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ASSESSMENT OF THE NUTRITIONAL STATUS BY MEASURING BODY MASS INDEX AND SCREENING OF SCHOOL GOING CHILDREN OF KHAIRPUR MIRUS SINDH.

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ABSTRACT… Objectives: To assess the Nutritional Status by measuring Body Mass Index and screening of School going children of Khairpur Mirus Sindh. **Study Design:** Cross Sectional Descriptive Study. **Setting:** Department of Pediatrics, Liaquat University of Medical and Health Sciences Jamshoro. **Period:** From 1st May to 31st May 2015. **Material & Methods:** Over 2400 children (age 5 to 18 years) studying at schools of Taluka Khairpur Mirus, Sindh. We conducted this study at 40 schools, both from government and private sector. Schools included Primary, Secondary, High and Higher Secondary Schools. Medical History was taken and detailed physical examination done, including Cardiovascular Examination, Eye and Abdominal Examination. History of presence of worms in stool was taken from children. Anemia was checked by palmer inspection. Weight and height was taken by well-trained doctors and paramedical staffs with the help of weight machine and stadiometer. **Results:** Out of total 2400 children 43.4% were male and 56.6% were female. Mean BMI was 15.97, while mean weight was 30.93 kg and mean height was 136.92 cm. Among 730 children, who were underweight, 54.5% children were mild underweight, while 29.7% children were moderate underweight and 15.7% children were severe underweight. 6% children were overweight, while 4% children were obese. Anemia was present in 63.04% children, Eye Squint was present in 3.1% children, worms infestations were present in 0.2% children and murmur was detected in 0.1% children. **Conclusion:** We found significant number of children having low BMI (30.4%) and the Mean BMI was 15.97. We also found significant number of children having underweight that is 54.5% children were mild underweight, while 29.7% children were moderate underweight and 15.7% children were severe underweight. On the other hand, overweight and obesity was less common, 6% children were overweight, while 4% children were obese. During Screening, Anemia was (63.04%) and Eye Squint (3.1%) was the most common clinical findings.

Key words: Anemia, Body Mass Index, Malnutrition, Obesity.

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INTRODUCTION

In our society big segment of population goes to schools. Anthropometric measurement of school going children is very important to know the general health status of community.[1]

Body Mass Index (BMI) is defined as body weight in kilograms divided by height in meters squared.[2] BMI is an anthropometric index of weight and height. If BMI is < 18.5, it is classifying as underweight, 18.5-24.9 is normal, 25-29.9 is overweight and ≥ 30 is classified as obesity. In children BMI centile is a reliable indicator of Obesity or under nutrition. BMI can be plotted on BMI Centile Chart for the monitoring of Obesity and under nutrition over time.[3]

Specific and separate charts for males and females, from the age of 2 to 20 years are designed by NCHS and CDC. According to that < 5th percentile age specific BMI, will be classified as underweight and in school going children it is commonly associated with low attendance and poor school performance.[4] According to a survey in Pakistan, nutritional deficiency is responsible for school absence in 30% children. In children intestinal infection leads to profound alterations in intellectual, cognitive and physical growth.

lintestinal parasites prevalence is 8.1% in our country.

The Prevalence of underweight is 23% worldwide and 41% in south Asia (WHO survey).[5] The prevalence of moderate underweight in Pakistan is 31.5% and severe underweight is 13% (National Nutritional Survey 2001-2002).[6] School based health and nutrition programme to improve the learning process of children is an older concept.

Developed countries are using school health programme as an essential component of their education system. There is lot of experience in this subject, because of national and international agencies interest in it. School lunch or school feeding programme are widely supported by these agencies. Neighboring countries are also using this school feeding programme. In past, Pakistan implemented this programme with very god results. However, due to mismanagement this programme was stopped. In India an important component of nutritional interventions in school going children is Mid-day meal programme. After implementing this programme there was improvement in enrolment, retention, and learning.[7]

Knowing the importance of malnutrition prevalence; we conducted this study to find the prevalence of malnutrition in school going children of our region and to recommend measures for its prevention.

To assess the Nutritional Status by measuring Body Mass Index and screening of School going children of Khairpur Mirus Sindh.

MATERIAL & METHODS

This survey was carried out by Department of Pediatrics, Liaquat University of Medical and Health Sciences Jamshoro from 1st May to 31st May 2015.

Over 2400 children (age 5 to 18 years) studying at schools of Taluka Khairpur Mirus, Sindh. We conducted this study at 40 schools, both from government and private sector.

Schools included Primary, Secondary, High and Higher Secondary Schools. Permission was taken from the School authorities.

Medical History was taken and detailed physical examination done, including Cardiovascular Examination, Eye and Abdominal Examination. History of presence of worms in stool was taken from children. Anemia was checked by palmer inspection. Weight and height was taken by well-trained doctors and paramedical staffs with the help of weight machine and stadiometer. Weight was taken in Kilograms and Height was taken in meters, data was recorded on predesigned proforma and BMI was calculated with the help of formula ie, Weight in Kg divided by height in meter square. 2400 children were dealt by non-probability, consecutive technique. Data was entered and analyzed in SPSS version 22.0. Mean and standard deviation was calculated for numerical variables like age. Frequency and percentage was calculated for Outcome. All Children of either gender aged 5years to 18 years, who were studying at schools of Taluka Khairpur Mirus, were included in the study. Children suffering from any Chronic Illness were excluded from the study.

Operational Definitions: Mild Underweight = BMI 16 – 18.49, Moderate Underweight = BMI 15-15.99, Severe Underweight = BMI < 15, Overweight = BMI 25 – 29.9 and Obese = BMI ≥30

RESULTS

Out of total 2400 children 43.4% were male and 56.6% were female. Mean BMI was 15.97, while mean weight was 30.93 kg and mean height was 136.92 cm. Among 730 children, who were underweight, 54.5% children were mild underweight, while 29.7% children were moderate underweight and 15.7% children were severe underweight. 6% children were overweight, while 4% children were obese. Anemia was present in 63.04% children, Eye Squint was present in 3.1% children, worms infestations were present in 0.2% children and murmur was detected in 0.1% children.

Total No. of Registration	Male	%	Female	%	Total
	1041	43.4%	1359	56.6%	2400
Age Group (in years)	**Male**	**%**	**Female**	**%**	**Total**
5-10	652	62.6%	675	49.7%	1327
11-15	360	34.6%	644	47.4%	1004
16-18	29	2.8%	40	2.9%	69
Weight mean(SD)	30.93(11.84)				
Height mean(SD)	136.92(18.47)				
BMI mean(SD)	15.97 (3.54)				

Table-I. Age Group. n=2400

Children's BMI-for-Age	Boys	%	Girls	%	Total	%
Number of children assessed:	1041		1359		2400	
Underweight (< 5th Percentile)	292	28%	438	32%	730	30%
Normal BMI (5th - 85th Percentile)	620	60%	803	59%	1424	60%
Overweight (≥ 85th - 94 Percentile)	79	8%	69	5%	148	6%
Obese (≥ 95th Percentile)	50	5%	49	4%	99	4%

Table-II. BMI percentile for age.

BMI Allocation	Total	Percentage
Severe Underweight (<15) BMI	115	15.7%
Moderate Underweight (15 - 15.99) BMI	217	29.7%
Mild Underweight (16 - 18.49) BMI	398	54.5%

Table-III. Underweight Classification. n=730

Findings	Male	%	Female	%	Total	%
Anemia	641	42.4%	872	57.6%	1513	63.04%
Eye Squint	22	44.9%	27	55.1%	49	3.1%
Worm Infestation	2	40.0%	3	60.0%	5	0.2%
Murmur	0	0.0%	1	100.0%	1	0.1%

Table-IV. Clinical Findings.

DISCUSSION

This survey done at schools of upper Sindh shows 30% underweight school going children. As the obesity was less common (4%) in these children, hence indicating the dietary inadequacy in these young children. Among under nutrition children 15.7% children were severe underweight that is BMI less than 15, hence necessitating to give attention to this treatable issue. Physical examination of children showed anemia in 63% children, so nutritional guidance is mandatory to prevent long term consequence of this easily manageable problem. Pakistan government expenditure on education is 2.4% of GDP (2013).

A similar study was conducted at university campus Peshawar; showed malnutrition prevalence 37% among 4 to 12 years old children. The prevalence of under nutrition was 30%; out of which 18% were mild underweight, 10% were moderately underweight and only 2% were severely underweight, while only 7% were overweight.[8] While in our study prevalence of under nutrition was 30%, 15.7% children were severe underweight; this difference may be due to area, social and cultural difference in these areas.

Another different study was carried out at PAF Hospital Islamabad & PAF Hospital Sargodha showed, 64% children had BMI<18kg/ $(m)^2$, 34% children had BMI18-22.9kg/ $(m)^2$ whereas

1% individuals had BMI 23-24.9kg/(m)^2 and no individuals belonged to BMI >25.[9] This study was different from our study because there was no obesity and overweight in these children, this may be due to age differences and better physical activity of these children.

In another similar study from Karachi, underweight children were 24% while, 3% public school children were obese and 11% private school students were obese.[10] The results were little bit same as our results, although they selected only class 5 students.

Another different study was carried out at Dera Ismail Khan, having underweight children 13.39%, Normal weight children72.15% normal, overweight children 8.83% and obese children 5.61%. Girls were more underweight than boys.[11] This study was very different from our study because the prevalence of underweight was low and prevalence of overweight and obesity was high, this may be due to good practices of food intake and financial upper class.

A similar study was done by nationwide project of Higher Education Commission, in four provinces of Pakistan. Obese children were 5.1% among them 8.1% were obese in 3-5 years age group, 5.1% in >5-10 year age group and 5.1% in >10-16 years age group[12] In a similar local study squint was present in 1.5% school going children.[11]

In a similar local study none of the obese boys or girls was suffering from anemia, however 58.82% healthy/normal weight boys were anemic, with maximum number at the age of 06 years. Similarly 70% healthy/normal weight girls were anemic, with maximum number at the age of 6 (100%), followed by 10 years (66.66%).[13] In our study we did not categorized presence of anemia on the basis of weight and BMI but the frequency of anemia is same. A different local study on school children's at rural area of District Swat, in the age range of 5-16 years showed 40% anemic children.[14] The low frequency of anemia in these children may be due to better diet and different geography as compared to us.

A different local study from Karachi showed the frequency of worm infestation was 77.31% in school going children.[15] Another study from Peshawar showed the frequency of helminthic infestation was found to be 66% in school going children.[16] This high frequency of worm infestation is due to, because they checked stool of children with microscope for the presence of worms, while in our study we just asked for the passage of worms in stool.

A similar study from Turkey showed the prevalence of Squint in children was 1.7%.[17] While a different study from Bannu Pakistan showed Squint in 0.25% high school children,[18] this low prevalence may be due to expertise in checking for squint (Eyes were checked by Ophthalmologists in that study).

Nutrition component of school health programme can be comprised of, food supplements, Food incentive, School feeding and school lunch programme. If not possible by government authorities then funding agencies can be contacted for help. Frequent visits to school should be done to know the De-worming status of children; Counseling should be done for physical activities and hygiene. There should be Promotion of iodized salt and provision of toilet facilities. Training of teachers should be done to promote health screening by teachers themselves in the absence of medical staff. There should be provision of safe and clean water supply.

CONCLUSION

We found significant number of children having low BMI, that is Mean BMI was 15.97, while mean weight was 30.93 and mean height was 136.92 cm. We also found significant number of children having underweight that is 54.5% children were mild underweight, while 29.7% children were moderate underweight and 15.7% children were severe underweight. On the other hand overweight and obesity was less common as compared to underweight children, 6% children were overweight, while 4% children were obese. During Screening, Anemia (63.04%) and Eye Squint (3.1) were the most common clinical findings.

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AUTHORSHIP AND CONTRIBUTION DECLARATION

Sr. #	Author(s) Full Name	Contribution to the paper	Author(s) Signature
1	Salma Shaikh	Concept design, Final approval.	
2	M. Nadeem Chohan	Critical revision, Drafting, Final approval.	
3	Imran Ahmed	Data collection, Data interpretation.	
4	Hafeezullah Memon	Data collection, manuscript writing.	
5	Saleem Shaikh	Data collection, critical revision.	