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A Study of Overweight and Obesity among Secondary School Students in Dubai: Knowledge, Attitude, and Practice

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Abstract: The prevalence of overweight and obesity among children and adolescents in UAE was dramatically increased in the last few years, which has major public health implications. The aim of the present study was to assess knowledge, attitude, and practice towards overweight and obesity among secondary school students in Dubai. A cross sectional study was carried out in private secondary schools in Dubai using a multistage stratified random sample technique. Self administrated questionnaire was utilized to collect data about socio-demographic characteristics, knowledge, and attitude towards obesity, perception of the students about their weight, methods, and barriers of practicing weight reduction. Results revealed that 33.5% of the students had good knowledge about obesity and its complications while 44.8% had poor level. Positive attitude towards obesity and its treatment was found among 57.0% of the students with no significant gender difference. More than half of the students (56.7%) agreed that obesity is a disease and 72.1% agreed that obesity needs treatment. Self perception of being obese was found among 58.5% of the students, and the majority (72.6%) did not practice any weight reduction before. Females had significantly higher rate of practicing weight reduction compared to males. The most common barriers against practicing weight reduction were lack of knowledge about the methods (47%), lack of time (25%), and lake of interest or support (23.2%). Female gender and higher education of the mother were independent predictors of good knowledge about obesity, while higher education of the mother was an independent predictor for student's positive attitude towards obesity. Utilization of the mass media to enhance the level of community knowledge about obesity and its complications was recommended. Health education materials should be delivered to present and future mothers. School health programs should include interventions to improve knowledge, attitude, and practice of the students towards obesity.

INTRODUCTION

Obesity among children and adolescents is one of the most common disorders encountered which has major public health implications. It is a serious problem confronting families, communities, health care providers, and public health authorities. Unfortunately, it is also one of the most difficult and frustrating disorders to manage successfully.[1,2]

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Over the past 3 decades, the prevalence of overweight and obesity has more than tripled for children aged 6-11 years and more than doubled for youth 12-19 years.[3]

The increase in obesity has been well documented in developed as well as developing countries and can be attributed to a range of factors such as changes in eating behavior and exercise patterns, shifts in food production, and an increasingly obesogenic environment designed to encourage overeating and sedentary lifestyle.[4]

The prevalence of overweight and obesity among UAE children and adolescents was dramatically increased in the last few years as reported from different studies. At 2000, a study carried in Ras Al-Khaimah found that the prevalence of overweight in school children boys and girls was 16.5% and 16.9%, respectively and about 8% of them were obese.[5] Five years later, a study carried out in four regions in UAE, found that the overall prevalence of overweight and obesity in school students was 33.6%[6]. This high prevalence of overweight and obesity is a cause of concern, as it was estimated that between 40% and 70% of obese children will become obese adults. This precursor condition for adult obesity is a critical public health threat because of the associations with several chronic diseases including hypertension, type 2 diabetes, coronary heart disease, stroke, osteoarthritis, and sleep apnea[7].

It has been found that deficiencies exist in regard to knowledge, attitudes, and behaviors in relation to obesity and weight control among adults.[8] Moreover, several studies,[9,10] have shown low level of obesity knowledge among adolescents and high school students and most students presented negative attitudes

towards obesity and overweight people[10]. Despite the desire to have appropriate body weight, physical exercise and dietary measures tocontrol body weight are lacking both among adults and school students.[11,12]

The management of obesity is problematic with much research showing that although the most complex interventions may produce weight loss, this reduction in weight is often only short-term, with many studies showing that weight returns to baseline levels by follow up[13]. Little is known about the knowledge, attitude, and practice of the school students in UAE towards obesity problems. Getting enough knowledge about these factors may help in planning for intervention programs to deal with this important public health problem.

AIM OF THE STUDY

The aim of the present study was to assess knowledge, attitude, and practice towards overweight and obesity among secondary school students in Dubai.

MATERIAL AND METHODS

A cross sectional study was carried out in private secondary schools in Dubai. The private sector was chosen because the Department of Health and Medical Services supervises only private schools. However the private schools include all social categories (high and low) & national and international schools.

A Multistage stratified random sample with equal allocations was carried out. The stratification was based upon region (Bur Dubai, Deira; the two main geographic areas of Dubai), gender (males, females) and spoken language in schools (Arabic & English). The total number of the school was 20. One class from each grade of education was selected randomly and all the students were invited to participate in the study,

the sample amounted to 1186 students (as calculated using the computer program EPI-INFO version "6.04" and mentioned in the first part of this research**).** Most of the students were non-local and this represents approximately the actual distribution within the community.

Data collection plan

All students were subjected to a self administrated questionnaire (Arabic and English forms) using closed ended questions that included the following data:

- **Socio-demographic characteristics**: such as age, gender, nationality, grade, and mothers` education.
- **Knowledge about obesity:** this included 4 questions to assess students` knowledge about definition, causes, complications of obesity, and the methods for weight reduction. Each question was scored as 0 for incorrect answer or do not know and 1 for correct and the total score was 4. This was classified as follows : <2 was considered as poor level, 2 was fair, and score of 3-4 was of good level.
- **Attitude towards obesity and its treatment** : it comprised 5 items concerning student's opinions about obesity as a disease, treatment, health benefits of mild weight loss, whether childhood overweight treatment is easier to treat than adult, and in general if obesity is easy to treat. Each item consisted of three choices Likert like format; agree scored 3, uncertain or not sure scored 2, and do not agree scored 1. Thus the total score ranged from 5-15; positive attitude scored from 13-

15, neutral scored from 9-12, and negative attitude scored from 5-8.

- **Perception of body weight and the practice of weight reduction.** It included questions to explore student's perception towards their body weight and if they practiced weight reduction before.
- **The barriers of practicing weight reduction.** This investigates reasons which prevented those students who considered themselves obese from practicing weight reduction as lack of knowledge, time, interest, support, and the belief of ineffectiveness of obesity management.

Statistical analysis

The statistical analysis was carried out using computer program SPSS version "13". The following statistical analyses were performed:[14, 15]

- Descriptive statistics using mean and standard deviation.
- Chi–square test was used for categorical data.
- Student t test was used for comparison of mean knowledge and attitude score for two independent groups.
- ANOVA was used for comparison of mean knowledge and attitude score for three independent groups with post hoc pair wise comparison “Scheffe's test“.
- Stepwise multiple regression was used to delineate the predictors for knowledge and attitude scores. The independent variables included were age, gender, grade, nationality and educational level of the mother.
- $P<0.05$ was used as cut off level of significance.

RESULTS

The present study comprised 1186 secondary school students. Table (1) shows that the sample included nearly equal percentages of males and females, (about 50%), their mean age was 15.76 ± 0.93 years and only 29.5% of the students were local. Concerning the grade of education, 39% were in grade 10 and 35.2% in grade 11. More than half of the students had university or higher educated mothers (56.7%), while 14.3% were of illiterate/primary educated mothers.

Concerning knowledge about obesity, table (2) portrays that 54.1% of the students answered correctly the question about definition of obesity. On the other hand, more than half of them were not able to answer correctly the questions about causes, complications and methods for weight reduction (52.8%, 62.7% & 54.8%, respectively). Figure (1) displayed that 33.5% of the students had good knowledge and 44.8% had poor level of knowledge. Females had a higher percentage of good knowledge compared to males (39.8% and 27.5%, respectively) and this was statistically significant (χ^2 = 37.9, P <0.05) as presented in figure (2).

Mean knowledge score about obesity according to socio-demographic characteristics is presented in table (3). It was found that females demonstrated significant high mean knowledge score (2.06± 1.20) as compared to males (1.62± 1.24), t = 6.15, P <0.05. Furthermore, those of highly educated mothers (university or higher) had a high significant mean score (1.90 ±1.25) as compared to those of preparatory or secondary educated mothers (1.70 ± 1.15), F = 3.36, P <0.05, this was

demonstrated by post hoc Scheffe's test. On the other hand, there was no significant difference in the mean knowledge score concerning age, nationality, or grade of education.

Table (4) represents the distribution of students according to their attitude towards obesity and its treatment. It was found that 72.1% of the students agreed that obesity needs treatment. More than half of the students agreed that obesity is a disease, weight loss-even if mild - can produce health benefit, and childhood overweight is easier to treat than adult (56.7%, 62.5%, and 58.1%, respectively). Figure (3) demonstrated that an overall 57.0 % of the students had positive attitude towards obesity, and 2.7% had negative attitude. As presented in figure (4), there was an almost equal percentages of positive attitude for both males and females (56.2% and 57.8%, respectively), $P>0.05$.

Table (5) presents the mean attitude score of secondary school students according to sociodemographic characteristics. The table clarified that there was no significant differences in mean attitude score according to age, gender, nationality, or grade. On the other hand, students of highly educated mothers demonstrated a highly significant mean attitude score (11.92 ±1.72) compared to those of illiterate or primary educated mothers (11.50 ± 1.90), $F = 6.38$, $P <0.05$.

Table (6) represents the perception of students about their weight, practice of weight reduction, and barriers for those who were not practicing. It was observed that 58.5% of the students perceived themselves as overweight or obese, and most of them (72.6%) did not practice any method towards weight reduction.

The most common barriers were lack of knowledge about the methods of weight reduction (47%), lack of time (24.8%), and lake of interest or support (23.2%).

Figure (5) shows the distribution of the students according to the practice of weight reduction and sex. The figure reveals that females had higher rate of practicing weight reduction (30.5%) compared to males (23.3%) and the difference was found to be statistically significant ($\chi^2 = 4.35$, $P< 0.05$).

The results of stepwise multiple regression are presented in table (7). There were two predictors for knowledge score, which were sex and mothers' education; female gender and high education of the mothers were the predictors for high knowledge score (F model = 23.53 , $P <0.05$). Concerning the predictors for attitude score, only mothers' education was presented as a significant predictor, as increasing the level of education tends to be associated with a more positive attitude towards obesity and treatment, (F model = 7.34 , $P <0.05$)

Table (1): Distribution of the secondary school students according to socio-demographic characteristics

Socio-demographic factors	No. (n = 1186)	%
Age		
<15	60	5.1
15-	1066	89.8
>17	60	5.1
Gender		
Male	600	50.6
Female	586	49.4
Nationality		
Local	350	29.5
Non-local	836	70.5
Grade		
10	462	39.0
11	417	35.2
12	307	25.9
Educational level of mothers •		
Illiterate/read & write/primary	167	14.3
Preparatory/secondary	339	29.0
University/higher	662	56.7

• The level of education was not recorded for 18 mothers.

Table (2): Distribution of secondary school students according to their knowledge about obesity.

Knowledge item		Correct	Incorrect
What is the definition of obesity?	No.	642	544
	%	54.1%	45.9%
What are the causes of overweight and obesity?	No.	560	626
	%	47.2%	52.8%
What are the complications of obesity?	No.	442	744
	%	37.3%	62.7%
How do you reduce your weight?	No.	536	650
	%	45.2%	54.8%

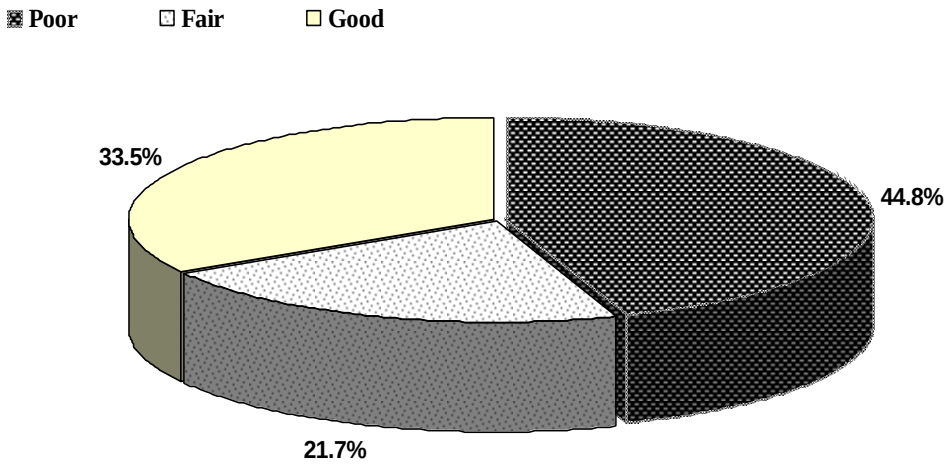


Figure (1) : Percent distribution of secondary school students according to level of knowledge about obesity

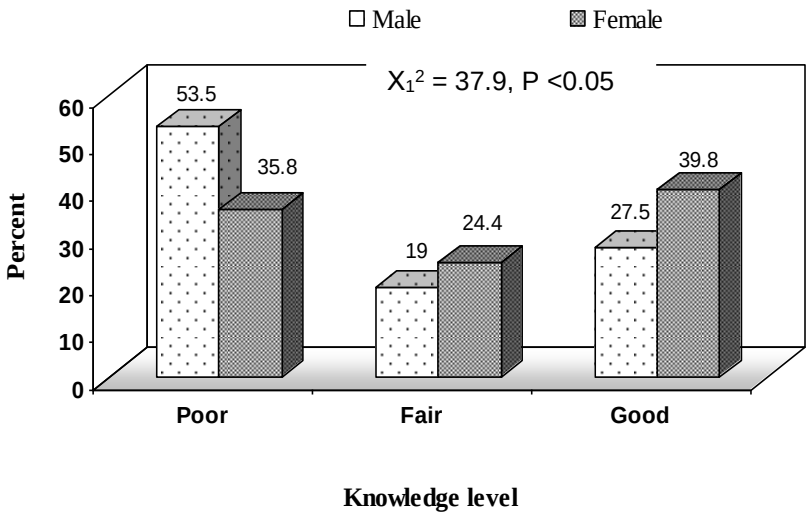


Figure (2):Percent distribution of secondary school students according to level of knowledge about obesity and sex

Table (3): Mean knowledge score of secondary school students in relation to socio-demographic data

Sociodemographic data	$\bar{X} \pm SD$	Test of significance
Age		
< 15 (n = 60)	1.93 ± 1.29	F= 0.64
15- (n = 1066)	1.83 ± 1.23	
17+ (n = 60)	1.98 ± 1.31	
Gender		
Male (n = 600)	1.62 ±1.24	t = 6.15*
Female (n = 586)	2.06 ± 1.20	
Nationality		
Local (n = 350)	1.9 ±1.3	t = 1.92
Non-local (n = 836)	1.7 ±1.2	
Grade		
10 (n = 462)	1.78 ± 1.27	F = 1.05
11 (n = 417)	1.85 ± 1.18	
12 (n = 307)	1.91± 1.28	
Mothers' education •		
Illiterate/read & write/primary (n = 167)	1.79 ± 1.30	F = 3.36*
Preparatory/secondary (n = 339)	1.70 ± 1.15	
University/higher (n = 662)	1.90 ± 1.25 °	

• The level of education was not recorded for 18 mothers.

* P <0.05

° Significantly different from those of preparatory or secondary educated mothers.

Table (4): Distribution of secondary school students according to their attitude towards obesity and its treatment.

Items of attitude	Agree		Not sure		Don't agree	
	No.	%	No.	%	No.	%
Obesity is a disease	673	56.7	253	21.4	260	21.9
Childhood & adolescent overweight needs treatment	855	72.1	179	15.1	152	12.8
Weight loss - even if mild – can produce health benefit	741	62.5	316	26.6	129	10.9
Childhood overweight is easier to treat than adult	689	58.1	317	26.7	180	15.2
Obesity is easy to treat	282	23.8	344	29.0	560	47.2

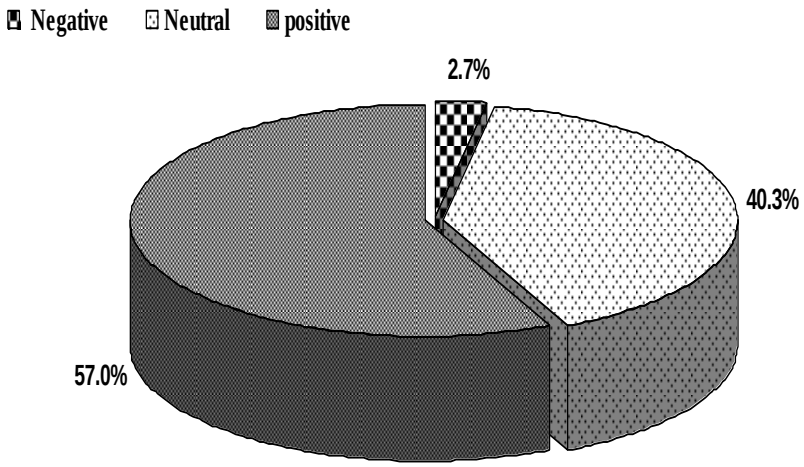


Figure (3) : Percent distribution of secondary school students according to their attitude towards obesity

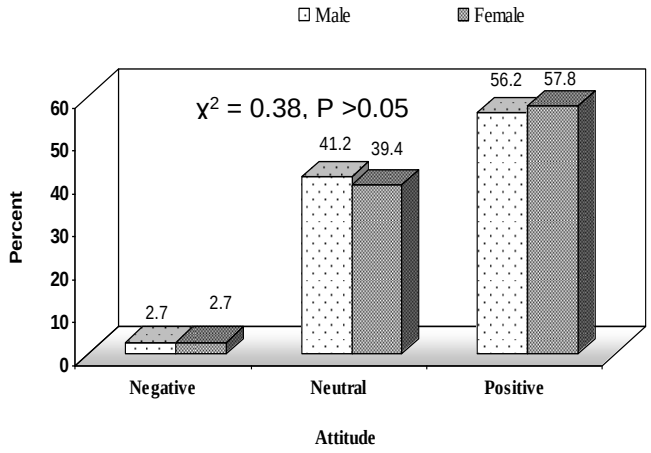


Figure (4):Percent distribution of secondary school students according to their attitude towards obesity and sex

Table (5): Mean attitude score of secondary school students according to sociodemographic data

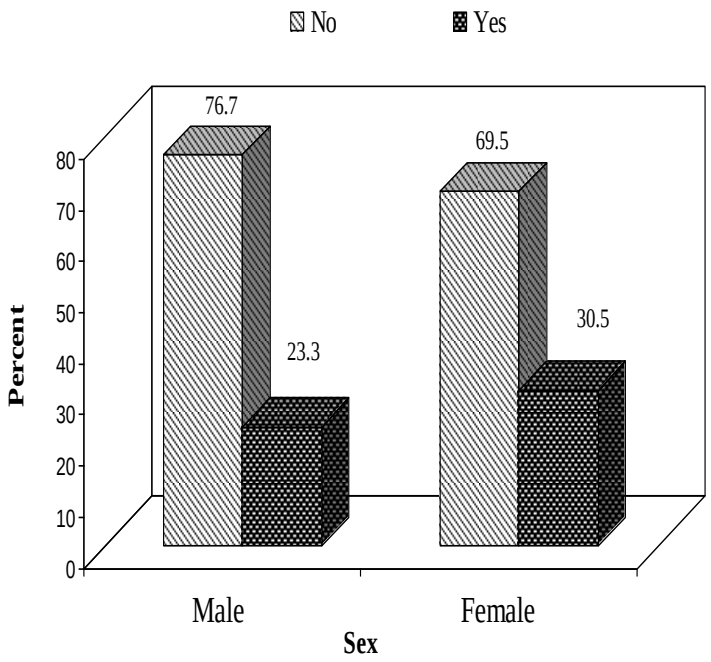
Sociodemographic data	$\bar{X}$ ± SD	Test of significance
Age		
< 15 (n = 60)	11.9 ±1.7	F= 1.11
15- (n = 1066)	11.6 ±1.7	
17+ (n = 60)	11.4 ±1.8	
Gender		
Male (n = 600)	11.66± 1.74	t= 0.23
Female (n = 586)	11.64± 1.84	
Nationality		
Local (n = 350)	11.75 ±1.84	t = 1.24
Non-local (n = 836)	11.61 ± 1.77	
Grade		
10 (n = 462)	11.6 ±1.8	F = 0.05
11 (n = 417)	11.6 ±1.7	
12 (n = 307)	11.6 ±1.7	
Mothers' education •		
Illiterate/read & write/primary (n = 167)	11.50 ±1.9	F = 6.38*
Preparatory/secondary (n = 339)	11.76 ± 1.43	
University/higher (n = 662)	11.92 ±1.72 º	

• The level of education was not recorded for 18 mothers.
* P <0.05
º Statistically significant different from illiterate/read & write or primary

Table (6): Distribution of secondary school students according to perception about their weight and practicing weight reduction

Item	No. (n = 1186)	%
Students perception about their weight		
Consider yourself overweight or obese?		
No	492	41.5
Yes	694	58.5
Practicing weight reduction		
Did you practice weight reduction before?•		
No	504	72.6
Yes	190	27.4
What are the barriers for practicing weight reduction? °		
Lack of knowledge	237	47.0
Lack of time	125	24.8
Lack of interest	90	17.9
Lack of support	27	5.3
Obesity management is not effective	25	5.0

• Excluding students who did not perceive themselves as obese
° Excluding students who practiced weight reduction



Figure(5):Percent distribution of secondary school students according to practice of weight reduction and sex

$\chi^2 = 4.35$, $P < 0.05$

Table (7): Stepwise multiple regression analysis of factors affecting knowledge and attitude score of the secondary school students

Independent variable	B	Standard error	t	P	R^2	F
Knowledge						
Gender	0.462	0.071	6.52	0.000	0.04	23.53*
Mother education	0.113	0.049	2.31	0.000		
Constant	0.861	0.165	5.23	0.021		
Attitude						
Mother education	0.195	0.072	2.71	0.007	0.02	7.34*
Constant	12.134	0.182	66.70	0.000		

* P <0.05

DISCUSSION

Knowledge, attitude, and practices in regards to obesity are the cornerstones and very crucial ones because they have strong influence on the health seeking behavior of students in terms of prevention and control.[16] Student's knowledge about obesity varied from study to another. In a sample of 1271 eighth and ninth grade students from six Latin American cities,[9] the mean test scores reflected a low level of obesity knowledge among male and female adolescents from higher and lower SES groups in all study sites. Another study,[10] revealed that students' knowledge of food and nutrition, the risk of obesity, and the danger of excessive diets was insufficient. This is consistent with the results of the present study, where around two-thirds of the students had fair or poor knowledge about obesity (figure 1). The results also revealed that the worst level of knowledge was that regarding complications of obesity (table 2). Similarly, adolescents in the study by Nowak and Crawford[17] attached a great deal of importance on the impact that food has on their current looks, weight, appearance, and energy compared to the importance that they placed on the prevention of future illness or complications. On the other hand, another study[12] demonstrated that students were aware of the seriousness of obesity to a certain extent; however, there was no difference in knowledge of obesity between normal-weight and obese students. It was also found that most of the information concerning nutrition was obtained through the media; school education about food and nutrition only amounted to 28.3% of the total.[10] Moreover, in a study done in USA,[18] it was noticed that medical school curricula do not address obesity as a disease. It was suggested that medical school curricula should be changed to reflect the growing epidemic of obesity and enhance students' knowledge about obesity as a disease. The

present study also portrayed that female students had significantly better knowledge about obesity than males (tables 3 and 7). This may be explained by the desire of females to be lesser in weight than males; hence they are trying to get more knowledge about obesity. This was also previously found,[10] where girls expressed the desire to be thinner four times more than boys and practiced weight reduction diets three times more than them. This is also consistent with the present study, where females showed a significantly higher level of practicing weight reduction than males (figure 5). On the other hand, Kim *et al*.,[12] found no significant difference between knowledge level of obesity in either boys or girls. Another socio-demographic variable which was found to be significantly associated with student's better knowledge about obesity in the present study, both in the univariate and multivariate analyses is the higher education of the mother (tables 3 and 7). Different studies,[19,20] have found a significant association between lower education of the mother and higher prevalence of obesity among children. Moreover, mother education was the only independent predictor of the attitude of the students towards obesity in the present study (table 7). Researches suggest that parents are still considered by children and adolescents to be the gate keepers of the family food supply and that parents act as important role models for children's eating behaviors.[21,22] Researchers in diverse disciplines have noted that more educated persons are more aware of health risks and more likely to initiate actions to reduce these risks.[23] The present study also demonstrated that more than half of the students had a positive attitude towards obesity and its treatment (figure 3) and considers it as a disease (table 4). It also revealed that there was no significant gender difference regarding this attitude towards obesity (figure 4). In another

study,[10] it was observed that 31% of the students regarded obesity as a handicap. On the other hand, a study done in Jamaica[24] revealed that most of the students who participated in the focus group sessions did not think of obesity as a nutritional disease, but rather regarded it as a sign of wealth, good living, or access to an abundance of food. Socio-economic and cultural factors may explain difference of the student's believes in the last study.

The present study also showed that 58.5% of the students consider themselves overweight or obese. This is much higher than the actual prevalence of overweight and obesity (38.9%) as measured in the first part of this study.[25] This was also found by Brook and Tepper,[10] where forty-four percent of the high school students expressed a subjective feeling of being obese while, in truth, only 10% of them were actually overweight. Another study conducted in India[26] also revealed that among adolescents who perceived themselves to be overweight or obese, 63.4% were neither overweight nor obese. This may indicate excess worry or suspiciousness of the adolescents and high school students of being obese. In the present study, despite the excess worry of the students of being obese, and despite that more than half of them perceive that obesity is a disease and 72% of them believe that it has to be treated (table 4), it was found that only 27.4% of those who consider themselves obese had practiced weight reduction before (table 6). This was also previously found in Jamica,[24] where students' knowledge about the causes of obesity and prevention measures were not very consistent with their dietary patterns. Also in Korea,[12] there was no relationship between knowledge of obesity and healthy eating habits or the presence or absence of regular exercises. This may be due to the general perception that obesity is difficult to be managed. The present study also demonstrated that near to half of the

students (47.3%) didn't agree that obesity is easy to be treated (table 4). Also, it showed that the main barriers for not practicing weight reduction methods among the students were lack of knowledge, lack of time, and lack of interest (table 6). These three barriers were tackled by The WAY program[27] which was offered by the Institute for America's Health (IAH). Under the program, teachers let students take 10-minute daily breaks to exercise along with a videotaped program. There were also incorporated lessons on nutrition, calories, goal setting and stress management into core subject areas - math, language arts, science, and social studies. Resources also provided for parents to participate in efforts to encourage the students in life-long healthy behaviors. Teachers and parents reported positive shifts in students' lunch and snack choices, eating habits at home and physical activity rate at and outside school within two weeks of beginning the WAY program.

CONCLUSION AND RECOMMENDATIONS

It could be concluded that knowledge of the secondary school students in Dubai about obesity and its complications is insufficient. Female gender and higher education of the mother were independent predictors of good knowledge about obesity, while only higher education of the mother was an independent predictor for student's positive attitude towards obesity and its treatment. The majority of the students perceived themselves as overweight or obese, had a positive attitude towards obesity but did not do any practice towards reduction of their weight. The most common barriers against practicing weight reduction were lack of knowledge, time, and interest. It is recommended to utilize the mass media to enhance the level of

community knowledge about obesity, its complications, and methods to combat it. Health education materials about obesity which is simple, self explanatory, and culturally oriented to be suitable for those with lower educational level should be delivered to present and future mothers in any site of contacts like health centers, workplaces, and shopping centers.

School health programs should include interventions to improve knowledge, attitude, and practice of the students towards obesity. Such programmes should include health education about obesity, sound dietary habits, increase supervised physical education and physical exercise sessions, competition and prizes, and active involvement of teachers and parents.

REFERENCES

1. Committee on Prevention of Obesity in Children and Youth. Preventing Childhood Obesity: Health in the Balance. Washington, DC: Institute of Medicine; 2005.
2. Guiding SS, Leibel RL, Daniels S, Rosenbaum M, Horn LV, Rmarx GR. Understanding obesity in youth. Circulation. 1996; 94: 3383-7.
3. DeWolf A. Flesch-Kincaid grade level formula. 2005. Available from: http://techlearning.com/story/showArticle.jhtml?articleID= 159902483. Accessed 26, 5/ 2007.
4. Ogden J. The psychology of eating: from healthy to disordered behavior. Br J Gen Pract. 2005 October 1; 55(519): 750–4.
5. Haddad F, Nuaimi Y , Little B, Thabit M. Prevalence of obesity among school children in the United Arab Emirates. J Hum Biol. 2000;12:498-502.
6. World Health Organization. Report of a WHO consultation. Global School-based Student health survey (UAE-GSHS-2005).
7. Jain A. What Works for Obesity? A Summary of the Research Behind Obesity Interventions. London: BMJ Publishing Group; 2004.
8. O'Dea JA, Abraham S. Kknowledge, beliefs, attitudes and behaviors in relation to weight control, eating disorders, and body image in Australian trainee home economics and physical education teachers. J Nutr Educ. 2000; 33:332-40.
9. McArthura L, Holbertb D, Penac M. Obesity knowledge of adolescents from six Latin American cities: a multivariable analysis. Nutrition Research. 2001; 21(10): 1323-33.
10. Brook U, Tepper I. High school students' attitudes and knowledge of food consumption and body image: implications for school based

education. Patient Education and Counseling. 1997; 30 (3) 283-8.
11. Qidwai W, Azam SI. Knowledge, attitude and practice regarding obesity among patients, at Aga Khan University Hospital, Karatchi. J Ayub Med Coll Abbottabad. 2004; ;16(3):32-4
12. Kim MJ, Choi KH, Lee KS. A Study on Awareness and Knowledge of Obesity, Life Style, and Eating Habits According to Body Mass Index in High School Students. J Korean Pediatr Soc. 2002 Dec; 45(12):1491-6.
13. NHS Centre for Reviews and Dissemination. Systematic review of interventions in the treatment and prevention of obesity. York: University of York; 1997.
14. Jekel JF, Katz DL, Elmore JG. Epidemiology, Biostatistics, and Preventive Medicine. 2ed edition. Philadelphia: WB SaundersCompany; 2001.
15. Feinstein AR. Principles of Medical Statistics. Boca Raton: Chapman & Hall /CRC. A CRS Press Company; 2002.
16. Neumark-Sztainer D, Story M, Evans T, Ireland M. Weight-related issues among overweight adolescents: what are health care providers doing? Top Clin Nutr.1999; 14:62 –8.
17. Nowak M, Crawford D. Getting the message across: adolescents' health concerns and views about the importance of food. Aust J Nutr Diet. 1998; 55: 3-8.
18. Banasiak M, Murr MM. Medical school curricula do not address obesity as a disease.Obes Surg. 2001 ;11(6):677-9
19. Lamerz A, Kuepper-Nybelen J, Wehle C, Bruning N, Trost-Brinkhues G, Brenner H, *et al*. Social class, parental education, and obesity prevalence in a study of six-year-old children in Germany. Int J Obes. 2005 ; 29(4):373-80.
20. Mozaffari H, Nabaei B. Obesity and related risk factors. Indian Journal of Pediatrics. 2007; 74, (3): 265-7.
21. Giskes K, Patterson C, Turrell G, Newman B. Health and nutrition beliefs and perceptions of Brisbane adolescents. Nutr Diet. 2005; 62: 69-75.
22. Neumark-Sztainer D, Story M, Perry C, Casey MA. Factors influencing food choices of adolescents: findings from focus-group discussions with adolescents. J Am Diet Assoc. 1999; 99: 929-37.
23. Williams DR. Socioeconomic differentials in health: A review and redirection. Social Psycholog Quarterly. 1990; 3, 81-99.
24. Bockarie, Philip M; Taren, Douglas L; Patterson, A. Wynante. KAP study of secondary school students towards obesity in Jamaica. Cajanus. 1994; 27(1):22-47,
25. Allatar F, Makhlouf MM, Ahmed A, Jaffar M, Dafalla E, Mahdy N, *et al*. A study of overweight and obesity among secondary school students in Dubai: prevalence and associated factors. A paper submitted to the 14Th Biennial School Nurses International Conference: Looking Beyond: Charting the Direction in School

Nursing; 30 July-3 August 2007 Singapore.
26. Ramachandran TY. Prevalence of overweight and obesity among school and college going adolescents in rural and urban Thiruvanarthapuram Districts, Kerala, India. Working paper No.7; 2004.
27. Institute for America's Health. Groundbreaking Four State Test of School Based Obesity Program Shows Reductions in Overweight Population; WAY Program Meets National Alliance for Nutrition and Activity Model Policies Criteria; 2006**.** Available from: http://www.Healthy-America.org. Accessed on 20/1/2007.