

Physical Growth Status Among School Age Children at Sohag Governorate

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Abstract

Background: Children belong to 6-12 years need more attention and care for the physical development. **Aim of the study** to assess physical growth of school age children at Sohag Governorate. **Subjects and method:** A descriptive cross sectional research design was utilized. Four public (urban and rural) primary schools were included in the stud. Structure questionnaire was developed to assess personal characteristic of children, social class level. Weight and height percentiles for age were determined according to Egyptian growth charts. A total sample of 1000 children aged 6-12 years was participated in this study. **Results:** Nearly three quarters (74%) of children had moderate social level, while (14%) of them had low social class. Boys represented 52.4%. Height and weight were higher among urban boy's children. The prevalence of underweight and short stature was higher in girls than boys in all age group except 10-<11 years also; overweight and obesity were higher among urban children than rural children. **Conclusion and Recommendation:** This study concluded that underweight and short statures were higher among rural school children; overweight and obesity were higher in boys than girls in all age group except 10-<11 years. The study recommended that regular weight and height measurement should be taken in the school so that a regular check can be kept on the development of the children.

Keywords: *Prevalence, Underweight, Short Stature, Overweight, Obesity & Growth Charts.*

Introduction

Growth in childhood is one of the most fascinating, complex and dynamic biological processes it is tightly controlled and regulated. Growth evaluation, height and weight determinations, remains one of the most useful of all indices of public health and economic well-being, specifically in developing countries and countries in transition (**World Health Organization, 2010**).

Growth measurements correlate directly to nutritional status and can indicate whether a child's health and well-being are at risk. Accurate and reliable physical measures are used to monitor the growth of an individual, detect growth abnormalities, monitor nutritional status, and track the effects of medical or nutritional intervention. They are also considered essential components of the physical examination, standardized growth charts allow an individual child's growth (height, weight, body mass index) to be compared with statistical norms (**UNICEF 2010**).

The school children are the most important segment in the society, their physical growth and nutritional status is of utmost significance and presents a general health status of a community and nation as a whole. Therefore, good nutrition is a determinant of a healthy growth of mind and body (**Grover, 2009**).

Children belong to 6-12 years are vulnerable to malnutrition because of their rapid growth rate. They need more attention and care for the physical and

mental development. However, physical growth, development and well-being are directly related to the nutritional status (**Nandy et al., 2008**).

There is a significant difference between urban and rural populations in terms of economic status, lifestyle and nutrition. There is a similar difference between male and female children, such differences affect the health and nutritional status of the affected children. Data related growth of school-age children that are generated in a consistent manner across countries and over time are difficult to find (**Bose, et al., 2007**).

School age is the active growing phase of childhood; it represents a dynamic period of physical growth as well as, mental development of the child (**UNICEF, 2010**).

The nurse play an important role in assessed growth measurements that correlate directly to nutritional status and can indicate whether a child's health and well-being are at risk. Accurate and reliable physical measures are used to monitor the growth of an individual, detect growth abnormalities, and track the effects of medical or nutritional intervention.

UNICEF, (2010).

The school children are the most important segment in the society; their physical growth is utmost significance and presents a general health status of a community and nation as a whole. Good nutrition is also determinants of a healthy growth of mind and body (**Grover, 2009**).

Aim of the study

was to assess physical growth and nutritional status among school age children at Sohag Governorate.

Subjects & Method

Research Questions

The following research questions were used for this study.

- What is the prevalence of figure of under and over growth among school age children in Sohag Governorate?
- What is the relation between the figure of growth among school age children with their different ages, sex, residence, and their social class?

Research design

A descriptive cross sectional research design was utilized to meet the aim of this study. It was selected randomly.

Setting

This study was conducted randomly in four public primary schools in Sohag Governorate (Molhakt el-moalemat school, Bahethat El- Badia School) as urban areas and (Abo Bakr El-Sedek school, Salamon Baneen School) as rural areas.

Subjects: The study subjects consisted of 1000 school-age children of both sexes from 6-12 years (500 children from urban schools, and 500 children from rural schools in Sohag). Primary schools were stratified into rural and urban. A stratified random sample of two schools from each stratum. Then from each school, two classes were randomly selected from each of the six academic years, thus, a total of 48 classes from four schools were recruited. However, the capacity of classes ranged from 40 to 45 students.

Exclusion criteria

Children with past medical history as diabetes, renal disease, history of parasitic manifestation, blood disease, as thalassemia, CNS disorder, cardiovascular disease as rheumatic heart and others were excluded from the study.

Tools of data collection

Two tools were used in this study.

Tool I: A structured questionnaire form was prepared by the researcher based on literature review. It was included two parts;

Part I: Data about the child such as age, sex, residence, and the enrolled academic year.

Part II: Assessment of Anthropometric measurements as weight, height of the studied children, it was plotted on Egyptian Growth chart to estimate weight for age, and height for age and body mass index.

Tool II: Assessment for socio-economic status of the children; this tool was developed by (Abd El-Twaab 2004). It included four items; level of education of

the parents (8 items), family income (6 items), job of the parent, life styles (3 items). Each item have one grade, the total score was divided into three classes as high, moderate and low class. Modification was done in the item of income of social class by the researcher as follows, according to the rate of inflation and increase to be conformity with recent income through comparing difference of the value of the golden pound at 1998 to that at 2015 and multiplying the rate of inflation to the scale.

Method of data collection

- Research proposal was approved from Ethical Committee in the faculty of nursing. An official permission was obtained from the prime minister of education at Sohag Governorate. Confidentiality and anonymity was assured. The validity of part two of the study was done by five experts in the pediatric nursing field and its result was 92%. Reliability was estimated by Alpha cronbachs and its result was R=0.80 for part one and 0.82 for part two. Written consent from children and their parents was obtained. A pilot study was carried out on 10% of the total children and which, to test the contents, clarity of the tools and to estimate the length of time needed to collect the data. Children included in the pilot study were excluded from the study sample. As a result of the pilot study no modifications were done.
- Interviewing of the studied children during the period of physical exercise class (PE) or music according to daily school schedule. The time needed for each student to take measurement (weight and height) 5 minutes for two days/ week, 21 students taken each time depending upon the response of the participant children.
- The weight was measured to the nearest 0.1 kg with a digital balance while the child was in light clothes and without shoes. Height was measured to the nearest 0.5 cm with measuring tape. The child was stand without foot wear the feet parallel and with heels, buttocks, shoulder and occiput touching the wall. The head was nodded comfortably upright the top of the head making firm contact with the horizontal head.
- After measuring weight and height, the numbers is plotted on Egyptian growth chart (for either girls or boys) to obtain a percentile ranking. The percentile indicates the relative position of child's (weight for age, height for age), numbers among the studied children according to their sex and age. According to Egyptian growth chart, children were considered underweight if the percentile falls below the 3rd percentile, normal from 3rd percentile to less than the 95th percentile ,overweight from 95th to 97th percentile and obese if greater than the 97th percentile.

- Socioeconomic assessment scale was distributed to children and they were instructed about how to fill it with their parent and take it in the next day. Data were collected during the academic year 2015-2016 from the period of 1st October 2015 to May 2016.

Statistical analysis

Descriptive statistics (i.e. frequencies, percentage, mean and standard deviation etc) were calculated

using computer programme SPSS version seventeen chi square, t test and correlation were used to compare differences in the distribution of frequency among different groups. It is considered significance when p.value was less than ($p < 0.05$).

Results

Table 1: Frequency and percentage distribution of socio-demographic characteristics of the studied children. (n=1000).

Items	No.	%
Age/years		
6-<7	107	10.7
7-<8	124	12.4
8-<9	154	15.4
9-<10	142	14.2
10-<11	159	15.9
11-12	314	31.4
Gender		
Boys	524	52.4
Girls	476	47.6
Grading		
1 st study year	171	17.1
2 nd primary	165	16.5
3 rd primary	171	17.1
4 th primary	162	16.2
5 th primary	171	17.1
6 th primary	160	16.0
Residence		
Urban	500	50.0
Rural	500	50.0
Mothers education		
Illiterate or read and write	81	8.1
Basic education	67	6.7
Secondary school of education	511	51.1
Bachelor or higher education	341	34.1
Fathers education		
Illiterate or read and write	66	6.6
Basic education	74	7.4
Secondary school of education	444	44.4
Bachelor or higher education	416	41.6
Mothers occupation		
House wife	632	63.2
Employee	368	36.8
Fathers occupation		
Daily wage worker	194	19.4
Salaried	89	8.9
Employee	717	71.7

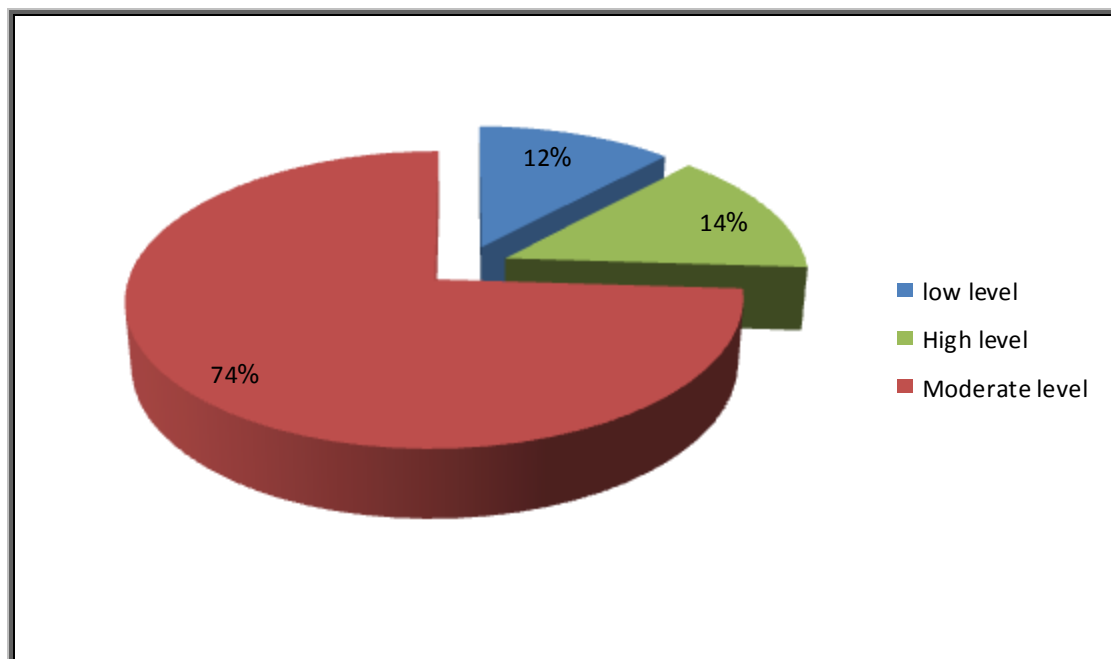


Figure (1): Percentage distribution of social class level of the studied children (n=1000)

Table (2): The relation between the mean height and weight of boys and girls among the studied children and their age. (n=1000).

Age/years	Mean Height		t- test	P. value	Mean weight		t- test	P. value
	Boys n=524 mean \pm SD	Girls n=476 mean \pm SD			Boys n=524 mean \pm SD	Girls n=476 mean \pm SD		
6 -<7	117.24 \pm 6.09	115.96 \pm 6.291	1.06	0.290	23.80 \pm 5.06	22.92 \pm 4.74	0.92	0.360
7-<8	119.37 \pm 5.97	118.11 \pm 6.11	-0.36	0.716	24.69 \pm 4.20	23.74 \pm 4.43	1.33	0.185
8-<9	122.35 \pm 7.52	122.06 \pm 7.641	0.24	0.810	26.59 \pm 7.46	26.52 \pm 4.94	0.06	0.949
9-<10	129.45 \pm 7.52	126.23 \pm 7.601	2.70	0.008**	31.18 \pm 7.05	29.11 \pm 6.56	1.81	0.072
10-<11	132.75 \pm 7.56	133.81 \pm 6.512	-0.94	0.349	32.61 \pm 8.45	33.19 \pm 6.99	-0.47	0.642
11-12	141.31 \pm 8.87	139.80 \pm 8.698	0.50	0.615	40.11 \pm 7.92	38.49 \pm 7.86	0.49	0.627

** Statistical significant difference p .value <0.005

Table (3): The relation between the mean height and weight of the studied children in urban and rural areas with their age. (n=1000).

Age/years	Mean Height		t- test	P. value	Mean weight		t- test	P. value
	Urban n=500 mean \pm SD	Rural n=500 mean \pm SD			Urban n=500 mean \pm SD	Rural n=500 mean \pm SD		
6 -<7	118.06 \pm 5.62	111.27 \pm 5.36	3.62	0.001**	23.91 \pm 5.26	21.45 \pm 2.54	1.21	0.229
7-<8	121.85 \pm 6.76	112.51 \pm 5.67	5.06	0.001**	24.75 \pm 5.12	22.87 \pm 3.60	1.25	0.213
8-<9	125.68 \pm 6.95	118.94 \pm 6.60	5.23	0.001**	28.08 \pm 6.99	25.11 \pm 5.53	2.42	0.016*
9-<10	130.14 \pm 6.59	126.10 \pm 7.28	2.86	0.005**	31.79 \pm 7.81	28.90 \pm 5.88	2.42	0.017*
10-<11	132.09 \pm 7.52	134.09 \pm 6.68	-1.12	0.264	32.61 \pm 8.52	33.08 \pm 7.25	0.00	1.000
11-12	142.60 \pm 6.66	138.70 \pm 7.85	7.45	0.001**	40.89 \pm 7.63	38.48 \pm 7.06	4.21	0.001**

** Statistical significant difference p .value <0.005

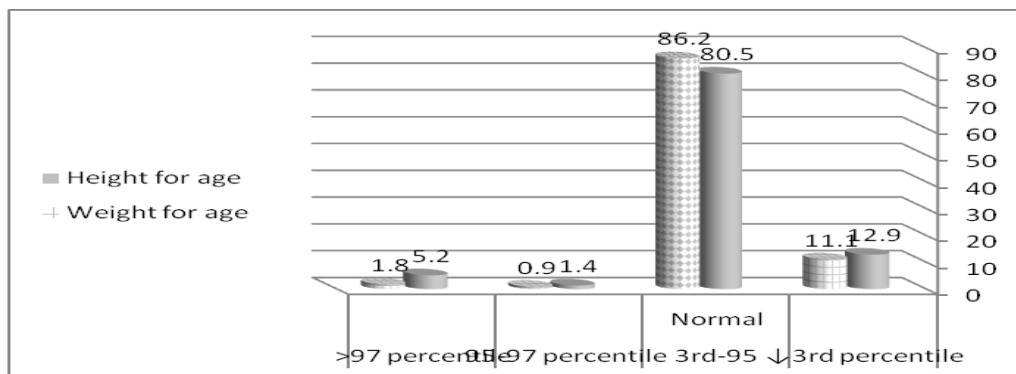


Figure (2): Distribution of studied children according to their height and weight for age. n=1000

Table (4): The relation between the weight and height percentile of the studied children and their age.

Age in years	↓3 rd percentile n=111	3 rd -95 Normal n=862	95-97 percentile n=9	>97 percentile n=18	X ²	P. value
6-<7	36(32.4%)	71(8.2%)	0(0%)	0(0%)	159.81	<0.001**
7-<8	14(12.6%)	101(11.7%)	9(100%)	0(0%)		
8-<9	28(25.2%)	122(14.2%)	0(0%)	4(22.2%)		
9-<10	11(9.9%)	127(14.7%)	0(0%)	4(22.2%)		
10-<11	12(10.8%)	145(16.8%)	0(0%)	2(11.1%)		
11-12	10(9%)	296(34.3%)	0(0%)	8(44.4%)		
Height	n=129	n=825	n=14	n=32	75.51	<0.001**
6-<7	12(9.3%)	95(11.8%)	0(0%)	0(0%)		
7-<8	31(24%)	85(10.6%)	5(35.7%)	3(5.8%)		
8-<9	27(20.9%)	125(15.5%)	0(0%)	2(3.8%)		
9-<10	17(13.2%)	112(13.9%)	8(57.1%)	5(9.6%)		
10-<11	22(17.1%)	127(15.8%)	1(7.1%)	9(17.3%)		
11-12	20(15.5%)	281(34.9%)	0(0%)	13(25%)		

** Statistical significant difference p.value <0.005

Table (5): Relation between social class levels with the height, weight for age percentile for the studied children.

Weight and height for age percentile	Socio-economic level						X ²	P. value
	Low		Moderate		High			
	No.	%	No.	%	No.	%		
	117	11.7	738	73.8	145	14.5		
Height The							18.16	0.006**
↓3 rd percentile (below normal)	25	21.4	98	13.3	6	4.1		
3 rd -95 Normal	84	71.8	593	80.4	128	88.3		
95-97 percentile (above normal)	2	1.7	9	1.2	3	2.1		
>97 percentile	6	5.1	38	5.1	8	5.5		
The Weight							24.29	0.005**
↓3 rd percentile (below normal)	17	14.5	86	11.7	8	5.5		
3 rd -95 Normal	95	81.2	640	86.7	127	87.6		
95-97 percentile (over weight)	0	0.0	5	0.7	4	2.8		
>97 percentile (obese)	5	4.3	7	0.9	6	4.1		

** Statistical significant difference p.value <0.005

Table (1): Shows socio-demographic characteristics of the studied sample. It was noticed that more than half of the children were boys 52.4% and approximately they were equal distributed regarding their academic year. Half of the studied children (50%) come from the rural area. however 51.1% of the mothers were secondary school of education followed by bachelor or higher education 34.1%. Regarding the fathers of the studied children, the higher percentages of them had secondary school and bachelor or higher education (44.4% & 41.6% respectively), the employed fathers in this study constituted nearly three quarters (71.7%).

Figure (1): Presents percentage distribution of the social class level of the studied children. It was found that almost three quarters (74%) of studied children had moderate social level while, 14% of them were low social class and only 12% of them were high social class.

Table (2): Shows the means height and weight among boys and girls in the studied school age children in relation to their age. It was noticed that boys were heavier and taller than girls in all age group except the period of 10-<11 years age. A statistically significant difference was found between mean height and gender in age group 9-<10 years 0.008, and no statistically significant difference were observed between mean weight and gender among different ages of school children.

Tables (3): Presents the mean value of height and weight of the studied children according to their residence. It was noticed that the mean height and weight of children were higher among children in the urban areas compared to those in the rural areas with highly statistically significant difference related all age groups except the age group ranged from 10-<11 years for children height, as noted from that table there are statistically significant difference were found between children weight and their residence related to age groups 8-<9; 9-<10 and 11-12 regarding $p < 0.05$.

Figure (2): The distribution of height and weight percentiles of the studied children, it was found that, the percentage of children fall between 95-97th percentile and >97th percentiles were higher for age compared to weight for age (1.4 vs. 5.2, 0.9 vs. 1.8 respectively) there is no statistically significant difference in this figure.

Table (4): Illustrates the relation between the weight and height percentile of the studied children and their age. There was a statistically significant differences found between the weight for age and height for age regarding the percentile position ($p < 0.001$).

Table (5): Shows the relation between social class with weight and height for studied school-age children. This table revealed that highly statistically

significance difference were found between the social class level and percentile of height and weight of age $p < 0.006$ and 0.005 respectively.

Discussion

Anthropometry has become a practical tool for evaluating the physical growth of populations, particularly of children in developing countries (Hakeem et al., 2004) and physical growth is the best indicator of the global well-being of children (Onis et al., 2000). One of the major global health problem faced by the developing countries, today is short stature and over weight (UNICEF, 1990 and Saunders et al., 2011).

Egypt is not an exception to this problem of short stature and over weight (El Masry, 2007, Hassan et al., 2006). The primary cause of ill-health and premature mortality among children, in developing countries is attributed to under nutrition. It is postulated that poverty and ignorance are primary causal factors of short stature and thinness (Oduwayo & Oyewole, 2006 & Nandy et al., 2008).

In the present study, it was observed that, the boys were heavier and taller than girls in all age group except in age group 10-<11 years with statistically significant difference between the mean height and weight of boys and girls in age group 9-<10 years which are presented in table 2. The study result is in agreement with Sahib & Rajendra Prasad (2009) who found that the boys were slightly taller than girls up to the age of 9 years.

Similarly, Medhi et al., (2007) & Akor et al., (2010) noted that, the boys were heavier and taller than girls counterparts till the age of 9-10 years after which the trend reversed with girls being heavier and taller than boys. These results may be interpreted by the pre-pubertal growth spurt which occurs earlier in girls than boys. Under hormonal influence, girls experience earlier and more rapid increase in body size and shape than boys just before puberty.

The results of the present study revealed that, children in urban areas were statistically higher in their mean weight and height in all age group in comparing to rural areas except in age group 10-<11 years, the rural children was slightly higher as shown in table 3. Similar findings that reported by Sahoo et al., (2011) who showed that physical parameters in urban children were at higher level than in rural children. A same result was notified by Srivastava, (2012) who stated that children with malnutrition in rural areas were at higher level in comparing with urban areas.

In the present study it was found that, underweight and short stature which estimated by weight, height for age, were statistically higher among rural children than urban children as shown in table 3. Many factors

may contribute to these results: first, rural areas exposed to poor environmental conditions (overcrowding, poor quality drinking water and sanitation, no removal of waste), second, ignorance and difficult life in the slums are likely to result in improper food habits, third, low health care use and hygiene awareness and lack of knowledge of the origin of sickness and proper measures for the cure. The situation is further worsened due to lack of necessary health centers, medications, and health care personnel.

Children living under such conditions are at especially high risk for health and nutritional problems. This is in agreement with **Pena Reyes et al., (2003)** who found that the urban populations had better nourishment than rural populations. A similar finding was obtained by **Bahreynian et al., (2015)** who found that underweight and short stature were more prevalent in rural regions.

Conclusion & Recommendation

This study concluded that, according to Egyptian growth curves, the underweight and short stature was higher among rural school children than urban children, overweight and obesity was higher in boys than girls in all age group except 10-<11 years. On other hand high socioeconomic level was higher in obesity compared with low socioeconomic level. The recommendation to improve the health status of the school children may be: Regular weight and height measurement should be taken in the school so that a regular check can be kept on the development of the children. Health education about healthy nutrition to avoid over weight and obesity and personal hygiene may be made as part of the school curriculum.

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