ORIGINAL ARTICLE

Prevalence of dyslipidemia and obesity among college students in Kuwait

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Abstract *Background:* Dyslipidemia is a major cause of cardiovascular disease. There is a remarkable rise in its prevalence. The relation between overweight/obesity and dyslipidemia has been approved.

Objective: The purpose of this study was to determine the prevalence of elevated levels of blood lipids and obesity among college students in Kuwait.

Methods: A sample of 484 students aged 17–24 years, were chosen randomly from the College of Basic Education, Kuwait, during the period from the beginning of March 2009 till mid January 2010. Data were collected, using a predesigned interviewing schedule that contained personal information, weight, height, waist circumference and blood lipid profile.

Results: The overall prevalence of dyslipidemia, overweight and obesity were 10.5%, 30.6% and 19.8% among the studied sample respectively. Waist circumference based obesity was found in 41.8%. Overweight was more frequently encountered in females whereas higher proportion of BMI-based obesity was found in males. The prevalence of waist circumference-based obesity was higher in females than in males.

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Conclusion: Prevalence of elevated levels of blood lipids and BMI-based obesity was higher among male than female students in the college. More screening should be performed especially for overweight/obese students for the risk of dyslipidemia.

1. Introduction

Dyslipidemia is a disruption in the amount of lipids. Most dyslipidemias are hyperlipidemias; that is an elevation of plasma cholesterol, triglycerides (TGs), or both, or low levels of high density lipoprotein (HDL) in the blood due to diet and style of life. The prevalence of dyslipidemia is increasing worldwide.[1–3] Regionally, several studies showed an increased prevalence of dyslipidemia in Kuwait.[4,5]

One of the causes of dyslipidemia is obesity. Overweight and obesity are considered major epidemic health problems in both developed and underdeveloped countries as many studies showed a remarkable rise.[6–8] Several recent studies in the United States, showed that overweight and obesity prevalence is increasing dramatically and suggesting that 86.3% of adults will be overweight or obese as well as 51.1% will be obese by 2030.[9,10]

This is also true regionally, as many studies showed the presence of higher levels of overweight and obesity among children and adults in the Arabian Gulf countries particularly Kuwait,[11–14] and also suggested the positive relation between obesity and high proportion of dyslipidemia.[15–17] But there is, generally, a lack of such studies among college students (17–24 years old). This study was conducted to assess the prevalence of dyslipidemia among college students in Kuwait as they are a target group.

2. Methods

Data were collected using a predesigned interviewing schedule. A sample of 484 students aged 17–24 years, were chosen randomly from the College of Basic Education campuses during the period from the beginning of March 2009 till mid January 2010. The inclusion criteria of the present study were Kuwaiti students (male or female) in the age group 17–24 years, present in Kuwait one year before the period of the study, and who accepted to participate in the study. Also they were non pregnant or receiving medications that may affect blood lipid profile. Students were asked to be fasting for 8–14 h at the time of interview. Each of the students visited the clinic twice. The first visit was for filling the questionnaire and performing physical and clinical measurements. During the second visit, blood samples were taken, and deficient data were completed and medical advice was provided.

All the necessary approvals for carrying out the research were obtained. The Ethical Committee of the Kuwaiti Ministry of Health approved the research. A written format explaining the purpose of the research was prepared and signed by the students before starting the interview. In addition, the purpose and importance of the research were discussed with the interviewer.

Personal data were taken during the student's stay in college clinic and included: age, sex, marital state and smoking habits. Physical measurements were also taken. A scale was used to measure the weight (Detectoscale, MO USA). Height was measured with the subject standing upright against a wall on which was affixed a height measuring device. The measurements were recorded to the nearest 1 cm. Waist circumference was measured using a measuring tape to the nearest 0.1 cm. Three blood pressure measurements were obtained by trained physicians using a standardized sphygmomanometer after a 5-min sitting rest and the average of three readings was calculated.

Blood sample of 5 μl was examined for total cholesterol, triglycerides, high density lipoprotein (HDL), low density lipoprotein (LDL) using the Reflotron® Plus (Roche Diagnostics GmbH, Germany).

2.1. Measurements

BMI was used as an indicator for overweight and obesity. It was calculated as weight in kg/height in square meters. Norms were defined as underweight, normal, overweight and obese for < 18.5, 18.5–24.9, 25.0–29.9 and ⩾ 30.0 respectively. Abdominal obesity was considered if waist circumference > 102 cm for males and > 88 cm for females.[18]

According to the guidelines described by the National Institute of Health, these measurements were used. Hypertension was considered if the participant is currently under medication or with systolic blood pressure ⩾ 140 and/or diastolic blood pressure ⩾ 90 mmHg. Lipid profiles were defined as follows: hypercholesterolaemia (total cholesterol) ⩾ 5.2 and < 6.5 mmol/L; low HDL Cholesterol < 0.9 mmol/L; high LDL Cholesterol > 4.1 mmol/L and high Triglycerides > 4.5 mmol/L.[19]

2.2. Statistical analysis

Data were collected and coded then entered into an IBM compatible computer, using the SPSS version 17 for Windows. Qualitative variables were expressed as number and percentage. The χ^2-test was used to detect age and gender difference with overweight, obesity and dyslipidemia at 0.05 level of significance A5 level was chosen as the level of significance in all statistical significant tests used.

3. Results

A total of 484 students were recruited from the different campuses of one of the largest colleges in the Public Authority of Applied Education and Training in Kuwait, the College of Basic Education. Personal data of the participating students were presented in Table 1. Their age ranged from 17 to 24 years (mean = 18.6 ± 1.4). Of them, 35.7% were males, 9.1% were married, 10.3% were smokers. On the basis of BMI, 30.6% of the students were overweight and 19.8% were

Table 1 General characters of participating students.

Characteristics	No.	%
Age		
< 18	211	43.6
⩾ 18	273	56.4
Gender		
Males	173	35.7
Females	311	64.3
Marital status		
Single	440	90.9
Married	44	9.1
Smoking		
No	434	89.7
Yes	50	10.3
Hypertension		
No	437	90.3
Yes	47	9.7
Triglyceride		
Normal	442	91.3
High	42	8.7
Total cholesterol		
Normal	473	97.7
High	11	2.3
Dyslipidemia		
No	433	89.5
Yes	51	10.5
BMI		
Normal	240	49.6
Overweight	148	30.6
Obese	96	19.8
Waist circumference		
Normal	283	58.5
Obese	201	41.5
HDL		
Normal	439	90.7
High	45	9.3
Total	484	100.0

obese. According to their waist circumference, 41.5% had central obesity. Hypertension was diagnosed in 9.7%. The prevalence of dyslipidemia was 10.5% among the studied sample (Table 1).

Table 2 shows the prevalence of obesity and dislipidemia among the participating students by gender and age (< 18 and > 18 years). Concerning BMI-based obesity, it was found that the proportion of normal BMI was higher in females than males in both age groups. Overweight was more prominent in females. On the contrary, obesity was found more in males than females. However, in females, the proportion of obesity was higher in those > 18 than in < 18 years (15.9% versus 10.4%) whereas, in males the reverse was noticed (29.6% versus 33.3%) ($P < 0.001$).

On the other side, as regards waist circumference-based obesity, it was found that the percentage of females were more significantly higher than those of males in both age groups. Again, in females, the proportion of obesity was higher in those > 18 than in < 18 years (45.2% versus 50.0%) whereas, in males the reverse was noticed (28.6% versus 32.0%) ($P = 0.001$).

Dyslipidemia, based on both hypercholesterolemia and hypertriglycemia, was significantly higher among males above 18 years of age, when compared with their female counterparts or those less than 18 years aged-male students ($P = 0.005$).

4. Discussion

The aim of the present study was to determine the prevalence of dyslipidemia in a sample of college students in Kuwait. The findings of our study show that the overall proportion of dyslipidemia, overweight and obesity were high among the students, 10.5%, 30.6% and 19.8% respectively. Waist circumference based obesity was detected in 41.5%. Our findings are consistent with other studies as the prevalence of dyslipidemia is increasing worldwide.[20–23]

Previous local studies have shown that, by using standard diagnostic measurements, over 50% of Kuwaiti adults were suffering from hyperlipidemia.[24–26] A study on adults attending the coronary care units in different hospitals in Kuwait showed that the proportion of hyperlipidemia, among men and women, was 53% and 80% respectively.[27] Akanji recently

Table 2 Obesity and dyslipidemia among participating students by age and gender.

	Females				Males				No.	%	
	< 18 (n = 135)		> 18 (n = 169)		< 18 (n = 75)		> 18 (n = 98)				
	No.	%	No.	%	No.	%	No.	%			
BMI											
Normal	75	55.6	89	50.6	30	40.0	46	46.9	240	49.6	$\chi^2 = 24.62, P < 0.001$
Over weight	46	34.1	59	33.5	20	26.7	23	23.5	148	30.6	
Obese	14	10.4	28	15.9	25	33.3	29	29.6	96	19.8	
Waist circumference											
Normal	74	54.8	88	50.0	51	68.0	70	71.4	283	58.5	$\chi^2 = 15.52, P = 0.001$
Obese	61	45.2	88	50.0	24	32.0	28	28.6	201	41.5	
Dyslipiemia											
No	125	92.6	162	92.0	68	90.7	78	79.6	433	89.5	$\chi^2 = 12.89, P = 0.005$
Yes	10	7.4	7	8.0	7	9.3	20	20.4	51	10.5	

demonstrated that almost 75% of the Kuwaiti subjects attending the Lipid Clinic were showing either hyperlipidemia or hypertriglyceridemia.[28]

Our findings indicated that the high proportion of dyslipidemia, based on both hypercholesterolemia and hypertriglycemia, was higher among males above 18 years of age, when compared with their female counterparts or those less than 18 years aged-male students. These findings are in agreement with other studies. A study by Antal et al.[29] on a group of Hungarian university students in Budapest, have showed the higher occurrence of decreased level HDL-cholesterol in the male group than the female. Another study that was conducted to estimate the prevalence of dyslipidemia in Turkey, found that dyslipidemia was higher in men than in women, and that the prevalence of dyslipidemia increased with age.[30] In addition, a study on an age group 20–29 years, showed that the proportions of high TG, low HDL cholesterol were higher among males than females and that these ratios increased with age.[31] Finally, Feliciano-Alfonso et al.,[32] showed that the mean plasma triglycerides and low HDL cholesterol were significantly higher in males than females and that of low HDL was much higher in males.

Our results showed that, in general, overweight and obesity proportions were high. Obesity was more frequently encountered in males than in females, whereas the proportion of overweight was higher in females than in males. Also, on the other hand, obesity due to waist circumference was significantly higher in females than males. These results are consistent with other studies.[33–35] Wang et al.,[9] showed that the vast increase in weight in overweight American adults was faster than in children, and in women than in men. In a study among Kuwait University students, Al-Isa showed that the level of obesity was high among men.[14]

It is well documented that obesity is a major cause for dyslipidemia, the results of the present study suggested the positive correlation of obesity with dyslipidemia among the college students.

A final interesting finding in the present study is the increased level of dyslipidemia with age. Although not a very strong correlation, the time interval in our study is between 17 and 24 years, yet it showed a positive significance. Several studies confirmed this correlation as adults who were overweight in childhood have higher levels of lipids and blood pressure are thus at increased risk for coronary heart disease compared with adults who were thin as children.[36–38] A fifteen year tracking study by Haney et al.,[39] showed that the higher proportions of dyslipidemias in adolescence will consequently lead to serious cardiovascular diseases. In brief, these data present a valuable record on the health status/indicators and the impact of life of the college students.

5. Conclusion

A large proportion of the college students were overweight or obese. Consequently, the increase in obesity may account for the high blood pressure and dyslipidemia among the students. Our findings suggest the need for carrying out more nutrition programs to those overweight/obese students and even at an earlier age, and wide-ranging epidemiological studies to prevent hypertension and dyslipidemia in this age group in Kuwait.

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