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ORIGINAL ARTICLE

Prevalence and Risk Factors of Primary Malnutrition in Children Below 5 Years of Age

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ABSTRACT

Objective: To find out the prevalence and risk factors of primary malnutrition among children below 5 years of age visiting outpatient department of a tertiary care hospital.

Study Design: A cross-sectional study.

Place and duration: Department of Pediatric Medicine, Ibn-e-Siena Hospital, Multan from 1st January 2022 to 30th June 2022.

Methodology: A total of 151 children of either gender aged below 5 years visiting outpatient department of pediatrics. At the time of enrollment, socio-demographic as well as anthropometric characteristics were noted. Z-score were calculated to label malnutrition considering weight for height criteria according to "World Health Organization (WHO)" charts as: mild, -1.0 to -1.9, moderate, -2.0 to 2.9, and severe, ≤ -3.0.

Results: In a total of 151 children, 78 (51.7%) were girls. The mean age, weight and height were 2.67±1.56 years, 10.18±3.55 kg and 82.99±16.39 cm. The mean birth weight was 2.44±0.21 kg. Exclusive breast-feeding for the first 6 months was reported in 69 (45.7%) children while cow's mild before 1 year of age was reported by 101 (66.9%). The mean height for weight Z-score was calculated to be -1.40±2.20. Distribution of nutritional status revealed that 61 (40.4%) were normal while mild, moderate and severe malnutrition were observed among 37 (24.5%), 11 (7.3%) and 42 (27.8%) children respectively. Malnutrition status had significant association with increasing age (p<0.001), poor maternal educational status (p=0.034) and use of cow's milk before 1 year of age (p=0.004).

Practical Implications: There is a massive need to identify causes behind factors linked with primary malnutrition among children below 5 years of age so that targeted interventions could be planned.

Conclusion: The prevalence of primary malnutrition was very high among children below 5 years of age. Age, poor maternal educational status and use of cow's milk before 1 year of age had significant association with malnutrition.

Keywords: Breastfeeding, maternal education, malnutrition, socio-economic status, Z-score.

INTRODUCTION

Globally, more than 165 million children below 5 years of age are estimated to have malnutrition but burden of malnutrition is significantly more among children hailing from developing countries.[1-3] Malnutrition is considered to be a major cause behind morbidity and mortality in the pediatric age groups.[4] Among children, around 50% deaths are credited to malnutrition.[5] Malnutrition in the early age groups may go on to influence academic achievement among children in the later years of life.[6] On the other hand, proper nutrition is found to contribute to strong immune system as well as proper physical and intellectual development among children.[7,8]

Local data has shown poverty and parental illiteracy to have significant linkage with malnutrition.[9] A study from Khayber Pakhtunkhwa province of Pakistan revealed prevalence of malnutrition as 49.3% among children aged between 2 to 5 years.[10] A study from Sindh Province reported much higher prevalence of malnutrition among children which was 61%.[11] Another study revealed malnutrition among 30.1% hospitalized children.[12] Moreover, mortality rates between 14-16% have been reported among hospitalized children having malnutrition.[12] Despite the ample support from the "United Nations International Children's Emergency Fund (UNICEF)", "World Health Organization (WHO)" and "World Bank" towards achieving nutritional freedom, we are still far from the world without malnutrition.[13]

Variation exists regarding prevalence of malnutrition but much is known about the burden of malnutrition among children visiting outpatient department of tertiary care centers of South Punjab, Pakistan. Estimation of the burden of malnutrition in our region was thought to help clinicians about the anticipation, arrangement of resources and better management of affected pediatric population. Our objective was to find out the prevalence and risk factors of primary malnutrition among children below 5 years of age visiting outpatient department of a tertiary care hospital of South Punjab, Pakistan.

METHODOLOGY

Study Design, Place and Duration: This cross-sectional study was performed at the Outpatient Department of Pediatric Medicine, Ibn-e-Siena Hospital, Multan from 1st January 2022 to 30th June 2022.

Sample Size: Considering prevalence of malnutrition as 49.3% among children below 5 years of age with 95% confidence level and 8% margin of error, a sample size of 151 was calculated.

Sample Selection: Inclusion criteria were children of either gender aged below 5 years visiting outpatient department of pediatrics. Children with any known underlying ailment causing malnutrition or those with chronic liver disease, chronic kidney disease, chronic lung disease or celiac disease were excluded.

Data Collection: At the time of enrollment, socio-demographic as well as anthropometric characteristics were noted. Z-score were calculated for labeling malnutrition considering weight for height criteria according to "World Health Organization (WHO)" charts as: mild, -1.0 to -1.9, moderate, -2.0 to 2.9, and severe, ≤ -3.0. Parents or legal guardians accompanying the children were enquired about the birth weight and feeding history. Family income below Pakistani Rupees (PKR) 25,000 were labeled as low socio-economic status, > PKR 25,000 to 50,000 middle and above PKR 50,000 as high. Approval from "Institutional Ethical Committee" was acquired. Informed/written consents were sought from parents or legal guardians. Data was collected on an especially formed proforma.

Data Analysis: Data analysis was performed utilizing "Statistical Package for Social Sciences (SPSS)", version 27.0. Qualitative data were described as proportions while quantitative variables had representation in terms of mean and standard deviation (SD). Comparisons were made using independent sample t-test or chi-square test considering p-value < 0.05 as statistically significant.

RESULTS

In a total of 151 children, 78 (51.7%) were girls representing a female to male ratio of 1.1:1. The mean age, weight and height

were 2.67±1.56 years, 10.18±3.55 kg and 82.99±16.39 cm. There were 94 (62.3%) children who were living in rural areas. Mothers of 26 (17.2%) children were illiterate while maternal status of 62 (41.1%) was primary. The mean birth weight was 2.44±0.21 kg. Exclusive breast-feeding for the first 6 months was reported in 69 (45.7%) children while cow's mild before 1 year of age was reported by 101 (66.9%). Start of weaning within 6-months of age was noted in 104 (68.9%) children. There were 80 (53.0%) children who belonged to middle socio-economic status. Table-1 is showing characteristics of children.

Table-1: Characteristics of Children (n=151)

Characteristics		Frequency (%)
Gender	Boys	73 (48.3%)
	Girls	78 (51.7%)
Age (years)	<1	30 (19.9%)
	1-3	73 (48.3%)
	4-5	48 (31.8%)
Residence	Urban	57 (37.7%)
	Rural	94 (62.3%)
Maternal education	Illiterate	26 (17.2%)
	Primary	62 (41.1%)
	Secondary	31 (20.5%)
	Higher secondary	14 (9.3%)
	Graduate	6 (4.0%)
	Post-graduate	12 (7.9%)
Socio-economic status	Low	62 (41.1%)
	Middle	80 (53.0%)
	High	9 (6.0%)
Birth weight (kg)	<2.5	60 (39.7%)
	≥2.5	91 (60.3%)
Exclusive breastfeeding for first 6 months of life		69 (45.7%)
Use of cow's milk before 1 year of age		101 (66.9%)
Weaning before 6 months of age		104 (68.9%)

The mean height for weight Z-score was calculated to be -1.40±2.20. Distribution of nutritional status revealed that 61 (40.4%) were normal while mild, moderate and severe malnutrition were observed among 37 (24.5%), 11 (7.3%) and 42 (27.8%) children respectively (figure-1)

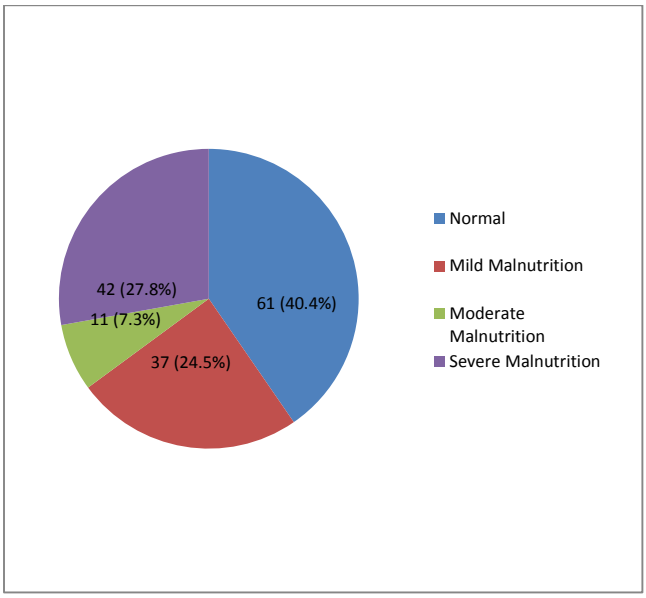

Figure-1: Distribution of Nutrition Status

Table-2 is showing stratification of nutritional status with respect to risk factors and it was found that malnutrition status had significant association with increasing age (p<0.001), poor maternal educational status (p=0.034) and use of cow's milk before 1 year of age (p=0.004).

Table-2: Stratification of Nutritional Status with respect to Risk Factors (N=151)

Characteristics		Malnutrition Status				P-value
		No (n=61)	Mild (n=37)	Moderate (n=11)	Severe (n=42)	
Gender	Boys	31 (50.8%)	19 (51.4%)	2 (18.2%)	21 (50.0%)	0.227
	Girls	30 (49.2%)	18 (48.6%)	9 (81.8%)	21 (50.0%)	
Age (years)	<1	18 (29.5%)	9 (24.3%)	3 (27.3%0	-	<0.001
	1-3	26 (42.6%)	22 (59.5%)	7 (63.6%)	18 (42.9%)	
	4-5	17 (27.9%)	6 (16.2%)	1 (9.1%)	24 (57.1%)	
Residence	Urban	21 (34.4%)	16 (43.2%)	6 (54.5%)	14 (33.3%0	0.488
	Rural	40 (65.6%)	21 (56.8%)	5 (45.5%0	28 (66.7%)	
Maternal education	Illiterate	12 (19.7%)	4 (10.8%)	3 (27.3%0	7 (16.7%)	0.034
	Primary	17 (27.9%)	16 (43.2%)	4 (36.4%)	25 (59.5%)	
	Secondary	10 (16.4%)	10 (27.0%)	3 (27.3%)	8 (19.0%)	
	Higher secondary	10 (16.4%)	2 (5.4%)	-	2 (4.8%)	
	Graduate	3 (4.9%)	3 (8.1%)	-	-	
	Post-graduate	9 (14.8%)	2 (5.4%)	1 (9.1%0	-	
Socio-economic status	Low	23 (37.7%)	10 (27.0%)	5 (45.5%)	24 (57.1%)	0.080
	Middle	32 (52.5%0	25 (67.6%)	5 (45.5%)	18 (42.9%)	
	High	6 (9.8%)	2 (5.4%0	1 (9.1%0	-	
Birth weight (kg)	<2.5	27 (44.3%)	17 (45.9%)	3 (27.3%0	13 (31.0%)	0.364
	≥2.5	34 (55.7%0	20 (54.1%)	8 (72.7%)	29 (69.0%)	
Exclusive breastfeeding for first 6 months of life		28 (45.9%)	18 (48.6%)	5 (45.5%)	18 (42.9%)	0.966
Use of cow's milk before 1 year of age		46 (75.4%)	23 (62.2%)	11 (100.0%)	21 (50.0%)	0.004
Weaning before 6 months of age		43 (70.5%)	27 (73.0%)	7 (63.6%)	27 (64.3%)	0.821

DISCUSSION

Malnutrition is considered to be the most severe consequence of food insecurity among pediatric population below 5 years of age.[14] The WHO endorses anthropometric characteristics for labeling nutritional status including height for age, weight for height and weight for age.[15] These anthropometric measures convert in to z-scores which was considering to label different types of malnutrition in the present study. The literature shows that burden of malnutrition is significant in South Asia and Africa.[16-18] In this study, prevalence of primary malnutrition was noted among 59.6% children studied. Data from India shows that 43.5% children below 5 years of age have under-nutrition.[19] According to "Bangladesh Demographic Health Survey", 36.2% children had stunting, 15% wasting while 33% were underweight which again shows that the burden of malnutrition is very high in this part of the world.[20] A meta-analysis evaluating prevalence of global malnutrition analyzing data from 1999 to 2014 reported the proportion of malnutrition in children below 5 years of age as 30.7%.[21]

This research revealed that among children below 5 years of age, increasing age (p<0.001), poor maternal educational status

(p=0.034) and use of cow's milk before 1 year of age had significant association with malnutrition. Gul and Kibria from Peshawar stated mother's literacy, younger maternal age and multiple parities to have significant association with malnutrition.[22] Other local data have shown poverty, poor educational status, low socio-economic status and household over-crowding to be linked with malnutrition among children.[23,24] Mahmood et al also reported maternal educational status to have significant linkage with malnutrition among the child which is quite similar to what we found.[25] Literature highlights that childhood nutritional status is of vital importance and there exists a multifactorial relation of it with socio-demographic, clinical, developmental and political factors.[26] Childhood malnutrition is further influenced by factors linked with cultural, dietary and economical factors. There lies a huge responsibility on primary healthcare specialists for the timely identification and management of children presenting below 5 years of age.

There is a massive need to identify causes behind factors linked with primary malnutrition among children below 5 years of age so that targeted interventions could be planned. Existing literatures highlights maternal health and educational status to have significant impact on child's nutritional status.[27] Assessment of micronutrient intake among maternal and pediatric age groups can be studied to shed some light upon the current practices in the local population.

Being a single center study conducted on a relatively small sample size were some of the limitations of the study. Information like birth weight, utilization of exclusive breastfeeding and cow's milk were largely based upon recall so there were chances that true information could not have been gathered in all cases.

CONCLUSION

The prevalence of primary malnutrition was very high among children below 5 years of age. Age, poor maternal educational status and use of cow's milk before 1 year of age had significant association with malnutrition.

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