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The Association Between College Age Students' Nutrition Intake and Depression

HNR 499: Senior Project

Grand Valley State University

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INTRODUCTION

College-age students undergo copious amounts of stress as they adjust to changing schedules and challenging coursework. In fact, a 2022 study done on college students and mental health revealed that 60% of college students suffer from major depression, anxiety or both.¹ This alarmingly large population of students is a 50% increase from the 2013 dataset.¹ Another issue is that of the student population struggling, 75% are reluctant to reach out for help.² Many studies have explored how nutrient intake can reduce or prevent depression.³ Diet and exercise can play a large role in an individual's mental state.

Vitamin D

Vitamin D is a key player in nutritional studies related to depression. Although vitamin D levels tend to be low in those who have depression, this micronutrient does not cause depression.⁴ Vitamin D deficiencies are common in populations that live further from the equator due to sunlight exposure, but vitamin D can also be found in one's diet. Vitamin D is in fish, fortified milk and orange juice, eggs, and many other plant based foods.⁵ In one study it was found that women who ate fish more often experienced a lower risk to depression.³ This may be due to the levels of vitamin D found in fish.

Vitamin B12

Another important nutrient associated with depression is vitamin B12. Vitamin B12 is responsible for making DNA and also contributes to the health of blood and nerve cells.⁶ A healthy amount of B12 in the body prevents megaloblastic anemia as well.⁶ It is found that B12 deficiencies are very common among those that are depressed.⁷ Again, this does not mean that a cobalamin deficiency causes depression, but perhaps supplementation can

help treat mood disorders.⁷ Vitamin B12 is typically found in animal foods as it binds to proteins from the food consumed.⁸

Fatty Acids

Fatty acid consumption is another key player in helping treat depression. Healthy fats, such as omega 3s, are linked to a decrease in depression while unhealthy fats are linked to worse depressive symptoms.³ A study done in Finland examined the effects of eating a nutrient dense, whole foods diet to eating a “western” diet consisting of fried foods.³ It was found that those who ate closer to the dietary guidelines suggested (nutrient dense foods) experienced a 25% reduced risk for depression.³ The group that ate more saturated fats and fried foods experienced an increase in depressive symptoms by 41%.³

Unsaturated fats can also help lower blood cholesterol, decrease inflammation, and stabilize heart rhythms.⁹ Monounsaturated fats are found in olive oil, avocados, almonds, pumpkin and sesame seeds.⁹ Polyunsaturated fats are found in corn and sunflower oils, walnuts and fish.⁹ Omega-3 unsaturated fats are especially important for consumption as the body does not make these.⁹

Fiber

Fiber, found in plant based foods, is also associated with lowering the risk of depression. Fiber is an indigestible carbohydrate, with many fibrous foods also acting as prebiotics.^{10,11} A high intake of dietary fiber is linked to lowering inflammation, which may be the link to depression.¹² Diets high in fruits, vegetables, and fiber have also shown a reduction in depression among women.³ Fiber is also a nutrient most Americans lack.¹⁰ The recommended daily fiber intake is 25-35g, while most Americans average 15g

a day.¹⁰ The disparity in fiber intake may be contributing to the occurrence of depression in the United States and can also contribute to other health problems.

Physical Activity

In addition to dietary factors, physical activity also alters brain activity to cope with depression. Exercising releases endogenous cannabinoids, dopamine, and other hormones that enhance mental states.¹³ This release of neurotransmitters are known to be responsible for the runner's high.¹⁴ In fact, exercise for some can be just as effective as antidepressants.¹⁴ Creating an exercise routine may help college age students fight off stress and negative thoughts by spending time focusing on movement.

RESEARCH QUESTIONS AND STUDY PURPOSE

Do young adults struggling with depression also have low levels of vitamin D/B12, low fiber intake, and lower occurrence of exercise than those individuals who do not indicate any history of depression?

Are young adults who consume a diet rich in saturated fats at a higher risk for developing depressive symptoms when compared with those who consume a lower amount of saturated fats and a higher amount of unsaturated fats?

This study will use the National Health and Nutrition Examination Survey (NHANES) data to determine if young adults who suffer with depression also experience low vitamin D and vitamin B12 levels along with reduced fiber intake while considering other factors such as fat consumption and physical activity levels. These factors will also be compared to those who do not experience depression. My hypothesis is that those with depression also experience lower vitamin, fiber and exercise levels with an increased consumption of unhealthy fats compared to

those without depression. This data will be analyzed and interpreted to give nutritional suggestions for young adults suffering from depression.

METHODS

This study was designed using quantitative data for a retrospective analysis of publicly available datasets from NHANES 2017-2020 pre-pandemic research. All included participants were between the ages of 18 to 27. All races, ethnicities, genders, and other socioeconomic factors were included in this database. All research data was obtained directly from NHANES meaning no participants needed to be contacted and thus did not require consent for this data collection. No personal identifying information was used and data was downloaded to password protected computers to retain confidentiality. GVSU Human Subjects Institutional Review Board reviewed the study and determined that this was not human subjects research.

Data Analysis

The software used was IBM's SPSS version 27 for data analysis. Descriptive statistics were performed to find the minimum, maximum, mean, and standard deviation along with Pearson correlations to determine any significant relationship for the dietary and lifestyle variables used with depression. The descriptive statistics listed in (**Table 1 and Table 2**) are from NHANES years 2017-2020 pre-pandemic data. The table includes each variable and the values used for the correlation tests.

RESULTS

The study compared the variables from (**Table 2**) against the DPR score. Each variable studied used a Pearson correlation to assess the relationship between depression and the other variables listed. There is significant correlation related to some dietary factors and depression. Participants who had higher intake of all unsaturated fats and fiber had a lower DPR score. As

the depression score decreased, the intake of these nutrients increased. Fiber was seen to have the strongest negative Pearson's correlation with depression.

Table 1. Descriptive Statistics: Gender and Race

Participant description	Total Number
Age 18-27 years	1537
Males	764 (49.7%)
Females	773 (50.3%)
Hispanic Americans	240 (15.6%)
Other Hispanic	182 (11.8%)
Non-Hispanic White	451 (29.3%)
Non-Hispanic Black	384 (25.0%)
Other race & Multi-Racial	280 (18.2%)

Table 2. Descriptive Statistics: Dietary & Lifestyle factors

Variable surveyed	Number of participants	Minimum value	Maximum value	Mean value	Standard deviation
DPR Score (depression screening)	963	1.00	29.00	5.2212	4.85634
Total intake of *SFAs (gm)	1288	0.07	195.85	29.4063	18.93097
Total intake of **MUFAs (gm)	1288	0.05	200.10	30.0535	19.27124
Total intake of ***PUFAs (gm)	1288	0.03	200.70	15.42486	15.42499
Vitamin D (D2+D3) (mcg)	1288	0.00	54.40	4.0890	5.42486
Days moderate activity	718	1	99	3.49	3.978

Dietary Fiber (gm)	1288	0.00	107.80	14.9182	10.41371
Age	1537	18	27	22	2.974
Vitamin B12 (mcg)	12392	0.00	248.71	4.3604	5.40222

* SFAs stands for saturated fatty acids

** MUFAs stands for monounsaturated fatty acids

***PUFAs stands for polyunsaturated fatty acids

Table 3. Correlations with DPR Screening Score

Variable	Pearson's R Value	Approximate Significance (p-value)
Total saturated fatty acids (gm)	-0.033	0.321
Total monounsaturated fatty acids (gm)	-0.070	0.035
Total polyunsaturated fatty acids (gm)	-0.068	0.039
Days moderate activity	0.091	0.051
Dietary fiber (gm)	-0.112	<0.001
Vitamin B12 (mcg)	-0.024	0.476
Vitamin D (D2+D3) (mcg)	-0.057	0.087

DISCUSSION

The DPR survey assesses depression and severity of illness. A value of 5 is considered mild depression, 10 is considered moderate or higher depression, and anything above 10 is considered severe depression. From the sample surveyed and used in data analysis, the DPR scores ranged from 1 to 29. The average value of the participants was 5.2212, indicating mild cases of depression on average. As mentioned previously, the DPR score was compared with the other variables to assess correlation.

Negative Correlation Variables

The variables with a significant negative correlation to the depression screening are all unsaturated fats and fiber. These variables showed that as the DPR score increased, the intake of these nutrients decreased. Those whose diets consisted of more fruits and vegetables, and higher amounts of healthy fats are less likely to experience depression on average than those who lack these nutritional qualities. Fiber had the most significant correlation with a P-value of <0.001 . This shows a strong relationship between depression and fiber intake.

No Correlation Variables

The following variables had no significant correlation: saturated fatty acid consumption, days of moderate activity, vitamin D, and vitamin B12 intake with depression. This means there was no relationship between the depression score and the frequency of the variables. These factors listed above have less influence in managing depression for 18-27 year olds when compared to fiber and unsaturated fats.

The findings of this study parallels the literature review for fiber and unsaturated fats intake and their correlation to depression. However, the study did not show a relationship between depression and vitamin D, vitamin B12, and saturated fatty acid intake, along with physical activity levels. Saturated fatty acid consumption was expected to have a positive correlation with depression based on previous research findings. The vitamin levels, along with physical activity were expected to have a negative correlation with depression. These factors in the study instead had no relationship whatsoever to young adults who experience depression.

CONCLUSION

The hypothesis stated that those who experienced higher levels of depression would also have less fiber, vitamin D, physical activity, vitamin B12, and unsaturated fatty acids in their

lifestyle. Additionally, those who have higher DPR scores would also have higher saturated fatty acid intake. However, from the research conducted it was found that only fiber, and unsaturated fatty acid consumption affected the depression screening scores. As the depression score increased, these nutrients decreased which means that those who consumed more whole foods (fruits, vegetables, healthy fats) had a lesser risk for severe depression. A link with depression was not found in the levels of vitamin B12, vitamin D, fatty acids, and physical activity for those ages 18-27 during the study period. These factors did not have any significant correlation and may not be key determinants of depression for this age demographic. Despite this data, these factors have been proven to affect the emotional wellbeing of participants in other studies.

Consuming more nutrient rich foods has many benefits, but more importantly this can reduce the occurrence of depression in young adults. College age students can increase their nutritional quality to protect against mental illness. This will overall improve the quality of life these students experience and will encourage their success. If these variables such as fiber and unsaturated fats are increased in the diet of college students, then they are less likely to experience symptoms of extreme depression.

Overall, this study was designed to help understand the nutritional quality of those who are in college and are struggling with depression to give insight as to how to manage college life efficiently. Further research should be developed to solve accessibility and cost issues for college age students to receive nutrient dense foods, along with other factors outside of nutrient intake/lifestyle that may affect their overall mental wellbeing. Additionally, research done specifically on each gender can provide more specific recommendations to this age group to improve overall health and emotional wellbeing.

References

1. *Depression in college students*: New Statistics and Research. Newport Institute.
<https://www.newportinstitute.com/resources/mental-health/depression-on-college-campus-es/>. Published January 10, 2023. Accessed April 19, 2023.
2. Reese Druckenmiller R. *College students and Depression*. Mayo Clinic Health System.
<https://www.mayoclinichealthsystem.org/hometown-health/speaking-of-health/college-students-and-depression>. Published December 7, 2022. Accessed April 19, 2023.
3. Ljungberg T, Bondza E, Lethin C. *Evidence of the importance of dietary habits regarding depressive symptoms and depression*. International journal of environmental research and public health. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7084175/>. Published March 2, 2020. Accessed April 19, 2023.
4. *Does Vitamin D Boost Mental Health?* WebMD.
<https://www.webmd.com/vitamins-and-supplements/what-to-know-about-vitamin-d-and-mental-health>. Accessed April 19, 2023.
5. *Vitamin D*. The Nutrition Source.
<https://www.hsph.harvard.edu/nutritionsource/vitamin-d/>. Published March 7, 2023. Accessed April 19, 2023.
6. *Office of Dietary Supplements - Vitamin B12*. NIH Office of Dietary Supplements.
<https://ods.od.nih.gov/factsheets/VitaminB12-Consumer/#:~:text=Vitamin%20B12%20is>

- %20a%20nutrient,makes%20people%20tired%20and%20weak. Accessed April 19, 2023.
7. Syed EU, Wasay M, Awan S. *Vitamin B12 Supplementation in Treating Major Depressive Disorder: A Randomized Controlled Trial*. The open neurology journal. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3856388/>. Published November 15, 2013. Accessed April 19, 2023.
 8. *Vitamin B12*. The Nutrition Source. Harvard T.H. Chan School of Public Health. <https://www.hsph.harvard.edu/nutritionsource/vitamin-b12/#:~:text=Vitamin%20B12%20C%20or%20cobalamin%2C%20is,in%20the%20foods%20we%20eat>. Published March 7, 2023. Accessed April 19, 2023.
 9. *Types of Fat*. The Nutrition Source. Harvard T.H. Chan School of Public Health. <https://www.hsph.harvard.edu/nutritionsource/what-should-you-eat/fats-and-cholesterol/types-of-fat/#:~:text=Unsaturated%20fats%2C%20which%20are%20liquid,number%20of%20other%20beneficial%20roles>. Published July 24, 2018. Accessed April 19, 2023.
 10. *Fiber*. The Nutrition Source. Harvard T.H. Chan School of Public Health. <https://www.hsph.harvard.edu/nutritionsource/carbohydrates/fiber/>. Published February 2, 2023. Accessed April 19, 2023.
 11. Slavin J. *Fiber and Prebiotics: Mechanisms and Health Benefits*. Nutrients. <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3705355/#:~:text=The%20DGAC%20notes%20that%20although,provide%20prebiotics%20to%20the%20diet>. Published April 22, 2013. Accessed April 19, 2023.
 12. Swann OG, Kilpatrick M, Breslin M, Oddy WH. *Dietary Fiber and Its Associations with Depression and Inflammation*. Nutrition reviews.

<https://pubmed.ncbi.nlm.nih.gov/31750916/>. Published May 2020. Accessed April 19, 2023.

13. *Depression and Anxiety: Exercise Eases Symptoms*. Mayo Clinic.

<https://www.mayoclinic.org/diseases-conditions/depression/in-depth/depression-and-exercise/art-20046495#:~:text=Regular%20exercise%20may%20help%20ease,your%20sense%20of%20well%2Dbeing>. Published September 27, 2017. Accessed April 19, 2023.

14. *Exercise is an All-Natural Treatment to Fight Depression*. Harvard Health.

<https://www.health.harvard.edu/mind-and-mood/exercise-is-an-all-natural-treatment-to-fight-depression>. Published February 2, 2021. Accessed April 19, 2023.