Research Article

Dietary and Lifestyles assessment among Obese Women in Gaza City, Palestine

Marwan O Jalambo[1]*, Basil Kanoa[2], Mohammed S Ellulu[3], Smaher Younis[2] and Mueen El-Kariri[2]

[1]Nutrition and Public Health Division, Academic Department, Palestine Technical College, Gaza, Palestine
[2]Ministry of Health, Gaza, Palestine
[3]Clinical Nutrition Specialist, Gaza, Palestine

*Address for Correspondence: Marwan O Jalambo (PhD), Nutrition and Public Health Division, Academic Department, Palestine Technical College, Gaza, Palestine, Tel: +97082531171; Fax: +97082538101; Email: moj_biology@yahoo.com

Abstract

Background: The fundamental cause of obesity and overweight is an energy imbalance between calories consumed and calories expended.

Aim: To clarify and figure out food habits and different lifestyle pattern among a sample of Palestinian women attending the nutrition center in the Gaza Strip.

Methods: A cross-sectional study involved 116 women were randomly chosen by purposive census sampling. They aged 25 to 60 years with a diagnosis of obesity. The data collected by interview questionnaire that included social factors, lifestyle habits, and health/disease history.

Results: Age group variable has distributed significantly (p=0.024), (31.0%) of morbid obese were ≥35 years group compared to (13.5%) of morbid obese amongst the younger group. The higher intakes of legumes (OR: 2.134, P=0.003), nuts (OR: 3.917, P=0.019), eggs (OR: 6.840, P=0.009), fast foods (OR: 4.461, P=0.005), and soda drinks (OR: 2.230, P=0.004) were the risk factors linked to the increased risk of morbid obesity. Moreover, the higher intakes of legumes (OR: 8.439, P=0.011), eggs (OR: 6.900, P=0.041), chips (OR: 5.049, P=0.012), sugar (OR: 2.068, P=0.011), and fast foods (OR: 3.029, P=0.025) are risk factors of chronic diseases.

Conclusion: The study identified several lifestyle factors and improper dietary habits associated with obesity among women in Gaza city. There is a great need to change these habits to avoid the increased risk of obesity. Gene-environment interaction can explain the high incidence of obesity. A national plan of action to overcome obesity is urgently needed to reduce its economic and health burden.

Introduction

Obesity is recognized as a multi-factor metabolic change of epidemic proportions [1]. Factors such as inadequate dietary intake, sedentary lifestyle, patterns of physical activity, social and environmental variables were involved in the development of obesity [2]. Other factors like individual susceptibility; determined by unmodified factors such as genetic and family history factors were also considered [2].

Globally, there is a gradual increase in obesity that observed during the last few decades. In fact, some studies have reported that the prevalence of obesity had already reached epidemic proportions in developed and developing countries [3-7].

In Palestine, like many countries, people have lived through rapid globalization that prompted changes in their behaviors and attitudes. Activities that formerly required

high energy expenditure have been replaced by the ease offered by urbanization and industrial and technological progress, leading, in turn, to lower energy consumption at work, during commuting, and in domestic and leisure activities [8,9].

Obesity is not only considered as a disease in itself, but it also gives rise to and aggravates many others, and is thus known to be a risk factor for certain chronic diseases, in particular being closely associated with metabolic abnormalities like diabetes, cardiovascular diseases, and certain types of cancer [10]. Therefore, this study aimed to figure out food habits and physical activity patterns among Palestinian obese women attending a Nutrition Clinic in the Gaza city.

Materials and Methods

A cross-sectional study involved 116 women between 25–60 years of age with a diagnosis of obesity during the period from September 2015– October 2016. The enrolment of participants was chosen by non-probability sample using purposive census method for women who attended the Nutrition Clinic in the Gaza city. All women had a stable body weight for at least three months prior to data collection.

Data collected by interview questionnaire, which involved socio-demographic factors, eating habits, health/disease status, and physical activity after signing a written consent form, in which the women's socio-demographic factors included age and marital status (classified to married and unmarried that involved single, widowed, and divorced women). Lifestyle factors in this study involved physical activity pattern, which was evaluated according to the Global Physical Activity Questionnaire (GPAQ) Version-2 that considers the Palestinian specialties. Health/disease history depended on participants self-reporting; disease meant chronic diseases or non-communicable diseases (NCDs) like hypertension and diabetes.

Interview questionnaire involved a section of practicing weight management, Dietary habits, and body mass index (BMI) calculated by using height and weight, which was classified internationally according to World Health Organization, and measured based on the formula [BMI (kg/m^2) = Weight (kg) / Height square (m^2)]. BMI was classified according to the obesity status; non-obese [BMI: <30 kg/m^2] women were excluded from the enrollment of the study. The inclusion criteria involved obese class I [BMI: ≥30 – <35 kg/m^2], obese Class II [BMI: ≥35 – <40 kg/m^2], and morbid obese [BMI: ≥40 kg/m^2].

The validity of the questionnaire was tested by four experts in the field of nutrition, health, obesity, and chronic diseases from the same community. The accuracy of responses was matched with a participant health records for routine visits. Weight was measured using a commercial scale (Seca Scale, Germany) with an accuracy of 0.01 kg. The subjects were asked to remove their footwear and wear minimal clothes before weighing. Standing body height was measured to the nearest 0.1cm by using Holtain Stadiometer with the shoulder in a relaxed position and arms hanging freely and without shoes.

Data were analyzed statistically by using the Statistical Package for Social Sciences version 22.0 software. Descriptive interview session has presented by frequencies and percentages. Chi-square (χ2) was used to compare the categorical variables. Binary Logistic Regression was used to estimate the Odds Ratio (OR) for the dietary risk factors. *P*-value of ≤0.05 was considered statistically significant and level of confidence was 95%.

Results

This study aimed to clarify and figure out food habits and lifestyle pattern among obese women in Gaza city. The recruitment of study participants began in September 2015 and was completed in October 2016. Table 1 describes the baseline characteristics

of all participated women. The total number was 116 women and 74 (63.8%) of them were aged ≥35 years. 63 (54.3%) were married, while the others stated not married who involved single, widowed, and divorced. None of them stated having high physical activity, while 64 (55.2%) were moderate physically active and the rest were light physical activity.

Regarding the body mass index, 23 (19.8%) were morbidly obese (BMI≥40 kg/m^2) and 93 (80.2%) were the obese class I and II (ranged from BMI≥30 to BMI<40 kg/m^2). In addition, 22 (19.0%) have stated that they have one of the chronic diseases such as hypertension or diabetes type-2, while the rest is free from chronic diseases.

At Table 1 section A, within the interview questionnaire, 116 women were the entire population was involved. The majority 52 (44.8%) have responded "Not Good" regarding the 1st question "how do you evaluate your current health?". The 2nd question was "what is the main cause to reduce weight? The majority of 66 (56.9%)

Table 1: Baseline characteristics.

Total Number = 116			Frequency	%
Sex				
Female			116	100%
Age groups				
25 to <35 years			74	63.8
≥35 years			42	36.2
Marital status				
Not Married (single; widowed; divorced)			53	45.7
Married			63	54.3
Physical activity				
Light			52	44.8
Moderate			64	55.2
Body mass index (BMI)				
Obese class I & II (from BMI≥30 to BMI<40 kg/m^2)			93	80.2
Morbid obese (BMI≥40 kg/m^2)			23	19.8
Having one of the chronic diseases such as hypertension or diabetes type-2				
Yes			22	19.0
No			94	81.0
Interview Questionnaire (weight management)				
Section A: Involves all subjects (N=116)				
		How do you evaluate your current health?		
Q1	A1	Apparently healthy	36	31.0
	A2	Moderate healthy	28	24.2
	A3	Not good	52	44.8
		What is the main cause to reduce weight?		
	A1	True obesity evidenced by high BMI	66	56.9
Q2	A2	Presence of health/disease condition	30	25.9
	A3	Psychological causes	8	6.9
	A4	To improve the social attendance and quality of life	12	10.3
Q3		**How long the period for getting weight scale?**		
	A1	Once per a week	30	25.9
	A2	Once per a month	20	17.2
	A3	Once per more than a month	66	56.9
Q4		**Do you think that you can lose weight?**		
	A1	Yes	26	22.4
	A2	No	90	77.6
Q5		**Have you ever tried to lose weight?**		
	A1	Yes	88	75.9
	A2	No	28	24.1
Section B: Involves subjects who responded **YES** in Q5 (n=88); Respondents of NO are excluded (n=28)				
Q6		**What are the approaches to reduce weight?**		
	A1	By physical activity exercising	4	4.5
	A2	By talking herbal or chemical medicine	58	66.0
	A3	By following diet plans	26	29.5
Q7		**How long the period of reducing weight did you use?**		
	A1	Less than 1 month	28	31.8
	A2	From 1 to 3 months	47	53.4
	A3	More than 3 months	13	14.8
Q8		**Have you satisfied by the used program for reducing weight?**		
	A1	Yes	32	36.4
	A2	No	56	63.6

Abbreviations: BMI: body mass index; **Q**: question; **A**: answer.

have concerned that they had true obesity evidenced by high BMI. The 3rd question was "how long the period for getting weight scale?", the most frequent answer was "once per more than a month". About 77.6% of them mentioned that they won't lose a weight in response to the 4th question. Finally, in response to the 5th question, about 75.9% have used different methods to lose weight in different periods of life.

When the researcher asked the participant regarding trying to lose weight, about three quartiles of them answer they tried to do lose their weight as shown as in table 1. In addition, about two-thirds of women tried to lose their weight was used herbal and chemical medicines without prescription by Dietitians or Physicians. Moreover, the period was used to lose their weight were less than 3 months among the majority of them (85.2%), and two-thirds of them satisfied their lost weight, and the rest concerned the self-programs that follow it were not satisfied as shows as in table 1.

Table 2 has determined the distribution of subjects' characteristics on two factors; obesity and chronic disease conditions. Three categorical factors have involved; age, marital status, and physical activity. None of the factors have associated significantly with chronic disease. Regarding obesity status, just age group variable has distributed significantly (*p*=0.024), (31.0%) of morbid obese were ≥35 years group compared to (13.5%) of morbid obese amongst the younger group.

Prediction of dietary risk factors that contribute to the development of morbid obesity and/or chronic diseases has described in Table 3. Two models have involved by logistic regression; Model-I predicted the risk factors associated with morbid obesity (BMI≥40 kg/m^2), and Model-II predicted the risk factors associated with acquired chronic diseases such as HTN and/or DM.

Model-I in table 3 shows the risk factors associated with morbid obesity, the higher intakes of legumes [OR: 2.134] (95% CI: 1.901-3.969, *P*=0.003),nuts [OR: 3.917] (95% CI: 1.249-12.289, *P*=0.019), eggs [OR: 6.840] (95% CI: 1.601-29.223, P=0.009), fast foods [OR: 4.461] (3.057-19.884, P=0.005), and soda drinks [OR: 2.230] (95% CI: 1.084-8.627, P=0.004) were the risk factors linked to the increased risk of morbid obesity. In contrast, lower intakes of meats [OR: 0.085] (95% CI: 0.011-0.676, P=0.020) and fruits [OR: 0.288] (95%CI: 0.084-0.989, P=0.048), were also the risk factors linked to the increased risk of morbid obesity. By the same way, low physical activity was a risk factor has associated with morbid obesity [OR: 5.183] (95% CI: 1.731-13.265, P=0.002), while the absence of obesity during childhood and absence of family's history of obesity were protective factors.

Model-II in table 3 shows the risk factors associated with obese women who suffer from chronic disease. The higher intakes of legumes [OR: 8.439] (95% CI: 2.938-36.418, *P*=0.011), eggs [OR: 6.900] (95% CI: 1.085-13.862, P=0.041), chips [OR: 5.049] (2.342-12.700, P=0.012), sugar [OR: 2.068] (1.009-4.547, P=0.011), and fast foods [OR: 3.029] (1.001-12.639, P=0.025. In contrast, high intake of nuts, the absence of obesity during childhood and absence of family's history of obesity were protective factors.

Table 2: Distribution of subjects' characteristics of obesity and chronic disease conditions.

Factor	Obesity				X² value	P value	Chronic Disease				X² value	P value
	Obese Class I & II		Morbid Obese				Not Diseased		Diseased			
	n	%	n	%			n	%	n	%		
Age groups												
25 to <35 years	64	86.5	10	13.5	**5.126**	**0.024***	60	81.1	14	18.9	0.001	0.986
≥35 years	29	69.0	13	31.0			34	81.0	8	19.0		
Marital status												
Not married	45	84.9	8	15.1	1.375	0.241	47	88.7	6	11.3	3.711	0.054
Married	48	76.2	15	23.8			47	74.6	16	25.4		
Physical activity												
Light	45	86.5	7	13.5	2.403	0.121	42	80.8	10	19.2	0.004	0.948
Moderate	48	75.0	16	25.0			52	81.2	12	18.8		

X²: measured by the Pearson Chi-Square test value.
* Distribution is significant at P value ≤0.05.

Table 3: Prediction of dietary risk factors that contribute to the development of morbid obesity and/or chronic diseases.

Risk factors	Model-I				Model-II			
	OR	95% C.I.		P value	OR	95% C.I.		P value
		lower	upper			lower	upper	
White Meats	**0.085**	0.011	0.676	**0.020***	0.038	0.001	1.350	0.073
Legumes	**2.134**	1.901	3.969	**0.003***	**8.439**	2.938	36.418	**0.011***
Vegetables	0.947	0.382	2.347	0.907	0.194	0.024	1.571	0.124
Fruits and juices	**0.288**	0.084	0.989	**0.048***	2.008	0.394	10.230	0.401
Nuts	**3.917**	1.249	12.289	**0.019***	**0.036**	0.002	0.647	**0.024***
Milk	0.696	0.213	2.268	0.547	0.380	0.069	2.079	0.264
Animal protein (Eggs and red meat)	**6.840**	1.601	29.223	**0.009***	**6.900**	1.085	13.862	**0.041***
Chips	2.214	0.881	5.567	0.091	**5.049**	2.342	12.700	**0.012***
Sugars	0.620	0.260	1.479	0.281	**2.068**	1.009	4.547	**0.011***
Preference of fatty foods	0.744	0.253	2.191	0.592	2.310	0.064	5.324	0.647
Consumption of fast foods	**4.461**	3.057	19.884	**0.005***	**3.029**	1.001	12.639	**0.025***
Sugar sweetened beverages	**2.230**	1.084	8.627	**0.004***	0.038	0.003	1.556	0.117
Drinking water	0.494	0.082	2.988	0.422	3.064	0.159	18.873	0.458
Physical in-activity	**5.183**	1.731	13.265	**0.002***	3.934	0.698	11.673	0.073
Absence of Childhood obesity	**0.160**	0.027	0.941	**0.043***	**0.036**	0.002	0.667	**0.026***
Absence of family's obesity	**0.238**	0.064	0.883	**0.032***	**0.005**	0.002	0.206	**0.009***
Constant	0.353			**0.023***	8.030			0.011*

Model-I: prediction of risk factors associated with morbid obesity (BMI≥40 kg/m^2).
Model-II: prediction of risk factors associated with acquired chronic diseases (HTN and/or DM).
* Risk factor is significant at level (≤0.05).

Discussion

Obesity class I and II were most common at age group less than 35 while co-morbid obesity was most common at old ages. This indicator for increasing obesity prevalence is in line with increasing the age and reaches its highest levels in the more than 35-year-old age group. This could be attributed to decreasing physical activity with increasing age. If, for example, this resulted in a body weight increase by only 1 kg per year, the weight would increase by 10 kg at the end of 10 years [11].

There is no doubt about the inverse relationship existing between physical activity and obesity [12-16], and the benefit and its preventive effect by acting on the control of fats and cholesterol [17,18].

Results of the study linked being not married (single, divorced and widowed) with a lower percentage of chronic disease in women. On the other hand, married women were positively associated with chronic disease. It has been suggested that, after getting married, subjects are less physically active, change their dietary pattern, may be less focused on being attractive, have more social support, or may be exposed to other environmental factors [19].

Frequent consumption of fruits and its juices were classified as a protective factor among the participants. Reports indicated that increased fruit consumption contributed to reduced adiposity among obese and comorbid obese women. This result was consistent with other studies of overweight adults showed marked associations between increased consumption of fruits and vegetables and slower weight gain [20]. The mechanism by which fruit intake may prevent obesity is not fully understood but could be related to the clustering effect of healthy habits while other authors reported their fiber content and its effect on satiety and manage their body weight [20,21].

In Palestine, as well as other countries in the Eastern Mediterranean region, the food habits and pattern of food consumption have changed enormously over the past decades [22]. The intake of fruit and vegetables and complex carbohydrates has

decreased, which linked strongly with obesity prevalence. In addition, Western calorie-dense fast foods are increasingly available and consumed by the young generation in this region [22-25].

The consumption of white meat like chicken has been related to the lower risk of obesity. Consistent with previous findings, adequate consumption of poultry meat can facilitate the control of body weight due to its high protein content and help to counteract against the development of obesity, cardiovascular diseases, diabetes mellitus and cancer [26]. On the other side, red meat can be relatively high in fats. It can also be energy dense and has a role in weight gain, overweight, and obesity. Eating more plants, especially vegetables and fresh fruit, in place of things like meats specially processed is said to be one of the most valuable things we can do to treat obesity and help reverse the growing obesity epidemic [27].

In addition, women who consumed more nuts are at risk of obesity, which opposes the previous studies of Flores-Mateo et al., Ibarrola-Jurado et al. in 2013 and Sabaté in 2003 [27-29]. Traditional weight loss diets tend to be low in total fat and therefore often restrict nut consumption. However, nuts are an important source of many vitamins, minerals, monounsaturated and polyunsaturated fatty acids. Studies showed that the role of nut consumption in body weight management is varied. Nuts, when included as part of an energy-controlled diet, were found to assist with weight management [30]. However, when nuts were added to an existing diet without controlling for energy intake, body weight increased, although to a lesser extent than theoretically predicted. There are limited evidence on the effect of nut consumption on non-communicable diseases, although available evidence indicates that nuts as part of a healthy diet do not cause weight gain and can have a positive influence on the fatty acid profile of a person with diabetes [30].

A positive correlation between fast food consumption and women obesity and chronic diseases was a significant finding, which is consistent and matched with other previous studies [31-35].

Possible factors determining obesity in the Eastern Mediterranean Region (EMR) including Palestine were nutrition transition, inactivity, urbanization, marital status, a shorter duration of breastfeeding, frequent snacking, skipping breakfast, a high intake of sugary beverages, an increase in the incidence of eating outside the home, long periods of time spent viewing television, massive marketing promotion of high fat foods, stunting, perceived body image, cultural elements, and food subsidize policy and A national plan of action to overcome obesity is urgently needed to reduce the economic and health burden of obesity in this region [36].

Physical activity (PA) provides important health benefits and recent guidelines on recommendation indicated that people should engage in light to moderate activity every day [37]. The study showed physical inactivity constitutes a risk factor that increased the prevalence of obesity and co-morbidity among the participants. Regular physical activity is associated with a healthier, longer life while inactivity is widely recognized as a major risk factor for chronic diseases [37,38].

Furthermore, the absence of childhood obesity and family history have reduced the risk of adulthood obesity and co-morbidity and reduced the risk of chronic diseases in the future. Genetics alone cannot explain obesity, gene-environment interaction can explain the high incidence of obesity [39]. Reports suggest that environmental factors are largely associated with the development of an obesity status and it also concludes that genetics only contributes 30% to the issue and 70% is attributed to the environment [40]. There has been a rise in unhealthy food accessibility along with long physical activity levels which are factors related to the genetic aspect of obesity [41].

Moreover, increase consumption of sugar-sweetened beverages increased the risk of obesity and co-morbid obesity among the participants. Worldwide, the consumption of sugar-sweetened beverages has increased dramatically in the past decades, in parallel with the increasing prevalence of overweight and obesity in the globally. Currently, sugary soft drinks contribute ≈8%–9% of total energy intake in both children and adults [42,43]. The calories provided by sugar-sweetened beverages have little nutritional value and may not provide the same feeling of fullness that solid food provides, so a total energy intake may increase which can lead to unhealthy weight gain [44].

Conclusion

This study was conducted to identify the possible risk factors contributing to obesity and co-morbid obesity among women aged >25 years in Gaza city, Palestine. Food and eating habits, physical activity, social characteristics, the relationship between parents' characteristics and BMI, family history of the disease and co-morbid obesity in parents were all examined. Logistic regression analysis predicted the dietary and lifestyle risk factors that contribute to the development of obesity class I and II /co-morbid obesity and chronic disease state among them. If the women more frequently eat legumes, nuts, eggs, fast food, and soda drink and if they less frequently engaged in a physical activity they are at risk. In contrast, lower intakes of meats and fruits were also the risk factors linked to the increased risk of morbid and co-morbid obesity. By the same way, absence of obesity during childhood and absence of family's history of obesity were protective factors.

Dietary risk factors that associated with the development of chronic disease included increase consumption of legumes, eggs, chips, sugar, and fast food while lower consumption of meat and absence of childhood obesity were considered as protective factors of chronic diseases. Based on the BMI measurements drawn from the sample of 116 obese women, 80.2% were classified as obesity class I and II and 19.8% were classified as co-morbid obesity. According to the study results, only 19% of the sample were classified as obese women with chronic disease. A national plan of action to overcome obesity is urgently needed to reduce its economic and health burden.

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