Original Article

Knowledge of Female University Students about Obesity and its Adverse Effects on Reproductive Health

Azza A. Mehanna [1 ¥], Manal A. Ali [2], Nihad I. Dabbous [3], Kholoud Y. Tayel [3]

[1] Department of Health Administration and Behavioral Sciences, High Institute of Public Health, Alexandria University, Egypt.

[2] Ministry of Health, Alexandria, Egypt.

[3] Department of Family Health, High Institute of Public Health, Alexandria University, Egypt.

Abstract

Background & Objective(s): Obesity remains a public health challenge, particularly in developing countries. Research has denoted the relation between obesity and some female general and reproductive health problems including hypertension, diabetes, infertility, miscarriage, stillbirth, birth defects and cesarean section. The high prevalence rates of obesity in developing countries may reflect lack of adequate knowledge about obesity. The aim of the present work was to estimate the prevalence rate of obesity among female university students and assess their knowledge regarding obesity and its adverse effects on reproductive health.

Methods: A cross-sectional study was conducted among 400 female university students attending the Outpatient Clinics affiliated to Alexandria University. Students were selected using systematic random sampling technique. Students' knowledge about obesity, its risk factors and adverse effects was assessed using a self-administered questionnaire. Weight and height were measured for each student and body mass index (BMI) was calculated.

Results: The present study revealed that 31.5% of the studied students were overweight and 11% were obese (grade I). The mean BMI was 25.13 ± 3.63 kg/m^2. About one quarter (24%) had poor knowledge about the effect of obesity on reproductive health, as 85% considered oocyte development and maturation better in obese females and 71% reported that obesity reduced the risk of developing early menopause. A notable percentage of them did not know that obesity increased the risk of still birth (28%) and miscarriage (24.2%).

Conclusion: Prevalence rate of overweight and obesity among sampled female university students in Alexandria was high and a considerable proportion lacked knowledge about the effect of overweight/obesity on their reproductive health.

Keywords: Female university students; knowledge; obesity; Reproductive health.

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¥*Correspondence*:
Email: hiph.Amehanna@alexu.edu.eg

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INTRODUCTION

Obesity remains a public health challenge, particularly in developing countries.(1) The prevalence of obesity has shown a significant increase in several countries of Eastern Mediterranean Region including Egypt and Gulf Region Arab countries.(2,3) This increase resulted in higher rates of coronary heart diseases, diabetes mellitus, hypertension, and some forms of cancer.(1,4)

The increasing mechanization, industrialization and urbanization occurring in most countries around the world is associated with changes in diet and behavior. Diets are becoming richer in fat and high energy food and lifestyles are becoming more sedentary. While metabolic alteration exists in obesity, endocrine disorders alone or in association with genetic diseases and other rare metabolic disorders account for only 5%of obesity cases.(5) The 2014 Egypt Demographic and Health Survey (EDHS) found that one-quarter of children and adolescents aged 5-19 years were overweight, 10 % and 11% of females and males respectively were obese.(6) The trend of obesity is steadily increasing among young adults aging 18–25 years.(7) Under the influence of a variety of popular cultures, incorrect information and peer pressure typical of this age group, university students are at a higher risk of making unhealthy lifestyle choices that could affect their health and wellbeing across their future life.(8,9)

Reproductive health is a part of the overall health status of individuals and significantly impacts their quality of life.(10,11) Research has denoted the relation between obesity and the development of female reproductive health

problems including; infertility,[12,13] miscarriage,[14,15] stillbirth,[16] birth defects[17] and cesarean section.[18] Evidence from literature suggests that offsprings of obese mothers are at an increased risk of hyperglycemia, hyperlipidemia[19,20] and obesity.[21,22] Moreover, obesity has been linked to increased risk of breast cancer[23] and endometrial cancer.[24, 25]

Egyptian female university students do not receive sufficient education through the formal education in schools and university system about the risk factors of obesity and its effect on the general and reproductive health.[26] Knowledge about obesity and its impact on the general and reproductive health is necessary, although not sufficient, for acquiring healthy behaviors such has healthy dieting and exercise.[27] The aim of present work was to estimate the prevalence of obesity among female university students and to assess their knowledge regarding obesity and its adverse effects on reproductive health.

METHODS

A cross-sectional study was conducted among 400 female university students attending the outpatient clinics (ophthalmology, dental and dermatology clinics) affiliated to Alexandria University for minor complaints. The sample was calculated assuming 50% prevalence of poor knowledge among the university students, using 5% degree of precision, α of 0.05 and power of 80%. The sample size was calculated using EPI-Info 2002 software. Sample was equally allocated from each of the previously mentioned clinics. Each clinic was visited by the researcher 3 times per week. In each clinic, the predetermined sample was selected by including every third female student.

A predesigned structured self-administered questionnaire was used to collect socio-demographic data and data about the students' knowledge about obesity. *The level of knowledge* was measured using a scale constructed by the researcher based on a comprehensive review of literature. The scale was pilot tested on thirty female university students chosen at random and some questions were modified and reworded according to the pilot study. The scale was composed of four subscales measuring knowledge about risk factors of obesity (24 questions), adverse effects of obesity on general health (15 questions), adverse effects of obesity on reproductive health (16 questions) and body mass index (BMI, 3 questions). Students responded to each question by "yes", "no" or "do not know". The correct response was given one point, the incorrect and uncertain responses were given zero points. The mean and standard deviation were calculated for the total and subtotal scores for all students. The score was converted to percentage and students' knowledge was categorized into poor (<50%), fair (50-75%) and good (>75%). The internal consistency of the subscales, as determined by Cronbach's alpha coefficients, ranged from 0.67 to 0.71.

Anthropometric measurements were carried out for every student. Body weight was recorded to the nearest 0.1 kg with the digital scale. The scale was calibrated and checked daily against a known weight before use for accuracy. The student stood erect, in light clothing and bare footed on the center of the scale without touching anything else. Height was measured using a non-stretch tape fixed on the wall. Each student was asked to remove shoes and anything on head, stand erect on the flat floor: feet were together with heels, buttocks, back of the shoulders and back of the head touching the wall adjacent to the tape. The student was asked to look forward so that the line of vision was parallel to the floor and the arms hanging at the sides. A plastic block was placed on the top of the head with the sides of the block resting firmly against the wall to form a right angle. Height was recorded to the nearest 0.1 cm.[28]

Body mass index (BMI) was calculated for each student using the following formula: The weight in kilograms divided by the square of the height in meters (kg/m^2).[29] Students were classified according to their BMI as underweight (<18.5 kg/m^2), normal (18.5 to 24.9 kg/m^2), overweight (25 to 29.9 kg/m2), obese class I (30 to 34.9kg/m^2), obese class II (35 to 39.9kg/m2) and obese class III (≥40 kg / m^2).[30]

Statistical analysis

Data entry and statistical analysis were performed using SPSS version 20.0 (IBM Corporation, Armonk, NY, USA). Percentages, frequencies, means and standard deviations were used to describe the demographic variables, anthropometric measures and knowledge level. Analytical statistics were used to investigate the association between knowledge and anthropometric measures. Statistical significance was set at p <0.05.

Ethical considerations

The study was approved by the Ethics Committee of High Institute of Public Health, Alexandria University, Egypt. After explaining the aim of the study, verbal informed consent was obtained from participants and their anonymity and confidentiality were guaranteed.

RESULTS

Table 1 shows that the mean age of the studied students was 21.59±1.57 years, 30.8% of them were medical students, 45.3% of their mothers and 54.0% of their fathers had university education.

The results revealed that 31.5% of students were overweight and 11% were obese grade I The mean BMI was 25.13 ± 3.63 kg/m^2 (Figure 1). Most students had the correct information that overweight/ obesity may lead to irregular menstruation (97.3%), gestational diabetes (92%), macrosomic baby (64.7%) and thrombo-embolic disorders during pregnancy (61%). A big proportion of students had false information that oocyte development and maturation were better in obese females, that obesity reduced the risk of developing early menopause and that there was no association between obesity and obstructed labor (85%, 71% and 49.3%, respectively). More than one quarter of the sample (28%) did not know that obesity increased the

risk of still birth and about one quarter did not know that obesity increased the risk of developing miscarriage (24.2%) and of early menopause (23%) (Table 2).

Table 1: Sociodemographic characteristics of Alexandria University female students

Demographic characteristics	Female university students (n=400)	
	No.	%
Age		
Min. – Max.	18.0 – 24.0	
Mean ± SD	21.59 ± 1.57	
Faculty		
Medical	123	30.8
Non-medical	277	69.2
Mother's Education		
Illiterate or read and write/	28	7.0
Primary/preparatory	52	13.0
Secondary	100	25.0
University/postgraduate	220	55.0
Father's Education		
Illiterate or read and write/	4	1.0
Primary/ Preparatory	28	7.0
Secondary	68	17.0
University/ Postgraduate	300	75.0

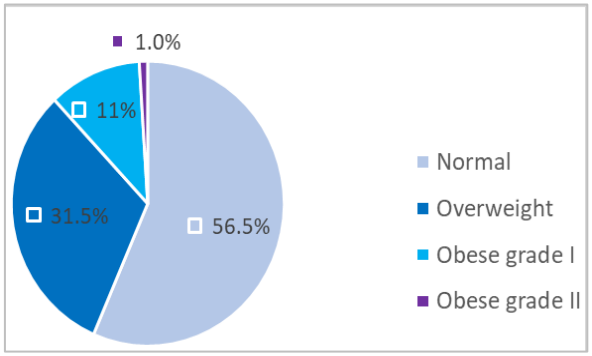

Figure 1: Distribution of Alexandria female university students according to their body weight

Most of the students (75.5%) had poor knowledge about BMI, and about one quarter had poor knowledge about the effects of obesity on reproductive and general health (24%, and 26%, respectively). Knowledge mean percent subscores were 37.50±34.51, 80.69±9.56, 56.64±15.04 and 57.87±12.73 respectively and overall knowledge mean percent score was 65.92±9.32 (Table 3).

High fat intake, low physical activity, eating while watching TV, late dinner and sleeping immediately after meals were recognized by almost all students (97%, 100%, 97%, 100%, 96% respectively) as risk factors of obesity. Moreover, 98% of students realized that increasing water intake does not lead to increased weight.

Table 2: Knowledge of Alexandria female university students about the effect of obesity on reproductive health

Effect of obesity on reproductive health	University students' responses (n=400)					
	Correct		Incorrect		Do not know	
	No.	%	No.	%	No.	%
Overweight doubles the likelihood of early menarche	179	44.7	177	44.3	44	11.0
Overweight may lead to irregular menstruation	389	97.3	11	2.7	0	0.0
There is no association between obesity and fecundity*	258	64.5	102	25.5	40	10.0
Obesity increases incidence of getting PCOS	124	31.0	117	29.3	159	39.7
Oocyte development and maturation is better in obese females*	340	85.0	12	3.0	48	12.0
Obesity reduces the risk of developing early menopause*	284	71.0	24	6.0	92	23.0
Obesity increases the risk of developing miscarriage	201	50.0	103	25.8	96	24.2
Obesity increases the risk of getting pre-eclampsia	226	56.5	90	22.5	84	21.0
There is no association between obesity and cesarean section*	214	53.5	130	32.5	56	14.0
Thrombo-embolism during pregnancy is considered one of the complications of obesity	244	61.0	92	23.0	64	16.0
Obesity increase the risk of getting gestational diabetes	368	92.0	12	3.0	20	5.0
There is no association between obesity and obstructed labor*	197	49.3	119	29.7	84	21.0
Obesity decreases fetal development and maturation	136	34.0	176	44.0	88	22.0
There is no association between obesity and fetal congenital anomalies*	168	42.0	144	36.0	88	22.0
Obesity increases the risk of still birth	200	50.0	88	22.0	112	28.0
Obesity increases the risk of getting macrosomic baby	259	64.7	97	24.3	44	11.0

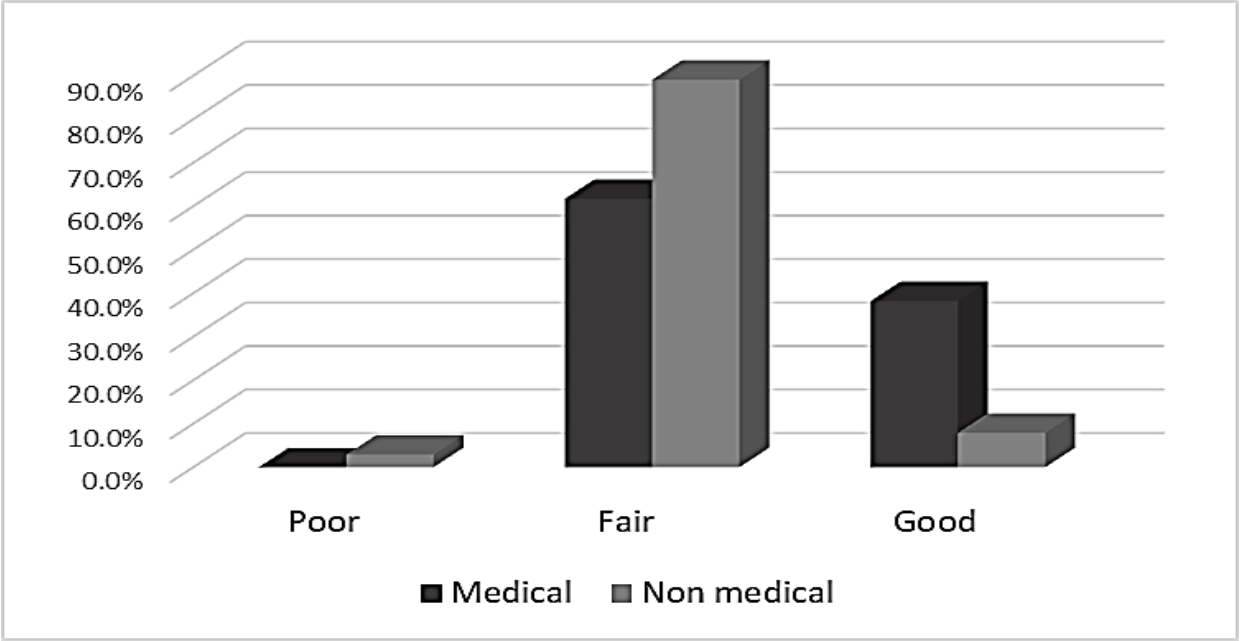

Figure 2: Level of knowledge of Alexandria female university students according to their faculty

Table 3: Level of Knowledge of Alexandria female university students about risk factors and effect of obesity on reproductive health

Knowledge subscales	Level of knowledge (n=400)						
	Poor		Fair		Good		% score
	No.	%	No.	%	No.	%	Mean ± SD
Knowledge about Risk factors of obesity	0	0.0	124	31.0	276	69.0	80.69±9.56
Knowledge about Effects of obesity on general health	104	26.0	258	64.5	38	9.5	57.87±12.73
Knowledge about Effects of obesity on reproductive health	96	24.0	268	67.0	36	9.0	56.64±15.04
Knowledge about body mass index	302	75.5	26	6.5	72	18.0	37.50±34.51
Overall knowledge	8	2.0	323	80.7	69	17.3	65.92±9.32

SD: standard deviation

Regarding adverse effects of obesity on general health, 28.8% and 36.3% indicated that obesity was related to cancer colon and cancer breast, 81.7%, 74.7% and 60.5% stated that obesity was a risk factor of hypertension, diabetes and osteoporosis respectively (Data not presented). About half or more of the students having good or fair knowledge showed normal BMI (50.7% & 56.7% respectively), these percentages decreased for overweight (37% & 40% respectively) and obese students (11.6% &12.4% respectively). However, no significant association was found between students' overall knowledge and their BMI (Table 4). About one quarter of students whose mothers and fathers had university education and above had good overall obesity-related knowledge (27.7% and 23% respectively), whereas, none of those whose mothers and fathers were illiterate, had primary, preparatory or secondary education reached that level of knowledge. The relation between mothers' and fathers' education and students' obesity-related knowledge was statistically significant (χ^2= 51.349, χ^2= 48.765, p <0.001, respectively) (Table 5).

Table 4. Distribution of Alexandria female university students according to their BMI and their level of knowledge

BMI	Level of knowledge						χ^2	p
	Poor (n = 8)		Fair (n = 323)		Good (n = 69)			
	No.	%	No.	%	No.	%		
Normal	8	100	183	56.7	35	50.7		
Overweight	0	0.0	100	40.0	26	37.7	3.79	0.43
Obese grade I,II	0	0.0	40	12.4	8	11.6		

Table 5: Relation between Alexandria female university students' level of knowledge and their parents' education

Parents' education	Level of knowledge								χ^2	*p*
	Poor (n = 8)		Fair (n = 323)		Good (n = 69)		Total (n = 400)			
	No.	%	No.	%	No.	%	No.	%		
Mother's Education										
Illiterate or read and write/	0	0.0	28	100.0	0	0.0	28	100.0	40.55*	<0.001*
Primary/ Preparatory	4	7.7	48	92.3	0	0.0	52	100.0		
Secondary	0	0.0	92	92.0	8	8.0	100	100.0		
University/ Postgraduate	4	1.8	155	70.5	61	27.7	220	100.0		
Father's Education										
Illiterate or read and write/	0	0.0	4	100.0	0	0.0	4	100.0	30.24*	<0.001*
Primary/ Preparatory	0	0.0	28	100.0	0	0.0	28	100.0		
Secondary	0	0.0	68	100.0	0	0.0	68	100.0		
University/ Postgraduate	8	2.7	223	74.3	69	23.0	300	100.0		

*Significant (p<0.05)

DISCUSSION

The present findings revealed that the prevalence rate of overweight and obesity altogether was 43.5% among female university students in Alexandria, with overweight being 31.5% and obesity 12%. These figures are not far from those of a previous study conducted on Alexandria university students (2017)[31], where 28.9% of students were overweight and 11.8% were obese.

In a similar vein, studying the effects of overweight and obesity in 195 countries over 25 years revealed that 35% of Egyptian adults (around 19 million Egyptians) suffered from obesity.[32] These high rates may be attributed to the tremendous changes in lifestyle in the recent eras, these include physical inactivity patterns (such as riding cars, using elevators and not practicing sports) and dietary habits (such as consumption of energy dense foods as fast food and soft drinks). Such dramatic lifestyle changes are thought to have contributed immensely to the increase in obesity prevalence among young adults in developing countries. A small percentage of students had good overall knowledge about obesity which may provide some explanation for the high prevalence rate of overweight and obesity among them.

Despite the fact that most students in the current work have heard about BMI, they could not respond correctly to items concerning BMI. This finding draws the attention to the need for educating students about BMI and its implications as an important indicator of overweight and obesity. In contradiction to our findings, a study conducted in New York (2014) showed that more than half of the participants had fair knowledge of BMI.[33] The present study revealed that the majority of studied students had good knowledge about the risk factors of obesity including dietary fat, sedentary life, and sleeping immediately after meals. In agreement with our findings, the previously mentioned study conducted in New York[33] and another Korean study[34] indicated that most participants had good knowledge about obesity risk factors. In their study, Winston et al., reported that most participants were aware that high blood pressure (94%), diabetes mellitus type II (96%) and joint pains/arthritis (89%) were associated with overweight/obesity.[33] In Nigeria, 81.3% of female undergraduate students realized the relation between hypertension and obesity.[35] In accordance with the previous findings, the present results revealed that a high percentage of students were aware of the association between obesity and hypertension, diabetes mellitus and osteoarthritis. However, lower percentages of participants who had known the relation between cancer and obesity were reported in several studies including the current one.

A population-based study among 2250 Iranian women (2014) showed that only 42.57% of women were aware that obesity was a risk factor for cancer breast.[36] Consistently, an American study demonstrated that 45% of obese women and 49% of overweight women were not knowledgeable about the relation between increased risk of breast cancer and obesity.[37] Similar findings were reported by other studies.[38-40] The rates described in the present work are even lower than the pre-mentioned rates, this may be attributed to the different study populations. These findings highlight an ongoing need for raising the awareness regarding the relation between the increased risk of breast cancer with obesity.

In their study conducted in urban Chicago, Cardozo et al., reported that more than one third of women were aware of the association between obesity and some reproductive health issues including miscarriage (37.5%), irregular menstruation (35.8%) and infertility (33.9%). Lower proportions of women were aware about other adverse effects, including cesarean section (30.8%), birth defects (23.7%), stillbirth (14.1%) and endometrial cancer (18.1%).[40] These figures are not far from those in our study, where about half of the sampled students identified some of the adverse effects of obesity on reproductive health including pre-eclampsia (56.5%), caesarean

section (53.5%), stillbirth (50%), miscarriage (50%), early menarche (44.7%,) and birth defects (42%). Whereas, 64.5% were aware that obesity was a risk factor for infertility and only 31% recognized polycystic ovaries as an adverse effect of obesity. Although the rates reported in our study are somewhat higher, probably due to the different population characteristics in both studies,[40] these figures reveal a non-negligible gap between the students' current and required knowledge about the association between obesity and reproductive health.

Limitations of the study

Conducting the study on university students produced a highly educated, young aged sample, thus, generalization of findings on the Egyptian population is not possible. Moreover, our study population was females only which made the generalization of findings on male population not appropriate. The frequency of obesity among the studied female university students could give some indication of its prevalence among female university student population, however, generalization would require a larger sample size.

CONCLUSION AND RECOMMENDATIONS

The present study found that the prevalence rate of overweight and obesity among the studied female university students was high and that a considerable proportion of them had poor knowledge about the effects of obesity on their reproductive health. These students need more education about the impact of obesity on their reproductive health.

Conflict of Interest

The authors report no conflicts of interest in this work.

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