

Obesity and its Association with Dietary Habits among Students of Al-Ghad Health Colleges-Abha

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Abstract: There have been rapid and cultural changes in the Arabian Gulf region over the past few years, which have also increased the prevalence of overweight and obesity rates. The aim of this research was to determine the prevalence and variables associated with overweight/obesity among students of Al-Ghad health colleges. Between February and March 2019, a descriptive cross-sectional study was carried out at Al-Ghad colleges, using convenient sampling to recruit students. A total of 276 students completed self-reported questionnaires that include demographic data on weight, height, eating habits and physical activities. Body Mass Index (BMI) was calculated to determine whether they fall under the category of being overweight/obese. Out of 276 students, 166 were male (60.1%) and 110 (39.9%) were female students. The prevalence of underweight in the current study was found to be 8.0%, overweight 24.6% and obese 25.4%. It was found that 17.8% of obese students were males, while 7.6% were females with a significant association between gender and body mass index ($p=0.019$). Statistical significant associations were found between obesity and walking up night to eat, wishing to reduce weight and adopting certain diet program ($p<0.05$). Results highlighted the need of educating students regarding good dietary habits.

Key words: Dietary Habits • Body Mass Index • Obesity • University Students

INTRODUCTION

The World Health Organization (WHO) describes a body mass index (BMI) ≥ 25 kg/m² as overweight and a BMI ≥ 30 kg/m² as obesity [1]. Obesity is often defined to the point of adversely affecting well-being as a condition of excessive and unhealthy accumulation of fat in adipose tissue [1]. In both developing and developed countries, the prevalence of obesity is growing at an unprecedented pace worldwide. It has become a major epidemic health problem, projected to be the fifth leading cause of global mortality [1]. In 2025, it is expected that the prevalence of overweight and obesity will rise and approximately more than 2.3 billion overweight and more than 700 million, were obese worldwide [2]. In adults, estimated prevalence of obesity exceeded 50.0 % in many countries of the world [3]. Several studies have also confirmed the prevalence of overweight and obesity among university students [3-7].

In addition, overweight and obesity are significant risk factors for a variety of chronic diseases, such as some cancers, hypertension, type II diabetes mellitus,

dyslipidemia, metabolic syndrome and coronary heart disease [1, 8, 9]. The rapid cultural and social changes in the Arab Gulf region have been linked to an unprecedented rise in obesity [5, 7, 10]. Dietary shifts, which have been more 'Westernized' in terms of quantity and quality, are one of the major causes of obesity [11]. A recent study in Kingdom of Saudi Arabia (KSA) has found that the consumption of animal products and refined dietary foods at the expense of vegetables and fruits has increased [5]. In the last few decades, these dietary changes have been accused of increasing the prevalence of both overweight and obesity among Saudi children, teens and adults [12-14].

Obesity is typically more common among women than among men, according to the WHO [1]. Nevertheless, research on college students reported higher rates of obesity in men than in women [7, 15] and among those with chronic diseases [7]. A study was conducted among male students ranging from age 18 to 24 years at Al-Qassim University, showed that 22% of the students were classified as overweight and 16% were classified as obese [13]. Although, a school based study

of adolescents conducted in three major cities Al-Khobar, Jeddah and Riyadh of Saudi Arabia showed a prevalence of overweight of 20.0 % in males and 21.0 % in females while that of obesity was 24.0 % in males and 14.0 % in females [16]. A recent study conducted at University of Hail in college medicine showed that the overall prevalence obesity among the medical students of Hail University is high (64.7 %), which is comparable to the other studies [14].

In some Saudi studies, unhealthy eating habits have been reported, such as low consumption of fruits, vegetables, fiber and dairy foods, high intake of fast foods and fizzy drinks, snacking outside the home and erratic eating habits, such as skipping meals, particularly breakfast, have been recorded in some Saudi studies [17, 18]. In the etiology of obesity, there are a range of variables involved, including genetic predisposition, lack of physical activity and high intake of fat, energy-dense, easily available, inexpensive, widely advertised, behavioral and physiological factors [1, 17, 19].

The prevalence of obesity among Saudi undergraduate students in the northern or western region of Saudi Arabia was investigated in previous studies conducted in Saudi Arabia, but little or no data was available on the prevalence of obesity and related risk factors among health college students in the southern region of Saudi Arabia. The ultimate purpose of this current study was to determine the prevalence of obesity and overweight and variables associated with overweight/obesity among students of Al-Ghad health college.

MATERIALS AND METHODS

Study Design and Setting: A descriptive cross-sectional study was undertaken at Al-Ghad health colleges –in Abha city between February-March, 2019.

Population and Sampling: The study comprised undergraduate students from two branches of Al-Ghad colleges by convenience sampling method. In Alghad colleges, students in the preparatory year and after successful completion of preparatory year were enrolled; students will be distributed to four academic departments: Emergency Medical Services, Radiology Sciences, Nursing Sciences and Clinical Laboratory Sciences.

Previous studies have reported prevalence of obesity among medical students ranged from 13.7 to 28.7 % in Saudi Arabia. Hence, based on 28.7 % prevalence of obesity, at 95 % confidence interval and margin of error as

5 %, the target sample size was calculated as 315 students. The final sample was constituted by 276 students who returned completely filled- in questionnaires with response rate of 87.6 %.

Instrumentation: A version of closed-ended Arabic questionnaire was developed by researchers to collect the required information. The Arabic version was used to ensure better understanding among the subjects. The final version of questionnaire was reviewed for face validity by the expert panel of researchers at King Khalid University and Al-Ghad International Colleges for Applied Medical Sciences. Self-administrated questionnaires, together with information sheets and consent forms, were distributed to Al-Ghad college students to obtain data for three sections: Section 1- included information on demographic data such as gender, age, current living condition, student department, family size, monthly income, father and mother education, family history of chronic illness and overweight/obesity. Section 2- included information about eating habits and physical activities as, eating balanced nutrition, eating breakfast, eating fried food, waking up night to eat, wishing reducing weight, following up certain diet program, playing sports for how many days, watching T.V, using computer, studying hours. Section3- included physical assessment data concerning weight, height and calculation of Body Mass Index (BMI).

BMI is a measure of the mass of the body relative to height, measured by dividing the weight in kilograms to the square height in meters (kg/m^2). Participants were graded according to their BMI in five classes: (1) underweight, $\text{BMI} < 18.5 \text{ kg}/\text{m}^2$; (2) average weight, $\text{BMI} 18.5\text{-}24.9 \text{ kg}/\text{m}^2$; (3) overweight, $\text{BMI} 25\text{-}29.9 \text{ kg}/\text{m}^2$; (4) obesity grade I, $\text{BMI} 30.0\text{-}34.9 \text{ kg}/\text{m}^2$ and (5) obesity grade II, $\text{BMI} 35.0\text{-}39.9 \text{ kg}/\text{m}^2$ and obesity grade III $\text{BMI} \geq 40.0 \text{ kg}/\text{m}^2$.

Data Collection Procedures: A pilot study was conducted earlier on a convenience sample of 15 male and 15 female students studying in a college rather than Al-Ghad colleges selected in the actual study to check the validity, feasibility, clarity and comprehensibility of the questionnaire and the necessary modifications were done accordingly. Study subjects given a brief details on the study before being asked to complete the self-administered questionnaire. The subjects were told of the importance of responding frankly and confidentially to the questions. Throughout their class sessions, the researchers contacted the lecturers of the selected

classes, presented information about the study and determined a strategy for data collection. During the second semester of the 2018/2019 academic year, data collection was carried out. After their lecture in class, the questionnaire was administered to the students and collected immediately to avoid them consulting each other.

Ethical Consideration: Prior data collection, ethical approval was received from the ethics and study committee of Al-Ghad colleges. By using the student data sheet, the students were completely briefed about the essence of the analysis. Participation was voluntary and consent was received from each participant in writing. Anonymity of all respondents was retained as the questionnaire did not mention any names.

Statistical Analysis: Data Analysis was done using Statistical Package for Social Sciences (IBM SPSS statistics) version 22. Descriptive statistics, suitable to the used measurement level, was utilized to describe and summarize all demographic variables. For comparative analyses, the medical students with BMI ≥ 18.5 kg/m² were selected and placed in 2 groups: those with BMI ≤ 29.9 kg/m² (Non-Obese group), those with BMI > 29.9 kg/m² (Obese group). The latter group was compared with the first group (reference group). Different differential statistical tests were used to determine the strength of association between being non-obese and/or obese and each of the two health behaviors was studied with the level of statistical significance at $p < 0.05$.

RESULTS

Socio-Demographic Characteristics of the Students: Of the total 276 students, 60.1 % (n=166) were males, with 59.0 % (n=163) belonged to the age group 20 to 24 years. Majority of the subjects were lived with their families (84.1 %). Nearly one third 30.8 % (n=85) of the subjects enrolled in nursing department followed by 21.4 % (n=59) in emergency medical services. About half 54.7 % (n=151) of the subjects belonged to large family size that have more than five members. Overall, 44.6 % (n=123) of the subjects belonged to families with an average monthly income greater than 10000 Saudi Riyals (SAR). Nearly half of the subjects 48.2 % (n=133) reported their fathers' education and 45.3 % (n=125) their mothers' education were below school education. More than two thirds 69.2 % (n=191) had not a family history of either obesity or overweight (Table 1).

Anthropometric Measurements: Anthropometric measurements and prevalence of overweight and obesity among Al-Ghad College students according to gender groups are presented in Table 2. The prevalence of obesity was higher among males than females. Out of 70 obese participants, 17.8 % were males while only 7.6 % were females. Out of 68 of total overweight participants, 13.8 % of females were overweight compared to 10.8 % of males. There was a significant association between gender and body mass index among Al-Ghad health college undergraduate students ($p=0.019$). The mean weight and height of the male students were (76.12 ± 23.96 kg) and (1.67 ± 0.09 cm) respectively while in female were (65.7 ± 17.68 kg) and (1.61 ± 0.10 cm) respectively. The average BMI of male students was (27.15 ± 7.56 kg/m²) compared to (25.35 ± 7.14 kg/m²) in females. The comparing of mean body weight, height, BMI and gender groups revealed that there were a significant difference ($p=0.000$, $p=0.000$ and $p=0.049$) respectively.

Association Between Student's Socio-Demographic Characteristics and Level of BMI: The relationship between non-obese, obese and students characteristics is shown in Table 3. The criteria for non-obese category include students who have underweight, normal weight and overweight BMI. The criteria for obese category include students who have obesity Class I, Class II and Class III BMI. Male students (70.0 %) were more likely to get obesity compared to females students (30.0 %), there were a statistical significant between gender and level of BMI ($p=0.05$). The prevalence of obesity was high (34.3 %) among emergency services students compared to other students. A statistical significant association between obese BMI and students' department was identified ($p=0.036$). However, the highest prevalence of obesity was found in those who had father and mother education below school (30.0 and 40.0 %) respectively with no statistical significant difference ($p > 0.05$). There were no significant difference existed between obese BMI level and other students' characteristics as age groups, current living condition, family size, monthly income, family history of chronic illness, overweight and obesity ($p > 0.05$).

Association Between Students' Life Style/dietary Factors and Level of BMI: The relationship between non-obese, obese BMI and life style/dietary factors is presented in Table 4. The study results revealed that the majority of students did not eat balanced nutrition and breakfast (68.5 and 62.3 % respectively). The prevalence of obesity

Table 1: Distribution of Socio-demographic Characteristics of the Students' (N=276)

Variable		No.	%
Gender	Male	166	60.1
	Female	110	39.9
Age Groups	< 20 years	46	16.7
	20 – 24 years	163	59.0
	25 – 29 years	46	16.7
	>29 years	21	7.6
Living Condition	With Family	232	84.1
	Hostel House	23	8.3
	Others	21	7.6
Department	Preparatory	50	18.1
	Nursing Sciences	85	30.8
	Radiology Sciences	50	18.1
	Emergency Health Services	59	21.4
	Clinical Laboratory Sciences	32	11.6
Family Size	<3 members	81	29.3
	3 - 5 members	44	15.9
	>5 members	151	54.7
Monthly Income	< 5000 SAR	78	28.3
	5000-10000 SAR	75	27.2
	>10000 SAR	123	44.6
Father Education	Below School Education	133	48.2
	School Education	72	26.1
	Diploma Education	10	3.6
	University Education	61	22.1
Mother Education	Below School Education	125	45.3
	School Education	83	30.1
	Diploma Education	27	9.8
	University Education	41	14.9
Family History Overweight/Obesity	Yes	85	30.8
	No	191	69.2
Family History Chronic Illness	Yes	76	27.5
	No	200	72.5

Table 2: Distribution of the Students' Anthropometric Characteristics (N=276)

Variable	Gender			F	p value	
	Male	Female	Total			
Body Weight (Mean ± SD)	76.12 ± 23.96	65.7 ± 17.68	71.97 ± 22.24	22.83	.000*	
Height (Mean ± SD)	1.67 ± .09	1.61 ± .10	1.65 ± .098	15.20	.000*	
Body Mass Index (Mean ± SD)	27.15 ± 7.56	25.35 ± 7.14	26.43 ± 7.44	3.92	.049*	
Body Mass Index Classes	Underweight (<18.5)	9 (3.3)	13 (4.7)	22 (8.0)	5.458	.019*
	Normal (18.5-24.9)	70 (25.3)	46 (16.7)	116 (42.0)		
	Overweight (25.0-29.9)	38 (13.8)	30 (10.8)	68 (24.6)		
	Obesity Class I (30.0-34.9)	23 (8.3)	13 (4.7)	36 (13.0)		
	Obesity Class II (35.0-39.9)	12 (4.4)	5 (1.8)	17 (6.2)		
	Obesity Class III (≥= 40)	14 (5.1)	3 (1.1)	17 (6.2)		

* Significant ($p < 0.05$)

was high (72.9 %) among those who did not eat balanced diet and (61.4 %) among those who did not eat daily breakfast, while the prevalence of obesity was approximately equal among those who did not eat and eat

fried diet. Statistical significant associations were found among obesity and walking up night to eat, wishing to reduce weight and following certain diet program ($p < 0.05$).

Table 3: Association between Student's Socio-demographic Characteristics and Level of BMI (N=276)

Variable		Body Mass Index			χ^2 test	p value
		Non-Obese BMI < 29.9	Obese BMI > 30.0	Total		
Gender	Male	117 (56.8)	49 (70.0)	166 (60.1)	3.800	.05*
	Female	89 (43.2)	21 (30.0)	110 (39.9)		
Age Group	< 20 years	39 (18.9)	7 (10.0)	46 (16.7)	5.191	.168
	20 – 24 years	118 (57.3)	45 (64.3)	163 (59.1)		
	25 – 29 years	36 (17.5)	10 (14.3)	46 (16.7)		
	>29 years	13 (6.3)	8 (11.4)	21 (7.6)		
Living Condition	With Family	173 (84.0)	59 (84.3)	232 (84.1)	.034	.983
	Hostel House	17 (8.3)	6 (8.6)	23 (8.3)		
	Others	16 (7.8)	5 (7.1)	21 (7.6)		
Department	Preparatory	39 (18.9)	11 (15.7)	50 (18.1)	10.279	.036*
	Nursing Sciences	69 (33.5)	16 (22.9)	85 (30.8)		
	Radiology Sciences	37 (18.0)	13 (18.6)	50 (18.1)		
	Emergency Health Services	35 (17.0)	24 (34.3)	59 (21.9)		
	Clinical Laboratory Sciences	26 (12.6)	6 (8.6)	32 (11.6)		
Family Size	< 3 members	63 (30.6)	18 (25.7)	81 (29.3)	.846	.655
	3 – 5 members	31 (15.0)	13 (18.6)	44 (15.9)		
	>5 members	112 (54.4)	39 (55.7)	151 (54.7)		
Monthly Income	< 5000 SAR	62 (30.1)	16 (22.9)	78 (28.3)	2.709	.259
	5000-10000 SAR	58 (28.2)	17 (24.3)	75 (27.2)		
	>10000 SAR	86 (41.7)	37 (52.9)	123 (44.6)		
Father Education	Below School Education	107 (51.9)	26 (37.1)	133 (48.2)	4.815	.186
	School Education	51 (24.8)	21 (30.0)	72 (26.1)		
	Diploma Education	7 (3.4)	3 (4.3)	10 (3.6)		
	University Education	41 (19.9)	20 (28.6)	61 (22.1)		
Mother Education	Below School Education	97 (47.1)	28 (40.0)	125 (45.3)	1.513	.679
	School Education	61 (29.6)	22 (31.4)	83 (30.1)		
	Diploma Education	20 (9.7)	7 (10.0)	27 (9.8)		
	University Education	28 (13.6)	13 (18.6)	41 (14.9)		
Family History/ Chronic Illness	Yes	57 (27.7)	19 (27.1)	76 (27.5)	.007	.932
	No	149 (72.3)	51 (72.9)	200 (72.5)		
Family History/ Overweight Obesity	Yes	61 (29.6)	24 (34.3)	85 (30.8)	.536	.464
	No	145 (70.4)	46 (65.7)	191 (69.2)		

Table 4: Association between students' life style/dietary factors and level of BMI (N= 276)

Life style/dietary factors		Body Mass Index Classes			χ^2 test	p value
		Non-Obese BMI < 29.9	Obese BMI > 30.0	Total		
Eating Balanced Nutrition	Yes	68 (33.0)	19 (27.1)	87 (31.5)	.833	.361
	No	138 (67.0)	51 (72.9)	189 (68.5)		
Eating Breakfast	Yes	77 (37.4)	27 (38.6)	104 (37.7)	.032	.859
	No	129 (62.6)	43 (61.4)	172 (62.3)		
Eating Fried Food	Yes	98 (47.6)	34 (48.6)	132 (47.8)	.021	.885
	No	108 (52.4)	36 (51.4)	144 (52.2)		
Waking up Night to Eat	Yes	65 (31.6)	11 (15.7)	76 (27.5)	6.569	.010*
	No	141 (68.4)	59 (84.3)	200 (72.5)		
Wishing Reducing Weight	Yes	75 (36.4)	41 (58.6)	116 (42.0)	10.534	.001*
	No	131 (54.9)	29 (41.4)	160 (58.0)		
Following Up Certain Diet Program	Yes	93 (45.1)	43 (61.4)	136 (49.3)	5.542	.019*
	No	113 (54.9)	27 (38.6)	140 (50.7)		
Playing for how many days	< 3 days/Week	110 (53.4)	40 (57.1)	150 (54.3)	2.143	.543
	> 3 days/Week	44 (21.4)	12 (17.1)	56 (20.3)		
	Irregular Program	39 (18.9)	16 (22.9)	55 (19.9)		
	Others	13 (6.3)	2 (2.9)	15 (5.4)		
Watching T.V	No Watch	54 (26.2)	15 (21.4)	69 (25.0)	.760	.859
	< 2 hrs/day	84 (40.8)	30 (42.9)	114 (41.3)		
	2 - 4 hrs/day	46 (22.3)	16 (22.9)	62 (22.5)		
	> 4 hrs/day	22 (10.7)	9 (12.9)	31 (11.2)		
Using Computer	No Use	39 (18.9)	14 (20.0)	53 (19.2)	2.654	.448
	< 2 hrs/day	68 (33.0)	29 (41.4)	97 (35.1)		
	2 - 4 hrs/day	56 (27.2)	13 (18.6)	69 (25.0)		
	> 4 hrs/day	43 (20.9)	14 (20.0)	57 (20.7)		
Studying Hours	No Study	37 (18.0)	18 (25.7)	55 (19.9)	2.446	.485
	< 2 hrs/day	77 (37.4)	23 (32.9)	100 (36.2)		
	2 - 4 hrs/day	57 (27.7)	20 (28.6)	77 (27.9)		
	> 4 hrs/day	35 (17.0)	9 (12.9)	44 (15.9)		

* Significant (p < 0.05)

Regarding physical behaviour, the prevalence of obesity was high among those who played sports less than three days a week (57.1 %), with no statistical significant was observed between obesity and playing sports. Although the prevalence of obesity was (41.4%) among those who used computer less than two hours a day, while the prevalence of obesity was (32.9 %) among those who studied for less than two hours a day, with no statistically significant association between obesity and computer use and daily study. The highest prevalence of obesity (42.9 %) was found in those who watched T.V less than two hours a day, with no statistical significant association between obesity and watching T.V.

DISCUSSION

This study provides an evidence-based estimate of the prevalence of obesity and overweight among undergraduates of Al-Ghad International Colleges for Applied Medical Sciences in Abha city. Obesity is one of the most common health issues that cited as a root cause for various non-communicable chronic diseases [20-22]. Despite obesity is marked as a worldwide health concern [23], there is a dearth in studies about obesity among university students in Saudi Arabia.

A total of 276 students was enrolled in the study. About half of participants belonged to large family size with an average monthly income greater than 10000 Saudi Riyals (SAR). Several authors have concluded that the prevalence of obesity is higher among families with high income [7]. In parallel, Al-Hussaini *et al.* [24] have stated that the high level of socioeconomic status of Saudi population increases the prevalence of overweight and obesity. El Rhazi and colleagues [25] have shown that living in household of a high socioeconomic level is a strong determinant of overweight.

According to this study, results revealed that among the study participants about one quarter (25.4%) was obese and one quarter (24.6%) was overweight. Previous literature on female university students in Saudi Arabia indicated that prevalence of overweight and obesity reached 47.9 % [26]. More recently, Naji *et al.* [27] have studied the prevalence of obesity and overweight among Majmaah University students and reported that 58.1% of study participants were obese. The findings are consistent with those found earlier that the rate of obesity among Saudi university students is significantly high. However, the prevalence rate of overweight and obesity observed in the current research is lower compared to that observed at Majmaah University by Naji and colleagues [27].

In general, considering the study participants, it is important to note that reasons behind obesity and overweight are sedentary life style, students depend on motorized transport to school, predominance of unhealthy dietary habits such as consumptions of high calories fast food, eating from large dishes and eating lately at night [6, 26, 28]. The prevalence of obesity was higher among males (17.8 %) than females (7.6 %) whereas, overweight was more common among female 13.8 % than male students (10.8 %), the findings were consistent with previous studies. Another study in Saudi Arabia by Naji and colleagues [27] reported opposite results that obesity was more prevalent in female students (31.0 %) compared to male students (27.0 %). Female students at that age paid more attention to body image than males.

The current research found that with BMI \geq 25, half of the students (50.0%) were obese and overweight. Similar findings were collected from previous research in which 54.3% of university students were overweight and obese [30]. In the present analysis, BMI showed that normal weight was (42.0%) compared to UAE university students (58.8%) [10] and Lebanese university students (64.7%) [15]. Investigation of the relationship between obesity and dietary habits and physical activity showed that the majority of students did not eat balanced nutrition and skipped breakfast and the prevalence of obesity was high (72.9 %) among those who did not eat balanced diet and (61.4 %) among those who did not eat daily breakfast and the prevalence of obesity was high (64.3 %). Several studies have reported that skipping breakfast is associated with an increased body weight [31-33].

The study also has shown that obesity was significantly associated with eating habits. Students who wake up at night to eat are more obese than who do not ($p=0.010$). Only about one third of students were eating a balanced nutrition and have breakfast and only about half wishing to reduce their weight and follow certain diet program. Interesting findings of this study, despite that three - quarter of students play sports; physical activities were not significant in relation to normal body weight which consistent with finding in a recent study conducted by Khamaiseh [34]. Among overweight and obese students, about one third of participants' parents are overweight and/or obese. The previous literature supported this result; Badawi *et al.* [35] found strong positive association between students' overweight and their parents' overweight. In addition to genetic impact on body weight, family dietary behaviours might influence the students' body weight.

CONCLUSIONS

The present study reveals that the prevalence of overweight and obesity among the students of Al-Ghad college students is high and comparable to the findings of earlier conducted studies. This study reinforces the need to improve students' awareness about overweight and obesity health problems through adoption of healthy dietary habits and physical activities at campuses to decrease the prevalence of obesity in this age group and prevent chronic diseases related to obesity.

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