

## Prevalence and Associated Factors of Maternal Malnutrition Among Women in Yamuna Area of Prayagraj District

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**ABSTRACT:** Maternal malnutrition is wide spread in resource-limited environments. As a result, this assessment aimed to identify characteristics linked with pregnant women's dietary practices and nutritional health in the Prayagraj district's Yamuna area. The names of 250 pregnant and nursing mothers were drawn at random from a pool of applicants. In addition to awareness questions, the questionnaire includes a general anthropometric profile of the respondent. The ethical committee conducted a consideration meeting for the research-related ethical clearance and approval from the institutional ethical committee, SHUATS, Prayagraj. The interventional group's 24-hour dietary recall method and food frequency ratio was calculated. Dietary practice questions were used to gauge people's habits. Along with that the clinical symptoms of the respondents were assessed in the presence of doctor and ANM's staff and recorded for the future investigation. Thus the observation found that there was a poor dietary practice among pregnant women and obtained poor nutritional status. In the first trimester of pregnancy and no previous sickness, the bad dietary pattern was affirmatively linked with the poor perception of the severity of malnutrition, the poor perception of advantages, and poor self-efficacy. The likelihood of undernutrition increased with factors such as lack of history of illness, a poor diet's nutritional diversity, a lack of nutritional knowledge base, poor dietary practice, low self-efficacy perception and poor hygiene practices. The data was analyzed by using appropriate Frequency and percentage ratio, Critical Difference, and other appropriate statistical analysis methods and interpret the data. The major Challenges faced during the study was the lack of interest of the respondents during the observation but the Community Health Officer, Auxillary Nurse Midwives and Asha Worker were much supportive of the selected villeges and providing necessary facilities.

**Keywords:** Maternal malnutrition, covid 19, Dietary practice, Undernutrition, Pregnancy, Poor Hygiene Habits.

### INTRODUCTION

The WHO defines malnutrition as 'imbalance between the supply and demand of nutrients and energy at the cellular level to ensure development, maintenance, and performance of various particular tasks. To the dismay of many, the term "mild malnutrition" does not just relate to a lack of food but rather to a surplus or imbalance of calories, protein, and/or other nutrients (Bank, 2006). The bodily system requires a balanced intake of nutrients to operate properly. The importance of nutrition can't be overstated, as it's a foundational element of long-term well-being and development. To live, grow, develop, perform and produce at one's maximum potential, it is critical to eat nutritiously and adequately. On the other hand, dietary requirements change with age, gender & physiologic variations, such as pregnancy. Pregnancy is a crucial time in a woman's life because she requires the best possible nutrition for her growing baby.

Malnutrition is a result of a variety of interrelated circumstances that have an impact on a country's child welfare status. It's linked to poor nutrition and diseases caused by living conditions such as food shortages, inadequate childcare and feeding practices, unsanitary living conditions, cultural beliefs, and a lack of parental knowledge, especially among mothers. These are just a few examples.

In India, key MCH indicators remain concerning, as evidenced by partially released results from the National Family Health Survey-5 (NFHS-5), which indicate worsening of maternal and child nutrition indicators in several states (Ministry of family and health welfare, 2021).

Women's health and the success of their pregnancies depend on their having a nutritionally appropriate state during pregnancy. As a result of the improved nutritional needs, impregnation is an important period to ensure that the body receives enough macro-and micronutrients. Micronutrient deficiencies afflict 53.8

million pregnant women worldwide, including anemia and vitamin A deficiency (VAD) (Fouda *et al.*, 2012). Around the world, the incidence of malnutrition is on the decline. As a result of the improved nutritional needs, pregnancy is a serious period to ensure that the body receives enough macro-and micronutrients. Poor nutrition is one of the world's most pressing public health issues. To this day, India is the leading source of malnutrition in the world. Children's growth, development, and survival can be seriously harmed by malnutrition (Patel *et al.*, 2020). Malnutrition is a well-documented reason for sickness and mortality in children all around the world. Malnutrition is referred to as "bad nutrition" in the medical community, and it encompasses both overeating and undereating. Malnutrition is a problem in many countries, but obesity is also becoming an issue. In developed countries like the United States, obesity has long been seen as a problem. However, in developing countries like India, where food habits and lifestyles are rapidly changing, countries like India are now seeing an increase in obesity, particularly among children and mothers. Previous research that examined the coexistence of obesity & undernutrition has examined the twofold burden of malnutrition. Researches have looked into a variety of double burdens of malnutrition, including underweight and obesity in moms, obesity and thinness in children, as well as obesity in mothers and children alike (Pal *et al.*, 2016).

In recent years, micronutrient inadequacy has added to the misery caused by malnutrition. Anemia in Indian women is closely linked to micronutrient inadequacy, which has been extensively researched. Women's anemia has long been a significant public health issue, and it's one of the most common nutrition-related morbidities in underdeveloped nations. In India, anemic children aged 6–59 months constituted 58% of the total. India is a major contributor to child anemia among developing countries. Children's undernutrition, micronutrient deficiency, and obesity have been the triple burden of malnutrition (TBM). When a mother is obese, and her children are anemic or malnourished, TBM coexists. Malnutrition results in stunting, being underweight and wasting (Ahmad *et al.*, 2018).

The direct effects of the disease, the indirect effects of the pandemic have been devastating. Limitations in the availability of skilled health workers and health system access barriers have led to lower coverage of antenatal and postnatal care services, and routine childhood immunization services, especially in rural India (Kumari *et al.*, 2020).

### **THE IMPACT OF THE COVID-19 PANDEMIC ON MATERNAL MALNUTRITION**

There was already a lag in the world's ability to meet Sustainable Development Before the COVID-19 epidemic; the 2030 goal was to eradicate hunger and malnutrition. The pandemic and associated global

economic crisis are serious reverses, and there are already insufficiencies in achieving the 2025 global food objectives for stunting, waste, breastfeeding, and maternal anemia. Economic retrenchments and disruptions of food and health systems due to pandemics increasingly threaten to aggravate malnutrition in low- and medium-income nations. (LMICs) (Headey *et al.*, 2020).

Evidence from household surveys in Africa & Asia also indicates that poverty and food insecurity have increased significantly until 2020. Disruptions have been observed at the local level in supply chains for perishable foods high in nutrients, such as fruits and vegetables and animal feeds, mainly when lockdowns resulted in price volatility and decreasing food intake. Millions of individuals have lost their sources of income as a consequence of the epidemic and pandemic response. Households have lowered their consumption of nutrient-rich fruits and vegetables and animal products such as meat, dairy, and fish in favor of cheap sources of calories such as starchy staples, grains, and oils, and non-perishable ultra-processed foods. Malnutrition is more likely if the meal's nutritional value is reduced, especially if micronutrient deficiencies are more commonplace. As a result of the epidemic's early interruption of social protection systems, many countries have adjusted, amended, or enlarged their programs. However, they are likely to fall short of pre-crisis standards and remain so. There is no way to compare the current pandemic's impact on poverty and food safety with previous ones due to the extraordinary extent and scale of the outbreak. Local food markets are subject to global trade shocks, leading to decreased consumption of nutritious foods and worsened nutritional status and health for disadvantaged populations. This was illustrated by the global food price crisis of 2007–2008 (Amare *et al.*, 2020).

The global mid-2020 projections (economic growth prediction has deteriorated since then) indicated that economic downturns and interruptions to the food supply chain had led to severe poverty of 95 million people and exacerbated domestic food insecurity. According to updated World Bank estimates, the epidemic may drive up to 150 million more people into severe poverty by 2020 (Hamadani *et al.*, 2020).

Early indications of food, economic, and health issues point to a wide variety of dietary effects. Health system shocks and economic shocks on poverty early in the pandemic have been estimated separately regarding their effects on children and maternal and infant mortality. However, disturbances in the economic, food and health sectors have never fully reviewed their combined influence on maternal and child undernutrition (Carducci *et al.*, 2021).

Severe increases in maternal mental health issues, such as clinically relevant anxiety and depression, were reported. Prenatal care visits decreased, healthcare

infrastructure was strained, and potentially harmful policies implemented with little evidence. Women were more likely to lose their income due to the pandemic than men, and working mothers struggled with increased childcare demands (Kotler *et al.*, 2021).

**Objective:**

1. To find out the prevalence and associated risk factors of maternal malnutrition in maternal age women of trans-Yamuna area of Prayagraj district.
2. To determine the factors affecting maternal malnutrition during covid-19.

**MATERIAL AND METHODS**

The study will be a community-based, cross-sectional study with descriptive and analytical components among the maternal age group of the Prayagraj district.

**Criteria for selection of the sample.** Two fifty pregnant and lactating women were randomly chosen from two villages such as Mahewa Purab patti and Mahewa Pashchim patti of Prayagraj district, based on their clinical symptoms anthropometric measurement.

**Selection of Respondents.** Among the three villages verified in Trans Yamuna Area for the cross-sectional study, two fifty pregnant and lactating women were randomly chosen from which pregnant & lactating women were selected from the different villages such as Mahewa Purab Patti and Mahewa Pashchim Patti, respectively for the Anthropometric measurement and to assessed dietary intake and hygiene practices.

**Selection of District and Villages.** The total number of villages in the Prayagraj district is 3170. Among the trans-Yamuna area of

Prayagraj district Two villages such as Mahewa Purab patti and Mahewa Pashchim patti, were selected purposively for the area of study.

**Ethical Considerations.** The ethical committee conducted a consideration meeting for the research-related ethical clearance and approval from the institutional ethical committee, SHUATS, Prayagraj. Oral concurrence was gained by the Community Health Officer and Auxiliary nurse-midwife. For the Assessment of the biochemical profile of the selected malnourished pregnant and lactating women the blood, Campaign was organized under the supervision of the Chief Superintendent, Block Program Mobilizer, Supervisor, and Community Health Officer.

**Tools and Techniques of Data Collection.** The questionnaire consists general and anthropometric profile of the individual response as well as awareness questions. The 24-hour dietary recall method and food frequency ratio was calculated for the targeted interventional group. A weighing machine and flexible, non-stretchable measuring tape was used to determine the weight and length of pregnant and breastfeeding women.

— **Clinical symptom Assessment**

**Risk Factors For Maternal Malnutrition.** It contains information regarding clinical risk factors like past diarrheal diseases, dietary risk factors like food habits, insufficient nutrient intake, source of drinking water, the inclusion of green leafy vegetables in the diet, and behavioral risk factors like pica

The clinical signs were observed in terms of the following heads:

1.	Appearance	Small/Average/Large
2.	Eyes	Normal/Watery/Dry
3.	Nails	Normal/Thin/Flat/Spoon shape
4.	Lips	Normal/Angular
5.	Tongue	Normal/Pale/Red/Stomatitis
6.	Skin	Normal/Pale/Dry & Rough
7.	Teeth	Normal/Discolored
8.	Gums	Normal/Bleeding
9.	Bone	Bone pain/softened bones
10.	Other symptoms	Breathlessness/Weakness/Irritability/ Preeclampsia/Night blindness/throat and chest infection/ None

After clinical examination of individual samples, deficiency symptoms will be noted under the supervision of a doctor.

**Determination of associated risk factors related to the questionnaire developed on the “Dietary habits” and Personal Hygiene and Sanitation”.** Under this, a detailed questionnaire related to the associated risk factor of pregnant and Lactating women based on Dietary habits and Personal hygiene has been framed.

**Statistical Analysis.** The data was analyzed by using Frequency and percentage method, Critical Difference, and other appropriate statistical analysis methods and interpret the data (Gupta *et al.*, 2002).

**RESULTS AND DISCUSSIONS**

**Anthropometric Measurements.** In anthropometry, measurements are used to determine the physical geometry, mass characteristics, and strength capabilities of the human body to make predictions (Singh, 2013)

Anthropometry is the study of human body dimensions, and each person has a unique set of measures proportioned differently, which determines their overall body form (Muze, 2020). Anthropometric assessments included taking weight and height measurements from all of the participants.

**Standing** When determining height, a portable Stadiometer (SECA 217) with an adjustable headpiece was used. This device measures the maximum vertical size of the subject's body. The individual's height was calculated to be within 0.1 centimeters of the exact value. An accurate stadiometer calibration was performed using a set of predetermined lengths. Correct body posture was achieved when measuring the standing height (Karim & Qaisar, 2020).

**Height of the observed Pregnant and Lactating women:** The above Table 1. gives the data related to the Height of the women. In the above table, the Critical Difference method is used. The Critical Variation is the smallest difference between two sets of sequential laboratory findings that indicates a genuine shift in the patient's condition when it comes to patients. As we observe the data in the above table, it

can depict that the total number of only three women of age 18-19 years has a difference of 14.93, which is the critical difference which is the actual difference between the Observed mean (146.17) and NCHS (161.1), which is the value of National Centre for Health Statistics and is considered to be the standard value for this particular age group. Similarly, let's talk about the woman having an age group of 20-24 years of age; it can observe that a total of 118 women has a difference of 13.65. In the women of 25 years of age and above, a total of 129 women have a difference of 14.33.

Thus, it can interpret from the above table that women of 20-24 years of age have the least difference of 13.65, and the women of 18-19 years of age have the greatest difference of 14.93. Weight and body fat percentage were re-recorded to the nearest 0.1 percent and 0.1 kg, respectively. Each participant in the pair had their weight and waist circumference measured three times, with a third measurement required if the difference was higher than 0.2 kg in weight (0.5 percent). For purposes of calculating weight, averaging the two closest measurements was used (Ghosh-Dastidar *et al.*, 2020).

**Table 1: Height of the observed Pregnant and Lactating women.**

Age	N=250	Observed Mean	*NCHS (2010)	Difference
18-19 years	3	146.17	161.1	14.93
20-24 years	118	147.05	160.7	13.65
25 above	129	146.67	161	14.33

\*NCHS(2010): National Center for Health Statistics (2010)

**Table 2: Weight of the Observed Pregnant Women and Lactating women.**

Age	N=250	Observed Mean	*NCHS (2010)	Difference
18-19 years	3	44.67	53.8	9.13
20-24 years	118	47.88	54.8	6.92
25 above	129	48.57	56.6	8.03

\*NCHS(2010): National Center for Health Statistics (2010)

**Weight of the Observed Pregnant Women and Lactating women:** In the above table, again critical difference method is used. As has been noticed from the Table 2, only three women of age group 18-19 years of age have a difference of 9.13, which is the actual difference between observed Mean (44.67) & NCHS (53.8). In the scenario of the women of 20-24 years of age, 118 women have a difference of 6.92, and for the age group of 25 years and above, 129 women have a difference of 8.03. Hence, it can be interpreted that women of age group 20-24 years of age in case of weight have the least critical difference of 6.92, and the women of age 18-19 years have the highest critical difference of 9.13. This assessment aims to investigate the occurrence, risk factors, and implications of maternal obesity and give proof of existing policies and

programs in India to combat it. This is a multi-method investigation. A desk review of the literature and stakeholder mapping using interviews provided policy guidelines based on the 2015–16 NFHS-4. Obesity was linked to an urban location, maternal age, enhancing wealth quintile, and secondary education in pregnant and postpartum women; only postpartum women had a greater risk of obesity. (OR: 1.90; 95% CI: 1.44–2.52) when these factors were taken into consideration. In this study, no connection was found between obesity and dietary factors. Policymakers have noted several implementation issues in several healthcare system blocks. Obesity is common during and after pregnancy in India; however, the prevalence varies widely across districts. Obesity prevention and management in pregnant and postpartum women must emphasize state-

level policy and program development (Chopra *et al.*, 2020). The BMI (body mass index) is widely regarded as a reliable metric for determining whether or not persons in underdeveloped nations are suffering from a chronic energy shortage. It has a strong relationship with fat and lean mass, allowing us to calculate the body's protein and fat stores. People with a low BMI are underweight in relation to their height (Bhattacharya *et al.*, 2019).

**BMI of the observed Pregnant and Lactating women:** The above Table 3 gives the information related to the BMI of the women. In the above table, we used the methodology of critical difference. It can be depicted that the only three women of age group 18-19 years of age have a difference of 0.70, which again comes after subtracting the value of Observed mean (20.80) from NCHS (20.1). In the scenario of the women of age group 20-24 years, a total of 118 women has the difference of 1.41, and in the case of women of age group 25 years above, a total of 129 women has the difference of 1.60. Hence, it can interpret that the women of age 18-19 years of age have the least difference and the women of age group 25 years of age and above have the highest difference.

It is widely accepted that enough food and nutrient consumption is essential for both the healthy growth of the fetus and the health of the pregnant woman. 1-5, in order to fulfill the rising needs of the fetus as well as the increased physiological requirements of the mother, greater caloric and nutrient intakes are recommended, notably for folate, iron, iodine, and copper. 6,7 it is unlikely that pregnant women and women who are childbearing will be able to achieve their nutritional demands only through diet, despite the fact that nutrient intakes should come from a variety of foods (Bailey *et al.*, 2019).

Breastfeeding is the gold standard for newborn nutrition around the world. In favor of this statement is the World Health Organization and U.S. Surgeon General, as well as the American Academy of Pediatrics, the

American Congress of Obstetricians and Gynecologists, and the American Academy of Family Practice. AAPD also suggests exclusive breastfeeding for the first six months and continued nursing for the first year of life. Similar to pregnancy, lactation and breastfeeding have different energy and dietary needs (Kominiarek & Rajan, 2016).

**Clinical Examination of the selected respondents:** The above Table 4 gives information about the clinical examination of pregnant women and lactating women related to their appearance, eyes, nails, lips, skin, teeth, gums, bone, and other symptoms.

As it is evident from the above table, in the case of Appearance, 60.80% of women have an average body, 1.20% have a Large body, and 38% have a small body. Thus, we can interpret that, majority of the women have an Average Body with a frequency of 152 and a percentage of 60.80%. In the scenario of Eyes, 16.80% have dry eyes, 14.40% have normal eyes, 29.20% have pale eyes and 0.80% have small eyes, and the remaining 38.80% have watery eyes. Therefore, we can interpret that most of the women have watery eyes with a frequency of 97 and a percentage of 38.80%. Similarly, in the case of nails, as it is noticeable from the above table, most of the women have thin nails with a frequency of 183 and a percentage of 73.20%. In the case of Lips, most of the women have Normal lips with a frequency of 142 and a percentage of 56.80%. For Tongue, it can be interpreted that most of the women have Red Tongue with a frequency of 99 and a percentage of 39.60%.

In the case of Skin, the majority of women have Dry and Rough Skin with a frequency of 134 and a percentage of 53.60%. For teeth, it can be interpreted that, majority of the women fall under the category of Normal teeth with a total frequency of 155 and a percentage of 62%. In the case of Gums, most of the women have normal gums with a total frequency of 203 and a percentage of 81.20%.

**Table 3: BMI of the observed Pregnant and Lactating women.**

Age	N = 250	Observed Mean	*NCHS (2010)	Difference
18-19 years	3	20.80	20.1	0.70
20-24 years	118	22.61	21.2	1.41
25 above	129	23.20	21.6	1.60

\*NCHS(2010): National Center for Health Statistics (2010)

**Table 4: Clinical Examination of the selected respondents.**

Particulars	(N = 250) Frequency	Percentage
<b>Appearance</b>		
Average	152	60.80
Large	3	1.20
Small	95	38.00
<b>Eyes</b>		
Dry	42	16.80
Normal	36	14.40
Pale	73	29.20

Small	2	0.80
Watery	97	38.80
<b>Nails</b>		
Flat	31	12.40
Normal	19	7.60
Pale	7	2.80
Spoon shape	10	4.00
Thin	183	73.20
<b>Lips</b>		
Angular	33	13.20
Dark	75	30.00
Normal	142	56.80
<b>Tongue</b>		
Normal	58	23.20
Pale	93	37.20
Red	99	39.60
<b>Skin</b>		
Dry & Rough	134	53.60
Normal	50	20.00
Pale	66	26.40
<b>Teeth</b>		
Discolored	71	28.40
Normal	155	62.00
Pale	24	9.60
<b>Gums</b>		
Discolour	47	18.80
Normal	203	81.20
<b>Bone</b>		
Back pain	5	2.00
Bone pain	117	46.80
Normal	128	51.20
<b>Other symptoms</b>		
Breathlessness	30	12.00
Weakness	6	2.40
Irritability	8	3.20
Preeclampsia	10	4.00
Night blindness	52	20.80
Throat and chest infection	124	49.60
Frequently exhausted	16	6.40
None	4	1.60

In the case of Bone, most of the women have Normal bones with a frequency of 128 and a percentage of 51.20%. In the case of talking about other symptoms, we can interpret that majority of the women have throat and chest-related infections with a frequency of 124 and a percentage of 49.60%.

**Specific question related to the dietary habits to know the associated risk factor for Maternal Malnutrition:** The Table 5 has revealed that the

respondents were having bad dietary habits as the very few respondents were consuming green leafy vegetables and micronutrients rich foods and including millets in their daily diet. The exposure of the sun was gained by major respondents. The faulty habits like tobacco and cigarette were found in very few respondents. Thus the poor food knowledge and dietary practices can lead to the severe chronic maternal malnutrition among maternal age group.

**Table 5: Specific question related to the dietary habits to know the associated risk factor for Maternal Malnutrition.**

Sr. No.	Particulars	Yes		No	
		Frequency (N=250)	Percentage	Frequency (N=250)	Percentage
1.	Do you have knowledge about the main food groups or a balanced diet?	81	32.40	168	67.20
2.	Do you include millets in your diet? If yes, then mention the millet and its frequency in a week?	35	14.00	215	86.00
3.	Do you use a filtration process for drinking water?	25	10.00	225	90.00
4.	Do you consume Green leafy vegetables and micronutrient-rich foods?	6	2.40	244	97.60
5.	Do you get regular exposure to the sun (at least 10-15 minutes per day)?	246	98.40	4	1.60
6.	Any Faulty Habits (Tobacco/ cigarette)	9	3.60	241	96.40

**Table 6: Specific Information Related to Personal Hygiene to know the associated risk factor for Maternal Malnutrition.**

Sr. No.	Particulars	Yes		No	
		Frequency (N = 250)	Percentage	Frquency (N=250)	Percentage
1.	Do all family members take a bath every day?	225	90.00	25	10.00
2.	Do all family members cut their nails regularly?	228	91.20	22	8.80
3.	Do mothers or children have an insect in the stomach?	28	11.20	222	88.80
4.	Do all family members' do hand wash after the toilet or before eating the food?	231	92.40	19	7.60
5.	Do you have a garbage facility in your locality?	60	24.00	190	76.00

Specific Information Related to Personal Hygiene to know the associated risk factor for Maternal Malnutrition: The above Table 6 shows that the majority population of these village were doing poor practices of hygiene and sanitation thus the chances of infection among maternal age women and infants was higher. They have poor facility for garbage dumping and dewormification. The personal hygiene practices was very poor among them. Thus the poor hygiene practices plays the major role to cause severe infectious disease which lead into maternal malnutrition and chronic micronutrient deficiencies.

## CONCLUSION

Poor dietary habits and high nutritional status were common among pregnant women. Having a history of disease and being pregnant in the first trimester were linked to poor dietary practices. In contrast, low self-efficacy and low self-perception of advantages were linked to bad dietary practices. Unhealthy eating habits were associated with poorer self-efficacy and low self-efficacy perception, while undernutrition was positively associated with not attending prenatal care. A link was found between poor dietary practices and being pregnant in the first trimester and past sickness, the perceived degree of malnutrition, and the benefits and self-efficacy that came from improving one's diet. Participants with low self-efficacy and inadequate nutritional knowledge were more likely to be undernourished than those with greater attention to ANC, sickness history, or variety in their diets.

## FUTURE SCOPE

To raise public awareness of the dangers of sedentary lifestyles, policymakers must support public health initiatives.

In addition, this research suggests that nutrition initiatives aimed at combating child malnutrition, anemia, and female obesity be implemented effectively.

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**Conflict of Interest.** There was no conflict of interest observed during the investigation.

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