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Effect of Multiple Micronutrient Suplementation (MMS) in Pregnant Women on Anemia

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ABSTRACT

Introduction: The nutritional needs of pregnant women increase 2-3 times as the gestational age increases. Fulfilling the dietary needs of pregnant women is a challenge, especially for low- and middle-income countries. Many pregnant women in poor countries experience micronutrient deficiencies. Micronutrient deficiencies can have a negative impact on pregnant women because they can cause problems for the health of the mother and fetus. The effect of deficiencies of micronutrients, namely iron, folic acid, and B12 in pregnant women is anemia. Iron deficiency anemia is one of the most common diseases during pregnancy. In addition to iron and folic acid supplements which are intended to anticipate anemia problems, pregnant women also need other micronutrient components in the form of vitamins and minerals. *Multi Micronutrient Supplements* (MMS) is one of the global strategies recommended by the United Nations International Childhood Emergency Fund (UNICEF) to prevent micronutrient deficiencies. **Objective**: The literature review aims to examine the benefits of consuming Multi Micronutrient Supplements (MMN) in overcoming anemia in pregnant women. **Method**: The method used in writing this article is a review of research results related to the provision of MMS to overcome anemia in pregnant women. **Result**: Based on the articles that have been analyzed, it can be seen that consuming MMN during pregnancy can increase hemoglobin levels so that it can prevent anemia in pregnant women. **Conclusion**: MMS consumption during pregnancy can increase hemoglobin levels and prevent anemia in pregnant women. Referring to this conclusion, it is recommended for pregnant women to consume MMS regularly.

Keywords: anemia, mms, pregnant women

Introduction

The nutritional needs of pregnant women increase 2-3 times as the gestational age increases (Ambarwati et al., 2023; Aprilia Hendraswari et al., 2024). The increase in nutritional needs is needed to support all body changes, prepare the body for childbirth and breastfeeding, and ensure normal fetal/baby development (Susanto & Adjie, 2024).

Malnutrition during pregnancy can cause several health problems including anemia. Anemia can be caused by various things including iron deficiency, vitamin B12 deficiency, folate deficiency, infectious diseases, congenital factors, and bleeding. Anemia in pregnant women will have an impact on the suboptimal growth and development of the fetus in the womb and has the potential to cause complications in pregnancy and childbirth, even causing maternal and child death (Hulinggi et al., 2023).

Diet during pregnancy needs to be maintained to improve the health of the mother and fetus. A healthy diet includes good nutrition for pregnancy consisting of energy, protein, vitamins, and minerals. (Aprilia Hendraswari et al., 2024)Meeting the nutritional needs of pregnant women is a challenge, especially for low-and middle-income countries (Aprilia Hendraswari et al., 2024). Many pregnant women in poor countries experience micronutrient deficiencies (Susanto & Adjie, 2024). Micronutrient deficiencies occur so that micronutrient supplementation is needed (Aprilia Hendraswari et al., 2024).

Micronutrient deficiencies can have a negative impact on pregnant women because they can cause health problems for the mother and her fetus. The impact of micronutrient deficiencies, namely iron, folic acid, and B12 in pregnant women is that the mother experiences anemia characterized by symptoms of paleness, fatigue, weakness, and lethargy and can cause impaired fetal growth and development, increasing the risk of premature birth and low birth weight (Imelda et al., 2023).

Anemia is one of the main nutritional problems in Indonesia, including in pregnant women. Anemia is a condition in which the number of red blood cells or the concentration of hemoglobin in it is lower than normal. Iron deficiency anemia is one of the most common diseases during pregnancy (Lestari et al., 2022). One of the factors of anemia in pregnant women is the lack of iron intake consumed by the mother every day. The results of the study showed an influence between inadequate iron (Fe) intake and the incidence of anemia in pregnant women (Sari et al., 2022).

Currently, nutritional interventions are still given in the form of iron folate supplements aimed at anticipating anemia problems and fetal growth and development during pregnancy because anemia is still a crucial problem for pregnant women. The incidence of anemia from year to year does not show a significant decrease. Meanwhile, pregnant women also need other micronutrient components in the form of vitamins and minerals which are expected to prevent anemia and various health problems during pregnancy (Lalusu et al., 2023).

Therefore, giving iron folate supplements to pregnant women should be accompanied by other micronutrient supplementation. Combining these micronutrients into one supplement will be more efficient (Lalusu et al., 2023). *Multi Micronutrient Supplement* (MMS) is a supplement containing multivitamins, iron, and folate given to pregnant women as one of the programs of the Indonesian Ministry of Health to prevent anemia during pregnancy (Muzaina et al., 2024).

Objective

The purpose of this literature review is to further examine the benefits of consuming *Multi Micronutrient Supplements* (MMN) in overcoming anemia in pregnant women.

Method

The research method used is a literature review study (Literature Review) which tries to dig up more information about tomato juice to increase hemoglobin levels in pregnant women. The type of data used is secondary data. Sources for conducting this literature review include a systematic search study of computerized databases on Google Scholar in the form of research journals totaling 3 articles. The research journals used are from 2022 to 2025.

The analysis method used is using content analysis of online research journal documents obtained through searching trusted journal sites with inclusion criteria, namely research journals that study tomato juice to increase hemoglobin levels in pregnant women, within the last 5 years, national and international class, have an ISSN (International Standard of Serial Number) number, both printed and electronic versions or there is a DOI (Digital Object Identifiers) in the journal.

Result

Table 1. Analysis of Literature Review Results

	Author	Title	Method	Purpose	Results
1	(Hastuty et al., 2022)	Relationship Between MMS Tablet Administration and Laboratory Examination with the Incidence of Anemia in Pregnant Women	*Analytical observation* with *cross-sectional study design.*	Knowing the relationship between giving MMS tablets and laboratory examinations in pregnant women with the occurrence of anemia.	There is a relationship between the administration of MMS tablets and laboratory examinations with the incidence of anemia in pregnant women.
2	(Hulinggi et al., 2023)	The Relationship Between Nutrition Knowledge and Micronutrient Intake with the Incidence of Anemia in Pregnant Women During the Covid-19 Pandemic (Case Study in the Work Area of the Tapa Health Center, Bone Bolango Regency)	Observational with a *cross-sectional approach.*	Analyzing the relationship between nutritional knowledge and micronutrient intake with the incidence of anemia in pregnant women during the Covid-19 pandemic.	There is a relationship between nutritional knowledge and micronutrient intake with the incidence of anemia in pregnant women during the COVID-19 pandemic.
3	(Mustar et al., 2025)	Comparison of Multi Micronutrient Supplementation (MMS) and Fe	Observational with a retrospective approach.	Analyzing the comparison of Multi Micronutrient Supplements and	There is a comparison of Multi Micronutrient Supplements and

Author	Title	Method	Purpose	Results
	Tablets on Increasing Hemoglobin Levels in Pregnant Women at the Barebo Health Center UPT		Fe tablets on increasing hemoglobin levels in pregnant women.	Fe tablets on increasing hemoglobin levels in pregnant women.

Discussion

Multi Micronutrient Supplements (MMS) are one of the most widely consumed types of supplements (Mustar et al., 2025). Supplements are an effective short-term solution to prevent and overcome micronutrient deficiencies in at-risk groups because they can meet daily micronutrient needs (Mandowa et al., 2022). With a variety of vitamins and minerals in them, multivitamins are believed to be beneficial for improving body health, balancing unhealthy diets, and even preventing disease (Mustar et al., 2025). Important micronutrient supplementation for pregnant women is iron (Fe), folic acid, calcium (Ca), magnesium (Mg), copper (Mg), zinc (Zn), and vitamins A, vitamin B, vitamin C, vitamin D (Aprilia Hendraswari et al., 2024).

MMS contains 15 essential vitamins and minerals that are safe and effective in improving the diet and nutritional status of pregnant women (UNICEF, 2022). MMS not only contains iron but also contains 15 types of vitamins and minerals that are very important for pregnant women and help the absorption of nutrients. Although MMS only contains 30 mg of iron (lower than the iron content in the Fe + Folate formula), this supplement has various advantages and has gone through various clinical trials related to its positive and negative impacts on health. (Lalusu et al., 2023). When taken daily during pregnancy, MMS can treat anemia and is 13 percent more effective in reducing low birth weight than iron and folic acid supplements alone. For women who are both underweight and anemic, the benefits of MMS are even greater, reducing the prevalence of low birth weight by 19 percent (UNICEF, 2022).

Proper consumption of MMS can be beneficial for pregnant women and does not reduce hemoglobin levels. Some ingredients in MMS such as iron, play an important role in the formation of hemoglobin in the blood and help prevent or overcome anemia (decreased hemoglobin) (Mustar et al., 2025). The absorption of iron in the MMS formulation is higher compared to Fe + Folate due to the content of vitamin C, vitamin A, and riboflavin (Lalusu et al., 2023). Vitamin C plays an important role in increasing the absorption of iron from food. Vitamin C deficiency can cause decreased iron absorption, potentially increasing the risk of anemia (Budiana et al., 2024).

As a water-soluble vitamin, vitamin C helps the absorption of iron (Fe) by creating an acidic environment and acting as a reducing agent. Vitamin C reduces ferric iron to ferrous iron which can accelerate absorption in the intestines, and transfer it into the blood. In addition, vitamin C inhibits the formation of hemosiderin, allowing iron to be available when needed, and helps the transfer of iron from transferrin in plasma to ferritin in the liver. Vitamin C can increase the absorption of non-heme iron up to four times, so vitamin C deficiency can inhibit iron absorption and increase the risk of anemia. However, if other nutritional intakes are met, anemia can be prevented. Vitamin C also plays an important role in the production of red blood cells and protects cells from oxidative damage to support optimal immune system function (Budiana et al., 2024).

The results of the study (Geniz Rieny et al., 2021), the increase in hemoglobin levels is not only influenced by iron intake but also by enhancer factors and inhibitor factors of iron absorption. Vitamin C has an effect on hemoglobin levels. Vitamin C is an enhancer factor in iron absorption. Consuming vitamin C together with iron tablets increases iron absorption so that hemoglobin levels in the blood also increase.

The addition of 60 mg of iron should be accompanied by at least 30 mg of zinc (zinc) to avoid possible negative effects on iron absorption (Lalusu et al., 2023). The results of the study (Finasari et al., 2023), showed that there was no relationship between zinc intake and hemoglobin levels in pregnant women in the work area of the Bumiratu Health Center UPTD. The role of zinc does not directly affect the anemia status of pregnant women, but it plays a major role in the synthesis of transferrin protein, an iron-transporting protein. If someone experiences zinc deficiency, their immune system decreases, which can lead to inflammation (Finasari et al., 2023).

Supplementing with iron can increase the total amount of the metal, which can increase negative side effects. Lower iron levels are sufficient if taken regularly, as they can reduce certain side effects such as constipation. Excessive iron levels will increase susceptibility to some infections. Almost all pregnant women experience mild or moderate anemia, which can be treated with 30 mg of iron (Lalusu et al., 2023).

This supplement can be consumed according to what the body needs. One of the effects of consuming supplements during pregnancy is that it can prevent anemia (Aprilia Hendraswari et al., 2024). Normal hemoglobin levels are very important for the health of pregnant women and fetuses while maintaining good muscle mass also plays a role in supporting body strength, reducing the risk of injury, and helping the labor process. Therefore, pregnant women need to maintain a nutritious diet, consume iron, and stay active with safe physical exercise during pregnancy (Mustar et al., 2025).

Consumption of MMS in pregnant women has beneficial effects on the health of pregnant women and also the children they give birth to, including preventing Low Birth Weight (LBW) because MMS contains various vitamins and minerals to counteract the oxidative stress of pregnant women which increases during pregnancy and other mechanisms that support more optimal fetal growth and development (Susanto & Adjie, 2024).

Conclusion

From the results of the study, it can be concluded that consuming MMS during pregnancy can increase hemoglobin levels can prevent anemia in pregnant women. Referring to this conclusion, it is recommended that pregnant women consume MMS regularly.

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