

Dietary habits, lifestyle pattern and obesity among young Saudi university students

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Abstract

Objective: To investigate dietary habits, lifestyle pattern and obesity in young university students.

Methods: This cross-sectional study was performed at the Rabigh campus of King Abdulaziz University, Jeddah, Saudi Arabia, from March to May 2016, and comprised healthy male students. A close-ended questionnaire was filled by all students about their dietary habits and lifestyle pattern and the lipid profile, blood glucose levels and body mass index was determined. The participants were selected by convenience sampling method. SPSS 21 was used for data analysis.

Results: Of the 116 participants, 34(29.3%) were obese, 34(29.3%) were overweight and 48(41.4%) had normal body mass index. Overall, 66(57%) participants were taking 3 to 4 fast food meals weekly and was also taking junk food at least once in a day. Also, 50(43%) participants were using soft/energy drink more than once per day. Besides, 82(70.7%) respondents were spending 3 to 4 hours daily in watching TV, using the Internet or PlayStation. Significant differences were observed for low-density lipoprotein and high-density lipoprotein cholesterol levels ($p=0.02$ and $p=0.006$, respectively) among overweight and obese subjects as compared to those having normal weight.

The majority of the overweight and obese participants' had experienced shame or other uncomfortable feelings and had a negative impact on their activity ($p<0.001$).

Conclusion: Dietary habits and lifestyle of the majority of the participants were not up to the mark and the obesity prevalence was common.

Keywords: Dietary habits, Lifestyle pattern, Obesity, TV watching, Lipid profile, University students. (JPMA 67: 1541; 2017)

Introduction

The Western lifestyle has changed the dietary habits and lifestyle pattern among young students in developing countries, which is making them overweight and obese and consequently more prone to develop diabetes mellitus type 2 (T2DM) and cardiovascular disease (CVD).¹

A study reported substantial correlations between junk food intake and screen time.² A study in Brazil reported a positive relationship between physical activity (PA) and increased intake of vegetables and fruits, whereas television watching was linked to an increased consumption of fried food.³

A systematic review revealed that screen time was associated with dietary behaviours in all age groups (from childhood to adults).⁴ This combination of sedentary behaviour and consumption of an unhealthy diet may lead to obesity in children and adolescents, independent of reduced PA.² There are several studies which pointed out that overweight and obesity was common among people

whose intake of junk and fast food was abundant.^{5,6}

Unhealthy diets are considered a health-risk behaviour among college students and the increase in weight often goes hand in hand with shifting from high school to college, which is often the first chance to make decisions for young adults about their food and exercise.⁷

A recent World Health Organisation's (WHO) report revealed that the prevalence of overweight, obesity and physical inactivity in the Kingdom is 68.2%, 33.7% and 58.5%, respectively, and all these are involved in the development of diabetes mellitus(DM).⁸

The Kingdom of Saudi Arabia (KSA) is included among those countries that have very high prevalence of obesity. Additionally, the trend of eating western diet is very popular among the young Saudi generation, and they are very much inclined towards eating pizzas, burgers, chocolates and other traditional sweets with increased consumption of soft and energy drinks. Lack of PA is also prevalent among them. Therefore, we expect that blood sugar and lipid profile are deranged in this particular group. In older age group (i.e. above 35 years), it is already understood that there are more chances that lipid profile

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and blood sugar would be altered. It is important to detect the problem in the early stage so that preventive measures can be taken for avoiding adverse consequences.

The current study was designed to find out dietary habits, lifestyle pattern and prevalence of obesity and to compare the dietary pattern, lipid profile and blood glucose level among normal, overweight and obese young students.

Subjects and Methods

This cross-sectional study was conducted at the Rabigh campus of King Abdulaziz University (KAU), Jeddah, Saudi Arabia, from March to May 2016, and comprised apparently healthy male medical and non-medical students from five faculties. We notified our research and its purpose to all students by displaying posters and banners and personally informed them. All subjects aged ≥ 18 years (18-26 years), without the history of DM, hypertension, coronary artery disease, endocrinopathy and who were not taking any lipid-altering medication were included in this study. Participants who fulfilled the eligibility criteria and were interested in participating in the study were scheduled to attend an on-site in-person screening.

The sample size was calculated by the formula from OpenEpi, version 3, $n = [Np(1-p)] / [(d^2/Z^{2-1-\alpha}/2*(N-1)+p*(1-p)]$ by taking population size at 1,600, percentage frequency of outcome factor in the population at $23.3\% \pm 7.5$ and confidence level at 95%.⁹ Rabigh is a small town, located 150 km away from Jeddah city. The KAU has established its campus there a few years back, and 1,600 male students are studying there at present.¹⁰

All participants filled a questionnaire having several questions regarding their health and medical history. The questionnaire was prepared with the help of previously published studies.^{11,12} We inquired about the participants' family medical history of hypercholesterolaemia (HC), CVD, DM, hypertension and other disorders. All participants mentioned their lifestyle pattern and eating habits. All participants' body weight and height were determined to calculate their body mass index (BMI). We asked the questions such as "do you feel that your social life has been limited because of obesity?" and participants' responses were mentioned as "I don't know/Never/Sometimes/ Always". The ethics unit of the KAU campus approved this research project. Informed consent was taken from each participant. Participants were selected from each faculty by convenience sampling method.

A 5ml venous blood sample of each volunteer was collected after 12-14 hours overnight fasting. The total cholesterol (TC), triglyceride (TG), low-density lipoprotein cholesterol (LDL-c), and high-density lipoprotein cholesterol (HDL-c) and blood glucose were measured on

Cobas Clinical Chemistry analyser. The values of TC < 200 mg/dl, TG < 150 mg/dl, LDL < 100 mg/dl and HDL > 40 mg/dl were taken normal for comparing the values.¹³

SPSS 21 was used to analyse data. Blood sugar and lipid profile parameters were compared in relation to BMI. Descriptive analysis was done to determine frequencies and percentages. The relationship between categorical variables was calculated by chi-square test. $P < 0.05$ was considered significant.

Results

Of the 116 participants, 34(29.3%) were obese, 34(29.3%) were overweight and 48(41.4%) had normal BMI.

The lipid profile analysis showed that majority of the students had their lipid profile values in the normal range. Cholesterol was <200 mg/dL in 109(94%) participants and >200 mg/dL in 7(6%) participants. LDL was <100 mg/dL in 88(75.9%) participants and HDL was >40 mg/dL in 106(91.4%) participants (Table-1).

Significant mean differences were observed for LDL and HDL scores ($p=0.02$ and $p=0.006$, respectively) while other lipid profile characteristics and glucose were found to be insignificant in relation to BMI (Table-2).

The majority of the overweight and obese participants believed that their eating habits were the cause of their obesity condition ($p < 0.001$). Of the 30(25.9%) participants who accepted that their social life had been sometimes limited because of obesity, 14(46.7%) were obese.

The majority of the overweight and obese participants' had experienced shame or other uncomfortable feelings which had negative effect on their movements and

Table-1: Baseline characteristics of the subjects.

		No.	Percent
BMI Status	Normal	48	41.4
	Over Weight	34	29.3
	Obese	34	29.3
Cholesterol	<200 mg/dL	109	94.0
	>200 mg/dL	7	6.0
Triglyceride	<150 mg/dL	109	94.0
	>150 mg/dL	7	6.0
LDL	<100 mg/dL	88	75.9
	>100 mg/dL	28	24.1
HDL	>40 mg/dL	106	91.4
	<40 mg/dL	10	8.6
Glucose	≤ 110	112	96.6
	>110	4	3.4

BMI: Body mass index.

LDL: Low-density lipoprotein.

HDL: High-density lipoprotein.

Table-2: Comparison of lipid profile and blood sugar by BMI.

		No.	Mean	Std. Deviation	P-Value*
Cholesterol (mg/dl)	Normal	48	123.746	40.1301	0.06
	Over Weight	34	125.635	36.3107	
	Obese	34	143.338	40.3478	
	Total	116	130.042	39.7268	
Triglyceride (mg/dl)	Normal	48	66.304	50.7868	0.11
	Over Weight	34	82.524	70.8423	
	Obese	34	93.009	50.2266	
	Total	116	78.885	57.8545	
LDL (mg/dl)	Normal	48	77.298	33.0615	0.02
	Over Weight	34	82.012	31.0595	
	Obese	34	97.385	29.8044	
	Total	116	84.567	32.4195	
HDL (mg/dl)	Normal	48	40.975	13.0478	0.006
	Over Weight	34	33.029	9.9913	
	Obese	34	34.988	10.8712	
	Total	116	36.891	12.0241	
Glucose (mg/dl)	Normal	48	80.273	15.3982	0.28
	Over Weight	34	79.594	14.9464	
	Obese	34	84.456	9.4166	
	Total	116	81.300	13.8094	

*P-value are based on one-way analysis of variance (ANOVA) (F-test). BMI: Body mass index. LDL: Low-density lipoprotein. HDL: High-density lipoprotein.

Table-3: Perceptions about eating habits and obesity.

		Normal No. (%)	Over Weight No. (%)	Obese No. (%)	Kendall's tau-b	P-Value
Normal eater	I Don't know	7(70)	2(20)	1(10)	0.13	0.14
	Never	5(45.5)	2(18.2)	4(36.4)		
	Sometime	30(37.5)	28(35)	22(27.5)		
	Always	6(40)	2(13.3)	7(46.7)		
Eating habits are the cause of obesity	I don't know	15(68.2)	4(18.2)	3(13.6)	0.31	<0.001
	Never	12(75)	2(12.5)	2(12.5)		
	Sometime	13(31)	14(33.3)	15(35.7)		
	Always	8(22.2)	14(38.9)	14(38.9)		
Loss and regain of weight	I don't know	5(41.7)	4(33.3)	3(25)	0.157	0.06
	Never	5(62.5)	1(12.5)	2(25)		
	Sometime	32(44.4)	22(30.6)	18(25)		
	Always	6(25)	7(29.2)	11(45.8)		
Social life been limited because of obesity	I don't know	9(45)	5(25)	6(30)	0.152	0.07
	Never	30(48.4)	19(30.6)	13(21)		
	Sometime	8(26.7)	8(26.7)	14(46.7)		
	Always	1(25)	2(50)	1(25)		
Feel ashamed or other uncomfortable feelings because of obesity	I don't know	7(87.5)	0(0)	1(12.5)	0.364	<0.001
	Never	27(56.3)	15(31.3)	6(12.5)		
	Sometime	10(22.7)	14(31.8)	20(45.5)		
	Always	4(25)	5(31.3)	7(43.8)		
Weight negatively affects movement and activity	I don't know	4(66.7)	0(0)	2(33.3)	0.304	<0.001
	Never	28(60.9)	15(32.6)	3(6.5)		
	Sometime	8(19)	13(31)	21(50)		
	Always	8(36.4)	6(27.3)	8(36.4)		
Exercise helps to lose weight	I don't know	6(75)	0(0)	2(25)	0.030	0.75
	Never	3(75)	0(0)	1(25)		
	Sometime	3(25)	3(25)	6(50)		
	Always	36(39.1)	31(33.7)	25(27.2)		

Table-4: Participants' responses regarding eating pattern/habits.

		Normal No. (%)	Over Weight No. (%)	Obese No. (%)
No. of meals / Day	0	0(0)	0(0)	0(0)
	1	3(60)	0(0)	2(40)
	2	13(37.1)	9(25.7)	13(37.1)
	3	21(39.6)	19(35.8)	13(24.5)
	>=4	11(47.8)	6(26.1)	6(26.1)
Fruit consumption/ Day	0	25(43.9)	16(28.1)	16(28.1)
	1	16(35.6)	15(33.3)	14(31.1)
	2	7(58.3)	3(25)	2(16.7)
	3	0(0)	0(0)	2(100)
	>=4	0(0)	0(0)	0(0)
Average No. of meals/snacks contain vegetable / Day	0	9(45)	7(35)	4(20)
	1	19(40.4)	15(31.9)	13(27.7)
	2	15(39.5)	11(28.9)	12(31.6)
	3	3(37.5)	1(12.5)	4(50)
	>=4	2(66.7)	0(0)	1(33.3)
Fast food meals/snacks consumption / week	0	2(28.6)	2(28.6)	3(42.9)
	1	6(42.9)	5(35.7)	3(21.4)
	2	11(37.9)	9(31)	9(31)
	3	9(42.9)	7(33.3)	5(23.8)
	>=4	20(44.4)	11(24.4)	14(31.1)
Snacks consumption (cold cuts sandwiches, donuts, chocolate, nuts, and packaged snacks) / week	0	0(0)	5(55.6)	4(44.4)
	1	10(58.8)	4(23.5)	3(17.6)
	2	8(34.8)	5(21.7)	10(43.5)
	3	18(58.1)	9(29)	4(12.9)
	>=4	12(34.3)	11(31.4)	12(34.3)
Soft/Energy drink consumption / day	0	20(46.5)	10(23.3)	13(30.2)
	1	7(30.4)	10(43.5)	6(26.1)
	2	10(47.6)	6(28.6)	5(23.8)
	3	4(33.3)	5(41.7)	3(25)
	4	7(41.2)	3(17.6)	7(41.2)
Hours spend on watching TV, using Internet, PlayStation/ day	0	2(50)	2(50)	0(0)
	1	7(50)	4(28.6)	3(21.4)
	2	7(43.8)	3(18.8)	6(37.5)
	3	13(44.8)	6(20.7)	10(34.5)
	>=4	19(35.8)	19(35.8)	15(28.3)
Hours spend on exercise and sports / Week	0	7(29.2)	8(33.3)	9(37.5)
	1	8(26.7)	10(33.3)	12(40)
	2	6(33.3)	5(27.8)	7(38.9)
	3	16(72.7)	4(18.2)	2(9.1)
	>=4	11(50)	7(31.8)	4(18.2)

activity ($p < 0.001$) (Table-3).

Moreover, 76(65.5%) participants were taking 3 to 4 meals daily, and the majority of these participants were eating fruits and vegetables once in a day. Besides, 66(56.9%) participants were taking 3 to 4 fast food meals weekly. Furthermore, 50(43.1%) participants were having a soft drink or energy drink more than once per day. Also, 82(70.7%) participants were spending 3 or more hours daily in watching TV, using the Internet or PlayStation (Table-4).

Discussion

Our results show that the majority of the participants were taking more junk food and fewer fruits and vegetables and they were using soft drink or energy drink more than once per day, and the prevalence of overweight and obesity was common among students.

A study in Jeddah reported that 73.4% of the students were eating food rich in fat and 13.1% eating fast food daily, while the majority of the students (76.6%) eats fruits

and 38.3% eat vegetables weekly.¹¹ A study from Dammam, KSA, described that the physical inactivity and high consumption of fast food are the most common causes of the high prevalence of overweight and obesity among the younger generation.¹⁴ In contrast to our results, a study in Pakistan reported that medical students have preferred to eat fruits and vegetables, less fast food and soft drinks intake.¹² Recently, Khan et al. reported that there is association between frequent fast-food consumption and weight gain and risk of T2DM.¹⁵

More than two-thirds of our study participants were spending 3 to 4 hours daily in watching TV, using the Internet or PlayStation. Surprisingly, the majority of the overweight and obese participants were neither taking part in sports nor exercising. In literature, several studies have pointed out similar results about screen time.^{5,11,15,16} We suggest that students should avoid spending high percentage of time on computer and the Internet, especially if it is for non-educational purposes.

Several studies have pointed out association of watching television/using the computer for a long time with high BMI.^{5,17,18} Nevertheless, a few studies reported no significant association between overweight/obesity with watching TV/using the computer.^{19,20} A recent study described that among all sedentary behaviours, watching television for a longer period was the most predictive of obesity and diabetes risk.¹⁶ The relationship between sedentary activities with unhealthy dietary habits could be because of the reason that adolescents are likely to consume soft drinks and junk foods while watching TV.²¹

The majority of our study participants were using soft drink or energy drink more than once per day. Numerous studies have pointed out the role of soft drinks in weight gain.^{5,6,17,20} The reason for weight gain could be the high sugar content of these beverages, low satiety, and inadequate compensation for total energy.⁵

Our results showed that more than half (58%) of the students were either overweight (29%) or obese (29%). These results are similar to a study conducted in Riyadh, Saudi Arabia.⁹ Our overweight and obesity incidence is higher than reported by several other studies among college students.^{5,11,22,23} This difference could be due to the small sample size of the present study, but our results are still lower than the reported by the WHO in KSA.⁸

Our study observed that overweight and obesity was prevalent among those participants whose junk food intake was higher. These results are similar to several other studies.^{5,6,17,24}

We found that the obese subjects had significantly

elevated LDL levels and reduced HDL levels. Our results are synchronised with other studies.^{11,25} The high concentration of LDL and low HDL are precipitating cause of CVD. Therefore, it seems that obese subjects are more prone to develop CVD. It is suggested that regarding elevated LDL and decreased HDL levels there is a need to do regular exercise and avoid intake of junk food.

Our study reported 3.4% elevated levels in fasting blood sugar (FBS) levels among all overweight and obese groups. A study mentioned 2.1% of students had elevated FBS level (impaired fasting glucose and hyperglycaemia).¹¹ Another study involving urban adult population found 34.9% elevated FBS.²⁵ The impaired fasting glucose and hyperglycaemia found in overweight and obese subjects make them prone to develop T2DM and consequently CVD. Therefore, to prevent DM and CVD in young age it is very crucial that the young generation has good healthy eating habits and active living.

The overweight and obese participants were feeling difficulties in their daily life, and they had the positive attitude that exercise would help them in losing weight. But surprisingly, their positive attitude is not being translated into practice. Recently, a study from Pakistan reported that with overweight and obesity there was lack of physical activity among medical students.¹⁵

The high percentage of overweight/ obesity could be explained from the fact that low PA and the use of saturated fat in customary cooking was common in this region.¹⁸ A study pointed out that in Saudi Arabia the staple food is bread, rice and meat, and the young generation has unhealthy eating habits, and they fulfil their calories requirement by high intake of fat and carbohydrates.²⁶ We suggest that we should inculcate good habits of healthy eating and active living among our students.

The obesity, diabetes and cardiovascular risk interconnection has already been established among comparatively older people but we investigated these among young university students because we believe that early detection plays important role in prevention. Moreover, these diseases are chronic in nature and start in young age and become overt in middle age or late stages of life. Therefore, it is important to find out their connections among young university students.

Family and community norms, schools and colleges settings, government policies, and social and mass media influence children and adolescents dietary pattern and physical activity behaviours.¹⁶ There is a need that all these play their role more efficiently. We suggest that if children are trained since their childhood about the importance of healthy dietary patterns and physical

activities and their impact on human life then it may help in the prevention of related problems in adulthood.

The colleges and universities should also provide opportunities to the students to participate in physical activities and make them realise that a healthy mind and brain can only make a progressive and strong nation.

There are several limitations to our study as the dietary patterns and physical activities were evaluated by a questionnaire. Therefore, the respondents' biases cannot be ignored. Moreover, the sample size of our study was small, it was carried out at one place and only males were included. Therefore, our results cannot be generalised.

Conclusion

Dietary habits and lifestyle of most participants were not up to the mark. The prevalence of overweight and obesity was common among young students.

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