Obesity and its Related Factors among Women from Popular Neighborhoods in Casablanca, Morocco

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Objectives: Study of overweight and obesity among women from modest neighborhoods in Casablanca and the related factors influencing this phenomenon.

Design: A survey was conducted in 6 neighborhoods of Casablanca using multistage cluster sampling. Anthropometric parameters and body composition were measured, and information about food habits, sociodemographic situation and body image perception were collected using a questionnaire.

Participants: 425 adult women from popular neighborhoods in Casablanca.

Results: We found a prevalence of 47% obesity and 36% overweight. Obesity and overweight exceeded 80% in all age categories except among women <25 years, where we found a prevalence of 44% overweight. Furthermore, abdominal obesity prevalence was high in all age categories with an overall prevalence of 67%. Body image perception data showed that 62% women perceived their weight as being either normal or insufficient, 46% of those women were, in fact, either overweight or obese. Fattening products were used by 12% of the population at least once, especially by women <35 years, 68% of these women were overweight or obese at the time of the study.

Conclusions: The problem of obesity in this society is amplified by its perception of a regular weight and by the use of fattening substances even among young and educated women. (*Ethn Dis*. 2013;23[3]:369–373)

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Introduction

Obesity prevalence is rising worldwide and countries with low and middle income groups are no exception.[1,2] Evidence shows that overweight problems in the developing world are becoming more prevalent than underweight among women.[3] In Morocco, obesity affects more women than men;[4] according to the World Health Organization Global Infobase, obesity in Moroccan women increased from 19% to 23% just between 2002 and 2010.[5] This evolution of obesity seems to be a result of the combination of several factors such as education, lifestyle, cultural beliefs, and economic status.[5] However, national data do not reflect the regional differences in economics, food availability, customs that are present in Morocco. It appears that the gravity of obesity is not only different between the urban and the rural,[5] but also depending on the region and the ethnic group;[6–8] some ethnic groups even engage in fattening practices by using appetite enhancers or some corticosteroids and by decreasing their physical activity.[9] However, even if these practices have only been reported among Sahraoui women, obesity is generally a coveted status by all Moroccan women since it is considered as a cultural symbol of beauty in the country.[4]

It appears that the gravity of obesity is not only different between the urban and the rural,[5] but also depending on the region and the ethnic group[6–8] [in Morocco].

Still, little data are available on the prevalence of overweight and obesity in many parts of Morocco; therefore, the objectives of our study were to estimate the prevalence of overall and central obesity in women from Casablanca, to describe their body composition, and to examine the influence of age, education level, body image perception, and fattening products consumption on obesity prevalence. The selection of Casablanca was based on its status as the economic capital of the country, which made it the migratory destination of individuals and families from all over Morocco, and created a mixture of different cultures and customs.

Methods

The survey was conducted between December 2011 and January 2012 in 6 popular neighborhoods of Casablanca with a sample of 425 women aged ≥18 years. We used multistage cluster sampling based on the national census of 2004 and the data provided by the Department of Statistics of Casablanca. The sampling methodology is described in the sampling guide of the Food and Nutrition Technical Assistance project.[10]

Recruited women were aged ≥18 years. Only one woman per household was interviewed, if more than one adult woman were present at the moment of the interview; a draw was performed to decide which one to recruit. The household of the first woman interviewed in

Table 1. Means and standard deviations (SD) of the anthropometric parameters of our sample according to age category

Age	*n*	Weight, kg	Height, cm	BMI, kg/m^2	BF, %	SM, %	WC, cm	HC, cm	WHR
<25 (a)	32	69.60 (13.26)	161.82 (4.99)	26.72 (4.91)	40.4 (9)	24.8 (4.3)	84.33 (12.96)	103.11 (10.31)	.82 (.09)
25–35 (b)	95	73.64 (12.36)	159.93 (5.53)	28.67 (5.17)	43.8 (6.8)	23.4 (2.9)	89.48 (11.29)	107.13 (8.99)	.84 (.08)
35–45 (c)	110	78.02 (13.92)	158.73 (6.02)	31.14 (5.22)	46.4 (7.17)	22.1 (2.6)	93.79 (15.96)	109.14 (15.18)	.89 (.35)
45–55 (d)	95	75.79 (15.18)	157.32 (5.05)	30.53 (5.32)	45.8 (7.5)	22.2 (2.8)	96.72 (14.7)	110.6 (17.73)	.92 (.57)
55–65 (e)	47	76.65 (13.94)	156.36 (5.26)	30.92 (5.18)	46.2 (6.1)	22.3 (2.1)	98.76 (13.25)	112.14 (12.29)	.88 (.1)
>65 (f)	22	70.16 (14.12)	155.08 (5.71)	29.07 (5.17)	44.2 (6.7)	22.4 (2.1)	98.3 (12.46)	108.25 (12.03)	.91 (.11)
Total	401	75.19 (14.01)	158.45 (5.72)	29.9 (5.35)	45 (7.3)	22.7 (2.9)	93.52 (14.46)	108.81 (13.92)	.88 (.34)
P[a]	a vs b	ns	ns	ns	ns	ns	ns	ns	ns
	b vs c	ns	ns	ns	ns	0.017	0.008	ns	ns
	c vs d	ns	ns	ns	ns	ns	ns	ns	ns
	d vs e	ns	ns	ns	ns	ns	ns	ns	ns
	e vs f	ns	ns	ns	ns	ns	ns	ns	ns

BF, body fat percentage; HC, hip circumference; SM, skeletal muscle percentage; WC, waist circumference; WHR: waist-to-hip ratio; ns, not statistically significant.
[a]Means are tested for significance with Sidak's test.

each cluster was randomly chosen by the interviewers.

Anthropometric measurements were collected by trained investigators in accordance with World Health Organization standards.[11] Weight and body composition were measured while women were wearing light clothing and no shoes using Omron's body composition monitor BF511 (HBF-511T-E). Height was measured using a stadiometer graduated in centimeters (Seca 213). Waist and hip circumferences were measured at the horizontal level of the umbilicus and the horizontal level of the maximal protrusion of the gluteal muscles and waist-to-hip ratio calculated. Body mass index was calculated as weight divided by the square of height (kg/m^2). WHO cut-off points for overweight (BMI ≥25) and obesity (BMI ≥30) were used as measures of adiposity. Waist circumference (WC) and Wait-to-Hip Ratio (WHR) was used to assess central obesity; we categorized women with WC ≥.88 m and WHR >.85 as abdominally obese.[6,11]

A standardized questionnaire was used to collect data on sociodemographic status, physical activity, fattening products consumption and body image perception. Marital status was categorized as single, married, divorced or widow. Education level was categorized as never attended school, attended literacy classes, primary school, secondary school, high school or university. Body image perception was categorized as; women with accurate body image perception, overweight and obese women perceiving their weight as normal, and normal, overweight and obese women perceiving their weight as insufficient.

Statistical Analysis

Summary statistics were used to describe the study population. One-way ANOVA was used for the analysis of variance of the anthropometric parameters according to age, and Sidak's test was used to compare the means between age groups. Correlation between BMI, age, education level and marital status was tested using the Spearman Rank test. A Chi-square test was used to test the association between fattening substances consumption, body image perception accuracy and other variables. Statistical significance was set at $P<.05$. Data analysis was performed with the SPSS package (Only data from non-pregnant women was included in the analysis).

RESULTS

Our study population had a mean BMI of 29.9 and a mean waist circumference of 93.5 cm. BMI increased with age, maximum values were observed between 35 and 45 years, a slight, but statistically insignificant, decrease was observed after that age. Waist and hip circumferences, however, kept increasing after 45 years (Table 1).

While underweight problems remained slightly insignificant with a prevalence of .2%, the situation of overweight and obesity was far more alarming (Table 2). In our study population 36.2% of the women were overweight and 47.4% were obese. Furthermore, all age categories (except <25 years) had a prevalence of normal weight lower than 20%. In women younger than 25 years, overweight was higher than obesity with a prevalence of 43.8%, then it seemed to be decreasing with age in favor of obesity (Table 2). Marriage also appeared to be associated with obesity in this population (r=.169, P=.001); obesity was higher in married women (47%) than in single women (22%) among whom overweight was the highest (48%). In contrast, education

Our study showed a prevalence of obesity higher than twice the national prevalence [in Casablanca].

Table 2. Prevalence of overweight, obesity and fattening products consumption in women from Casablanca according to their education, marital status and age category, *n*=401

		Overweight	Obesity	Fattening Products Consumption
Education	None	35.0	51.1	9.9
	Literacy	46.9	40.7	6.5
	Primary	33.0	50.9	17.8
	Secondary	32.3	43.5	11.9
	High School	35.3	50.0	5.6
	University	52.2	26.0	13.0
Marital status	Never married	48.1	22.2	7.4
	Married	36.3	47.5	12.5
	Divorced	41.7	41.6	30.8
	Widow	26.8	63.4	2.4
Age category	<25	43.8	18.8	17.6
	25–35	45.3	39.2	18.6
	35–45	31.8	55.5	11.3
	45–55	32.6	54.7	7.2
	>55	27.7	52.2	7.4
Total		36.2	47.4	12.2

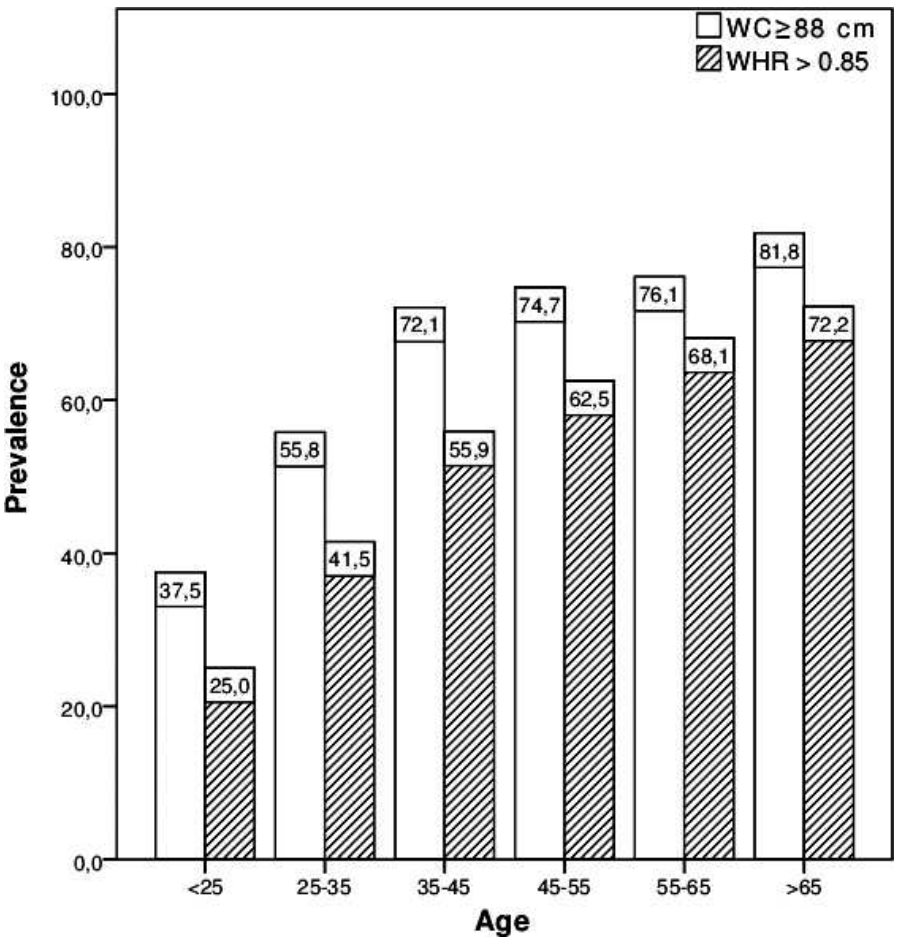

Fig 1. Prevalence of waist circumference > 88 cm and waist-to-hip ratio >0.85 among survey population of 425 women aged >18 years

was negatively associated with BMI, but this association wasn't significant (r=−.076, *P*=.129); obesity prevalence was lower among women with a higher education background (26%).

Among this survey population, 67.1% had a WC ≥88cm and 54% had a WHR >.85. Also, high WC and high WHR were noticed in younger women (<25 years), at least 25% had a WHR>.85 (Figure 1). Both WC and WHR increased gradually with age, we noticed a significant increase of WC (*P*=.008) after 35 years (Table 1). Furthermore, a progressive increase of central obesity was observed in this population which exceeded 70% after 65 years (Figure 1).

Although we have noticed that more than 80% women of our population were either overweight or obese, most of them still thought they had either a normal or a low weight. Indeed, only 47% had an accurate perception of their weight (Table 3). The percentage of overweight and obese women appreciating their body weight was increased with age. However, with education, women seemed to be more accurate in perceiving their body image, but, we couldn't find a significant association between the two parameters (*P*=0.1). (Table 4) On the other hand, women with professional activity were less perceptive of their own weight than inactive women (*P*=.017) (Table 5).

Fattening products were consumed by 12.2% women at least once in their lives. This percentage seems to be higher among women <45 years, married women (divorced and widowed included) and educated women (Table 2). We also noticed that these practices were associated with body image perception (*P*=.015); women who consumed fattening products were more inclined to underestimate their weight (34%) than those who never did (14%). Furthermore, these dietary habits were associated with education level (*P*<.001), age (*P*=.018), and waist circumference (*P*=.006).

Table 3. Accuracy of body image perception according to education, marital status, professional activity, consumption of fattening products and age category in women from Casablanca, *n*=401

		Normal Overweight and Obese Women Perceiving Their Weight as too Low	Overweight and Obese Women Perceiving Their Weight as Normal	Women with Accurate Perception of Their Weight
Education	None	14.9	44.7	40.4
	Literacy	15.6	40.6	43.8
	Primary	22.3	34.8	42.9
	Secondary	16.1	25.8	58.1
	High School	14.7	23.5	61.8
	University	8.7	30.4	60.9
Marital status	Never married	3.7	37.0	59.3
	Married	17.6	34.6	47.8
	Divorced	33.3	41.7	25.0
	Widow	14.0	46.5	39.5
Age category	<25	21.9	31.3	46.9
	25–35	17.9	31.6	50.5
	35–45	17.1	33.3	49.5
	45–55	12.5	41.7	45.8
	>55	18.3	40.9	40.8
Working	Yes	29.8	38.3	31.9
	No	15	35.8	49.2
Consumed fattening products	Yes	34.0	29.8	36.2
	No	14.5	37.8	47.7
Total		16.7	36.1	47.2

DISCUSSION

The city of Casablanca is the biggest and most populated city in Morocco. Studies have shown that urbanization is one of the factors that favor an increased rate of obesity,[3,5,12] and associated with some behavior and risk factors of chronic diseases and obesity.[2,13–16] High prevalence of overweight and obesity are often observed in developing countries witnessing an accelerated rate of urbanization.[17]

Our study showed a prevalence of obesity higher than twice the national prevalence. Obesity was found to be increasing with age in this population but we noticed that even if obesity was relatively low at a young age (18.8% among women younger than 25 years) overweight was high (43.8%) which could be interpreted as a predisposition to obesity later. Furthermore, only 25% of young women were aware that their weight was too high.

In this population, the prevalence of women with high WC and WHR exceeded the prevalence of women with general obesity (BMI ≥30), the problem of abdominal obesity seemed to be affecting women from this population at an early age and to be increasing with age.

The cultural view of feminine fatness might explain this prevalence, as it is one of the factors influencing obesity.[6,18,19] The view of overweight is very subjective and different from a civilization or an ethnic group to another.[20] In our population study, half of the women with a normal BMI considered their weight as insufficient, while most of those who thought they had normal weight had, in fact, high BMI values. We also found that fattening substances were consumed by women from different educational backgrounds, and although education is commonly associated with obesity prevalence in developing countries,[21,22] in this particular case, we did not find any correlation between education and the body mass index.

Marriage has also been associated with obesity.[23] Since our study population consisted mainly of married women and obesity prevalence increased after the age of 25 years, this high prevalence of obesity may be linked to marriage and pregnancies. However, even among single women there was a high prevalence of overweight, which might be a result of the cultural view of feminine fatness. In many countries, obesity is considered an attractive trait in a woman[4] and helps to increase the possibility of finding a potential life partner,[6] thus encouraging young women to be in a more "marriageable shape" to match the expectations of their future partners. This may not only explain the important prevalence of overweight among young women, but also may explain the significant percentage of the population that consumed fattening

Table 4. Spearman correlation between anthropometric status and education level, marital status, body image perception and age category, *n*=401

	r	*P*
Education	−.076	.129
Marital status	.169	.001
Age category	.176	<.001
Body image perception	.536	<.001

Correlation was tested using Spearman Rank test.

Table 5. Association[a] of fattening substances consumption (FSC) and body image perception accuracy (BPA) with education level, professional activity marital status, WC, WHR, and age category, *n*=401

	FSC	BPA
FSC	-	.015
BPA	.015	-
Education level	<.001	.10
Professional activity	.49	.017
Marital status	.17	.23
Age	.018	.86
WC	.006	.001
WHR	.25	.48

WC, waist circumference; WHR: waist-to-hip ratio.
[a]Associations were tested using Chi-squared test.

substances. Indeed, fattening practices are usually used by women living in an environment that values feminine fatness.[9,24] Surprisingly, these practices were more frequent among educated and younger women.

In conclusion, our study showed a high prevalence of overall and central obesity among women from modest neighborhoods in Casablanca; our study also showed that most of these women were not concerned about it. This acceptance of obesity may be explained by the promotion of feminine fatness in this part of society and its perception as normal weight. Furthermore, the consumption of fattening products by an important part of the study population reflects the effect that cultural beliefs may have on the prevalence of overweight and obesity.

Our findings demand urgent action in order to raise awareness about the serious problem of obesity in Morocco as it is not only a matter of personal preference but also a matter of public health which may lead to more serious complications.

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