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RESEARCH ARTICLE

CULTURAL-DIETARY BEHAVIOR AND CONSUMPTION OF FRUIT AND VEGETABLES WITH ADVERSE BIRTH OUTCOMES IN PREGNANT MINORITY WOMEN: A LITERATURE REVIEW

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ABSTRACT

Background: Poor nutrition in pregnancy is a major public health concern. The high intake of saturated fats, carbohydrates and sodas have been related to an increased risk of gestational diabetes mellitus. Therefore, nutritional deficiencies in pregnant women can lead to preterm labor & intra uterine growth retardation. **Objective:** Reproductive-aged women should adopt a healthy dietary lifestyle, which reduces the risk of adverse birth outcomes and chronic diseases of both mother and newborn. Therefore, the purpose of this study is to assess cultural-dietary behavior of consuming vegetables and fruit with adverse birth outcomes in pregnant ethnic minority women. **Method:** Literature for this review was conducted using the following online databases such as Pubmed, Google scholar and Science direct; a total of thirty-four articles were included in this study after the inclusion and exclusion criteria. All the findings in this study are based on published information as listed in the references. **Result:** Several of the reviewed study reported that association between maternal diet and adverse birth outcomes such as preterm birth, stillbirth, low birth weight, neonatal death, congenital anomaly and small for gestational age. Studies showed that the lifestyle intervention group showed higher consumption of vegetables compared to women in the control group. Also, sixty-five percent of ethnic minority women did not meet the maximum score for total vegetables intake. **Conclusion:** In a nutshell, longitudinal studies are required to assess and explore long-term influences and dietary behaviors for an effective behavioral change intervention study.

INTRODUCTION

Poor nutrition in pregnancy is a prominent public health concern; one of the overarching goals of the Healthy People 2020 is based on increasing nutritional intake to improve reproductive outcomes. The federal guidelines recommend that adults eat at least 1½ to 2 cups of fruit per day and 2 to 3 cups of vegetables per day as part of a healthy eating pattern (1). Also, pregnant women should consume about 300 more calories of vegetables and fruits per day (1). Despite these recommendations, only 1 in 10 adults meet the federal fruit or vegetables consumption recommendations (1). According to Healthy People 2020, 16.1% of pregnant females were iron deficient in 2003 to 2009. Reproductive-aged women should adopt a healthy dietary lifestyle, which reduces the risk of adverse birth outcomes and chronic diseases of both mother and newborn (1). Several factors influenced the dietary behaviors of pregnant women, which may impact the health of the mother and the fetus. Adverse birth outcomes include stillbirth, low birth weight, preterm birth, neonatal death, congenital anomaly and small for gestational age. Ethnic minority pregnant women are more likely to experience adverse birth outcomes in the United States (2).

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According to (2), data from 2016 showed that approximately 13.7% of African American infants were born with low birth weight (less then 2500g) compared to Caucasian infants born with low birth weight (7.0%). Also, preterm birth rate among African American women is 1.6 times higher compared to preterm birth rate among Caucasian women. In 2015, the rate of preterm birth among African American women was 3.09% compared to white women (1.27%) (3). The causes underlying the disparities in adverse birth outcomes are poorly understood. Disparities continue to exist even after accounting for known factors such as socioeconomic status and education (3). Several investigations of the connection between diet and health outcomes depend on a single or a couple of food items or nutrients and supplements; for example, high intake of saturated fats, carbohydrates, sodas (4), (5), and low intake of polyunsaturated unsaturated fatty acids have been related to an increased risk of gestational diabetes mellitus (6). Despite the scientific research conducted on racial disparities in adverse birth outcomes, disparities remain largely unknown. Several studies have focused on factors such as adequacy of prenatal care, maternal health behaviors, stress and social support (7), (8). Also, socioeconomic factors in adverse birth outcomes are well known, but few studies have examined cultural-dietary behavior among pregnant ethnic minority women. Therefore, the purpose of this study is to assess the cultural-dietary behavior of consuming vegetables and fruit and adverse birth outcomes in pregnant ethnic minority women.

MATERIALS AND METHODS

Literature for this review was conducted using the following online databases such as Pubmed, Google scholar and Science direct. Also, some papers published online by CDC were included in the analysis. The research authors, year of publication, journal language, and methodological characteristics were included in the analysis. The search primarily based on studies or articles published between 2015 to present; thus, included older articles if necessary, to the review. The search keywords were 'Dietary', 'Minority women', 'Pregnant' AND 'Low-income, 'Adverse birth outcomes' AND Vegetables', and 'Nutrient'. All the relevant scientific publications and some non-peer reviewed sources were included, but articles less than ten years were excluded from the analysis. After applying the exclusion criteria, the result produced 99 free articles. From the 99 articles, we used the significant articles for this literature review. The original search produced 469 articles, and some articles were excluded because the full text was inaccessible; eventually, a total of 34 publications were included in this analysis. Figure 1 shows the summary of the search process using the PRISMA flow diagram.

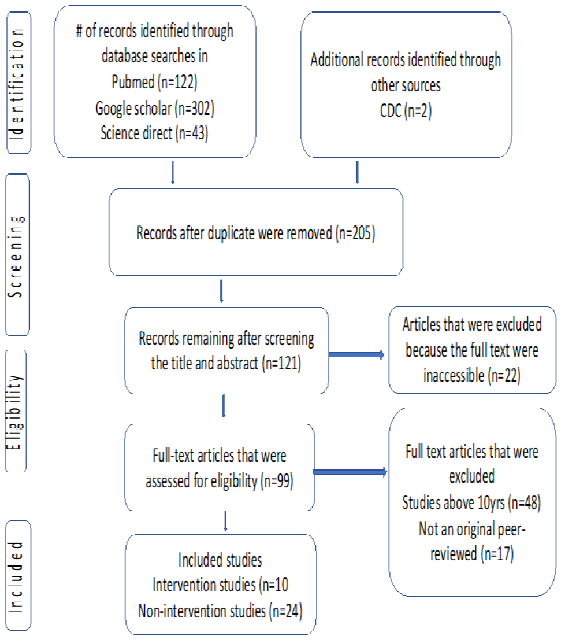

Figure 1. PRISMA flow diagram of study identification

RESULTS

Among the 44 articles included in the analysis, more than 15 were non-intervention articles and 10 were intervention-based articles. All the publications (n=469) are in English language. No intervention study exclusively targeting the food culture of ethnic minority women during pregnancy was identified. Most of the studies evaluated exposures using food frequency questionnaires (FFQs) and interview procedures. Exposures to vegetables were categorized in the studies as vegetables, green vegetables, green leafy vegetables, and non-green leafy vegetables. Also, fruit and vegetables exposures were quantified as number of servings per day and frequency of intake. Perceived behavioral control (PBC) and behavioral intention were found to be the strongest predictors of healthy eating behaviors among pregnant women compared to subjective norms (9). The intervention by (10), resulted in a significant reduction in soft drink intake ($p < 0.001$) and an increase in the consumption of vegetables ($p = 0.023$). The study showed that the lifestyle intervention group showed higher consumption of vegetables compared to women in the control group; the adjusted effect size for vegetable intake 19.83 g/day (95% CI 2.75) to 36.91 g/day with a p-value of <0.023 (10). Also, 65% of ethnic minority women did not meet the maximum score for total vegetables consumption (11).

DISCUSSION

It is evident that healthy dietary during pregnancy can exert long-lasting effects on the health of the fetus. According to (12), nutritional deficiencies can lead to preterm labor & intra uterine growth retardation. Also, another study reported that prenatal dietary including more vegetables and fruits have more adequacies for about fifteen nutritional trace elements (6).(13), in their study inspected pregnant women dietary examples indicated that about 13 percent of their participants meet guidelines for fruits, and about 7 percent for vegetables; vegetables consumption were just 2 servings per day, not meeting the guidelines of > 7 servings per day dependent on American Diabetes Association (13). Among pregnant Japanese women, the prenatal dietary example was high in rice, fish and vegetables demonstrated a better profile of healthful and nutrient adequacy than participants who consumed meat and egg, and wheat products (12).

These outcomes propose that the dietary consumption high in fruit and vegetables is related with high intake of vitamins, protein, and minerals (12). Also, a research was conducted to examine the relationship between dietary intake during pregnancy and postpartum depression (12); the study reported that more intake of vegetables and fruit were related with a reduction in depression test scores (12). Furthermore, a study proposed that inadequate consumption of vegetables and fruit during pregnancy may prompt reprogramming of the fetus phenotype, which may result to permanent physiological changes and exposing the kid to coronary heart illness, insulin resistance, obesity, and hypertension when becoming an adult (12). (14), stated that sociodemographic factors such as education, age, and employment, has no significant relationship in meeting diet guidelines neither before nor after education. In their study, they examined the racial, ethnic, and socioeconomic variations in prenatal health education among pregnant women who recently had a live birth (12). Women from racial or ethnic minorities groups reported receiving higher levels of prenatal dietary education compared with women from advantaged groups (12). The study further stated that their finding on ethnic minorities pregnant women had greater odds of receiving prenatal health education was consistent with other existing studies (12). Another research study reported using the Oregon PRAMS from 2000 to 2001 found that African American women had a higher probability of receiving smoking cessation education compared to white women (15).According to (16), African American and Hispanic women were more likely to receive advice on several health-related topics including smoking and alcohol use during pregnancy than white mothers. However, study showed that African Americans, Hispanics and Native Americans consume low amounts of fruits and vegetables, whole grains, low-fat dairy, lean meats, and fish and fatty foods (17).

Behavioral health theories used to address vegetables and fruit consumption: The Health Belief Model theory (HBM) was used by (18)to promote preventive behaviors against iron deficiency anemia among pregnant women. The study reported that after the intervention there was an increase in knowledge in the intervention group concerning nutrition intake during pregnancy. Also, there was a significance difference between intervention and control groups in term of perceived susceptibility; participants believed that they may be susceptible to anemia because of unhealthy diet intake (18). Furthermore, the study reported that there was significant difference between intervention and control groups in term of perceived severity, cues to action, perceived benefits, and barriers (18). In the study, one of the mentioned perceived barriers by the participants was poor diet. Education based on HBM promote behaviors among participants, but how consistent was participants with consumption of healthy diet? Cultural practices, beliefs and attitudes take long-term to change. Women are used to certain type of cultural diet in their lifetime. Limitations of (18)was loss of participants and lack of long-term follow-up of participants up to time of delivery. In other words, dietary behavior and pregnancy outcomes were not surveyed. Furthermore, the theory of planned behavior (TPB) was another theory used widely by several studies for predicting intention and behavior; also, the theory maintains that intention is the most important determinant of behavior (9). TPB was used by (9) to determine the predictors of healthy eating behavior among pregnant women in Qazvin, Iran. The researchers result showed that perceived behavioral control was strongly correlated with behavioral intention and healthy eating behaviors (9). Also, TBP variables strongly predicted the healthy eating behaviors among pregnant women (9). This finding is consistent with the results of other study (19). (9) further stated that social effects of healthy eating behaviors among pregnant women can be somewhat attributed to families, and partners or husbands. (20) used the phenomenology qualitative approach on their study to understand ethnocultural dietary and health practices of pregnant immigrant women. The researchers conducted phenomenology approach in order to find out if acculturation impact food choices and practices among immigrant women during pregnancy. The results showed that women adhered to the advice given by family members, which is continuing to follow customary food practices of their foremothers (20). Therefore, it is prominent that health care providers understand the complexity in various ethnocultural dietary norms and practices, and how socioeconomic status, age, ethnicity, and family support may distinctively shape these beliefs and practices.

Limitations/Strengths: In a nutshell, there are few limitations in this study such as none of the studies explored whether the production of the fruits and vegetables was conventional or organic. Also, the behavioral intervention conducted by the reviewed intervention studies has limitation on consistence among participants with consumption of vegetables and fruit. Cultural practices, beliefs and attitudes take long-term to change; thus, the studies did not conduct a long-term intervention to assess continuous healthy diet behavior among participants. The fact that this study establishes sites of interest on association of dietary behavior of consuming vegetables and fruit with adverse birth outcomes in pregnant ethnic minority women, it becomes a useful scientific tool in policymaking in the light of dispersing structured information to the public, particularly pregnant ethnic minority women.

Conclusion

The strengths of the literature review are based on the fact that the studies used represented participants from diverse backgrounds, and therefore, the findings are representative of the populations of pregnant women. Getting information for women from different socioeconomic backgrounds and ethnic groups, as was the case in the review led to creating more understanding of the issue. For instance, the comparison of the access to dietary education among women from all ethnic groups was important because it may help create strategies that target the minority groups that are more affected by the problem of not consuming enough fruits and vegetables during pregnancies. However, there are gaps in the literature, especially concerning the use of dietary education as a means of solving the problem of women not consuming enough fruits and vegetables. African women were more likely to get information on the dietary recommendations for pregnant women and yet they were still the most affected led to the question of which other appropriate methods should be used to motivate the group to implement proper dieting during pregnancies. Therefore, future research interventions should focus on the cultural dietary factor that affect the consumption of vegetables among African Americans and the Hispanics. Research should focus on why ethnic groups like the Caucasians and the Japanese women ate more balanced diets than African Americans and the Hispanics despite the latter groups getting more education on the recommended diets for healthy pregnancies. Research should also focus on longitudinal studies to assess and explore long-term influences and dietary behaviors for an effective behavioral change intervention to encourage women, especially in minority groups to consume enough vegetables and fruits to prevent chronic illnesses and unhealthy babies. Solutions should be tailor-made to suit the behavioral dietary pattern of ethnic minority women.

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