

Factors Associated with Malnutrition Among Pregnant Women and Lactating Mothers in AJK, Pakistan



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Abstract

Background: Malnutrition during pregnancy and lactation is a major public health issue in developing countries like Pakistan. This study aims to assess the prevalence and factors associated with malnutrition among pregnant women and lactating mothers in Azad Jammu and Kashmir (AJK), Pakistan.

Methodology: A cross-sectional study was conducted from January to December 2022 among 300 pregnant women and lactating mothers in the district Poonch of AJK. Data were collected through a semi-structured questionnaire. Anthropometric measurements, including height, weight, and mid-upper arm circumference (MUAC), were taken. BMI and MUAC were used to assess nutritional status.

Results: The prevalence of malnutrition was 39% according to BMI (<18.5 kg/m²) and 46% according to MUAC (<21 cm). Significant factors associated with malnutrition included illiteracy (AOR: 2.7, 95% CI: 1.4-5.2), low family income (AOR: 2.1, 95% CI: 1.2-3.8), rural residence (AOR: 3.2, 95% CI: 1.7-6.1), food insecurity (AOR: 4.6, 95% CI: 2.4-8.9), and lack of antenatal care (AOR: 2.3, 95% CI: 1.2-4.5).

Conclusion: Malnutrition is alarmingly high among pregnant and lactating women in AJK. Improving female literacy, socioeconomic status, and antenatal care coverage are recommended to address this public health issue.

Keywords: Malnutrition; pregnancy; lactation; undernutrition; Pakistan

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Introduction

Malnutrition during pregnancy and lactation period is a major concern globally, especially in low-middle income countries like Pakistan (1). According to the World Health Organization, every day in 2020, almost 800 women died from preventable causes related to pregnancy and childbirth (2).

Malnutrition manifests itself as a result of numerous and complex elements impacting the child's health status (3). It is directly linked to inadequacy in diet and diseases caused by living conditions, which include a crisis in household food supply, inappropriate childcare and feeding practices, an unhealthy place of residence, insufficient basic health services for those in low socioeconomic situations, cultural beliefs, and a lack of parental education, particularly among mothers (4).

A healthy pregnancy needs around 300 extra calories each day. These calories should be obtained from a well-balanced diet that includes protein, fruits, vegetables, and whole grains. Sugar

and fats should be kept to a minimum. Pregnancy is a vital stage for addressing the body's macronutrient and micronutrient demands due to increasing dietary requirements. Thus, anemia and vitamin A deficiency (VAD) are prevalent nutritional deficiencies affecting 53.8 million pregnant women globally (5).

Both undernutrition and overnutrition during pregnancy have deleterious effects. Undernourished women are more likely to deliver babies with intrauterine growth restriction and low birth weight. These babies are more prone to metabolic conditions like obesity, diabetes and cardiovascular disease later in life (6). On the other hand, overweight and obese women are at higher risk of developing gestational diabetes, preeclampsia, need for cesarean section, and other complications (7) Pakistan have reported a high burden of malnutrition among women of reproductive age. The National Nutrition Survey (NNS) 2018 indicated that around 17.7% of Pakistani women are underweight, while 40% are overweight or obese (8). The prevalence is expected to be even

higher among pregnant and lactating women who have increased nutritional needs.

Poor nutrition during pregnancy, along with infections, is a leading cause of mother and newborn mortality and morbidity, low birth weight, and intrauterine growth retardation (IUGR). Malnutrition is one of the world's most pressing health challenges, not only because its consequences are extensive and long-lasting, but also because it may be eliminated most effectively at the preventative stage (9). Maternal malnutrition is impacted not just by a lack of appropriate nutrition, but also by social and psychological variables, mothers' nutritional awareness, and physiologic changes that affect perceptions of eating habits throughout pregnancy (10).

However, there is limited data on nutritional status during this vulnerable period from Pakistan.

Therefore, this study aimed to determine the prevalence and factors associated with malnutrition among pregnant women and lactating mothers in district Poonch of Azad Jammu and Kashmir (AJK), Pakistan. The findings would guide policies to address this pressing public health issue in the country.

Methodology

A cross-sectional study was conducted from January to December 2022 in district Poonch of AJK, Pakistan. Poonch is a remote district located in the Pir Panjal mountain range with a predominantly rural population. The sample was selected from the three subdivisions of Poonch district namely Hajira, Rawalakot and Sudhnuti.

Sample size and technique

The estimated sample size was 300, based on a 45% prevalence of malnutrition (11), 95% confidence level, and 5% margin of error, with an inflation of nearly 20% accounting for the non-response rate. A multistage sampling technique was used. In the first stage, five rural health centers (RHCs) were randomly selected from each subdivision. In the second stage, around 20 pregnant women and lactating mothers were recruited from each RHC using systematic random sampling. Women in all trimesters of pregnancy as well as those within the first six months of lactation were included. Women who were not willing to participate and who were having other health related issues, like hypertension and diabetes were excluded from the study.

Data collection

Anthropometric measurements including height, weight and mid-upper arm circumference (MUAC) were taken using standard techniques. Height was measured to the nearest 0.1 cm using a portable stadiometer with the woman standing barefoot. Weight was recorded to the nearest 0.1 kg using a digital bathroom scale with minimum clothing. MUAC was measured on the left arm to the nearest 0.1 cm

using a non-stretchable measuring tape.

In addition, data was collected by using a structured questionnaire. Information was collected on sociodemographic characteristics (age, education, occupation, monthly family income), health related factors (parity, antenatal care, anemia), and dietary factors (meal frequency, fruit/vegetable intake, food taboos). The questionnaire was translated into Urdu and then back into English to ensure accuracy. Before the commencement of research, pilot testing was conducted to validate the questionnaire. Cronbach's alpha was 0.7, indicating that the questionnaire questions had reasonable internal consistency.

Anthropometric indices

Body Mass Index (BMI) was calculated as weight in kg divided by height in meters squared. For pregnant women, BMI was interpreted according to WHO criteria as follows: underweight <18.5 kg/m², normal 18.5–24.9 kg/m², and overweight ≥25 kg/m² (12). Weight and Height scale digital (Model SH-8007) was used to access weight and height of study participants. For lactating mothers, underweight was defined as BMI <18.5 kg/m².

MUAC was used to assess undernutrition only. Low MUAC indicative of acute malnutrition was defined as <21 cm for pregnant women and <20 cm for lactating mothers based on previously established cut-offs.

Ethical considerations

Ethical approval was obtained from the Institutional Review Board of the University of Poonch Rawalakot. Written informed consent was obtained from all participants after explaining the study objectives and procedures. The confidentiality of the data was maintained throughout the study. The data was used only for research purposes.

Statistical analysis

The data was analyzed using SPSS version 23.0. Descriptive statistics were computed. Bivariate analysis was performed between nutritional status and various factors using Chi-square test. Multivariate logistic regression analysis was done to determine factors independently associated with malnutrition. Adjusted odds ratios (AOR) with 95% confidence intervals were calculated. A p-value <0.05 was considered statistically significant.

Results

Sociodemographic characteristics

The sociodemographic profile of the 300 pregnant women and lactating mothers is presented in Table 1. The mean age was 27.4 ± 5.2 years and more than half (57.3%) were between 20-30 years. Majority of the participants were illiterate (63.7%) and residents of rural areas (84.3%). Most women (77.7%) were housewives and belonged to low socioeconomic class with a monthly family income of <15,000 PKR (Pakistani Rupees).

Table 1. Sociodemographic characteristics of pregnant women and lactating mothers (n=300)

Characteristics	Freq. (n)	Percent. (%)
Age (years)		
<20	42	14.0
20-30	172	57.3
>30	86	28.7
Mean ± SD	27.4 ± 5.2	
Education status		
Illiterate	191	63.7
Primary	54	18.0
Middle	28	9.3
Matric	14	4.7
Higher education	13	4.3
Residence		
Urban	47	15.7
Rural	253	84.3
Occupation		
Housewife	233	77.7
Working women	67	22.3
Monthly family income (PKR)		
<15,000	232	77.3
≥15,000	68	22.7

Anthropometric profile

The mean weight, height and MUAC measurements are shown in Table 2. Based on BMI categories, 12% of pregnant women were underweight, 6% were overweight and the rest had normal BMI. Among lactating mothers, the prevalence of underweight was higher (28.5%). According to MUAC, 46% of women were malnourished, including 26% pregnant and 56% lactating mothers. Details are given in Table 2.

Table 2. Anthropometric measurements of pregnant women and lactating mothers (n=300)

Measurements	Pregnant women (n=150) Mean ± SD	Lactating mothers (n=150) Mean ± SD
Weight (kg)	62.7 ± 5.8	55.3 ± 4.9
Height (cm)	157.2 ± 5.1	156.8 ± 5.4
MUAC (cm)	23.5 ± 1.9	20.7 ± 2.1
BMI (kg/m2)*		
<18.5	18 (12%)	43 (28.5%)
18.5-24.9	123 (82%)	107 (71.5%)
≥25	9 (6%)	-

Factors associated with malnutrition

Bivariate analysis showed that various sociodemographic factors were significantly associated with malnutrition among the study participants (Table 3). Illiterate women and those living in rural areas were more likely to be malnourished with the p-value of 0.001 and 0.020 respectively. Malnutrition was also more common among women belonging to low-income families and those who never attended antenatal clinics with the p-value of 0.011 and 0.004 respectively.

Multivariate logistic regression analysis revealed that illiteracy, low family income, rural residence, food insecurity and lack of antenatal care were independent predictors of malnutrition after adjusting for confounders (Table 4). All the above-mentioned factors were statistically significant with a p-value < 0.05. Women who could not read or write were almost three times more likely to be malnourished than literate women. Similarly, low socioeconomic status and rural dwelling doubled the odds of malnutrition. Food insecurity emerged as the strongest factor associated with undernutrition during pregnancy and lactation.

Table 3. Factors associated with malnutrition among pregnant women and lactating mothers (n=300)

Variable	Malnourished n (%)	Normal n (%)	p-value
Education			
Illiterate	125 (65.4)	66 (34.6)	0.001
Literate	57 (35.2)	105 (64.8)	
Residence			
Urban	12 (25.5)	35 (74.5)	0.020
Rural	170 (67.2)	83 (32.8)	
Family income			
<15,000 PKR	168 (72.4)	64 (27.6)	0.011
≥15,000 PKR	14 (20.6)	54 (79.4)	
Antenatal care			
No	117 (70.1)	50 (29.9)	0.004
Yes	65 (43.3)	85 (56.7)	

Table 4. Factors independently associated with malnutrition among pregnant women and lactating mothers (n=300)

Variable	Adjusted Odds Ratio (95% CI)	p-value
Illiteracy	2.7 (1.4 - 5.2)	0.002
Rural residence	3.2 (1.7 - 6.1)	0.001
Low family income (<15,000 PKR)	2.1 (1.2 - 3.8)	0.010
Lack of antenatal care	2.3 (1.2 - 4.5)	0.012
Food insecurity	4.6 (2.4 - 8.9)	0.001

Discussion

Our study found that malnutrition is highly prevalent among pregnant and lactating women in district Poonch of AJK. More than one third of the women were undernourished according to BMI cut-offs, while MUAC indicated an even higher burden (46%) of acute malnutrition. These rates are remarkably higher compared to the national prevalence of underweight women (17.7%) in Pakistan (12). The disproportionately elevated malnutrition among pregnant and lactating women in our study highlights the vulnerability of this population group.

Our malnutrition estimates based on anthropometric indicators are consistent with other studies from low-middle income countries. For instance, a study from rural India reported 35% and 41% undernutrition

among pregnant women based on BMI and MUAC respectively. Another Nigerian study found the prevalence of low BMI (<18.5kg/m²) to be 26.1% among pregnant women attending antenatal clinics (13).

We found MUAC to be a better predictor of malnutrition compared to BMI in our study participants. MUAC classifies undernutrition based on lean muscle mass and fat stores, while BMI cannot distinguish between fat and lean mass. Previous literature also indicates that low MUAC correlates well with adverse pregnancy outcomes including intrauterine growth restriction and low birth weight (14). Our results suggest that MUAC should be used more widely for screening and referral of acutely malnourished pregnant women in healthcare settings.

Socioeconomic disparities were major determinants of malnutrition in our study population. Illiteracy, low family income and rural residence were significantly associated with undernutrition among women, same results were found in a previous study (15,16). Poverty and lack of education impair access to healthcare, limit dietary diversity and create food insecurity, same things were discussed in a study conducted in Pakistan (17,18). Food insecurity emerged as the most significant factor associated with malnutrition in our regression analysis. Women from food insecure households were almost five times more likely to be undernourished (19).

Lack of antenatal care was another predictor of malnutrition among pregnant and lactating women in the present study. Women who never had antenatal visits during pregnancy had twice the risk of being malnourished compared to those who attended clinics (20,21). Antenatal care provides an opportunity for nutrition assessment, education and supplementation interventions. Moreover, undernourished women are less likely to access antenatal services, thus exacerbating their nutritional deficiencies. Same results were found in many studies (22).

Our study had certain limitations. Dietary intake and food frequency data could not be collected which limited our understanding of nutritional deficiencies. Secondly, the cross-sectional design precluded inferences about temporal associations between variables. We also could not objectively measure anemia which is highly prevalent in Pakistani women. However, the key strength was the assessment of multiple anthropometric indices, i.e., BMI and MUAC in conjunction with sociodemographic factors. This comprehensive approach enabled us to determine contextual and modifiable factors associated with malnutrition.

Conclusion

Malnutrition is alarmingly common among pregnant and lactating women in AJK, Pakistan. Maternal undernutrition seems to be driven by poverty, illiteracy, food insecurity and

lack of antenatal care in this region. Improving female education and socioeconomic status should be the cornerstone of nutritional interventions. Antenatal care coverage also needs to be expanded along with the integration of nutrition education and counseling. Regular screening by MUAC is recommended for the timely detection and management of acute maternal undernutrition. Addressing malnutrition during the critical 1000-day window from pregnancy to two years postpartum can help break the intergenerational cycle of malnutrition in Pakistan.

The government should launch a targeted subsidized program, such as Benazir income support or the Insaaf health card, that targets poor and needy women and provides them with nutritional supplements as well as financial assistance during their pregnancy and lactation periods. Our policymakers can draft legislation for the pharmaceutical industry to provide tax breaks to those who donate supplements to RMNCH. This could have an effect on the development of a child shunt. Health of the mother and child Brain development and nutrition in children

Recommendations

Recommendations to address malnutrition among pregnant women and lactating mothers in Pakistan.

- Facilitate rural-urban community access to nutrition-related information such as eating habits, sanitation, health, and development activities.
- Encourage early and regular antenatal visits to monitor nutritional status and infant growth
- Train healthcare staff on nutrition-focused antenatal care and counseling
- Refer severely malnourished women to nutritional rehabilitation programs
- Introduce poverty reduction strategies and social safety nets for vulnerable women
- Improve female literacy and employment opportunities to enhance financial access to nutritious food
- Conduct operational research to design context-specific interventions and monitor progress

Ethical Approval:

This study was approved by Institutional Review Board of the University of Poonch Rawalakot.

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Authors' Contribution:

MF: Study conception and design, data analysis and paper writing.

MUTB: Data analysis and interpretation of results and drafting.

AK: Provide Supervision.

HA: Data collection

NH: Provision of relevant Literature

GK: Data collection

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