International Journal of Trend in Scientific Research and Development (IJTSRD)
Volume 10 Issue 2, Mar-Apr 2026 Available Online: www.ijtsrd.com e-ISSN: 2456 – 6470

Maternal Diet Pattern and birth outcomes Among Economically Underprivileged Women

Swetalata[1], Padmaja Kumari[2]

[1]University Department of Zoology, T.M.B.U. Bhagalpur, Bihar, India
[2]Research Scholar, University Department of Zoology, T.M.B.U. Bhagalpur, Bihar, India

ABSTRACT

Maternal dietary pattern plays a crucial role in determining pregnancy and birth outcomes, especially among those mothers that are economically underprivileged and are more vulnerable to insufficient nutrition. Because of the increased physiological demands of gestation, pregnant women are especially susceptible to various nutritional deficiencies. Iron, folate, calcium, iodine, and vitamin B12 deficiencies are frequently caused by inadequate dietary intake, particularly in women from economically disadvantaged backgrounds. This study highlights the relationship between maternal nutrition during pregnancy and birth outcomes such as low birth weight, preterm delivery, small for gestational age, increased risk of diseases, and child mortality. Several previously done studies have revealed that poor maternal diet significantly increases the risk of complications during pregnancy and adverse birth outcomes. Socioeconomic constraints, food insufficiency, and restricted nutritional awareness remarkably affects the health status of low-income mothers.

KEYWORDS: *maternal diet, birth outcomes, pregnancy nutrition, iron, folate, calcium, deficiencies, anaemia, low birth weight, fetal death.*

How to cite this paper: Swetalata | Padmaja Kumari "Maternal Diet Pattern and birth outcomes Among Economically Underprivileged Women" Published in International Journal of Trend in Scientific Research and Development (ijtsrd), ISSN: 2456-6470, Volume-10 | Issue-2, April 2026, pp.744-749, URL: www.ijtsrd.com/papers/ijtsrd116433.pdf

IJTSRD116433

INTRODUCTION

Female body have unique nutritional needs at different stages of their life, especially before conception, throughout developmental period, and during lactation, when nutritional demand is relatively high (UNICEF). Maternal dietary intake plays a key role during pregnancy and it is critical for both maternal and offspring wellbeing. A balanced maternal diet with proper macronutrients results into greater chance for healthy and safe gestation, supports the development of fetus, and provides optimal birth outcomes. Adequate nutrition is crucial for zygotic growth and minimizing the risk of birth complications including premature birth and underweight offspring. The importance of maternal nutrition starting before conception, during developmental period, at childbirth, and continuing into pediatric period and adolescence has historically been overlooked, however, it is now recognized as a major issue (Marshall et al., 2022).

The nutritional status of economically weaker women remains a critical health concern, where a wide range of women experience insufficient nutritional intake during their pregnancies. In addition, inadequate nutrition not only affect the maternal health and postpartum recovery but also compromise the growth and development of newborn baby by declining the quality of breast milk (Menber et al., 2024). Poor nutrition of mother is associated with compromised maternal health and birth outcomes including neurological impairment, auditory loss, cardiovascular diseases, neonatal hypoglycemia, and premature death (Soofi et al., 2022; Kim et al., 2024; Huang et al., 2022).

Singh et al., (2021) reported that prevalence of physically underdeveloped, low body weight and wasted children was greater among underweight, uneducated, rural, and economically underprivileged mothers.

Insufficient maternal diet during pregnancy is linked with significantly greater risks of low birth weight and preterm birth, primarily due to poor dietary diversity, restricted autonomy, and lack of awareness (Dassie et al., 2026).

This study highlights the status of maternal dietary intake and the birth outcomes among economically underprivileged women.

Importance of Proper Maternal Diet

During the developmental period, maternal body needs enhanced macronutrients such as carbohydrates, proteins and fats. Several studies have been supported that the quality of maternal nutrition regulates the placental growth (Meng et al., 2024), fetal development (Duttaroy, 2023). Single nutrient supplementation includes folic acid to avoid neural tube defects, iodine to prevent cretinism, zinc is required to reduce the threat of preterm birth, and iron is needed to decrease the chances of lower birth weight (Gernand et al., 2016).

Optimal Foetal Growth: Maternal nutrition directly influences the growth and development of growing fetus. Cell division, tissue differentiation, proper organ formation, brain and immune development require optimal intake of macronutrients and micronutrients (Naaz and Muneshwar, 2023). Maternal nutrition during pregnancy, primarily the consumption of omega-3 fatty acids rich food including fatty fish and fortified foods, has been linked with better cognitive abilities and neurological development in infants (Fleischhacker, 2023).

Optimal Placental Function: The placenta is a temporary organ formed during pregnancy and acts as a connecting link a critical between the mother and the fetus. Maternal diet abundant in vital nutrients supports the proper development of placenta and transfers nutrients to the developing fetus, facilitates gaseous exchange, removes fetal waste products, acts as a selective barrier, and synthesizes important hormones including hCG (human chorionic gonadotropin), progesterone, estrogen, and human placental lactogen (Geddam et al., 2011; Macnab, 2025; Aye et al., 2025; Burton and Jauniaux, 2023).

Reduced risks of Complications: A healthy maternal dietary intake plays a critical role in decreasing the risks of complications in both the mother and the fetus (Cetin and Laoreti, 2015). An adequate nutrition reduces the chances of preterm birth, prevent anemia, hypertension, and gestational diabetes (Kibret et al., 2019). Gete et al., (2020) also supported that the intake of balanced nutrition before conception has been associated with a decreased threat of preterm birth.

Healthy birth weight: Birth weight is a critical factor that determine the health status of an infant. Adequate dietary intake supports optimal birth weight (Santana et al., 2021). A study conducted by Mursil et al., (2024) reported that maternal nutrition plays a crucial role in determining birth weight. They recommended that continuous tracking of vitamin B12 and folate levels during developmental period may improve prenatal care and decrease the risk of neonatal issues related with low birth weight.

Nutritional Deficiencies Among Economically Underprivileged Pregnant Women

Nutritional deficiencies among economically backward women are a critical public health concern, often contributes to malnutrition. This maternal undernutrition often results into severe health issues for both mother and fetus. Multiple studies have been confirmed that economically deprived women often begin their pregnancy in a malnourished condition, and the nutritional needs of developmental period can worsen the micronutrient deficiencies, altering the growth and development of fetus (Gernand et al., 2016).

In various countries, female's diet contains restricted vegetables, fruits, dairy, meat and fish. Poor dietary pattern during pregnancy lacking in key nutrients such as iron, iodine, folate, calcium and zinc – can cause anaemia, haemorrhage, pre-eclampsia, and death in mothers. They can also lead to stillbirth, low birthweight, wasting and developmental delays for children (UNICEF).

Common nutritional deficiencies among economically underprivileged pregnant women includes:

Iron Deficiency – Globally, the approximate occurrence of iron deficiency anaemia during gestational period is around 15-20 % . Al-Bayyari et al., (2024) documented that iron deficiency anaemia is one of the most prevalent medical conditions in pregnant women in low and middle-income countries. According to the data presented by WHO, (2015) approximately 32 million pregnant women suffer from anaemia worldwide. It occurs primarily due to poor maternal nutrition, greater dependence on monotonous, cereal based diets, and less intake of iron rich foods. Ali et al., (2023) reported that iron deficient anaemia is highly prevalent in reproductive age females, particularly in economically backward females and it can lead to complicated maternal and neonatal outcomes. Food insecurity, poverty, and poor access to healthcare services significantly enhance the threat of maternal anaemia during pregnancy.

Folate Deficiency – Globally, 11.1 % pregnant women have been reported to be folate deficient, particularly in low and middle-income countries, which in turn give rise to adverse maternal and birth consequences (Nguyen et al., 2025; Lazar et al., 2024).

Calcium Deficiency - In low- and middle-income countries, where dietary intake is frequently inadequate, calcium deficiency is a common nutritional concern, especially among pregnant women. According to a recent systematic review, a significant portion of the world's population consumes less calcium than is advised, with economically backward populations being most at risk. Poor dietary diversity, low dairy product consumption, and socioeconomic limitations are the main causes of this inadequacy. Inadequate calcium consumption during pregnancy raises the risk of problems like gestational hypertension, preeclampsia, and stunted fetal growth (Shlisky et al., 2022; Cormick et al., 2019). Calcium metabolism and absorption are indirectly impacted by associated micronutrient deficiencies, such as vitamin D, which are very common in pregnant women, despite the lack of direct estimates of calcium deficiency prevalence. This calcium deficiency is made worse by poor sun exposure, a poor diet, and a lack of supplements (Silveira et al., 2022).

Iodine Deficiency - Due to limited access to iodized salt and poor dietary diversity, economically disadvantaged populations are disproportionately affected by the high prevalence of inadequate iodine intake worldwide, according to the study. These deficiencies are linked to poor fetal neurodevelopment and unfavorable pregnancy outcomes (Patriota et al., 2022; Kabthymer et al., 2021).

Reason behind all these maternal deficiencies include poor socioeconomic status, food insufficiency, lack of nutritional awareness, early marriage and repeated pregnancies.

Pregnancy complications and Birth outcomes associated with poor maternal diet

Pregnancy related malnutrition leads to maternal anaemia, gestational diabetes, and hypertension (Nabi et al., 2025) and these are more commonly associated with poor pregnancy outcomes. These outcomes include but are not limited to, preterm birth, low birth weight babies, stillbirths, miscarriages, small-for-gestational-age (SGA) fetuses, antepartum, intrapartum/postpartum haemorrhage, fatigue, higher rates of cesarean deliveries, and maternal mortality (Figueiredo et al., 2018).

Low Birth weight: UNICEF reported that more than 20 million infants are affected by low birth weight annually. Figueiredo et al., (2018) reported that maternal anaemia is significantly associated with low birth weight. Low birth weight is linked with diabetes, obesity, kidney disorder and hypertension in later age (Luyckx and Brenner, 2005).

Preterm delivery: Preterm birth refers to the delivery before 37 weeks of gestational period. Preterm birth and small for gestational age (SGA) are associated with low birth weight (<2500 g birth weight). It significantly increases the threat of neonatal illness and mortality. Every year, more than 15 million infants are born prematurely worldwide (WHO, 2018; Hughes et al., 2017). Gete et al., (2020) reported that higher quality maternal diet that is rich in fruits, vegetables, whole grains, proteins and dairy products, may reduce the risk of preterm delivery and SGA infants.

Increased risk of diseases: Food insufficiency during gestational period enhances the threat of chronic diseases at a later stage of life. The child may develop insulin resistance and glucose intolerance in later life (Food and Nutrition Board, 2013). Poor maternal diet pattern may cause certain congenital abnormalities in children and elevate the prevalence of chronic diseases later in life (Marian et al., 2024). UNICEF reports that poor maternal nutrition often results in compromised immune systems in newborns. This increases the risk of pneumonia, diarrhoea, and malaria in children, thereby increasing the child mortality globally.

Child mortality: Maternal diet during pregnancy can have a significant influence on the first 1,000 days of a infant's life. Poor maternal dietary intake during pregnancy may increase the risk of prior fetal death (Tesfaye et al., 2022).

Conclusion

The study concluded that poor maternal dietary pattern adversely affects pregnancy and birth outcomes, particularly in economically underprivileged women. Poor maternal nutrition during pregnancy results in complications including anaemia, gestational diabetes, hypertension, miscarriages, and preeclampsia. It further affects the birth outcomes such as low birth weight, preterm delivery, cesarean delivery, child mortality, and elevate the risk of diseases.

References

[1] Al-Bayyari N., Sabbah H. A., Hailat M., AlDahoun H., and Abu-Samra H., (2024). Dietary diversity and iron deficiency anemia among a cohort of singleton pregnancies: a cross-sectional study. *BMC Public Health*. 24(1840). https://doi.org/10.1186/s12889-024-19294-z

[2] Ali S.A., Razzaq S., Aziz S., Allana A., Ali A. A., Naeem S., Khowaja N., and Rehman F. U., (2023). Role of iron in the reduction of anemia among women of reproductive age in low-

middle income countries: insights from systematic review and meta-analysis. *BMC Women's Health.* 23(184). https://doi.org/10.1186/s12905-023-02291-6

[3] Aye I. L. M. H., Tong S., Charnock-Jones D. S., and Smith G. C. S., (2025). The human placenta and its role in reproductive outcomes revisited. *Physiol Rev*. 105(4):2305-2376.

[4] Burton G. J. and Jauniaux E., (2023). The human placenta: new perspectives on its formation and function during early pregnancy. *Proc Biol Sci*. 290 (1997): 20230191. https://doi.org/10.1098/rspb.2023.0191.

[5] Cetin I. and Laoreti A., (2015). The importance of maternal nutrition for health. *J Pediatr Neonat Individual Med*. 4(2):e040220. doi: 10.7363/040220.

[6] Committee on National Statistics; Division of Behavioral and Social Sciences and Education; Food and Nutrition Board; National Research Council; Institute of Medicine. Research Opportunities Concerning the Causes and Consequences of Child Food Insecurity and Hunger: A Workshop Summary. Washington (DC): National Academies Press (US); 2013. 8, Health and Developmental Correlates of Child Food Insecurity from Pregnancy to Adolescence. Available from: https://www.ncbi.nlm.nih.gov/books/NBK201400/.

[7] Cormick G., Betrán A. P., Romero I. B., Lombardo C. F., Gülmezoglu A. M., Ciapponi A., and Belizán J. M., (2019). Global inequities in dietary calcium intake during pregnancy: a systematic review and meta-analysis. *BJOG*. 126(4):444-456. doi: 10.1111/1471-0528.15512.

[8] Dassie G.A., Lemi H., Getachew T., Ayana S., (2026). Maternal diet quality during pregnancy and birth outcomes in low- and middle-income countries: a scoping review. *BMC Nutr*. 12(1):25. doi: 10.1186/s40795-025-01229-5.

[9] Duttaroy A. K., (2023). Influence of Maternal Diet and Environmental Factors on Fetal Development. *Nutrients*. 15(19):4094. doi: 10.3390/nu15194094.

[10] Fleischhacker W., (2023). The importance of diet during pregnancy: Impacts on the developing baby and maternal health. *Clinical Nutrition And Hospital Dietetics*. 43(3): 01-02. DOI: 10.12873/0211-6057.43.03.207

[11] Geddam J. J. B., Radhakrishna K.V., Ramalaxmi B.A., Balakrishna N., Qadri S.S.Y.H., and Sesikeran B., (2011). Maternal Nutrition in Early Pregnancy Effects Placental Development. *Int. J. Med. Public health*. 1(2): 22-29. DOI: 10.5530/ijmedph.2.2011.6.

[12] Gernand A. D., Schulze K. J., Stewart C. P., West K. P. J., and Christian P., (2016). Micronutrient deficiencies in pregnancy worldwide: health effects and prevention. *Nat Rev Endocrinol*. 12(5):274-89. doi: 10.1038/nrendo.2016.37.

[13] Gete D. G., Waller M., and Mishra G. D., (2020). Effects of maternal diets on preterm birth and low birth weight: a systematic review. *British Journal of Nutrition*. 123(4):446-461. doi: 10.1017/S0007114519002897.

[14] Gete D.G., Waller M., and Mishra G.D., (2020). Prepregnancy dietary patterns and risk of preterm birth and low birth weight: findings from the Australian longitudinal study on women's health. The American Journal of Clinical Nutrition. 111 (5): 1048-1058.

[15] Huang X., Liu J., Qi L., Adachi J. D., Wu J., Li Z., Meng Q., Li G., Lip G. Y. H., (2022). Birth Weight and the Risk of Cardiovascular Outcomes: A Report From the Large Population-Based UK Biobank Cohort Study. *Front Cardiovasc Med*. 9:827491. doi: 10.3389/fcvm.2022.827491.

[16] Hughes M. M., Black R. E., and Katz J., (2017). 2500-g Low Birth Weight Cutoff: History and Implications for Future Research and Policy. *Matern Child Health J*. 21(2):283-289. doi: 10.1007/s10995-016-2131-9.

[17] Kabthymer R. H., Shaka M. F., Ayele G M., and Malako B. G., (2021). Systematic review and meta-analysis of iodine deficiency and its associated factors among pregnant women in Ethiopia. *BMC Pregnancy Childbirth*. 21(1):106. doi: 10.1186/s12884-021-03584-0.

[18] Kibret K. T., Chojenta C., Gresham E., Tegegne T. K., and Loxton D., (2019). Maternal dietary patterns and risk of adverse pregnancy (hypertensive disorders of pregnancy and gestational diabetes mellitus) and birth (preterm birth and low birth weight) outcomes: a systematic review and meta-analysis. *Public Health Nutr*. 22(3):506-520.

[19] Kim H. Y., Cho G. J., Ahn K. H., Hong S. C., Oh M. J., and Kim H. J., (2024). Short-term neonatal and long-term neurodevelopmental

outcome of children born term low birth weight. *Scientific Reports*. 14(1):2274. doi: 10.1038/s41598-024-52154-9.

[20] Lazar V. M. A., Rahman S., Chowdhury N. H., Hasan T., Akter S., Islam M. S., Ahmed S., Baqui A. H., Khanam R., (2024). Folate deficiency in pregnancy and the risk of preterm birth: A nested case-control study. *J Glob Health*. 14:04120. doi: 10.7189/jogh.14.04120.

[21] Luyckx V. A. and Brenner B. M., (2005). Low birth weight, nephron number, and kidney disease. *Kidney Int Suppl*. (97); S68-77. doi: 10.1111/j.1523-1755.2005.09712.x.

[22] Macnab W. R., (2025). Functions of the placenta. Anaesthesia & Intensive Care Medicine. 26(4): 216-219. https://doi.org/10.1016/j.mpaic.2025.01.017.

[23] Marian M.., Pérez R L.., McClain A. C.., Hurst S, Reed E., Barker K. M., and Lundgren R., (2024). Nutritional Knowledge and Practices of Low-Income Women During Pregnancy: A Qualitative Study in Two Oaxacan Cities. *Research Square.* 2024 Oct 14:rs.3.rs-4902977. doi: 10.21203/rs.3.rs-4902977/v1. Update in: J Health Popul Nutr. 2025 Feb 07;44(1):33. doi: 10.1186/s41043-025-00776-8.

[24] Marshall N. E., Abrams B., Barbour L. A., Catalano P., Christian P., Friedman J. E., Hay W. W. Jr.., Hernandez T. L., Krebs N. F., Oken E., Purnell J. Q., Roberts J. M., Soltani H., Wallace J., Thornburg K. L., (2022). The importance of nutrition in pregnancy and lactation: lifelong consequences. *Am J Obstet Gynecol*. 226(5):607-632.

[25] Menber Y., Gashaw S., Belachew T., and Fentahun N., (2024). Micronutrient inadequacy among lactating mothers in rural areas of North Mecha District, Amhara Region, Ethiopia. *Front. Nutr.* 11:1354459. doi: 10.3389/fnut.2024.1354459.

[26] Meng Q., Rosario I. D., Sung K., Janzen C., Devaskar S. U., Carpenter C. L., Ritz B., (2024). Maternal dietary patterns and placental outcomes among pregnant women in Los Angeles. *Placenta*. 145:72-79. doi: 10.1016/j.placenta.2023.12.002.

[27] Mursil M., Rashwan H. A., Cavallé-Busquets P., Santos-Calderón L. A., Murphy M. M., and Puig D., (2024). Maternal Nutritional Factors Enhance Birthweight Prediction: A Super Learner Ensemble Approach. *Information*. 15(714). https://doi.org/10.3390/info15110714

[28] Naaz A. and Muneshwar K. N., (2023). How Maternal Nutritional and Mental Health Affects Child Health During Pregnancy: A Narrative Review. *Cureus*. 15(11):e48763. doi: 10.7759/cureus.48763.

[29] Nabi S., Ayaz M., Abdullah M., Taj N., Shah A. W., Baloch G. H., Farooq F., and Sarwar B., (2025). Impact of Maternal Nutrition on Pregnancy Outcomes and Infant Health. *Journal of Neonatal Surgery*. 13(1):451-6. https://www.jneonatalsurg.com/index.php/jns/article/view/8421

[30] Nguyen N. T. H., Chen Y. C., Nhu N T.., Bao H. B., Hsu C. Y., Das A., and Chao J. C., (2025). Global prevalences of erythropoiesis-associated micronutrient deficiencies (iron, folate, and vitamin B12) among pregnant women: a systematic review and meta-analysis. *Annals of Medicine*. 57(1):2602960. doi: 10.1080/07853890.2025.2602960.

[31] Patriota E.S.O., Lima I.C.C., Nilson E.A.F., Franceschini S. C. C., Goncalves V. S. S., and Pizato N., (2022). Prevalence of insufficient iodine intake in pregnancy worldwide: a systematic review and meta-analysis. *Eur J Clin Nutr*. 76(2022); 703–715. https://doi.org/10.1038/s41430-021-01006-0

[32] Santana J. D. M., Queiroz V. A. D. O., Pereira M., Paixão E. S., Brito S. M., Santos D. B. D., Oliveira A. M., (2021). Associations between Maternal Dietary Patterns and Infant Birth Weight in the NISAMI Cohort: A Structural Equation Modeling Analysis. *Nutrients*. 13(11):4054. doi: 10.3390/nu13114054.

[33] Silveira E. A. D., Moura L. A. N. E., Castro M. C. R., Kac G.., Hadler M C. C. M., Noll P. R. E. S.., Noll M., Rezende A. T. O., Delpino F. M., and Oliveira C., (2022). Prevalence of Vitamin D and Calcium Deficiency and Insufficiency in Women of Childbearing Age and Associated Risk Factors: A Systematic Review and Meta-Analysis. *Nutrients*. 14(20):4351. doi: 10.3390/nu14204351.

[34] Singh D. P., Biradar R. A., Halli S. A., and Dwivedi L. K., (2021). Effect of maternal nutritional status on children nutritional status in India. *Children and Youth Services Review*. 120(2021); 105727. https://doi.org/10.1016/j.childyouth.2020.105727.

[35] Soofi S. B., Khan G. N., Ariff S., Ihtesham Y., Tanimoune M., Rizvi A., Sajid M., Garzon C.,

Pee S., and Bhutta Z. A., (2022). Effectiveness of nutritional supplementation during the first 1000-days of life to reduce child undernutrition: a cluster randomized controlled trial in Pakistan. *Lancet Reg Health*. 4:100035. doi: 10.1016/j.lansea.2022.100035

[36] Tesfaye A., Sisay G., Kabthymer R. H., and Tesfaye T., (2022). Under-nutrition and associated factors among pregnant women in public health care hospitals of Gedeo Zone, southern Ethiopia: A cross-sectional study. *Heliyon.* 8(5):e09511.

[37] UNICEF (2022). Maternal, newborn and child survival. https://www.unicef.org/health/maternal-newborn-and-child survival?utm_source=chatgpt.com

[38] UNICEF. Maternal nutrition: Preventing malnutrition in pregnant and breastfeeding women. Retrieved March 20, 2026. https://www.unicef.org

[39] United Nations Children's Fund (UNICEF). Maternal nutrition. Retrieved March 29, 2026. https://www.unicef.org/nutrition/maternal.

[40] World Health Organization (2018) Maternal, newborn, child and adolescent health. http://wwwwhoint/maternal_child_ adolescent/newborns/prematurity/en/

[41] World health organization, (2015). The global prevalence of anaemia in 2011. *World Health Organization*.