

Overweight Problem among Early Adolescents in Preparatory Schools in Tanta City

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Abstract

Background: Overweight is a major public health problem affecting adolescents. Prevalence of overweight and obesity is rapidly increasing. Good nutritional knowledge and behavior may help in prevention of overweight and obesity.

Aim of Study: 1- Assess the prevalence of overweight and obesity among preparatory school children in Tanta City. 2- Assess students' nutritional knowledge and eating habits.

Subjects and Methods: Cross sectional study carried-out at the preparatory schools in Tanta City, Egypt. The study subjects included; 250 boy and 250 girl were chosen by stratified random sample technique. The first stratum was boys and girls schools and the second stratum was school grades. Each school was divided into three grades and one class was chosen randomly from each grade.

Tools of the Study:

- 1- Predesigned questionnaire asked about (sociodemographic data, nutritional knowledge and eating behavior).
- 2- Weight and height measurements to calculate BMI.

Results: The prevalence of overweight and obesity among studied group was (22.8% and 11.8%) respectively. Prevalence of overweight among girls and boys (13.4% and 9.4%) respectively, while obesity (5.2% and 6.6%) respectively. (76.4%) of the students had fair nutritional knowledge level while only (19.4%) of them had good nutritional knowledge. (88.4%) of the students had fairly sound nutritional behavior while only (5.4%) of them had sound nutritional behavior.

Conclusion and Recommendations: More than one fifth of the students in the study were overweight with smaller percent of obesity. Overweight was more common among females while obesity was more among males. Fair nutritional knowledge and behavior were found in most of the students. So we should encourage healthy eating among adolescents and provide healthy snacks at school canteen with a suitable price. Guide students and their families to the best YouTube channels that can help them to prepare healthy food in a rapid and delicious way.

Key Words: *Overweight – Obesity – Adolescents – Nutritional knowledge – Nutritional behavior.*

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Introduction

NUTRITION is an essential component of total adolescence health care. Changes occurring during adolescence can cause a crisis in the nutritional needs. Eating habits may change from regular meals prepared at home to irregular meals, skipped meals, poor snacks and fast food meals. Healthy eating is associated with reduced risk for many diseases, including several of the leading causes of death: Heart disease, cancer, stroke, and diabetes [1].

Overweight and obesity have increased globally among children, adolescents, and adults. During adolescence, overweight and obesity are often a burden that results in psychosocial problems and a reduced capacity for physical activity. Adolescence is a critical period for the onset of obesity and for obesity-associated morbidity in later life. Therefore, from a public health perspective, it is important to monitor overweight in adolescence [2].

Several studies showed the prevalence of overweight and obesity. The Middle East and North Africa region has the highest rates of overweight and obesity of the developing world with implications for the global disease burden and local health service capacity. Egypt is the largest country in the region and has one of the highest levels of female obesity (~46%), exceeding the UK and USA [3]. In general, overweight was more prevalent than obesity in both males and females [4].

In Egypt data from several nationally representative surveys carried by National Nutrition Institute (NNI) and Egypt Demographic and Health Survey (EDHS) (2008) revealed that the overall prevalence of overweight and obesity among the age group (10-18 years old) ranged between 19 to 23% with

higher prevalence rates among females (22.9 to 29.6%) compared to males (14.7 to 20.7%) [5,6].

Food intake has been related to obesity not only in terms of the volume of food ingested, but also in terms of the composition and quality of the diet. Furthermore, eating habits have also changed and current habits-including the low consumption of fruits, greens and milk, increasing consumption of cookies with fillings, salty industrialized snacks, sweets and soft drinks, as well as not having breakfast help explain the continuous increase in adiposity among children [7,8].

In order to promote healthier eating habits, and consequently, decrease the rates of obesity, knowledge about food and nutrition is believed to be important [9]. Studies that utilized nutritional education as an intervention strategy, have reported an improvement in nutritional knowledge, attitudes and eating habits, that also influenced the family's eating habits [8,10].

So the purpose of this study is to assess the overweight and obesity problem among early adolescence, their nutritional knowledge, dietary behaviors and barriers to healthy eating as a primary step for future planning suitable intervention programs. Early adolescence starts with the onset of puberty which is one of the most rapid phases of physical growth and hormonal changes. Nutrition is an essential component of total adolescence health care. Changes occurring during adolescence can cause a crisis in the nutritional needs.

Subjects and Methods

It was a cross sectional study carried out at the preparatory schools in Tanta City, Egypt on early adolescents age from (12-15) years. This study started from the first of October 2017 and completed by December 2018.

Subjects in this study were chosen randomly from preparatory schools in Tanta City by disproportionate stratified random sample technique.

The first stratum in this sample: Were boys and girls schools.

Three schools for boys (2 governmental schools: Mohamed Farid school and Tanta preparatory school and 1 private school: Elgeel Elmoslem school) and three schools for girls (2 governmental school: El-Mensawy School and El-Sayda Eisha School and 1 private school: Noterdam School). The schools were chosen randomly (by a simple random technique) from both governmental and private schools in both administrations.

The second stratum:

One class was chosen randomly from each grade in each school. All the students in each chosen class were included in the study. The student number in each class is about 30 to 35 students in average.

So, finally the study included nine classes for boys and nine classes for girls to justify the sample size.

Sample size calculation:

The minimal sample size for this study was calculated by this equation:

$$N = \frac{(1.96)^2 \times pq}{D^2} \quad [11]$$

Whereas 1.96 is the critical value of z at the adopted 95% confidence level which can be approximated to 2 providing that the population is normally distributed. The p (proportion) is equal to the prevalence of overweight in the adolescence which is estimated to be 20% as an average from previous studies in Egypt [5,6]. D refers to the confidence interval around the estimate. The d or the precision should not exceeds 20% out of the proportion p.

$$N = \frac{(1.96)^2 \times pq}{d^2}$$

After approximation of Z,

$$N = \frac{4 \times P(1-P)}{d^2}$$

If d = 0.04 (20% out of the prevalence of 20%).

$$N = \frac{4 \times 0.20(1-0.20)}{0.042}$$

N= 400 student (the minimal sample size) + 80 (the estimated loss in Persons completing the study) = 480.

So a sample of 500 students justified the study.

Inclusion criteria:

All students at the three preparatory grades of the selected schools were included.

Exclusion criteria:

Chronically ill children (diabetic, cardiac, asthmatic, epileptic children, any child treated with corticosteroids and other chronically ill children).

Pretest study: It was carried out before starting data collection including 10% of the expected sample size (not included in the study) with the following objectives:

- To test and evaluate the adequacy of the designed questionnaire.
- To estimate the time needed for filling questionnaire sheet (it took about 20 minutes to be completed) and assessment of weight and height for each study subject.
- To determine the potential obstacles that might be met with during the execution of the study.

Tools of the study:

1- *Tool (1) questionnaire: Formed of 3 parts:*

- *Sociodemographic data:* Questions were asked to gather background information of the participants about: Age, sex, residence, educational grade, father education, father job, mother education, mother job and family history of obesity.
- Nutritional knowledge and eating behavior questions regarding healthy dietary habit [12].

To assess the following:

* *Students' nutritional knowledge:*

- It contains 12 questions. The response categories were scored as 1 for correct answer, 0 for incorrect answer.
- The total score of them ranged from (0-12). If the total score was:
 - Two thirds or more ($\geq 66.7\%$) was considered as having good nutrition knowledge.
 - One third to less than two third ($33.3\% < 66.7\%$) was considered as having fair nutritional knowledge.
 - Less than one third ($< 33.3\%$) was considered as having poor nutritional knowledge.

* *Students' nutrition behavior:* Consists of 20 questions about eating habits.

- The total score of this section was 52. If the total score was:
 - Two thirds or more ($\geq 66.7\%$) was considered sound nutritional behavior.
 - One third to less than two third ($33.3\% < 66.7\%$) was considered fairly sound nutritional behavior.
 - Less than one third ($< 33.3\%$) was considered to have unsound nutritional behavior.

Barriers to healthy eating questionnaire [13]: "Barriers" had nine questions that related to differ-

ent potential barriers. Responses were measured on a nominal scale as yes, no.

2- *Tool (2): Weight and height measurement to calculate BMI:* BMI was estimated by dividing weight (kg) by height² (m²). According to The Egyptian Growth Charts 2002 [14], BMI-for-age.

Weight status categories and the corresponding percentiles are:

Table (I): Weight status categories and percentiles.

• Underweight	• Less than the 5 th percentile
• Normal or healthy weight	• 5 th percentile to less than the 85 th percentile
• Overweight	• 85 th to less than the 95 th percentile
• Obese	• 95 th percentile or greater

Validity and reliability:

Were assessed for tools used in this study through:

- Cronbach's Alpha test, its result was 0.8.
- Face and content validity.

Ethical consideration:

Ethical considerations of the study were carried out according to that of Ethical Committee for Research at Tanta Faculty of Medicine. Oral and written informed consent was obtained from parents of participant in the study groups, while those who refused to participate were not included. Data was not used for any purpose other than the scientific research.

Statistical analysis of data:

Statistical analysis was performed using SPSS Package 20 for Microsoft Windows. Numerical data were presented as mean and standard deviation and categorical ones as number and percentage.

Results

The sample included 500 students, 50% of them were males and 50% were females with their age ranges from 12 to 15 years old and the mean age was 13.03 ± 0.961 . The entire sample was from urban areas. Percentage of studied participants was nearly the same from the three grades. More than half (52%) of the participants' fathers completed university education and about one third (36%) of them were employee. On the other hand, more than one third (38.4%) of the participants' mothers completed university education and more than half (60.6%) of them were housewives (Table 1). Prev-

alence of overweight and obesity was (22.8% and 11.8% respectively). Percent of overweighted males and females from the total participants was (9.4% and 13.4%) respectively. Percent of obese males and females from the total participants was (6.6% and 5.2%) respectively (Table 2). Nearly three quarters of the participants (76.4%) had fair nutritional knowledge. On the other hand, good knowledge was found in (19.4%) and only (4.2%) with a poor knowledge (Table 3). Majority of students (88.4%) had fairly sound nutritional behavior. On the other hand, unsound nutritional behavior was found in (6.2%) and sound nutritional behavior in (5.4%) of the participants (Table 4). Nearly two thirds of the participant (66.8%) prefer healthy eating while the remaining one third (33.2%) don't prefer healthy eating (Table 5). Regarding barriers to healthy eating, it was found that most of students' families (59.6%) don't know how to prepare foods in a healthy way followed by (57.2%) of the students' families don't have time to make healthy foods, (55.4%) think that they will still hungry if they eat healthy (Table 6).

Table (1): Characteristics of the studied students (n=500).

Characteristics	No.	Percent (%)
<i>Study year:</i>		
1 st year	170	34
2nd year	170	34
3rd year	160	32
<i>Father education:</i>		
Illiterate	14	2.8
Primary	111	22.2
Secondary	115	23
University	260	52
<i>Mother education:</i>		
Illiterate	41	8.2
Primary	114	22.8
Secondary	153	30.6
University	192	38.4
<i>Father job:</i>		
Unemployed	3	0.6
Manual worker	79	15.8
Employee	180	36
Professional	109	21.8
Private work	129	25.8
<i>Mother job:</i>		
Housewife	303	60.6
Manual worker	1	0.2
Employee	120	24
Professional	43	8.6
Private work	33	6.6

Table (2): Prevalence of overweight and obesity among the studied group (n=500).

Weight grades	No.	Percent (%)
<i>Overweight:</i>		
Male	47	9.4
Female	67	13.4
<i>Obese:</i>		
Male	33	6.6
Female	26	5.2

Table (3): Nutritional knowledge level among the studied group (n=500).

Nutritional knowledge level	No.	Percent (%)
Poor	21	4.2
Fair	382	76.4
Good	97	19.4

Table (4): Nutritional behavior level among the studied group (n=500).

Nutritional behavior level	No.	Percent (%)
Unsound nutritional behavior	31	6.2
Fairly sound nutritional behavior	445	88.4
Sound nutritional behavior	27	5.4

Table (5): Frequency of preferring healthy eating among the studied group (n=500).

Preferring healthy eating as (fruits, vegetables, meat and milk)	No.	Percent (%)
Yes	334	66.8
No	166	33.2

Table (6): Barriers to healthy eating among those who didn't prefer healthy eating (n=166).

Barriers to healthy eating	Yes		No	
	No.	Percent (%)	No.	Percent (%)
• The family don't want to eat healthy foods.	80	48.2	86	51.8
• The family don't keep healthy foods in the house.	79	47.6	87	52.4
• Healthy foods don't taste good.	88	53	78	47
• The family don't have time to make healthy foods.	95	57.2	71	42.8
• Healthy foods cost too much that can't be afford by family.	88	53	78	47
• Student will still feel hungry if he/she eat healthy foods.	92	55.4	74	44.6
• Your family don't know how to prepare foods in a healthy way.	99	59.6	67	40.4
• Healthy food isn't available at school.	92	55.4	74	44.6

Discussion

The sample included 500 students, 50% of them were males and 50% were females with their age ranges from 12 to 15 years old and the mean was 13.03 ± 0.961 . The entire sample was from urban areas: From Tanta preparatory schools. Each grade was representing nearly one third of the sample. More than half of the participants' fathers completed university education and about one third of them were employee. On the other hand, more than one third of the participants' mothers completed university education and more than half of them were housewives.

The present study showed that prevalence of overweight among students was (22.8%) while obesity was (11.8%). Overweighed and obese males represent (18.8% and 13.2% respectively) from the studied males. While in females, overweight and obesity represent (26.8% and 10.4% respectively) from the studied females. Prevalence of overweight was nearly similar with Krassas G et al., [15] in Greece who revealed that prevalence of overweight was 19% while obesity was less than our study (2.6%). That study was carried out in Thessaloniki city (Greece) to investigate the prevalence of overweight and obesity among children and adolescents (11-17 years). The higher prevalence of obesity in our study may be due to absence of the role of governmental schools so students spend most of their day outside home and school and this force them to eat fast and unhealthy food.

Regarding prevalence of overweight, our results were higher than the results of Ogden CL et al., [16] in US. They reported prevalence of overweight (17.4%) in their study which was carried on 1138 children and adolescents (12 to 19 years) as part of the 2003-2004 and 2005-2006 National Health and Nutrition Examination Survey (NHANES) the higher prevalence of overweight in our study may be due to absence of healthy life style for students and unavailability of healthy foods outside home.

On the other hand, Bin Zaal A et al., [17] in Dubai showed that prevalence of obesity was 20.5% and this was higher than our results. This study was carried out among adolescents aged 12 to 17 years to study dietary habits associated with obesity among adolescents in Dubai, United Arab Emirates. The main reasons for the rising levels of obesity are the improved socio-economic status of many Middle East countries, which makes life more sedentary and is coupled with diminished patterns of exercise.

Also, our results were less than El-Bayoumy I et al., [18] results in Kuwait who revealed that prevalence of overweight and obesity in adolescent Kuwaiti children aged 10 to 14 years was 30.7% and 14.6%, respectively. This may be due to food consumption patterns and dietary habits in Gulf countries that have changed markedly during the past 4 decades. Kuwait has been undergoing modernization that has been shown to positively influence the level of obesity, because it is associated with physical inactivity due to increased dependence on labor-saving devices like cars, increased intake of high-caloric diet, such as soft drinks and fast foods.

Our results were in agreement with Ella NARA et al., [6] results in Egypt which showed that the overall prevalence of overweight among the age group (10-18) ranged between 19 to 23%. This study was carried on seven Egyptian governorates about the prevalence of overweight and obesity among Egyptian adolescents.

Also, our results were in agreement with Talat MA and El-Shahat E [19] results in Egypt which revealed that the prevalence of overweight and obesity was (20% and 10.7% respectively). It was cross-sectional study which was carried out during academic year 2014-2015 to assess prevalence of overweight and obesity among preparatory school adolescents (12-15 years) in Urban Sharkia Governorate, Egypt.

However, findings of Hadhood SESA et al., [20] in Egypt regarding overweight were less than our results (16.5%). While prevalence of obesity was higher than our study (14.6%). This study was conducted on 711 school children between 6-14 years in Sohag, Egypt to assess prevalence and correlates of overweight and obesity among school children. These variations may be due to different residence among the studied groups where rural students in that study represented 63.2% compared with no rural students in our study. In Egypt, Sohag governorate is one of poorest governorates that results in high consumption of the cheap high carbohydrate diet and a relatively less consumptions of nutrient dense foods. In addition, availability of cars and taxies in Tanta had led to reduced physical activities of children.

Concerning nutritional knowledge level, the present study showed that nearly three quarters of the participants 76.4% had fair knowledge, followed by 19.4% with a good knowledge and only 4.2% with a poor knowledge. Our results were nearly similar to results of Ismail MA et al., [21] in Egypt

who showed that more than half of the studied subjects (53.5%) had got fair knowledge regarding diet needed for healthy life style. While good knowledge was reported only by 12.3% of them. The study was carried on 608 adolescents in some of preparatory schools in Ismailia city to assess knowledge, attitude and practice of adolescents towards obesity in the preparatory schools.

On the other hand, our results were dissimilar to Abd El-Rahman S et al., [1] results in Egypt who showed that more than three quarter of the studied sample had incorrect knowledge about healthy nutrition, this result was attributed to lack of knowledge they had, due to inefficiency of the implemented health education program about nutrition for this age of adolescents by health authority which either deficient or unsuitable.

Regarding nutritional behavior level, the present study showed that the majority of the students (88.4%) had fairly sound nutritional behavior followed by (6.2%) with unsound nutritional behavior and (5.4%) of sound nutritional behavior. On the other hand, our results were not on the same line either with Abd El-Rahman S et al., [1] in Egypt or with Triches RM and Giugliani ERJ [22] study in Brazil about obesity, eating habits and nutritional knowledge among school children. That study was carried on 573 school children of public schools. Both studies showed that eating habits were less healthy. Abd El-Rahman S et al., [1] attributed their findings to the social level of their participants where they belonged to low and middle social class, came from rural areas, their mothers were illiterate and were house wives.

The current results were nearly similar to results of Al-Beltagy R. [23] study in Egypt about food habits among adolescents in El-Gharbia Governorate which showed that most of studied adolescents (more than 60%) were following fairly sound dietary habits in both urban and rural areas.

The present study showed that nearly two thirds of the participants prefer healthy eating but there are some barriers to this habit in those who not prefer healthy eating. Most of their families (59.6%) don't know how to prepare foods in a healthy way followed by (57.2%) of the students' families don't have time to make healthy foods, (55.4%) think that they will still hungry if they eat healthy foods and lastly (53%) of the students think that healthy foods cost too much. It was in agreement with Croll JK et al., [24] in their study about healthy eating and what does it mean to adolescents, it was found that barriers to healthy eating include a lack

of time, limited availability of healthy foods in schools, and a general lack of concern regarding following healthy eating recommendations.

On the other hand, Shepherd J et al., [25] in their systematic review about young people and healthy eating: Barriers and facilitators showed that barriers to healthy eating included poor school meal provision and personal taste preferences for fast food. Difference in barriers depends on age of the participants, family readiness to prepare healthy food with a good taste and different levels of socioeconomic status.

Conclusion:

Based on the results of the present study, we can conclude that:

- 1- The preparatory schools are good targets for early management of overweight and consequently obesity problems.
- 2- It was revealed that more than one fifth of the participants (22.8%) were overweighted and less percent were obese (11.8%).
- 3- Fair nutritional knowledge and behavior were found in most of the students.

Recommendations:

Based on the findings of the current study, the followings can be recommended:

- 1- Encourage healthy eating among adolescents.
- 2- Provide healthy snacks at school canteen with a suitable price.
- 3- Guide students and their families to the best YouTube channels that can help them to prepare healthy food in a rapid and delicious way.

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مشكلة الوزن الزائد فى مرحلة المراهقة المبكرة فى المدارس الإعدادية فى مدينة طنطا

المقدمة: مشكلة الوزن الزائد هى إحدى أهم مشاكل الصحة العامة التى تؤثر على المراهقين. يختلف معدل إنتشار مشكلة الوزن الزائد والسمنة بين البلدان المختلفة إلا أنه يتزايد بسرعة وقد تساعد المعرفة العلمية الصحيحة بأسس التغذية السليمة والسلوك الغذائى الصحى فى الوقاية من الوزن الزائد والسمنة.

الهدف من الدراسة:

- ١- تقييم إنتشار مشكلة الوزن الزائد والسمنة بين أطفال المدارس الإعدادية فى مدينة طنطا.
- ٢- تقييم المعرفة التغذوية الطلاب، وعادات الأكل والحواجز التى تحول دون تناول الطعام الصحى.

طريقة البحث: دراسة مقطعية عرضية أجريت على المدارس الإعدادية فى مدينة طنطا، مصر. تم إختيار ٢٥٠ ولد و٢٥٠ بنت بإستخدام عينة عشوائية طبقية. لقد كانت الطبقة الأولى هى مدارس الأولاد والبنات وكانت الطبقة الثانية هى الصفوف المدرسية حيث تم تقسيم كل مدرسة إلى ثلاث صفوف وتم إختيار فصل واحد بشكل عشوائى من كل صف دراسى.

أدوات الدراسة:

- ١- إستبيان يتكون من (البيانات الإجتماعية الديموغرافية، أسئلة حول المعرفة والسلوك التغذوى).
- ٢- قياس الطول والوزن لحساب مؤشر كتلة الجسم.

نتائج البحث: معدل إنتشار مشكلة الوزن الزائد والسمنة فى المجموعة المدروسة (٢٢.٨٪، ١١.٨٪) على التوالى. كانت زيادة الوزن أكثر شيوعا فى الإناث عن الذكور بنسب مئوية (١٣.٤٪، ٩.٤٪) للإناث والذكور على التوالى، فى حين كانت نسبة السمنة بالنسبة للذكور أكثر من الإناث بنسب مئوية (٦.٦٪، ٥.٢٪) للذكور والإناث على التوالى. (٧٦.٤٪) من الطلاب لديهم مستوى معرفة غذائية معتدل بينما (١٩.٤٪) فقط منهم لديهم مستوى معرفة غذائية جيدة. (٨٨.٤٪) من الطلاب لديهم سلوك غذائى سليم إلى حد ما فى حين أن (٥.٤٪) منهم فقط لديهم سلوك غذائى سليم.

الخلاصة: كان أكثر من خمس الطلاب فى الدراسة يعانون من الوزن الزائد مع وجود نسبة صغيرة من السمنة بين الطلاب. زيادة الوزن كانت أكثر شيوعا بين الإناث بينما كانت السمنة أكثر بين الذكور. لدى معظم الطلبة معرفة وسلوك تغذوى معتدل.

التوصيات:

- ١- تشجيع المراهقين على الأكل الصحى.
- ٢- تقديم وجبات خفيفة صحية فى مقصف المدرسة بسعر مناسب.
- ٣- توجيه الطلاب وعائلاتهم إلى أفضل قنوات اليوتيوب التى يمكن أن تساعد فى إعداد الطعام الصحى بطريقة سريعة ولذيذة.