

Introduction

Postpartum depression is defined as depression occurring after child birth, and up to a year. A systematic review of postpartum and antepartum depression studies showed that 21% of pregnant women reported being depressed either during or after pregnancy². Women who have the potential to become pregnant are also highly susceptible to malnutrition, especially malnutrition of nutrients theorized with depression/anxiety⁵. One research article reveals the effect that PPD has shown on the quality of life for women diagnosed: there were lower levels of functioning in household care, increased risk for becoming homeless, and the increased risk of low-birth-weight in the infant³. Over the previous decades, the link between the central nervous system and diet has been a large focus in scientific nutrition research on the brain as well. If evidence exists that there is an association between PPD and micronutrient deficiencies, depressed individuals could become less reliant on antidepressant medications, and more reliant on Medical Nutrition Therapy with Whole Foods.



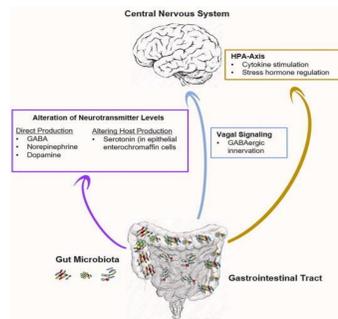
Woman With PPD, Citation: <https://womensmentalhealth.org/posts/childbirth-related-ptsd/>

Methodology

My thesis is about the association between nutrient deficiencies and postpartum depression. For results, research articles were searched in a database using specific keywords. Terms included in looking for resources were nutrition-related terms, paired with the phrases “Postpartum depression”, “mental health during pregnancy”, and “maternal depression”. In order to find enough outcomes on this new and specific topic, my inclusion criteria were more vague than preferred. That is why there were broader keywords not necessarily related to postpartum depression, but relevant to show evidence that there is a connection between nutrition and the brain; These key phrases included “Gut-microbiome theory”, “general depression”, and “nutrient deficiencies and mental health”.

Brain and Diet (Gut Microbiome Study)

There were several experiments that explored theories of the connection between the health of the gastrointestinal(GI) tract and the brain⁷. One experimental study intervened on a population of germ-free mice (mice with a completely clean gut) to generalize human connections to mammals. Germ-free mice were given an MRI to measure brain activity and dopamine release. As changes were made to the gut microbiomes, there was an effect on neurotransmission of the dopaminergic, noradrenergic/adrenergic, glutamatergic, and GABAergic nerves. There was also stimulation of dopamine-releasing nerves with the reward of food after satiation. These two observations show that there was an interaction between the gut and the brain, and they could have the possibility of influencing each other in humans⁷. This experimental research is the first piece of evidence in regards to how gut health, which is managed by nutrition, can stimulate receptors in the brain.



Neurotransmitters that interact with the gut microbiome.

Citation: <https://www.sciencedirect.com/science/article/abs/pii/S0006899318301501>

Diet-Quality Studies

There were six research articles in this review that examined mental health during the postpartum period and diet quality using the USDA’s Healthy Eating Index 2010 (HEI-2010) metric tool 1,4,9,10,11,12. Guidelines on Healthy Eating Index 2010 (HEI-2010) included intake of food groups like total fruit, whole fruit, total vegetables, greens and beans, whole grains, dairy, total foods with protein, seafood and plant proteins, fatty acids, refined grains, sodium, and empty calories. This tool evaluated the participant’s types of foods they consumed and ranked the nutritional quality of their diet pattern on a scale of “1-100” with “100” being the most nutritious. One of the most recent studies, in 2020, examined the link between perinatal depression and defined postpartum depression in participants if they met these two criteria: they scored a score of 10 or higher on the patient health questionnaire or they were on antidepressants between the time of their last menstrual cycle and their food frequency questionnaire¹¹. Eighty-six percent of the recruited participants were eligible to be considered for postpartum depression. The study involved women adhering to a healthier diet during their entire pregnancy period and after, showed the overall mean score of pregnant women taking the HEI in this RCT was 74.6 out of 100 which was above average. It did not see a decrease in postpartum depression symptoms with a better diet, however, there was a decrease in atypical depression symptoms (depression symptoms that can go away in response to other positive actions)¹¹. This conclusion of anxiety having non-significant outcomes with overall diet quality does not disprove the connection of food with the brain, but could deter them into specifying their outlook by evaluating certain nutrient deficiencies.

| Components | Maximum Scores | Standard for Maximum Scores ³ | Standard for Minimum of Zero |
|---|----------------|--|------------------------------|
| Adequacy | | | |
| Total Fruits ⁴ | 5 | ≥0.8 cup | No Fruits |
| Whole Fruits ⁵ | 5 | ≥0.4 cup | No Whole Fruits |
| Total Vegetables ⁶ | 5 | ≥1.1 cup | No Vegetables |
| Greens & Beans ⁶ | 5 | ≥0.2 cup | No Greens and Beans |
| Whole Grains | 10 | ≥1.5 oz | No Whole Grains |
| Dairy ⁷ | 10 | ≥1.3 cup | No Dairy |
| Total Protein Foods ^{6,8} | 5 | ≥2.5 oz | No Protein Foods |
| Seafood & Plant Proteins ^{6,8} | 5 | ≥0.8 cup | No Seafood & Plant Proteins |
| Fatty Acids ⁹ | 10 | (PUFAs + MUFA)/SFA ≥ 2.5 | (PUFAs + MUFA)/SFA ≤ 1.2 |
| Moderation | | | |
| Refined Grains | 10 | ≤1.8 oz | ≥4.3 oz |
| Sodium | 10 | ≤1.1 g | ≥2.0 g |
| Added Sugars | 10 | ≤6.5% of energy | ≥26% of energy |
| Saturated Fats | 10 | ≤8% of energy | ≥16% of energy |

¹ Scoring standards are expressed as cup and ounce equivalents from the MyPyramid Equivalents Database (MPED), whereby 1 oz = 28.3 g and 1 cup = 225 mL. ² Intakes between the minimum and maximum standards are scored proportionately. ³ All standards represent amounts per 1000 kcal, except for Fatty Acids, Added Sugars and Saturated Fats. ⁴ Includes 100% fruit juice. ⁵ Includes all forms except juice. ⁶ Includes legumes (beans and peas).

This is how the scoring system work for the USDA’s Healthy Eating Index.
Citation: <https://www.fns.usda.gov/healthy-eating-index-hei>

Specific Nutrient Deficiency Studies

Dietary reference intakes of certain vitamins are higher for pregnant or nursing women because they are used a lot in physiological processes for nourishing the baby^{1,4,5}. These women are at a greater risk for nutrient deficiencies which are vitamins A, D, E, C, folate, B12, B6, iron, zinc, iodine, copper, and selenium for optimum health of the mother and the fetus⁵. Even though the research indicated that vitamin A (specifically retinoic acid) is vital in function of the nervous system, there were not any articles in this review that did a focus on vitamin A associations with mental disorders. However, zinc was widely seen in studies and had a positive correlation with improvement of depression in all of the studies it was featured in^{1,4,13}. Only one study found a depressive symptom benefit for pregnant women taking vitamin E supplements⁴. Folate and other B-vitamins are linked to brain function because they are also producers of certain neurotransmitters while also preventing neural tube defects⁵. The outcomes of nutrient-specific studies were sometimes inconsistent but had a few positive correlations with depression. This was enough to suggest further studies and identify any possible extraneous variables causing inconsistency.



EATING SAFELY DURING PREGNANCY

ENJOY:

- VEGETABLES:** Carrots, Cooked greens, Potatoes, Spinach, Sweet potatoes, Red sweet potatoes, Beans, Vitamin A & Potassium
- FRUITS:** Apricots, Bananas, Citrus, Grapefruit, Grapefruit, Honeydew, Mangoes, Grapes, Pears, Tomatoes, Beans, Potassium
- DAIRY:** Skim or 1% milk, Yogurt, or low-fat yogurt, Ready-to-eat cereal, Cooked cereal
- GRAINS:** Beans and peas, Lentils and chickpeas, Nuts and seeds, Peanut butter, Salmon, trout, Herring, Sardines and codfish, Biscuits, Amine Acid
- PROTEINS:** Beans and peas, Lentils and chickpeas, Nuts and seeds, Peanut butter, Salmon, trout, Herring, Sardines and codfish, Biscuits, Amine Acid

AVOID: Hot dogs/furcheon mass/bologna/other deli meats (unless reheated), Raw fish, Soft cheeses that are unassured, Risky bacteria

Certain food groups and nutrients recommended during pregnancy.
Citation: <https://www.hopkinsmedicine.org/health/wellness-and-prevention/nutrition-during-pregnancy>

Polyunsaturated Fatty-Acid Studies

The studies of PUFAs and depression itself have such a large amount of information in research already, it has its own category for outcomes. There is a Reason why so much focus is placed in research on this one type of fat: PUFAs are responsible for signaling neurotransmitters that send signals to the brain and power functions¹. Involving fish intake and PUFA supplements, one study analyzed a fifty percent efficacy rate, two out of four studies showed change in symptoms of depression^{1,4}. There is highly-logical reasoning behind the theory of vitamin D’s connection to depressive symptoms. There has not been research to disprove the connection in the articles as well.

Conclusion

This new line of research for how nutrition relates to depression is expanding the field for RDNs and will assist in their ability to work interprofessionally and help a larger array of people. The first piece of information to conclude from this review is that the experiment with germ-free animals does show evidence to support that there is connection with having a healthy GI tract and stimulation of neurotransmitters with the brain. Studies did not see a decrease in postpartum depression symptoms with a better quality diet, however, there was a decrease in atypical depression symptoms (depression symptoms that can go away in response to other positive actions)¹¹. Certain Nutrient deficiencies showed positive correlation but were inconsistent. Two studies also showed a positive correlation between PUFAs (Poly-unsaturated fatty acids) and a decrease in severity of symptoms^{1,4}. Even though these articles provided a thorough overview of nutrients in researchers’ findings that connect to the brain, there is a need for more evidence, and further studies should be made on this topic of female nutrition and PPD rather than general depression.

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