

# Nutritional Status of School-Going Children Visiting Out Patient Department of a Tertiary Care Hospital

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## ABSTRACT

**Aim:** To evaluate the nutritional status of school-going children visiting the outdoor patient department of a tertiary care hospital.

**Study Design:** Cross-sectional study

**Place and duration:** Pediatric OPD of POF hospital Wah Cantt/ NUMS University from 1 June 2021 to 30 August 2021

**Methodology:** The age of each child was verified from the hospital HMIS data after which weight and height were recorded. Weight in kilograms (Kg) divided by the square of height in meters was used to determine body mass index. Using WHO AnthroCalc v 2.10, Z score values for weight for age, height for age, and BMI for age were determined.

**Results:** In the present study, 51.6% were of male gender out of 519 children. Mean age was 9.2 (SD = ±2.2) years, 56.6% were of age less than 10 years old, mean height was 131.4 (SD=±14.8) cm and mean weight was 28.4 kg (SD=±10.9). 46.8% studied in government schools, 52.8% in private schools and just 0.4% in Madrasa. The majority i.e. 325 (62.5%) children were found with normal body mass index, 66(12.7%) were thin, 49 (9.4%) were of severe thinness, 48 (9.2%) were overweight and 31 (6%) were found obese according to the WHO BMI criteria for children.

**Conclusion:** WHO BMI criteria is a valuable tool for the screening of malnutrition in children. Our study showed a double burden of malnutrition in school going children with high prevalence of obesity and severe thinness in boys.

**Keywords:** Thinness, body mass index, double burden of malnutrition, obesity

## INTRODUCTION

Anthropometry has been a major tool in assessing the nutritional status of children and helps in identifying cases of malnutrition in the population<sup>1</sup>. Malnutrition has been a major public health problem worldwide leading to various short term and long-term co morbidities and mortality<sup>2</sup>. Globally the prevalence of thinness in age group 5-9 years is 10.9% in boys and 8.9% in girls<sup>3</sup> whereas more than 340 million children between age 5-19 years are either overweight or obese<sup>4</sup>.

In recent years, various low and middle-income countries have documented double burden of malnutrition (DBM) i.e. under nutrition and over nutrition<sup>5</sup> that has further compromised their health structure. Pakistan is also among those nations that are experiencing slow decline of cases of undernutrition on one hand and rising cases of overweight and obesity on the other hand thus resulting in DBM. According to the Pakistan national nutritional survey, 11.8% adolescent girls & 21.1% adolescent boys are underweight whereas 5.5% adolescent girls & 7.7% adolescent boys are obese<sup>6</sup> which is a matter of grave concern for the health authorities. Various studies have been done in past to identify the reasons of malnutrition of which sex, socioeconomic status, dietary habits, area and maternal education status have been the more common causes<sup>7,8</sup>.

Approximately 1.8 billion children belong to the age bracket of 5–15 years worldwide, with majority of them residing in low and middle-income countries<sup>9</sup>. Although many studies had been done to assess the nutritional status of children under 5 years of age in past but there is limited data on the health status of children of 5-15 years of age thus ignoring a large group of children.

Therefore, this study was intended to analyze the growth status of school-age children in Pakistan by using BMI charts.

## METHODOLOGY

After approval of the hospital ethical committee, this cross-sectional study was conducted in the Pediatric OPD of POF hospital / NUMS University from 1 June 2021 to 30th August

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2021. The sample size was calculated using Epi Info 3.01 (US CDC, 2013) with a confidence (1- $\alpha$ ) of 95%, an anticipated prevalence of 35%<sup>10</sup> and a margin of error±1%. The minimum sample size calculated was 350 but we took 519 cases. Data was collected through convenient sampling Children of age less than 5 years, with a history of chronic illnesses (congenital heart disease, chronic renal disease, malabsorption syndrome, endocrine illness, chronic respiratory disease), taking any drugs for a prolonged period and with dysmorphic features were excluded. The age of each child was verified from the hospital HMIS data after which weight and height were recorded. Instruments used for checking anthropometry were calibrated daily. Before checking the weight, zero error was checked and the weighing scale was placed on firm smooth ground. Each participant's weight was recorded to the closest kg while wearing only the bare necessities and without shoes. Using a wall-mounted stadiometer, height was measured while the subject was standing without shoes. Biodata and anthropometric measurements were recorded on a pre-design proforma. BMI was calculated as weight in kilogram (Kg) divided by the square of the height in meters. Z score values for weight for age, height for age and BMI for age were calculated by using WHO Anthro Calc v 2.10.

**Operational Definition:**

**Obese:** BMI for age > +2 SD above the WHO Growth Reference median

**Overweight:** BMI for age > +1 SD above the WHO Growth Reference median

**Thinness:** BMI for age <-2 SD below the WHO Growth Reference median

**Severe Thinness:** BMI for age <-3 SD below the WHO Growth Reference median<sup>11</sup>.

Data was analyzed by using IBM-SPSS version 23.0, Counts with percentages were reported on age group, gender, school and Body mass index, and mean with standard deviation was reported on age, height, and weight of children. Pearson Chi-Square test was used to check the association of body mass index with age group, gender and school type of children, p-values less than 0.05 were considered statistically significant. A Pie diagram was also used to give outcomes on the body mass index of school children.

## RESULTS

Table 1 reports that in the present study there were 519 children out of which majority i.e. 51.6% were male. Mean age of the study was 9.2 (SD=±2.2) years and 56.6% were found with age less than 10 years. Mean height was 131.4 (SD=±14.8) cm, mean weight was 28.4 (SD=±10.9) kg with majority of the students studying in the private schools. Majority of the children were found with normal body mass index whereas 66 were thin, 49 had severe thinness and 48 were overweight according to the WHO BMI criteria for children (Fig. 1).

Table 2 is showing the association of body mass index with studied factors. Results showed that among severe thinness samples, 55.1% were of age less than 10 years, 57.1% were male and 61.2% studied in government schools. Among thinness samples, 65.2% were less than 10-years of age, 53% were of female gender and 59.1% were from government schools. Among overweight samples, 47.9% were less than 10 years old, 45.8% were male and 33.3% were from government schools. Obesity was

more in children over 10 years of age, males and students studying in private schools 51.6%, 74.2% and 71% respectively. Pearson Chi-Square test did give a significant association of body mass index with school type of children ( $p < 0.05$ ). There was no effect of gender and age group on body mass index

Table 1: Baseline Characteristics of Studied Samples (n= 519)

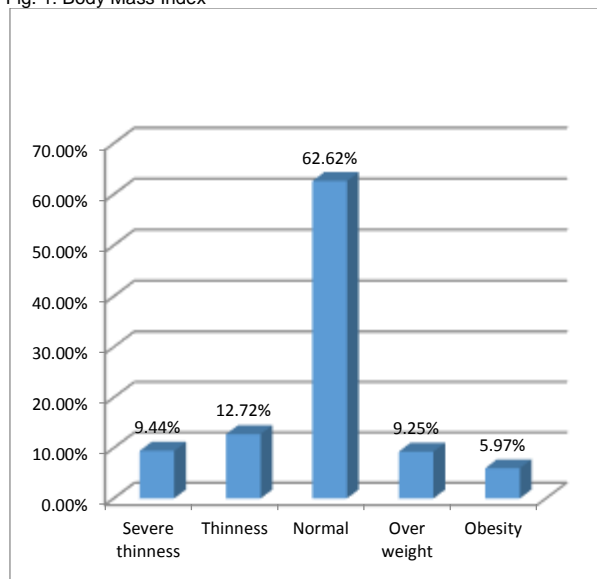
Characteristics	n	%	
Gender	Male	268	51.6
	Female	251	48.4
Age Group	Less than 10 years	294	56.6
	More than 10 years	225	43.4
	Mean ±SD	9.2	±2.2
Height (cm)	Mean ±SD	131.4	±14.8
Weight (kg)	Mean ±SD	28.4	±10.9
School	Government	243	46.8
	Private	274	52.8
	Madarsa	2	0.4

Table 2: Association of Body Mass Index with Age, Gender and School of Children

Variables	BMI					P value
	Severe thinness (n=49)	Thinness (n=66)	Normal (n=325)	Overweight (n=48)	Obesity (n=31)	
<b>Age group</b>						
Less than 10 year	27(55.1%)	43(65.2%)	186(57.2%)	23(47.9%)	15(48.4%)	0.35
More than 10 year	22(44.9%)	23(34.8%)	139(42.8%)	25(52.1%)	16(51.6%)	
<b>Gender</b>						
Male	28(57.1%)	31(47%)	164(50.5%)	22(45.8%)	23(74.2%)	0.08
Female	21(42.9%)	35(53%)	161(49.5%)	26(54.2%)	8(25.8%)	
<b>School</b>						
Government	30(61.2%)	39(59.1%)	149(45.8%)	16(33.3%)	9(29%)	0/01*
Private / Madarsa	19(38.8%)	27(40.9%)	176(54.2%)	32(66.7%)	22(71%)	

\* $p < 0.05$  was considered statistically significant using Pearson Chi-Square test

Fig. 1: Body Mass Index



## DISCUSSION

In the present study, mean age was 9.2 (SD= ±2.2) years with mean weight 28.4 (SD = ±10.9) kg and mean height 131.4 (SD= ±14.8) cm. Majority (51.6%) of the children were male and less than 10 years old i.e. 56.6%. According to a multi-district local survey, average weight was 35.28±12.30kg and average height was 139.26 ± 20.09 cm<sup>12</sup>. In a population based study done in Lahore, children's mean and standard deviation for weight and height were 26.9 (8.5) kg and 128.4 (11.4) cm and respectively<sup>13</sup>. In an Indian study, mean weight and mean height of children

between 5-9 years were 15.7±3.8kg and 110.7±0.6cm respectively<sup>14</sup>. All these surveys show that anthropometric measurements not only vary from one country to another country but also in rural and urban districts of the same country thus emphasizing on the need of more surveys in different regions of the country.

Under nutrition and nutritional deficiencies during school going period has been linked to decreased physical growth and poor brain development thus resulting in poor academic performance<sup>15</sup>. Thinness (12.7%) was the predominant form of malnutrition in our study followed by severe thinness (9.44%). Results also revealed that thinness was more common in females (53%) whereas severe thinness affected boys (57.1%). With respect to educational sector, students of government sector had high frequency of thinness and severe thinness. In a cross-sectional study of Lahore<sup>16</sup>, frequency of underweight was 17% with predominance in females and students of private sector that is different from our study. In an Indian study conducted in a slum area, thinness was present in 23.6% children with predominance in males (28.1%)<sup>17</sup>. In a rural Bangladesh study, thinness was more common in females and was attributed to large family size and improper complimentary feeding habits<sup>18</sup>.

Childhood obesity is on the rise in last few years. In past, it was only considered a problem of developed countries but recent studies have documented increase in number of cases in developing countries also<sup>19</sup>. Childhood obesity has been linked to various short and long-term complications due to which there is now emphasis on implementing preventive measures to reduce the burden of this disease<sup>20</sup>. The current study found 9.2% children were overweight and 6% were obese. Results of a study done in Multan found that 10% of the studied population was overweight and 5% were obese<sup>21</sup> which is similar to our study results whereas in Farhin et al study which was done in a rural area, had found higher percentage of obese (12.8%) children than overweight (7.5%) children<sup>22</sup>. Various studies have been conducted to find the contributory factors of obesity and overweight of which sedentary

life style and consumption of junk food have been the leading causes<sup>23,24</sup>. According to Tanveer et al prevalence of overweight and obesity is more in boys than in girls of different districts of Punjab aged 5-19 years [25] whereas our study revealed that frequency of overweight was more in females (54.2%) whereas obesity was more common in males (74.2%) than females.

**Limitations:** The limitations of the study were that this was a cross sectional study thus representing the figures of malnutrition at a one-time point. Secondly, no risk factors contributing to malnutrition were studied.

## CONCLUSION

Anthropometric measurements are an important part of child health surveillance and can help to detect abnormal growth patterns at an early stage and prevent the complications. Although in the current study majority of children had normal body mass index but we picked cases at extremes of body mass index that are severely thin, overweight and obese.

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