ORIGINAL ARTICLE

Determinants of Malnutrition among Children under Five in a Tertiary Care Hospital, Lahore

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ABSTRACT

Objective:

- To determine the frequency of underweight, stunting and wasting in children aged 6-59 months visiting private tertiary care hospital.
- To find out the relationship of under-nutrition with socio-demographic factors and feeding practices

Study Design: A cross-sectional study was carried out in Pediatrics Outpatient Department of a private tertiary care hospital Lahore.

Place and Duration of Study: The study was conducted from May to October 2022 in OPD of Fatima Memorial Hospital, Lahore

Material and Methods: A sample of 245 children of required age group was selected using nonprobability purposive sampling technique. A pretested structured questionnaire was used to record data and analysis was done on SPSS Version 21.0. A Chi-square/Fisher test was applied to find out the determinants of malnutrition and p-value of ≤0.05 was taken as significant.

Results: The frequency of stunting, underweight and wasting among children was 31.43%, 19.2% and 24.90% respectively. Underweight among children was associated statistically with low birth weight, family size and parental decision making for health seeking (p-values=0.031, 0.045 and 0.05) respectively. Whereas there was statistically significant association of stunting with education of the mother (p-value=0.038) and wasting had shown significant relationship with age and exclusive breast feeding (p-value=0.05 and0.042) respectively.

Conclusion: There is high frequency of under-nutrition among children between 6−59 months and there is significant association of under-nutrition with birth weight, family size, education of mother, age of child and breast feeding.

Key Words: *Malnutrition, Wasting, Stunting, Underweight, 6-59 months.*

INTRODUCTION

Malnutrition is defined as an insufficient, excessive or disproportion in a person's intake of nutrients. It encompasses two major sets of diseases. One is under-nutrition, which is manifested by low height for age (stunting), low

weight for height (wasting), low weight for age (underweight) and micronutrient vitamin and mineral deficits. The second group is overweight or obesity, which increases the risk of chronic diseases such as diabetes and heart diseases.[1] Malnutrition affects people in every country and being a universal public health problem, it is regarded as a main hindrance to worldwide poverty, productivity and financial growth, it is expected that 32% world disease burden would be removed by elimination of malnutrition.[2]

It was projected that 149 million children under five would be stunted, 45 million would be wasted and 38.9 million would be overweight/obese in the world in 2020. Around 45% of mortality in children under five are attributed to under-nutrition. The majority of these occur in developing countries.[3]

The member nations of the World Health Organization (WHO) have proposed global goals for enhancing maternal and child under 5 nutrition and they are devoted to keeping track of the results. These goals are necessary for identifying important issues for intervention and catalyzing worldwide change.[4] In 2017, over 1 in 5 kids did not grow to their fullest potential and faced the danger of developing long-term cognitive problems as a result. In South Asia, about 40% of children are stunted, while the proportion of stunted children in Africa is growing. More than one in fourteen children worldwide are wasted.[5] Undernourished children under 5 are more prone to serious illnesses. Stunting can have a serious and protracted impact on a child's physical and mental wellbeing if it results from poor nutrition, improper care and living circumstances.[6] Pakistan, India and Bangladesh are the main South Asian countries where more than fifty percent children are suffering from malnutrition.[7] In Pakistan, 40.2% children under five are stunted, 17.7% are wasted and 28.9% are underweight.[8] According to the Multiple Indicator Cluster Survey 2017-2018, the percentage of moderate underweight, moderate stunting and moderate wasting in children under 5 in Punjab is 21.2%,, 31.5% and 7.5% respectively.[9]

Multifaceted elements such as biological, behavioral, social, demographic, economic and ecological factors have an impact on children's malnutrition.[10] A study conducted in Swat, Pakistan, the frequency of under-nutrition and obesity was 45% and 11.5% respectively revealing association with mother's education, number of family members, income per month, breastfeeding and weaning practices. A Ghana study depicted that stunting, wasting, and underweight were all prevalent at varying degrees and they were related with the child's age, while wasting and stunting were also associated with the gender. Other risk factors which were related to under-nutrition in children under 5 were low birth weight, low dietary diversity, birth order, total number of children in family and educational status of husband.[11] Thus identification of preventable risk factors will help to reduce the frequency of under nutrition in children under 5.

MATERIAL AND METHODS

A cross-sectional study was conducted in Pediatrics Out Patient Department (OPD) of Fatima Memorial Hospital, Lahore. Children 6 to 59 months of age who were ambulatory, of both sexes, who attended the OPD with their mothers, who did not have any chronic illnesses, and for whom hospitalization was not required were included in the study. The sample size was calculated by using the standard formula based on prevalence of wasting equal to 17.7% (8), 95% confidence level with a 5% margin of error which was 223 but we collected data from 245 children. The respondents were chosen by non-probability purposive sampling technique. The data was collected from mothers of children under 5 on a pretested survey form after approval from Institutional Review Board (IRB # FMH-19/10/2023-IRB-1324) and after taking written consent from them. The duration of study was from May to October 2022. The three dependent variables in this study were underweight, wasting and stunting. Weight-for-age (WAZ), weight-for-height (WHZ) and height-for-age (HAZ) z-scores of less than minus 2 standard deviations (SD) from the median according to the 2006 child growth standards of the World Health Organization (WHO)[12] were used to define underweight, wasting and stunting respectively. Independent variables like age, gender of the child, educational status and job of the parents, nuclear/ joint family, family income, birth order, number of children under five, immunization status, exclusive breastfeeding, duration of breast feeding, weaning practices and history of illness in

last 2 weeks were taken into consideration. Ambulatory children are those who need only outpatient care and do not require hospitalization. The child who had received complete vaccination course according to age would be considered as fully immunized. Data was cleaned and then entered for analysis in SPSS version 20. Simple frequency tables were generated for dependent and independent variables. Weight and height/length were translated in terms of malnutrition indicators i.e. underweight, stunting and wasting. Chi-square test/Fisher exact test was applied to find out the association of risk factors with malnutrition. Statistical significance value was set at p≤ 0.05.

RESULTS

Out of 245 children, mean age of children between 6 to 59 months was 24.84 ± 16.5 months and 140 (57.1%) children were males. The actual birth weight of children was reported by152 (62%) mothers. Educational status of 146 (59.5%) mothers and 192 (78.36%) fathers out of 245 families was matric and above. Regarding occupation, 217 (87.3%) mothers were housewives. One hundred six children had nuclear family system. About 107 (43.7%) and 80 (32.7%) children were of the birth order of one and two respectively. Parental involvement in decision making for health seeking in relation to children was 213 (89%) table 1. The number of fully immunized children was 216 (88.2%). Parental involvement in decision making for health seeking in relation to children was 213 (87%). Exclusive breast feeding was reported by 132 (53.9%) mothers while weaning was started at 6 months in 170 (69.4%) children. Regarding diarrhea and acute respiratory tract infections, 138 (56.3%) and 161 (65.7%) children did not suffer respectively from these diseases.

Out of 245 children, 47 (19.2%), 77 (31.4%) and 61 (24.9%) were underweight, stunted and wasted respectively whereas only 60 (24.5%) were well nourished (fig 1). Weight for age of the child is significantly associated with parental decision making. (p value = 0.05), birth weight (p value = 0.031) and number of family members (p value = 0.045) table 2. However, stunting had substantial association with education of the mother (p-value = 0.03) table 3. There was significant relationship between age and wasting among children 6-59 months of age (p value = 0.05). Exclusive breastfeeding also depicted significant relationship with wasting (p value 0.04) table 4.

TABLE 1: Socio-demographic profile of children 6-59 months of age (n-245)

Determinants	Variables	Frequency (%)
Age in months	6-12 months	96(39.2)
	13-24	49 (20.0)
	25-36	40 (16.3)
	37-48	36 (14.7)
	49-59	24 (9.8)
	Males	140 (57.1)
Gender	Females	105 (42.9)
	Illiterate	11 (4.5)
	Primary	8 (3.3)
	Middle	11 (4.5)
Mother's Education	Matric	59 (24.1)
	F.A/F.Sc	41 (16.7)
	Graduation	87 (35.5)
	Post-graduation	28 (11.4)
Father's Education	Illiterate	19 (7.7)
	Primary	14 (5.7)
	Middle	20 (8.2)
	Matric	46 (18.8)
	F.A/F.Sc	53 (21.6)
	Graduation	73 (29.8)
	Post-graduation	20 (8.2)
Mother's occupation	Working	214 (87.35)
	Non-Working	31 (13.00)
Monthly income (Rupees)	< 30000	63 (25.71)
	>30000	182 (74.28)
Type of family	Nuclear	106 (43.3)
	Extended	139 (56.7)
Number of family members	1-10	206 (84.08)
	11-35	39 (15.9)
Main Decision maker	Father	55 (22.4)
	Yourself	45 (18.4)
	Both	113 (46.1)
	Mother-in-law	12 (4.9)
	Father-in-law	20 (8.2)

TABLE 2: Impact of various determinants on weight for age among children (n=245)

Variables	Below – 2SD for weight (Underweight)	Above – 2SD for weight (Normal weight)	Chi-square and p-value
Age			
6 to 30 months	34 (21 %)	130 (79 %)	Chi- square = 0.767
31 to 59 months	13 (16 %)	68 (64 %)	p-value = 0.381
Gender			
Male	26 (18.6 %)	114 (81 %)	Chi- square = 0.079
Female	21 (20 %)	84 (80 %)	p-value = 0.779
Mothers' education			
Illiterate	6 (32 %)	13 (68 %)	Chi- square = 2.041
Literate	41 (18 %)	185(82 %)	Fisher exact p-value = 0.219
Fathers' education			Chi- square = 0.486
Illiterate	3 (27%)	8 (73%)	Fisher exact p-value = 0.446
Literate	44 (19 %)	190 (81 %)	
Mothers' occupation			
Non-working	41 (19 %)	173 (81%)	Chi- square = 0.001
Working	6 (19 %)	25 (81 %)	p-value = 0.979
Type of family			
Nuclear	19 (18%)	88 (82 %)	Chi- square = 2.49
Extended	28 (20 %)	110 (80 %)	p-value = 0.618
Income per month (Rupees)			Chi-square=0.001
<30,000	12(19%)	51 (81%)	p-value=0.975
>30,000	35 (19%)	147 (81%)	
Number of family members			
2-10 members	35 (17%	171(83%)	Chi-square=4.016
11-35 members	12(30.8%	27(69.2%)	**p-value=0.045**
Birth order			
1- 4	44 (19 %)	193 (81%)	Chi- square = 1.790
More than four	3 (38%)	5 (62%)	Fisher exact p-value = 0.182
Immunization status:			
Not immunized /Partially immunized	2 (50 %)	2 (50 %)	Chi- square = 2.491 Fisher exact p-value = 0.167
Immunized	45(19 %)	196 (81 %)	
Main decision maker			
Mother/Father/Both	36 (14.7%)	122(77%)	Chi- square = 3.722
Others	11 (13%)	76 (87 %)	**p-value = 0.054**
Birth weight			
<2.5kg	10 (29%)	24 (71%)	Chi-square=4.678 &
>2.5kg	16 (14%)	102 (86%)	**p-value=0.031**
Exclusive breast feeding			
Yes	23(20%)	90 (80 %)	Chi- square = 0.185
No	24 (18 %)	108 (82 %)	p-value = 0.667
Initiation of weaning			
Less than six months	7 (19%)	30 (80%)	Chi- square = 0.002
At six months	40 (19%	168 (801%)	p-value = 0.965
Diarrhea during the two months:			
Yes	22(21 %)	85(79 %)	Chi- square = 0.232
No	25 (18 %)	113 (82 %)	p-value = 0.630
ARI during the last two months			
Yes	21 (25 %)	62 (75%)	Chi- square = 3.030
No	26 (16 %)	136 (84 %)	p-value = 0.082

TABLE 2: Impact of various determinants on weight for age among children (n=245)

Variables	Below – 2SD for weight underweight (%)	Above – 2SD for weight Normal weight (%)	Chi- square and p-value
Age			
6 to 30 months	34 (21.0)	130 (79.0)	Chi- square = 0.767
31 to 59 months	13 (16.0)	68 (64.0)	p-value = 0.381
Gender			
Male	26 (18.6)	114 (81.0)	Chi- square = 0.079
Female	21 (20 0)	84 (80.0)	p-value = 0.779
Mothers' education			
Illiterate	6 (32 0)	13 (68.0)	Chi- square = 2.041
Literate	41 (18 0)	185 (82.0)	Fisher exact p-value = 0.219
Fathers' education			Chi- square = 0.486
Illiterate	3 (27.0)	8 (73.0)	Fisher exact p-value = 0.446
Literate	44 (19.0)	190 (81.0)	
Mothers' occupation			
Non-working	41 (19.0)	173 (81.0)	Chi- square = 0.001
Working	6 (19.0)	25 (81.0)	p-value = 0.979
Type of family			
Nuclear	19 (18.0)	88 (82.0)	Chi- square = 2.49
Extended	28 (20.0)	110 (80.0)	p-value = 0.618
Income per month (Rupees)			Chi-square=0.001
<30,000	12(19.0)	51 (81.0)	p-value=0.975
>30,000	35 (19.0)	147 (81.0)	
Number of family members			
2-10 members	35 (17.0	171(83.0)	Chi-square=4.016
11-35 members	12(30.8	27(69.2)	**p-value=0.045**
Birth order			
1- 4	44 (19.0)	193 (81.0)	Chi- square = 1.790
More than four	3 (38.0)	5 (62.0)	Fisher exact p-value = 0.182
Immunization status:			
Not immunized /Partially immunized	2 (50.0)	2 (50.0)	Chi- square = 2.491
Immunized	45(19.0)	196 (81.0)	Fisher exact p-value = 0.167
Main decision maker			
Mother/Father/Both	36 (14.7)	122 (77.0)	Chi- square = 3.722
Others	11 (13.0)	76 (87.0)	**p-value = 0.054**
Birth weight			
<2.5kg	10 (29.0)	24 (71.0)	Chi-square=4.678 &
>2.5kg	16 (14.0)	102 (86.0)	**p-value=0.031**
Exclusive breast feeding			
Yes	23(20.0)	90 (80.0)	Chi- square = 0.185
No	24 (18.0)	108 (82.0)	p-value = 0.667
Initiation of weaning			
Less than six months	7 (19.0)	30 (80.0)	Chi- square = 0.002
At six months	40 (19.0)	168 (801.0)	p-value = 0.965
Diarrhea during the two months:			
Yes	22(21.0)	85 (79.0)	Chi- square = 0.232
No	25 (18.0)	113 (82.0)	p-value = 0.630
ARI during the last two months			
Yes	21 (25.0)	62 (75.0)	Chi- square = 3.030
No	26 (16.0)	136 (84.0)	p-value = 0.082

TABLE 3: Impact of various determinants on length / height of children (n=245)

Variables	Below – 2SD length / height for age Stunting (%)	Above – 2SD length / height for age Normal (%)	Chi- square and p – value
Age			
6 to 30 months	49 (30.0)	115 (70.0)	Chi- square = 0.553
31 to 59 months	28 (34.0)	53 (65.0)	p-value = 0.457
Gender			
Male	40 (29.0)	100 (71.0)	Chi- square = 1.237
Female	37 (35.0)	68 (65.0)	p-value = 0.266
Education of mother			
Illiterate	10 (53.0)	9 (47.0)	Chi- square = 4.297
Literate	67 (30.0)	159(70.0)	**p-value = 0.038**
Fathers' education			
Illiterate	6 (55.0)	5 (46.0)	Chi- square = 2.856
Literate	71 (30.0)	163 (70.0)	Fisher exact p-value =0.10
Mother occupation			
Non-working	70 (33.0)	144 (67.0)	Chi- square = 1.289
Working	7 (23.0)	24 (77.0)	p-value = 0.256
Type of family			
Nuclear	32 (30.0)	75 (70.0)	Chi- square = 0.204
Extended	45(33.0)	93 (67.0)	p-value = 0.651
Income per month (Rupees)			
Less than30,000	16 (25.0)	47 (75.0)	Chi-square=1.432
More than 30,000	61 (34.0)	165 (68.0)	p-value=0.231
Number of family members			Chi-square=1.98
1-10	61 (30.0)	145 (70.0)	p-value=0.15
11-35	16 (41.0)	23 (59.0)	
Birth order			
1-4	75 (32.0)	162 (68.0)	Chi- square = 0.159
More than four	2 (25.0)	6 (75.0)	Fisher exact p-value = 1.000
Immunization status			
Not immunized /Partially immunized	2 (50.0)	2 (50.0)	Fisher exact p-value = 0.592
Immunized	75 (31.0)	166(69.0)	
Main decision maker			
Mother/Father/Both	48 (30.0)	110 (70.0)	Chi- square = 0.227
Others	29 (33.0)	58 (67.0)	p-value = 0.634
Birth weight			
< 2.5 kg	13 (38.0)	21 (62.0)	Chi- square = 1.565
>2.5 kg	32 (27.0)	86 (73.0)	p-value = 0.211
Exclusive breast feeding			
Yes	37 (33.0)	76 (67.0)	Chi- square = 0.168
No	40 (30.0)	92 (70.0)	p-value = 0.682
Time of initiation of weaning			
Less than six months	11(30.0)	26 (70.0)	Chi- square = 0.058
At six months	66 (32.0)	142 (68.0)	p-value = 0.809
Diarrhea during last two months			
Yes	36(34.0)	71 (66.0)	Chi- square = 0.433
No	41 (30.0)	97 (70.0)	p-value = 0.511
ARI during last two months			
Yes	22 (27.0)	61 (74.0)	Chi- square = 1.411
No	55 (34.0)	107 (66.0)	p-value = 0.235

TABLE 4: Factors affecting on the weight for length/ height of children 6 months -59 months (n=245)

Variables	Below – 2SD for weight for length / height Wasting (%)	Above – 2SD for weight for length / height Normal (%)	Chi- square and p- value
Age			
6 to 30 months	47 (29.0)	117 (71.0)	Chi- square = 3.752
31 to 59 months	14 (17.0)	67 (83.0)	**p-value = 0.05**
Gender			
Male	33 (24.0)	107 (76.0)	Chi- square = 0.307
Female	28 (27.0)	77 (73.0)	p-value = 0.579
Mother Education			
Illiterate	7 (37.0)	12 (63.0)	Chi- square = 2.603
Literate	54 (24.0)	172(76.0)	p-value = 0.148
Fathers' education			
Illiterate	5 (46.0)	6 (55.0)	Chi- square = 1.571
Literate	56 (24.0)	178 (76.0)	p-value = 0.210
Mothers occupation			
Non-working	51 (24.0)	163 (76.0)	Chi- square = 1.028
Working	10 (32.0)	21 (68.0)	p-value = 0.311
Type of family			
Nuclear	26 (24.0)	81 (76.0)	Chi- square = 0.036
Extended	35 (25.0)	103 (745.0)	p-value = 0.849
Income per month (Rupees)			
Less than30,000	19 (30.0)	44 (70.0)	Chi- square = 1.255
More than30,000	42 (23.0)	140 (77.0)	p-value = 0.263
Number of family members			
2-10 members	52	154	Chi- square = 0.774
11-35 members	9	30	p-value = 0.082
Birth order			
1- 4	58 (245.0)	179 (76.0)	Chi- square = 0.702
More than four	3 (38.0)	5 (623.0)	Fisher exact p-value = 0.415
Immunization status			
Not immunized /Partially immunized	2 (50.0)	2 (50.0)	Chi- square = 1.370 Fisher exact p-value = 0.259
Immunized	59 (25.0)	182(76.0)	
Decision maker			
Mother/Father/Both	41 (26.0)	117 (74.0)	Chi- square = 0.263
Others	20 (23.0)	67 (77.0)	p-value = 0.608
Birth weight			
<2.5kg	11 (32.0)	23 (68.0)	Chi- square = 1.263
>2.5kg	27 (23.0)	91 (77.0)	p-value = 0.261
Exclusive breast feeding			
Yes	35 (31.0)	78 (69.0)	Chi- square = 4.140
No	26 (20.0)	106 (80.0)	p-value = 0.042
Time of initiation of weaning			
Less than six months	8 (22.0)	29 (78.0)	Chi- square = 0.250
At six months	53 (26.0)	155 (75.0)	p-value = 0.617
Diarrhea during last two months			
Yes	31(29.0)	76 (71.0)	Chi- square = 1.686
No	30 (22.0)	108 (78.0)	p-value = 0.194
ARI during last two months			
Yes	24(29.0)	59 (71.0)	Chi- square = 1.084
No	37 (23.0)	125(77.0)	p-value = 0.298

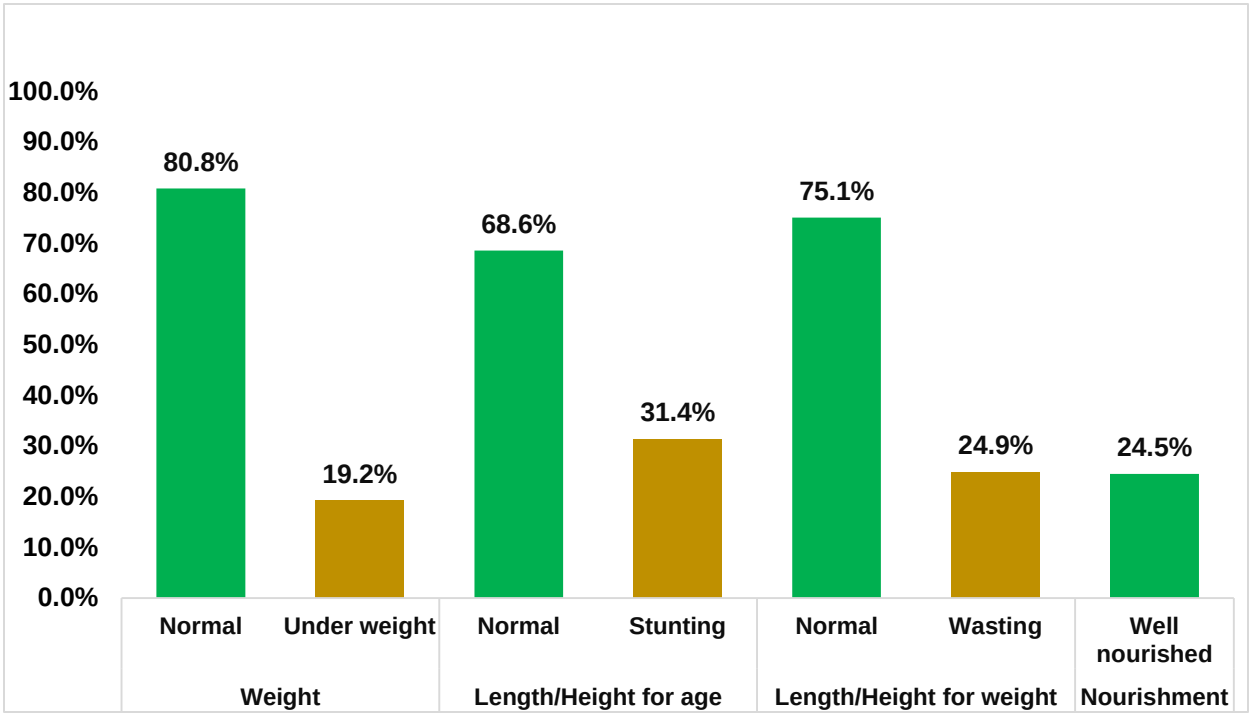

Fig1: Percentage of various types of under-nutrition among children 6− 59 months of age

DISCUSSION

Malnutrition among children is a key public health problem globally specifically under-nutrition in poor nations. In our study the frequency of stunting, underweight and wasting was 31.4%, 19.2% and 24.9% respectively among children aged 6 to 59 months. Thus, stunting among these children was more frequent as compared to wasting and underweight. According to the Pakistan Nutritional Survey, the frequency of stunting, underweight and wasting among children under 5 in Punjab was 36.4% 23.5% and 15.3% respectively.[8] The percentages of stunting and underweight are comparable to recent study but the percentage of wasting was much higher in our study. However, another study conducted in Tehsil Battagram, 49.2% were stunted, 33.1% were underweight and 18.7% were wasted.[13] According to WHO Nutrition Landscape Information System (NLiS), the frequency of stunting and wasting was more than the WHO standard prevalence cut-off values for public health significance, and thus the frequency of undernutrition was considered to be "very high". The prevalence cut-off values for public health importance regarding stunting were ≥30%, which places our findings in this category and falls under the public health significance and wasting falls under the public health significance of very high defined as ≥15%.[14] The variation in the frequency or prevalence of undernutrition may be due to application of different methodology, as well as socioeconomic and cultural variations regarding feeding practices, food diversity and availability and proper health care services for children.

Underweight: In this study, there is a statistically significant relationship of low birth weight with underweight kids under 5 (p-value=0.031). The results of the Malawian study point to the fact that children under the age of five with normal birth weight are less likely to be underweight, stunted and wasted than infants with low birth weights. This suggests that birth weight can have a significant impact on a child's nutritional status and overall health during early childhood.[15]

However these results are contrary to our result except for underweight which showed statistically significant association with low birth weight. Regarding family size, there is a statistically significant association of underweight with number of family members (p-value=0.045) which is also reported from a study indicating that there is a higher prevalence of underweight among children from households with more than 10 members compared to those with 2-5 members. The reason for this association is likely due to difficulty in providing sufficient food for all members in larger households, which increases the risk of underweight children (p-value=0.03).[16] Another study concluded that children who resided in bigger families with more than six people were more likely to be underweight due to limited access and unequal distribution.[17] Income per month had reported no significant association with weight for age (p-value=0.975) in our study and the same result was depicted by a study of Rawalpindi (p= 0.81).[18] However a study of India reported significant relationship of household income with weight for age (p< 0.05).[19]

Stunting: Regarding stunting, educational status of mother and stunting depicted statistically strong relationship (p-value=0.038) which is confirmed by a Nairobi study (p < 0.01).[20] Similarly, another study result corroborates with the recent study claiming that mothers with graduation degree had fewer stunted children as compared to mothers with primary and high school education. Statistics indicate that these differences were substantial (p 0.001).[21] The explanation might be that educated moms are more likely to practice appropriate child feeding, engage in healthy activities throughout pregnancy and breastfeeding, and demonstrate better health-seeking behavior. Exclusive breastfeeding practices were significantly associated with stunting in a study of Bangladeshi children (p=.048)[22] which is contrary to our study where there is no significant relationship between stunting and exclusive breast feeding. The household income in this study reported no statistically significant association with stunting among children (p-value=0231) and similar result was reported by an Indian study.[19]

Wasting: Among children under five, there is a statistically significant association between exclusive breastfeeding and wasting (p-value=0.042). This result is consistent with data from Indonesia showing that moms who do not exclusively breastfeed their babies are 3.6 times more likely to have wasted infants (p=0.036).[23] Regarding age of children our result implies that 6-30 months children suffered from wasting more as compared to those above 31 months (p-value=0.05). A study of Bangladesh confirmed present study result in relation to age (p=0·004) and had shown no statistically significant association with parental education (p-value=>0.05).[24] These results are similar to our study where 29% children aged 6-30 months were wasted as compared to children aged 31-59 months which was 17%. Poor weaning and infant feeding practices can increase risk of wasting in children because of inadequate protein and energy intake. In the current study no significant association was reported of wasting among children with the household income (p-value= 0.263) and similar result was depicted by an Indian study.[19].

CONCLUSION

Stunting is more common among children aged 6-59 months as compared to underweight and wasting. Major factors associated with undernutrition are birthweight, family size, education of mother, age of child and breast feeding.

Recommendations:

1. Regular growth monitoring of children under five is to be done by lady health workers in the community and healthcare workers in the health facilities so that early diagnosis and treatment of malnutrition to be followed.
2. Significant risk factors for undernutrition in children under five include pre-lacteal feeding and inappropriate weaning. Lady health workers can play a major role to raise awareness among mothers about the importance of antenatal care, breastfeeding, immunization and appropriate weaning food.
3. Print and electronic media should also play its role for creating awareness among the masses in relation to antenatal care, exclusive breast feeding, immunization and proper weaning practices.

4. Multiple intervention strategies based on the risk factors can reduce early malnutrition of the children under the age of five. Integrating nutrition interventions into existing health systems is essential to ensure that nutrition is a priority across all levels of healthcare.

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Conflict of interest: None

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REFERENCES

1. World Health Organization. Malnutrition-Question & Answers (Internet) World Health Organization;2020 April15. (cited 2022 June 3) Available from: https://www.who.int/news-room/questions-and-answers/item/malnutrition
2. World Health Organization. Nutrition [Internet]. World Health Organization; 2020. (cited 2022 June 13). Available from: https://www.who.int/nutrition/topics/2_background/en/index1.html
3. World Health Organization, United Nations Children's Fund ((UNICEFWorld &) Bank.2021) Levels and trends in child . malnutrition: UNICEF / WHO / The World Bank Group joint child malnutrition estimates: key findings of the 2021 edition.(cited 2022June 13) World Health Organization. Available from: https://apps.who.int/iris/handle/10665/341135
4. World Health Organization. Global Nutrition Targets 2025. Policy Brief series.(Internet) World Health Organization; 2014(cited 2022 June12) Available from**:** https://www.who.int/publications/i/item/WHO-NMH-NHD-14.2
5. Adepoju AA, Allen S. Malnutrition in developing countries: nutrition disorders, a leading cause of ill health in the world today. Paediatrics and Child Health. 2019 Sep 1; 29(9):394-400.
6. Save the Children. Malnutrition in Children Can Be Caused by Poor Quality of Diet (Internet). (cited2022 June 3) Available from: Save the Childrhttps://www.savethechildren.org/us/charity-stories/what-is-malnutrition-in-children
7. Shahid N, Salman F, Makhdum M. Major factors responsible for child malnutrition: A review. J Pak Med Assoc. 2021 Feb; 71 (2(B)):729-733. doi: 10.47391/JPMA.1243. PMID: 33941968.
8. National Nutrition Survey 2018 Key Findings Report. (cited june10). Government of Pakistan. Available from:https://www.unicef.org/pakistan/media/1871/file/KeyFindings---NationalNutritionSurvey2018.pdf
9. Multiple Indicator Cluster Survey 2017-18. Punjab Survey Findings Report. Provincial Survey Report Vol. -1 Bureau of Statistics. Planning &Development Board. Government of Punjab Available from.https://bos.punjab.gov.pk/system/files/MICS%20SFR_Final_Vol1_0.pdf
10. Sarkar S. Cross‐sectional study of child malnutrition and associated risk factors among children aged under five in West Bengal, India. Int J Popul Stud 2016; 2:89‐102.
11. Boah M, Azupogo F, Amporfro DA, Abada LA. The epidemiology of undernutrition and its determinants in children under five years in Ghana. Plos one. 2019 Jul 31;14(7): e0219665
12. World Health Organization. Child Growth Standards.(cited June 12). Available from: https://www.who.int/tools/child-growth-standards/standards/
13. Ahmad S, Abid J, Muhammad N, Wasila H, Zaitoun M, Awudi DA. Prevalence and factors associated with undernutrition among 6-59 months children in Tehsil Battagram, Pakistan. JPMA. 2022;72(1535)
14. World Health Organization.Nutrition Landscape Information System (NLiS).(cited June14) Available from: **Global Nutrition Monitoring Framework**http://apps.who.int/nutrition/landscape/global-monitoring-framework?ISO=PAK

15. Ntenda PA. Association of low birth weight with undernutrition in preschool-aged children in Malawi. Nutr J. 2019 Dec;18(1):1-5.

16. Nsubuga EJ, Arinda Kato I, Lee S, Ssenyondo M, Isunju JB. Predictors of Stunting and Underweight Among Children Aged 6 to 59 months in Bussi Islands, Wakiso District, Uganda: A Cross-Sectional Study. Nutr Metab Insights. 2022 Sep; 15:11786388221125107.

17. Sinha T, Singh G, Nag U. Nutritional status of children under 5 years in tribal villages of Bastar Chhattisgarh India. J intern Med Prim Healthcare. 2019;3(007):4.

18. Mahmood S, Nadeem S, Saif T, Mannan M, Arshad U. Nutritional status and associated factors in under-five children of Rawalpindi. Journal of Ayub Medical College Abbottabad. 2016 Mar 10;28(1):67-71

19. Murarkar S, Gothankar J, Doke P, Pore P, Lalwani S, Dhumale G, Quraishi S, Patil R, Waghachavare V, Dhobale R, Rasote K. Prevalence and determinants of undernutrition among under-five children residing in urban slums and rural area, Maharashtra, India: a community-based cross-sectional study. BMC public health. 2020 Dec;20:1-9.

20. Abuya BA, Ciera J, Kimani-Murage E. Effect of mother's education on child's nutritional status in the slums of Nairobi. BMC pediatrics. 2012 Dec;12(1):80. Available from: https://doi:10.1186/1471-2431-12-80

21. Manalac T. Lower maternal education linked to child stunting. MIMS Paediatrics. 2022 Aug09.Available from:https://specialty.mims.com/topic/lower-maternal-education-linked-to-child-stunting

22. Chowdhury IA, Hussain SH. Feeding Practices and Nutritional Status of Children under Five Years Attending at Selected Child Welfare Centre, Dhaka Cantonment. Journal of Armed Forces Medical College, Bangladesh. 2022 Oct 16;18(1):54-6.

23. Setiawan MI, Husaini FY, Anggraini L, Putri AO, Laily N, Noor MS, et al. Exclusive Breastfeeding for Preventing the Occurrence of Wasting among Under-Five Children in Guntung Payung, Banjarbaru. InConference on Nutrition and Food 2020 (1st IPB ICNF 2020) 2020 Nov (Vol. 18, p. 25).

24. Hussain M, Ans M, Shahid S, Bibi A, Sultan M. Factors Influencing Malnutrition Among Under 5 Year Children of District Gwadar, A Cross-Sectional Community Based Study: Factors Influencing Malnutrition among Under 5 Year Children. Pakistan Journal of Health Sciences. 2022 Oct 31:105-9.)