

7-23-2022

Nutrition's Impact on Mental Well-Being

Amy A. Kauer
Indiana State University

Follow this and additional works at: <https://scholars.indianastate.edu/uhp-fac>



Part of the [Neuroscience and Neurobiology Commons](#), and the [Nutrition Commons](#)

Recommended Citation

Kauer, Amy A., "Nutrition's Impact on Mental Well-Being" (2022). *University Honors Program*. 68.
<https://scholars.indianastate.edu/uhp-fac/68>

This Article is brought to you for free and open access by the Honors College at Sycamore Scholars. It has been accepted for inclusion in University Honors Program by an authorized administrator of Sycamore Scholars. For more information, please contact dana.swinford@indstate.edu.

Nutrition's Impact on Mental Well-Being

Amy A. Kaur

Indiana State University

Honors 401

Dr. Bierly

July 25, 2022

Abstract

This honors thesis examines the relationship between nutrition and mental well-being by investigating nutrition's relationship with mood, cognition, mental dexterity, chronic disease, mental health, and treatment plans. The author of the thesis researched and investigated the following questions:

1. Is diet and mood intertwined?
2. How does nutrition impact cognition and mental dexterity?
3. How does nutrition impact chronic disease?
4. What is the correlation between nutrition and mental health, and is nutrition being addressed in mental health treatment?

The author found six key components to a healthy diet through a literature review. These six components include complex carbohydrates, EFAs (Essential Fatty Acids), amino acids, vitamins, minerals, and water. These six components are essential in mood, cognition, mental dexterity, chronic disease, and mental health. Implementing these six components into treatment plans could help alleviate and reduce mental health problems. Unfortunately, humans can only produce some of these components; the rest must come from external sources. These components help replenish and restore nerve cells and neurotransmitters, which in turn help our bodies function to the best of their ability. Unfortunately, it is difficult to find these specific nutrients being implemented into treatment plans. **Nutrients, Chronic Disease, Fatty Acids, Diet, Neurotransmitters**

Nutrition's Impact on Mental Well-Being

Background

"The food you eat can be the safest and most powerful form of medicine or the slowest form of poison. -Ann Wigmore" Is there truth to this statement? Do the foods we consume impact one's quality of life? This honors thesis examines the relationship between nutrition and mental well-being.

"A healthy dietary pattern can affect mental health and well-being through anti-inflammatory, antioxidant, neurogenesis, microbiome- and immune-modifying mechanisms, as well as through epigenetic modifications. Dietary patterns affect brain composition, structure, and function, as well as endogenous hormones, neuropeptides, neurotransmitters, and the microbiota-gut-brain axis, which plays a role in the modulation of stress and inflammation and the preservation of cognitive function (Muscaritoli 2021)." Mental Health and mental well-being are affected by various physiological processes, and these physiological processes are affected by the foods one eats, whether those foods be nutrient-dense or not.

Nutrients play a vital role in one's ability to function as humans. Nutrients are chemical compounds in foods that help one's body function and maintain health. Certain nutrients such as omega-3 polyunsaturated fatty acids (PUFAs), eicosapentaenoic acid (EPA), docosahexaenoic acid (DHA), alpha-tocopherol, magnesium, folic acid, vitamins B12, B1, B9, and B3 allow for sufficient cognitive function (Adan et al., 2019; Muscaritoli 2021). Lack of nutrients such as these can lead to depleting cognitive function, mental impairment, and loss of mental dexterity.

The Unknown

Years of research has shown a relationship between nutrition and physical health, yet the relationship between nutrition and mental well-being has been researched significantly less. We are in the process of learning the underlying unknown mechanisms nutrients play in mental health and mental well-being and understanding studies conducted to test whether there is a relationship between nutrition and mental well-being. By understanding the mechanisms nutrients play in mental well-being, one can learn how to adequately and efficiently fuel one's mind with these nutrients and positively impact one's lives. Understanding the studies that are being conducted to test the effects of lacking nutrients is beneficial to understanding how nutrients positively affect mental well-being.

A plethora of research has been conducted on mental health as well as nutrition individually and their various aspects. Yet, there is so much to learn about the relationship between nutrition and mental health. For example, how are diet and mood intertwined? How does nutrition impact cognition and mental dexterity? How does nutrition impact chronic disease? What is the correlation between nutrition and mental health, and is nutrition being addressed in mental health treatment? These questions are very intriguing to me, and my honors thesis has allowed me to answer them and better understand the relationship between nutrition and mental well-being.

Thesis Question

This thesis aims to investigate the relationship between nutrition and mental well-being and understand how nutrients impact mood, cognition, mental dexterity, and chronic diseases. This thesis will be investigated by answering four main questions.

How are diet and mood intertwined?

It is important to understand the relationship between diet and mood because the food one eats can potentially affect one's mood. The importance of this question lies in how one would enjoy living their life. If one could be happier, would they not want to be? If the secret to being happier is as simple as adding certain foods to one's diet, would one not want to incorporate those foods?

How does nutrition impact cognition and mental dexterity?

Understanding how nutrition impacts cognition and mental dexterity is important because one should be their best at all times. If the implementation of certain nutrients can lead to improvements in attention, function, and memory, we should be implementing those nutrients. If nutrients can play a role in brain composition, structure, and function, then one should implement foods that provide nutrients with positive outcomes.

How does nutrition impact chronic disease?

Why is it important to understand whether nutrition impacts chronic disease? It is important because if we can help alleviate or prevent chronic diseases, we should. For example, nobody wants to be depressed or have anxiety; if we can add nutrients to impact these chronic diseases positively, we should.

What is the correlation between nutrition and mental health, and is nutrition being addressed in mental health treatment?

Understanding the correlation between nutrition and mental health and whether nutrition is being addressed in treatment is very beneficial to understanding how to better treat people with mental health problems. If one can alleviate and reduce mental health problems by implementing nutrients into one's treatment plan, one should.

Summary

This honors thesis will investigate the relationship between nutrition and mental well-being. This thesis focuses on four main questions: How are diet and mood intertwined? Second, how does food impact cognition and mental dexterity? Third, how does nutrition impact chronic disease? Finally, what is the correlation between nutrition and mental health, and is nutrition being addressed in mental health treatment? Does nutrition impact mental well-being, and does lacking certain nutrients affect one not only physically but mentally, as well?

Are diet and mood intertwined?

Humans can only supply and nourish their bodies to a certain extent to remain healthy. The rest comes from external nutrients such as complex carbohydrates, EFAs (Essential Fatty Acids), amino acids, vitamins, minerals, and water (Dunne, 2012). So, how does nourishing one's body with external nutrients affect one's mood? Nourishing one's body with external nutrients and mood are intertwined through one's nerve cells. According to the journal article Food and mood: evidence for diet-related changes in mental health, "The brain contains billions of nerve cells that enable the brain to communicate with itself and other parts of the body. These nerve cells are primarily made up of fat, derived from the diet. Chemicals called neurotransmitters help the nerve cells communicate with each other; neurotransmitters are made from amino acids, which are often derived from the diet (Dunne, 2012)." Therefore, nerve cells and neurotransmitters deriving their contents from one's diet implies that one's diet does impact one's mood. Humans need a balance of the neurotransmitters their body is composed of because neurotransmitters play a vital role in anxiety, memory, and cognitive status (Dunne, 2012). Therefore, humans should have a healthy balanced diet composed of nutrients such as complex carbohydrates, EFAs, amino acids, vitamins, minerals, and water. Without these critical

nutrients, nerve cells and neurotransmitters would be depleted, and one would not be able to function to the best of one's ability.

Diet should contain complex carbohydrates, EFAs (Essential Fatty Acids), amino acids, vitamins, minerals, and water. These six components are necessary for a healthy diet because these six components each play a vital role in one's body and mood. Carbohydrates provide glucose to the brain, stabilize blood sugar, support metabolism, and break down over an extended period of time which provides one's brain with constant fuel. Stabilizing blood sugar is important because it prevents peaks and troughs in energy levels (Dunne, 2012). Carbohydrates are in a variety of foods, but one must be careful which foods one chooses to nourish one's body and which foods one chooses not to nourish one's body. A few examples of good carbohydrates are beans, lentils, and oats. A few examples of poor carbohydrates are sweets, chocolates, and alcohol. Fats provide one's body with fat-soluble vitamins A, D, E, and K and essential fatty acids omega-3 and omega-6 (Dunne, 2012). Essential fatty acids cannot be obtained from one's body; they must be obtained from one's diet. A few examples of essential fatty acids one should add to their diet are oily fish, flaxseed, and walnuts (Dunne, 2012). Amino acids are both non-essential and essential, meaning humans make some naturally, and humans need to consume some from one's diet. Amino acids are the building blocks of proteins, and neurotransmitters are composed of amino acids (Dunne, 2012). Amino acids are essential because, without them, neurotransmitters would not be able to communicate with one another. Multiple studies have found that tryptophan is a vital amino acid to play a role in mood. According to the article "The Biology of Tryptophan Depletion and Mood Disorders," tryptophan is the only precursor of serotonin, and serotonin modulates central nervous system functions such as control of appetite, sleep, memory and learning, temperature, regulation, mood, behavior, perception, etc... (Toker et

al., 2010). Therefore, a lack of this amino acid would lead to a lack of serotonin which can affect mood. Amino acids can be found in foods such as eggs, lean meat, and beans. Vitamins play a vital role in mood; for example, a deficiency in B vitamin niacin can lead to depression (Dunne, 2012). Minerals such as iron and selenium also play a vital role in the relationship between diet and mood. Iron makes hemoglobin which carries oxygen throughout the body; lack of iron can lead to anemia which can result in tiredness, lethargy, and low mood (Dunne, 2012). Selenium is a mineral essential for immune systems, reproduction, and thyroid hormone metabolism; low selenium intake can make one more anxious, depressed, and tired (Dunne, 2012).

The last component of one's diet that we should make sure to implement is water. "Water makes up more than three-quarters of the brain and ensures that the chemical processes in one's bodies work efficiently. We lose water daily through waste, sweat, and bodily fluids (Dunne, 2012)." If water makes up more than three-quarters of one's brain, then it is implied that it is essential to one's daily functioning. Without water intake, one's nerve cells and neurotransmitters would not be able to work correctly. This can lead to irritability and low mood. Six key components of a healthy diet that everyone should have, yet they do not, but there is one component in most people's diet that leads to mood changes. That component is caffeine, which is a stimulant. Mood changes and anxiety can occur from increased caffeine consumption (Dunne, 2012).

Specific diets are associated with a lower risk of depression or depressive symptoms. According to the journal article *Linking What We Eat to One's Mood: A Review of Diet, Dietary Antioxidants, and Depression*, the three most common dietary patterns in nutrition epidemiology studies are the Mediterranean dietary pattern (MD), the Western dietary pattern (WD), and the Oriental dietary pattern (Huang et al., 2019). There is much controversy about

whether these diets play a role in cognitive function. Studies say they do, as well as studies that do not. More testing needs to be conducted to have a definitive answer. However, a study examining the cognitive effects of a Mediterranean diet with additional red meat found that “nutrients contained within the Mediterranean diet influenced brain function directly (Wade et al., 2019). This study found that omega-3 fatty acids, vitamin B12, vitamin E, and folate protect against cognitive decline (Wade et al., 2019). There still needs to be more studies conducted with larger sample sizes for more accurate results.

How does nutrition impact cognition and mental dexterity?

The second question this thesis will investigate is how nutrition impacts cognition and mental dexterity. Knowing if one's cognition and mental dexterity can be affected by the foods; one chooses to consume is important. For example, if one could work more effectively and understand concepts faster by just choosing better foods, would one not want to? This question helps to answer how nutrients affect brain composition, structure, and function.

As previously mentioned, six components of a healthy diet include complex carbohydrates, EFAs (Essential Fatty Acids), amino acids, vitamins, minerals, and water. These six components affect cognition and mental dexterity in a variety of ways. According to the journal article *The Impact of Nutrients on Mental Health and Well-Being: Insights from the Literature*, the macronutrient (fatty acid) DHA (Docosahexaenoic acid) plays a very important role in cognition. The article states “DHA is highly concentrated in the central nervous system (CNS), where it plays a key role in optimal development and later cognitive function (Muscaritoli, 2021).” DHA can decrease in one's brain as one ages because of the lack of omega-3 PUFAs in one's diet (Muscaritoli, 2021). Adding more omega-3 rich foods can help one's brains contain DHA, which can lead to better cognitive function. According to the article

“Omega-3 DHA and EPA for Cognition, Behavior, and Mood: Clinical Findings and Structural-Functional Synergies with Cell membrane Phospholipids,” found that “DHA/EPA supplementation can improve higher brain functions- sense of well-being, reactivity, attention, cognitive performance, and mood-in young healthy adults.”

Alpha-tocopherol is an isoform of vitamin E and essential for neurological development and deficiency in this can lead to neurological abnormalities or disorders (Muscaritoli, 2021). Folic acid and folate are metabolized into L-methylfolate to be able to cross the blood-brain barrier (BBB) and regulate the production of the neurotransmitter's dopamine, norepinephrine, and serotonin which all play a role in mental function and performance. It is crucial to have this in one's diet for good cognition and mental dexterity because deficiency of it can lead to neurological symptoms in adult and neural tube defects in fetuses (Muscaritoli, 2021). The journal article “Poor nutrition during pregnancy and lactation negatively affects neuro development of the offspring: evidence from a translational primate model,” states that increasing folic acid intake during pregnancy decreases the incidence of neural tube defects. Neural tube defects can lead to problems in cognition and mental dexterity. Another key component for good cognition and mental dexterity is magnesium. Magnesium is responsible for cellular energy metabolism, nerve conduction, membrane stability, and synaptic transmission. Without DHA, Vitamin E, folic acid, and magnesium one's brains would not be able to function to the best of its ability. These nutrients, along with many others, play an essential role to the structure, function, and composition of one's brain. Nutrients are building blocks of nutrition and help one's body, in this case one's brain, work to the best of their ability.

The six components of a healthy diet are important to cognition and mental dexterity but so are polyphenols. According to the journal article “Natural mood foods: The actions of

polyphenols against psychiatric and cognitive disorders,” polyphenols are natural compounds found in plant-based foods and have special properties that can combat oxidative stress and stimulate the activation of molecules that aid in synaptic plasticity which is a process that underlies cognitive function. This article mentions BDNF (brain-derived neurotrophic factor) which is a gene that is responsible “for its influence on the maintenance, survival, growth, and differentiation of neurons (Gomez-Pinilla & Nguyen, 2012).” BDNF stimulates synaptic plasticity in neurons, enhancing learning capacity and memory formation for normal neural development (Gomez-Pinilla & Nguyen, 2012). BDNF is crucial to one’s normal cognition, if the gene was not present it would weaken memory retention and inhibit long-term potentiation (Gomez-Pinilla & Nguyen, 2012). Polyphenols are in foods such as green tea and turmeric (Gomez-Pinilla & Nguyen, 2012). Nutrition can positively impact cognition and mental dexterity through various foods, especially polyphenols.

One study in particular showed the relation between nutrition’s impacts on cognition and mental dexterity, this study is a nutrition-based intervention study performed on a group of doctors. A known reality amongst the medical community is that healthcare workers do not receive adequate breaks to replenish and nourish their bodies, simply due to how busy they tend to be. According to the journal article “Physician nutrition and cognition during work hours: effect of a nutrition based intervention,” the purpose of this study was “to examine the effect of a nutrition based intervention, that of scheduled nutrition breaks during the work day, upon physician cognition, glucose, and hypoglycemic symptoms.” They conducted this study using baseline and intervention days and measured cognition using Brian Checkers software, Version 3.01 run on Palm Tungsten E2 (Lemaire et al., 2010). This study found that “scheduled healthy food and fluids consumed during the intervention day were associated with improved physician

cognition and less glucose variability (Lemaire et al., 2010).” Although this study indicates that nutrition intervention has a positive effect on cognition, we need to acknowledge that it is a small sample size, as it is with quite a few studies regarding nutrition and cognition, and that a larger sample size can help better implicate how nutrition impacts cognition and mental dexterity.

How does nutrition impact chronic disease?

The third question this thesis investigates is how nutrition impacts chronic disease. This question will investigate whether chronic diseases can be affected positively due to sufficient nutrient intake. The two chronic diseases this thesis will focus on are anxiety and depression. Chrono-nutrition is the incorporation of biological temporal rhythms, chrono-biology, into nutrition research; chrono-nutrition includes research into the distribution of energy intake, meal frequency and regularity, the duration of eating and fasting periods, and the relative importance of these factors for metabolic health and chronic disease (Pot, 2021). Chrono-nutrition is a newer field and is important because it can lead to understanding the relationship nutrition has with chronic diseases, which can, in turn, help one live a better life with a certain chronic disease or lessen the symptoms of a certain chronic disease.

According to the journal article ‘Losing to Gain: The Effects of a Healthy Lifestyle Intervention on the Physical and Psychosocial Well-being of Clients in a Community-based Mental Health Setting,” individuals with persistent mental health illness tend to face poorer physical and psychosocial well-being, higher comorbidity, and increased mortality rates compared to the general population (Mechling & Arms, 2019). This thesis investigates the role depression and anxiety, which are diseases that can be chronic, play in more depth and try to understand nutrition’s role in these diseases.

According to the article “Understanding nutrition, depression, and mental illness,” nutrition can play a key role in the onset and the severity, and duration of depression. Let’s begin answering this question by understanding depression. “Depression is a disorder associated with major symptoms such as increased sadness and anxiety, loss of appetite, depressed mood, and a loss of pleasurable activities (Sathyanarayana Rao et al., 2008).” A few food patterns associated with depression are poor appetite, skipping meals, and a dominant desire for sweet foods (Sathyanarayana Rao et al., 2008). People’s diets that lack essential vitamins, minerals, and omega-3 fatty acids tend to be associated with suffering from mental disorders due to lack of these nutrients (Sathyanarayana Rao et al., 2008).

One can get these nutrients back into one’s diet through supplementation. Supplements that contain amino acids convert to neurotransmitters which can alleviate mental health problems such as depression (Sathyanarayana Rao et al., 2008). Supplementation “may be appropriate for controlling and to some extent preventing depression, bipolar disorders, schizophrenia, eating disorders and anxiety disorders, attention deficit disorder/attention deficit hyperactivity disorder (ADD/ADHD), autism, and addiction (Sathyanarayana Rao et al., 2008).”

Earlier, this thesis mentioned the importance of carbohydrates, proteins, essential fatty acids, and minerals and their effects on mood, cognition, and mental dexterity. Now let’s go through these nutrients and their relation to depression. Carbohydrates trigger insulin release, which helps blood sugar into cells where it can be used for energy and trigger the entry of tryptophan into the brain (Sathyanarayana Rao et al., 2008). If one’s diet were low in carbohydrates, there would be a shortage in the production of brain chemicals serotonin and tryptophan, which can precipitate depression (Sathyanarayana Rao et al., 2008). Proteins consist of amino acids, which are the building blocks of life. A lack of proteins can lead to depression

because proteins are composed of neurotransmitters, and neurotransmitters are responsible for carrying chemical signals. A lack of neurotransmitters such as dopamine and serotonin can lead to low mood and aggression (Sathyanarayana Rao et al., 2008). Lack of omega-3 fatty acids can lead to depression, as well. One's bodies convert EPA (eicosapentaenoic acid) to DHA (docosahexanoic acid), which elicits antidepressant effects in humans (Sathyanarayana Rao et al., 2008). Low levels of minerals such as selenium are associated with lowered mood (Sathyanarayana Rao et al., 2008). Depression is a disease that can be onset by many factors; this thesis focuses more on the nutrition aspect of the disease.

“The term anxiety describes the experience of worry, apprehension, or nervousness in association with physical, cognitive, and behavioral symptoms (Aucoin et al., 2021).” According to the article “Diet and Anxiety: A Scoping Review,” a study done on animals conducted quite a few things: higher intake of simple or refined carbohydrates, higher glycemic index diet or sugar intake, and higher levels of anxiety; tryptophan depletion associated with higher anxiety symptoms; higher intake of omega-3 fatty acids and lower levels of anxiety; supplementation of vitamin C led to improved anxiety symptoms; the study also found that supplementation of the minerals zinc, magnesium, manganese, and selenium had consistent anti-anxiety effects (Aucoin et al., 2021). This study provides evidence that certain dietary patterns can influence the development and progression of anxiety disorders.

What is the correlation between mental health and nutrition and is it being addressed in mental health treatment?

The fourth question this thesis investigates is the correlation between mental health and nutrition and whether this relationship is being addressed in mental health treatment. This question will help investigate how nutrition and mental health are connected. This question will

also investigate the treatment plans for mental health and whether nutrition is being considered when making these plans. If nutrition plays a vital role or any role in mental health, treatment plans should be adjusted, and the nutrients each person lacks should be implemented in their treatment plans.

According to the article "Mental Health and Eating Behaviors," the relationship between nutrition and mental health is "bidirectional." Meaning "one's mood or psychological state can affect what and how much one eats and eating affects one's mood and psychological well-being (Polivy & Herman, 2005)." The article states, "individual psychological factors that affect eating include personality traits such as self-esteem, body image and restrained eating (chronic dieting), as well as mood and focus of attention (Polivy & Herman, 2005)." This finding is fascinating because other studies indicate mainly certain nutrients one is lacking and how they affect mental health but not the reasons why some may lack these nutrients.

This thesis investigates whether nutrition is being assessed in treatment plans for people with mental health issues. According to the article "Losing to Gain: The Effects of a Healthy Lifestyle Intervention on the Physical and Psychosocial Well-being of Clients in a Community-based Mental Health Setting," "healthy lifestyle interventions (HLIs) are client-focused programs of a healthy diet and increased exercise and socialization and include components such as nutrition planning, regular exercise, weight management, body mass index (BMI), and waist circumference monitoring, and group support, which together can amplify physical and psychosocial wellness and improve overall functioning." Although there is this great treatment plan, the article states that mental health services exclude HLIs from care. The authors of this article did a study. They asked the following questions: (1) Does an HLI improve clients with SPMI who attended psychosocial well-being, and (2) Does an HLI improve general physical

well-being and within what parameters (Mechling & Arms, 2019)? The study found improvements in anxiety and depressive symptoms in the intervention group compared to the control group at three months. However, no difference at six months, but the control group had higher scores for overall psychological well-being at three months over the intervention group but not ongoing or at the six-month mark (Mechling & Arms, 2019). The authors are unsure what to contribute to these findings; it could have been seasonal changes; one group may have had higher self of esteem than the other. There are a variety of factors that could be at play.

Many studies have been conducted regarding implementing healthier lifestyle changes. Some of these studies have found that implementing healthier lifestyle changes has been improved mental health. However, research conducted on this question for this thesis has not found one that explicitly stated that they made the participants add nutrition components, specifically carbohydrates, essential fatty acids, amino acids, vitamins, minerals, water ,etc.... into their diet to improve mental health.

Conclusion

This honors thesis aims to understand the relationship between nutrition and mental well-being. The approach the author of this thesis took to do this is by answering the following four questions:

1. Are diet and mood intertwined?
2. How does nutrition impact cognition and mental dexterity?
3. How does nutrition impact chronic disease?
4. What is the correlation between nutrition and mental health, and is nutrition being addressed in mental health treatment?

The author of this thesis found journal articles that aided in answering these questions to further understand the relationship between nutrition and mental well-being.

The author of this thesis found that diet and mood are intertwined in many aspects. Individuals can only supply and nourish their bodies to a certain extent, so they need external nutrients such as complex carbohydrates, EFAs (Essential Fatty Acids), amino acids, vitamins, minerals, and water. Nourishing one's body with these external nutrients allows one's nerves and neurotransmitters to be replenished and work to the best of their ability. Each of the six essential nutrients listed above have a key role in relation to one's mood. Carbohydrates provide glucose to the brain, stabilize blood sugar, and support metabolism; these functions are crucial to regulating one's mood because, without them, one would have peaks and troughs in their energy levels. Essential fatty acids cannot be obtained from one's body, so they must be obtained from external nutrients; lack of fatty acids can lead to mood disorders such as depression. Amino acids such as tryptophan are a precursor for serotonin which modulates the central nervous system (CNS) and controls appetite, sleep, memory, learning temperature, regulation, mood, behavior, perception, etc... (Toker et al., 2010). Deficiency in vitamin B can lead to depression (Dunne, 2012). Lack of the mineral iron can lead to anemia, resulting in tiredness, lethargy, and low mood (Dunne, 2012). Lack of the mineral Selenium can result in poor functioning of immune systems, reproduction, and thyroid hormone metabolism; low selenium intake can also make one more anxious, depressed, and tired (Dunne, 2012).

The last component of one's diet that we should make sure to implement is water. "Water makes up more than three-quarters of the brain and ensures that the chemical processes in one's bodies work efficiently. One loses water daily through waste, sweat, and bodily fluids (Dunne, 2012)." If water makes up more than three-quarters of one's brain, it is implied that it is essential

to one's daily functioning. Without water intake, one's nerve cells and neurotransmitters would not be able to work correctly. This would lead to irritability and low mood. Nutrition impacts cognition and mental dexterity as well. The six components just mentioned play a role in cognition and mental dexterity. These nutrients play a role in optimal development and cognitive function. A lack of these nutrients can lead to neurological abnormalities and disorders. For example, the mineral magnesium is responsible for cellular energy metabolism, nerve conduction, membrane stability, and synaptic transmission. Polyphenols are another component of the diet that is important to incorporate. They combat oxidative stress and stimulate the activation of molecules that aid in synaptic plasticity, a process that underlies cognitive function. Polyphenols have a positive effect on BDNF, a gene responsible "for its influence on the maintenance, survival, growth, and differentiation of neurons (Gomez-Pinilla & Nguyen, 2012)."

The author of this thesis found that nutrition impacts chronic diseases such as depression and anxiety in various ways. According to the journal article 'Losing to Gain: The Effects of a Healthy Lifestyle Intervention on the Physical and Psychosocial Well-being of Clients in a Community-based Mental Health Setting,' individuals with persistent mental health illness tends to face poorer physical and psychosocial well-being, higher comorbidity, and increased mortality rates compared to the general population (Mechling & Arms, 2019). People who lack the nutrients mentioned earlier tend to suffer from mental disorders. Supplementation is a great way to get nutrients back into one's diet. A lack of the amino acid tryptophan, which again is the precursor for serotonin, can have negative effects and lead to depression and anxiety. The author of this thesis found that the correlation between mental health and nutrition is bidirectional and many aspects affect the relationship between mental health and nutrition. The author of this thesis had a tough time finding evidence as to whether nutrition was being implemented into

mental health treatment plans. An article was trying to implement healthy lifestyle interventions but had varying results.

The findings of this thesis are very interesting, and the author learned a lot through the process of writing this honors thesis. This honors thesis can be applied to the nutrition and mental health fields in many ways. Although there was a vast amount of evidence supporting the author's first three questions, the author had a very difficult time researching and finding evidence of nutrition's role in treatment plans. It is relevant to know that there is not much implementation of nutrition into mental health plans, specifically incorporating the six key components of a healthy diet. More research should be done on incorporating the six key nutrients in mental health treatment plans; this can lead to positive outcomes of mental health recovery and prevention.

Sources

- Adan, R. A. H., van der Beek, E. M., Buitelaar, J. K., Cryan, J. F., Hebebrand, J., Higgs, S., Schellekens, H., & Dickson, S. L. (2019). Nutritional psychiatry: Towards improving mental health by what you eat. *European Neuropsychopharmacology*, 29(12), 1321–1332. <https://doi.org/10.1016/j.euroneuro.2019.10.011>
- Aucoin, M., LaChance, L., Naidoo, U., Remy, D., Shekdar, T., Sayar, N., Cardozo, V., Rawana, T., Chan, I., & Cooley, K. (2021). Diet and anxiety: A scoping review. *Nutrients*, 13(12), 4418. <https://doi.org/10.3390/nu13124418>
- Dunne, A. (2012). Food and mood: Evidence for diet-related changes in Mental Health. *British Journal of Community Nursing*, 17(Sup11). <https://doi.org/10.12968/bjcn.2012.17.sup11.s20>
- Gomez-Pinilla, F., & Nguyen, T. T. (2012). Natural mood foods: The actions of polyphenols against psychiatric and cognitive disorders. *Nutritional Neuroscience*, 15(3), 127–133. <https://doi.org/10.1179/1476830511y.00000000035>
- Huang, Q., Liu, H., Suzuki, K., Ma, S., & Liu, C. (2019). Linking what we eat to one's mood: A review of diet, dietary antioxidants, and Depression. *Antioxidants*, 8(9), 376. <https://doi.org/10.3390/antiox8090376>
- Keenan, K., Bartlett, T. Q., Nijland, M., Rodriguez, J. S., Nathanielsz, P. W., & Zürcher, N. R. (2013). Poor nutrition during pregnancy and lactation negatively affects neurodevelopment

of the offspring: Evidence from a translational primate model. *The American Journal of Clinical Nutrition*, 98(2), 396–402. <https://doi.org/10.3945/ajcn.112.040352>

Kidd, P. M. (2007). *Omega-3 DHA and EPA for Cognition, Behavior, and Mood: Clinical Findings and Structural-Functional Synergies with Cell Membrane Phospholipids*, 12.

Lemaire, J. B., Wallace, J. E., Dinsmore, K., Lewin, A. M., Ghali, W. A., & Roberts, D. (2010). Physician nutrition and cognition during work hours: Effect of a nutrition based intervention. *BMC Health Services Research*, 10(1). <https://doi.org/10.1186/1472-6963-10-241>

Mechling, B. M., & Arms, T. (2019). Losing to gain: The effects of a healthy lifestyle intervention on the physical and psychosocial well-being of clients in a community-based mental health setting. *Community Mental Health Journal*, 55(4), 608–614. <https://doi.org/10.1007/s10597-019-00371-2>

Mechling, B. M., & Arms, T. (2019). Losing to gain: The effects of a healthy lifestyle intervention on the physical and psychosocial well-being of clients in a community-based mental health setting. *Community Mental Health Journal*, 55(4), 608–614. <https://doi.org/10.1007/s10597-019-00371-2>

Muscaritoli, M. (2021). The impact of nutrients on mental health and well-being: Insights from the literature. *Frontiers in Nutrition*, 8. <https://doi.org/10.3389/fnut.2021.656290>

Polivy, J., & Herman, P. C. (2005). *Mental Health and Eating Behavior's A Bi-Directional Relation*, 96.

Pot, G. K. (2021). Chrono-nutrition – an emerging, modifiable risk factor for chronic disease?

Nutrition Bulletin, 46(2), 114–119. <https://doi.org/10.1111/nbu.12498>

Sathyanarayana Rao, T. S., Asha, M. R., Ramesh, B. N., & Jagannatha Rao, K. S. (2008).

Understanding nutrition, depression and mental illnesses. *Indian Journal of Psychiatry*, 50(2), 77. <https://doi.org/10.4103/0019-5545.42391>

Toker, L., Amar, S., Bersudsky, Y., Benjamin, J., Klein, E., & Agam, G. (2010). *The Biology of Tryptophan Depletion and Mood Disorders*, 47.

Wade, A. T., Davis, C. R., Dyer, K. A., Hodgson, J. M., Woodman, R. J., Keage, H. A., & Murphy, K. J. (2019). A Mediterranean diet with fresh, Lean pork improves processing speed and mood: Cognitive findings from the MEDPORK randomised controlled trial. *Nutrients*, 11(7), 1521. <https://doi.org/10.3390/nu11071521>