JOURNAL OF MULTIDISCIPLINARY SCIENCES AND INNOVATIONS

VOLUME 5, ISSUE 02
MOPNTHLY JOURNALS

ISSN NUMBER: 2751-4390
IMPACT FACTOR: 9,08

THE ROLE OF VITAMINS AND MICROELEMENTS DURING PREGNANCY: A LITERATURE REVIEW

Bahromova Sarvinoz Sherzotbek kizi

3rd-year student of the Faculty of Medicine, General Medicine program
[Contact: bahromova.010@gmail.com]

Abstract: Pregnancy is a critical physiological stage associated with increased nutritional requirements necessary to support maternal health and fetal development. Adequate intake of vitamins and microelements is essential for cellular growth, organogenesis, metabolic regulation, and immune function. Micronutrient deficiencies during pregnancy remain a significant global health concern and are associated with adverse outcomes such as maternal anemia, neural tube defects, preeclampsia, and impaired fetal growth. This literature review analyzes current scientific evidence on the role of essential vitamins and trace elements during pregnancy, highlighting their biological functions, recommended supplementation, and the consequences of inadequate intake. Adequate maternal nutrition and targeted micronutrient supplementation are crucial strategies for improving prenatal care and reducing maternal and neonatal complications.

Keywords: Pregnancy, maternal nutrition, vitamins, microelements, fetal development, micronutrient deficiency, prenatal care

Introduction: Pregnancy is a complex physiological process characterized by substantial metabolic, hormonal, and anatomical changes that increase maternal nutritional requirements. Adequate intake of vitamins and microelements is essential to support maternal health and ensure optimal fetal growth and development. Micronutrients play critical roles in cellular metabolism, organogenesis, immune regulation, and enzymatic activity. Deficiencies in essential nutrients such as folic acid, iron, vitamin D, calcium, iodine, zinc, and magnesium have been associated with numerous adverse pregnancy outcomes, including anemia, neural tube defects, preeclampsia, intrauterine growth restriction, and preterm birth.

Main Body

Vitamins During Pregnancy

Folic Acid (Vitamin B9)

Folic acid is one of the most critical vitamins during pregnancy, essential for DNA synthesis, cell division, and neural tube formation. Insufficient folic acid intake before conception and during the first trimester increases the risk of neural tube defects, such as spina bifida and anencephaly. WHO recommends a daily supplementation of 400 µg for women planning pregnancy and during early gestation.

Vitamin D

Vitamin D is crucial for calcium homeostasis, skeletal development, and immune system modulation. Deficiency during pregnancy is linked with gestational diabetes, preeclampsia, and low birth weight.

Iron

Iron is vital for hemoglobin production and oxygen transport. Pregnancy increases maternal blood volume and iron requirements. Iron deficiency anemia is associated with preterm birth, low birth weight, and maternal fatigue. Daily supplementation of 30–60 mg with vitamin C is recommended.

Vitamins A and E

Vitamin A supports fetal organ development, vision, and immune function. Excessive intake is teratogenic. Vitamin E acts as an antioxidant, protecting cells from oxidative stress.

Microelements During Pregnancy

Calcium

Calcium is essential for fetal skeletal and dental formation and maternal bone health. Low calcium intake is associated with increased risk of hypertensive disorders, including preeclampsia. Recommended intake: 1,000–1,300 mg/day.

Iodine

Iodine is necessary for thyroid hormone production, regulating fetal brain development and metabolism. Deficiency can result in cognitive impairment and goiter. Universal salt iodization and supplementation prevent deficiency.

Zinc

Zinc supports over 300 enzymatic reactions, cellular growth, immune function, and DNA synthesis. Deficiency is linked to prolonged labor, preterm birth, and impaired fetal growth.

Magnesium

Magnesium is critical for neuromuscular function, energy metabolism, and enzymatic reactions. Adequate magnesium reduces the risk of preeclampsia, preterm labor, and intrauterine growth restriction.

Consequences of Micronutrient Deficiency

Micronutrient deficiencies during pregnancy can result in multiple adverse outcomes for both mother and fetus, including anemia, low birth weight, congenital anomalies, preeclampsia, and impaired neurodevelopment.

Conclusion

Vitamins and microelements play a fundamental role in ensuring maternal health and supporting optimal fetal development during pregnancy. Adequate intake of essential nutrients such as folic acid, iron, vitamin D, calcium, iodine, zinc, and magnesium prevents neural tube defects, anemia, preeclampsia, low birth weight, and impaired neurodevelopment. Early nutritional assessment, supplementation, and maternal education are key strategies for improving pregnancy outcomes.

References

1. Zerfu, T. A., & Ayele, H. T. (2013). Micronutrients and pregnancy; effect of supplementation on pregnancy outcomes. Nutrition Journal.

2. Haider, B. A., Yakoob, M. Y., & Bhutta, Z. A. (2011). Effect of multiple micronutrient supplementation during pregnancy. BMC Public Health, 11(S3), S19.

3. Santander Ballestín, S., et al. (2021). Is supplementation with micronutrients still necessary during pregnancy? Nutrients, 13(9), 3134.

4. Liu, J., et al. (2025). Clinical benefits and safety of multiple micronutrient supplementation during preconception, pregnancy, and lactation. Nutrition Reviews.

5. Al Rahmad, A. H. (2023). Scoping review: The role of micronutrients (Fe, Zn, iodine, retinol, folate) during pregnancy. Journal of Health.

6. Micronutrients and pregnancy outcome: A review. Nutrition Research, 19(1), 103-159.

7. World Health Organization. (2016). Nutrition in pregnancy. Geneva: WHO.