ORIGINAL ARTICLE

Nutritional Status of Preschool Children Assessed by Anthropometric Indicators

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ABSTRACT

Objective: The aim of this study was to assess the nutritional status of preschool children in the semi urban areas using anthropometric indicators.

Study Design: Cross sectional study.

Place & Duration: Department of Community Medicine, KMU Institute of Medical sciences Kohat, from January to February 2011

Material & Methods: One hundred preschool children from the semi-urban areas of Karak, Khyber Pukhtun khawa were assessed for their nutritional status using anthropometric indicators. The age range of the children was 24 72 months (2-6 years) based on their birth certificates or immunization cards. The children were grouped according to the age into three groups i.e.24-36, 37-48 and 49-72 months. The age, weight (WT) and height (HT) were recorded using the applicable tools. The nutritional status was assessed and the means were compared with the norms using appropriate references i.e. Modified Gomez Classification (MGC) World Health Organization (WHO). The data collected for the indicators, were processed for means and standard deviation of the means using descriptive statistics.

Results: Out of the 100 children 33 percent were under-weight 77% were normal weight. Based on the Modified Gomez Classification (MGC), it was found that 54 % of the children were normal and remaining 46 % children were malnourished. In the malnourished children 39 % were in the 1st, 7 % were in the 2nd and none in the 3rd degree of malnutrition. The children were stunted and wasted compared to the reference stature and body weights of the same age and heights of WHO standard.

Research Limitations: These data were collected on limited number of children which are surely not representative of the whole province/country. However, it provides some information and a blurred picture of malnutrition existing in this particular region.

Conclusion: The prevalence of malnutrition was high in the geographic area studied, but it cannot be generalized for the whole province. However this study will serve as a base line information for the health professional as well as for future research.

Keywords: Malnutrition, Pre -school children, Assessment

INTRODUCTION

The nutrition of preschool children is of considerable importance not only because of concern over their nutrition in formative stage of life but is widely perceived to have a substantial and persistent impact on their physical and mental development and on their health status and productivity as adults. Childhood malnutrition is characterized by growth failure. Anthropometric measurements especially that of children is particularly important in assessing their nutritional status[1].

Malnutrition prevails everywhere around the world and both the developed and developing countries are suffering from malnutrition. The effect of malnutrition remains and brings devastation in the individuals, community & ultimately nation's standard of living. Approximately, 70% of the world's malnourished children live in Asia, resulting in region highest concentration of childhood malnutrition.

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About half of the preschool children are malnourished ranging from16% in People Republic of China to 64% in Bangladesh. Prevalence of stunting and underweight is high especially in South Asia where one in every two preschool children is stunted. Besides protein energy malnutrition, asian children suffer from micronutrients deficiency. Iron deficiency anemia affects 40% to 50% of preschool and primary school children. Nearly half of the vitamin A deficiency and xeropthalmia occurs in South and Southeast Asia with large number of cases in India (35.3 million), Indonesia (12.6 million) and China (11.4 million)[2].

Malnutrition generally implies undernutrition and refers to all deviations from adequate and optimal nutritional status in infants, children and in adults. In children, under-nutrition mani-fests as under weight and stunting, while severely under nourished children present with the symptoms and signs that characterize conditions known as kwashiorkor, marasmus or marasmic-kwashiorkor.

Malnutrition in various regions of the Pakistani communities prevails at alarmingly higher rates compared to many other countries. There are no single studies available on the entire country preschool children nutritional status, however, there are research articles and reports which document the nutritional status of preschool children mostly based on clinics and thesis data. There is strong association of malnutrition with family size, income of the parents and children number in the family in rural areas[3]. In Pakistan the prevalence of malnutrition has been associated with many factors for example food availability, child-care practices, diarrhea, household size, income, mother education and poor sanitary conditions all affect the dietary intake of the preschool children and thus result in malnourishment[3]. In rural areas of southern Pakistan, sex of child, age of the child and father's occupation may be considered as an important risk factor[4] for stunting among school children aged 6-12 years[5]. Another study reports the prevalence of malnutrition is higher among children from larger and poorer households / families in Pakistan[3-5].

In most countries including Pakistan there is clear association between the factors like food habits, social, cultural and government policies[7,8], family economy[9], primary health care[10], poor complementary feeding[11], socioeconomic inequality[12], food consumption pattern[13], infections[14], worms[15], behavior [16], inheritance, low nutrients intakes, etc are the main causes[17,18]. Karak is one of the southern districts of KPK Province with a total population of 4,87,000 (51% male and 49% female) and the preschool children are 70,160[19]. There are limited sources of income being subsistence farmers (85%) and serving in Armed Forces of Pakistan.

MATERIAL AND METHODS

The present study was conducted in the Community Medicine department, KMU Institute of Medical sciences Kohat, from Jan to Feb 2011.

One hundred preschool children from the semi-urban areas of Karak, Khyber Pukhtun khawa were assessed for their nutritional status using anthropometric indicators.

Age & Anthropometric Measurements:

A questionnaire having all necessary information was filled in front of the mother/ father/guardian of the child. Age, of the child were recorded either from birth certificates or immunization cards, as the date of birth was mentioned on these cards, the height & weight were recorded with the help of ZT-120 body-weight balance, Majiaqiao, Guangyi, Wuxi, Jiangsu, China Postal Code: 214011.

Inclusion Criteria & Exclusion Criteria:

All the children included within the age range of 24-72 months (2-6 years) & permanent residents of the district Karak both rural and urban. Children below the age of 2 years or above the age of 6 years at the time of survey were excluded from the study. Furthermore, guest staying in the responding family were excluded as well. Those children who were suffering from inborn diseases & having history of severe illness in the recent past were also excluded.

Assessment of Nutritional Status:

The nutritional status was assessed and the means were compared with the norms using appropriate references of anthropometric indicators from World Health Organization (WHO, 1983). Specifically the following classifications were used to describe appropriately nutritional status of the children.

Gomez Classification:

Based on the Modified Gomez Classification (MGC), the children were cate-gorized into normal, mild, moderate and severe degrees of malnutrition.

Gomez[20] Classification is used for child's weight to compare to that of a normal child (50th percentile) of the same age & is ascribed useful for population screening & public health evaluations. The calculation is performed as stated below;

Percent of reference weight for age= [(Child's weight) / (weight of normal child of same age)] X 100.

Statistical Analysis:

The data collected for the indicators, was processed for means and standard deviation of the means using descriptive statistics.

RESULTS

The collected data for the preschool children was compiled and compared for the three age groups based on aforementioned norms and GMC classification, both by degrees of malnutrition within the age groups & sex. Among the children, 54% were normal and 46% were malnourished. Among 46 children 39 were mildly malnourished and 7 were moderately malnourished. None of the child was severely malnourished (Table-1). When the children were assessed for their current nutritional status on the sex basis 20% of the boys and 26% of the girls were in the mild and moderate degree of malnutrition (Table-2).

Stature of Children by Age and Sex

The results indicate that both male and female children were stunted and wasted when compared with the counterpart reference from WHO of the same age. The data on stature and body weight are very much consistent for both sex and age groups as indicated in the Tables 3 & 4 respectively. This data indicate that 100% of the children are stunted and wasted. The stature & body weight for the preschool children were lower than the recommended stature and body for the same age group for both sexes. The statures were lower by 12.91-16.33% compared to reference stature of WHO for the same age (Table-3). Similarly, the body weights were lower by 26.67-36.29% compared to reference weights of WHO for the same age (Table-4).

Body Weight of Children by Stature and Sex

The children were assessed for their body weight according to their stature as indicated in the Table 5. When the observed weight was compared with the reference weight for the observed stature both sexes had lower body weights. There were considerable lower body weights among the children population studied for the male and female and for the age groups. Based on stature the boys were more wasted compared to girls. According to the stature, the body weights of the boys were lower by 17.16 - 18.49% compared to reference weights of WHO for the same stature. Similarly, the body weights of the girls were lower by 4.62 -16.58% compared to reference weights of WHO for the same stature (Table-5).

Table-1 Percentages of Children by Degree of Malnutrition within the Age Groups

Category	Age Groups in Months			
	25-36	37-48	49-72	Total
Normal	15	19	20	54
Mild Malnutrition	16	05	18	39
Moderate Malnutrition	01	03	03	07
Severe Malnutrition	0	0	0	0

Table-2 Percentages of Children in the Degrees of Malnutrition Based on Modified Gomez's classification

Male				Female			
Normal	Mild Degree of Malnutrition	Moderate Degree of Malnutrition	Severe Degree of Malnutrition	Normal	Mild Degree of Malnutrition	Moderate Degree of Malnutrition	Severe Degree of Malnutrition
30	18	2	0	24	21	5	0

Table-3 Stature of Children by Age and Sex

Age Group (Months)	Male				Female			
	(N)	Stature (CM) ±Sd	Reference Stature (CM)	Percent ↓ or ↑ Over Reference Statue	(N)	Stature (CM) ±Sd	Reference Stature (CM)	Percent ↓ or ↑ Over Reference Statue
24-36	17	83 ± 2.9	99.2	-16.33	18	83 ± 1.75	96.5	-13.99
37-48	17	94 ± 1.6	111.2	-15.47	16	91 ± 2.14	105.7	-13.91
49-72	16	105 ± 1.4	123.7	-15.12	16	102 ± 1.33	117.2	-12.97

Table-4 Body Weight of Children by Age and Sex

Age Group (Months)	Male				Female			
	(N)	Weight (Kg) ±SD	Reference Weight (Kg)	Percent ↓ or ↑ Over Reference	(N)	Weight (Kg) ±SD	Reference Weight (Kg)	Percent ↓ or ↑ Over Reference
24-36	17	11.9±0.37	17.0	-30.00	18	12.4±0.67	16.4	-24.39
37-48	17	14.3±0.37	19.5	-26.67	16	14.1±0.63	19.4	-27.32
49-72	16	16.5±0.70	25.9	-36.29	16	16.1±0.70	23.2	-30.60

Table-5 Comparison of Observed Body Weight by Stature of Children

	Male					Female			
(N)	Observed Stature (CM)±Sd	Observed Weight (Kg)±Sd	Reference Weight (Kg) for the Observed Stature	Percent ↓ or ↑ Over Reference Weight for Stature	(N)	Observed Stature (CM)±Sd	Observed Weight (Kg)±Sd	Reference Weight (Kg) for the Observed Stature	Percent ↓ or ↑ Over Reference Weight for Stature
17	83 ± 2.9	11.9±0.37	14.6	-18.49	18	83±1.75	12.4±0.67	13.0	-4.62
17	94 ± 1.6	14.3±0.37	17.2	-16.86	16	91±2.14	14.1±0.63	14.8	-4.73
16	105 ± 1.4	16.5±0.70	20.4	-17.16	16	102±1.33	16.1±0.70	19.3	-16.58

DISCUSSION

Previous studies reports that in Pakistan the children are 50% stunted, 9% wasted while 40% underweight[21,22]. In the present study, in this particular area 46% of the children were underweight. However, it is higher than the reports currently available online in WHO report State of the World children which shows State of the world's children[23]. According to this report, 37% of the children are stunted & it appears that the national prevalence report is underestimated. However, the present study sample size is smaller and cannot be extrapolated to the general population of Pakistan.

A study conducted in Sindh province reports that on overall prevalence for stunting were 61% in the study population[24]. This study prevalence is yet higher than ours. In the present study the extent of malnutrition is similar based on either comparison. The present study suggests that 46% of the children are malnourished whereas in the national survey it has been reported to be 48% as well. Generally, 54% of the total children were normal and 46% were underweight. In the indicator height 47.14% of the children were normal while 52.86% of the children were stunted (Table 1). Therefore, this prevalence of under-weight and stunting in the Urban and rural area of this district indicate that children in this particular area are 50% malnourished.

The body weights for most of the children were lower than the 3rd percentile for their respective ages as indicated in the Table-1. Similar trend of percentages was obtained when the comparison were made based on Z-score. According to earlier reports the extent of mal-nutrition in children less than five years of age was 48% based on low weight-for-age, 10% were seriously malnourished (very low weight-for-age), 46% were chronic malnourished (stunting: low height-for-age), 15% had acute malnourished (wasting: low weight-for-height) and acute malnourishment rate 20% infants,. Among the children 65% were anemic and 28% are severely anemic[23,24]. In this study, correlation analysis association was found to be negative and significant with the economic status, number of children in the family and order of the child within the family in the urban areas but was having no effect on overall basis and in the rural area.

The earlier studies reports combined prevalence of malnutrition to the similar extent with exception reported elsewhere. In this study, it has been proposed that weight for height appears to be the best single anthropometric indicator of current

nutritional status of preschool children over 1 year of age and in fact it is true since it take into consideration the current weight and height of the individuals[25].

Present study indicate that 46% of the preschool children are suffering from malnourishment. The association of malnourishment with various factors has to be clearly investigated. However this study provides the baseline information to further probe the causing factors in this particular area and for necessary intervention. This study indicates that the children in this particular area on average are at the risk of malnutrition.

CONCLUSION

This study shows a blurred picture of nutritional status of preschool children. This may not be the representative of the whole population of district Karak as well as of the whole province. However this study may provide baseline data for further research and for comparison.

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