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The role of nutritional intake on dental caries prevention in pregnant women

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Abstract

Introduction: Pregnant women are included in the vulnerable group to experience dental caries due to changes in diet to hormonal changes during pregnancy. In the first and second trimesters, pregnant women often consume cariogenic foods, increasing dental caries. Prevention of dental caries in pregnant women can be done by adopting a healthy diet through the provision of good nutrition.

Purpose: This study was conducted to determine the relationship between nutritional intake and the prevention of dental caries in pregnant women.

Method: The collection of scientific data was conducted through a systematic search of journal databases, including Google Scholar, PubMed, ScienceDirect, and Elsevier.

Discussion: Nutrient intake in the diet of pregnant women containing vitamins, minerals, calcium, phosphate, and fluoride is useful for encouraging tooth remineralization, which plays an important role in preventing dental caries. Meanwhile, the habit of pregnant women consuming cariogenic food must be reduced because it causes demineralization of the tooth surface and results in caries.

Conclusion: Nutritional intake is related to the prevention of dental caries in pregnant women. Good nutritional intake and withdrawal of cariogenic foods during pregnancy can reduce the occurrence of dental caries in pregnant women.

Keywords: Nutrition intake; Dental caries; Pregnant women; Dietary habit

1. Introduction

Pregnant women are highly susceptible to oral and dental health problems due to hormonal changes during pregnancy. Systemically, progesterone levels increase up to 30 times, and estrogen levels increase up to 10 times during pregnancy. Elevated estrogen and progesterone levels are associated with increased dental plaque accumulation, which may be exacerbated by nausea and morning vomiting experienced during pregnancy [1].

Hormonal, physical, and behavioral changes influence the oral and dental health of pregnant women. During early pregnancy, women often experience fatigue, frequent nausea, and occasional vomiting. These conditions can increase the acidity of the oral cavity. Reduced motivation to maintain oral hygiene may lead to increased plaque accumulation and subsequently accelerate the progression of dental caries [2].

In pregnant women, the oral pH tends to be more acidic than in non-pregnant women. Pregnancy can alter salivary flow rate, salivary pH, and biochemical composition. A reduction in salivary flow rate and pH may impair the buffering

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capacity of saliva, thereby disrupting the balance between demineralization and remineralization processes. Consequently, pregnant women are at a higher risk of experiencing an increased incidence of dental caries [3].

Dietary changes during pregnancy increase the susceptibility of pregnant women to dental caries. During the first trimester, pregnant women tend to consume sweet foods to alleviate nausea and vomiting. From the first to the second trimester, the intake of unhealthy foods tends to increase, indicating higher consumption of sugary foods and beverages. The increased intake of sweet foods and drinks from the first to the second trimester may reflect responses to pregnancy cravings, altered satiety, and changes in food preferences [4].

Oral health and nutrition have a bidirectional relationship: good oral health is essential for maintaining adequate nutritional intake, while appropriate nutrition is crucial for preserving oral health. In pregnant women, oral and dental health requires particular attention to prevent chewing difficulties and discomfort that may interfere with adequate nutritional intake during pregnancy [5, 6].

Given that pregnant women are a vulnerable group for dental caries due to hormonal changes and dietary modifications during pregnancy, balanced nutritional intake is required to improve maternal oral health. Based on the considerations above, this literature review aims to examine the effect of nutritional intake on the prevention of dental caries in pregnant women.

2. Method

This article is a narrative literature review. The collection of scientific data was conducted through a systematic search of journal databases, including Google Scholar, PubMed, ScienceDirect, and Elsevier. The literature search was performed using the following keywords and Boolean combinations: “pregnant women”, “dental caries”, “disease”, “nutrition”, “dietary pattern”.

3. Result

3.1. Nutrition

Nutrition refers to nutrients and other substances that are closely associated with health and disease. Adequate nutritional intake supports daily activities, as nutrients serve as a primary source of energy for various organs in the body and function as structural and regulatory components essential for physiological processes. Nutrients consist of chemical compounds required by the body to fulfill these functions, particularly as a source of energy. This energy enables living organisms to carry out daily activities and physiological actions. Nutritional intake in pregnant women plays a crucial role in determining maternal nutritional status. Maternal nutritional status during pregnancy has a significant impact on fetal growth and development; inadequate maternal nutrition may result in impaired fetal brain development, miscarriage, and other adverse pregnancy outcomes [7].

3.2. Dental Caries

Dental caries is a disease of the hard tissues of the teeth, including enamel, dentin, and cementum, caused by the activity of microorganisms that metabolize fermentable carbohydrates. The disease is characterized by the demineralization of dental hard tissues, followed by the destruction of their organic components. This process allows bacteria to invade and damage the dental pulp and potentially spread to the periapical tissues, resulting in pain. Dental caries is a progressive and cumulative condition; if left untreated over time, it may worsen in severity. The development of dental caries is influenced by both internal and external factors. Internal factors originate within the oral cavity and are directly involved in the caries process, including the host, microorganisms, substrate, and time. External factors include socioeconomic status, family environment, occupation, availability of dental health services, and previous oral health education [1].

3.3. Dietary Pattern

Table 1 Results of the literature review on the effect of nutritional intake on the prevention of dental caries in pregnant women

Authors	Title	Result	Conclusion
Udijanto Tedjosasongko, Fridianty Anggraeni, Mok Li Wen, Satiti Kuntari, Mega Moeharyono Puteri	Prevalence of Caries and Periodontal Disease Among Indonesian Pregnant Women	The study found that 84.7% of pregnant women experienced dental caries, while only 15.3% were caries-free. The DMF-T index values were 2.33 in the first trimester, 4.69 in the second trimester, and 4.57 in the third trimester.	The majority of pregnant women in Indonesia have limited knowledge regarding oral health. Most pregnant women experience dental caries, with the highest prevalence observed during the second trimester [9].
Mutia Rizki Rahmayani, Anne Agustina Suwargiani, Netty Suryanti	Caries experience, periodontal disease, and caries risk level of pregnant women	The results of a study involving 50 pregnant women showed that the mean DMF-T index was 7.84, which was classified as low. A total of 17 pregnant women (34%) had a moderate level of caries risk, while 33 pregnant women (66%) had a high level of caries risk.	The caries experience of pregnant women falls into the low category, the most common periodontal disease is gingivitis, and the level of caries risk among pregnant women is classified as high [3].
Putri Ayu Indiarto, Pawarti, Halimah	The Impact of Oral and Dental Health of Pregnant Women on Nutritional Intake	Pregnant women experience various oral and dental health problems, including dental caries, gingivitis, and oral manifestations associated with malnutrition and maternal oral health behaviors. Poor oral and dental health conditions may reduce appetite, resulting in inadequate nutritional intake.	There is an association between oral health in pregnant women and nutritional intake. Hormonal changes during pregnancy may lead to decreased appetite and reduced motivation to maintain oral hygiene [5].
Philippe P. Hujoel dan Peter Lingstrom	Nutrition, Dental Caries and Periodontal Disease: A Narrative Review	The maintenance of periodontal health depends on the ability to obtain optimal nutritional intake. Nutritional deficiencies can disrupt the mineralization process, making teeth more susceptible to dental caries. Individuals with high-carbohydrate diets have a higher prevalence of dental caries.	Dental caries and periodontal disease are indicators of unhealthy dietary patterns. Dietary recommendations for pregnant women include foods rich in mineralization factors, such as dark green leafy vegetables, cheese, milk, eggs, and cod liver oil [10].
Laura E. Forbes, Jocelyn E. Graham, Casey Berglund, dan Rhonda C. Bell	Dietary Change during Pregnancy and Women's Reasons for Change	The study results showed that pregnant women reduced or eliminated caffeine and alcohol intake to maintain fetal health. However, they increased the consumption of dairy products and sugary foods to satisfy cravings during pregnancy.	The dietary changes during pregnancy reported in this study indicate that pregnant women reduced the intake of foods considered harmful to pregnancy; however, they did not increase the consumption of foods that provide essential nutrients for pregnancy [11].

Rahmidah, R.A. Zainur, Saluna Deynilisa	Overview of Oral Health Behaviors Related to Caries Prevention Among Pregnant Women	Pregnant women are a population vulnerable to oral and dental diseases. Pregnancy induces hormonal changes that may increase the risk of oral and dental health problems. Based on the frequency distribution of oral health–related behaviors, the majority of pregnant women demonstrated poor oral health maintenance behaviors during the third trimester.	The prevalence of dental caries increases with advancing gestational age. This may be attributed to prolonged exposure of the teeth to caries risk factors [12].
Hasya Prana Dewi, Susi, Surma Adnan, Suci Erawati.	Risk Factors for Dental Caries in Pregnant Women	The study results indicated that mothers with higher levels of education had lower DMF-T index scores compared with those with primary and secondary education ($F = 4$, $n = 152$, $p = 0.024$). Lower educational level among pregnant women was associated with improper toothbrushing practices ($t = 2.06$, $p = 0.041$) and greater plaque accumulation ($r = 0.31$, $p < 0.00001$), resulting in higher DMF-T index values.	Knowledge and educational level among pregnant women are influential factors in the development of dental caries. Providing oral and dental health education to pregnant women may have a positive impact on the oral and dental health of their children [13].
Renata Chałas, Angelika Kobylinsk, Magdalena Kukurba-Setkowicz, Anna Szulik, dan Elzbieta Pels.	The Role of Proper Maternal Nutrition During Pregnancy For Caries Prevention in Both Mother and Child. Opinion Of the Working Group of The Polish Alliance For A Cavity-Free Future on Dental Prophylaxis In Pregnant Women	Nutrisi yang tepat pada kehamilan berdampak pada kesehatan ibu serta perkembangan janinnya. Inadequate vitamin intake may lead to metabolic disturbances in pregnant women and their fetuses, as the fetus obtains essential compounds from the maternal body. Vitamins A, C, and D are among the key vitamins required during pregnancy. Pregnant women are advised to choose foods with high nutritional value but low caloric content to prevent excessive weight gain.	Controlling dietary patterns in pregnant women can help prevent abnormalities in dental development. Diet is an essential component of caries prevention in pregnant women. A balanced diet rich in protein, calcium, phosphorus, fluoride, and vitamins is recommended [14].
Marija Jevtic, Jelena Pantelinac, Tatjana Jovanovic Ilic, Vasa Petrovic, Olja Grgic dan Larisa Blazic.	The Role of Nutrition in Caries Prevention and Maintenance Of Oral Health During Pregnancy	Cariogenic foods increase the risk of dental caries development during pregnancy. Diet plays a significant role in the progression of dental caries. Foods containing vitamins, minerals, and various bioactive compounds can support the preservation and remineralization of tooth structures. The initial step in establishing a healthy diet during pregnancy is identifying potential nutritional imbalances and correcting existing dietary habits.	Caries prevention through a healthy diet involves reducing both the frequency and amount of cariogenic food intake, particularly refined carbohydrates such as sugars and confectionery. Foods with caries-preventive (prophylactic) effects should predominate in a healthy dietary plan [15].

Yeti Yuwansyah dan Een Nuraeni.	Relationship Between Knowledge And The Incidence Of Dental Caries among Pregnant Women at The Midwife Independent Practice (Pmb) Of Bd. Eti Suryati, Amd. Keb Cipeundeuy Village, Jatinunggal Sub-District, Sumedang District In 2020	Based on the study results, there is an association between knowledge level and the occurrence of dental caries in pregnant women. When pregnant women experience oral and dental problems, dietary intake may be compromised, particularly in cases of dental caries or tooth decay.	Good knowledge leads to better understanding; therefore, pregnant women with good knowledge are more likely to engage in effective preventive practices against dental caries [16].
Geum Joon cho, So-youn Kim, Hoi chang Lee, Ho Yeon Kim, Kyu-Min Lee, Sung Won Han & Min-Jeong oh.	Association Between Dental Caries and Adverse Pregnancy Outcomes	Among 120,622 women who gave birth during the study period, 28,623 (23.7%) experienced dental caries. Compared with women without dental caries in this study, those with dental caries had a higher prevalence of overweight status and elevated fasting glucose levels, which are known risk factors for dental caries.	Pregnant women with dental caries tended to be younger and had higher body mass index (BMI), waist circumference, blood pressure, fasting glucose levels, and total cholesterol levels compared with pregnant women without dental caries [17].

Dietary patterns refer to the manner in which individuals regulate the quantity and composition of food intake, thereby contributing to improved physical health, psychological well-being, disease prevention, and recovery processes. Healthy eating habits reflect the optimal fulfillment of nutritional requirements. A healthy dietary pattern should consider recommended dietary allowances, including adequate intake of carbohydrates, proteins, fats, and minerals. Nutritional status serves as an important health indicator. A healthy diet is characterized by appropriate portion sizes, sufficient nutrient diversity, and proper frequency of food consumption. Through a healthy dietary pattern, adequate nutritional intake can be ensured. Nutrients consumed by the body are subsequently converted into energy to support daily activities [8].

4. Discussion

Based on the results of the literature review, pregnant women are at high risk of dental caries. Pregnant women often demonstrate suboptimal oral health behaviors related to caries prevention, such as irregular toothbrushing, failure to rinse the mouth with water after vomiting, not brushing teeth before bedtime, infrequent consumption of fruits rich in vitamins A and C, and frequent intake of sticky foods such as chocolate. Dietary changes during pregnancy are one of the contributing factors to the high prevalence of dental caries among pregnant women. These dietary changes may be influenced by the desire to maintain fetal health, the frequency of nausea and vomiting, psychological factors such as anxiety and concern, as well as pregnancy-related cravings [11, 12].

Dental caries is an indicator of unhealthy dietary patterns. Dietary changes during pregnancy, such as increased carbohydrate consumption, higher eating frequency, snacking between main meals, digestive disturbances, and nausea and vomiting experienced during the first trimester, may have negative effects on oral health. Frequent consumption of snacks, such as sweets and sugary fruit juices, can lower salivary pH, thereby increasing the risk of dental caries, which may lead to enamel erosion and dental hypersensitivity [14].

Certain foods can increase the risk of dental caries development during pregnancy and should therefore be considered when planning dietary patterns for pregnant women. Easily digestible carbohydrates, particularly sugars, are regarded as potential triggers for dental caries formation because acidic byproducts of bacterial metabolism attack and damage tooth enamel and dental structures. Cariogenic foods, those rich in carbohydrates and acids, should be limited, while a caries-preventive diet is recommended to reduce the risk of caries development in pregnant women. Each time cariogenic foods are consumed, carbohydrates exposed on the enamel surface are fermented by bacteria, leading to a decrease in pH to critical levels below 5.5, which results in dental demineralization [10, 15].

An appropriate dietary pattern for preventing dental caries in pregnant women involves ensuring adequate intake of nutrients that support tooth mineralization, including vitamins A, C, and D, calcium, phosphate, and fluoride. Vitamin A plays an essential role in bone and tooth development and in the regeneration of mucosal and other tissues, while vitamin C contributes to collagen synthesis, prevents gingival bleeding, enhances iron and calcium absorption, and acts as an antioxidant. Vitamin D is crucial for maintaining bone and tooth density during pregnancy and facilitates calcium and phosphate absorption; together with calcium and phosphate, it is a key component of bone and tooth mineralization. These nutritional requirements can be met through the consumption of fruits, vegetables, dairy products, fatty saltwater fish, eggs, nuts, legumes, and green leafy vegetables. Overall, dietary patterns during pregnancy are vital for maternal and fetal health and should be calorically efficient, rich in protein, vitamins, and minerals, and balanced in carbohydrate and lipid intake [15,18].

Dental caries in pregnant women can be prevented by adopting a nutritious dietary pattern and increasing awareness of maintaining oral hygiene and oral health during pregnancy. Proper oral health care during pregnancy includes regular and correct toothbrushing practices, supported by the use of adjunctive oral hygiene aids such as tongue cleaners, interdental brushes, mouth rinses, fluoride-containing toothpaste, and dental floss. Pregnant women should consume a balanced and nutritious diet that supports tooth mineralization, avoid sugary and sticky foods, choose fruits as healthier alternatives to snacks between main meals, and undergo routine dental check-ups [2, 13].

5. Conclusion

Based on the findings of this review on the effect of nutritional intake on the prevention of dental caries in pregnant women, it can be concluded that oral health and nutrition are closely interrelated. Adequate oral health is essential for maintaining sufficient nutritional intake, while appropriate nutrition plays a critical role in preserving oral health. Pregnant women tend to exhibit suboptimal behaviors in maintaining oral health related to caries prevention and are considered a vulnerable group for dental caries due to hormonal changes and dietary modifications during pregnancy.

Therefore, the prevention of dental caries in pregnant women can be achieved by ensuring balanced nutritional intake and enhancing awareness of oral hygiene and oral health maintenance throughout pregnancy.

Compliance with ethical standards

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Disclosure of conflict of interest

The authors declare that there is no conflict of interest.

References

[1] Listrianah, Zainur RA, Hisata LS. Overview of Caries in the Permanent First Molar Teeth Among Students of State Elementary School 13 Palembang in 2018. Journal of Health Poltekkes Palembang. 2018;13(2):138-140.

[2] Gejir IN, Sukartini NKA. The Relationship Between Oral and Dental Hygiene and Pregnancy Trimester Among Pregnant Women Visiting Klungkung I Community Health Center, Klungkung Regency, in 2016. Journal of Dental Health. 2017;5(1):1-4.

[3] Rahmayani MR, Suwargiani AA, Suryanti N. Caries experience, periodontal disease, and caries risk level of pregnant women. Journal of Dentistry Padjadjaran University. 2021;33(1):5.

[4] Jardi C, Aparicio E, Bedmar C, Aranda N, Abajo S, March G, Basora J, Arija V. Food Consumption during Pregnancy and Post-Partum. Nutrients. 2019;11(247):11.

[5] Indiarto PA, Pawarti, Halimah. The Effect of Oral and Dental Health in Pregnant Women on Nutritional Intake. Journal of Dental Therapist. 2022;1(1):9.

[6] Makkiyah IF. Association Between Pregnancy Stage and Dental Caries, Gingivitis, and Periodontitis in Pregnant Women. Journal of Study Literature. 2020;1-2.

[7] Rachmawati A, Anggraeni PI, Putri SA. Maternal Nutrition and Fetal Growth. State University of Malang Journal. 2015;1-5.

[8] Nurwijayanti. Dietary Patterns, Breakfast Habits, and Nutritional Status Are Associated with Academic Achievement Among Vocational High School Students in Kediri City. Journal Care. 2018;6(1):59-61.

[9] Tedjosasongko U, Anggraeni F, Wen ML, Kuntari S, Puteri MM. Prevalence of Caries and Periodontal Disease among Indonesian Pregnant Women. Pesqui. Bras. Odontopediatria Clin. Integr. 2019;19:4533.

[10] Hujoel PP, Lingstorm P. Nutrition, Dental Caries and Periodontal Disease: A Narrative Review. J Clin Periodontol. 2017;44(18):80.

[11] Forbes LE, Graham JE, Berglund C, Bell RC. Dietary Change during Pregnancy and Women's Reasons for Change. Nutrients. 2018;10(1032);5.

[12] Rahmidah, Zainur RA., Deynilisa S. Overview of Oral Health Behaviors of Pregnant Women in Preventing Dental Caries. Journal of Oral and Dental Health. 2020;2(2):48.

[13] Dewi HP, Susi, Adnan S, Erawati S. Risk Factors for Dental Caries in Pregnant Women. Prima Journal of Oral and Dental Sciences. 2023;6(1):8.

[14] Chałas R, Kobylinsk A, Setkowicz MK, Szulik A, Pels E. The Role Of Proper Maternal Nutrition During Pregnancy For Caries Prevention In Both Mother And Child. Opinion Of The Working Group Of The Polish Alliance For A Cavity-Free Future On Dental Prophylaxis in Pregnant Women. Nowa Stomatol. 2018; 23(2):84-89.

[15] Jevtic M, Pantelinac J, Jovanovic-Ilic T, Petrovic V, Grgic O, Blazic L. The Role of Nutrition in Caries Prevention and Maintenance of Oral Health during Pregnancy. Med Preg. 2015; LXVIII (11-12):388-390.

[16] Yuwansyah Y, Nuraeni E. Relationship Between Knowledge And The Incidence Of Dental Caries among Pregnant Women at The Midwife Independent Practice (Pmb) Of Bd. Eti Suryati, Amd. Keb Cipeundeuy Village, Jatinunggal

Sub-District, Sumedang District In 2020. Proceedings of the National Seminar on Research Results and Community Service. 2020; 1(1):4-6

[17] Cho GJ, Kim S, Lee HC, Kim HY, Lee KM, Han SW, Oh, MJ. Association between dental caries and adverse pregnancy outcomes. Scientific Reports. 2020; 10(1): 1-5

[18] Popovici D, Crauciuc E, Socolov R, Balan R, Hurjui L, Scripcariu I, Pavaleanu I. Early Diagnosis and Treatment of Dental Caries in Pregnancy. Maedica. 2018; 13(1):103.