Dietary habits among female medical student in King Khalid University, Abha City, 2014

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Abstract

Background: Diet and physical activity play important roles in maintaining health. A better understanding of the relationships and healthy behaviors among people are considered as effective prevention and management techniques of lifestyle-related risk factors.

Objective: To assess and determine the dietary habits among the female medical students in King Khalid University (KKU).

Materials and Methods: A cross-sectional study was conducted among female medical college students of KKU, Abha. A previously validated questionnaire was used. It consisted of information about the students (age, grade, and marital status), their measurements [weight, height, and body mass index (BMI)], their dietary assessment using Food Frequency Questionnaire, and physical exercise assessment using General Practice Physical Activity Questionnaire.

Result: Of the 382 students, 314 female medical students were included for the study with a response rate of 82.2%. Their age ranged between 17 and 29 years. Half of them were normal whereas 20.7% and 9.2% were overweight and obese, respectively. Regarding physical activities, 60.8% female students were physically inactive whereas 29% and 8.6% of them were moderately inactive and active, respectively. Only 1.6% students were active. The infrequent intake of fresh vegetables was associated with higher significant rate of overweight and obesity among female students (12.2% vs. 8.3%, $p = 0.009$). Less intake of fresh fruits was associated with higher significant rate of obesity among female students (30.5% and 17% vs. 18.4% and 7.5%, respectively, $p = 0.008$), whereas the frequent intake of chocolate was associated with higher significant rate of overweight among female students (24.7% vs 1.8%, $p < 0.001$).

Conclusion: A considerable proportion of female students of KKU, KSA were either overweight or obese. Some dietary habits were significantly associated with overweight and/or obesity among them.

KEY WORDS: Dietary habits, Abha, medical student, female

Introduction

Dietary habits and physical activity play significant roles in maintaining health as well as preventing the diseases. Unhealthy dietary habits and lifestyles among adolescents are now considered as risk factors for several nutrition-related diseases in adulthood.[1] A significant association has been found between unhealthy food habits and nutrient deficiencies, such as iron deficiency anemia, calcium and vitamin D deficiencies, and underweight. Problems associated with over-nutrition were obesity, elevated blood pressure, and diabetes in children and adolescents.[2] Patterns of food consumption have changed dramatically in the Eastern Mediterranean countries during the past four decades; calorie-dense foods and sugar-sweetened beverages are becoming increasingly accessible to children and adolescents.[3] Many studies have shown that adults often establish these tastes and habits when they are young.[4] So, it is advisable to begin establishing good eating habits at younger age. Importantly, however, for children food decisions are controlled by parents and preschools.[5] One of the important time of life for choice of food is when

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people step out independently for the first time and begin to make all of their own food decisions. For many people, this is the transition to college life. The transition to college or university is a critical period for young adults, who are often facing their first opportunity to make their own food decisions.[6]

Students have the habits of eating fewer fruits and vegetables on a daily basis and reported high intake of high-fat, high-calorie foods.[7] The transition to college life often worsens dietary habits among students,[8] which could contribute to weight problems. Student's life depends on his or her dietary habits and diet-related health.[9] Students living off-campus reported a higher percentage of energy from protein. Similarly, serum triglyceride level and the ratio of total cholesterol to high-density lipoprotein were also higher among students living off campus. Students living outside the campus are choosing different foods than those living inside the campus. Female college students tend to eat more fatty foods than male students, though their fruit and vegetable consumption tends to remain similar. Residence on or off campus made a difference, but it also interacted with gender. Higher energy from protein was more prevalent among men living off campus than on campus. For women, higher serum triglyceride and ratio of total cholesterol to high-density lipoprotein was found among those who lived off campus. Mooney and Walbourn[10] found that females avoided certain foods for weight, health, and ethical reasons (especially when avoiding meat) more significantly than males. A study conducted on American adolescents indicated that breakfast consumption during school years was associated with about a 30% lower likelihood of later becoming overweight or obese.[11] Moreover, research studies and reviews indicate that skipping the breakfast is highly prevalent among adolescents in many Arab countries.[12] The most alarming is the clustering effect of such unhealthy lifestyle habits among children and adolescents. Results of a systematic review indicated that sedentary behaviors, as measured by total screen-viewing time, were clearly associated with lower fruit and vegetable intake and higher consumption of energy-dense snacks, drinks, and fast foods.[13] Studying the current food habits and lifestyles among various age groups in the Saudi community is the first step to establish an effective intervention strategy. Food habits and lifestyle in Saudi Arabia have been the focus of a number of studies. Farghaly et al.[14] found that the food habits of schoolchildren in Abha, Saudi Arabia were rich in carbohydrates and deficient in fiber. About 49% secondary school children consumed breakfast regularly. Amin et al.[15] reported that children aged 10–14 years in Al-Hassa, Saudi Arabia, either missed or had an infrequent intake of breakfast at home; had a frequent intake of fast foods; and a low intake of fruit, vegetables, and milk. Washi and Ageib[16] showed that 44.6% adolescents were overweight, and 56.6%, 30.5%, and 13.0% energy was derived from carbohydrates, fats, and proteins, respectively in Jeddah, Saudi Arabia. Compared to the dietary reference intake, carbohydrate and fat intakes were higher and calcium, iron, and zinc intakes were lower. Higher cholesterol and lower hemoglobin levels were found in 30.5% and 53.6% of the adolescents, respectively.

The poor dietary habits among schoolgirls aged 13–18 years were related to the impaired nutritional status of the girls. A study in Saudi[17] revealed that the majority of adolescents did not have a daily intake of breakfast, fruit, vegetables, and milk. Females were significantly ($p < 0.05$) more sedentary; not physically active, especially with vigorous physical activity; and there were fewer days per week when they consumed breakfast, fruit, milk and diary products, sugar-sweetened drinks, fast foods, and energy drinks than males. However, the females' intake of French fries and potato chips, cakes and donuts, and candy and chocolate was significantly ($p < 0.05$) higher than the males'. Screen time was significantly ($p < 0.05$) correlated inversely with the intake of breakfast, vegetables, and fruit. Physical activity had a significant ($p < 0.05$) positive relationship with fruit and vegetable intake but not with sedentary behaviors. The high prevalence of sedentary behaviors, less physical activity, and unhealthy dietary habits among Saudi adolescents is a major public health concern. There is an urgent need for national policy to promote active living, healthy eating, and to reduce sedentary behaviors among children and adolescents in Saudi Arabia. Lifestyle factors associated with overweight and obesity among Saudi adolescents. Al-Hazzaa et al.[18] reported that compared with nonobese, obese males and females were significantly less active, especially in terms of vigorous activity and had less favorable dietary habits (e.g., lower intake of breakfast, fruits, and milk), but had lower intake of sugar-sweetened drinks and sweets/chocolates. This study aimed to identify several lifestyle factors associated with obesity that may represent valid targets for the prevention and management of obesity and to clarify the difference of lifestyle and dietary habits among female medical students in King Khalid University.

Materials and Methods

A cross-sectional design study was carried out among 382 female students at King Khalid University, Aseer Region, KSA. A validated questionnaire was used to obtain information on the frequency of the intake of food items and on lifestyle. It composed of the general information about the students (age, grade, and marital status), their measurements (weight, height, and body mass index). Obesity in adults was defined as BMI greater than or equal to 30 kg/m², whereas BMI from 25 to 29.9 kg/m² was considered overweight, BMI from 18.5 to 24.9 kg/m² was considered normal whereas BMI < 18.5 was considered underweight.[19] Dietary assessment using Food Frequency Questionnaire[20] measures the frequency of common meals. For the purpose of this study, students who never consumed or consumed the studied food staffs in a frequency of 1–3 times per month were considered as having infrequent consumption whereas those who consumed at a rate of more than this were considered as having frequent consumption. Physical exercise using General Practice Physical Activity Questionnaire (GPPAQ), which is developed by the London School of Hygiene and Tropical Medicine as a

validated short measure of physical activity.[21] The questionnaires were distributed to students in their college and were explained to the students by the researcher. It also consisted of two sections: food frequency intake per week and lifestyle habits. The frequency of the intake of foods per week was then grouped according to two categories: <once/week and ≥4 once per week. Lifestyle habits included hours of watching television per day (eating le watching television) and the frequency of eating breakfast, practicing exercise, and using internet per day. The researcher was available to clarify any issue and recollected soon after encounter. The data were collected using the Statistical Package for Social Sciences (SPSS) software, version 21.

Result

Of the 382 students recruited, the study included 314 female medical students with a response rate of 82.2%. Table 1 summarizes baseline characteristics of the respondents, their age ranged between 17 and 29 years with a mean of 21 years. They were equally distributed among the six academic years. Majority of them (88.2%) were unmarried. Half of the students were normal whereas 20.7% were overweight and 9.2% were obese. Underweight was recorded among 18.8% students. Majority of them were nonsmoking (98.8%). Table 2 shows the association between BMI and baseline characteristics. Higher rates of overweight and obesity were reported among students in the age group 21–23 years (25.4% and 9.9%, respectively) compared to younger students (16.3% and 8.8%, respectively) and older students (20% and 8%). These differences were statistically significant, $p = 0.023$. The highest rate of overweight was seen among students of the fourth academic year (36.5%) whereas the lowest rate was observed among those of the sixth academic year (9.1%). Highest rate of obesity was reported among students of the fifth academic year (12.7%) and the lowest was observed among those of the first academic year (5.9%). However, the association between academic year of the students and their BMI was not statistically significant. On one hand, overweight was reported at higher rate among married compared to single students (27% vs. 19.9%). On the other hand, rate of obesity was higher among single than married students (9.7% vs. 5.5%). However, these differences were not statistically significant. Table 3 shows that 60.8% female students were physically inactive whereas 29% and 8.6% of them were moderately inactive and moderately active, respectively. Only 1.6% students were active. Although the rate of physical inactivity reported among normal students (56.1%) was lower than those reported among overweight (69.2%), underweight (63.5%), and obese (62.1%) subjects, the difference was not statistically significant. Table 4 shows that female students who reported frequent intake of semi-skimmed milk were more likely to be obese than those who took infrequently (31.1% and 5.6%, respectively). This difference was statistically significant, $p < 0.001$. Female students who reported frequent intake of

orange juice were less likely to be overweight than those who infrequently take orange juice (24.3% and 11.4%, respectively). This difference was statistically significant, $p < 0.05$. Female students who reported frequent intake of fruit drink with sugar were more likely to be overweight than those who infrequently take fruit drink with sugar (22.5% and 17.5%, respectively). However, they were less likely to be obese (8% and 11.4%, respectively). This difference was borderline statistically significant, $p = 0.054$. Female students who reported frequent intake of soft drink with sugar were more likely to be overweight than those who infrequently took soft drink with sugar (25.9% and 13.2%, respectively). This difference was statistically significant, $p < 0.05$. Students who frequently take soft drink without sugar were more likely to be overweight than those who infrequently take soft drink without sugar (22.8% and 6.2%, respectively) and difference was statistically significant, $p = 0.001$. Frequency of intake of boiled potatoes was significantly associated with obesity compared to infrequent intake (10.8% vs 5.9%), $p = 0.029$. Also the intake of potatoes chips was associated with higher rate of overweight among female students (23.7% vs. 9.2%). However, this was not statistically significant, $p = 0.077$. Less intake of fresh vegetables was associated with higher significant rate of overweight and obesity among female students (12.2% vs. 8.3%, $p = 0.009$). Less intake of fresh fruits was associated with higher significant rate of obesity among female students (30.5% and 17.0% vs. 18.4% and 7.5%, respectively, $p = 0.008$). Less frequent intake of chocolate was associated with higher significant rate of overweight among female students (24.7% vs. 1.8%, $p < 0.001$) (Table 4).

Discussion

This study revealed that the prevalence of obesity and overweight was 9.2% and 20.7%, respectively, among the included female medical students. Half of them are normal in weight. This is higher than the study reported by Majeed[22] among female college students at Dammam University who found that 18% students were overweight or obese. Survey population of Anding et al.[23] has an overweight incidence of 20%. They reported that many college students had poor nutritional habits. Most did not meet the minimum recommended intake of dietary fiber, fruits, and vegetables; they also exceeded recommended intakes of total fat, sugar, and sodium. Similarly, this study observed that infrequent intake of fresh fruits and vegetables, frequent intake of chocolates and boiled potatoes, and the intake of soft drinks with/without sugar were associated with overweight and/or obesity. Low intake of fruit and vegetables is associated with several chronic diseases at adulthood.[24] Interestingly, the frequent intakes of semi-skimmed milk and soft drinks without sugar were significantly associated with higher rate of obesity. This could be attributed to the fact that their intake is a consequence of obesity and not the reason of it.

Also, this study revealed that almost a quarter of the students reported skipping breakfast and/or lunch often whereas

Table 1: Baseline characteristics of the respondents (N=314)

	Number	Percentage
Age in years:		
17-20	147	46.8
21-23	142	45.2
>23	25	8.0
Academic year:		
1st	51	16.2
2nd	59	18.8
3rd	53	16.9
4th	52	16.6
5th	55	17.5
6th	44	14.0
Marital status:		
Single	277	88.2
Married	37	11.8
Smoking status:		
Non-smoking	304	96.8
Smoking	10	3.2
Weight status:		
Under-weight	63	18.8
Normal	157	50
Over-weight	65	20.7
Obesity	29	9.2

Table 2: Association between baseline characteristics of female medical students in king Khalid University and their body mass index

Baseline characteristics	Body mass index				X^2 (p-value)
	Under-weight N=63 N (%)	Normal N=157 N (%)	Overweight N=65 N (%)	Obese N=29 N (%)	
Age in years					
17-20 (n=147)	42 (28.6)	68 (46.3)	24 (16.3)	13 (8.8)	
21-23 (n=142)	19 (13.4)	73 (51.4)	36 (25.4)	14 (9.9)	14.70
>23 (n=25)	2 (8.0)	16 (64.0)	5 (20.0)	2 (8.0)	(0.023)
Academic year					
1st (n=51)	11 (21.6)	27 (52.9)	10 (19.6)	3 (5.9)	
2nd (n=59)	15 (25.4)	27 (45.8)	10 (16.9)	7 (11.9)	
3rd (n=53)	14 (26.4)	22 (41.5)	13 (24.5)	4 (7.5)	
4th (n=52)	6 (11.5)	22 (42.3)	19 (36.5)	5 (9.6)	
5th (n=55)	11 (20.0)	28 (50.9)	9 (16.4)	7 (12.7)	22.84
6th (n=44)	6 (13.6)	31 (70.5)	4 (9.1)	3 (6.8)	(0.088)
Marital status					
Single (n=277)	55 (19.9)	140 (50.5)	55 (19.9)	27 (9.7)	1.67
Married (n=37)	8 (21.6)	4 (5.9)	10 (27.0)	2 (5.5)	(0.645)

Table 3: Association between body mass index of female medical students in king Khalid University and their physical activity

Body mass index	Physical activity				X^2 (p-value)
	Inactive N=191 N (%)	Moderately inactive N=91 N (%)	Moderately active N=27 N (%)	Active N=5 N (%)	
Body mass index					
Underweight (n=63)	40 (63.5)	14 (22.2)	8 (12.7)	1 (1.6)	
Normal (n=157)	88 (56.1)	54 (34.4)	13 (8.3)	2 (1.3)	8.55
Overweight (n=65)	45 (69.2)	14 (21.5)	4 (6.2)	2 (3.1)	(0.480)
Obese (n=29)	18 (62.1)	9 (31.0)	2 (6.9)	0 (0.0)	

Table 4: Association between dietary intake and body mass index among female medical students, King Khalid University, Abha

	Body mass index				p-value
	Underweight N=63 N (%)	Normal N=157 N (%)	Overweight N=65 N (%)	Obese N=29 N (%)	
Full fat milk					
Infrequent (n=147)	23 (15.6)	75 (51.0)	34 (23.1)	15 (10.2)	
Frequent (n=167)	40 (24.0)	82 (49.1)	31 (18.6)	14 (8.4)	0.282
Low fat milk					
Infrequent (n=214)	43 (20.1)	110 (51.4)	45 (21.0)	16 (7.5)	
Frequent (n=100)	20 (20.0)	47 (47.0)	20 (20.0)	13 (13.0)	0.466
Semi-skim. milk					
Infrequent (n=269)	55 (20.4)	143 (53.2)	56 (20.8)	15 (5.6)	
Frequent (n=45)	8 (17.8)	14 (31.1)	9 (20.0)	14 (31.1)	<0.001
Skimmed milk					
Infrequent (n=280)	60 (21.4)	142 (50.7)	54 (19.3)	24 (8.6)	
Frequent (n=34)	3 (8.8)	15 (44.1)	11 (32.4)	5 (14.7)	0.094
Orange juice					
Infrequent (n=88)	16 (18.2)	51 (58.0)	10 (11.4)	11 (12.5)	
Frequent (n=226)	47 (20.8)	106 (46.9)	55 (24.3)	18 (8.0)	0.040
Fruit drink with sugar					
Infrequent (n=114)	31 (27.2)	50 (43.9)	20 (17.5)	13 (11.4)	
Frequent (n=200)	32 (16.0)	107 (53.5)	45 (22.5)	16 (8.0)	0.054
Fruit drink without sugar					
Infrequent (n=241)	48 (19.9)	122 (50.6)	50 (20.7)	21 (8.7)	
Frequent (n=73)	15 (20.5)	35 (47.9)	15 (20.5)	8 (11.0)	0.941
Soft drinks with sugar					
Infrequent (n=129)	27 (20.9)	74 (57.4)	17 (13.2)	11 (8.5)	
Frequent (n=185)	36 (19.5)	83 (44.9)	48 (25.9)	18 (9.7)	0.036
Soft drinks without sugar					
Infrequent (n=257)	52 (20.2)	132 (51.4)	57 (22.2)	16 (6.2)	
Frequent (n=57)	11 (19.3)	25 (43.9)	8 (14.0)	13 (22.8)	0.001
Boiled potatoes					
Infrequent (n=213)	38 (17.8)	115 (54.0)	37 (17.4)	23 (10.8)	
Frequent (n=101)	25 (24.8)	42 (41.6)	28 (27.7)	6 (5.9)	0.029
Potato chips					
Infrequent (n=65)	16 (24.6)	37 (56.9)	6 (9.2)	6 (9.2)	
Frequent (n=249)	47 (18.9)	120 (48.2)	59 (23.7)	23 (9.2)	0.077
Vegetables (fresh)					
Infrequent (n=59)	11 (18.6)	20 (33.9)	18 (30.5)	10 (17.0)	
Frequent (n=255)	52 (20.4)	137 (53.7)	47 (18.4)	19 (7.5)	0.008
Fruit (fresh)					
Infrequent (n=74)	24 (32.4)	28 (37.8)	13 (17.6)	9 (12.2)	
Frequent (n=240)	39 (16.3)	129 (53.7)	52 (21.7)	20 (8.3)	0.009
Whole meal bread					
Infrequent (n=120)	24 (20.0)	62 (51.7)	27 (22.5)	7 (8.3)	
Frequent (n=194)	39 (20.1)	95 (49.0)	38 (19.6)	22 (11.3)	0.416
Fish					
Infrequent (n=174)	34 (19.5)	93 (53.4)	28 (16.1)	19 (10.9)	
Frequent (n=140)	29 (20.7)	64 (45.7)	37 (26.4)	10 (7.1)	0.103
Pizza					
Infrequent (n=150)	31 (20.7)	78 (52.0)	29 (19.3)	12 (8.0)	
Frequent (n=164)	32 (19.5)	79 (48.2)	36 (22.0)	17 (10.4)	0.797
Sweets					
Infrequent (n=72)	12 (16.7)	39 (54.2)	12 (16.7)	9 (12.5)	
Frequent (n=242)	51 (21.1)	118 (48.8)	53 (21.9)	20 (8.3)	0.445
Chocolate					
Infrequent (n=55)	22 (40.0)	28 (50.9)	1 (1.8)	4 (12.7)	
Frequent (n=259)	41 (15.8)	129 (49.8)	64 (24.7)	25 (9.7)	<0.001
Savoury snacks					
Infrequent (n=94)	13 (13.8)	57 (60.6)	16 (17.0)	8 (8.5)	
Frequent (n=220)	50 (22.7)	100 (45.5)	49 (22.3)	21 (9.5)	0.086

approximately only one-fifth never skipped. A quarter reported skipping evening meal often whereas 17.8% never skipped evening meal. Worse results were found by a Malaysian study in which more than 40% of the study participants skipped breakfast.[25] In a Chinese study, 83.6% university students consumed regular meals and 79% of them took their meals at least three times per day.[25] Smith et al.[26] concluded in their longitudinal study that skipping breakfast may be related to risk for obesity and cardio-metabolic health as they found that participants who skipped breakfast in both childhood and adulthood had a larger waist circumference and higher fasting insulin, total cholesterol, and LDL cholesterol concentrations than those who ate breakfast regularly. In this study, skipping breakfast and lunch were significantly associated with increased rate of overweight or obese, whereas skipping evening meal was associated with lower rate of obesity. Our findings revealed that a minority of female university students were physically active. Also, in this study, BMI was not significantly associated with the physical activity level. The same has been reported by Khalaf et al.[27] in a study conducted among female university students in Southwestern Saudi Arabia. A recently published review study reported significant correlations between increased BMI and decline in physical activity levels.[28] Contrary to this, a study conducted on American university students of Arabic origin found that the overweight students were more physically active than their underweight counterparts.[29] In this study, 3.2% female students at King Khalid University, KSA have experimented with smoking. It is comparable to rate reported in a study conducted by Abdulghani et al.[30] to determine the prevalence of tobacco smoking among Saudi female students studying at the five different colleges in KSU (4.3%). One of the major limitations of this study is that it used a self-administered questionnaire. This may have affected the estimation of the true prevalence of studied habits due to recall bias that should be taken into consideration. Furthermore, the compliance of students in answering the questionnaire and giving true information might not have been accurate, as the study dealt with sensitive issues regarding our preserved Saudi culture (smoking, physical activity, and dietary consumption), especially in the female population. Finally, the cross-sectional design of the study is also questionable in detecting the cause–effect relationship.

Conclusion

A considerable proportion of female students, King Khalid University, KSA were either overweight or obese. Some dietary habits were significantly associated with overweight and obesity, such as skipping any of main meals, removing visible fat from meat and skin from chicken, inclusion of some unsalted nuts and seeds in your diet, infrequent intake of fresh vegetables and fruits, frequent intake of chocolates and boiled potatoes, and intake of soft drinks with or without sugar. Minority of the students were physically active and smokers. However, both of them were not related to BMI of the students. Based on this study, we recommended nutrition education for college students

regarding importance of good dietary habits in maintaining healthy body weight. Encouragement was recommended to improve students' lifestyles and personal health behaviors through a health promotion program. Female college students will be future mothers, thus this will benefit the whole community. Increase in awareness of female college students regarding the importance of physical activity and decrease in the body weight, regular interaction between students, college authorities, and health personnel is required to emphasize the connection between health, healthy food choices, and lifestyle habits. Finally, there is a need for a national strategy both at institutional and community levels aiming at modifying the unhealthy lifestyle among Saudi people.

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