Assessment of Growth among Preparatory School Students in Menia El-Kamh –Sharkia Governorate

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ABSTRACT

Background: Normal growth is essential for development and general health of children. Height and weight measurements are therefore the most important clinical findings in child development. In fact, short stature is a common problem for children. It should not be neglected because the underlying medical conditions must be detected and treated before satisfactory catch-up growth can be demonstrated.

Objective: This study was aimed to improve health status of the preparatory school children in Sharkia Governorate, and to find the impairment factors associated with growth.

Patients and Methods: This cross-sectional study included a total of 538 students aged 12-15 years selected from preparatory schools in Menia El-Kamh Sharkia governorate. This study was conducted between July 2017 to March 2018.

Results: The overall prevalence of short stature (SS), underweight, overweight, and obesity were 7.1%, 2.4%, 24.5%, and 11.7% respectively.

Conclusion: The importance of assessment of Anthropometric measurement in children. Prevelance of overweight and obesity in Preparatory School students was common. Obesity was common among females than males in our study.

Keywords: Assessment, Growth, Preparatory School students.

INTRODUCTION

Normal growth is essential for development and general health of children. Height and weight measurements are therefore the most important clinical findings in child development. In fact, short stature is a common problem for children. It should not be neglected because the underlying medical conditions must be detected and treated before satisfactory catch-up growth can be demonstrated [1].

Assessment of growth of children and adolescents by using growth charts is an important part of clinical practice. The history of development of growth charts dates back to the end of the 18th century and with continued improvements mainly in terms of statistical methods and chart design [2].

In a previous systematic review, worldwide variations of human growth was demonstrated, indicating the risks of using a single reference growth chart in all countries [3].

In fact, the same remarks have been reported in previous studies from KSA and USA. This was confirmed in two reports regarding the implications of using the Centers for Disease Control and Prevention (CDC) or WHO growth charts for assessment of nutrition and growth of Saudi children, potentially exaggerating the prevalence of short stature and malnutrition [4].

In short child, the prevalence of known growth disorders is more than in the total population, but these still represent the minority. In most short children no diagnosis can be made, and these are known as having idiopathic short stature [5].

It is increasingly apparent that different forms of childhood malnutrition, from short stature (SS) and underweight to overweight, are growing global health concerns affecting developed and developing countries alike. Short stature is also associated with cardiovascular system. In addition, SS in females may be adversely affect the health and survival of her offspring [6].

It is also more prevalent in regions with high infectious disease rates, and is linked to impaired host immunity. Children with SS always enroll later in school compared to their healthy peers, and have lower overall years of education [7].

Childhood obesity is also a strong predictor of adult obesity, and is currently, as well as childhood overweight, more prevalent in developed countries. However, this might change in the future [8].

Zayed et al. [9] investigated the prevalence of SS, underweight, overweight, and obesity among school aged children in Jordan. They concluded that variations in height and weight among school children might be affected by socioeconomic status.

This study was aimed to assess the prevalence of short stature, underweight, overweight and obesity among preparatory school children in Sharkia Governorate and to find the impairment factors associated with growth to improve health status.

PATIENTS AND METHODS

This cross-sectional study included a total of 538 students aged 12-15 years selected from preparatory schools in Menia El-Kamh Sharkia governorate. This study was conducted between July 2017 to March 2018.

Sample size and methods of selection: the total population was 38451 students, and the estimated prevalence was 15% at 80% power and 95%

Confidence level. The estimated sample was 538 students (EPI – INF version 6).

Type of sample: multi stage sample technique was used for selection of the studied students.

Inclusion criteria: All subjects aged (12-15 years old).

Exclusion criteria: any disorder could affect child growth like:

1. Chromosomal abnormalities e.g., Down syndrome.
2. Hormonal disorders e.g., low level of Growth hormone (GH).
3. Metabolic disorders e.g., rickets
4. Corticosteroid therapy.
5. Cyanotic heart disease.
6. Skeletal deformities e.g., Scoliosis, kyphosis.
7. Renal, digestive, or lung diseases.

Operational design:

The following was done to every subject:

1. Full history taking: Score for socioeconomic status is based on education, occupation and income which are the three major variables for measurement.
2. Anthropometric measurements (weight, height and BMI).

Body Mass Index (BMI): It equals weight in kilograms over height in meters square (BMI = Wt \ ht^2) [10].

BMI Percentile Interpretation [11]:
- Percentile < 5: Underweight.
- Percentile >= 5 and < 85: Healthy weight.
- Percentile >= 85 and < 95: Overweight.
- Percentile >= 95: Obesity.

Short stature is a condition in which height of an individual is below 3rd percentile of the corresponding height for a given age and gender [12].

Ethical Consideration:

This study was ethically approved by educational administration in Menia El-Kamh and Directorate of Education in Sharkia. The study was approved from IRB in Faculty of Medicine, Zagazig University. Written informed consent of all the participants' parents was obtained. The study protocol conformed to the Helsinki Declaration, the ethical norm of the World Medical Association for human testing.

Statistical Analysis

The data were coded, entered and processed on computer using SPSS (version 22).The results were represented in tabular and diagrammatic forms then interpreted. Mean, standard deviation, range, frequency, and percentage were use as descriptive statistics.

Chi-Square test (X^2) was used to test the association variables for categorical data. **Student's t-test** was used to assess the statistical significance of the difference between two population means in a study involving independent samples. P value < 0.05 was considered significant.

RESULTS

Table 1 shows descriptive analysis of demographic data (Mean ±SD) regarding age which was 13.6±7, gender male was 243 (45.2%) and female was 295 (54.8%), residence urban was 419 (77.9%) and rural was 119 (22.1%), social class, high was 172 (32%), moderate was 162 (30.1%) and low was 204 (37.9%).

Table (1): Descriptive analysis demographic data.

Variable		No.	%
Age (years)	**Mean ±SD**	13.6±7	
	Range	12-16	
	13-	262	48.7
	14-	218	40.5
	15	58	10.8
Gender	**Male**	243	45.2
	Female	295	54.8
Residence	**Urban**	419	77.9
	Rural	119	22.1
Social class	**High**	172	32
	Moderate	162	30.1
	Low	204	37.9

Table 2 shows anthropometric measurements, regarding weight which was ranged between 33 to 95 kg with mean 55.7±12.7. Regarding height which was ranged between 1.35 to 1.88 m with mean 1.59±0.1. Regarding BMI it was ranged between 15 to 40 kg/m^2 with mean 21.9±4. Regarding upper segment it was ranged between 61 to 95 with mean 77.6±46.1, and lower segment was ranged between 69 to 98 with 81.5±7.

Table (2): Anthropometric measurements.

	Mean ±SD	Range
Weight (kg)	55.7±12.7	33-95
Height (m)	1.59±0.1	1.35-1.88
BMI (kg/m²)	21.9±4	15-40
Upper segment	77.6±17.1	61-95
Lower segment	81.5±7	69-98

There was a statistically significant difference between males and females regarding anthropometric measurements **(Table 3)**.

Table (3): Comparison between males and females regarding anthropometric measurements.

		Males No.= (243)	Females No.= (295)	T.test	P. value
Weight (kg)	**Range**	33-95	39-95	-1.843	.046
	Mean±SD	54.49±13.24	56.46±11.50		
Height (m)	**Range**	1.43-1.88	1.35-1.83	4.261	.000
	Mean±SD	1.60±0.101	1.57±0.07		
BMI (kg/m2)	**Range**	15.20-29.60	15.50-40.00	-5.774	.000
	Mean±SD	20.79±3.14	22.70±4.27		
Upper Segment	**Range**	61-95	61-95	-8.805	.000
	Mean±SD	75.07±6.08	79.89±6.49		
Lower Segment	**Range**	72-98	44-97	16.481	.000
	Mean±SD	85.63±6.04	77.56±5.30		

This table shows Statue for age, normal was 463 (86.1%), short was 38 (7.1%) and tall were 37 (6.9%). Regarding BMI for age, normal was 330 (61.3%), underweight was 13 (2.4%), overweight were 132 (24.5%) and obese were 63 (11.7%) **(Table 4).**

Table (4): Statue for age, BMI for age.

		No.	%
Statue	**Normal**	463	86.1
	Short	38	7.1
	Tall	37	6.9
BMI for age	**Normal**	330	61.3
	Underweight	13	2.4
	Overweight	132	24.5
	Obese	63	11.7

There was no statistically significant difference between males and females regarding statue for age **(Table 5)**.

Table (5): Comparison between males and females regarding statue for age

			Males (No.= 243)	Females (No.= 295)	X²	P. value
Stature for age	**Normal**	**No.**	208	255	.195	.907
		%	85.6%	86.4%		
	Short	**No.**	17	21		
		%	7.0%	7.1%		
	Tall	**No.**	18	19		
		%	7.4%	6.4%		

There was a statistically significant difference between males and females regarding BMI for age **(Table 6)**.

Table (6): Comparison between males and females regarding BMI for age

			Males (No.= 243)	Females (No.= 295)	P. value
BMI for age	Normal	No.	147	183	.000
		%	60.5%	62.0%	
	Underweight	No.	12	1	
		%	4.9%	.3%	
	Overweight	No.	71	61	
		%	29.2%	20.7%	
	Obese	No.	13	50	
		%	5.3%	16.9%	

DISCUSSION

This study showed that, prevalence of obese among all the study samples according to BMI for age, obese was 63 (11.7%), which was higher than the national prevalence reported by the Thailand National Health examination survey as 6.7% in 2001 and as 8.7% in 2010 [13]. But smaller than regional prevalence of 14.8% in Bangkok [14].

These results agreed also with **Talat and El Shahat** [15] who found that, the prevalence of obesity was 10.7%, this study showed that, prevalence of overweight was 132 (24.5%).

These higher rates could be explained by low educational level of parents, unhealthy dietary behaviors with high caloric intake particularly snacks and fast food and life style of the participants. The prevalence of overweight and obesity in our study was nearly similar to that founded by **Talat and El Shahat** [15] who revealed that the prevalence of overweight and obesity was 20% and 11% respectively. At the same time the prevalence of obesity was less than figures recorded by **Bin Zaal et al.** [16] in Dubai who revealed that the prevalence of obesity was 20.5% and by a study made in Kuwait showed that the prevalence of overweight and obesity was 32.1% and 14.2% respectively [17].

But this prevalence was higher than that reported in similar studies in UK and Brazil (8.7% and 4%) respectively [18].

This study showed that, prevalence of underweight was 13 (2.4%). **Zayed et al.** [9] who made cross-sectional study which was conducted from May 2015 to January 2016 in Jordon included 2702 subjects aged 6–12 years found prevalence of underweight was (5.7%).

Our study revealed that mean value of weight was statistically significant higher among females than males p<.05. Percentage of female was significantly higher among obesity than not obesity p<.05

This agreed with **Jagadesan et al.** [19] who made project a cross-sectional study carried out on 18,955 children (age 6-11 years) and adolescents (age 12-17 years) across 51 schools (31 private and 20 government) of Chennai. He found that the prevalence of obesity was higher in girls than boys.

This agreed also with **Shabana and Vijay** [20] in Chennai who found prevalence of obesity was higher in girls than boys.

This disagreed with results observed in a study in Saudi Arabia as the prevalence of obesity was higher in boys than girls [21].

This study showed no statistically significant difference between short and tall regarding socioeconomic.

This result agreed with a study conducted in England concluded that there was no statistically significant difference between short and tall regarding socioeconomic [22].

CONCLUSION

The importance of assessment of Anthropometric measurement in children. Prevalence of overweight and obesity in Preparatory School students was common. Obesity was common among females than males in our study.

REFERENCES

1. **Fan F, Reinmuth N, Liu W et al. (2002):** Impact of Insulin-Like Growth Factor Receptor-I Function on Angiogenesis, Growth, and Metastasis of Colon Cancer. Lab Invest., 82: 1377–1389
2. **El Mouzan M, Al Salloum A, Alqurashi M et al. (2016):** The LMS and Z Scale Growth Reference for Saudi School-age Children and Adolescents. Saudi Journal of Gastroenterology : Official Journal of the Saudi Gastroenterology Association, 22(4): 331–336.
3. **Natale V, Rajagopalan A (2014):** Worldwide variation in human growth and the World Health Organization growth standards: a systematic review. BMJ Open, 4(1): 735-39.

4. **Bonthuis M, van Stralen K, Verrina E *et al.* (2012):** Use of National and International Growth Charts for Studying Height in European Children: Development of Up-To-Date European Height-For-Age Charts. PLoS One, 7(8): e42506.

5. **Pedicelli S, Peschiaroli E, Violi E *et al.* (2009):** Controversies in the Definition and Treatment of Idiopathic Short Stature (ISS). J Clin Res Pediatr Endocrinol., 1(3): 105–115.

6. **Dewey K, Begum K (2011):** Long-term consequences of stunting in early life. Matern Child Nutr., 7 (3): 5–18.

7. **Martorell R, Horta B, Adair L *et al.* (2010):** Weight gain in the first two years of life is an important predictor of schooling outcomes in pooled analyses from five birth cohorts from low- and middle-income countries. J Nutr., 140(2):348–54.

8. **De Onis M, Blossner M, Borghi E (2010):** Global prevalence and trends of overweight and obesity among preschool children. Am J Clin Nutr., 92(5): 1257–64.

9. **Zayed A, Beano A, Haddadin F *et al.* (2016):** Prevalence of short stature, underweight, overweight, and obesity among school children in Jordan. BMC Public Health, 16: 1040.

10. **WHO (2007):** Multicentre Growth Reference Study Group. WHO Child Growth Standards. Acta Paediatr., 450:76-85.

11. **Sukhonthachit P, Aekplakorn W, Hudthagosol C *et al.* (2014):** The association between obesity and blood pressure in Thai public school children. BMC Public Health, 14: 729-33.

12. **Cohen P, Rogol A, Deal C *et al.* (2008):** Consensus statement on diagnosis and treatment of children with idiopathic short stature: a summary of the Growth Hormones Research Society, and Lawson Wilkins Pediatric Society, and the European Society for Paediatric Endocrinology workshop. J Clin Endocrinol Metab., 93(11):4210–17.

13. **Aekplakorn W, Mo-suwan L (2009):** National prevalence of obesity: Prevalence of obesity in Thailand. Obes Rev., 10: 589–592.

14. **Mo-suwan L, Nontarak J, Aekplakorn W *et al.* (2014):** Computer Game Use and Television Viewing Increased Risk for Overweight among Low Activity Girls: Fourth Thai National Health Examination Survey 2008-2009. Int J Pediatr., 14: 364702.

15. **Talat M, El Shahat E (2016):** Prevalence of Overweight and Obesity among Preparatory School Adolescents in Urban Sharkia Governorate, Egypt. Egyptian Pediatric Association Gazette, 64: 20-25.

16. **Bin Zaal A, Musaiger A, Souza R (2009):** Dietary habits associated with obesity among adolescents in Dubai, United Arab of Emirate. Nutr Hosp., 24(4):437–44.

17. **El-Bayoumy I, Shady I, Lotfy H (2009):** Prevalence of Obesity among Adolescents (10 to 14 Years) in Kuwait. Asia Pacific Journal of Public Health, 21: 153-159.

18. **Matijasevich A, Victora C, Golding J *et al.* (2009):** Socioeconomic position and overweight among adolescents: data from birth cohort studies in Brazil and UK. BMC Public Health, 9: 105-109.

19. **Jagadesan S, Harish R, Miranda P *et al.* (2014):** Prevalence of overweight and obesity among school children and adolescents in Chennai. Indian Pediatr., 51(7): 544-9.

20. **Shabana T, Vijay V (2009):** Impact of socioeconomic status on prevalence of overweight and obesity among children and adolescents in urban India. The Open Obesity Journal, 1: 9-14.

21. **El-Hazmi M, Warsy A (2002):** The Prevalence of Obesity and Overweight in 1-18-Year-Old Saudi Children. Annals of Saudi Medicine, 22: 303-7.

22. **Hancock C, Bettiol S, Smith L (2015):** Socioeconomic variation in height: analysis of National Child Measurement Programme data for England. Arch Dis Child., 101(5): 422–6.