to 18 years old currently receiving treatment from the outpatient clinic. *13 adolescents and 10 parents participated.	*Analysis was done through observations and interviews in a non-linear manner. *Interview times varied from 30 to 70 minutes.	*The barriers hypothesized were true such as stigma, difficulty of access to care, and lack of guidance and information.	*Have a set of specific criteria for interview. *Separate parents from adolescents. *Include a larger study size.	*Access to care is crucial to mental health care for adolescents and young adults. *Once access is achieved, outcomes will likely improve.
* Thesing et al. (2017).	*DSM-V was used to identify depressive symptoms and disorder.	*The purpose of this study was to conduct a cross-sectional study on serum levels of N-3 and N-6 PUFAs as the relation to anxiety and depression.	*Five groups were studied: participants with current pure depressive disorder, comorbid anxiety/depression, remitted depressive and/or anxiety disorder,	*Baseline plasma levels were taken. *A diagnostic interview was done by trained researchers.	* Results were unable to determine any relationship with N-6 PUFA levels. *Patients that were currently experiencing a depressive episode,	*Repeat the study with less participants. *Include a group that takes omega supplements.	*Supplements such as omega 3 may be beneficial in the treatment of anxiety and depression.

			and a healthy control group.		especially with more severe cases had lower N-3 PUFA levels than participants in remission and healthy controls.		*It is beneficial to educate on which foods contain N-3 versus N-6 PUFAs.
* Pfeiffer & In-Albon (2022).	*This study used both a quantitative and qualitative approach.	*The goal of this study was to assess barriers in an adolescent age group for seeking psychotherapy.	*288 adolescents, ages 12 to 21 years old were interviewed about the barriers of people with mental illness seeking psychotherapy.	*Participants were interviewed with open-ended questions, given a questionnaire, and given information on psychotherapy.	*There were several barriers identified such as self and public stigma, access to care, lack of trust, and perception of people with mental illness.	*Educate on psychotherapy to a group and reassess their opinions of barriers. *Separate groups for those with a mental illness diagnosed or those exhibiting symptoms. *Ask a group about perception of medication for treatment.	*Educating patients about what psychotherapy is and the benefits to decrease barriers.
* Lopresti et al. (2019).	*To assess levels of stress and anxiety, the Hamilton Anxiety Rating Scale (HAM-A) and the Depression, Anxiety, and Stress Scale (DASS) was used.	*The aim of this study was to explore the antistress effects, mood enhancing effects, and safeness of ashwagandha root extract in a population of health adults experiencing mild stress.	*60-day, randomized, double-blind, placebo-controlled study. *Participants were 60 healthy adults with mild stress.	*Participants were either given a placebo or 240mg of ashwagandha. *Assessments were done using the HAM-A and DASS. *Serum morning cortisol, testosterone, and DHEA-S levels were drawn.	* When compared with the placebo, there was a significant reduction in the feeling of stress. * Morning cortisol levels were also decreased in the participants that were given ashwagandha.	*Larger sample sizes. *More diverse subjects, both clinically and culturally.	*Ashwagandha may be beneficial for patients with mild stress levels and/or anxiety.
*Izquierdo et al. (2022).	*None.	*This study investigated if NAC would help improve cellular immunity that was compromised by illness, such as Covid-19.	*Hospitalized patients positive with Covid-19. *Study was conducted over a 10-month period.	*Participants were inpatient and must have tested positive for Covid-19. *There was a group that received oral NAC 600mg every 8 hours and compared to a group that did not receive it.	*The study size was significant and included over 19,000 patients, which may be too large. *There were many patients with several comorbidities, and they were not separated.	*Smaller groups or more defined groups. *A group that continued to take NAC after discharged from the hospital.	*NAC may have anti-inflammatory and decrease cytokines, similar to how it impacts patients with psychiatric disorders.

IRB Approval

FIU Research & Economic Development
FLORIDA INTERNATIONAL UNIVERSITY

MEMORANDUM

To: Dr. Eric Fenkl

CC: Heather Stein

From: Carrie Bassols, BA, IRB Coordinator CeB

Date: March 7, 2023

Proposal Title: "Strategies to Implement the Use of Supplements versus Psychotropics in a Pediatric and Adolescent Population: A Quality Improvement Project"

The Florida International University Office of Research Integrity has reviewed your research study for the use of human subjects and deemed it Exempt via the **Exempt Review** process.

IRB Protocol Exemption #:	IRB-23-0102	**IRB Exemption Date:**	03/07/23
TOPAZ Reference #:	112666		

As a requirement of IRB Exemption you are required to:

1) Submit an IRB Exempt Amendment Form for all proposed additions or changes in the procedures involving human subjects. All additions and changes must be reviewed and approved prior to implementation.
2) Promptly submit an IRB Exempt Event Report Form for every serious or unusual or unanticipated adverse event, problems with the rights or welfare of the human subjects, and/or deviations from the approved protocol.
1) Submit an IRB Exempt Project Completion Report Form when the study is finished or discontinued.

Special Conditions: N/A

For further information, you may visit the IRB website at http://research.fiu.edu/irb.

Letter of Support from Facility

SOUTH FLORIDA
INTEGRATIVE MEDICINE

2/14/2023

Dr. Eric A. Fenkl, Ph.D., RN, CNE
Tenured Associate Professor
Nicole Wertheim College of Nursing & Health Sciences
Florida International University

Dear Dr. Fenkl:

Thank you for inviting South Florida Integrative Medicine to participate in the Doctorate of Nursing Practice project developed by Heather Stein. I understand that this student will be conducting this project as part of the requirements for the DNP program at Florida International University (FIU). After reviewing the proposal of the project titled "Strategies to Implement the Use of Supplements versus Psychotropics in a Pediatric and Adolescent Population: A Quality Improvement Project," I have warranted her permission to conduct the project in this company.

We understand the project will be developed in our setting and will occur in two sessions in a 2-month time frame. We are also aware that our resources are imperative in supporting the student to complete this project. This includes the support from our staff by participating in the intervention. We will give the student permission to access to our facility, give consent, deliver questionnaires, and present the educational materials.

This project intends to evaluate the effect of a structured education intervention targeting providers and will improve the provider's knowledge of supplement use for treatment of anxiety and depression. Prior to the implementation of this project, the FIU Institutional Review Board will evaluate and approve the procedures to conduct this project. Evidence suggests that this training has the potential to reduce the health disparities experienced by pediatric and adolescent populations. Additionally, improved knowledge surrounding supplements may improve the provider-patient relationship and lead to individual, positive patient outcomes such as improved treatment adherence and patient satisfaction.

The educational intervention will be delivered through an in-person presentation. Educational materials will be e-mailed to each participant partaking in the intervention. Any data collected by Heather Stein will be kept confidential and will be stored in a password protected laptop.

We expect that Heather Stein will not interfere with the normal office performance, behaving in a professional manner and following the office standards of care. As owner of South Florida Integrative Medicine, I support the participation of our providers in this project and look to working with you.

Sincerely,

Reed Humphery (she/her)
Managing Partner

5915 Ponce de Leon Boulevard, Suite 26, Coral Gables, Florida 33146
T: 786-664-7810 | F: 305-340-2646 | contact@southfloridaintegrativemed.com | www.southfloridaintegrativemed.com

Recruitment Letter

RECRUITMENT LETTER

Recruitment Email for addressing current knowledge gaps among providers knowledge regarding the use of supplements versus pharmaceuticals in pediatric and adolescent patients with anxiety and/or depression: A quality improvement project.

Dear Participants,

My name is Heather Stein, and I am a student from the Graduate Nursing Department at Florida International University. I am writing to invite you to participate in my quality improvement project for completion of my Doctor of Nursing Practice. The goal of this project is to address current knowledge gaps among providers regarding knowledge regarding the use of supplements versus pharmaceuticals in pediatric and adolescent patients with anxiety and/or depression. It strives to broaden the provider's expertise so they may use it in their everyday clinical practice to assist pediatric and adolescent patients and parents in becoming more informed from a recognized and reliable source so they can make better informed decisions about this subject.

You are eligible to take part in this project because you are a provider at South Florida Integrative Medicine. I am contacting you with the permission of your Office Manager and Administrative Team at such a location. If you decide to participate in this project, you will complete a pre-test questionnaire, which is expected to take approximately 10-15 minutes. Then, you will then be asked to view an approximately 20-minute educational Keynote presentation. After completion of the educational module, you will be asked to complete the post-test questionnaire, which is expected to take approximately 10-15 minutes. *No compensation will be provided.*

Remember, this is completely voluntary. If you would like to participate, please reply to this email and more information will be provided. If you have any questions about the study, please email or contact me at hstei002@fiu.edu or (954)240-6792.

Thank you kindly,

Heather Stein, MSN, APRN, PMHNP-BC

Participant Consent

ADULT CONSENT TO PARTICIPATE IN A RESEARCH STUDY
Strategies to Implement the Use of Supplements versus Psychotropics in a Pediatric and Adolescent Population: A Quality Improvement Project.

SUMMARY INFORMATION

Things you should know about this study:

- **Purpose:** The purpose of the study is to enhance knowledge of supplement use to treat anxiety and depression.
- **Procedures**: If you choose to participate, you will be asked to attend an educational session and complete a pre and post-assessment.
- **Duration:** This will take about less than 1 hour
- **Risks**: There are no risks or discomfort associated with this research,
- **Benefits:** The main benefit to you from this research is to enhance knowledge that will impact the quality of care delivered.
- **Alternatives:** There are no known alternatives available to you other than not taking part in this study.
- **Participation:** Taking part in this research project is voluntary.

Please carefully read the entire document before agreeing to participate.

PURPOSE OF THE STUDY

The purpose of this study is to enhance knowledge of supplement use to treat anxiety and depression by implementing an educational plan. The ultimate goal is to reduce the stigma associated with mental health treatment, to enhance provider knowledge, to provider cost efficient options for patients that have minimal to no side effects.

NUMBER OF STUDY PARTICIPANTS

If you decide to be in this study, you will be one of 10 people in this research study.

DURATION OF THE STUDY

Your participation will involve taking a pretest, attending one educational session virtually or in person, followed by a post test.

PROCEDURES

If you agree to be in the study, we will ask you to do the following things:

- Complete a pretest for knowledge assessment.
- Attend an educational session.
- Complete a pretest knowledge assessment.
- All items needed for completion will be emailed.

RISKS AND/OR DISCOMFORTS

The study does not have any physical, psychological, societal, or economical risks to you.

BENEFITS

The study has the following possible benefits to you:

- Knowledge enhancement.
- Opportunity to learn during work hours.
- No need to leave the workplace.
- The study has the following possible benefits to society:
    - Enhance patient outcomes.
    - Reduce individual healthcare cost.

ALTERNATIVES

There are no known alternatives available to you other than not taking part in this study. Any significant new findings that may affect your willingness to continue participation developed during the course of the research and/or before you attend the educational session will be communicated to you via email.

CONFIDENTIALITY

The records of this study will be kept private and will be protected to the fullest extent provided by law. In any sort of report we might publish, we will not include any information that will make it possible to identity you. Research records will be stored securely, and only the researcher team will have access to the records. However, your records may be inspected by authorized University or other agents who will also keep the information confidential.

USE OF YOUR INFORMATION

Your responses and the information gathered from them information as part of the research will not be used or distributed for future research studies even if no identifiers are collected.

COMPENSATION & COSTS

You will not receive payment or any other incentives for your participation. There are no costs to you for participating in this study.

MEDICAL TREATMENT

Routinely, FIU, its agents, or its employees do not compensate for or provide free care for human subjects in the event that any injury results from participation in a research project. If you become ill or injured as a direct result of participating in this study, contact your regular medical provider. If you have insurance, your insurance company may or may not pay for these costs. If you do not have insurance, or if your insurance company refuses to pay, you will be billed. Funds to compensate for pain, expenses, lost wages and other damages caused by injury are not routinely available.

RIGHT TO DECLINE OR WITHDRAW

Your participation in this study is voluntary. You are free to participate in the study or withdraw your consent at any time during the study. You will not lose any benefits if you decide not to participate or if you quit the study early. The investigator reserves the right to remove you without your consent at such time that he/she feels it is in the best interest.

RESEARCHER CONTACT INFORMATION

If you have any questions about the purpose, procedures, or any other issues relating to this research study you may contact Heather Stein at Florida International University, (954) 240-6792, hstei002@fiu.edu.

IRB CONTACT INFORMATION

If you would like to talk with someone about your rights of being a subject in this research study or about ethical issues with this research study, you may contact the FIU Office of Research Integrity by phone at 305-348-2494 or by email at ori@fiu.edu.

PARTICIPANT AGREEMENT

I have read the information in this consent form and agree to participate in this study. I have had a chance to ask any questions I have about this study, and they have been answered for me. I understand that I will be given a copy of this form for my records.

_____ _____

Signature of Participant Date

_____

Printed Name of Participant

_____ _____

Signature of Person Obtaining Consent Date

Pre/Posttest and Demographic Questionnaire

Pre-test

Please click on the appropriate response:

1. It can be dangerous to take supplements or herbs with some prescription medications.
    a. True
    b. False
2. Liver toxicity is one of the most common side effects of Kava Kava.
    a. True
    b. False
3. Vitamin D is not only important in bone health and proper brain development, but deficiency can lead to which of the follow psychiatric illnesses?
    a. Eating disorders
    b. Depression, anxiety, and association with schizophrenia
    c. Borderline, narcissistic, and avoidant personality disorders
    d. May cause relapse in drug and alcohol addiction
4. Supplements are only effective for depression and anxiety in conjunction with therapy and/or a pharmaceutical such as an SSRI, SNRI, or Anxiolytic in newly diagnosed patients.
    a. True
    b. False
5. L-Theanine is a supplement known for its calming effects. Which of the following neurotransmitters are impacted by L-Theanine?
    a. Norepinephrine
    b. Acetylcholine
    c. Gamma-aminobutyric acid (GABA)
    d. Glutamate
6. Since L-Theanine has a calming effect, it should only be taken at night.
    a. True
    b. False
7. Approximately 70% of all mental health disorders can be diagnosed prior to age 25.
    a. True
    b. False
8. Ashwagandha is an herb that is gaining popularity for its uses in promoting youthfulness by enhancing endurance, muscular health, and overall health. It can be effective in mental health for reducing which of the following?
    a. Stress
    b. Depression
    c. Mania
    d. Agoraphobia
9. Magnesium is a supplement identified to safe be for pediatric and adolescent ages.
    a. True
    b. False
10. Omega 3 supplements are associated with reducing the symptoms in depression and in mood disorders.
    a. True

b. False

Provider Demographics
Please click on the appropriate response:

1. What is your age range?
    a. 20 to 30 years old
    b. 31 to 45 years old
    c. 46 years old or older
2. What is your gender?
    a. Female
    b. Male
    c. Other
3. What is your highest level of education?
    a. Bachelor's
    b. Master's
    c. Doctorate
4. How many years of clinical experience do you have?
    a. 0-4 years
    b. 5-10 years
    c. 10-15 years
    d. More than 15 years
5. What is your perceived knowledge on mental health risk factors in youth?
    a. None
    b. Competent
    c. Proficient
    d. Expert
6. What is your perceived knowledge on the use of supplements for anxiety and depression?
    a. None
    b. Competent
    c. Proficient
    d. Expert

Post-test
Please click on the appropriate response:

1. It can be dangerous to take supplement or herbs with some prescription medications.
    a. True
    b. False
2. Liver toxicity is one of the most common side effects of Kava Kava.
    a. True
    b. False
3. Vitamin D is not only important in bone health and proper brain development, but deficiency can lead to which of the follow psychiatric illnesses?
    a. Eating disorders
    b. Depression, anxiety, and association with schizophrenia

    c. Borderline, narcissistic, and avoidant personality disorders
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4. Supplements are only effective for depression and anxiety in conjunction with therapy and/or a pharmaceutical such as an SSRI, SNRI, or Anxiolytic in newly diagnosed patients.
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    d. Agoraphobia
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    a. True
    b. False
10. Omega 3 supplements are associated with reducing the symptoms in depression and in mood disorders.
    a. True
    b. False