

Physical activity patterns in Egyptian obese and nonobese adolescents assessed using a validated WHO questionnaire

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Background/aim

Obesity is one of the major health problems especially when started early in life, and is associated with serious complications. The study aimed to focus on physical activity in a sample of Egyptian obese and nonobese adolescents.

Patients and methods

This study enrolled 89 adolescents of both sexes from the Medical Research Centre of Excellence at Cairo, Egypt, and were divided into two groups. Group 1, the obese group which included 45 children with a BMI more than or equal to 85th centile and group 2 the nonobese group which consisted of 44 matched peers with a BMI less than 85th centile. Physical habits were determined using a validated (yes or no) questionnaire according to WHO recommendations,

Results

Physical activity patterns and intensity in the studied individuals according to WHO recommendations differed between obese and nonobese adolescents as 33.3% of obese adolescents were involved in 60 min of moderate to vigorous physical activity compared with 15.9% of the nonobese group with a *P* value of 0.057, while 35.5% of obese adolescents were involved also in daily activity of more than 60 min compared with 15.9% of nonobese adolescents. In 73.3% of the obese group, most of their physical activity is aerobic compared with 40.9% of the nonobese group with a statistically significant difference, *P* value of 0.002. Of the obese group 4.4% were involved in vigorous-intensity activities three times per week at least including those that strengthen the muscle and the bone.

Conclusions

Physical activity is a habit encountered in obese adolescents than nonobese adolescents that is reflected on their answers of the questionnaire, regarding its pattern and intensity, which is beneficial to reduce the risk of development of chronic diseases, complications resulting from obesity and assist the promotion of healthy lifestyle.

Keywords:

adolescents, obese and nonobese, physical activity

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Introduction

Obesity is one of main public health problems. Obese children have a shorter lifespan of 20 years if he/she remained obese until young adulthood [1]. Different cofactors are implicated in the development of obesity such as genetics, cultural, metabolic, environmental, and social factors. The prevalence of obesity among Egyptian children is 13.5–23.7% [2,3]. Physical activity is the body movement generated by skeletal muscles and leading to above-basal energy expenditure. Frequent physical activity involvement is commonly recognized as having significant health benefits [4]. For instance, physical activity has been considered as necessary for normal growth and development due to its positive impacts in decreasing the obesity risk and complications such as type 2 diabetes mellitus, bone health problems, and cardiovascular illness [5]. Encouraging all children to enhance involvement in physical activity and practice, irrespective of their body

weight, and to decrease their sedentary lifestyle, can assist in preventing weight gain over a period of the time [6]. Physical activity adds to improve the structure of the body and helps to maintain weight loss [7] and decreases the hazards of adult obesity [5]. Faulty eating is a behavior found in adolescence regardless of the category of BMI. Family, media, and friends are the main influencers of eating practices in adolescence. Good parental support therefore has a significant mark on reforming such damaging behavior. In addition, as a source of simple access to extensive data, scholastic healthy eating programs are highly essential. The college canteen must be a perfect

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example of how to eat healthy. Food advertising should be subject to rigorous supervision [8].

There is an increasing concern in educating obese children and adolescents and their families about benefits of physical activity and increasing the awareness of its importance for healthier lifestyle instead of concentrating on weight loss per se [9]. Physical activity and nutrition are the key components of obesity prevention and treatment [10].

Subjects and methods

The current study was conducted at the Medical Research Centre of Excellence in the Nutrition Immunotherapy Clinic, as a part of the inhouse project entitled 'Early Renal Injury Markers in Obese Adolescents.' In this cross-sectional study, 89 Egyptian adolescents of both sexes were included. Adolescents aged 10–18 years were included in the study, while adolescents who had syndromic and endocrinal causes of obesity were excluded.

Study design

A total of 89 Egyptian adolescents of both sexes were included in this study. The cutoff BMI was calculated according to the WHO growth charts the study participants were classified as follows:

Group 1: the obese group included 45 children with a BMI more than or equal to 85th centile.

Group 2: the nonobese group consisted of 44 with a BMI less than 85th centile.

Ethical approval

The study was approved by the 'Ethics Committee' of the National Research Centre, Cairo, Egypt, under approval number 16/130. The legal guardian of each participant signed a written informed consent prior to participation in the research in accordance with the World Medical Association Code of Ethics (Helsinki Declaration) [11].

Anthropometric parameters

Anthropometric measures were recorded for each participant including height and weight. The height was evaluated on a Holtain (University of London Institute of Child Health) mobile anthropometer to the closest 0.5 cm and the weight was determined on a Seca Scale Balance to the closest 0.1 kg with the participant wearing minimal clothing and without shoes. BMI was measured as weight (kg)/height

(m²). Data were plotted using the software AnthroCalc, v1.66 Homeon WHO curves [12].

Physical activity

The enrolled participants were subjected to assessment of involvement in the physical activity via a physical activity questionnaire. Every patient was interviewed to answer a questionnaire consisting of four questions to assess whether they were engaged in physical activity or not and also to assess the time expended in physical activities.

The questionnaire was prepared according to their recommended levels of WHO for physical activity in children between the ages of 5–17 years. A validated (yes or no) questionnaire consists of four questions which included items for evaluation of physical activity and inactivity as follows:

- (1) Q1: a daily total of 60 min of moderate to vigorous physical activity (yes or no).
- (2) Q2: amounts of daily physical activity more than 60 min (yes or no).
- (3) Q3: most of the daily physical activity is aerobic (yes or no).
- (4) Q 4: vigorous-intensity activities such as strengthening exercises for the muscle and the bone for at least three times per week (yes or no) [13].

Statistical analysis

Data were statistically analyzed using the Statistical Package for the Social Sciences, version 16. Data were showed as mean and SD. Significant difference in the distribution between groups was detected by χ^2 test at *P* value less than 0.05.

Results

The study group comprised 30 (33.7%) males and 59 (66.3%) females with a mean age of 12.62±2.6 and 13.05±2.61 for cases and controls, respectively. The study comprised 12 (27%) nonobese males and 32 (73%) nonobese females and 18 (40%) obese males and 27 (60%) obese females. Anthropometric data are delineated in Table 1.

We found that about 24% engaged in a total daily activity of 60 min of moderate to vigorous physical activity, while 74% of adolescents did not. About 25.6% practiced physical activity for more than 60 min, while 73.3% did not engage in any physical activity. In about 56.7% of our participants most of their daily physical activity was aerobic, activities such

as brisk walking, swimming, running, or cycling. Only 3.3% of the studied group practiced vigorous-intensity activities such as strengthening exercises for the muscle and the bone for at least three times per week (Table 2).

Percentages of obese individuals who were practicing daily physical activity for about 60 min were greater than that of the nonobese group (the obese one was about 68.2% while the nonobese was about 31.8%) with statistically significant difference, P value of 0.05. Obese participants represent also 69.6% of the participants who were attending daily physical activities for more than 60 min with statistically significant difference, P value of 0.034. Also, of those who practiced aerobic physical activity the majority were obese (64.7%), P value of 0.002. Regarding vigorous-intensity activities, a very limited number of the studied individuals attended this type of activity without statistically significant difference between obese and nonobese groups; these results are presented in Table 3.

As regards differences in daily physical activity based on sex distribution in the obese group, the percentages of obese males who were practicing daily physical activity for about 60 min were greater than the obese female group (60 vs. 40%) with statistically insignificant difference ($P=0.053$). Obese males who were attending daily physical activity of more than 60 min (62.5%) were significantly higher than obese

females (37.5%) ($P=0.022$). Obese females practiced aerobic physical activity more than obese males (57.6 vs. 42.4%) but with statistically insignificant difference ($P=0.582$). Regarding vigorous-intensity activities only one male and one female in the obese group did vigorous-intensity activities. The total score of four questions was significantly higher among obese males (51.5%) than obese females (48.5%) ($P=0.016$); these results are presented in Table 4.

Discussion

The present study was conducted to describe the lifestyle as regards (physical activity) in a sample of Egyptian obese and nonobese adolescents. It is well known that physical activities together with a healthy diet are important factors for weight reduction for overweight and obese individuals. Also, physical activity is a part in the intervention programs particularly school-based interventions that promote a healthy and active lifestyle [14]. This study included 89 adolescents, 31 (34.4%) were males and 59 (65.6%) were females with a mean age of 12.62 ± 2.6 years for obese and 13.05 ± 2.61 for nonobese groups.

Table 1 Anthropometric parameters of the studied group

Variables	Obese group (N=45) (mean $\pm$ SD)	Nonobese (N=44) (mean $\pm$ SD)
WT	72.23 $\pm$ 18.94	41.28 $\pm$ 10.14
WT centile	97.23 $\pm$ 3.82	40.91 $\pm$ 24.06
HT	154.77 $\pm$ 11.49	151.74 $\pm$ 10.22
HT centile	65.20 $\pm$ 18.22	53.90 $\pm$ 20.71
BMI	29.78 $\pm$ 5.43	17.68 $\pm$ 2.70
BMI centile	98.25 $\pm$ 2.79	39.19 $\pm$ 27.52

HT, height; WT, weight.

Table 2 Questions and answers of questionnaires by the studied groups

Variable (WHO Q)	Frequency	Percent
A daily total of 60 min of moderate- to vigorous-intensity physical activity (yes or no)		
Yes	22	24.4
No	67	74.4
Amount of daily physical activity for more than 60 min (yes or no)		
Yes	23	25.6
No	66	73.3
Most of the daily physical activity is aerobic (yes or no)		
Yes	51	56.7
No	38	42.2
Vigorous-intensity activities as strengthening exercises for the muscle and bone for at least 3 times per week (yes or no)		
Yes	3	3.3
No	86	95.6

Table 3 Comparison of different answers of the studied groups

Parameters	Answers of question	Obese [n (%)]	Nonobese [n (%)]	P value ^a	P value ^b
WHO Q1 practicing 60 min	Yes	15 (68.20)	7 (31.80)	0.088	0.057
	No	30 (44.80)	37 (55.20)	0.392	
WHO Q2 practicing > 60 min	Yes	16 (69.60)	7 (30.40)	0.061	0.034
	No	29 (43.90)	37 (56.10)	0.325	
WHO Q3 aerobic exercise	Yes	33 (64.70)	18 (35.30)	0.036	0.002
	No	12 (31.60)	26 (68.40)	0.023	
WHO Q4 vigorous exercise	Yes	2 (66.70)	1 (33.30)	0.564	0.570
	No	43 (50.00)	43 (50.00)	1.000	

^a P value using χ^2 to compare between obese and nonobese for each group. ^b P value using cross-tab χ^2 for comparison between all groups.

Table 4 Comparison of different answers between obese men and women

Parameters	Answers of question	Obese – males (N=18) [n (%)]	Obese–females (N=27) [n (%)]	P value ^a	P value ^b
WHO Q1	Yes	9 (60.00)	6 (40.00)	0.439	0.053
	No	9 (30.00)	21 (70.00)	0.028	
WHO Q2	Yes	10 (62.50)	6 (37.50)	0.317	0.022
	No	8 (27.60)	21 (72.40)	0.016	
WHO Q3	Yes	14 (42.40)	19 (57.60)	0.384	0.582
	No	4 (33.30)	8 (66.70)	0.248	
WHO Q4	Yes	1 (50.00)	1 (50.00)	1.000	0.768
	No	17 (39.50)	26 (60.50)	0.170	
WHO Q1–Q4	Yes	34 (51.50)	32 (48.50)	0.806	0.016
	No	38 (33.30)	76 (66.70)	0.001	

In this study, generally speaking, there were small percentages of our studied participants involved in the physical activity regardless of their BMI, and patterns and intensity of physical activity. This is an important point to raise the awareness on the indispensability of educating children and young adults on the importance of physical activity as a cornerstone for a healthier life with good quality. This is matching with the results of many studies conducted in Arab countries, for example in Morocco and in Arab Gulf Countries, where most adolescents had inactive sedentary lifestyles [15,16]. Despite the intense attention paid to sports by health authorities around the world, Arab countries need more support for the concept of active life to avoid the high risk of inactivity as a major determinant of mortality [16]. In this study, percentages of obese individuals who were practicing daily physical activity for about 60 min was greater than that in the nonobese group 68.2 versus 31.8%. Obese group represent also 69.6% of the participants who were attending daily physical activity for more than 60 min. Also, of those who practiced aerobic physical activity the majority were obese (64.7%) whereas vigorous-intensity activities were practiced by a very limited number of the studied individuals.

Our findings are contrary to Maffei *et al.* [17], who estimated physical activity in a small group of obese (BMI >97th percentile) and nonobese children who were aged between 8 and 10 years. Nonobese kids have spent 100 min per day more of physical activity than their obese children (all activities were beyond sedentary behavior). In the two groups, moderate to energetic physical activity was comparable, so light-intensity activity accounted for the difference in total daily activity. In addition, the authors found that obese children spent more time in sedentary pursuits (about 100 min a day) than nonobese children. Trost *et al.* [18] also reported that in comparison to nonobese children, the total counts for obese children participating in daily

moderate and vigorous physical activities were significantly lower compared with nonobese children, among the sixth grade of students from four randomly selected public secondary schools in Columbia.

To compare the full activity beyond sedentary behavior between 18 obese (BMI ≥ 95th percentile) and 18 nonobese participants in the age range of 6–18 years of age, Yu *et al.* [19] used heart rate to derive estimates of energy expenditure. The obese youth studied by Yu *et al.* [19] spent 30% less time monitoring physically active pursuits, but 51% more time in sedentary activities in waking hours (no information were given for breakdown of light, moderate, or energetic activity).

In obese young adults, accelerometric studies have also shown reduced rates of physical activity. Hughes *et al.* [20] identified total activity time (mean accelerometer counting/min) as being smaller among obese (648 counts/min) comparing with the nonobese kids (729 counts/min). Interestingly, the time between the two groups of children in this research was not different. When compared with nonobese (average of 23 min per day) the proportion of the period spent in moderate to vigorous activities was marginally lower (2.4%) in the obese (average of ~16 min a day). In the same way, the study of Page *et al.* [21] discovered that in 14 obese children (BMI >99th percentile; average of about 10 min per day), the amount of time spent on moderate to vigorous activities was slightly lower than 54 nonobese (average around 13 min per day) 10-year-olds. In the present study, percentages of obese males who were practicing daily physical activity for about 60 min were greater than the obese female group. Obese men who were attending daily physical activity for more than 60 min were significantly higher than obese women, while obese women who practiced aerobic physical activity were more than obese men. Regarding vigorous-intensity activities only one man and one women in the obese group did vigorous-

intensity activities. Total score of four questions was significantly higher among obese men. The study of Kemp and Pienaar [22] have shown that the group of overweight children spent more time at in moderate physical activity every day (79 and 101 min for boys and girls, respectively) and on the weekend day (94 and 64 min for boys and girls, respectively) compared with the obese group (every day: 44 and 55 min, weekend day: 37 and 55 min for boys and girls, respectively). Regarding high-intensity physical activity, both men and women in the overweight group spent more time in everyday activities than the obese ones. While on the weekend, obese men spent more time than the overweight men and obese girls spent less time than overweight females. In addition, obese men and women were more inactive than peers in the overweight group. According to our knowledge, this is the first Egyptian study to explore the relationship between physical activity and obesity among Egyptian adolescents.

Conclusion and recommendations

This study implicates that physical activity is a habit encountered in obese adolescence than in the nonobese which is reflected in their answers of the questionnaire, regarding its pattern and intensity. This is an important point to raise awareness about the indispensability of educating children and young adults about the importance of physical activity as a cornerstone of a healthier life with good quality regardless of their BMI.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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