



Diet in pregnant women in preventing stunting: a scoping review

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ABSTRACT

Stunting is a chronic nutritional health problem in toddlers. However, stunting can be prevented, one of which is by maintaining maternal health during pregnancy, namely diet and nutritional intake. Therefore, pregnant women are expected to be able to control their diet. This study aims to provide an overview of diet in pregnant women as a prevention of stunting events. This study used the scoping review method. The databases used are EBSCOhost and PubMed with a search for relevant studies published from 2017-2022. The inclusion criteria for selected articles are English-language articles, fulltext articles. Excluded articles are articles that use meta-analysis and systematic review methods. The results obtained were 8 articles, of which seven articles showed the type and healthy diet of the significance of increasing birth weight which is an indicator of growth and incidence of stunting. In detail, the type and healthy diet in pregnant women is to increase food intake by 15% than usual with the consumption of the main food 3x a day plus 2x interludes / snacks consisting of ≥ 5 types of food (MDD-W) with ≥ 4 servings / week in each type, so that the nutrition of pregnant women remains fulfilled, accompanied by multivitamin supplementation (vitamin B-1 (thiamin), B-2 (riboflavin), B-6, niacin, B-12, C, and E), calcium, folic acid and IFA tablets. The conclusion obtained is that the type and healthy diet in pregnant women produces a significant good effect on birth weight in preventing stunting. As well as demographic factors affecting the diet in pregnant women.

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INTRODUCTION

Stunting is a chronic nutritional health problem that is prone to occur in toddlers and is still a priority nutritional problem in Indonesia. The prevalence of stunting in Indonesia is 24.4% in 2021. However, this value still does not meet the target of the 2024 RPJMN, which is 14%. In Dhamayanti's research, 2021, it was found that the prevalence in children at risk of stunting increased by 4.3% during the Covid-19 pandemic. (SSGI, 2021)

Risk factors for stunting are maternal education, maternal height less than 150 cm, low maternal BMI, BBLR, number of toddlers in the household and recurrent diarrhea (Berhe et al., 2019). One of the factors is malnutrition in mothers before and during pregnancy because according to the Ministry of Health of the Republic of Indonesia 2021, it is stated that of the 34 provinces 4,656,382 pregnant women

measured (LiLA), it is known that around 451,350 pregnant women have LiLA < 23.5 cm (experiencing the risk of Protein Energy Deficiency) (SSGI, 2021). On research Komalasari et al., (2020), It is known that toddlers with mothers who experience malnutrition status during pregnancy have a 3,333 times higher risk of experiencing stunting events compared to mothers with good nutritional status during pregnancy (Komalasari et al., 2020).

The period of the first 1000 days of life is a golden period and a critical period for a person (windows of opportunity). So it is important to maintain the health of the mother during pregnancy. Therefore, pregnant women are expected to be able to control their diet to get adequate nutrition for themselves and for the fetus (Djauhari, 2017). This is supported by the results of research Ningsih et al (2021), i.e. there is a significant relationship between good diet and good nutritional status of pregnant women (Ningsih et al.,

2021). A bad diet can cause insufficient nutritional intake, so it will have a bad impact on toddlers in the future, namely the risk of stunting. Stunting can have an impact on delayed growth and impaired brain and neurological development (Nugroho et al., 2021). Based on this background, researchers want to know the picture of diet in pregnant women in preventing stunting.

METHODS

The design of this research study is a literature review type research with a scoping method. The framework used in this review is the research framework from Arksey O'Malley from the scoping review and the literature search results are presented using the Prisma Scr framework (Levac et al., 2010).

Criteria eligible for this review are identified by using the PCC Framework, which is defined as:

- Population : Pregnant Women
- Concept : Diet, which is the type, quantity, and frequency eaten every day by one person
- Context : Growth of fetuses and toddlers after birth

While other criteria used are meta-analysis and systematic review articles as exclusion criteria, and other inclusion criteria are English, fulltext articles, direct research articles and articles published in the last 5 years.

This literature search process strategy is carried out using the EBSCO CINAHL and PubMed databases. Then the keywords used in the article search are Pregnancy OR Pregnant OR Prenatal OR Antenatal OR Perinatal OR Maternal Pregnant Mother OR Expecting Mother AND Dietary Habits OR Eating Behaviors OR Diet AND Stunting OR Stunted OR Growth Disorder OR Malnutrition OR Undernourishment OR Underweight OR Low Birth Weight based on CINAHL and Medical Subject Heading (MeSH) Terms. After finding the literature corresponding to the study, the literature was sorted using Prisma and produced 8 articles corresponding to this review.

RESULTS AND DISCUSSION

In all, 8 articles were found that fit the search criteria in this review, i.e. proprietary research (Mitku et al., 2020a), (Madzorera, Ghosh, et al., 2020), (Sharma et al., 2021a), (Yang et al., 2021), (Yan et al., 2020b), (Quansah & Boateng, 2020a), (Santana et al., 2021a), dan (Madzorera, Isanaka, et al., 2020).

Characteristics based on an analysis of 8 selected articles, information was found about the description of diet in pregnant women in preventing stunting. All articles are in English and published in the last five years. The research method used in the selected article consists of Cross-sectional study, Case Control Study, Cohort study, and there is one article that does not mention the research method.

The results of the analysis on 8 articles that passed the selection showed that the background of the article writer came from the departments of Nutritional Sciences, Public Health, and Medicine. The countries studied in the article consist of South Africa, Brazil, China, Ghana, India, Uganda and Tanzania. All research was conducted with a community setting.

Table 1. Article Characteristics (N=8)

Article Characteristics	Frequency	Article Author
Author's Background		
Public Health	6	(Mitku et al, 2020), (Yan et al, 2021), (Santana et al, 2021), (Madzorera, Ghosh, et al, 2020), (Quansah & Boateng, 2020), (Madzorera, Isanaka, et al, 2020) (Yan et al, 2021), (Madzorera, Ghosh, et al, 2020), (Madzorera, Isanaka, et al, 2020) (Santana et al, 2021), (Sharma et al. 2021), (Madzorera, Ghosh, et al, 2020), (Yan et al, 2021), (Madzorera, Isanaka, et al, 2020)
Medicine	3	
Nutritionist	5	
Year of publication		
2021	3	(Sharma et al., 2021a), (Santana et al., 2021a), (Yang et al., 2021)
2020	5	(Madzorera, Isanaka, et al., 2020), (Yan et al., 2020b), (Quansah & Boateng, 2020a), (Mitku et al., 2020a), (Madzorera, Ghosh, et al., 2020)
Countries studied		
Afrika Selatan	1	(Mitku et al., 2020a)
Brazil	1	(Santana et al., 2021a)
China	1	(Yan et al., 2020b)
Ghana	1	(Quansah & Boateng, 2020a)
India	1	(Sharma et al., 2021a)
Uganda	1	(Madzorera, Ghosh, et al., 2020)
Tanzania	2	(Madzorera, Isanaka, et al., 2020), (Yang et al., 2021)
Types of Research design		
<i>Case Control Study</i>	1	(Sharma et al., 2021a)
<i>Cross-sectional study</i>	2	(Yan et al., 2020b), (Quansah & Boateng, 2020a)
<i>Cohort study</i>	4	(Madzorera, Ghosh, et al., 2020), (Mitku et al., 2020a), (Santana et al., 2021a), (Yang et al., 2021)
<i>Not mentioned</i>	1	(Madzorera, Isanaka, et al., 2020)

The characteristics of the respondents in each selected article are pregnant women with an age range of <20 tahun,="" 20-30="" tahun="" dan="" > 30 years. The results of the analysis in 8 articles, there are factors that affect the diet

of pregnant women, namely age (<20 tahun="" dan="" >35 years), employment (low income and non-work), education (low level), income (low), early marriage, antenatal visits (<4 visits), monthly family expenses (high), shelter (difficulty in accessing food), and culture.

Based on Diet, Outcomes, and Effects as a result of the analysis on 8 articles that have passed the selection, there are 2 categories of division of the diet of pregnant women, namely based on the type of food and diet. The type of food that refers to the Prime Diet Quality Score (PDQS) divides food into 2 groups, namely healthy and unhealthy foods. Foods that are included in the healthy category are Minimum Dietary Diversity for Women (MDD-W) which consists of 10 types of foods and foods rich in protein, while foods that are included in the unhealthy category are snacks and energy, fast food and spreads, and alcoholic beverages. Characteristics based on diet are also divided into 2 categories, namely a healthy diet consisting of vegetarian patterns, balance patterns, and traditional patterns and unhealthy diets consisting of processing patterns, western patterns.

In this Scoping Review, the type of outcome of each appropriate article is categorized based on the type of examination carried out, namely anthropometric measurements and health disorders. Anthropometric measurements consist of measurements of body length (length/ height), weight (weight), BMI of pregnant women. The categories of body disorders in toddlers are stunting, underweight, thin / wasted, and in pregnant women, namely LGA, anemia, hypertension, diabetes melleus.

Diet in Pregnant Women Based on Type of Food

Types of food that refer to the Prime Diet Quality Score (PDQS) divide food into 2 groups, namely Healthy food: Among the 8 selected articles in the Scoping Review, there are four articles that use food groups based on the Minimum Dietary Diversity for Women (MDD-W) index of the Food and Agriculture Organization (FAO) in 2016 consisting of starchy staple foods, meat, poultry, fish, vegetables, and fruits, nuts and seeds, milk, and eggs. As many as three out of four showed good significance to one of the outcomes, namely birth weight, namely research by Sharma, Yang, and Madzorera. In detail, MDD-W was assessed using dietary diversity scores (DDS) with a low classification if pregnant women consumed <5 jenis="" makanan="" sedang="" 6-8="" jenis="" makanan="" tinggi="" >8 types of food. Three of the four articles show significance that consuming a diversity of ≥ 5 foods with good frequency when ≥ 4 servings/week of each type of food that belongs to medium and high DDS has a lower chance of giving birth to a baby with BBLR.

Unhealthy foods are various types or foodstuffs that contain unbalanced nutrition. This type of food should not be consumed in excess. Generally, unhealthy foods contain only a small amount of substances and little fiber needed for the development of the body (Pratiwi, 2020). Among the 8 selected articles included in this Scoping Review, there are two articles explaining the types of unhealthy foods, namely snacks and energy, fast food and spreads, alcoholic beverages. In the research of Mitku et al., 2020, it was found that snacks and alcoholic beverages have a negative impact on the outcome of stunting events, namely birth weight (Mitku et al., 2020b). Snacks contain food chemicals such as preservatives, flavorings and salt in high quantities so that they can increase the risk of various diseases in pregnant women and also have a bad impact on the fetus. Meanwhile, alcohol consumption during pregnancy is dangerous because

the fetal liver organs are not fully formed, so the body is not able to filter toxins and other harmful substances so that the alcohol consumed by pregnant women enters the fetal body through the placenta which adversely affects the growth and development of the fetus (Ismawati et al., 2021).

Eating in Pregnant Women Based on Patterns

A healthy diet in pregnant women is food consumed by pregnant women must have the amount of calories and nutrients that suit their needs or meet the quality of the dish. In the general guidelines of balanced nutrition (PUGS) the recommended food arrangement is the one that ensures the balance of nutrients (Puspasari & Andriani, 2017). This can be achieved by consuming a variety of foods that are both in quality and quantity every day. Each food can complement each other in the nutrients it contains. Nutritional needs during pregnancy are different from the period before pregnancy, increasing the nutritional needs of pregnancy by 15% by increasing 300 calories, because it is needed for the growth of the uterus, breasts, blood volume, placenta, amniotic water and fetal growth. The food consumed by pregnant women is used for fetal growth of 40%, while the 60% is to meet the needs of the mother.

Among the 8 selected articles in the Scoping Review, there are two articles that use food groups based on a healthy diet, namely: Vegetarian patterns have a higher intake of cereals, legumes, vegetables, fruits, livestock and poultry. In Yan's research, vegetarian patterns can significantly promote low birth weight (Yan et al., 2020a). The vegetarian pattern has an energy intake of 2325 ± 899 kcal, carbohydrates $369 \text{ g} \pm 126 \text{ g}$ kcal, proteins $60 \pm 12 \text{ g}$ and fats $68 \pm 9 \text{ g}$ (Yan et al., 2020a).

Traditional patterns have a higher intake of cereals, potatoes, legumes, vegetables, fruits, livestock and poultry, and eggs. In Yan and Quansah's research, traditional patterns can significantly decrease babies born with BBLR (Quansah & Boateng, 2020b) (Yan et al., 2020a).

The Balance Pattern has a higher intake of cereals, potatoes, legumes, vegetables, fruits, mushrooms, farm and poultry meat, fish, shrimp, crabs, shellfish, milk, and nuts. In Yan's article, the balance pattern significantly decreases babies born with BBLR (Yan et al., 2020a). The balance pattern has an average energy intake of 2527 ± 895 , protein $78 \pm 9 \text{ g}$, vitamin A $637 \pm 452 \mu\text{gRE}$, vitamin B12 $2.5 \pm 0.5 \text{ g}$ acid intake is $559 \pm 227 \text{ gDFE}$, calcium $906 \pm 365 \text{ mg}$, and iron $33 \pm 12 \text{ mg}$ kcal more adequate than vegetarian, processing, traditional patterns (Yan et al., 2020a).

Among the 8 selected articles in the Scoping Review, there are three articles that use food groups based on unhealthy diets, namely: The processing pattern consists of a kind of spaghetti, steamed rice noodles, instant noodles, bacon/sausage, bean products, root vegetables, green vegetables, snacks, drinking. In Yan and Santana's research, processing/processing patterns in pregnant women can increase the risk of low birth weight (Santana et al., 2021b). The processing/processing pattern has an energy intake of $2789 \pm 853 \text{ kcal}$, cholesterol $220 \pm 105 \text{ g}$ and fat $75 \pm 10 \text{ g}$. higher compared to the balance pattern, vegetarian, traditional, protein $58 \pm 8 \text{ g}$, carbohydrates $389 \pm 133 \text{ g}$ (Yan et al., 2020a). The western pattern consists of meat, poultry, meat organs (liver, kidneys), eggs, pork. In Quansah's article, western patterns in pregnant women can increase the risk of low birth weight (Quansah & Boateng, 2020b).

Table 2. Effects / Descriptions of Diet Types on Outcomes

Heading	Researcher and Year of Research	Repondent Characteristics	Tried interventions	Outcome	Types of Statistical Tests	Result	Conclusion (Significance)
<i>Prenatal dietary diversity may influence underweight in infants in a Ugandan birth-cohort</i>	(Madzorera, Ghosh, et al., 2020)	General (Pregnant Women)	Types of food (Healthy food)	No Low Birth Weight Stunting	Wilcoxon raksum test	Not mentioned (Insignificant)	-
<i>The differential effect of maternal dietary patterns on quantiles of Birthweight</i>	(Mitku et al., 2020a)	General (Pregnant Women)	Types of food (Healthy food) Unhealthy food	No Low Birth Weight	Quantile regression	Not mentioned, p<0,001 p<0.001	√ √
<i>Association between Maternal Dietary Diversity and Low Birth Weight in Central India: A Case-Control Study</i>	(Sharma et al., 2021a)	General (Pregnant Women)	Types of food (Healthy food)	No Low Birth Weight	Logistic regression	Not mentioned (Significant)	√
<i>Dietary diversity and diet quality with gestational weight gain and adverse birth outcomes, results from a prospective pregnancy cohort study in urban Tanzania</i>	(Yang et al., 2021)	General (Pregnant Women)	Types of food (Healthy food) Unhealthy food	No Low Birth Weight	Poisson regression	0,31-0,99 ^a 0,29-0,94 ^a Not mentioned (Insignificant)	√ -
<i>Dietary patterns of Chinese women of childbearing age during pregnancy and their relationship to the neonatal birth weight</i>	(Yan et al., 2020b)	General (Pregnant Women)	Diet (healthy diet) Unhealthy diet	No Low Birth Weight	Not mentioned	1,06-2,93 ^a , 1,18-2,62 ^a 1,05-3,75 ^a 1,14-0,83 ^a 0,43-0,99 ^a , 1,22-15,16 ^a	√ -
<i>Maternal dietary diversity and pattern during pregnancy is associated with low infant birth weight in the Cape Coast metropolitan hospital, Ghana: A hospital based cross-sectional study</i>	(Quansah & Boateng, 2020a)	General (Pregnant Women)	Diet (healthy diet) Unhealthy diet	No Low Birth Weight	Pearson Chi-square test	P<0,001 p>0,001	√ -
<i>Associations between Maternal Dietary Patterns and Infant Birth Weight in the NISAMI Cohort: A Structural Equation Modeling Analysis</i>	(Santana et al., 2021a)	General (Pregnant Women)	Types of food (Healthy food) Unhealthy food	No Low Birth Weight	Chi-square statistical test	Not mentioned p<0,05	√ -
<i>Maternal dietary diversity and dietary quality scores in relation to adverse birth outcomes in Tanzanian women</i>	(Madzorera, Isanaka, et al., 2020)	General (Pregnant Women)	Types of food (Healthy food) Unhealthy food	No Low Birth Weight	Log binomial regression	p<0,001 p<0,001	√ -

Factors Affecting Diet in Pregnant Women

Age affects how pregnant women think about fulfilling the food consumed and the higher the age, the higher the need for food intake, the higher the need for food intake. In an article by Santana and Sharma, it is mentioned that age affects the diet of pregnant women to meet their nutritional needs (Santana et al., 2021b) (Sharma et al., 2021b). Employment and income are related to economic limitations, which means not being able to afford good quality foodstuffs, thus interfering with the fulfillment of nutrition (Santana et al., 2021b).

Educational factors can affect the ability to absorb knowledge about nutrition that it obtains through various information. Lack of nutritional knowledge, prejudice in certain foodstuffs, misperceptions about the needs and nutritional value of a food can affect a person's nutritional status (Quansah & Boateng, 2020b).

Women who made the recommended number of antenatal visits (four or more) were less likely to have a baby with BBLR than women who had fewer visits. In Yan's research, it was stated that urban women are more likely to choose a balanced pattern, rural women are more likely to choose a vegetarian pattern (Yan et al., 2020a).

Quansah's research states that reasons such as cultural taboos can affect women's food choices with lower education and can lead to less food diversity (Quansah & Boateng, 2020b).

CONCLUSIONS AND SUGGESTIONS

The results of this study found that the type and healthy diet in pregnant women produced a significant good effect on birth weight in preventing stunting. This type and healthy diet consists of Minimum Dietary Diversity for Women (MDD-W) consuming ≥ 5 types of food with a good category if the frequency of ≥ 4 servings / week in each type, protein-rich foods, balance patterns, and traditional patterns. In detail, a good diet in pregnant women by increasing food intake by 15% than usual with the consumption of the main food 3x a day plus 2x interludes / snacks consisting of ≥ 5 types of food, so that the nutrition of pregnant women remains fulfilled, accompanied by multivitamin supplementation. In increasing the amount, frequency and portion of food in pregnant women must also be considered according to calorie needs but even though the mother's caloric needs during pregnancy are met according to their needs, the quality of food consumed during pregnancy is preferred. Based on the results of the study, the factors that affect the diet of pregnant women consist of age, occupation and income, education, antenatal visits, place of residence and culture

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Reviewer's Advice

The authors leave it entirely up to the maintainers to review our articles, and the reviewer results are relayed back to us if they need to be corrected according to the input of the reviewer team..

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