Introduction
Postpartum depression (PPD) is prevalent across the world, but a direct cause has not been identified. There has been a focus on research for treatment of PPD rather than on risk factors and prevention. PPD is defined as depression occurring after childbirth and may occur at any point postpartum, with symptoms appearing within the first 2 years. Postpartum depression is a symptom of the Antenatal and postnatal depression spectrum, which was compared to the Hald-10. More studies were extracted and compared to the data obtained from studies that were published recently in the last five years and were considered to be on postpartum depression, because diagnostic tools are not standardized across different care. According to the Office on Women’s Health, postpartum depression is possible for anyone including women who are pregnant, had a miscarriage, had an abortion, or fetus being deprived of oxygen either during or after pregnancy. There is a statistically significant amount of pregnant women becoming depressed, however, there has not been enough evidence to suggest that there is any correlation. If medication is given to a pregnant woman, it may be a. A systematic review of postpartum and antenatal depression studies observed that there was no significant association being depressed either during or after pregnancy.2

Diet-Quality Studies
There were six research articles in this review that examined mental health during the antenatal and postpartum period and diet-quality and diet-quality studies were compared to the Hald-10. More studies were extracted and compared to the data obtained from studies that were published recently in the last five years and were considered to be on postpartum depression, because diagnostic tools are not standardized across different care. According to the Office on Women’s Health, postpartum depression is possible for anyone including women who are pregnant, had a miscarriage, had an abortion, or fetus being deprived of oxygen either during or after pregnancy. There is a statistically significant amount of pregnant women becoming depressed, however, there has not been enough evidence to suggest that there is any correlation. If medication is given to a pregnant woman, it may be a. A systematic review of postpartum and antenatal depression studies observed that there was no significant association being depressed either during or after pregnancy.2

Methodology
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”. There were also keywords not necessarily related to postpartum depression, but were shown to be relevant on evaluating nutrition-related terms. These key phrases included “Gut-microbiome theory” and “nutrient deficiencies because diagnostic tools are not standardized across different care. According to the Office on Women’s Health, postpartum depression is possible for anyone including women who are pregnant, had a miscarriage, had an abortion, or fetus being deprived of oxygen either during or after pregnancy. There is a statistically significant amount of pregnant women becoming depressed, however, there has not been enough evidence to suggest that there is any correlation. If medication is given to a pregnant woman, it may be a. A systematic review of postpartum and antenatal depression studies observed that there was no significant association being depressed either during or after pregnancy.2

Specific Nutrient Deficiencies
When studying postpartum depression, it is necessary to understand the mechanisms behind the nutrients and the ones that are linked to maternal health. Dietary reference intakes of certain vitamins are higher for pregnant women compared to non-pregnant women.3-5 Excess intake of nutrients can affect the brain processes for nourishing the baby.6-8 As stated previously, women are at a higher risk for nutrient deficiencies which are vitamins A, D, E, D, folate, B1, B6, iron, zinc, iodine, copper, and selenium for optimum health of the mother and the fetus.9-10 Vitamin A as a nutrient that participates in development of the embryo and cell differentiation. Vitamin A also contains retinoic acid which is present in several tissues in the body including the nervous system, heart, eyes, skeleton, respiratory system, ears, and the pancreas. It can be a factor behind changes to the organ structure because it is highly teratogenic.11 Even though the research indicated that pregnant women are not at a higher risk for deficiencies in the nervous system, there were no articles in this review that did a focus on Vitamin A association with mental disorders. Zinc also contributes to development of the baby, but in placental size, weight, and protein differentiation.12 Zinc also had a positive correlation for reducing the symptoms of depression in all of the studies that was featured in it.11,13 Vitamin D is needed for physiological functions during pregnancy. Vitamin D is essentially used for vascular endothelial growth factor that is required for the development of the placenta. One study found that vitamin D can improve mood for people with seasonal affective disorder.14 Another literature review identified a statistically significant difference in the people protected from depressive symptoms when the vitamin intake was consistent around most studies. A meta-analysis reported a medium to high risk of bias. On the other hand, a factor not taken into account in the vitamin D report was that their exposure was not considered even though a large amount of absorption accounts from that. Another vitamin required at the beginning of pregnancy is vitamin B12. Vitamin B12 is involved in the formation of DNA nucleotides for cell division, and embryo development before sex cells implant. Folate and other B-vitamins are linked to brain development and the baby but, only one study identified a small association with improved outcomes of maternal depression. There was not an association with diet-quality and perinatal anxiety, because studies that were published recently that were actually involved in the studies, so there was not enough evidence to state that this is the main cause of postpartum depression. This was because there were not enough data on this study to test every specific nutrient to determine evidence because only one or no studies discovered that observed that nutrient deficiencies and postpartum depression. Rather for the nutrient outcomes could be derived from an extraneous variable. There is still a lot of potential for this research because there are still unknown theories and findings about neurological connections to nutrients. With evidence from the gut-microbiome theory and the postpartum depression, there is a potential to find a link between nutrient deficiencies and postpartum depression. There needs to be more research for this topic to find more evidence. Even though these articles provide a thorough overview of researchers’ findings that connect to the brain, there is a need for more evidence studies and should be further studies made on this topic due to so much uncertainty still.

Conclusion and Implications
This new line of research for how nutrition relates to depression is expanding the field for RDNs to educate themselves and their clients on mental health disorders, like postpartum depression, can be effectively regulated and treated but there are not always certain causes or cures.15 If researchers find enough evidence with the nutrition-link to the brain, which leads to depression, this could allow professionals to treat postpartum depression and other mental illnesses. The first piece of evidence to conclude from this review is that the experiment with germ-free animals does not completely represent humans but has a parallel relation between maternal depression and other mental conditions. Any evidence from studies in this review that had shown that dietary intervention had a positive correlation for reducing depression had a poor diet quality-compared to the ones that did not meet the criteria for postpartum depression. There was not an association with diet-quality and perinatal anxiety, because studies that were published recently that were actually involved in the studies, so there was not enough evidence to state that this is the main cause of postpartum depression. This was because there were not enough data on this study to test every specific nutrient to determine evidence because only one or no studies discovered that observed that nutrient deficiencies and postpartum depression. Rather for the nutrient outcomes could be derived from an extraneous variable. There is still a lot of potential for this research because there are still unknown theories and findings about neurological connections to nutrients. With evidence from the gut-microbiome theory and the postpartum depression, there is a potential to find a link between nutrient deficiencies and postpartum depression. There needs to be more research for this topic to find more evidence. Even though these articles provide a thorough overview of researchers’ findings that connect to the brain, there is a need for more evidence studies and should be further studies made on this topic due to so much uncertainty still.

Works Cited

Brain and Diet (Gut Microbiome Studies)
There were several experiments which explored theories of the connection between health of the gastrointestinal(GI) tract and the brain. One experiment was on the gut-brain axis (microbiome-gut-brain axis) with a completely clean gut) to human connections to mammals. Germ-free mice were given an MR to measure brain activity and dopamine neurotransmission, which are associated with the development of the brain. One experiment observed the effects of probiotics on the brain. They found that specific probiotics had an effect on neurotransmission of the dopaminergic, noradrenergic, and serotonergic pathways in the brain. This allowed researchers to ask the question whether postpartum depression is directly correlated to nutrition. Neurotransmitters and the gut microbiome can affect each other.7 This experimental research is the first piece of evidence regarding how gut-health, which is managed by nutrition, can stimulate receptors in the brain. This allows researchers to ask the question whether postpartum depression is directly correlated to nutrition. 

How are Micronutrient Deficiencies Associated with Outcomes of Postpartum Anxiety and Depression in Women?
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