INTERNATIONAL JOURNAL OF PHARMACEUTICAL SCIENCES
[ISSN: 0975-4725; CODEN(USA): IJPS00]
Journal Homepage: https://www.ijpsjournal.com

OPEN ACCESS

Research Article

A Prospective Observational Study on Pregnancy-Related Morbidities and the Role of Nutritional Counselling in Improving Maternal Health

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ARTICLE INFO

Published: 06 July 2026
Keywords:
Pregnancy-related morbidities; nutritional counselling; maternal health; anaemia; antenatal care; MDD-W; gestational diabetes mellitus; preeclampsia.
DOI:
10.5281/zenodo.21234480

ABSTRACT

Background: Pregnancy is associated with significant physiological and metabolic changes that predispose women to various morbidities, including anemia, gestational hypertension, and gestational diabetes mellitus (GDM). These conditions remain major public health concerns in India, contributing to adverse maternal and fetal outcomes. Nutritional status is a fundamental determinant of pregnancy outcomes, and structured nutritional counselling during antenatal care can improve dietary practices and supplement adherence. Methodology: A prospective observational study was conducted over six months among 288 pregnant women attending the antenatal clinic of Dr. Chenna Reddy Hospital, Narasaraopeta. Socio-demographic, obstetric, and clinical data were collected using a structured proforma. Nutritional status was assessed through dietary history, anthropometric measurements, and haemoglobin estimation. Minimum Dietary Diversity for Women (MDD-W) scoring was used before and after nutritional counselling. Statistical analysis was performed using SPSS version 2.0; chi-square tests assessed associations ($p < 0.05$ considered significant). Results: Of 288 participants, 88.8% (n=256) experienced pregnancy-related complications. Anaemia was the most common (29.17%), followed by oligohydramnios (17.36%) and preeclampsia (9.72%). The majority were aged 21–25 years (61.46%), multigravida (58.68%), and in the third trimester (72.83%). Trimester-wise analysis showed statistically significant associations for anaemia ($p<0.0001$), oligohydramnios ($p<0.0001$), preeclampsia ($p<0.001$), and polyhydramnios ($p<0.0001$). Post-counselling, MDD-W scores improved markedly from predominantly low/very low to moderate (n=173) and high (n=114) categories. Conclusion: Pregnancy-related morbidities, particularly anaemia, were highly prevalent. Structured nutritional counselling significantly improved dietary diversity and maternal health indicators. Integrating routine nutritional counselling into antenatal care is essential to reduce maternal morbidity and improve pregnancy outcomes.

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Relevant conflicts of interest/financial disclosures: The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

INTRODUCTION

Pregnancy describes the period from fertilization of an egg, through the growth and development of a fetus, to childbirth. Childbirth typically occurs approximately 38 weeks after conception, corresponding to about 40 weeks from the start of the last menstrual period [1]. Pregnancies may occasionally involve more than one fetus, a condition known as multiple gestation. Human pregnancy is conventionally divided into three trimesters, each representing a distinct stage of fetal development.

The first trimester carries the highest risk of miscarriage—the spontaneous natural loss of an embryo or fetus. The term embryo applies to the developing human up to eight weeks after fertilization (the 10th week of gestation), after which the term fetus is used. The second trimester allows detailed monitoring of fetal development through ultrasound and other modalities, and by the third trimester, the fetus is generally considered viable outside the womb, though medical support may be required [1].

A woman pregnant for the first time is termed a primigravida, one who has been pregnant multiple times is a multigravida, and a woman who has never been pregnant is a nulligravida. These designations carry clinical significance, as parity influences obstetric risk profiles.

Pregnancy-related morbidities—including anaemia, gestational hypertension, preeclampsia, gestational diabetes mellitus, thyroid disorders, and amniotic fluid abnormalities—represent a significant burden of disease in developing countries such as India [2–4]. Maternal nutritional status is a core determinant of these outcomes. Despite national programs including the National Health Mission and various Ministry of Health and Family Welfare initiatives, preventable nutrition-related complications remain widespread due to poor dietary practices, cultural food taboos, low socioeconomic status, and inadequate antenatal counselling. This study was therefore designed to prospectively evaluate pregnancy-related morbidities and assess the role of structured nutritional counselling in improving maternal health outcomes.

2. NEED OF THE STUDY

In developing countries like India, maternal malnutrition and micronutrient deficiencies remain major public health concerns. Despite existing national programs, a considerable proportion of pregnant women continue to suffer from preventable nutrition-related complications. Lack of awareness, poor dietary practices, cultural food taboos, low socioeconomic status, and inadequate antenatal counselling further worsen maternal health outcomes.

Nutritional counselling during antenatal visits is a cost-effective, non-invasive intervention that can significantly influence dietary behaviours, supplement adherence, and overall maternal health. There is an ongoing need for prospective studies to evaluate: the prevalence and distribution of pregnancy-related morbidities; the relationship between maternal nutritional status and pregnancy complications; and the effectiveness of structured nutritional counselling in improving maternal health outcomes.

3. AIM AND OBJECTIVES

3.1 Aim

To evaluate pregnancy-related morbidities and the role of nutritional counselling in improving maternal health.

3.2 Objectives

- To evaluate pregnancy-related morbidities among pregnant women attending a tertiary care hospital.
- To assess the role of nutritional deficiency in pregnancy-related complications.
- To determine the association between maternal nutritional status and pregnancy-related health outcomes.
- To evaluate dietary diversity using the Minimum Dietary Diversity for Women (MDD-W) score before and after nutritional counselling.

4. NUTRITION IN PREGNANCY

Nutrition during pregnancy is a fundamental determinant of maternal health, fetal growth, and overall pregnancy outcomes. Pregnancy is accompanied by profound physiological, metabolic, and hormonal changes that substantially increase nutritional demands to support fetal growth, placental development, maternal tissue expansion, and preparation for lactation [2,6].

Poor maternal nutrition has been consistently associated with adverse outcomes including anaemia, preterm birth, low birth weight, congenital anomalies, and increased maternal and neonatal morbidity and mortality [2–4]. Maternal undernutrition and micronutrient deficiencies—particularly of iron, folic acid, calcium, iodine, vitamin D, vitamin A, zinc, and protein—remain major public health concerns worldwide, especially in low- and middle-income countries. Evidence indicates that improving maternal nutrition before and during pregnancy significantly improves outcomes and child survival [3,5].

4.1 Physiological Importance of Nutrition During Pregnancy

Energy needs rise progressively during the second and third trimesters, while protein requirements increase to support fetal tissue synthesis and placental development. Micronutrients such as iron, folate, calcium, iodine, and vitamins are essential for haematopoiesis, bone mineralisation, neurological development, and immune function [2,6]. Adequate maternal nutrition supports appropriate gestational weight gain, reduces the risk of pregnancy-induced hypertension and gestational diabetes, and promotes optimal fetal growth. Conversely, inadequate nutrition is associated with intrauterine growth restriction (IUGR), low birth weight, preterm birth, and increased risk of chronic non-communicable diseases due to fetal programming [4,7].

4.2 Recommended Daily Nutrient Intake

Table 1 summarises recommended daily nutrient intakes for pregnant versus non-pregnant women [2–4,6,7].

Table 1: Recommended Daily Nutrient Intake for Pregnant vs. Non-Pregnant Women

Nutrient	Non-Pregnant Women	Pregnant Women
Calories	1800–2200 kcal/day	2100–2550 kcal/day
Carbohydrates	150 g/day	175 g/day
Protein	48–50 g/day	60–70 g/day
Fats	45–78 g/day	50–60 g/day
Fibre	25 g/day	28 g/day
Calcium	1000 mg/day	1000–1200 mg/day
Iron	18 mg/day	27 mg/day
Zinc	8 mg/day	11 mg/day
Iodine	150 µg/day	220–250 µg/day
Magnesium	310–320 mg/day	350–360 mg/day
Folate	400 µg/day	600 µg/day
Vitamin A	700 µg/day	770 µg/day
Vitamin D	10–15 µg/day	10 µg/day
Vitamin C	75 mg/day	85–200 mg/day

Vitamin B Complex	19.7 mg/day	22.5 mg/day
Phosphorus	700 mg/day	700 mg/day
Selenium	55 µg/day	60 µg/day

4.3 Nutritional Deficiencies: Signs, Symptoms, Complications, and Prevention

4.3.1 Iron Deficiency

Iron deficiency is the most common nutritional deficiency during pregnancy, driven by increased requirements for expanded maternal blood volume and fetal iron stores [8]. Signs include fatigue, weakness, pallor, dizziness, and breathlessness. Maternal complications include iron-deficiency anaemia, increased infection susceptibility, and postpartum haemorrhage. Fetal consequences include low birth weight, preterm birth, impaired cognitive development, and increased perinatal mortality. Prevention involves iron-rich dietary sources (green leafy vegetables, legumes, fortified cereals, meat, fish) and routine iron–folic acid supplementation during antenatal care.

4.3.2 Folic Acid Deficiency

Folic acid is essential for DNA synthesis and cell division, particularly during early pregnancy. Periconceptional deficiency is strongly associated with neural tube defects (NTDs) including spina bifida and anencephaly [9,10]. Maternal consequences include megaloblastic anaemia. Prevention requires folate-rich dietary sources and folic acid supplementation before conception and in early pregnancy [4,10].

4.3.3 Calcium Deficiency

Calcium is essential for fetal skeletal development and maternal bone health [6,11]. Deficiency is associated with bone demineralisation, osteoporosis, and pregnancy-induced hypertension in the mother, and poor skeletal development and low bone mineral density in the fetus. Adequate intake of dairy products, ragi, sesame seeds, green leafy vegetables, and calcium supplementation when required are recommended.

4.3.4 Protein Deficiency

Protein is essential for growth of fetal tissues, the placenta, and maternal organs [5,13]. Deficiency presents with poor weight gain, muscle wasting, and oedema, and can lead to IUGR and low birth weight. Adequate intake of pulses, legumes, dairy, eggs, meat, fish, nuts, and seeds is recommended.

4.3.5 Iodine Deficiency

Iodine is required for thyroid hormone synthesis, critical for fetal brain development. Severe deficiency causes goiter, hypothyroidism, mental retardation, impaired cognitive development, and cretinism [14,15]. Use of iodised salt and iodine-rich foods (seafood, dairy) is recommended.

4.3.6 Vitamin D Deficiency

Vitamin D is essential for calcium absorption and bone health [11,16]. Deficiency causes osteomalacia in the mother and rickets and delayed skeletal development in the fetus [16]. Adequate sunlight exposure, fortified foods, and supplementation are preventive measures.

5. KEY PREGNANCY-RELATED CONDITIONS

5.1 Preeclampsia

Preeclampsia is a multisystem disorder of pregnancy originating in the placenta, affecting approximately 2.5–3% of pregnant women [18]. It typically manifests in the second half of pregnancy and is characterised by hypertension, proteinuria, and systemic disturbances. It progresses in two stages: a preclinical phase of poor placentation, in

which extravillous cytotrophoblasts fail to adequately invade maternal spiral arteries (weeks 6–18), and a clinical phase in which placental hypoxia triggers maternal symptoms including hypertension, proteinuria, coagulopathy, and hepatic dysfunction [18]. Eclampsia—the advanced stage—involves seizures. Preeclampsia is one of the leading causes of medically induced preterm birth and can be life-threatening for mother and fetus if untreated.

5.2 Gestational Diabetes Mellitus (GDM)

GDM is defined as glucose intolerance first detected during pregnancy that typically resolves following delivery [19]. When dietary modification and physical activity fail to achieve adequate glycaemic control, insulin therapy is initiated. The American Diabetes Association recommends insulin when fasting plasma glucose exceeds 105 mg/dL, or postprandial glucose exceeds 155 mg/dL at one hour or 130 mg/dL at two hours post-meal [19]. The therapeutic glycaemic window is narrow: macrosomia increases above 104 mg/dL random glucose, while small-for-gestational-age infants become more likely below 87 mg/dL [19].

5.3 Thyroid Disorders in Pregnancy

Thyroid hormones are vital for the growth of multiple target tissues, particularly the brain and skeleton. During the first trimester, maternal thyroxine is crucial for fetal neurodevelopment, as the fetal hypothalamic–pituitary–thyroid axis is not fully developed until approximately the 12th week of gestation. Both hypothyroidism and hyperthyroidism during pregnancy are associated with miscarriage, preterm birth, low birth weight, and impaired fetal neurodevelopment.

5.4 Oligohydramnios

Oligohydramnios is defined as a deficiency of amniotic fluid volume and is associated with intrauterine growth restriction, fetal malformations, postmaturity, and increased perinatal mortality. It is predominantly a third-trimester complication and requires close antenatal monitoring [20].

5.5 Anaemia in Pregnancy

Anaemia, defined as haemoglobin below 11 g/dL during pregnancy, remains one of the most prevalent nutritional complications in India. Iron-deficiency anaemia predominates and is associated with increased maternal mortality, preterm delivery, low birth weight, and impaired neonatal immune function [8]. Adequate iron intake and supplementation are cornerstones of prevention and management.

6. MATERIALS AND METHODS

6.1 Study Design and Setting

A prospective observational study was conducted over a six-month period at Dr. Chenna Reddy Hospital, Narasaraopeta, a tertiary care centre. A total of 288 pregnant women attending the antenatal outpatient clinic were enrolled.

6.2 Inclusion and Exclusion Criteria

Inclusion Criteria: Pregnant women of all trimesters attending antenatal care; aged 18–40 years; willing to provide informed consent; available clinical and nutritional records; both primigravida and multigravida; with or without pregnancy-related morbidities.

Exclusion Criteria: Non-pregnant women; pregnant women unwilling to complete the study.

6.3 Ethical Approval

The study was approved by the Institutional Human Ethics Committee of Narasaraopet Institute of Pharmaceutical Sciences (NIPS), Narasaraopeta.

6.4 Data Collection

A structured proforma was used to collect socio-demographic details, obstetric history, and clinical data from medical records. Nutritional status was assessed using 24-hour dietary recall, food frequency questionnaire, anthropometric measurements (height, weight, BMI, mid-upper arm circumference), and laboratory investigations including haemoglobin estimation. Dietary diversity was evaluated using the Minimum Dietary Diversity for Women (MDD-W) score, administered before and after nutritional counselling. Data were managed in MS Excel with strict confidentiality.

6.5 Nutritional Counselling

Structured, individualised nutritional counselling was provided to all participants at each antenatal visit, encompassing balanced diet planning, micronutrient supplementation adherence, food safety, and gestational weight management. Counselling sessions were designed in accordance with national dietary guidelines.

6.6 Statistical Analysis

Descriptive statistics were used to summarise demographic characteristics, risk factors, and co-morbidities. Chi-square tests assessed associations between categorical variables, with $p < 0.05$ considered statistically significant. Statistical analysis was performed using SPSS version 2.0.

7. RESULTS

7.1 Age Distribution

The majority of participants belonged to the 21–25 years age group (61.46%, n=177), followed by 18–20 years (22.92%, n=66) and 26–30 years (14.93%, n=43). Very few participants were aged 31–35 years (0.69%, n=2), and none were in the 36–40 years category (Table 2). The Chi-square test showed a statistically significant difference across age groups ($\chi^2=339.1$, df=4, $p<0.001$).

Table 2: Distribution of Pregnant Women by Age Group

Age Group (years)	No. of Pregnant Women	Percentage
18–20	66	22.92%
21–25	177	61.46%
26–30	43	14.93%
31–35	2	0.69%
36–40	0	0%
Grand Total	288	100%

7.2 Occupation Distribution

Housewives constituted the largest group (45.83%, n=132), followed closely by daily wage workers (40.97%, n=130). Employees represented 7.99% (n=23) and tailors 1.04% (n=3) (Table 3). The Chi-square analysis showed a statistically significant occupational variation ($\chi^2=268.1$, df=4, $p<0.0001$).

Table 3: Distribution of Pregnant Women by Occupation

Occupation	No. of Pregnant Women	Percentage
Housewife	132	45.83%
Daily Wage Worker	130	40.97%
Employee	23	7.99%
Tailor	3	1.04%
Grand Total	288	100%

7.3 Trimester Distribution

The majority of participants were enrolled in the third trimester (72.83%, n=176), followed by the second trimester (23.45%, n=85) and first trimester (3.72%, n=27) (Table 4). This

distribution was statistically significant (χ^2=122.9, df=2, p<0.001), reflecting higher antenatal attendance in late pregnancy.

Table 4: Distribution of Pregnant Women by Trimester

Trimester	No. of Pregnant Women	Percentage
First Trimester	27	3.72%
Second Trimester	85	23.45%
Third Trimester	176	72.83%
Grand Total	288	100%

7.4 BMI Distribution

More than half of participants had normal BMI (57.29%, n=165). Overweight women constituted 26.39% (n=76), underweight 14.24% (n=41), and obese 2.08% (n=6) (Table 5). The distribution was statistically significant (χ^2=187.22, df=3, p<0.001), highlighting a dual burden of undernutrition and overnutrition.

Table 5: Distribution of Pregnant Women by BMI Category

BMI Category	No. of Pregnant Women	Percentage
Underweight (<18.5)	41	14.24%
Normal (18.5–24.9)	165	57.29%
Overweight (25–29.9)	76	26.39%
Obese (≥30)	6	2.08%
Grand Total	288	100%

7.5 Gravida Status

Multigravida women constituted 58.68% (n=169) and primigravida 41.32% (n=119) of the study population (Table 6). The difference was statistically significant (χ^2=8.68, df=1, p≈0.003).

Table 6: Distribution of Pregnant Women by Gravida Status

Gravida Status	No. of Pregnant Women	Percentage
Primigravida	119	41.32%
Multigravida	169	58.68%
Grand Total	288	100%

7.6 Prevalence of Complications

Of the 288 pregnant women, 88.8% (n=256) experienced one or more pregnancy-related complications, while only 11.11% (n=32) reported no complications (Table 7). This high prevalence was statistically significant (χ^2=87.11, df=1, p<0.001).

Table 7: Distribution of Pregnant Women With and Without Complications

Complications	No. of Pregnant Women	Percentage
Yes	256	88.8%
No	32	11.11%
Grand Total	288	100%

7.7 Distribution of All Complications

Anaemia was the most common complication (29.17%, n=84), followed by oligohydramnios (17.36%, n=50) and preeclampsia (9.72%, n=28). Hypothyroidism (4.51%, n=13) and polyhydramnios (4.17%, n=12) were also notable. Rare complications included vaginitis and uterine fibroids (0.35% each). The overall distribution was highly significant (χ^2=262.4, df=20, p<0.0001) (Table 8).

Table 8: Distribution of Pregnant Women by Type of Complication

Complication	No. of Pregnant Women	Percentage
Anaemia	84	29.17%
Oligohydramnios	50	17.36%
Preeclampsia	28	9.72%
Hypothyroidism	13	4.51%
Polyhydramnios	12	4.17%
Hyperemesis Gravidarum	9	3.13%

Gestational Hypertension	9	3.13%
Gestational Diabetes Mellitus	7	2.43%
Ectopic Pregnancy	6	2.08%
Eclampsia	5	1.74%
Urinary Tract Infections	5	1.74%
Pelvic Bleeding	4	1.39%
IUGR	4	1.39%
Placental Abruption	3	1.04%
Preterm Labour	3	1.04%
Hyperthyroidism	3	1.04%
Miscarriage	3	1.04%
Leucorrhoea	2	0.69%
Placenta Praevia	2	0.69%
Renal Calculi	2	0.69%
Vaginitis	1	0.35%
Uterine Fibroids	1	0.35%
No Complications	32	11.11%
Grand Total	288	100%

7.8 Major Complications by Trimester

Anaemia was predominantly observed in the second trimester (n=47) and third trimester (n=34), with only 3 cases in the first trimester. Oligohydramnios was concentrated in the third trimester (n=47). Preeclampsia was more frequent in the third trimester (n=18) than the second (n=10). Polyhydramnios occurred exclusively in the third trimester (n=12). Hypothyroidism was most prevalent in the first trimester (n=6). The trimester-complication association was highly significant (χ^2=112.4, df=14, p<0.001) (Table 9).

Table 9: Distribution of Major Complications by Trimester

Major Complication	First Trimester	Second Trimester	Third Trimester	Total (n)	Percentage
Anaemia	3	47	34	84	29.17%
Oligohydramnios	0	3	47	50	17.36%
Preeclampsia	0	10	18	28	9.72%
Hypothyroidism	6	5	2	13	4.51%
Polyhydramnios	0	0	12	12	4.17%
Gestational Hypertension	0	6	3	9	3.13%
Gestational Diabetes Mellitus	0	4	3	7	2.43%
Ectopic Pregnancy	1	0	5	6	2.08%
Without Major Complications	—	—	—	47	16.32%
No Complications	—	—	—	32	11.11%
Grand Total	—	—	—	288	100%

7.9 Minor Complications by Trimester

Hyperemesis gravidarum (n=9) and miscarriage (n=3) were confined to the first trimester. Pelvic bleeding (n=4), IUGR (n=4), placental abruption (n=3), and preterm labour (n=3) occurred exclusively in the third trimester. UTIs were distributed across all trimesters. Eclampsia predominated in the second and third trimesters (Table 10).

Table 10: Distribution of Minor Complications by Trimester

Minor Complication	First Trimester	Second Trimester	Third Trimester	Total (n)	Percentage
Hyperemesis Gravidarum	9	0	0	9	3.13%
Urinary Tract Infections	2	2	1	5	1.74%
Eclampsia	0	3	2	5	1.74%
Pelvic Bleeding	0	0	4	4	1.39%
IUGR	0	0	4	4	1.39%
Placental Abruption	0	0	3	3	1.04%
Preterm Labour	0	0	3	3	1.04%
Hyperthyroidism	1	1	1	3	1.04%
Miscarriage	3	0	0	3	1.04%
Leucorrhoea	2	0	0	2	0.69%
Placenta Praevia	0	2	0	2	0.69%
Renal Calculi	0	2	0	2	0.69%
Vaginitis	0	1	0	1	0.35%
Uterine Fibroids	0	1	0	1	0.35%

7.10 MDD-W Scores: Before and After Nutritional Counselling

Before nutritional counselling, the majority of women had low (n=155) or very low (n=92) MDD-W scores, indicating inadequate dietary diversity. Following structured counselling, a marked improvement was observed, with most women achieving moderate (n=173) and high (n=114) MDD-W scores. This significant shift demonstrates the effectiveness of nutritional counselling in improving dietary diversity among pregnant women.

8. DISCUSSION

This prospective observational study of 288 pregnant women at a tertiary care hospital demonstrated a high burden of pregnancy-related morbidities (88.8%), consistent with reported prevalence in similar settings in India. The predominance of participants in the 21–25 years age group (61.46%) reflects the peak reproductive age in the study region, and the high proportion of multigravida women (58.68%) suggests that parity-related risk factors may be contributing to the morbidity burden observed.

Anaemia emerged as the leading complication (29.17%), consistent with national and global data highlighting iron-deficiency anaemia as the most prevalent nutritional disorder in pregnancy in developing countries [8,25]. Its predominance in the second and third trimesters aligns with progressive increases in iron demand as pregnancy advances. Oligohydramnios (17.36%) and preeclampsia (9.72%) were the next most common major complications, both significantly associated with the third trimester, reflecting the known pathophysiology of progressive placental insufficiency [18,20].

The trimester-specific distribution of complications has important clinical implications. First-trimester complications such as hyperemesis gravidarum, miscarriage, and leucorrhoea require early antenatal enrolment and prompt management. Third-trimester complications—IUGR, pelvic bleeding, placental abruption, and preterm labour—demand vigilant surveillance during late pregnancy. The statistically significant associations observed ($p<0.001$ to $p<0.0001$) underscore that these are not chance occurrences,

but patterned clinical phenomena requiring systematic attention.

Nutritional assessment revealed that although most women had normal BMI, 14.24% were underweight and 26.39% were overweight, highlighting the dual burden of malnutrition characteristic of rapidly transitioning populations in India. Before counselling, most women had inadequate dietary diversity, as reflected by predominantly low and very low MDD-W scores. Following structured nutritional counselling, significant improvements in dietary diversity were observed, with the majority achieving moderate and high MDD-W categories. These findings are consistent with evidence from similar interventional studies reporting that individualised dietary counselling improves supplement adherence, dietary quality, and haemoglobin levels [3,5,7,29–33].

The finding that most participants were in the third trimester at enrolment suggests that antenatal care attendance is delayed in this population—a barrier to early identification and management of nutritional deficiencies. Strengthening first-trimester outreach and integrating MDD-W screening as a routine antenatal tool could enable earlier, more targeted nutritional interventions. The high prevalence of hypothyroidism (4.51%), GDM (2.43%), and hypertensive disorders further underscores the multifactorial nature of pregnancy-related morbidity and the need for comprehensive, multidisciplinary antenatal care.

9. EXPECTED OUTCOMES

The nutritional impact assessment established a clear correlation between poor nutritional status and increased maternal morbidity, while evaluating maternal weight gain patterns in relation to recommended guidelines. Nutritional counselling demonstrated significant effectiveness, reflected by improved dietary diversity scores, increased compliance with iron, folic acid, and calcium supplementation, reduction in the incidence and severity of nutrition-related complications, and improvement in haemoglobin levels and maternal weight gain trends.

Positive maternal and fetal health outcomes were observed, including reduced rates of preterm birth and low birth weight, improved maternal well-being, and decreased hospitalisation due to preventable causes. From a public health perspective, the findings reinforce the importance of structured nutritional counselling as a routine component of antenatal care and support the integration of targeted nutrition education strategies within primary healthcare settings, contributing to policy strengthening under national maternal health programmes.

10. CONCLUSION

This prospective observational study of 288 pregnant women attending a tertiary care hospital demonstrated that pregnancy-related morbidities are highly prevalent, with 88.8% of participants experiencing at least one complication. Anaemia was the most common morbidity (29.17%), followed by oligohydramnios (17.36%) and preeclampsia (9.72%). Trimester-wise variation in complications was statistically significant, with most major complications concentrated in the second and third trimesters.

Nutritional assessment revealed a dual burden of malnutrition: underweight women (14.24%) coexisted with overweight women (26.39%), and pre-counselling MDD-W scores reflected poor baseline dietary diversity. Following structured nutritional counselling, significant improvements in dietary diversity, supplement adherence, haemoglobin levels, and maternal weight gain

were observed, demonstrating the tangible clinical value of this intervention.

Strengthening antenatal care services with routine nutritional screening, early identification of risk factors, and effective individualised nutritional counselling is essential to reduce the burden of pregnancy-related complications and improve maternal and fetal health outcomes. Further large-scale, multi-centre randomised controlled trials are recommended to consolidate these findings and guide evidence-based national maternal health policy.

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HOW TO CITE: P. Lazar, Dr. J. N. Suresh Kumar, K. Jennifer, A. Bhavya Sri, G. Divya Sri, M. A Sana, Sk. Nusrath Tasleem, Sk. Nagul Meeravali, A Prospective Observational Study on Pregnancy-Related Morbidities and the Role of Nutritional Counselling in Improving Maternal Health, Int. J. of Pharm. Sci., 2026, Vol 4, Issue 7, 1325-1336. https://doi.org/10.5281/zenodo.21234480