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Vegan Diet - Adverse Pregnancy Outcomes

By

Satenik Melkonyan

Introduction

Globally, plant-based diets are continuing to increase with knowledge that such diets may prevent coronary heart disease, cancer, and diabetes. In the United States, vegan diets have seen recent growth with the vegan population growing past 1.6 million. In simple terms, vegans refrain from consuming any animal products such as meat, eggs, dairy products, as well as other animal-derived substances [1]. Vegan diet has several known risks, as it exposes its participants to various nutritional deficiencies such as proteins, iron, vitamin D, calcium, iodine, omega-3, and vitamin B12 [2]. These nutrients are typically found in a balanced diet that includes red meat, fish, poultry, dairy products, nuts, and vegetables. A well-balanced diet is especially important in promoting healthy pregnancy and healthy fetal growth and development.

There is an abundance of research regarding vegan diets and their effect on pregnancy and fetal growth and development. Unfortunately, some studies reached differing conclusions on the effect of a vegan diet during pregnancy. Majority of these studies concluded that a strict vegan diet is harmful during pregnancy. However, there are contradictory studies on this subject. One contradictory study concluded that the evidence around vegan-vegetarian diets in pregnancy is controversial and limited, as such the study determined that vegan-vegetarian diets may be considered safe in pregnancy [3].

With contradictory studies, there is an elevated risk of inadvertently following an incorrect study. It is therefore critical to understand the impact a strict vegan diet has on pregnancy and fetal development, as well as determine optimal treatment options to prevent pregnancy complications and potential birth defects.

Methods

Various independent studies were analyzed to reach conclusions about the effects of a strict vegan diet on pregnant participants. A best practices review searching for peer-reviewed articles in English was conducted using the electronic databases: PubMed, Google Scholar and Iceberg. Searches were performed using keywords “vegan diet”, “plan based diet” in combination with “pregnancy.” Titles of studies were evaluated by looking for keyword combination. Relevant studies were compiled for further analysis and results were summarized.

Discussion and Results

Selected research studies were examined to assess the effects of specific nutrients and the effect on the human body, specifically during pregnancy. Vitamin B12 is critical for division and differentiation of normal cells, and essential for the development and myelination of the central nervous system. Several studies such as “*Discussion: effects of folate and vitamin B12 deficiencies during pregnancy on fetal, infant, and child development*”, “*Effects of folate and vitamin B12 deficiencies during pregnancy on fetal, infant and child development*” and “*Vitamin B-12 and neural tube defects: the Canadian experience*” concluded that inadequate vitamin B12 intake during pregnancy was linked to some adverse health outcomes, including recurrent fetal losses, preeclampsia, intrauterine growth retardation, preterm delivery, and low birth weight [4,5,6]. In addition, a number of studies concluded that vitamin B12 deficiency may increase the risk of birth defects such as neural tube defect and anencephaly [7,8,9]. Moreover, two studies “*Severe vitamin B12 deficiency in infants breastfed by vegans*” and “*Severe vitamin B12 deficiency in an infant associated with a maternal deficiency and a strict vegetarian diet*” concluded that vitamin B12 deficiency led to a severe megaloblastic anemia, neurologic damage

and delayed development of an infant and hypospadias due to a strict vegan diet by the mother during maternity [10,11]. In addition, a study focusing on iodine intake determined that there is an increased risk of poor perinatal outcome including preeclampsia, placental abruption, spontaneous abortion, preterm birth, and low birth weight [12]. This is because during pregnancy and lactation, iodine requirements increase, making the mother and the developing fetus vulnerable to nutritional defects. The most detrimental effect of maternal iodine deficiency is the development of fetal brain. Furthermore, another study around pregnant woman with iron deficiencies revealed poor pregnancy outcomes and other birth complications including intrauterine growth retardation, premature labor, low birth weight, birth asphyxia and neonatal anemia [13,14].

What complicates this matter are various contradictory studies on this specific subject. For example, as recent as 2016, two prominent organizations, the Academy of Nutrition and Dietetics [AND] and the German Nutrition Society [GNS] each issued statements concerning vegan diets. According to the AND, well-planned vegan, lacto-vegetarian, and lacto-ovo-vegetarian [LOV] diets are appropriate for all stages of the life cycle, including pregnancy and lactation [15]. On the other hand, the GNS stated that “With a pure plant-based diet, it is difficult or impossible to attain an adequate supply of some nutrients. The most critical nutrient is vitamin B12... The DGE does not recommend a vegan diet for pregnant women, lactating women, infants, children or adolescents” [16].

Most recently, a comprehensive review study was conducted in 2019 called “*The Effects of Vegetarian and Vegan Diet during Pregnancy on the Health of Mothers and Offspring*”, which compiled several observational studies in humans, with a focus on maternal diets enriched in plant-derived foods and possible unfavorable outcomes related to nutrient deficiencies and

their impact on fetal development. The study concluded that a strict-plant based diet leads to various nutritional deficiencies such as proteins, iron, vitamin D, calcium, iodine, omega-3, and vitamin B12 [17]. As a strict-plant based diet leads to nutritional deficiencies that are essential in fetal development, it is critical to properly plan and supplement required nutrients through vitamin intake to avoid maternal undernutrition and consequent impaired fetal growth [17].

Below is a table illustrating current nutritional recommendations for pregnant woman following a strict vegan diet.

Nutrient	Nutritional Value Considerations	Pregnant women - Vegan Diet
Vitamin D	Serum 25-OH vitamin D levels should be above 75 nmol/L [30ng/ML]	2000 IU for 5 months or 4000 IU for 2.5 months
Vitamin B12	Serum total should be considered optimal above 360 pmol/L	1. Serum B12 < 75 -- 1000 µg/day for 4 months pmol/L 2. Serum B12 between 75 and 150-- 1000 µg/day for 3 months 150 pmol/L 3. Serum B12 between 150 and 220 -- 1000 µg/day for 2 months 220 pmol/L 4. Serum B12 between 220 and 300-- 1000 µg/day for 1 month 300 pmol/L

Nutrient	Nutritional Value Considerations	Pregnant women - Vegan Diet
Calcium	Range of 8.5 and 10.5 mg/dL [2.12 to 2.62 mmol/L]	1200 to 1500 mg per day
Iron	Hemoglobin levels drop below: 1. 110g/l 1 st trimester 2. 105g/l 2 nd and 3 rd trimester	30 mg per day
Iodine	N/A	220 mcg and 290 mcg per day [1 teaspoon [5 g]]
Protein	Proteins demand during pregnancy increases up to 71 g/day [1.1–1.2 g/kg/day] compared to 46 g/day [0.8 g/kg/day] for nonpregnant women.	Additional in the second and third trimesters: 25 g of protein may be added by including 1.5 cups of lentils or 2.5 cups of soy milk per day
DHA	N/A	100–200 mg per day

Conclusion

As number of individuals choosing vegan diet in the US continues to grow, healthcare providers must be vigilant and be prepared to provide optimal advice to vegan patients, especially during pregnancy. A strict vegan diet may be sufficient during pregnancy, as long as it is well-planned to provide all required nutrients, such as protein, iron, omega-3, iodine, calcium, vitamin D, and vitamin B12 [18]. To promote healthy fetal development, a daily iron intake of 30 mg is recommended [19]. Also, as vegan diet pregnant participants are at higher risk of protein deficiency, additional protein is recommended in the second and third trimesters: 25 g of protein may be added by including 1.5 cups of lentils or 2.5 cups of soy milk per day [20].

Additionally, sufficient amount of Vitamin D [600 UI/day], iodine [220 mcg/day] and 1200 to 1500 mg/day of calcium are required for normal fetal growth and brain development [21,22,23]. In addition, it is recommended that a higher intake of Vitamin B-12 of more than 3.0 mcg/daily and 100 to 200 mg microalgae-derived DHA [24,25].

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