

INFANT FEEDING RELATED BEHAVIOURS LEADING TO MALNUTRITION

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ABSTRACT:

Introduction: During infancy the proper diet is very crucial regarding their physical and brain development. There is no doubt that breast milk is the best nutrition of these kids but once weaning starts as for example after 4-6 months, other dietary supplements become important too.

Objective: This study was done to highlight the indicators and malnutrition in infants.

Methods: The cross-sectional study was done in the outdoor of pediatrics, Rahimyar Khan Public Hospital among infants from January to September 2025. Based on combined prevalence of stunting and wasting of 42% among infants, 89% confidence level and 5% margin of error, calculated sample size was 375. Non-probability consecutive sampling technique was used to enroll participants. Children with congenital abnormalities, and acute severe infections were excluded from study.

Results: The mean age of children was 14.2 ± 5.3 months, with male predominance 52.0% (n=195). Nearly two thirds of the participants 64.8% (n=243) successfully introduced solid or semisolid foods at six months, whereas only 40.0% (n=150) of the mothers continued breastfeeding until 12 months. The composite diet quality measures were startlingly poor. Of the infants, only 21.9% (n=82) reached the Minimum Dietary Diversity (MDD) level and 44.8% (n=168) satisfied the Minimum Meal Frequency (MMF) requirements. Only 12.0% (n=45) of the children followed Minimum Acceptable Diet (MAD)

Conclusion: To decrease the high burden of infant stunting and wasting in Pakistan, immediate, context specific nutritional interventions that emphasize dietary quality and maternal education are crucial.

Keywords: Cross-Sectional Studies; Infant Food; Malnutrition; Nutritional Status; Outpatients.

INTRODUCTION

It has been established that malnutrition in childhood is a major problem among the problems of kids. Similarly, it is even more common in poor and underdeveloped countries as Pakistan. More than 1.4 million children aged less than 5 years suffer from stunted growth, and more than 40 million children have been found to have marasmus worldwide.¹ Pakistani studies show malnourished children throughout the country. In Pakistan more than thirty six percent of the children who have ages lesser than five years have stunted growth and more than

7% have marasmus.² This is not only a physical problem but the cognitive functions of these children are also seen. This disorder later restricts their mental capability to do work and getting a good job opportunity in their adult life.³

During infancy the proper diet is very crucial regarding their physical and brain development. There is no doubt that breast milk is the best nutrition of these kids but once weaning starts as for example after 4-6 months, other dietary supplements become important too.⁴ Therefore it is necessary that proper nutrition should be given to these babies to prevent physical, mental and psychological health inclusive of prevention from infection by increasing their immunity.⁵ It serves as proxy for the proper c-

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ompletely healthy diet, directly representing the intake of key vitamins and minerals necessary for hematological and immunological function.⁶

Despite widespread public health initiatives, CF practices across Pakistan remain inadequate. Dietary patterns in the region are significantly skewed toward energy dense, micronutrient poor staple cereals, such as wheat based roti and lentil based dal, with a marked exclusion of animal source proteins, dairy and dark green leafy vegetables.^{2,7} For majority of children, this diet does not satisfy the MDD requirements. Evaluating CF practices within this clinical environment provides actionable, context-specific data. It allows clinicians and policymakers to identify precise dietary gaps and tailor nutritional counseling for families navigating the complex socioeconomic and cultural barriers to optimal child feeding in Pakistan.⁷

METHODS

The cross-sectional study was done in the outdoor of pediatrics, Rahimyar khan Public Hospital among infants from January to September 2025 after taking approval from Institutional ethical review committee (Ref. No. 19/RDSU/SZMC Dated: 15-01-2024) and informed consent form parents or legal guardian. Based on combined prevalence of stunting and wasting of 42% among infants,⁸ At a 95% confidence level with a 5% margin of error, the required sample size was determined to be 375 participants. Non-probability consecutive sampling technique was used to enroll participants.

Eligible participants included infants and toddlers aged 6 to 24 months who attended the OPD accompanied by their primary caregiver, typically the mother or father. Children presenting with severe congenital anomalies or chronic systemic illnesses

known to independently alter growth trajectories, such as congenital heart defects, cerebral palsy, or chronic kidney disease were excluded from the study. Twins and multiple births were also omitted. Additionally, children suffering from acute severe illnesses at the time of the visit, including severe acute diarrhea or pneumonia, were excluded. A known questionnaire was used to collect data. The detailed profiles included the child's age, gender, parental education levels, occupational status, monthly household income, family structure (joint versus nuclear) and the total number of children. Birth order, birth intervals, antenatal care attendance and delivery site were all recorded in maternal and child health histories. For children between the ages of six and twenty three months, dietary evaluations were according to the WHO Infant and Young Child Feeding (IYCF) parameters.

Anthropometric evaluations were conducted by researchers using standardized protocols. Weighing machine was used to weigh babies. Infants under 24 months were weighed unclothed and without diapers. Recumbent length was measured for children under 24 months using an infant meter. These measurements were converted into Z-scores for Weight-for-Age (WAZ), Length/Height-for-Age (HAZ) and Weight-for-Length/Height (WHZ) utilizing the WHO Anthro software for children under two years. Operationally, stunting was defined as HAZ below -2 standard deviations (SD), wasting as a WHZ below -2 SD, and underweight as a WAZ below -2 SD. SPSS Statistics version 25.0 was used. For categorical and continuous variables were assed using frequencies, percentage, means and SD respectively. Frequencies and percentages were used to summarize categorical variables, whereas means and standard deviations were used for continuous variables.

The Chi-square test was used to assess bivariate relationships between categorical independent factors and the presence of malnutrition; Fisher's exact test was used when anticipated cell frequencies were less than five. A multivariate binary logistic regression model was employed to identify independent predictors of malnutrition. Adjusted Odds Ratios (AOR) and their 95% Confidence Intervals (CI) were presented as the regression's findings. A p value of less than 0.05 was used to determine statistical significance for all tests.

RESULTS

The mean age of children was 14.2 ± 5.3 months, with male predominance 52.0% (n=195). Only 15.2% (n=57) of the mothers had completed higher secondary education or above, while 35.2% (n=132) had no formal education. Nearly half of the households 45.1% (n=169) reported monthly income of less than 30,000 Pakistani Rupees (PKR) and the majority of participants 65.1% (n=244) lived in joint family systems (Table I).

Nearly two thirds of the participants 64.8% (n=243) successfully introduced solid or semisolid foods at six months, whereas only 40.0% (n=150) of the mothers continued breastfeeding until 12 months. The composite diet quality measures were startlingly poor. Of the infants, only 21.9% (n=82) reached the Minimum Dietary Diversity (MDD) level and

44.8% (n=168) satisfied the Minimum Meal Frequency (MMF) requirements. Only 12.0% (n=45) of the children followed Minimum Acceptable Diet (MAD) (Table II).

Stunting was affecting 42.1% (n=158) of the children. Wasting and underweight were observed in 15.2% (n=57) and 30.1% (n=113) of the children respectively. Total 48.0% (n=180) had at least one form of malnutrition (Table III).

Children residing in households with maternal illiteracy (p=0.012) and lower monthly incomes (p=0.041) showed significantly higher rates of nutritional deficiencies. Failure to achieve MDD (p<0.001), MMF (p=0.008) and MAD (p<0.001) were associated with the presence of malnutrition (Table IV).

Failure to achieve Minimum Dietary Diversity emerged as the strongest predictor of malnutrition, increasing the odds by nearly threefold (AOR 2.75, 95% CI: 1.65-4.58, p<0.001). Similarly, children who did not receive Minimum Acceptable Diet were twice as likely to be malnourished (AOR 2.10, 95% CI: 1.15-3.83, p=0.015). Socioeconomic factors also showed significance; maternal illiteracy (AOR 1.85, 95% CI: 1.12-3.05, p=0.016) and household income below 30,000 PKR (AOR 1.62, 95% CI: 1.05-2.49, p=0.029) independently predicted higher risks of growth faltering (Table V).

Table I: Socio-Demographic and Baseline Profile (n=375)

Variable	Category	Frequency (n)	Percentage (%)
Age	6 – 12	150	40.0
	13 – 18	131	34.9
	19 – 24	94	25.1
Sex	Boy	195	52.0
	Girl	180	48.0
Maternal Education	Illiterate	132	35.2
	Primary	94	25.1
	Secondary	92	24.5
	Higher Secondary/Above	57	15.2
Family System	Joint	244	65.1
	Nuclear	131	34.9
Monthly Household Income (PKR)	< 30,000	169	45.1
	30,000 - 60,000	150	40.0
	> 60,000	56	14.9

Table II: Frequency of Complementary Feeding Practices Based on WHO IYCF Indicators (n=375)

WHO IYCF Indicator	Status	Frequency (n)	Percentage (%)
Continued Breastfeeding	Yes	150	40.0
	No	225	60.0
Timely Introduction of Solids	Yes	243	64.8
	No	132	35.2
Minimum Dietary Diversity (MDD)	Achieved	82	21.9
	Not Achieved	293	78.1
Minimum Meal Frequency (MMF)	Achieved	168	44.8
	Not Achieved	207	55.2
Minimum Acceptable Diet (MAD)	Achieved	45	12.0
	Not Achieved	330	88.0

Table III: Detailed Statistics of Infants (n=375)

Nutritional Indicator	Classification	Frequency (n)	Percentage (%)
Stunting (HAZ)	Normal (≥ -2 SD)	217	57.9
	Stunted (< -2 SD)	158	42.1
Wasting (WHZ)	Normal (≥ -2 SD)	318	84.8
	Wasted (< -2 SD)	57	15.2
Underweight (WAZ)	Normal (≥ -2 SD)	262	69.9
	Underweight (< -2 SD)	113	30.1
Overall Malnutrition	Absent	195	52.0
	Present	180	48.0

Table IV: Bivariate Analysis of Factors Associated with Overall Malnutrition among Study Participants (n=375)

Variable	Category	Malnutrition Present n (%)	Malnutrition Absent n (%)	p-value
Child Gender	Male	95 (48.7)	100 (51.3)	0.642
	Female	85 (47.2)	95 (52.8)	
Maternal Education	Illiterate	82 (62.1)	50 (37.9)	0.012
	Primary	48 (51.1)	46 (48.9)	
	Secondary	34 (37.0)	58 (63.0)	
	Higher	16 (28.1)	41 (71.9)	
Monthly Income	< 30,000 PKR	94 (55.6)	75 (44.4)	0.041
	30k - 60k PKR	68 (45.3)	82 (54.7)	
	> 60,000 PKR	18 (32.1)	38 (67.9)	
Family System	Joint	128 (52.5)	116 (47.5)	0.071
	Nuclear	52 (39.7)	79 (60.3)	
MDD Status	Not Achieved	156 (53.2)	137 (46.8)	<0.001
	Achieved	24 (29.3)	58 (70.7)	
MMF Status	Not Achieved	118 (57.0)	89 (43.0)	0.008
	Achieved	62 (36.9)	106 (63.1)	
MAD Status	Not Achieved	168 (50.9)	162 (49.1)	<0.001
	Achieved	12 (26.7)	33 (73.3)	

Table V: Multivariate Binary Logistic Regression Analysis of Independent Predictors of Malnutrition (n=375)

Predictor Variable	Category	Adjusted Odds Ratio (AOR)	95% Confidence Interval (CI)	p-value
Maternal Education	Illiterate	1.85	1.12 - 3.05	0.016
	Primary	1.42	0.85 - 2.38	0.182
	Secondary	1.15	0.70 - 1.88	0.580
	Higher	1.00	-	-
Monthly Income	< 30,000 PKR	1.62	1.05 - 2.49	0.029
	30k - 60k PKR	1.25	0.82 - 1.90	0.295
	> 60,000 PKR	1.00	-	-
MDD Status	Not Achieved	2.75	1.65 - 4.58	<0.001
	Achieved	1.00	-	-
MMF Status	Not Achieved	1.55	1.02 - 2.36	0.040
	Achieved	1.00	-	-
MAD Status	Not Achieved	2.10	1.15 - 3.83	0.015
	Achieved	1.00	-	-

DISCUSSION

The results of this study showed substantial burden of development faltering, with at least one type of malnutrition present in nearly half of the participants (48.0%). The most common anthropometric deficit, affecting 42.1% of the children, was stunting. Pakistan has one of the highest rates of stunting in South Asia, according to recent regional epidemiological data, which is consistent with this high frequency of chronic undernutrition.⁹ The inadequacy of early life nutritional therapies to prevent irreversible growth retardation in vulnerable groups is indicated by the ongoing increase of stunting rates.¹⁰

Critically deficient composite indices of nutrition quality were found in dietary assessments. Only 21.9% of infants attained Minimum Dietary Diversity (MDD) and only 12.0% ingested Minimum Acceptable Diet (MAD), despite the timely introduction of solid foods being comparatively acceptable (64.8%). These results, which emphasize reliance on monotonous, cereal based diets, are consistent with other recent investigations from Pakistan and comparable low resource countries.¹¹ The high cost

of animal source proteins combined with the cultural predilection for low cost, high energy staples like wheat and lentils limits the consumption of vital micronutrients needed for the best possible growth of children.¹²

Multivariate regression identified failure to achieve MDD and MAD as the most potent independent predictors of malnutrition. This is consistent with global evidence emphasizing that dietary quality, rather than mere caloric sufficiency, is the primary driver of growth and weight gain in early childhood.^{13,14,15} Maternal illiteracy and household income below 30,000 PKR independently tripled and doubled the odds of malnutrition, respectively. These findings corroborate recent Pakistani findings demonstrating that maternal education acts as critical buffer, enabling mothers to navigate complex nutritional information and allocate household resources more effectively toward child feeding.^{16,17,18}

The use of standardized WHO IYCF indicators and the use of calibrated anthropometric equipment was main strength of study. Consecutive sampling in outpatient setting minimized selection bias. However,

er cross sectional design precludes the establishment of causal relationships between dietary practices and nutritional outcomes. Dietary data were taken by 24-hour maternal recall which may introduce social desirability and recall biases.^{19,20}

These results call for prompt, focused public health initiatives. Clinical counseling has to focus on dietary diversity instead than just encouraging calorie sufficiency. Healthcare professionals should actively advise mothers to include reasonably priced, locally accessible, micronutrient-rich foods in their child's daily diet, such as eggs and leafy green vegetables. Childhood malnutrition could be reduced by incorporating structured IYCF counseling into routine immunization visits at the primary care level.

CONCLUSION

To decrease the high burden of infant stunting and wasting in Pakistan, immediate, context specific nutritional interventions that emphasize dietary quality and maternal education are crucial.

DECLARATION OF INTEREST: The authors declare no conflict of interest.

AUTHORS CONTRIBUTIONS:

G.F: Conceptualization, literature review, data collection, data analysis, write up, proofreading and final editing of manuscript.

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