Review Article

A Review of the Impact of Food Insecurity, Undernutrition, and Associate Factors on Pregnant Women

Abstract

The health and well-being of pregnant women are greatly impacted by food insecurity and undernutrition, which can have serious negative effects on both the mother and the fetus. The purpose of this review is to investigate how pregnant women are affected by food insecurity, undernutrition, and related conditions. The review summarizes previous research and highlights important conclusions from investigations carried out in various contexts. Pregnant women worldwide are disproportionately affected by food insecurity, which is defined as having inadequate access to enough safe, nourishing food. Undernutrition in mothers raises the risk of unfavorable outcomes like low birth weight, premature birth, and difficulties for the mother. It is caused by inadequate food consumption, inadequate nutrient intake, and poor diet quality. Moreover, food insecurity exacerbates the difficulties pregnant women confront because it frequently coexists with socioeconomic inequality, restricted access to healthcare, and weak social support networks. Food insecurity and undernutrition during pregnancy can be caused by a variety of reasons, such as cultural practices, poverty, unemployment, and a lack of knowledge. A comprehensive strategy is needed for interventions targeted at resolving these concerns, including social protection programs, efforts to generate income, nutrition education, and healthcare services. Undernutrition and food poverty have a serious negative influence on pregnant women's health, both for the mother and the fetus. It is imperative to tackle the intricate interaction of factors that lead to food insecurity and undernutrition in order to enhance the health and overall wellbeing of expectant mothers and their offspring.

Keywords

Undernutrition, food insecurity, unborn, nutritional education and*pregnant women*

1. Introduction

The health and nutritional status of women have a significant impact during pregnancy, and a significant number of pregnant women suffer from poor nutrition, which puts them in unhealthy and distressing situations (Ayele et al., 2020). Pregnancy is a time of rapid and profound physiological changes from the time of conception until birth(Mousa et al., 2019). Nutritional requirements increase during pregnancy to maintain maternal metabolism and tissue accretion while supporting foetal growth and development(Nnam, 2015).An adequate supply of nutrients for the pregnancy women to her fetus is one of the factors that are critical for fetal survival.Food insecurity can have detrimental effects on the physical and mental health of pregnant women(Bastian et al., 2022).The health of mothers and children is significantly impacted by the complicated problem of food insecurity(Jebena et al., 2015).

The ability of the mother to provide nutrients for her baby depends upon the nutritional status, body size, and body composition of the mother (Robert-Mccomb et al., n.d.). Pregnancy outcomes are significantly affected by nutrition, which is recognized as a key factor in both a healthy and successful pregnancy and the long-term health of the next generation (Marshall et al., 2022). Malnutrition caused by inadequate maternal nutrition during pregnancy can have a negative impact on pregnancy outcomes, including low birth weight, premature delivery, fetal development failure, and an increased risk of prenatal and neonatal mortality and morbidity(Lassi et al., 2020).

Undernutrition is the major public health issue particularly for vulnerable groups including children and women of childbearing age especially pregnant mothers (Dalky et al., 2018). Undernutrition is a serious global health problem. About 795 million people are undernourished mostly in low and middle-income countries and the problem is most critical during pregnancy (Joshi et al., 2017). Globally, undernutrition is contributing to the deaths of 3.5 million mothers and under 5 years of age children each year(GergitoGelebo et al., n.d.).Globally, undernutrition is contributing to the deaths of 3.5 million mothers and under 5 years of age children each year(Skinner, 2012). It is estimated that 13 million children are annually born with IUGR (intrauterine growth retardation)various factors such as maternal health issues, placental problems, genetic factors, or environmental factors, 112 million are underweight secondary to undernutrition during pregnancy (Skinner, 2012). Food insecurity has been linked to a number of

unfavorable health consequences, including malnutrition, stunted growth, shortages in some micronutrients, and poor cognitive development in adolescent females, according a study by(Beyene, 2023).

Maternal undernutrition during pregnancy and breastfeeding phase has adverse effects on child growth and development(Dadi et al., 2019). This is because during this period, maternal nutrient needs increase and if they are not met, mothers may suffer from wasting which limits their ability to fully satisfy the needs of their infants. Nutritious foods and diverse diets which are of good quality and sufficient quantity, are essential for children to meet their nutrient needs and support growth, especially during the first 1000 days of a child's life which are critical for optimal child growth, health and development(Likhar& Patil, 2022). In low income regions, low quality, monotonous diets based mainly on grains and lacking vegetables, fruits and animal-source foods, dominate the diets of many women and children, leading to both maternal and childhood malnutrition (Nti, 2011).Therefore, in order to develop effective involvement, the undernutrition of pregnant women must be studied within a precise situation. Thus, the purpose of this review was to determine the impact of Food Insecurity, Undernutrition, and Associate Factors on Pregnant Women

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2. Literature review

2.1. Factors Influencing Food Insecurity among Pregnant Women

2.1.1. Effect of low Income and poverty levels Pregnant Women

Food insecurity is common among pregnant women in low-income households, and it is associated with an increased risk of pregnancy complications and negative health outcomes for both the mother and the child (Bastian et al., 2022; ShiferawAreba et al., n.d.). Food insecurity is associated with an increased risk of pregnancy complications and mental and physical health outcomes (Bastian et al., 2022). Pregnant women with low incomes frequently experience financial hardships that restrict their access to a wide variety of wholesome foods (Nicholls-Dempsey et al., 2023). Instead of fresh fruits, vegetables, lean proteins, and whole grains, they might have to rely on less expensive, processed, and high-calorie foods. This may lead to a diet lacking in vital nutrients.

Food insecurity is a condition where people do not always have access to enough food to lead active and healthy lives, and poverty can cause malnutrition(Bastian et al., 2022). It's possible that pregnant women who experience food insecurity won't consume enough calories to meet their increased energy requirements. This could result in insufficient weight gain and have a detrimental impact on the developing fetus's and the mother's health. During pregnancy, poor diets lacking in key nutrients – like iodine, iron, folate, calcium and zinc can cause anaemia, pre-eclampsia, haemorrhage and death in mothers (Mousa et al., 2019). They can also lead to stillbirth, low birthweight, wasting and developmental delays for children.

2.1.2. Inadequate availability and accessibility of food on Pregnant Women

Micronutrient deficits can have major health consequences for both the developing baby and the pregnant mother when there is a lack of consistent availability to nutrient-dense meals(Bastian et al., 2022). Deficiencies in macronutrients (like protein and carbs) and micronutrients (like iron, folate, and vitamin D) may occur in expectant mothers who are unable to obtain a varied and balanced diet(Savarino et al., 2021). Negative pregnancy outcomes are more likely as a result, and the mother's health may suffer. The developing fetus may experience long-term consequences if inadequate nutrition is consumed throughout pregnancy(Miese-Looy et al., 2008). Deficient consumption of vital nutrients can hinder the growth and development of the fetus, resulting in low birth weight, stunted growth, and health problems. Worldwide, there is a

high prevalence of micronutrient deficiencies during pregnancy, especially in low-income nations where nutritional deficiencies are common due to poor diets(Marshall et al., 2022). These deficiencies may result in low birth weight, premature delivery, and developmental problems for the unborn child throughout pregnancy.

2.1.3. Lack of Awareness of proper nutrition during pregnancy

Pregnant women often lack adequate knowledge of nutrition needs and access to reliable nutrition information (Marshall et al., 2022). A poor pregnancy diet can result in nutritional deficiencies, which may impair fetal development and lead to health complications for the child. However, education and nutritional support can play a crucial role in improving the nutritional awareness of pregnant women and promoting healthy eating during pregnancy(Apostolopoulou et al., 2024).Initiatives aimed at addressing barriers to nutritional pregnancy preparation and providing adequate support and resources to women of childbearing age have the potential to improve long-term health outcomes for future children(Parikh et al., 2021).

2.2 Factors associated with undernutrition among pregnant women

2.2.1 Inadequate dietary intake

Inadequate dietary intake among pregnant women is a concern as it can negatively impact maternal and offspring health outcomes(Kabahenda & Stoecker, 2024). Insufficient consumption of food can result in insufficiencies of vital minerals as calcium, iron, vitamin D, folate, and omega-3 fatty acids(Savarino et al., 2021). Both the mother's general health and wellbeing and the fetus's proper development depend on these nutrients. Deficiencies can impair fetal growth, raise the likelihood of problems, and harm the mother's general health and immune system(Marshall et al., 2021).

Pregnant women who consume inadequate nourishment may be more susceptible to problems like anemia, reduced immune systems, exhaustion, and increased infection susceptibility (Sukchan et al., 2010). For example, the prevalence of inadequacy of nutrient intake in some studies was found to be as high as 86.8% for carbohydrates, 59.2% for protein, and 78.0% for fat(Marshall et al., 2021). Additionally, inadequate intakes of specific nutrients during pregnancy have been linked to poor maternal and infant outcomes, such as low birth weight and increased risks of various health conditions.

2.2.2. Inadequate knowledge about pregnancy nutrition

A lack of knowledge about nutrition during pregnancy may to a lack of knowledge on the significance of healthy eating during pregnancy(Ibikunle et al., 2021). This may result in insufficient consumption of vital nutrients such as vitamins, iron, calcium, and folic acid. Inadequate consumption of nutrients can hinder the development of the fetus and raise the possibility of birth abnormalities, low birth weight, and other issues(Wong et al., 2018). Maternal health issues may be exacerbated by ignorance of pregnancy diet. For instance, low iron consumption can result in iron-deficiency anemia, which can impair the pregnant mother's general health, energy levels, and level of weariness(Muglia et al., 2022). Making appropriate eating choices during pregnancy is greatly aided by maternal education. Expectant women might not know which foods to prioritize or steer clear of if they lack the necessary understanding(Wang et al., 2023). This may lead to an inadequate intake of vital nutrients and an over dependence on unhealthy processed foods that are rich in sugar, fats, and additives.

Unsatisfactory dietary instruction for mothers may raise their risk of gestational diabetes. Blood sugar elevation during pregnancy is the cause of this disease(Mustafa et al., 2022). Inadequate nutrition during pregnancy may have long-term effects on the mother and the unborn child. A child's chance of acquiring chronic illnesses such as obesity, diabetes, cardiovascular disease, and even mental health issues in later life might be raised by nutritional inadequacies experienced during pregnancy(Miese-looy et al., 2008).

2.2.3 Cultural and social factors

Pregnant women's nutritional understanding and food habits are greatly influenced by cultural and societal variables(Fern et al., n.d.). Review reveals that a range of factors, such as sociodemographic traits, lifestyle-related elements, and pregnancy-related determinants, impact eating practices during pregnancy. Pregnant women's eating habits are significantly influenced by a number of factors, including socioeconomic status, age, education level, lifestyle, and religion(Kadawathagedara et al., 2021).

Pregnant women's diets may not be as nutritionally adequate as they could be due to certain cultural customs and beliefs. Pregnant women may experience differences in the quality of their diets due to socioeconomic factors including geography and income level that might affect their availability to nutrient-dense foods(Fern et al., n.d.). Undernutrition or insufficient nutrient

intake during pregnancy may result from a dependency on processed and less nutritious foods in certain communities that have limited access to fresh fruits, vegetables, and other healthful food options because of a lack of supermarkets or farmers' markets(Kadawathagedara et al., 2021)(.

2.2.4. Geographical factors

Pregnant women who live in isolated or rural locations may experience food insecurity and undernutrition as a result of geographic considerations(Zewdie et al., 2021). Fresh and healthy food access may be hampered by the scarcity of supermarkets, farmers' markets, and medical facilities in these communities. Long commutes and other obstacles to mobility can make it more difficult for expectant mothers to eat a varied and healthful diet. Preterm birth and low birth weight are two outcomes that can result from this, as well as higher chances of prenatal problems such gestational diabetes and high blood pressure (preeclampsia), which can be harmful to the health of both the mother and the fetus(Marshall et al., 2022).

2.3. The implications of undernutrition on pregnant women

Pregnant women are among the millions of people affected by undernutrition, a serious worldwide health concern. For the health and development of the expectant mother as well as the unborn child, proper diet is crucial during pregnancy(Imdad & Lassi, 2017). For the mother's and the unborn child's health and growth, proper nutrition is essential throughout pregnancy. On the other hand, undernutrition during pregnancy can have serious repercussions that go beyond the first trimester(Imdad & Lassi, 2017).

2.3.1. Physical Consequences

Pregnant women who undernutrition may experience serious physical health problems(Osteoporosis and bone loss,Anemia, Increased risk of infection and Poor fetal growth and development)(GergitoGelebo et al., n.d.). A lack of key nutrients that are required for overall health can arise from maternal malnutrition, which is caused by insufficient intake of essential nutrients such proteins, vitamins, and minerals. Pregnant women who are undernourished are more vulnerable to infections, have weakened immune systems, and are more likely to experience anemia and other nutrient-related deficits(Geda, 2021). Undernutrition can also cause weight loss, exhaustion, weakness, and general physical ill health, which makes it difficult for expectant moms to cope with the demands of pregnancy and childbirth(Dadi et al., 2019).

The review shows that undernourished women are more likely to develop metabolic diseases such gestational diabetes mellitus both before and during pregnancy(Zewude & Beshah, n.d.). Reducing the risks associated with undernutrition during pregnancy requires addressing maternal undernutrition through effective assessment, treatment, and interventions(Parikh et al., 2021). Differences in maternal nutritional status occur throughout the world due to a variety of factors, including social determinants, food insecurity, and access to health services. The significance of nutrition treatments before and during pregnancy is highlighted by the critical role that maternal nutrition plays in maintaining favorable pregnancy outcomes and long-term health for both the mother and child(Ramakrishnan & Reynaldo, 2014).

2.3.2. Maternal Consequences

Pregnant women who are undernourished run serious hazards to the health of the fetus and the mother. Low birth weight babies are more susceptible to illnesses and early death when they are born to mothers who are undernourished(Areba et al., 2022). Negative birth outcomes, such as intrauterine growth restriction (IUGR), perinatal morbidities, and long-term mental and physical disabilities in infants, are linked to maternal undernutrition(Chea, 2022). Pregnancy-related undernutrition is influenced by a number of factors, including low height, inadequate nutritional understanding, and maternal iron deficiency anemia. Pregnancy-related problems like anemia, pre-eclampsia, hemorrhage, and even death can result from inadequate nutrition for mothers, which is defined by diets deficient in important minerals like iodine, iron, folate, calcium, and zinc(Shi et al., 2022).

The risk of low birth weight and small for gestational age newborns is increased by preconception anemia and low preconception weight(Young & Ramakrishnan, 2021). Improved delivery outcomes can result from pregnancy interventions that include numerous micronutrient supplements, balanced-energy protein supplements, and lipid nutrient supplements(Marshall et al., 2021). Maternal undernutrition must be addressed in resource-constrained locations with appropriate assessment, treatment, and interventions to reduce the hazards of undernutrition during pregnancy (Nguyen & Foundation, 2020). The risk of metabolic diseases such gestational diabetes mellitus is increased in women who are undernourished both before and during pregnancy. To guarantee the best possible outcomes for mothers and their unborn children,

maternal nutrition treatments must be prioritized from conception through pregnancy(Ramakrishnan & Reynaldo, 2014).

2.3.3. Fetal Consequences

Maternal undernutrition during gestation reduces placental and fetal growth of humans(Bell & Ehrhardt, 2015). Available evidence suggests that fetal growth is most vulnerable to maternal dietary deficiencies of nutrients (e.g., protein and micronutrients) during the peri-implantation period and the period of rapid placental development(Duttaroy, 2023). Undernutrition in pregnant women may result from low intake of dietary nutrients owing to either a limited supply of food or severe nausea and vomiting known as hyperemesis gravidarum(Wu et al., 2018). This life-threatening disorder occurs in 1–2% of pregnancies and generally extends beyond the 16th week of gestation.

Pregnant women may also be at increased risk of undernutrition because of early or closely-spaced pregnancies (King, 2015). Since pregnant teenage mothers are themselves growing, they compete with their own fetuses for nutrients, whereas short interpregnancy intervals result in maternal nutritional depletion at the outset of pregnancy. Low birth weights and preterm deliveries in adolescent pregnancies are more than twice as common as in adult pregnancies, and neonatal mortality in adolescent pregnancies is almost three times higher than for adult pregnancies (King, 2015).

2.4. The Impact of Food Insecurity on Pregnant Women

Lack of regular access to enough, safe, and nourishing food is known as pregnancy-related food insecurity, and it can have serious and wide-ranging effects for expectant mothers and their growing fetuses (Laraia & Gundersen, 2010). Additionally, poor nutrition, stress, mental health problems, and insufficient availability to vital nutrients for the mother and the unborn child are all consequences of food insecurity.

2.4.1. Nutritional Deficiencies

Food insecurity during pregnancy has a significant effect on the nutrition of expectant mothers and the results of their pregnancies. It can result in insufficient intake of vital nutrients, raising the possibility of maternal malnutrition and problems (Bastian et al., 2022). Increased dietary

intake of folic acid, iron, calcium, and protein is necessary for pregnant women in order to support the growing and developing fetus. Living in a food insecure household during pregnancy may increase risk of greater gestational weight gain, disordered eating, chronic disease and pregnancy complications (Laraia & Gundersen, 2010). The impact of food insecurity on young children is particularly concerning given they are at a key stage of growth and development which can influence health during adolescence and even adulthood (Laraia & Gundersen, 2010).

Infants residing in food insecure households are more likely to have poor health, be nutrient deficient and be hospitalized (Bastian et al., 2022) with poor health and developmental challenges, including cognitive, linguistic, social, and emotional challenges being more common among food insecure children (Rose-jacobs et al., 2008). While there are clear negative health outcomes for food insecure households with pregnant women and young children, the coping mechanisms employed by these households are not well understood. Studies have reported that mothers experiencing food insecurity are likely to engage in coping strategies such as delaying payments of bills, giving up services, selling or pawning possessions and diluting infant formula (Beck et al., 2015).

2.4.2. Increased Risk of Gestational Complications

Food insecurity during pregnancy has been linked to a higher risk of gestational complications, including gestational diabetes and high blood pressure (preeclampsia)(Marshall et al., 2021). Pregnant women who lack access to an adequate and balanced diet are more prone to developing these conditions, which can have detrimental effects on both maternal and fetal health(Italian et al., 2016). This review has shown that food insecurity is associated with reduced quality of life and psychosocial outcomes, such as increased depression and anxiety. Furthermore, food insecurity can be associated with an increased risk of pregnancy complications, including anemia and poor fetal growth. It is also associated with poor health outcomes for the baby, such as low birth weight and an increased risk of birth defects.

Federal nutrition programs, such as the Supplemental Nutrition Assistance Program (SNAP) and the Special Supplemental Nutrition Program for Women, Infants, and Children (WIC), play a critical role in mitigating the physical and mental health consequences of food insecurity for pregnant women and their families(Bastian et al., 2022). It is important to identify women with food insecurity on their first pregnancy visit and take steps towards improving their health

through allocating a family food basket and nutritional counseling and education. Further studies are needed to investigate the association between food insecurity during pregnancy and the incidence of pregnancy complications(Laraia & Gundersen, 2010).

2.4.3. Adverse Birth Outcomes

Food insecurity during pregnancy is associated with adverse birth outcomes, including low birth weight and preterm birth(Agho & Pligt, 2023). review has shown that food insecurity is associated with an increased risk of specific birth defects, such as cleft palate, gestational diabetes, anemia, and pregnancy-induced hypertension(Bastian et al., 2022). Food insecurity is also associated with poor health outcomes for the baby, including increased risk of birth defects and poor developmental outcomes. Pregnant women experiencing food insecurity have a higher risk of delivering infants with low birth weight, which increases the likelihood of developmental delays and long-term health issues(Agho & Pligt, 2023).It is important to identify women with food insecurity on their first pregnancy visit and take steps towards improving their health through allocating a family food basket and nutritional counseling and education. Further studies are needed to investigate the association between food insecurity during pregnancy and the incidence of pregnancy complications.

3. Conclusion

Undernourishment and food insecurity have a significant effect on pregnant women's health and wellbeing as well as the growth and long-term consequences of their offspring. The negative consequences of not having enough access to a healthy diet during pregnancy are discussed in this review, including elevated probability of maternal death, low birth weight, preterm delivery, developmental delays, and compromised immune system.Pregnant women's undernutrition and food insecurity are caused by a number of important variables. Access to nutrient-dense food is significantly hampered by socioeconomic variables including poverty low income of household and low levels of education.

The issue is made worse by cultural norms, inadequate healthcare facilities, and inadequate information about maternal nutrition. Conflicts, natural disasters, and climate change can also make food poverty worse and make it more difficult for pregnant women to access and buy wholesome food. It takes a diverse approach to address pregnant women's food poverty and undernutrition. Agricultural production, income-generating ventures, and social safety nets for disadvantaged groups should be prioritized in the effort to increase overall food security. To improve their capacity to surmount these obstacles, women's emancipation, education, and access to healthcare services ought to be put first. Personalized treatments are essential for enhancing the health of mothers and their unborn children. Examples of these include nutrient counseling and supplementation.

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