

**PREVELANCE OF OBESITY AMONG LIBYAN WOMEN IN DERNA CITY AND ITS
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Article Received on 21/04/2020

Article Revised on 11/05/2020

Article Accepted on 31/05/2020

ABSTRACT

Obesity is a chronic and multi-factorial disease and one of the most important causes of morbidity and premature mortality worldwide. This study aimed to determine the prevalence and potential risk factors of obesity among women aged 19-60 years in Derna, Libya. A cross-sectional study was carried out and random sampling technique was used. The total sample included was 350 women aged from 19 to 60 years. (The International Obesity Task Force (IOTF) reference standard was used to classify the participants as normal weight, overweight, and obese. Data were analyzed using SPSS version 24. A value of $P < 0.05$ was interpreted as statistically significant. The prevalence of overweight and obesity was 49.4%. Obesity was a serious problem among women in Derna. Age, education level, marital state and number of birth were included as potential risk factors. Age was an important variable affecting obesity. Our data showed skipping breakfast and night eating is associated with overweight or obese. Another important outcome of the analysis performed in the present study was body mass index had a strong relationship to some disease and positive correlation was noted ($P < 0.05$). The present study showed that the considerably high prevalence of overweight and obesity among women in Derna, Libya and it increases progressively with age. The Libyan diet, which is high in calories and rich in fat, furthermore the consumption of fast food and soft drink every day, may contribute to overweight. Obesity should draw the attention of the healthcare community, researchers, and policy makers in Libya.

KEYWORDS: Obesity, Women, Body mass index (BMI), Libya.**INTRODUCTION**

Obesity is a global epidemic resulting in major morbidity and premature death and become a public health problem in both developed and developing countries at an alarming rate.^[1] Overweight and obesity are the fifth leading risk for global deaths.^[2] At least 2.8 million adults die each year as a result of being overweight or obese.^[3] In addition, 44% of the diabetes burden, 23% of the ischemic heart disease burden and between 7 and 41% of certain cancer burdens are attributable to overweight and obesity.^[4] The World Health Organization (WHO) defines a person to be overweight if his or her body mass index (BMI) is >25 , and obese if BMI is ≥ 30 .^[5] About 64% of Libyan adults are either overweight or obese, obesity progressively increasing with age, and two times more common among Libyan women than men. Cases of obesity and overweight are increasing in Libya as well as all over the world, with genetic and environmental factors playing a contributory role.^[6]

Obesity management is an important step in the prevention and control of chronic non-communicable diseases, such as cardiovascular disease, diabetes, hypertension, and some kinds of cancer. These diseases

contribute to 60% of overall morbidity and mortality in most Arab countries. Therefore, understanding the prevalence of obesity among schoolchildren is essential to any strategy for combating obesity in the community.^[7]

MATERIAL AND METHOD**Study population and setting**

A cross-sectional and descriptive design was used to conduct the study.

The random sampling technique was used to choose different places in Derna –Libya

The study population consisted of women between 19 to 60 years in period between 01/05/2019 up to 30/07/2019.

Sampling Design

We include 350 women in this study. Participants underwent height and weight measurement, and they were asked to complete a questionnaire.”

Trained researchers collected the questionnaires from the included women. The anthropometric data (height and weight) were measured in the same visit of the questionnaire administration. The questionnaires gathered socio-demographic characteristics such as age,

occupation and educational status, as well as medical history. A complete copy of the questionnaire included in the supplementary materials.

Anthropometric Measurements

Height and weight of each woman were measured. Women were weighed on personal Seca scales Portable digital scales (brand: Taurus; model: Level-MS/ 8608, Ollana, Spain). Weight was recorded to the nearest 0.1kg. Height was measured using a stadiometer attached to scales to the nearest 0.5cm. Weight and height were measured with the women barefooted and lightly clothed. The measurement was recorded immediately on data form.^[11]

BMI was calculated by divided the weight, measured in kilograms, by the square of height, measured in meter (kg/m²). BMI, low weight <18.5; normal weight 18.5–24.9; overweight 25.0–29.9; obesity I 30.0–34.9; obesity II 35.0–39.9 and obesity III 40.

Statistical Analysis

Data were first entered in an Excel file and then results were expressed as mean and standard deviation. Chi square, were calculated to analyze data using SPSS version 24. A value of $P < 0.05$ was interpreted as statistically significant.

RESULT

Data presented in table (3) demonstrated body weight difference by age group. Even though the three age categories (19-30, 31-50, and 51-60) have a closer probability of being overweight (24.7%, 30.1%, and 25%, respectively), there was a statistical difference between the three age groups comparing other body habitus ($P=0.001$).

As can be seen in (Table 3), there was an inverse relationship between obesity and education level. The proportion of overweight in the university level was higher 76.9%. However, the relation was not statically significant ($P=0.071$). Furthermore, the proportion of overweight was 44% in students compare with other occupations. In addition, the relation between occupation and body weight was noted ($P=0.001$). The proportion of overweight was 52.7% in married women, and the proportion of normal weight was 92.9% in single women. Moreover, the relation between marital status and body weight was statistically significant ($P=0.001$). Regarding type of delivery, the proportion of overweight was 36.4% in cesarean section type, the proportion of normal weigh was 75.4% in normal delivery, and positive relation was noted between delivery type and body weight ($P=0.001$). As for the number of births for the participants, the proportion of overweight was 33% when number of birth was 1 to 8 children, and the proportion of normal weight was 60.7% with one child. Also, the relation between number of children and body weight was statistically significant ($P=0.001$).

Regarding to the relationship between body weight of participants under study and foodstuff are illustrated in table 4. The most common types of foodstuff consumed daily by overweight women were; 87.9% bread, 65.9% milk, 49.5% deserts, 34.1% meat, followed by 22.3% fat. The least common types of foodstuff consumed by overweight women were vegetables and fruits. However, the relationship was statically insignificant with foodstuff ($P > 0.05$).

Table (5) demonstrated the relationship between body weight and main meals. Whereas the proportion of overweight women who never consumption breakfast was 64.8%, the proportion of overweight women who always consumption lunch and dinner were 87.9% and 70.3% respectively. Nevertheless, the relation between body weight and main meals consumption was insignificant ($P > 0.05$). Data presented in table 6 showed the relationship between BMI and fast food consumption. Whereas the proportion of overweight who consume fast food was 71.4%, the proportion of normal weight who never consume fast food was 72.8%. However, the relation between body weight and fast food was insignificant ($P=0.927$).

As can be shown in Table (7), BMI has a strong positive relationship ($P=0.001$) to some diseases such as diabetes mellitus, hypertension, atherosclerosis, diseases of the joints, spinal pain, gallbladder diseases and heart disease. Furthermore, the proportions of overweight were 100% with atherosclerosis, gallbladder and heart disease patients. On the other hand, the proportions were 92.9%, 84.2%, 91.7%, 76.3% diabetes mellitus, hypertension, joint diseases and spinal pain in that order.

Data presented in table 8 showed the relationship between physical activity (exercises) and obesity. We can see the proportion of sever obesity women who don't exercise were 92.9% versus 7.1% who do exercises. However, the relation was not statically significant ($P=0.300$).

Table 1: Socio-demographic characteristic of women.

	No.	%
Age		
19- 30	247	70.6
31-50	63	23.7
51- 60	20	5.7
Occupation		
Teacher	79	22.6
Engineer	5	1.4
Doctor	36	10.3
Lawyer	5	1.4
Office worker	26	7.4
Student	174	49.7
Pharmacy	25	7.1
Marital Status		
Single	21	61.4
Married	115	32.3
widow	214	4.6
Divorce	21	1.7
Delivery type		
No delivery	237	67.7
Normal	74	21.1
Cesarean section	22	6.3
No delivery& Cesarean section	17	4.9
Children No.		
No children	21	6.0
One child	214	61.1
1-8 children	115	32.9
Education level		
Primary	2	6
Secondary	64	18.3
University	275	78.6
Post graduate	9	2.6

Table 2: BMI categories.

	No.	%
Underweight	19	5.4
Normal	158	45.1
Overweight	91	26.0
Obesity – I	49	14.0
Obesity – II	19	5.4
Sever obesity	14	4.0

Table 3: Relationship of BMI with socioeconomic factors.

	Under weight	Normal	Over weight	Obesity- I	Obesity – II	Sever obesity	P value
	No. %	No. %	No. %	No. %	No. %	No. %	
Age							0.001
19-30	18(7.3%)	144(58.3%)	61(24.7%)	17 (6.9%)	4(1.6 %)	3(1.2%)	
31-50	1(1.2%)	12(14.5%)	25(30.1%)	28(33.7%)	11(13.3%)	6 (7.2 %)	
51-60	0 (0 %)	2 (10%)	5 (25.0%)	4(20%)	4(20%)	5(25.0%)	
Education level							0.071
Primary	0(0%)	0 (0%)	1 (1.1%)	1 (2%)	0 (0%)	0 (0%)	
Average	0 (0%)	30 (19%)	18(19.8%)	10(20.4%)	4 (21%)	2 (14.3%)	
University	18(94.7%)	127 (80.4%)	70(76.9%)	37 (75.5%)	13 (88.4%)	10 (71.4 %)	
High level	1 (5.3%)	1 (0.6%)	2 (2.2%)	1 (2%)	2 (0.5%)	2 (4.3%)	
Occupation							0.001
Teacher	3 (15.8%)	20 (12.7%)	26 (28.6%)	19(38.8%)	7 (36.8%)	4 (28.6%)	
Engineer	0 (0.0%)	3 (1.9%)	1 (1.1%)	1 (2.0%)	0 (0.0%)	0 (0.0%)	

Doctor	2 (10.5 %)	22 (13.9%)	6 (6.6%)	2 (4.1%)	2 (10.5%)	2 (14.3%)	0.001
Lawyer	0 (0.0%)	0 (0.0%)	2 (2.2%)	3 (6.1%)	0 (0%)	0 (0%)	
Office worker	1 (5.3%)	5 (3.2%)	8 (8.8 %)	7 (14.3%)	4(21.1%)	1 (7.1%)	
Student	12 (63.2%)	104 (65.8)	40(44.0%)	10 (20.4)	3 (15.8%)	5 (35.7%)	
Pharmacy	1 (5.3%)	4 (2.5%)	8 (8.8%)	7 (14.3)	3 (15.8%)	2 (14.3%)	
Marital Status							0.001
Single	17(89.5%)	131 (92.9%)	48(35.2)	13 (26.5)	4 (21.1)	2 (14.3)	
Married	2(10.5)	24 (15.2)	32 (52.7)	32 (65.3)	13(68.4)	10 (71.4)	
Widow	0	1 (0.6)	8 (8.8)	3 (6.1)	2 (10.5)	2 (14.3)	
Divorce	0	2 (1.3)	3 (3.3)	1 (2)	0	0	
Delivery type							0.001
Nodelivery	17(7.2%)	136(57.4%)	54(22.8%)	19(8.0%)	5(2.1%)	6(2.5%)	
Normal	1(1.4%)	16(21.6%)	23(31.1%)	16(21.6%)	12(16.2%)	6(8.1%)	
Cesarean section	1 (4.5%)	5 (22.7%)	8(36.4%)	5(22.7%)	1 (4.5%)	2(9.1%)	
Nodelivery & Cesarean section	0 (0.0%)	1(5.9%)	6(35.3%)	9(52.9%)	1(5.95%)	0(2.0%)	
Number of birth							0.001
No child	0 (0.0%)	5 (23.8%)	7 (33.3%)	6 (28.6%)	1 (4.8%)	2 (9.5%)	
One child	17 (7.9%)	130 (60.7%)	46 (21.5%)	14 (6.5%)	4 (1.9%)	3 (1.4%)	
1-8 children	2 (1.7%)	23 (20.0%)	38 (33.0%)	29 (25.2%)	14 (12.2%)	9 (7.8%)	

Table 4: Relationship between BMI and foodstuff.

Foodstuff		Under weight	Normal	Over weight	Obesity –I	Obesity-II	Sever obesity	P value
		No. %	No. %	No. %	No. %	No. %	No. %	
Milk	Daily	14 (73.3)	102 (64.6)	60 (65.9)	35 (71.4)	14 (73.7)	11 (78.6)	0.864
	Weekly	2 (10.5)	28 (17.7)	20 (22.0)	8 (16.3)	2 (10.5)	2 (14.3)	
	Monthly	0 (0)	3 (1.9)	3 (3.3)	0 (0)	1 (5.3)	0 (0)	
	Never	3 (15.8)	25 (15.8)	8 (8.8)	6 (12.2)	2 (10.5)	1 (7.1)	
Vegetable	Daily	11 (57.9)	105 (66.5)	4(4.4)	36 (73.5)	7 (36.8)	5 (35.7)	0.012
	Weekly	7 (36.8)	47 (29.7)	36 (39.6)	10 (20.4)	11 (57.9)	6 (42.9)	
	Monthly	0 (0)	4 (2.5)	1 (1.1)	3 (6.1)	0 (0)	2 (14.3)	
	Never	1 (5.3)	2 (1.3)	50 (54.9)	0 (0)	1 (5.3)	1 (7.1)	
Fruit	Daily	5 (26.3)	66 (41.8)	1 (1.1)	21 (42.9)	2 (10.5)	2 (14.3)	0.47
	Weekly	11 (57.9)	73 (46.2)	52 (57.1)	24 (49.0)	12 (63.2)	8 (57.1)	
	Monthly	3 (15.8)	12 (7.6)	7 (7.7)	2 (4.1)	4 (21.1)	4 (28.6)	
	Never	0 (0)	7 (4.4)	31 (34.1)	2(4.1)	1 (5.3)	0 (0)	
Meat	Daily	6 (31.6)	52 (32.9)	31 (34.1)	18 (36.7)	9 (47.4)	5(35.7)	0.63
	Weekly	5 (26.3)	61 (38.6)	32 (35.2)	16 (32.7)	4 (21.1)	4 (28.6)	
	Monthly	4(21.1)	23(14.6)	15 (16.5)	13 (26.5)	5 (26.3)	3 (21.4)	
	Never	4(21.1)	22 (13.9)	13 (14.3)	2 (4.1)	1 (5.3)	2 (14.3)	
Desserts	Daily	9 (47.4)	70 (44.3)	45(49.5)	20 (40.8)	8 (42.1)	9 (64.3)	0.31
	Weekly	9 (47.4)	52(32.9)	27(29.7)	18(36.7)	8(42.1)	1 (7.1)	
	Monthly	1 (5.3)	25(15.8)	10 (11.0)	5 (10.2)	3 (15.8)	1(7.1)	
	Never	0 (0)	11 (7.0)	9 (9.9)	6 (12.2)	0 (0)	3 (21.4)	
Nuts	Daily	2 (10.5)	11 (7.0)	5 (5.5)	3 (6.1)	1 (5.3)	1 (7.1)	0.050
	Weekly	4 (21.1)	54(34.2)	34 (37.4)	25 (51.0)	2 (10.5)	4 (28.6)	
	Monthly	10 (52.6)	64(40.5)	38 (41.8)	12 (24.5)	11(57.9)	2 (14.3)	
	Never	3 (15.8)	29 (18.4)	14 (15.4)	9 (18.4)	5(26.3)	7 (50.0)	
Bread	Daily	17 (89.5)	142(89.9)	80(87.9)	45(91.8)	18(94.7)	14(100.0)	0.325
	Weekly	2 (10.5)	12(7.6)	7 (7.7)	0 (0)	1 (5.3)	0 (0)	
	Monthly	0 (0)	2(1.3)	2 (2.2)	0 (0)	0 (0)	0 (0)	
	Never	0 (0)	2 (1.3)	2 (2.2)	4 (8.2)	0 (0)	0(0)	
Fat	Daily	8 (7.1)	43 (38.4)	25 (22.3)	17 (15.2)	11 (9.8)	8 (7.1)	0.007
	Weekly	3 (3.3)	35 (38.0)	33 (35.9)	13 (14.1)	5 (5.4)	3 (3.3)	
	Monthly	5 (8.1)	29 (46.8)	20 (32.3)	6 (9.7)	2 (3.2)	0 (0)	
	Never	3 (3.6)	51 (60.7)	13 (15.5)	13 (15.5)	1 (1.2)	3 (3.6)	

Table 5: Relationship between BMI and main meals.

Main meals		Under Weight	Normal	Over weight	Obesity –I	Obesity –II	Sever Obesity	P value
		No. %	No. %	No. %	No. %	No. %	No. %	
Breakfast	Always	13(68.4)	95(60.1)	5(5.5)	3(6.1)	3(5.8)	1(7.1)	0.869
	Usual	5(26.3)	52(32.9)	27(29.7)	11(22.4)	5(26.3)	5(35.7)	
	Never	1(5.3)	11(7.0)	59(64.8)	35(71.4)	11(57.9)	8(57.1)	
lunch	Always	19(100.0)	133(84.2)	80(87.9)	43(87.8)	18(94.7)	14(100.0)	0.331
	Usual	0(0)	25(15.8)	10(11.0)	5(10.2)	1(5.3)	0(0)	
	Never	0(0)	0(0)	1 (1.1)	1 (2.0)	0(0)	0(0)	
Dinner	Always	2(10.5)	107(67.7)	64(70.3)	33(67.3)	14(73.7)	9(64.3)	0.567
	Usual	17(89.5)	48(30.4)	22(24.2)	14(28.6)	4(21.1)	5(35.7)	
	Never	0(0)	3(1.9)	5(5.5)	2(4.1)	5.3(19)	0(0)	

Table 7: Relationship between BMI and health problems.

Health problem		Under Weight	Normal	Overweight	Obesity I	Obesity II	Sever obesity	p- value
		No. %	No. %	No. %	No. %	No. %	No %	
Diabetes mellitus	Yes	0(0)	1(7.1)	3(21.4)	6(42.9)	2(14.3)	2(14.3)	0.001
	No	19(5.7)	157(46.7)	88(26.2)	43(12.8)	17(5.1)	12(3.6)	
Hypertension	Yes	0(0)	3(15.8)	2(10.5)	6(31.6)	3(15.8)	5(26.3)	0.001
	No	19(5.7)	155(46.8)	89(26.9)	43(13.0)	16(4.8)	9(2.7)	
Atherosclerosis	Yes	0(0)	0(0)	0(0)	0(0)	3(66.7)	1(33.3)	0.001
	No	19(5.5)	158(45.5)	91(26.2)	49(14.1)	17(4.9)	13(3.7)	
Heart disease	Yes	0(0)	0(0)	1(33.3)	2(66.7)	0(0)	0(0)	0.001
	No	19(5.5)	158(45.5)	90(25.9)	47(13.5)	19(5.5)	14(4.0)	
Diseases of the joints	Yes	0(0)	3(8.3)	11(30.6)	9(25.0)	7(19.4)	6(16.7)	0.001
	No	19(6.1)	155(49.4)	80(25.5)	40(12.7)	12(3.8)	8(2.5)	
Spinal pain	Yes	0(0)	8(23.5)	8(23.5)	6(16.7)	6(16.7)	6(16.7)	0.001
	No	19(6.0)	150(47.5)	83(26.3)	43(13.6)	13(4.1)	8(2.5)	
Gallbladder diseases	Yes	0(0)	0(0)	1(16.7)	1(16.7)	2(33.3)	2(33.3)	0.001
	No	19(5.5)	158(45.9)	90(26.2)	48(14.0)	17(4.9)	12(3.5)	

Table 6: Relationship between BMI and fast food.

		Under Weight	Normal	Over weight	Obesity –I	Obesity –II	Sever Obesity	P value
		No. %	No. %	No. %	No. %	No. %	No. %	
	Yes	15(78.9)	115(27.2)	65(71.4)	38(77.6)	13(88.4)	11(78.6)	0.927
Fast food	No	4(21.1)	43(72.8)	26(28.6)	11(22.4)	6(21.6)	3(21.4)	

Table 8: Relationship between BMI and exercises.

Physical activity		Underweight		Normal		Overweight		Obesity –I		Obesity -II		Sever obesity		P value
		No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Exercises	Yes	3	(15.8)	44	(27.8)	22	(24.2)	12	(24.5)	2	(10.5)	1	(7.1)	0.300
	No	16	(84.2)	114	(72.2)	69	(75.8)	37	(75.5)	17	(89.5)	13	(92.9)	

DISCUSSION

Libya is following the trend observed in developing countries of steadily becoming more obese, such that obesity in Libya has reached epidemic proportions in the twenty-first century. In this study the prevalence of overweight among women in age group between 19 to 60 years in Derna- Libya was 49.4% which similar to what found in the study by Lemamsha (2019) in Libya which was 47.4% in wome.^[22]

The study by Musaiger (2012) in seven Arab countries among females, found that the highest prevalence of

overweight was reported in Libyan adolescents(26.6%), followed by Kuwaiti (20.8%), and Syrian (19.7%) adolescents.^[23] Although an increase in the prevalence of obesity has been reported in many countries around the world, the rate of increase in Libya has been observed to be particularly high. The prevalence of obesity in Libya has more than doubled in the last three decades, from 12.6% in 1984 to 30.5% in 2009.^[22]

From a study done in Derna, it was concluded that age was an important variable affecting obesity and more noticeable in women over 30 years of age. In addition,

positive relation ($P < 0.05$) was noted between age with body weight this findings agree with the findings by El-Hazmi (2002) in Saudi Arab^[24] which found that obesity increases with age and reaches its peaks at around 55-64 years and decreases afterwards. In addition, intake of more energy-dense food as well as having less physical activity may explain why women's likelihood of being overweight and obese increases with age. The cumulative effect of having a positive energy balance over the life course might be a reason for higher overweight and obesity rates with older age. Also, given that fat mass rises and also fat-free mass declines when a person crosses 30 years of his or her age, a possible explanation may also lie in the association of age with changes in body composition.^[24]

Moreover, this study showed an inverse relationship between obesity and education level and obesity increased with increasing education level that was different what found by Santas (2018) in Turkey.^[25] which said obesity was observed in women having no education or not completed primary school. Furthermore, higher rate of obesity was observed in women who were not working and positive correlation ($P < 0.05$) was noted between occupation with body weight this findings agree with the findings by Santas (2018) in Turkey^[25] which said unemployed women had 1.44 times higher risk of being overweight or obese compared to women involved in other work groups. Regarding marital state and its relationship with BMI, it could be noticed that the majority of married women (52.7%) categorized as overweight which was similar by Tanwi (2019) in Bangladesh^[26] which said women who are no longer living together with their husbands or separated from their husbands (95%) were less likely to be overweight and obese compared to married women. Moreover, increasing number of birth giving was also among the important results of this study. Higher rates of obesity were observed in women giving fourth birth and more compared to less birth, which was similar to study, by Santas (2018) in Turkey^[25] which said obesity increased with increasing number of birth. The number of full-term pregnancy could cause obesity in women.^[27] Pregnancy was triggered the body weight particularly after third childbirth.^[28]

Another important outcome of the analysis performed in the present study was body mass index had a strong relationship to some disease such as diabetes mellitus, hypertension, atherosclerosis, diseases of the joints, spinal pain and gallbladder diseases with positive correlation ($P < 0.05$). These findings agree with the findings by Mozaffarian (2011) in England^[29] which said healthy diet can prevent weight gain and chronic disease. There's increasing evidence that the same healthful food choices and diet patterns that help prevent heart disease, diabetes, and other chronic conditions may also help to prevent weight gain.

In addition, obese women are particularly susceptible to diabetes, and diabetes, in turn, puts women at dramatically increased risk of cardiovascular disease (CVD). Obesity substantially increases the risk of several major cancers in women. What is more, hypertension is very frequent among obese type 2 diabetic patient and hypertension in type 2 diabetes patients may develop with renal involvement. The risk of type 2 diabetes and hypertension are strongly related to obesity and central distribution of fat.^[30]

Moreover, the important result of this study was the most common types of foodstuff consumed every day by overweight women were; 87.9% consumed bread followed by 65.9% consumed milk. Regarding to the relation between bread consumption and body weight the results by Bautista-Castaño (2012) in Spain^[31] which found that dietary patterns that include whole-grain bread do not positively influence weight gain and most of the studies demonstrate a possible relationship with excess abdominal fat. Because differences in the study designs make it difficult to form definitive conclusions, more studies are needed that focus specifically on bread consumption, within different dietary patterns. On the subject of dairy products such as milk are nutrient rich foods, which provide many essential nutrients throughout life, and in study by Berkey (2005) in America^[32], which found in dairy products is the hormone estrone, which may promote increases in body weight. Furthermore, whey protein is often added during processing to reduced-fat milk, estrone is found in whey, and whey protein itself may promote weight gain. Furthermore, in this study finding the proportion of overweight was 45.1% with who consumption soft drink everyday that was similar what reported in study by Vartanian (2007) in America^[33] that sugary drinks increase the risk of weight gain, obesity, and diabetes: A systematic review and meta-analysis of 88 studies found clear associations of soft drink intake with increased caloric intake and body weight. This finding suggests that the association between soft drink consumption and weight change was because of the increase in daily energy intake caused by soft drink consumption.

This study revealed that the least common types of food stuff consumed by overweight women were 54.9% consumed vegetables and 34.1% consumed fruits which was similar to study by Ledoux (2011)^[34] which said people who increased their intake of whole fruits (not fruit juice) and vegetables over the course of the 20-year study gained less weight-0.4, 0.5, and 0.2 pounds less every four years, respectively.

In these collected data we observed the proportion of fat consumption by overweight women was 35.9% every day which was similar what found in study by Field (2007)^[35] which said increase consumption of unhealthy fats-trans fats, especially, but also saturated fats-was associated with greater weight gain among overweight women.

Our data showed the proportion of overweight women was 64.8% with who never consumption breakfast and the proportion of overweight women were 70.3% with who always consumption dinner which were similar to the study by Okada (2019) in Japanese^[36] which said skipping breakfast and night eating is associated with overweight or obese. One of the mechanisms for this observation is related to the definition of energy balance as the relationship between energy intake and energy expenditure.^[37] Nighttime eaters may consume more calories per day than those who do not eat at night and eating at night appears to have a lower energy expenditure than eating in the morning, as a result of lower diet-induced thermogenesis and a lower resting metabolic rate after meals.^[38] However, the relation between body weight and main meals consumption was insignificant ($P > 0.05$).

The results of this study revealed that the relationship between body weight and fast food was insignificant ($P > 0.05$) and over half 71.4% of overweight women were consumption fast food. Fast food is known for its large portions, low prices, high palatability, and high sugar content, and there's evidence from study by Duffey (2007) in America^[39] which reported teens and adults that frequent fast-food consumption contributes to overeating and weight gain.

The relation between BMI and physical activity (exercises) was not statically significant ($P > 0.05$). Which was agree with the finding in the result by Rahman (2015) in Malaysia^[40] which said exercise minutes is associated with a lower BMI in adults and a negative correlation between BMI and time of exercise performance in adult's sample. The relationship between physical activity and body weight is derived from the assumption that a normal-weight person's energy intake is equal or nearly equal to their energy expenditure. That is a person becomes overweight or obese if the energy intake is greater than the energy expenditure, and one way of maintaining the energy balance is by getting rid of the extra calories by performing physical activity. If physical activity is not sustained, even an individual with a healthy weight could easily regain some or all of it.

CONCLUSION

The present study showed that the considerably high prevalence of overweight and obesity among women in Derna -Libya also seems to have a socio-economic and demographic. More specifically, age, occupation, education, marital state, number of birth and the main risk factors for being overweight and obese. The Libyan diet, which is high in calories and rich in fat, and the lack of physical activity play an important role in the current obesity in Derna.

A plan of action to prevent and control obesity should be urgently established in Derna city especially among women combat the comorbidities associated with obesity. To prevent overweight/obesity, the timing of meals should be considered, e.g., avoiding late dinners and nighttime

meals. Also number of interventions can be implemented. There should be national and regional campaigns to encourage consumptions of healthy foods and physical activity. This should include the provision of healthy foods at university and nutritional education and communities. Interventions that will aim at addressing the socio-cultural barriers to maintaining healthy body size can also contribute to fighting the overweight and obesity epidemic in Libya

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