

Correlation of Maternal Nutritional Status with Neonatal Anthropometric Measurements at Birth: A Prospective Observational Study

Dr. C. Ashrita^{1*}, Dr. Bhaskar Reddy Dodda², Dr. Vellanki Brahma Kumar²

¹Assistant Professor, Department of Pediatrics, Dr Patnam Mahender Reddy Institute of Medical Sciences, Chevella, Ranga Reddy, Telangana, India

²Associate Professor, Department of Pediatrics, Mamata Medical College and Hospital, Khammam, Telangana, India

ABSTRACT

Background:

Maternal nutritional status influences placental function, fetal growth, and neonatal body size. Maternal body mass index (BMI), mid-upper arm circumference (MUAC), gestational weight gain, and haemoglobin provide practical indicators of nutritional adequacy during pregnancy.

Objectives:

To evaluate the correlation between maternal nutritional status and neonatal anthropometric measurements at birth and examine the association between maternal BMI and low birth weight.

Methods:

This hospital-based prospective observational analytical study included 300 mother–neonate pairs at Mamata Medical College and Mamata General Hospital, Khammam, Telangana, India, from July 2025 to June 2026. Eligible women with singleton live births were recruited consecutively. Maternal BMI, MUAC, gestational weight gain, and haemoglobin were assessed, and neonatal birth weight, length, head circumference, and chest circumference were measured after birth. Pearson correlation, one-way analysis of variance, and chi-square test were used as appropriate.

Results:

Mean maternal BMI was 22.7 ± 4.1 kg/m², MUAC was 25.4 ± 3.2 cm, and gestational weight gain was 10.8 ± 3.6 kg. Mean neonatal birth weight was 2.91 ± 0.48 kg; 57 neonates (19.0%) had low birth weight. Birth weight increased from 2.60 ± 0.39 kg among underweight mothers to 3.28 ± 0.49 kg among obese mothers ($p < 0.001$). Low birth weight occurred in 38.3% of neonates of underweight mothers compared with 16.4%, 11.1%, and 7.4% in the normal-BMI, overweight, and obese groups, respectively ($p < 0.001$). Maternal BMI correlated with birth weight ($r = 0.43$, $p < 0.001$), gestational weight gain showed the strongest correlation ($r = 0.47$, $p < 0.001$), and MUAC correlated positively with birth weight, length, head circumference, and chest circumference ($r = 0.27$ – 0.39 ; all $p < 0.001$).

Conclusion:

Better maternal nutritional indices were associated with greater neonatal anthropometric measurements, whereas maternal underweight was associated with low birth weight.

Recommendations:

Routine antenatal assessment should integrate BMI, MUAC, gestational weight gain, and haemoglobin to identify women requiring nutritional intervention.

Keywords: maternal nutrition; body mass index; mid-upper arm circumference; gestational weight gain; birth weight; neonatal anthropometry

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Corresponding Author: Dr. C. Ashrita

Email: chennuru.ashrita@gmail.com

Assistant Professor, Department of Pediatrics, Dr. Patnam Mahender Reddy Institute of Medical Sciences, Chevella, Ranga Reddy, Telangana, India

INTRODUCTION

Maternal nutrition is a major determinant of fetal growth because pregnancy requires substantial metabolic adaptation, expansion of maternal tissues, placental development, and sustained transfer of nutrients to the fetus. Nutritional inadequacy before conception or during pregnancy can restrict fetal growth, whereas excessive maternal adiposity and disproportionate weight gain can shift growth toward higher birth weight and greater neonatal size. Contemporary reviews from low- and middle-income settings consistently identify low maternal body mass index (BMI), reduced mid-upper arm circumference (MUAC), and poor overall nutritional status as important correlates of low birth weight, small-for-gestational-age birth, and other adverse outcomes.¹ Early-pregnancy BMI and MUAC are particularly attractive for clinical use because they are simple, inexpensive, and reproducible measurements that can be incorporated into routine antenatal care.²

Pre-pregnancy BMI reflects maternal energy reserves entering gestation, while gestational weight gain represents the combined contribution of maternal tissue expansion, extracellular fluid, placenta, fetus, and related pregnancy components. Evidence from large systematic reviews shows that gestational weight gain outside recommended ranges is associated with adverse infant outcomes.³ Similar associations have been observed across geographically and ethnically diverse populations, indicating that inadequate and excessive weight gain both deserve attention during antenatal surveillance.⁴ Low total gestational weight gain has also been linked with increased risks of low birth weight and preterm birth, supporting the value of longitudinal maternal weight assessment throughout pregnancy.⁵

MUAC provides an additional marker of maternal nutritional status and is less affected by pregnancy-related fluid changes than body weight. Indian prospective data have demonstrated that maternal MUAC can assist in identifying women at greater risk of delivering low-birth-weight infants.⁶ Studies from other populations likewise support an association between maternal arm circumference and subsequent infant growth.⁷ Earlier work also found meaningful relationships between maternal MUAC and birth weight, reinforcing its utility where reliable pre-pregnancy weight is unavailable.⁸ Maternal anthropometric measurements have additionally been correlated with multiple neonatal dimensions, including weight, length, and head circumference, suggesting that maternal nutrition influences overall fetal somatic growth rather than birth weight alone.⁹

Haemoglobin concentration is another relevant nutritional marker because anaemia can coexist with inadequate dietary intake and micronutrient deficiency. Undernutrition during pregnancy has been associated with low birth weight,¹⁰ while systematic reviews identify maternal anaemia as a risk factor for reduced birth weight and other adverse birth

outcomes.^{11,12} Evaluating several maternal indicators together therefore provides a broader picture than reliance on a single measure.

The present study was undertaken to determine the relationship between maternal nutritional status and neonatal anthropometry in a tertiary-care setting in Telangana. The objectives were to assess maternal BMI, MUAC, gestational weight gain, and haemoglobin; document neonatal birth weight, length, head circumference, and chest circumference; quantify correlations between maternal nutritional indices and neonatal measurements; and examine the association between maternal BMI category and low birth weight.

METHODOLOGY

Study design and setting

A hospital-based prospective observational analytical study was conducted at Mamata Medical College and Mamata General Hospital, Khammam, Telangana, India. The institution functions as a tertiary-care teaching hospital and receives obstetric referrals from Khammam and surrounding districts. The study was carried out over 12 months, from July 2025 to June 2026.

Study population and sampling

Pregnant women delivering at the study hospital during the study period were screened consecutively for eligibility. Women who delivered a singleton live-born neonate and had the maternal nutritional variables required for the study were invited to participate after written informed consent. Consecutive sampling was continued until the prespecified sample size of 300 mother–neonate pairs was achieved. Women with multiple gestation, major fetal congenital anomalies detected antenatally or at birth, or records insufficient for assessment of the principal maternal nutritional variables were excluded. Mother–neonate pairs with incomplete neonatal anthropometric measurements were excluded from the final analysis.

Study size

The sample size was calculated for the primary objective of detecting a correlation between maternal nutritional indicators and neonatal anthropometric measurements. Using Fisher's *z* transformation for a correlation coefficient, a minimum clinically relevant correlation of $r=0.17$, a two-sided alpha of 0.05, and 80% power yielded a required sample of approximately 270 mother–neonate pairs: $n = \frac{[Z\alpha/2 + Z\beta]^2}{\{0.5 \times \ln((1+r)/(1-r))\}^2} + 3$. Allowing approximately 10% for incomplete records or non-evaluable mother–neonate pairs increased the target to 297; this was rounded to 300 pairs for enrolment.

Bias

Potential selection bias was reduced by consecutive screening and recruitment of eligible women throughout the study period rather than selective enrolment. Measurement bias was addressed by using a structured data-collection

form, standardized anthropometric techniques, a calibrated neonatal weighing scale, and non-stretchable tapes for MUAC and neonatal circumferences. The same measurement protocol was followed throughout the study to limit inter-observer variation. Information bias related to maternal baseline weight and haemoglobin was reduced by obtaining these values from antenatal records. Exclusion of multiple gestations and major congenital anomalies reduced major non-nutritional influences on neonatal size; however, residual confounding from unmeasured dietary, socioeconomic, placental, and maternal clinical factors remains possible.

Maternal nutritional assessment

Maternal age, parity, relevant obstetric information, and nutritional measurements were recorded using a structured data collection form. Pre-pregnancy or early-pregnancy weight and height were obtained from antenatal records, and BMI was calculated as weight in kilograms divided by height in metres squared. Mothers were classified as underweight, normal BMI, overweight, or obese using standard adult BMI categories. Gestational weight gain was calculated from the difference between baseline and late-pregnancy weight. MUAC was measured at the midpoint between the acromion and olecranon using a non-stretchable measuring tape, with the arm relaxed. Maternal haemoglobin concentration was obtained from antenatal laboratory records. The use of BMI, MUAC, and gestational weight gain as complementary indicators is supported by evidence linking these measurements with fetal growth and birth outcomes.^{3,6-8}

Neonatal anthropometry

Birth weight was recorded in kilograms using a calibrated neonatal weighing scale. Crown-heel length was measured in centimetres with the neonate positioned supine. Head circumference was measured around the maximal occipitofrontal circumference, and chest circumference was measured at the nipple line using a flexible non-stretchable tape. Low birth weight was defined as birth weight below

2.5 kg. The same measurement protocol was followed throughout the study to reduce inter-observer variation.

Outcome measures

The principal outcomes were neonatal birth weight, birth length, head circumference, and chest circumference. Maternal BMI, MUAC, gestational weight gain, and haemoglobin were evaluated as nutritional correlates. The frequency of low birth weight across maternal BMI categories was also assessed.

Statistical analysis

Continuous variables were summarized as mean $\pm$ standard deviation, whereas categorical variables were expressed as frequency and percentage. Mean neonatal anthropometric measurements across maternal BMI categories were compared using one-way analysis of variance. Pearson correlation coefficients were calculated to examine linear relationships between maternal nutritional indicators and neonatal measurements. The association between maternal BMI category and low birth weight was assessed using the chi-square test. A two-sided p-value < 0.05 was considered statistically significant.

Ethical considerations

The study was conducted after approval from the Institutional Ethics Committee of Mamata Medical College. Written informed consent was obtained from participating mothers, and confidentiality of clinical information was maintained throughout data collection and analysis.

RESULTS

A total of 300 mother–neonate pairs were included in the study. The mean maternal age was 25.8 ± 4.1 years. The mean pre-pregnancy body mass index (BMI) was 22.7 ± 4.1 kg/m², while the mean mid-upper arm circumference (MUAC) was 25.4 ± 3.2 cm. The average gestational weight gain was 10.8 ± 3.6 kg. Based on maternal BMI, 60 (20.0%) women were underweight, 159 (53.0%) had normal BMI, 54 (18.0%) were overweight, and 27 (9.0%) were obese. Maternal anaemia was present in 111 (37.0%) participants (Table 1).

Table 1. Maternal demographic and nutritional characteristics (n = 300)

Characteristic	Value
Age, years, mean $\pm$ SD	25.8 $\pm$ 4.1
Primigravida, n (%)	132 (44.0)
Multigravida, n (%)	168 (56.0)
Pre-pregnancy BMI, kg/m ² , mean $\pm$ SD	22.7 $\pm$ 4.1
Underweight, n (%)	60 (20.0)
Normal BMI, n (%)	159 (53.0)
Overweight, n (%)	54 (18.0)
Obese, n (%)	27 (9.0)
MUAC, cm, mean $\pm$ SD	25.4 $\pm$ 3.2
Gestational weight gain, kg, mean $\pm$ SD	10.8 $\pm$ 3.6
Haemoglobin, g/dL, mean $\pm$ SD	10.9 $\pm$ 1.3
Maternal anaemia, n (%)	111 (37.0)

Note. BMI = body mass index; MUAC = mid-upper arm circumference; SD = standard deviation.

Among the neonates, 158 (52.7%) were male, and 142 (47.3%) were female. The mean gestational age at birth was 38.3 ± 1.4 weeks. Mean neonatal birth weight was 2.91 ± 0.48 kg, birth length was 49.1 ± 2.4 cm, head circumference was 33.8 ± 1.6 cm, and chest circumference was 32.4 ± 1.8 cm. Low birth weight (<2.5 kg) was observed in 57 (19.0%) neonates (Table 2).

Table 2. Neonatal characteristics and anthropometric measurements at birth (n = 300)

Characteristic	Value
Male, n (%)	158 (52.7)
Female, n (%)	142 (47.3)
Gestational age, weeks, mean $\pm$ SD	38.3 ± 1.4
Preterm birth (<37 weeks), n (%)	36 (12.0)
Birth weight, kg, mean $\pm$ SD	2.91 ± 0.48
Birth length, cm, mean $\pm$ SD	49.1 ± 2.4
Head circumference, cm, mean $\pm$ SD	33.8 ± 1.6
Chest circumference, cm, mean $\pm$ SD	32.4 ± 1.8
Low birth weight (<2.5 kg), n (%)	57 (19.0)
Birth weight ≥ 2.5 kg, n (%)	243 (81.0)

Note. Data are expressed as mean $\pm$ SD or number (percentage), as appropriate.

Neonatal anthropometric measurements increased progressively across maternal BMI categories. Neonates born to underweight mothers had the lowest mean birth weight (2.60 ± 0.39 kg), whereas those born to obese mothers had the highest mean birth weight (3.28 ± 0.49 kg). Birth length, head circumference, and chest circumference showed similar trends. Differences across BMI categories

were statistically significant for all four anthropometric measurements ($p < 0.001$). Low birth weight was also most frequent among underweight mothers, affecting 23 of 60 neonates (38.3%), compared with 26 of 159 (16.4%) in the normal-BMI group, 6 of 54 (11.1%) in the overweight group, and 2 of 27 (7.4%) in the obese group ($p < 0.001$) (Table 3).

Table 3. Neonatal anthropometric measurements and low birth weight according to maternal BMI category

Neonatal measurement	Underweight (n = 60)	Normal BMI (n = 159)	Overweight (n = 54)	Obese (n = 27)	p-value
Birth weight, kg	2.60 ± 0.39	2.91 ± 0.41	3.15 ± 0.46	3.28 ± 0.49	<0.001
Birth length, cm	47.8 ± 2.3	49.1 ± 2.1	50.0 ± 2.3	50.4 ± 2.5	<0.001
Head circumference, cm	32.9 ± 1.5	33.8 ± 1.4	34.4 ± 1.5	34.6 ± 1.7	<0.001
Chest circumference, cm	31.4 ± 1.7	32.4 ± 1.5	33.1 ± 1.7	33.4 ± 1.8	<0.001
Low birth weight, n (%)	23 (38.3)	26 (16.4)	6 (11.1)	2 (7.4)	<0.001

Note. Values are mean $\pm$ SD unless otherwise stated. One-way ANOVA was used for continuous anthropometric measurements; the chi-square test was used for low birth weight across BMI categories.

Correlation analysis demonstrated significant positive relationships between maternal nutritional indices and neonatal anthropometric measurements. Maternal BMI showed a moderate positive correlation with neonatal birth weight ($r = 0.43$, $p < 0.001$). Gestational weight gain had the strongest correlation with birth weight ($r = 0.47$, $p < 0.001$).

MUAC was positively correlated with birth weight, length, head circumference, and chest circumference. Maternal haemoglobin showed weaker but statistically significant positive correlations with the neonatal measurements (Table 4).

Table 4. Correlation between maternal nutritional parameters and neonatal anthropometric measurements

Maternal nutritional parameter	Birth weight r (p-value)	Birth length r (p-value)	Head circumference r (p-value)	Chest circumference r (p-value)
Maternal BMI	0.43 (<0.001)	0.31 (<0.001)	0.29 (<0.001)	0.32 (<0.001)
MUAC	0.39 (<0.001)	0.28 (<0.001)	0.27 (<0.001)	0.30 (<0.001)
Gestational weight gain	0.47 (<0.001)	0.35 (<0.001)	0.31 (<0.001)	0.34 (<0.001)
Maternal haemoglobin	0.22 (<0.001)	0.14 (0.016)	0.18 (0.002)	0.15 (0.009)

Note. Pearson correlation coefficient was used. BMI = body mass index; MUAC = mid-upper arm circumference.

Overall, the findings demonstrated a significant relationship between maternal nutritional status and neonatal anthropometric measurements at birth. Higher maternal BMI, greater MUAC, and higher gestational weight gain were positively related to birth weight, length, head circumference, and chest circumference, whereas maternal underweight was associated with a substantially higher occurrence of low birth weight.

DISCUSSION

Key findings

The study demonstrated a consistent positive relationship between maternal nutritional status and neonatal anthropometric measurements. Maternal BMI correlated with birth weight ($r=0.43$, $p<0.001$), length ($r=0.31$, $p<0.001$), head circumference ($r=0.29$, $p<0.001$), and chest circumference ($r=0.32$, $p<0.001$). Gestational weight gain showed the strongest correlation with birth weight ($r=0.47$, $p<0.001$) and was also associated with length ($r=0.35$), head circumference ($r=0.31$), and chest circumference ($r=0.34$), all $p<0.001$. MUAC showed positive correlations with birth weight, length, head circumference, and chest circumference ($r=0.39$, 0.28 , 0.27 , and 0.30 , respectively; all $p<0.001$), while maternal haemoglobin showed weaker but significant correlations ($r=0.14$ – 0.22 ; $p=0.016$ to <0.001). Mean birth weight increased from 2.60 ± 0.39 kg in underweight mothers to 3.28 ± 0.49 kg in obese mothers ($p<0.001$), and low birth weight was most frequent among underweight mothers (38.3%) compared with normal-BMI (16.4%), overweight (11.1%), and obese mothers (7.4%; $p<0.001$). These findings indicate that maternal nutritional status was associated with multiple dimensions of neonatal growth, with gestational weight gain showing the strongest observed relationship with birth weight.

The progressive increase in neonatal birth weight across maternal BMI categories was supported by mean birth weights of 2.60 ± 0.39 kg in underweight, 2.91 ± 0.41 kg in normal-BMI, 3.15 ± 0.46 kg in overweight, and 3.28 ± 0.49 kg in obese mothers ($p<0.001$); low birth weight occurred in 38.3%, 16.4%, 11.1%, and 7.4% of these groups,

respectively ($p<0.001$). Underweight mothers delivered infants with the lowest mean birth weight, while higher maternal BMI categories were associated with progressively greater neonatal size. This pattern is consistent with contemporary evidence demonstrating associations between low maternal BMI and adverse fetal growth outcomes.^{1,2} Large meta-analyses have also shown that gestational weight gain below recommended ranges is linked with small-for-gestational-age birth, low birth weight, and preterm birth.^{3–5} The present positive correlation between gestational weight gain and all neonatal measurements therefore agrees with the broader literature and reinforces the need to monitor maternal weight longitudinally during pregnancy.

MUAC showed significant positive correlations with neonatal birth weight ($r=0.39$), birth length ($r=0.28$), head circumference ($r=0.27$), and chest circumference ($r=0.30$), with $p<0.001$ for all comparisons. This finding is relevant in settings where reliable pre-pregnancy weight is often unavailable. Indian prospective evidence has shown that maternal MUAC can help identify women at risk of low-birth-weight delivery,⁶ and data from Cambodia indicate that lower maternal MUAC is associated with poorer early infant linear growth.⁷ Earlier anthropometric studies similarly documented associations between maternal arm circumference and birth weight,⁸ while classic work on maternal and neonatal anthropometry demonstrated that several maternal body measurements correlate with neonatal size.⁹ Together, these observations support MUAC as a practical adjunct to BMI and weight gain in antenatal nutritional assessment.

Maternal haemoglobin showed weaker but statistically significant positive correlations with birth weight ($r=0.22$, $p<0.001$), birth length ($r=0.14$, $p=0.016$), head circumference ($r=0.18$, $p=0.002$), and chest circumference ($r=0.15$, $p=0.009$). This is biologically plausible because anaemia often reflects inadequate iron status or broader nutritional disadvantage. Prospective evidence on maternal undernutrition has linked poor nutritional status with low birth weight,¹⁰ while systematic reviews and meta-analyses

consistently report increased low-birth-weight risk among anaemic mothers.^{11,12} Prenatal iron use has also been associated with improved birth weight,¹³ and greater dietary diversity during pregnancy has been related to lower risks of maternal anaemia, preterm delivery, and low birth weight.¹⁴ The findings therefore favour integrated nutritional surveillance rather than assessment of isolated anthropometric or laboratory variables.

Generalizability

The study was conducted in a tertiary-care teaching hospital serving women from Khammam and surrounding areas, and the findings are most applicable to comparable hospital-based obstetric populations in South India. The inclusion of 300 mother–neonate pairs and the use of several maternal nutritional indicators improve the relevance of the observed associations. However, extrapolation to community populations, remote rural settings, or women with substantially different socioeconomic, dietary, and obstetric profiles should be undertaken cautiously.

Conclusion

Maternal nutritional status showed a significant relationship with neonatal anthropometric measurements at birth in this cohort of 300 mother–neonate pairs. Maternal BMI, MUAC, gestational weight gain, and haemoglobin were positively associated with birth weight, length, head circumference, and chest circumference. Gestational weight gain demonstrated the strongest correlation with neonatal birth weight, while maternal underweight was associated with the highest frequency of low birth weight. These findings emphasize the value of nutritional assessment during antenatal care. Early identification of women with low BMI, reduced MUAC, inadequate weight gain, or anaemia can support nutritional counselling, dietary improvement, supplementation, and closer fetal-growth surveillance, thereby strengthening maternal and neonatal care across obstetric services.

Limitations

This study was conducted at a single tertiary-care hospital, which restricts direct extrapolation to all community settings. Pre-pregnancy weight depended on available antenatal records, introducing potential measurement variability. Dietary intake, socioeconomic status, micronutrient concentrations, placental factors, and maternal comorbidities were not analysed in detail. The observational design identifies associations but does not establish causality between maternal nutritional indicators and neonatal anthropometric outcomes.

Recommendations

Routine antenatal care should include assessment of BMI, MUAC, serial gestational weight gain, and haemoglobin rather than relying on a single nutritional indicator. Women identified as underweight, anaemic, or gaining insufficient weight should receive individualized nutritional counselling, dietary support, and micronutrient supplementation. Fetal-growth surveillance should be strengthened for mothers with persistent nutritional deficits. Training antenatal-care staff in standardized MUAC and neonatal anthropometric measurement can improve early risk recognition. Future multicentre studies should incorporate dietary assessment, socioeconomic factors, biochemical nutrient markers, maternal comorbidities, and gestational-age-specific growth measures to clarify independent predictors and develop locally applicable risk-stratification models for neonatal growth outcomes.

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Abbreviations

BMI: Body mass index;
LBW: Low birth weight;
MUAC: Mid-upper arm circumference;
SGA: Small for gestational age.

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Conflict of interest

The authors declare no conflict of interest.

Author Contributions

Dr. C. Ashrita: Conceptualization, study design, methodology, investigation, data collection, data curation, literature review, and preparation of the original manuscript draft. She also participated in interpretation of the findings, critical revision of the manuscript, and approval of the final version.

Dr. Bhaskar Reddy Dodda: Methodology, supervision, validation, formal analysis, interpretation of results, and critical review of the manuscript for important intellectual content. He contributed to manuscript editing and approved the final version for publication.

Dr. Vellanki Brahma Kumar: Supervision, methodological guidance, validation, interpretation of study findings, and critical revision of the manuscript. He contributed to reviewing and editing the manuscript and approved the final version.

Data availability

Data available on request

Author Biographies

Dr. C. Ashrita is an Assistant Professor in the Department of Pediatrics at Dr. Patnam Mahender Reddy Institute of Medical Sciences, Chevella, Ranga Reddy, Telangana, India. She is actively involved in undergraduate medical education, clinical pediatric care, and academic research. Her professional interests include general pediatrics, child health, preventive pediatrics, and evidence-based approaches to the management of childhood illnesses. She has a keen interest in clinical research aimed at improving pediatric healthcare outcomes and translating research findings into routine clinical practice. **ORCID ID:** <https://orcid.org/0009-0006-4345-8195>

Dr. Bhaskar Reddy Dodda is an Associate Professor in the Department of Pediatrics at Mamata Medical College and Hospital, Khammam, Telangana, India. He is involved in pediatric clinical services, undergraduate and postgraduate teaching, and academic research. His areas of interest include general pediatrics, childhood diseases, pediatric clinical research, and evidence-based patient care. He has contributed to academic activities through teaching, clinical mentoring, research methodology, and scientific manuscript development. **ORCID ID:** <https://orcid.org/0000-0002-0887-1017>

Dr. Vellanki Brahma Kumar is an Associate Professor in the Department of Pediatrics at Mamata Medical College and Hospital, Khammam, Telangana, India. He is engaged in clinical pediatric practice, medical education, academic supervision, and research. His professional interests encompass general pediatrics, pediatric disease management, clinical research, and the application of evidence-based principles to child healthcare. He contributes to the training and mentoring of medical students and participates in research directed toward improving clinical outcomes in pediatric populations. **ORCID ID:** <https://orcid.org/0000-0001-5527-5595>

References

1. González-Fernández D, Muralidharan O, Neves PA, Bhutta ZA. Associations of maternal nutritional status and supplementation with fetal, newborn, and infant outcomes in low-income and middle-income settings: an overview of reviews.

Nutrients. 2024;16(21):3725.

<https://doi.org/10.3390/nu16213725>

2. Ambreen S, Yazdani N, Alvi AS, Qazi MF, Hoodbhoy Z. Association of maternal nutritional status and small for gestational age neonates in peri-urban communities of Karachi, Pakistan: findings from the PRISMA study. BMC Pregnancy Childbirth. 2024;24:214. <https://doi.org/10.1186/s12884-024-06420-3>
3. Goldstein RF, Abell SK, Ranasinha S, Misso ML, Boyle JA, Black MH, et al. Association of gestational weight gain with maternal and infant outcomes: a systematic review and meta-analysis. JAMA. 2017;317(21):2207-2225. <https://doi.org/10.1001/jama.2017.3635>
4. Goldstein RF, Abell SK, Ranasinha S, Misso ML, Boyle JA, Harrison CL, et al. Gestational weight gain across continents and ethnicity: systematic review and meta-analysis of maternal and infant outcomes in more than one million women. BMC Med. 2018;16:153. <https://doi.org/10.1186/s12916-018-1128-1>
5. Han Z, Lutsiv O, Mulla S, Rosen A, Beyene J, McDonald SD. Low gestational weight gain and the risk of preterm birth and low birthweight: a systematic review and meta-analysis. Acta Obstet Gynecol Scand. 2011;90(9):935-954. <https://doi.org/10.1111/j.1600-0412.2011.01185.x>
6. Vasundhara D, Hemalatha R, Sharma S, Ramalaxmi BA, Bhaskar V, Babu J, et al. Maternal MUAC and fetal outcome in an Indian tertiary care hospital: a prospective observational study. Matern Child Nutr. 2020;16(2):e12902. <https://doi.org/10.1111/mcn.12902>
7. Kpewou DE, Poirot E, Berger J, Som SV, Laillou A, Belayneh SN, et al. Maternal mid-upper arm circumference during pregnancy and linear growth among Cambodian infants during the first months of life. Matern Child Nutr. 2020;16(Suppl 2):e12951. <https://doi.org/10.1111/mcn.12951>
8. Ricalde AE, Velásquez-Meléndez G, Tanaka AC, de Siqueira AA. Mid-upper arm circumference in pregnant women and its relation to birth weight. Rev Saúde Pública. 1998;32(2):112-117. <https://doi.org/10.1590/S0034-89101998000200002>
9. Neggers Y, Goldenberg RL, Cliver SP, Hoffman HJ, Cutter GR. The relationship between maternal and neonatal anthropometric measurements in term newborns. Obstet Gynecol. 1995;85(2):192-196. [https://doi.org/10.1016/0029-7844\(94\)00364-J](https://doi.org/10.1016/0029-7844(94)00364-J)
10. Berhe K, Weldegerima L, Gebrearegay F, Kahsay A, Tesfahunegn A, Rejeu M, et al. Effect of

- undernutrition during pregnancy on low birth weight in Tigray regional state, Ethiopia: a prospective cohort study. BMC Nutr. 2021;7:72. <https://doi.org/10.1186/s40795-021-00475-7>
11. Figueiredo ACMG, Gomes-Filho IS, Silva RB, Pereira PPS, da Mata FAF, Lyrio AO, et al. Maternal anemia and low birth weight: a systematic review and meta-analysis. Nutrients. 2018;10(5):601. <https://doi.org/10.3390/nu10050601>
 12. Rahman MM, Abe SK, Rahman MS, Kanda M, Narita S, Bilano V, et al. Maternal anemia and risk of adverse birth and health outcomes in low- and middle-income countries: systematic review and meta-analysis. Am J Clin Nutr. 2016;103(2):495-504. <https://doi.org/10.1093/ajcn.81.2.495>
<https://doi.org/10.3945/ajcn.115.107896>
 13. Haider BA, Olofin I, Wang M, Spiegelman D, Ezzati M, Fawzi WW; Nutrition Impact Model Study Group. Anaemia, prenatal iron use, and risk of adverse pregnancy outcomes: systematic review and meta-analysis. BMJ. 2013;346:f3443. <https://doi.org/10.1136/bmj.f3443>
 14. Zerfu TA, Umeta M, Baye K. Dietary diversity during pregnancy is associated with reduced risk of maternal anemia, preterm delivery, and low birth weight in a prospective cohort study in rural Ethiopia. Am J Clin Nutr. 2016;103(6):1482-1488. <https://doi.org/10.3945/ajcn.115.116798>

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