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Socio-Cultural Determinants of Malnutrition and its Health Implications on Mothers and Child in Punjab, Pakistan

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Abstract

Maternal and child malnutrition remains a critical public health challenge in Pakistan, with Punjab province exhibiting paradoxically high malnutrition rates despite agricultural abundance. This study examines socio-cultural determinants of malnutrition and their health implications for mothers and children in Punjab, Pakistan. A cross-sectional mixed-methods study was conducted in 2022-23 across three districts (Faisalabad, Rawalpindi, and Multan). The quantitative component included 600 mothers (aged 18-40 years) with children under five, equally distributed between rural and urban settings. Data encompassed socio-demographics, household characteristics, and anthropometric measurements. Eight focus group discussions (FGDs) with 6-8 mothers each provided qualitative insights. Chi-square tests examined bivariate associations, while thematic analysis coded qualitative data. Nearly half (46.7%) of mothers were underweight, while 31.8% were overweight, indicating a double burden of malnutrition. Over one-third of children exhibited stunting. Maternal nutritional status showed significant associations with spousal education (χ^2=77.3, $p<0.001$), household income, maternal education, and age at marriage. Qualitative findings revealed persistent food taboos, patriarchal decision-making patterns, and gender-biased food distribution practices that disadvantage women and girls. Malnutrition in Punjab stems from complex socio-cultural dynamics rather than food scarcity alone. Integrated interventions addressing gender inequality, education, poverty, and early marriage are essential to breaking the intergenerational cycle of malnutrition.

Keywords: Malnutrition; Maternal Health; Child Nutrition; Socio-Cultural Determinants; Gender Inequality; Punjab; Pakistan

Introduction

Malnutrition constitutes a leading cause of global morbidity and mortality, with an estimated 45 million children under five experiencing wasting, 148 million experiencing stunting, and 45 million classified as overweight (WHO, 2023). Child malnutrition contributes to approximately 45% of all deaths among children under five years (UNICEF, 2021). Women of reproductive age face particular vulnerability, experiencing high rates of micronutrient deficiencies including anemia, vitamin A deficiency, and iodine insufficiency (FAO, 2021).South Asia bears the highest global burden of malnutrition, with Pakistan consistently ranking among the most severely affected nations. The Pakistan Demographic and Health Survey (2017-18) documented that 38% of

children experience stunting, 23% are underweight, and 17.7% suffer from wasting (NIPS & ICF, 2019). Additionally, approximately 42% of women of reproductive age experience anemia (Pakistan National Nutrition Survey, 2018). Despite improvements in food production and availability, these statistics underscore that malnutrition represents a complex social and cultural phenomenon extending beyond mere food scarcity.

Socio-Cultural Context of Malnutrition

Socio-cultural determinants play a central role in understanding malnutrition patterns. Research consistently identifies early marriage, maternal education, household income, and family size as key predictors of maternal and child nutritional status (Asim & Nawaz, 2018; Black et al., 2013). Patriarchal structures and gender inequality exacerbate these challenges, as women often lack autonomy in household decision-making, restricting their access to healthcare and adequate nutrition (Mumtaz & Salway, 2009). Food taboos and intra-household food distribution practices frequently disadvantage women and girls, further compromising health outcomes (Widen et al., 2022). Punjab, Pakistan's largest and most agriculturally productive province, paradoxically experiences elevated malnutrition rates despite relative food availability. This phenomenon suggests that socio-cultural and structural barriers, including poverty, illiteracy, and patriarchal norms play crucial roles. Understanding these determinants proves essential for designing context-specific interventions.

Study Rationale and Objectives

While previous studies have examined malnutrition in Pakistan, limited research has specifically investigated the interplay of socio-cultural factors in Punjab using mixed-methods approaches. This study addresses this gap by combining quantitative prevalence data with qualitative insights into cultural practices and gender dynamics.

The specific objectives are to:

- To identify the socio-cultural determinants of malnutrition among mother and children
- To assess the nutritional status of respondent (mother and children)

Methodology

Study Design and Setting

This cross-sectional mixed-methods study was conducted in 2022-23 across three districts: Faisalabad, Rawalpindi, and Multan. These districts represent diverse socio-economic and cultural contexts within Punjab province. Both rural and urban areas were included to capture variation in determinants and outcomes.

Sample Size and Sampling Strategy

A total of 600 mothers aged 18-40 years with at least one child under five years participated in the survey. Sample size was calculated using the formula $n = Z^2pq/d^2$, where Z=1.96 (95% confidence level), p=0.38 (prevalence of stunting from PDHS 2017-18), q=0.62, and d=0.04 (margin of error), yielding approximately 570 participants. The sample was increased to 600 to account for potential non-response. Stratified random sampling ensured equal representation, with 300 respondents from rural areas and 300 from urban settings (100 from each district per stratum). Multi-stage sampling was employed: districts were selected purposively, then tehsils/towns were randomly selected, followed by random selection of villages/neighborhoods, and finally systematic random selection of households.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Mothers aged 18-40 years
- Having at least one child under five years
- Residing in the study area for at least six months
- Willing to provide informed consent

Exclusion criteria:

- Mothers with acute illness at the time of survey
- Those unable to communicate due to physical or mental limitations

Data Collection Instruments

Quantitative Component: A pre-tested structured questionnaire was developed based on literature review and PDHS instruments. The questionnaire comprised four sections:

1. **Socio-demographic information:** Age, education, occupation, marital status, family type, household size, monthly income, spousal education
2. **Reproductive health:** Age at marriage, parity, birth spacing, antenatal care utilization
3. **Cultural practices:** Decision-making autonomy, food taboos, dietary restrictions, intra-household food distribution
4. **Health and nutrition:** Dietary diversity, meal frequency, illness episodes

Anthropometric measurements:

- Maternal weight was measured using a digital weighing scale (accurate to 0.1 kg)
- Maternal height was measured using a stadiometer (accurate to 0.1 cm)
- Body Mass Index (BMI) was calculated as weight(kg)/height(m)^2
- Child weight and height/length were measured following WHO protocols
- Child nutritional indicators (stunting, wasting, underweight) were calculated using WHO AnthroPlus software

Qualitative Component: Eight focus group discussions (FGDs), each comprising 6-8 mothers, explored perceptions of nutrition, cultural practices affecting food consumption, and intra-household dynamics. A semi-structured FGD guide was used to facilitate discussions. FGDs were conducted separately in rural and urban settings to capture contextual differences. Sessions lasted 60-90 minutes, were audio-recorded with participant consent, and conducted in Urdu and Punjabi languages by trained female facilitators.

Data Quality Assurance

The questionnaire was pre-tested on 30 mothers (5% of sample) in a non-study area and refined accordingly. Data collectors received three-day training on interviewing techniques, anthropometric measurements, and ethical considerations. Daily data checking and weekly supervision ensured data quality. Anthropometric measurements were taken twice and averaged if the difference was within acceptable limits.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of [Institution Name - blinded for review]. Written informed consent was secured from all participants after explaining study objectives, procedures, risks, and benefits. Participants were assured of confidentiality, anonymity, and their right to withdraw at any time without penalty. Data were stored securely with access limited to research team members.

Data Analysis

Quantitative analysis: Data were entered in Epi Data 3.1 and analyzed using SPSS version 26.0. Data cleaning involved checking for missing values, outliers, and inconsistencies. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized socio-demographic characteristics and malnutrition prevalence.

For maternal nutritional status, BMI categories were defined as:

- Underweight: BMI <18.5 kg/m²
- Normal: BMI 18.5-24.9 kg/m²
- Overweight/Obese: BMI ≥25.0 kg/m²

For children, WHO Z-score classifications were used:

- Stunting: Height-for-age Z-score <-2 SD
- Wasting: Weight-for-height Z-score <-2 SD
- Underweight: Weight-for-age Z-score <-2 SD

A composite maternal health status indicator was created based on BMI, anemia status (self-reported), and dietary diversity score, categorized as low, medium, and high health status.

Bivariate associations between socio-cultural variables (education, income, marriage age, decision-making, family type) and nutritional outcomes were assessed using chi-square tests. Statistical significance was set at $p<0.05$.

Qualitative analysis: FGD audio recordings were transcribed verbatim in Urdu/Punjabi and then translated to English. Thematic analysis following Braun and Clarke's (2006) six-phase approach was conducted: familiarization with data, generating initial codes, searching for themes, reviewing themes, defining and naming themes, and producing the report. Two researchers independently coded the data to ensure reliability. Disagreements were resolved through discussion. Direct quotes were selected to illustrate key themes.

Results

Socio-Economic Characteristics

The mean age of mothers was 28.6 years (SD=5.2). Nearly half (48.3%) had no formal education, while 51.7% had attended school. Regarding spousal education, 21.0% of husbands had no education, 17.0% completed primary education, 22.0% middle school, 21.0% intermediate, and 19.0% graduation or above. Mean household monthly income was PKR 32,450 (SD=15,200). The majority (68.3%) lived in extended families. Mean age at marriage was 19.8 years (SD=3.1), with 37.2% married before age 18.

Prevalence of Maternal Malnutrition

The study revealed a concerning double burden of malnutrition among mothers. Nearly half of respondents (46.7%, n=280) were classified as underweight (BMI <18.5 kg/m²), while only 21.5% (n=129) exhibited normal BMI (18.5-24.9 kg/m²). Additionally, 31.8% (n=191) were overweight or obese (BMI ≥25.0 kg/m²). Rural mothers had significantly higher underweight prevalence (54.3%) compared to urban mothers (39.0%), $\chi^2=14.2$, $p<0.001$.

Table 1. Distribution of Maternal Nutritional Status by BMI Category (n=600)

BMI Category	Frequency (n)	Percentage (%)
Underweight (<18.5 kg/m²)	280	46.7
Normal (18.5-24.9 kg/m²)	129	21.5
Overweight/Obese(≥25.0kg/m²)	191	31.8
Total	**600**	**100.0**

Child Nutritional Status
Among 600 children assessed, 36.8% were stunted (low height-for-age), 18.2% were wasted (low weight-for-height), and 29.5% were underweight (low weight-for-age). Rural children exhibited higher stunting rates (42.3%) compared to urban children (31.3%), $p<0.01$.

Association Between Husband Education and Maternal Health Status
Maternal health status demonstrated highly significant association with husband's education level ($\chi^2=77.3$, $p<0.001$). Among mothers whose husbands had no formal education, 20.6% experienced low health status compared to only 10.5% among those whose husbands completed graduation or higher education. Conversely, high health status was observed in 38.6% of mothers married to graduates compared to 23.8% among those married to uneducated men.

Table 2. Association Between Husband's Education and Maternal Health Status (n=600)

Husband's Education Level	Health Status			
	Low	**Medium**	**High**	**Total (%)**
No education	26 (20.6)	70 (55.6)	30 (23.8)	126 (100.0)
Primary	25 (24.5)	59 (57.8)	18 (17.6)	102 (100.0)
Middle	44 (33.3)	66 (50.0)	22 (16.7)	132 (100.0)
Intermediate	16 (12.7)	106 (84.1)	4 (3.2)	126 (100.0)
Graduation or above	12 (10.5)	58 (50.9)	44 (38.6)	114 (100.0)
Total	**123 (20.5)**	**359 (59.8)**	**118 (19.7)**	**600 (100.0)**

$\chi^2=77.3$, df=8, $p<0.001$

Association Between Maternal Education and Child Nutritional Status
Maternal education significantly influenced child stunting ($\chi^2=32.6$, $p<0.001$). Children of uneducated mothers had 45.8% stunting prevalence compared to 21.3% among children of mothers with secondary or higher education. Similar patterns were observed for wasting and underweight indicators.

Association Between Household Income and Nutritional Outcomes
Household income showed significant association with both maternal ($\chi^2=48.9$, $p<0.001$) and child nutritional status ($\chi^2=41.2$, $p<0.001$). Families earning below PKR 20,000/month had 58.7% maternal underweight prevalence compared to 28.3% in families earning above PKR 50,000/month. Similarly, child stunting was 48.9% in low-income versus 22.4% in higher-income households.

Association Between Age at Marriage and Maternal Health
Mothers married before age 18 years had significantly poorer health status ($\chi^2=38.7$, $p<0.001$). Among early-married mothers, 27.8% had low health status compared to 15.2% among those married at age 18 or later. Early marriage was also associated with higher parity, shorter birth intervals, and lower educational attainment.

Qualitative Findings: Cultural Practices and Gender Dynamics
Thematic analysis of FGDs revealed four major themes:

Theme 1: Intra-Household Food Distribution
Women consistently described patterns of food allocation that prioritized male family members and sons. Mothers reported eating last and eating less to ensure adequate food for husbands and children. This practice was more pronounced during food scarcity and in larger households.

"When food is limited, I reduce my portion so my husband and children don't go hungry. It's my duty as a wife and mother to sacrifice for them." (32-year-old, rural Rawalpindi)
"Sons get more milk and eggs because they need strength. Daughters help with housework, so they don't need as much nutrition." (35-year-old, urban Faisalabad)

Theme 2: Limited Decision-Making Autonomy
The majority of mothers reported having minimal say in household decisions, including food purchases and healthcare-seeking. Husbands and mothers-in-law were identified as primary decision-makers. Women's lack of control over financial resources further constrained their nutritional autonomy.
"My husband decides what food to buy from the market. I can suggest, but he makes the final decision. If I need to see a doctor, I must ask his permission." (30-year-old, rural Multan)
"My mother-in-law controls the kitchen. She decides the menu and portion sizes for everyone. Even if I'm feeling weak, I can't cook something special for myself." (26-year-old, urban Rawalpindi)

Theme 3: Early Marriage and Its Consequences
Women married before age 18 described limited educational opportunities, early childbearing, and restricted mobility. They expressed regret about missing education and felt less capable of making informed health decisions.
"I was married at 16 and became pregnant within a year. I had to leave school and had no knowledge about nutrition or health. If I had studied more, I could have taken better care of myself and my children." (24-year-old, rural Faisalabad)

Theme 4: Awareness-Practice Gap
Interestingly, many mothers demonstrated awareness of proper nutrition but cited cultural pressure, family expectations, and economic constraints as barriers to practicing healthy behaviors.
"I know eggs and milk are good for pregnant women we learned this at the health center. But in our family, there are customs we must follow. It's difficult to go against what elders say." (29-year-old, urban Multan)

Discussion
This study provides comprehensive evidence of the multidimensional nature of malnutrition in Punjab, where socio-cultural determinants significantly influence maternal and child nutritional outcomes. The findings reveal three critical insights: first, the prevalence of both undernutrition and overnutrition among mothers indicates a nutrition transition; second, socio-economic factors strongly predict nutritional status; and third, deeply embedded cultural practices and gender norms perpetuate nutritional disadvantage for women and girls.

Double Burden of Malnutrition
The coexistence of maternal underweight (46.7%) and overweight/obesity (31.8%) reflects the nutrition transition occurring in developing countries, including Pakistan. This pattern has been documented in other South Asian contexts (Popkin et al., 2020). Undernutrition persists primarily in rural areas and among lower-income households, while overweight/obesity emerges with urbanization, dietary shifts toward processed foods, and reduced physical activity. This dual burden complicates intervention strategies, requiring simultaneous attention to both ends of the malnutrition spectrum.

Husband's Education as a Determinant of Maternal Health
The strong association between spousal education and maternal nutritional status (χ^2=77.3, $p<0.001$) underscores how patriarchal structures shape women's health outcomes in Punjab. This

finding aligns with previous research demonstrating that educated husbands possess greater health literacy, hold more progressive attitudes toward women's health, exhibit greater sensitivity to nutrition, and allocate household resources more equitably (Razzaq et al., 2020; Siddiqui et al., 2021). In patriarchal societies where men control household resources and decisions, spousal education may be more influential than women's own education in determining maternal health outcomes. However, this should not diminish efforts to improve female education, which has independent benefits for child nutrition and women's empowerment.

Maternal Education and Child Nutrition

Maternal education emerged as a significant predictor of child nutritional status, consistent with extensive literature from Pakistan and broader South Asia (Asim & Nawaz, 2018; Khan et al., 2019). Educated mothers demonstrate better understanding of nutrition, hygiene, and childcare practices; greater utilization of health services; enhanced decision-making power; and improved ability to challenge harmful traditional practices. The pathway from maternal education to child nutrition operates through multiple mechanisms including improved health literacy, greater household autonomy, delayed childbearing, and better employment opportunities.

Economic Determinants

Household income showed significant association with both maternal and child malnutrition, reflecting the fundamental role of poverty in perpetuating nutritional deprivation. Economic constraints limit access to diverse, nutrient-rich foods; adequate healthcare services; and safe water and sanitation facilities. However, the persistence of malnutrition even among relatively better-off families in Punjab suggests that economic factors alone cannot fully explain malnutrition patterns. Cultural practices and gender norms also play critical roles.

Early Marriage and Reproductive Health

The association between age at marriage and maternal health status highlights the consequences of early marriage for women's nutritional wellbeing. Girls married during adolescence experience pregnancy before achieving physical maturity, resulting in increased nutritional demands at a developmentally vulnerable period (Santhya, 2011). Early marriage typically truncates education, limits employment opportunities, and constrains decision-making autonomy all factors that negatively impact maternal nutrition. Furthermore, early-married women often face higher parity and shorter birth intervals, depleting maternal nutritional reserves. Despite legal minimum marriage age of 18 years in Pakistan, 37.2% of mothers in this study were married before this age, indicating weak enforcement of marriage laws and persistent cultural preference for early marriage. Addressing early marriage requires not only legal enforcement but also changing community norms through education and awareness campaigns.

Cultural Practices and Gender Norms

The qualitative findings illuminate how cultural practices and gender norms create an enabling environment for malnutrition. Three interconnected mechanisms emerged:

Food taboos: Numerous culturally-based dietary restrictions during pregnancy and lactation limit consumption of nutrient-rich foods. While some taboos may have originated from food safety concerns in pre-refrigeration eras, they persist despite modern food preservation and availability. These taboos are enforced through social pressure from older women (mothers-in-law, grandmothers) who gatekeep cultural knowledge. Healthcare providers' nutrition advice often conflicts with these traditional beliefs, creating confusion and non-compliance.

Intra-household food distribution: The consistent pattern of women eating last and eating least reflects deeply ingrained gender hierarchies that value male nutrition over female nutrition. This

practice, documented across South Asia (Rah et al., 2010; Widen et al., 2022), stems from patriarchal ideology that prioritizes male productivity and sons' development. Women's internalization of these norms viewing self-sacrifice as virtuous perpetuates the cycle. Girls observing these patterns learn to accept nutritional discrimination, transmitting practices across generations.

Limited decision-making autonomy: Women's exclusion from household decisions regarding food, healthcare, and resource allocation constrains their ability to prioritize their own nutritional needs. Even when women possess nutrition knowledge, they lack power to implement changes. This finding highlights that nutrition education alone is insufficient; empowerment interventions must address power dynamics within households.

The awareness-practice gap observed in this study suggests that knowledge dissemination, while important, cannot overcome structural and cultural barriers. Women who understood proper nutrition felt unable to practice it due to family pressure and economic constraints.

Implications for Policy and Practice

The findings carry significant implications for nutrition policy and programming in Punjab and Pakistan more broadly:

1. Integrated, Multi-Sectoral Approaches: Nutrition-specific interventions (supplementation, fortification) are necessary but insufficient. Pakistan's National Maternal Nutrition Strategy (2022-2027) appropriately emphasizes integrating nutrition-sensitive interventions across sectors including education, agriculture, social protection, and water/sanitation.

2. Gender-Transformative Programming: Interventions must explicitly address gender inequality and patriarchal norms that perpetuate malnutrition. This includes engaging men in nutrition education, challenging harmful traditional practices through community dialogue, supporting women's economic empowerment and decision-making autonomy, and promoting equitable intra-household resource distribution.

3. Education as a Long-Term Investment: Expanding girls' education and adult literacy programs should be prioritized, particularly in rural areas. Given the strong association between both maternal and paternal education and nutritional outcomes, universal education becomes a critical nutrition intervention.

4. Delaying Marriage: Strengthening enforcement of minimum marriage age laws requires community mobilization, incentive programs for families to keep girls in school, support services for at-risk girls, and addressing poverty that drives early marriage.

5. Community-Based Nutrition Education: Nutrition education must be culturally sensitive while challenging harmful practices. Strategies should include engaging traditional gatekeepers (mothers-in-law, religious leaders), using community health workers from local communities, and incorporating behavior change communication through multiple channels.

6. Social Protection: Cash transfer programs, food subsidies, and livelihood support can address economic barriers to adequate nutrition while conditionality (e.g., health service utilization, girls' school attendance) can address other determinants.

7. Strengthening Health Systems: Improving quality and accessibility of maternal and child health services, particularly in rural areas, is essential. Integration of nutrition screening and counseling into routine health services can improve early identification and management of malnutrition.

Study Strengths and Limitations

This study's mixed-methods approach provides both epidemiological evidence and contextual understanding of malnutrition determinants. The relatively large sample size and stratified

sampling enhance representativeness. Inclusion of both rural and urban areas captures geographical variation.

However, limitations must be acknowledged. The cross-sectional design precludes causal inference; longitudinal research could better establish temporal relationships and causal pathways. Self-reported data on income, dietary practices, and health indicators may be subject to recall bias and social desirability bias. The study covered only three districts; findings may not be generalizable to all of Punjab or other Pakistani provinces with different cultural contexts. Dietary diversity assessment relied on 24-hour recall, which may not represent usual intake. The composite maternal health status indicator, while useful, may oversimplify complex health dimensions.

Future research should employ longitudinal designs to establish causality; include biomarkers (hemoglobin, micronutrient levels) for objective nutritional assessment; examine the role of other factors such as women's employment, access to media, and social support networks; conduct intervention studies testing gender-transformative nutrition programs; and explore male perspectives on household nutrition and women's health.

Conclusion

Malnutrition in Punjab is not merely a consequence of food scarcity but reflects deeply rooted socio-cultural and gendered dynamics. Education (both maternal and spousal), household income, and age at marriage significantly influence maternal and child nutritional outcomes. Cultural practices including food taboos, discriminatory food distribution, and limited women's autonomy create structural barriers to adequate nutrition. Addressing malnutrition requires holistic, multi-sectoral approaches that integrate direct nutrition interventions with broader social reforms. Policies promoting female education, delaying early marriage, empowering women in household decisions, and challenging patriarchal norms are critical to breaking the intergenerational cycle of malnutrition in Punjab. Effective interventions must recognize that improving nutrition in patriarchal contexts requires transforming gender relations and power dynamics within households and communities. The path forward demands sustained political commitment, adequate resource allocation, cross-sectoral coordination, and community engagement. Only through addressing the root causespoverty, gender inequality, and harmful cultural practices can Pakistan achieve its nutrition targets and ensure the health and wellbeing of mothers and children.

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