Overweight and obesity among Jordanian women and their social determinants

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زيادة الوزن والبدانة بين النساء الأردنيات، والمحددات الاجتماعية لهما

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الخلاصة: تهدف هذه الدراسة إلى التعرُّف على المحددات الاجتماعية التي تترابط مع البدانة لدى النساء الأردنيات، انطلاقاً من البيانات الوطنية المستمدة من المسح الصحي للأسرة والسكان في الأردن لعام 2009. وقد وجد الباحثون أن المعدل الإجمالي لانتشار زيادة الوزن هو 30٪، وللبدانة 38.8٪ بين الأردنيات في أعمار 15–49 عاماً. وأوضحت النتائج من التحليل المتعدد المتغيرات أن كلاً من العمر، والإقامة في المناطق الجنوبية من الأردن، والزواج في سن مبكرة، وتعدد الحمول، والغنى، والتدخين، هي منبئات يُعتدّ بها إحصائياً للبدانة وزيادة الوزن لدى الأردنيات. كما أشارت الدراسة إلى الحاجة الملحة لتنفيذ برامج صحية تستهدف زيادة الوزن والبدانة وتكافحهما على الصعيد الوطني؛ وأنه ينبغي أخذ المحددات الاجتماعية في الاعتبار عند تصميم وتنفيذ تلك البرامج.

ABSTRACT This study aimed to explore the social determinants associated with obesity among Jordanian women using the national data from the Jordan Population and Family Health Survey 2009. We found the overall prevalence of overweight was 30% and obesity was 38.8% among Jordanian women aged 15–49 years. Results of multivariate analysis showed that age; residing in the south region of Jordan, marriage at an early age, parity, wealth status and smoking were statistically significant predictors of overweight and obesity among women in Jordan. Our results show that there is an urgent need to implement health programmes to prevent and control overweight and obesity at the national level. Social determinants should be taking into consideration in designing and implementing these programmes.

Surpoids et obésité chez des Jordaniennes et leurs déterminants sociaux

RÉSUMÉ La présente étude visait à explorer les déterminants sociaux associés à l'obésité chez des Jordaniennes à l'aide de données nationales issues de l'Enquête 2009 sur la population et la santé familiale en Jordanie. Nous avons observé une prévalence globale s'élevant à 30 % pour le surpoids et à 38,8 % pour l'obésité chez les Jordaniennes âgées de 15 à 49 ans. Les résultats d'une analyse multivariée ont montré que l'âge, le fait d'habiter dans la région sud de la Jordanie, un mariage précoce, la parité, le niveau de revenu et le statut tabagique étaient des facteurs prédictifs statistiquement significatifs du surpoids et de l'obésité chez les femmes en Jordanie. Nos résultats indiquent l'urgente nécessité de mettre en œuvre des programmes de santé pour prévenir le surpoids et l'obésité et lutter contre ces affections au niveau national. Les déterminants sociaux doivent être pris en compte dans l'élaboration et la mise œuvre de ces programmes.

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Introduction

Obesity has come to be recognized as a global pandemic [1]. The World Health Organization (WHO) recognizes obesity as a global health issue with one billion adults worldwide identified as overweight and an additional 300 million obese [1]. Globally, it has affected developed and developing countries [2]. Women in particular have a high prevalence of obesity [3,4]. Obesity has been found to have many harmful effects for women of reproductive age. Obese women are more likely to encounter problems becoming pregnant [5–7] and are more prone to miscarriage during early pregnancy [8]. Women who are overweight are at greater risk of developing pregnancy complications and problems associated with labour and delivery and are more at risk of postpartum complications such as infection, haemorrhage and embolism. This means, maternal mortality and morbidity are significantly elevated among obese women [9,10]. Obesity among women has been linked to education [11–13], age [11,12,14], income [15,16] as well as marital status [17].

In Jordan, there has been little research on the social determinants of obesity; the aim of our study is to explore possible social determinants associated with obesity among women in Jordan through analysing data from the Jordan Population and Family Health Survey (JPFHS) 2009.

Methods

For this study we conducted a secondary analysis of the JPFHS 2009. The JPFHS was based on data from the Jordan Demographic Health Survey (DHS) conducted in 2009 by Jordan's Department of Statistics in collaboration with Macro International [13]. The survey was designed to collect data on ever-married women of reproductive age; it covered demographic and socioeconomic characteristics, reproduction, family planning and nutrition status of women aged 15–49 years old. The survey was implemented in three stages: the first was the preparatory stage, including mapping and listing of households; the second stage encompassed interviews and data collection; and the third stage involved editing and coding.

The 2009 JPFHS sample was designed to produce reliable estimates of major variables for the country as a whole, urban and rural areas, *badia* and non-*badia*, in each of the 12 governorates. Governorates were grouped into three regions, north, central and south. The sampling frame was stratified by governorate, major cities, and other urban and rural within each stratum.

A two-stage sampling procedure was used to select participants in this study. The first stage—systematic block selection—produced a total of 930 primary sampling units (PSU). The second stage involved the selection of a fixed number of 16 households in each PSU resulting in a sample size of about 14 872 households. Out of the 14 872, a representative sample of 13 577 households was interviewed, in which 10 109 eligible women were identified. Pregnant women during the survey time were excluded from this study. Out of the 10 109 eligible women, measurements for weight and height were made on 4109 women. Weight was measured using electronic Seca scales; height was measured using Shorr height boards.

Body mass index (BMI; weight in kg/[height in metres]^2 × 100) was calculated for each woman. The definition of overweight/obesity was based on the 1997 WHO criteria, so that the BMI was classified into underweight (< 18.5), normal weight (18–24.99), overweight (25–29.99), and obese (^{3} 30) [18]. This was the outcome variable of the study.

A set of sociodemographic risk factors for BMI was identified. This included region (north, central and south), place of residence (urban, rural), women's age (15–24, 25–34, 35+), education (primary or less, secondary, higher than secondary), working status (not working, working), marriage age (10–15, 16–19, 20+), cigarette smoking (smoker, non-smoker), number of children ever born (1–2, 3–5, 6+). Data on income were not collected in this survey; we used household wealth index as a proxy measure of long-term standard of living. Several household amenities were used to develop a simple index of living standards. The index was grouped into three categories (low, middle and high) at the household level after weighting each item by natural logarithm of total frequencies for that item [19].

Descriptive statistics were used to examine the characteristics of women in the sample and bivariate associations with BMI. Adjusted odds ratios (OR) were calculated using logistic regression analysis to determine the net association between the various risk factors and non-obese versus obese women. The data were weighted using sample weights at the PSU level prior to the analysis. All analyses were undertaken using *SPSS*, version 15.

Results

Table 1 shows the characteristics of the JPFHS respondents; one-third of the respondents were overweight, and 38.8% of respondents were obese. About two-thirds of the respondents were living in the central region of Jordan; about 84% resided in urban areas. Approximately half of respondents were aged 25–34 years. About two-thirds of respondents had finished secondary education. Of respondents 86% were reported as not working. Approximately 57% of respondents were married at age ≥ 20 years. Almost 10% of respondents were smokers. Less than half of the respondents had 3–5 ever-born children,

Table 1 Characteristics of the JPFHS selected respondents, JPFHS 2009 (*n* = 4109)

Variable	No.	%
Body–mass index		
Normal weight	1136	27.6
Overweight	1380	33.6
Obese	1594	38.8
Region		
Central	2553	62.1
North	1188	28.9
South	368	9.0
Residence		
Urban	3456	84.1
Rural	653	15.9
Age (years)		
15–24	474	13.4
25–34	1526	43.2
35+	1532	43.4
Education		
Primary or less	434	10.6
Secondary	2432	59.2
Higher than secondary	1243	30.3
Working status		
Not working	3522	86.0
Working	575	14.0
Age at marriage (years)		
10–15	324	7.9
16–19	1448	35.2
20+	2337	56.9
Cigarette smoking		
Non-smoker	3685	89.7
Smoker	412	10.3
Number of children ever born		
1–2	1000	26.5
3–5	1770	46.8
6+	1012	26.7
Wealth index		
Low	726	17.7
Middle	1367	33.3
High	2016	49.1

JPFHS = Jordan Population and Family Health Survey.

and 49% of respondents were classified as having a high wealth index (Table 1).

Table 2 shows that region significantly correlated to BMI (*P* value < 0.005); two-thirds of respondents who lived in central areas were reported as either overweight or obese. Less than half of women living in rural areas were obese, whereas about one-third of those who lived in urban areas were obese (*P* value < 0.000). Half of women aged 35+ years were obese whereas about one-third of women aged 25–34 were reported overweight but only one-quarter of women in the same age group were obese (*P* value < 0.000).Working women were less likely to be obese comparing with not working women (*P* value < 0.000).Moreover, age at marriage, number of children ever born and smoking status were significantly related to the status of BMI with *P* value less than 0.05 (Table 2).

Table 3 shows the results of multivariate analysis. We found that women who resided in the southern part of the country were 1.6 times more likely to be overweight or obese compared to the middle region (OR = 1.6; 95% CI 1.2–2.09). Women aged 35+ years were three times more likely to be obese compared to women aged 15–24 (OR = 3.1; 95% CI 2.14–4.28). Marriage at early ages, having more children ever born and being a non-smoker were statistically positive significant predictors of overweight and obesity among women in Jordan. Women who were classified as having low wealth index and women who were classified as having middle wealth index were slightly more likely to be obese compared with women classified as having high wealth index (OR = 1.3; 95% CI 1.02–1.6; OR = 1.2; 95% CI (1.02–1.46) respectively (Table 3).

Discussion

Our study revealed that one-third of the respondents were overweight, and 38.8% of respondents were obese, in line with other studies from the region and local studies [16,20,21]. Results from the same earlier survey (DHS 2007) showed that 27% of women of reproductive age (15–49) were overweight and 20% were obese. Another study on the national prevalence of behavioural risk factors for chronic diseases (2007) showed that 30.5% of respondents were overweight and 36.0% of them were obese [22]. Jordan has experienced recent, rapid changes towards westernized lifestyles that are associated with greater risks of obesity. Sedentary lifestyles and high-fat diets are becoming common

Table 2 Percentage distribution of body mass index among ever married women aged 15–49 years by selected sociodemographic characteristics, JPFHS 2009 (*n* = 4109)

Variable	Normal weight		Overweight		Obese		*P*-value
	No.	%	No.	%	No.	%	
Region							< 0.0001
Central	774	30.3	867	34.0	912	35.7	
North	272	22.9	403	33.9	513	43.2	
South	89	24.2	110	29.9	169	45.9	
Residence							0.024
Urban	977	28.3	1168	33.8	1311	37.9	
Rural	159	24.3	212	32.4	283	43.3	
Age (years)							< 0.0001
15–24	251	53.0	135	28.5	88	18.6	
25–34	537	35.2	599	39.3	389	25.5	
35+	258	16.9	507	33.1	766	50.0	
Education							< 0.0001
Primary or less	93	21.4	117	27.0	224	51.6	
Secondary	650	26.7	796	23.7	987	40.6	
Higher than secondary	393	31.6	467	37.6	383	30.8	
Working status							0.002
Not working	989	28.1	1147	32.6	1386	39.4	
Working	144	25.0	231	40.2	200	34.8	
Age at marriage (years)							< 0.0001
10–15	60	18.5	90	27.8	174	53.7	
16–19	381	26.3	455	31.4	613	42.3	
20+	695	29.7	835	35.7	807	34.5	
Cigarette smoking							0.023
Non-smoker	966	27.0	1237	33.6	1452	39.4	
Smoker	137	32.5	143	34.0	141	33.5	
Number of children ever born							< 0.0001
1–2	447	44.7	354	35.4	200	20.0	
3–5	428	24.2	640	36.2	702	39.7	
6+	138	13.6	273	27.0	600	59.3	
Wealth index							0.040
Low	219	30.2	216	29.8	726	40.1	
Middle	370	27.1	449	32.8	1367	40.1	
High	546	27.1	715	35.5	2015	37.4	

JPFHS = Jordan Population and Family Health Survey.

[22,23]. Therefore, it seems reasonable to hypothesize that the prevalence of overweight and obesity in Jordan may have increased steeply in recent years. In Jordan, Zindah et al. showed that obesity was significantly associated with diabetes, high blood pressure, high cholesterol and asthma compared with adults of normal weight among Jordanian people [24]. The 2004 and 2007 Behavioural Risk Factor Surveys for Jordan showed a low intake of fruits and vegetables among people: only about 19% of survey respondents reported having consumed three or more cups of fruits, fresh juices or vegetables the previous day [22,23]. Of obese Jordanians 27.8% reported that they considered their weight to be normal [24]. In contrast, only 4.6% of obese females and 11.9% of obese males in the United States reported that they were of normal weight or overweight, which reflects the poor awareness of what constituted a healthy weight among Jordanian population [25]. In addition, results from the more recent Behavioural Risk Factor Survey (2007) showed that only 37.8% of the Jordanian population engaged in moderate physical activity [22]. Lack

Table 3 Association between body mass index and selected sociodemographic characteristics among ever married not pregnant women participants, JPFHS, Jordan, 2009

Variable	OR (95% CI)	*P*-value
Region		
Central	1	
North	1.2 (0.99–1.43)	0.065
South	1.6 (1.20–2.09)	0.001
Residence		
Urban	1	
Rural	0.95 (0.76–1.19)	0.66
Age (years)		
15–24	1	
25–34	1.3 (0.92–1.73)	0.157
35+	3.1 (2.14–4.28)	< 0.0001
Education		
Primary or less	1	
Secondary	1.2 (0.90–1.58)	0.217
Higher than secondary	0.98 (0.71–1.35)	0.871
Working status		
Not working	1	
Working	1.1 (0.82–1.35)	0.675
Age at marriage (years)		
10–15	2.2 (1.57–2.88)	< 0.0001
16–19	1.3 (1.11–1.60)	0.002
20+	1	
Cigarette smoking		
Non-smoker	1.5 (1.12–1.92)	0.005
Smoker	1	
Number of children ever born		
1–2	1	
3–5	1.8 (1.44–2.24)	< 0.0001
6+	2.5 (1.85–3.28)	< 0.0001
Wealth index		
Low	1.3 (1.02–1.61)	0.032
Middle	1.2 (1.02–1.46)	0.027
High	1	

JPFHS = Jordan Population and Family Health Survey; OR = odds ratio; CI = confidence interval.

of appropriate places for women to exercise is one of the major challenges. Moreover, negative social beliefs in some areas towards women who exercise is another concern.

Our study demonstrated considerable inequalities in obesity classed by socioeconomic status in Jordan. Coinciding with other studies, overweight and obesity were found to be significantly associated with women's age [11,12,18], age at marriage [20], number of children ever born [21] and wealth index [15,17]. Obesity is associated with a clear socioeconomic gradient, with individuals of lower socioeconomic status being more likely to be obese. Globally, the most common measures have been used to evaluate socioeconomic status are level of income, occupation and level of education. However; these measures are difficult to categorize in developing countries, particularly for females [26]. Household wealth is more than household possessions, but previous research showed that such proxy measure asset indexes are comparable to measures of consumption expenditure [27].

Our study revealed that there were discrepancies among regions in terms of the prevalence of overweight and obesity. The southern region reported the highest prevalence of overweight and obesity compared to other regions in the country. We recommend conducting further studies to better understand the difference of overweight and obesity prevalence among regions.

Study strengths and limitations

JPFHS is considered an important source of health information in Jordan and it provides essential information for decision-makers. The survey depends on physical measurements to provide more reliable information compared to a self-reported approach. The survey was population-based, which allowed us to represent all localities and subgroups among the Jordanian population. The relatively good sample size of the study provided high power and precision of estimates. At the same time, we are also aware of major limitations; in this study we used the wealth index to measure the socioeconomic status. Although the wealth index measure is important, it is considered a proxy measure which is sometimes not precise or sensitive. Moreover, we believe socioeconomic factors, which wealth index depends on, are affected by cultural, social differences and level of development across countries. Another limitation was that the survey was cross-sectional; therefore, cause-and-effect cannot be determined for the associations between BMI and selected health conditions.

Conclusion and recommendations

Overweight and obesity are major health problems among Jordanian women. The relationship between overweight/obesity and various noncommunicable diseases such as diabetes, high blood pressure and high cholesterol are well established [22,24]. Our study demonstrated considerable inequalities in obesity by socioeconomic status in Jordan. There is an urgent need to raise the awareness of decision-makers on the consequences of overweight and obesity in order to set forth legislation and regulations that help to control and prevent overweight and obesity. There is also need to empower women to take decisions which help to prevent overweight and obesity. Finally a national programme to prevent and control overweight and obesity with multi-component interventions should be implemented. The above sociodemographic factors are large contributors to obesity and provide the greatest opportunity for actions and interventions designed for prevention and treatment.

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