

FREQUENCY AND RISK FACTORS OF MALNUTRITION AMONG CHILDREN OF CLASS I (6 - 7 YEARS OF AGE) IN WAH CANTT

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Abstract-Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients. Malnutrition is one of the vital health and welfare problems facing Pakistan today. School age is the vibrant period of physical and mental development of a child. The health problems due to poor nutritional status are among the common causes of low school enrolment, high absenteeism and unsatisfactory academic performance. This survey was conducted to determine the frequency of Malnutrition and related risk factors among Children of class I (6 - 7 years of age) in Wah Cantt. A Cross-sectional study was conducted among children of public sector schools of Wah Cantt from Sep. 2013 to Feb. 2014. Two hundred and seventy children of Class I, aged six to seven years of any gender from six public sector schools of Wah Cantt were included in the study by simple random technique. After taking verbal consent, information regarding different demographic variables was obtained. The height and weight was measured and frequency of overweight, underweight, stunting and wasting was calculated. Results were statistically analyzed using SPSS 19.0. Chi-Square test was applied to find out the significance of association between risk factors and malnutrition. Out of 270 children there were 105 boys and 165 girls. The mean age was 76.5 ± 4.44 months. The overall frequency of children having different categories of malnutrition was 138 (51.1 %); 10 (3.7 %) underweight, 1(0.4 %) stunted, 33 (12.2 %) wasted, 3 (1.1 %) overweight, 73 (27 %) underweight & wasted, 14 (5.2 %) underweight, wasted & stunted, 4 (1.5 %) underweight & stunted and 132 (48.9 %) were normal. Frequency of malnutrition was more among boys as compared to girls (p-value 0.048). A significant inverse relationship was found between mother's education and frequency of underweight and stunting among children (p-value 0.05). The association of malnutrition with family income, family size, fathers' education and mothers' occupation was statistically insignificant.

Key Words: Malnutrition, Overweight, Underweight, Stunting, Wasting.

1. INTRODUCTION

The nutritional status of young children is an important indicator of health and development—it is not only a reflection of past health insults but an important indicator of future health trajectories¹. Malnutrition is a pathological state resulting from a relative or absolute deficiency or excess of one or more essential nutrients². It can be caused, primarily, by an inadequate diet or, secondarily, by deficiency in gastrointestinal absorption and/or increase in demand, or even, by an excessive excretion of nutrients³.

According to WHO database, globally 165 million (26 %) children younger than 5 years were stunted, more than 100 million (16 %) were under weight, 52 million (8 %) were wasted and 43 million (7 %) were over weight in 2011 on the basis of the WHO Child Growth Standards^{4,5}. Like other most important health issues malnutrition is widely prevalent in South Asian Region where half of the world's malnourished children are to be found in just 3 countries Bangladesh, India and Pakistan⁶. Nearly one-third of children in the developing world are malnourished. Of all children less than 5 years of age in developing countries, about 31% are underweight, 38% have stunted growth and 9% show wasting³. The National Nutrition Survey Pakistan-2011 showed stunting rate of 24.4%, wasting rate of 15.1 % and 29.7 % children were underweight across Pakistan⁶. A study conducted in Lahore (Pakistan) in 2012 showed prevalence of stunting 8.2 %, underweight 6.7 %, wasting 10.1 % and overweight 17.0 %⁷.

Malnutrition continues to be a growing problem in most developing countries. Poor nutrition during childhood is one important factor impeding the physical and mental development of children, which ultimately propagates the vicious cycle of intergenerational malnutrition. The issue of child malnutrition is critical because its effects are not limited to the boundary of childhood but rather persist into adulthood. It silently destroys the future productivity of nations. Malnutrition increases the economic burden of a society because it leads to increased risk of death from infectious diseases, more severe infections, and higher case fatalities, creating an additional psychosocial burden^{8,9}. The root of malnutrition in early childhood is complex with a variety of direct and underlying contributors related to lack of food, respiratory and gastrointestinal infections and inadequate water and sanitation¹⁰. In developing countries, poverty is the main underlying cause of malnutrition and its determinants. The degree of malnutrition in a

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given population depends on many factors: such as high rate of unemployment, illiteracy, world conflicts, natural disasters, overcrowding, the political and economic situation, food production, cultural and religious food customs, breast-feeding habits, prevalence of infectious diseases, the existence and effectiveness of nutrition programs and the availability and quality of health services ¹¹.

Today malnutrition is one of the major global health problems faced by the developing countries. We conducted this survey because it would help to determine the frequency of malnutrition and related risk factors among apparently healthy children in a literate community; literacy rate of Wah Cantt is 100%. By this survey the problem of malnutrition would be timely identified and corrected with nutritional supplements, as "access to nutritious and appealing meals either through canteens or school lunch service by provision of, biscuits, snacks etc especially to nutritionally deprived ones" is one of the domains of already existing School Health Service programme of Wah Medical College, as well its complications may be dealt with. Provision of health education to parents, and implementation of identified strategy would be easy as literacy rate is high. By health awareness campaign the students might be taught the relevance of problem.

2. MATERIALS AND METHODS

A Cross-sectional study was conducted among children of public sector schools of Wah Cantt from Sep. 2013 to Feb. 2014. Two hundred and seventy children of Class I, aged six to seven years of any gender from six public sector schools of Wah Cantt were included in the study. For each school, a list of all students in class I was obtained and by simple random technique forty five children were included in the study. For each of the sampled classes, information regarding age/date of birth, sex, family income, number of family members, parents' education and occupation of all officially enrolled students was obtained. Verbal informed consent for the child to participate in the study was taken from class teachers and school heads. Each child's height and weight were measured in the metric system, using standardized technique. The instruments were checked and calibrated on a daily basis. Height measurement was taken in centimeters (cm) to the nearest 0.1 cm and weight was measured in kilogram (kg) to the nearest 0.5 kg. For measuring height the child was asked to stand relax without footwear, feet were placed parallel with heels, buttocks and shoulder blades against the measuring rod and head was positioned in the Frankfurt horizontal plane. A portable balance was used to record the weight of the subjects. Children were instructed to stand on the balance with light clothing and without footwear and with feet apart and looking straight. Findings were recorded in the proforma.

All the data obtained was entered and analyzed using SPSS .v. 19. Mean and standard deviation (SD) was calculated for age, weight and height. Frequencies and percentages were calculated for gender, family income, number of family members, and parents' education/occupation. The frequency of overweight, underweight, stunting and wasting was calculated by applying the 2007 WHO Child Growth Standard tables. **Underweight:** weight for age < 3rd percentile of the median. **Stunting:** height for age < 3rd percentile of the median. **Wasting:** weight for height (BMI - Kg/m²) < 3rd percentile of the median. **Overweight:** weight for height (BMI - Kg/m²) between 85th and 95th percentile ¹². Chi-Square test was applied to find out the significance of association between risk factors and malnutrition.

3. RESULTS

Out of 270 children there were 105 boys and 165 girls. The mean age was 76.5 ± 4.44 months (Table 3.1).

Table- 3.1 Mean and Standard Deviation (SD) for Age, Height, Weight and BMI

	Mean	Standard Deviation (SD)
Age (months)	76.5037	4.44106
Height (cm)	114.293	5.2470
Weight (Kg)	17.174	2.5834
BMI (Kg/m ²)	13.094	1.4669

Thirty five percent, 53% and 12% children belong to lower social class (monthly income < 10,000), middle social class (monthly income 10,000 - 25,000), and upper social class (monthly income > 25,000) respectively. Forty five children have 4 family members, 89 have 5 family members, 82 have 6 family members and 54 have > 6 family members. The education of fathers' of 48, 154, 53 and 15 children was up to primary, Matric, Graduate and Post-graduate respectively. The education of mothers' of 112, 107, 40 and 11 children was up to primary, Matric, Graduate and Post-graduate respectively. The mothers of 252 (93 %) children were house wives and only of 18 (7 %) children were working woman.

The overall frequency of children having different categories of malnutrition was 138 (51.1 %); 10 (3.7 %) underweight, 1(0.4 %) stunted, 33 (12.2 %) wasted, 3 (1.1 %) overweight, 73 (27 %) underweight & wasted, 14 (5.2 %) underweight, wasted & stunted, 4 (1.5 %) underweight & stunted and 132 (48.9 %) were normal (Fig. 1).

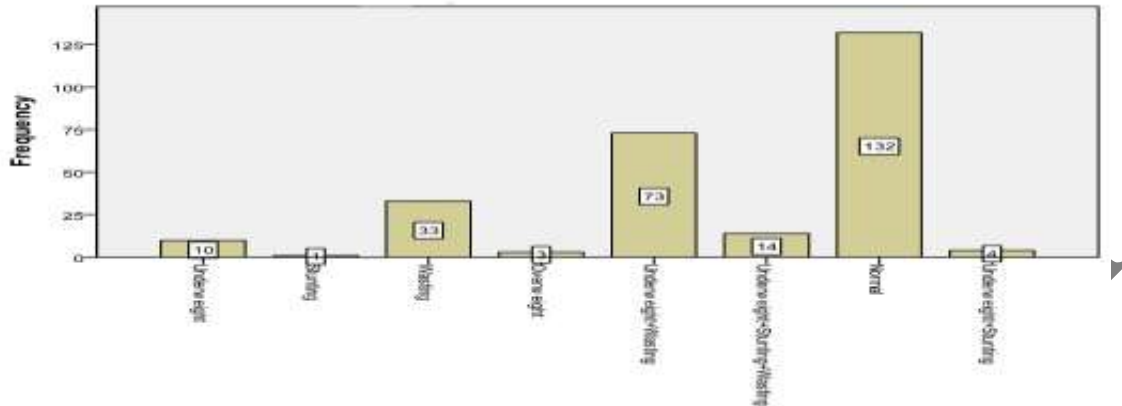


Fig. 3.1 Categories of Malnutrition

On individual analysis of frequency of each category of malnutrition 101 (37.4 %) children were underweight, 19 (7 %) were stunted, 120 (44.4 %) were wasted and only 3 (1.1 %) were overweight. Frequency of malnutrition was significantly high (p-value 0.048) among boys (56 out of 105, 53.3 %) as compared to girls (82 out of 165, 49.7 %) Table 3.2.

Table-3.2 Gender and Category of Malnutrition

Category of Malnutrition	Boys	Girls	Total
Underweight	2	8	10
Stunting	0	1	1
Wasting	19	14	33
Overweight	1	2	3
Underweight + Wasting	25	48	73
Underweight + Wasting + Stunting	9	5	14
Underweight + Stunting	0	4	4
Normal	49	83	132
Total	105	165	270

X²value - 14.206 p-value 0.048

A significant inverse relationship was found between mother's education and frequency of underweight and stunting among children (p-value 0.05).

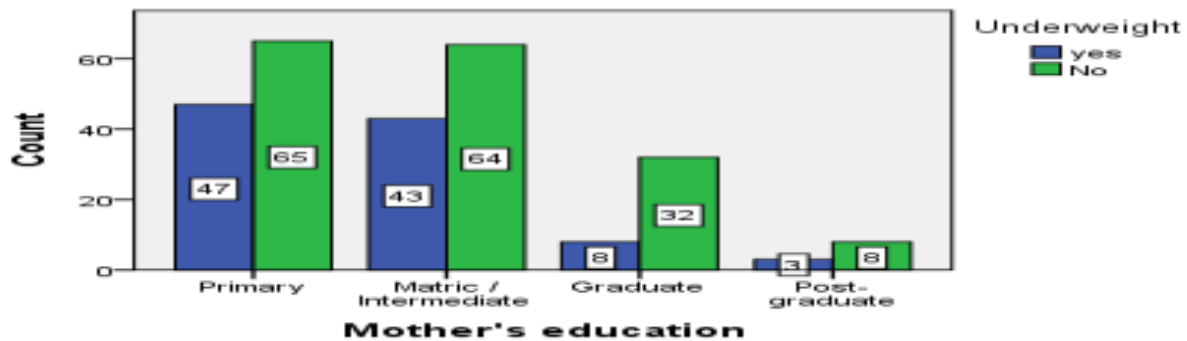


Figure 2: Frequency of Underweight and Mother's Education

The association of malnutrition with family income, family size, fathers' education and mothers' occupation was statistically insignificant (Table 3.3).

Table-3.3 Risk Factors and Malnutrition

Risk factors	Nutritional status	
	Normal (%)	Malnourished (%)
Gender: Boys	46.7	53.3
Girls	50.3	49.7
Family Income:		
Lower social class	47.4	52.6
Middle social class	46.5	53.5
Upper social class	63.6	36.4
No. of family members:		
4	57.8	42.2
5	51.7	48.3
6	40.3	59.7
>6	50.0	50.0
Fathers' education:		
Primary	44	56
Matric/Intermediate	51	49
Graduate	47	53
Post graduate	53	47
Mothers' education:		
Primary	45	55
Matric/Intermediate	50	50
Graduate	57	43
Post graduate	55	45
Mothers' Occupation:		
Working woman	56	44
House-wife	48	52

4. DISCUSSION

Child malnutrition remains one of the main public health challenges of the 21st century. Recent global estimates suggest that malnutrition is responsible for 2.2 million deaths and 21% of disability-adjusted life-years lost among children¹³. Malnutrition prevents children from reaching their full physical and mental potential¹⁴. This survey was conducted to determine the frequency of malnutrition and related risk factors among apparently healthy children in a literate community.

Under-nutrition in childhood is one of the reasons behind the high child mortality rates observed in developing countries. In this study 101 (37.4 %) children were underweight, these results are similar to findings of National Nutrition Survey Pakistan 2011 which showed that 29.7 % children were underweight across Pakistan⁶, in another study conducted in urban squatter settlements of Pakistan the frequency of underweight was found to be 29.5 %¹⁵. In developing countries 31 %³, India 40.3 %¹, and in Nigeria 43.4 %¹¹ children were underweight. The frequency of underweight children was quite high (52 %) in a survey from different schools of Karachi¹⁶ and in 6 - 7 years age group 48.9 % children were underweight in North Bengal¹⁷. In contrast only 6.7 % children were found to be underweight in a study conducted in Lahore (Pakistan)⁷, and 6.9 % in Saudi Arabia¹⁸.

In our sample frequency of underweight was more in girls 39.4 % (65 out of 165) as compared to boys 34.3 % (36 out of 105). Our results are similar to a study conducted in school-age children of India where more girls (45.2 %) were underweight as compared to boys (33.6%)¹⁹. These figures are different from two other studies conducted in Karachi and Lahore (Pakistan), which showed frequency of underweight 29 % boys versus 27 % girls²⁰ and 7.1 % boys versus 6.3 % girls⁷ respectively.

Stunting (low height-for-age) is considered as the best indicator for child growth as it reflects the cumulative effects of socioeconomic, health and nutritional problems. In our survey 19 (7 %) children were stunted, similar to the stunting rate of 8.2 % among school-aged children of Lahore⁷ and 14.6 % in Karachi²⁰. Similar results for stunting were found in different studies.^{18, 21, 22, 23, 24} The National Nutrition Survey Pakistan 2011 showed a quite high rate of stunting 24.4%⁶, it was also high (38 %) in developing countries³, and 35 % in an urban squatter settlement in Pakistan¹⁵. In our sample more boys 8.5 % (9 out of 105) were stunted than girls 6 % (10 out of 165). These results

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are similar to the studies among school children at Lahore and Karachi, where 8.4 % boys versus 7.7 % girls⁷ and 15.5 % boys versus 13.8 % girls²⁰ were stunted respectively, in Saudi children the figures for stunting in boys and girls were 11.3 % and 10.5 % respectively²⁵. In contrast in an urban squatter settlement in Pakistan proportionately more girls than boys were stunted (37 % vs. 33 %)¹⁵.

Wasting (low BMI-for-age) indicates acute under-nutrition and is usually because of insufficient food intake or a high incidence of infectious diseases. In our study 120 (44.4 %) were found to have wasting, in India also wasting was common 29 % - 34 %¹⁹. In distinction low rates of wasting 10 - 13 % were observed in different studies among Pakistani primary school children^{7, 15}, the National Nutrition Survey Pakistan 2011 showed wasting rate of 15.1 %⁶. Also low rates were found in, developing countries 9 %³, Saudi Arab 9.8 %¹⁸, and Bhutan 4.7 %¹³. In our survey proportionately more boys 50.4 % (53 out of 105) were wasted as compared to girls 40.6 % (67 out of 165). Likewise the prevalence of wasting was lower among girls in Saudi Arab¹⁸, and Nigeria¹¹. In contrast more girls were wasted against boys in India¹⁹, and Kenya²⁶.

Childhood overweight is becoming an equally challenging, yet under-recognized, problem in developing countries including Pakistan, with an estimated 10% of the world's school-going children being overweight and one quarter of these being obese. There was four-fold increase in overweight school-aged children in the past five years in the urban Pakistan²⁷. Only 3 (1.1 %) children, 1 boy and 2 girls were found to be overweight in our sample. Low frequency of overweight was also found in different studies^{13, 16, 20, 21, 22, 23, 24}. Prevalence of overweight children was high (17 %) in a study conducted in Lahore⁷, also high rates were noted in many studies^{27, 28, 29, 30, 31, 32}.

Research showed that there is a strong linkage between maternal education and children's health. Children born to educated women suffer less from malnutrition which manifests as underweight, wasting and stunting in children³³. Low income families are deprived of the means to provide quality foods to their children³⁴, also larger the number of people in a home, the smaller the amount of food that gets to children, especially in the poorest families³⁵. A significant inverse relationship was found between mother's education and frequency of underweight and stunting among children (p-value 0.05). The results regarding relation of mothers' education, family income and family members to malnutrition were statistically insignificant in this survey. In distinction lower parental education, low socioeconomic status and more siblings were significantly related to malnutrition in different studies^{1, 7, 10, 14, 15, 19, 35}. In our sample frequency of malnutrition was more in children whose mothers were housewives as compared to children whose mothers were working women. Similar results were found in Dhaka City, where children were found to be well-nourished if the mother held a job and had good knowledge of nutrition⁹. In disparity a study in India showed high frequency of malnutrition in children whose mother had a service¹⁹.

CONCLUSION

To sum up almost half of the children were found to have different categories of malnutrition among apparently healthy school children in a literate community. The most likely reason of childhood malnutrition in a literate community of Wah Cantt seems to be parents' lack of knowledge in nutrition leading to selection of low calorie, low nutrient foods. Parents' conceptions of child growth, health and malnutrition are also culturally bound, so making information about local understandings of malnutrition and its causes is necessary for designing effective nutrition programmes. Second, majority of children (88 %) were from lower and middle income groups which could have deprived them of the means to had good quality foods. Third, more than half of the children had six or more than six family members. The larger the family size, the smaller the amount of food that gets to children, especially in the poor families. Also, there is possible risk of overcrowding which could lead to the spread of diseases, such as acute respiratory infections and diarrhea which are recognized causes of malnutrition.

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