



A study on analysis of nutritional status in pregnancy women

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Abstract

The review is discussed about prevalence of anemia in pregnancy women in rural and urban areas of random survey, Assessed the proper care of her health status in pregnancy and assessed the necessity of nutritional status according to their BMI. In observational study was directed to evaluate healthful status of pregnant ladies. The wholesome districts of 147 pregnant ladies going to ANC in tertiary consideration Educated assent and moral endorsement were acquired information was acquired by utilizing information assortment structures which included patient demographics, income, measurements and 24 hr dietary history the study include 147 pregnant women in total out of 147 pregnant women where between the age 18-28, (21.0%) where between age 24-28, (47.6%) where between age of 29-33, (37.2%). The majority of (48.8%) had secondary level education (25.1%) has degree level education and uneducated (34.0%). Them where house wife (57.8%) of them where working (42.1%) and family income 30 thousand (40.8%) 50 thousand (23.8%) 1-1.5 lakhs (35.3%) similarly belongs to the joint families (51.0%) and nuclear families (48.9%). The study's findings demonstrate the general well-being significance of undernutrition among pregnant women in the study area. Wholesome districts of pregnant ladies was influenced by variables like Income, Type of family, Hemoglobin levels, their weight record and furthermore their dietary intake.

Keywords: Body mass index; Absolute Neutrophil Count; Anemia; Demographics; Dietary; Nutrition

1. Introduction

Nutritional problems have serious public health significance impacting psychological, physical, developmental and work performance of pregnant women. Iron deficiency is common nutritional cause of anemia. it may be associated with folate deficiency especially during pregnancy. Pregnant women form a large high-risk group requiring special care. According to WHO, in developing countries, the prevalence of anemia among pregnant women is 56%(WHO,1992). ¹The prevalence of anemia in India is 60 -70% (Park, 2005). In India, anemia is the 2nd most common cause of maternal deaths accounting for 19% of total maternal deaths (Govt.of India,2002). Nutritional problem may be caused not only by deficiency of protein, calorie, iron, vit -C etc, but by other conditions like malaria, worm infestation,² adverse environmental and sociodemographic factors. Association of nutritional problem with adverse maternal outcome such as puerperal sepsis. Anti partum haemorrhage, postpartum haemorrhage etc. are also responsible for low birth weight, premature birth, high perinatal mortality rate and decreased work capacity. The present study was planned to find out the prevalence of anemia amongst pregnant women the socio-demographic factors associated with anemia and utilization of health services by pregnant women.

2. Definition of nutrition

Nutrition plays an important role in every human to take food and change into energy and some more Nutrition is required for everyone. Nutrients like carbohydrates (breads, grains and starchy vegetables), proteins (meat, milk,

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almonds, eggs and nuts), vitamins (vitamin A, Vitamin C, vitamin B6, vitamin B12,) minerals (Dairy foods, nuts, fruits and vegetables) and fibers (fruit, vegetables, grains, beans and peas) every pregnant women need more nutrition before pregnancy. This high nutrition foods can help to Healthy pregnancy and healthy body³.

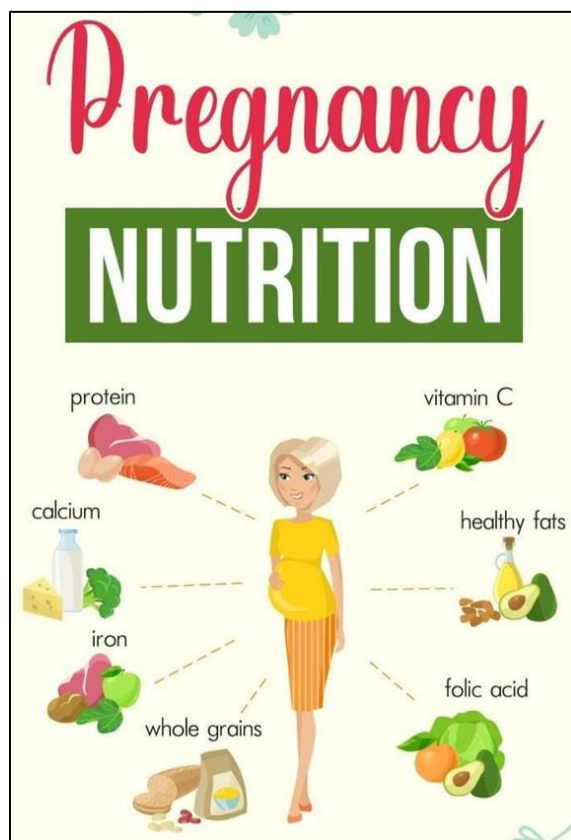


Figure 1 Nutrition during pregnancy

3. Important nutrients during pregnancy

- Folic acid(600mcg/day): Prevents neural tube defects.
- Iron(27mg/day): Supports body growth and brain development.
- Calcium: Reduces preeclampsia risk, build's baby bones and teeth.
- Vitamin D(600IV/day): Builds baby's bones and teeth.
- Choline: Supports brain development⁴.
- Omega-3 fatty acids: Supports foetal development.

3.1. Vitamin B: Essential for energy production

- Zinc: Supports immune function and growth.
- Iodine: Crucial for brain development.

3.2. Recommended foods

- Fortified cereals.
- Enriched bread and pasta
- Pea nuts.
- Dark green leaf vegetables.
- Orange juice.
- Beans.
- Fruits cantaloupe, honey, mangoes, prunes, banana, apricots, oranges, red/pink grape fruit.
- Dairy (fat-free/low-fat yogurt,1% milk, soymilk).

3.3. Risk of poor nutrition

- Anaemia.
- Preeclampsia
- Haemorrhage.
- Low birth weight.
- Preterm labour.

3.4. Recommended nutrient intakes

- Protein:76-78gm/day (for pregnant adolescents).
- Iron:30-60mg/day.
- Folic acid :1mg/day.
- Calcium:1.2-1.6g/day.

3.5. Supplementation guidelines

- Iron supplements recommended due to limited dietary sources.
- Folic acid supplements recommended, not to exceed 1mg/day
- Calcium supplements unnecessary if diet includes adequate milk and dairy products.
- Vitamin supplements not recommended due to potential fetal male formation.

3.6. Organizational recommendations

- American dietetic association (ADH) emphasizes dietary sources over supplementation.
- American institute of nutrition (AIN)and American society for clinical nutrition (ASCN): similar statement to ADA.
- American college of obstetricians and Gynecologist (ACOG): recommends vitamin/mineral supplements equal to RDA for pregnant women if dietary intake is in adequate, emphasizes increased protein, iron, folic acid and other vitamins/minerals during pregnancy.
- Task force on adolescent pregnancy: Recommended protein-rich foods and iron supplement, suggest calcium intake of 1.2-1.6gm/day.

4. Nutrition in pregnancy

Mainly pregnancy women most needed supplements like Folic acid, Iron, Calcium, Vitamin D, Choline, Omega 3 fatty acid and Vitamins.

- Pregnancy women usually need balance dietary plan are most important for healthy body.
- Pregnancy women need more than 300extra calories per day.
- Pregnancy women should take 75-100grams of protein per day.
- Pregnancy women must need to take 100mg of calcium per day.
- Pregnancy women must need 27mg of iron per day⁵.

5. Stages of nutritional status in pregnancy women first trimester, second and third trimester in pregnancy women



Figure 2 Stages of trimesters

5.1. First trimester

First trimester is most crucial stage. This is for every pregnant women to get starts experiencing various symptoms. Whenever early pregnancy symptoms is different from one women to another women while some might experience elevated energy levels some women are un explained there mood changes and fatigue⁶.

5.1.1. Signs and symptoms:

- Nausea
- Vomiting
- lack of appetite.
- Disinterest in daily routine.
- Frequent urination.
- Tenderness in breast and nipples.

5.2. Second trimester

The second trimester spans from 14 to 27weeks. The period of time foetus goes through many changes, growing to be around 1 foot long and weight is 1.5 pounds. In second trimester pregnant women feel much better than compare to first trimester. In every pregnant women may face morning sickness and fatigue sometimes reduce or vanish. The pregnant women abdomen may become enlarges as the foetus grows. Pregnant women can observe physical changes are stretch marks may appear on abdomen, thighs, breasts, buttocks, ankles fingers, and face may swell. During this trimester, it becomes possible to feel the baby's movements⁶.

5.2.1. Signs and symptoms

- Weight gain
- Stretch marks
- Braxton Hicks contractions
- Back pain
- Swelling in feet and ankles
- Linea nigra (dark line on abdomen period which is usually around week 40)
- Hair growth



Figure 3 Signs and symptoms in pregnancy women

5.3. Third trimester

The third trimester lasts from week 29 until delivery. Pregnant women may feel growth of the foetus can cause discomfort in this trimester. In this trimester pregnant women may experience leakage of milk from breasts, frequent urination, Braxton Hicks contractions (Which do not indicate labour), real contractions. Pregnant women also feel anxiety about delivery and parenthood toward the end of pregnancy.

5.3.1. Signs And Symptoms

- Rapid weight gain
- Swelling in face, hands and feet
- Headaches
- Vision changes
- Fatigue
- Braxton Hicks contractions
- Foetal movement changes.

6. Causes of nutritional status in pregnancy women

6.1. Socioeconomic

- Income: Limited financial resources affect access to nutritious food.
- Education: Knowledge about nutrition and health affects dietary choices.
- Occupation: Time constraints and physical demands impact meal planning.

6.1.1. Physical

- Morning sickness and nausea.
- Food cravings and aversions.
- Digestive changes (constipation, heartburn).
- Pre-existing medical conditions (diabetes, anemia).

6.1.2. Dietary

- Inadequate calorie intake.
- Poor nutrient diversity.
- Excessive caffeine or sugar consumption.
- Food allergies or intolerances.

6.1.3. Cultural And Environmental

- Traditional dietary practices.
- Access to healthcare and nutrition counselling.
- Environmental toxins (lead, mercury).
- Geographic location (food availability, climate).

6.1.4. Psychological

- Stress
- Depression
- Body image concerns

6.1.5. Healthcare-Related

- Inadequate prenatal care
- Multiple pregnancies
- Previous pregnancy complications

7. Measurements of nutritional status in pregnancy women

Body Mass Index (BMI): Measurements used in pre pregnancy women weight, body mass index key factors in determine how much weight women should gain during pregnancy⁷.

BMI categories are: Under weight: BMI ≤ 18.5 kg /m² Normal weight: BMI 18.5-24.9kg/m²

Over weight: BMI 25-29.9kg/m²

Obese: BMI ≥ 30 kg/m²

Dietary Intake: Dietary intake can be assessed by asking women about the frequency of consumption various of foods.

8. Nutritional diagnosis of status in pregnancy women

8.1. Clinical assessment:

- Medical history
- Physical examination (weight, height, body mass index (BMI))
- Obstetric history (previous pregnancies, complications)

8.2. Anthropometric measurements

- Weight
- Height
- BMI
- Mid-upper arm circumference (MUAC)
- Waist circumference

8.3. Laboratory tests

- Hemoglobin (Hb) or hematocrit (Hct) for anaemia.
- Blood glucose for gestational diabetes
- Serum albumin and prealbumin for protein status
- Vitamin and mineral levels (e.g., folate, iron, calcium)
- Urine tests (proteinuria, ketonuria)

8.4. Dietary assessment

- 24-hour dietary recall
- Food frequency questionnaire (FFQ)
- Dietary history

8.5. Nutritional-specific screening tools

- Pregnancy Nutrition Risk Assessment Tool
- Nutrition in Pregnancy Knowledge Questionnaire (NPQ)
- Pregnancy-Unique Quantification of Emesis and Nutrition (PUQE)

8.6. Classification of nutritional status:

- Underweight (BMI < 18.5)
- Normal weight (BMI 18.5-24.9)
- Overweight (BMI 25-29.9)
- Obese (BMI ≥ 30)
- Malnourished (based on anthropometric and laboratory measures)

9. Monitoring frequency

- Initial assessment at first prenatal visit
- Follow-up assessments at 24-28 weeks and 36 weeks gestation
- Additional assessments as needed (e.g., for high-risk pregnancies)

9.1. Consequence of poor nutritional status

- Maternal complications (Anemia, gestational diabetes)
 - Fetal growth restriction
 - Low birth weight
 - Preterm birth
 - 5. Increase risk of pregnancy-related mortality.
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10. Aim and objectives aim

The main aim of the study on analysis of nutritional status in pregnancy women.

10.1. Objectives

- To prove the prevalence of anemia in pregnancy women in Rural & Urban areas of random survey.
- To assess the proper care of her health status in pregnancy.
- To assess the necessity of nutritional status according to their BMI.

10.2. Plan of work

- Review existing studies on the prevalence of anemia and nutritional status in pregnant women.
 - Develop a structured questionnaire to collect data on health and nutritional status from pregnant women.
 - Identify and select pregnant women from rural and urban areas for a random survey. d) Measure weight, height, and calculate body mass index of the pregnant women.
 - Collect blood samples to assess hemoglobin levels and identify anemia.
 - Record dietary habits and intake using food frequency questionnaires or 24-hour recall methods.
 - Evaluate the general health status of the participants through physical exams and medical history.
 - Compile data on nutritional status, anemia prevalence, and body mass index for statistical analysis.
 - Perform statistical analysis to compare health status and nutritional outcomes between rural and urban populations.
 - Summarize findings, draw conclusions, and suggest recommendations for improving maternal health and nutrition based on the results.
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11. Methodology

11.1. Study design

Cross-sectional study

11.2. Study population

Pregnant women attending antenatal care (ANC) clinics in [insert location]

11.3. Sample size

[Insert sample size] pregnant women 150

11.3.1. Inclusion criteria:

- Pregnant women aged 18-33 years.
- Gestational age: 12-36 weeks.
- Attending ANC clinics.
- Willing to participate.
- Pregnancy women who are above 15-18 years women are included.

- Pregnancy women working as professionals and home makers.
- Pregnancy women as literate and illiterate women

11.3.2. Exclusion criteria

- Multiple pregnancies
- Chronic medical conditions (Eg: Diabetes, Hyper tension)
- Known nutritional disorders.
- Mental retardation
- Physically handicapped.

11.4. Data collection tools:

11.4.1. Socio-demographic questionnaire

- To collect information on age, education, income, occupation and other relevant socio-demographic factors

11.4.2. Dietary assessment tools

- 24-hour dietary recall(24HR).
- Food frequency questionnaire (FFQ).

11.4.3. Anthropometric measurements

- Height
- Weight
- Mid-upper arm circumference (MUAC).

11.4.4. Clinical data:

- Medical records reviews for gestational age and pregnancy complications
- Pregnant women were recruited from ANC clinics.
- Informed consent was obtained.
- Socio-demographic and dietary data were collected through interviews.
- Anthropometric measurements were taken.
- Clinical data were extracted from medical records.

12. Result and discussion

The study include 147 pregnant women in total out of 150 pregnant women. Where between the age 18-28, (21.0%) where between age 24-28, (47.6%) where between age of 29-33, (37.2%). The majority of (48.8%) had secondary level education (25.1%) has degree level education and uneducated (34.0%) Them. where house wife (57.8%) of them where working (42.1%) and family income 30 thousand (40.8%) 50 thousand (23.8%) 1-1.5 lakhs (35.3%) similarly belong to the joint families (51.0%) and nuclear families (48.9%). Table 2: Participants socio-demographic characteristics.

Table 1 Participants Socio-demographic characteristics

Variables	Category	Frequency	Percentage
AGE (In Years)	18-23	31	21%
	24-28	70	47%
	29-33	46	31%
Education	Secondary	60	40%
	Degree	37	25%
		50	34%

	Uneducated		
Occupation	House Wife	85	57%
	Working	62	42%
Annual income	30-Thousand	60	40%
	50-Thousand	35	23%
	1 - lakh	52	35%
Month of pregnancy	Trimester	24	16%
	Trimester	88	59%
	Trimester	35	23%
parity	1 st baby	74	50%
	2 nd baby	69	46%
	3 rd baby	4	2.7%
Type of family	Joint	75	51%

Table 2 Distribution of study participants according to there BMI

Variable	Category	Frequency	Percentage
Body mass index	Under weight (< 18.5)	43	29%
	Normal (19-24.9)	88	59%
	Overweight (25-29.9)	16	10%

From the above table shoes that out of 147 participant 43 (29%) underweight,88 (59%) Normal and 16 (10%) Overweight.

Table 3 The distribution of study participants based on their hemoglobin levels

Hemogolobin values	Frequency	Percentage
Mild anemia (10-11gm/dl)	44	29.9%
Moderate anemia(7-9.9gm/dl)	28	19.0%
No anemia (normal)	75	51.0%
Total	147	99.9%

12.1. Hemoglobin distribution

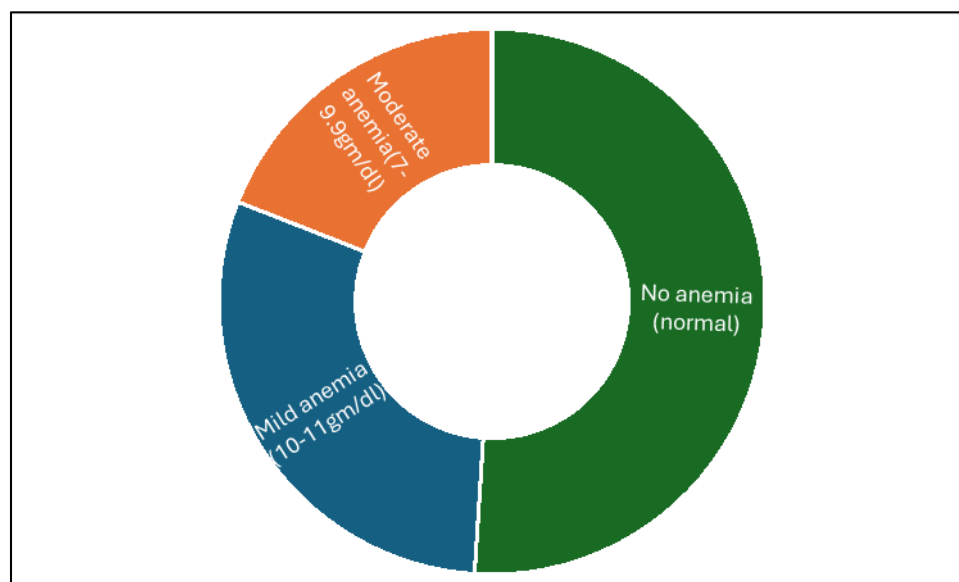


Figure 4 Hemoglobin level distribution

13. Conclusion

The analysis of nutritional status among pregnant women highlights the critical role of proper nutrition in ensuring positive maternal and fetal health outcomes. This study demonstrates that a significant proportion of pregnant women are either undernourished or at risk of nutrient deficiencies, often due to inadequate dietary intake, socioeconomic factors, and lack of awareness. Poor nutritional status during pregnancy can lead to complications such as low birth weight, anemia, preterm delivery, and impaired fetal development.

Findings from this research underscore the need for targeted nutritional interventions, routine screening, and enhanced antenatal care services that include dietary education and supplementation programs. Improving the nutritional status of pregnant women is essential for breaking the cycle of malnutrition and promoting long-term health for both mothers and their children. Future efforts should focus on community-based strategies, policymaking, and healthcare integration to ensure that all pregnant women receive the nutritional support they need.

Compliance with ethical standards

Disclosure of conflict of interest

No conflict of interest to be disclosed.

Statement of ethical approval

This study is should not involved any animals /humans this data is collected by all individuals.

Statement of informed consent

Yes this information obtained by all individual participation.

References

- [1] Sharma., Patnaik., Pattanaik., Dattatrekar. & Ruchibhuyan. (2023). Nutritional status of pregnant women in india. *Journal of Annals of the Romanian society for cell biology*, 25(2), 1352-1355.
- [2] Brown J.E. (2019). Nutrition during pregnancy. *Journal of Clinical Nutrition*, 112(3), 63-142.
- [3] Larson S., Huffman S. (2020), Nutrition and Pregnancy. *Journal of Pregnancy*, 2020(1), 1-9.

- [4] Yang, Zhang, Min fu., Wang, Denghailiu. & Xianglu meng. (2024). Salivary Iodine concentration in pregnant women and its association with iodine status and thyroid function. *European journal of nutrition*, 63, 1139-1149.
- [5] Wenqi Hu., wang., Chen. & Tingting Pan. (2023). Oral Health Status and Literacy/Knowledge Amongst Pregnant Women Shanghai. *International Dental Journal*, 73, 212-218.
- [6] Sharma., Patnaik., Pattanaik., Dattatreya., & Ruchibhuyan. (2023). Nutritional status of pregnant women in india. *Journal of Annals of the Romanian society for cell biology*, 25(2), 1352-1355.
- [7] 7. Hasan. et al. (2023). Nutritional status and Dietary diversity of pregnant and nonpregnant reproductive-age Rohingya women. *Journal of Food Science & Nutrition*, 11(9), 5523-5531. 8. Hansen., Knosgaard., Anderse., Sorensen., Vestergaard. & Andersen. (2022), Iodine status in Danish pregnant women after an increase in iodine fortification. *Journal of National Library of Medicine*, 98(3), 407-414.
- [8] 9. Miles A., Vahlverg., Calder C., Houttu., Pajaunen. & Koivuniemi. (2022). Iodine Status pregnancy women and infants in Finland. *Journal of Nationnal Library of Medicine*, 61(6), 2019-2927.
- [9] 10. Martinez., Fernandez., Morillo., Liano., Alvarez & Torre (2021). Nutritional Iodine Status in Pregnant. *Journal of National Library of Medicine*, 13(6), 1816.
- [10] 11. Tsegaye D., Tamiru D. & Velachew T. (2020). Factors associated with dietary practice and nutritional status of pregnant women in Rural communities of Illu Aba Bor Zethiopia. *Journal of Nutrition and Dietary Supplements*, 12, 103-112.
- [11] 12. Adami., Scherer-Adami., Dutra-Rosolen., Schedler., Carreno & Alves N. (2020). Nutritional status and dietary intake of pregnant women. *Journal of National Library of Medicine*, 22(1), 27-33.
- [12] 13. Ceulemans., Hompes., Foulon. (2020). Mental Health Status of Pregnant and breastfeeding women during the COVID 19. Pandemic. *International Journal of Gynecology*, 151(1), 146-147.
- [13] 14. Nodoshan., Alimorandi., Nazari. (2020). Speritual health and stress in pregnant women during the Covid-19 pademic. *Journal of Springer clinical nature Comprehensive clinical medicine*, 2(12), 2528-2534
- [14] 15. Jasper most., Dervis., Haman., Redman M., Adamo B. (2019). Energy intake Requiriments pregnancy. *Journal of National Library of Medicine*, 11(8), 1812.
- [15] 16. Misan., Paczkowska., Szmyt., Katska., Tomczak. & Breborowicz. (2019). Nutritional behavior in pregnancy. *Journal of National Library of Medicine*, 90(9), 527-533.
- [16] 17. Pallavi panth., Guerin. & Dimarco. (2019). Iodine Status women Reproductive age in USA. *Journal of National Library of Medicine*, 188(1), 208-220.