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ORIGINAL ARTICLE

OBESITY AND ASSOCIATED RISK FACTORS AMONG WOMEN OF REPRODUCTIVE AGE IN MOROCCO

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ABSTRACT

Background. Obesity is a major global health concern growing in every region and affecting millions of people worldwide. It has become a pandemic. In 2022, 1 of 8 people in the world were living with obesity and more than half of the world's population will be overweight or obese by 2035 leading to a total economic impact of US$ 4.32 trillion.

Objective. This study aims to update data on the prevalence of overweight and obesity and the associated socio-demographic and economic factors in women of reproductive age (WRA) in Morocco.

Material and Methods. A total of 2,172 women aged 18 to 49 years, representing all regions of Morocco, were enrolled. Socio-demographic and economic data as well as anthropometric measurements, specifically height, weight and waist circumference were collected.

Results. Based on body mass index (BMI), 30.3% of women were classified as overweight and 27.8% as obese. However, based on specific predictive equation of body composition for Moroccan population, 61.6% of women showed excess of fat (mass fat ≥ 35%). Age and household-index were positively correlated to the prevalence of obesity and excess body fat, whereas education was inversely correlated to the prevalence of obesity and excess fat. In addition, urban area and being married seem to play a positive role in the increase of obesity rate.

Conclusion. The prevalence of excess body fat is high among WRA in Morocco. This prevalence was impacted by age, education level, household-index, marital status and urban area. These factors highlight the complexity of addressing obesity and the need for comprehensive strategies that consider sociodemographic and economic factors.

Keywords: *overweight, obesity, excess body fat, women, sociodemographic and economic factors*

INTRODUCTION

Women are currently among the most affected by the nutritional transition, shifting from undernutrition to overweight and obesity, especially in emerging economies [1, 2]. While, obesity is a major global health concern growing in every region and affecting millions of people worldwide. According to the World Health Organization (WHO), obesity has become a pandemic. In 2022, 1 of 8 people in the world were living with obesity [3]. According to World Obesity Federation, more than half of the world's population will be overweight or obese by 2035 leading to a total economic impact of US$ 4.32 trillion [4]. Furthermore, excess weight and obesity contribute significantly to the global disease burden, accounting for 2.4 million deaths and 70.7 million disability-adjusted life years (DALYs) among women [5].

During the 75th session of the World Health Assembly (WHA75), new global guidelines for the prevention and management of obesity throughout the life cycle were officially adopted. Alongside this, the assembly endorsed the 'Acceleration Plan to STOP Obesity', a joint initiative of WHO and United Nations

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International Children's Emergency Fund (UNICEF) aimed at supporting Member States in implementing these recommendations. Also, this support is adapted to each country's unique needs and priorities and includes the development of monitoring and reporting systems [6]. Furthermore, an adequate nutritional status serves as a reflection of the general welfare of a population. Ensuring the sufficient nutritional status of women hold a significance not only for their own well-being and enhanced work capacity but also for the vitality of their descendants' health [7].

In Morocco, the last National Survey on Common Risk Factors for NCDs reports that 53% of adults are overweight or obese, with 20% classified as obese. Women are disproportionately affected, with 29% experiencing obesity compared to 11% of men [8]. Unfortunately, the pandemic will not stop at this point, by 2030, the World Obesity Atlas estimates that in Morocco 9.94 million women will be overweight. Obesity prevalence will account for 46% leading to a total economic impact of US$5.589 million with an impact on Gross Domestic Product (GDP) of 3.5% [4]. To stop and control this pandemic, Morocco, like many other countries has been, for over three decades, actively combating all forms of malnutrition including obesity, as defined by the WHO, which describes malnutrition as deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients [9]. This commitment has been reinforced through the endorsement of various international declarations and resolutions. In response, the Ministry of Health (MH) has developed and implemented multiple nutrition-focused health programs over the years, significantly contributing to the improvements of the nutritional and health status of the Moroccan population. As part of this ongoing effort, the MH has launched a comprehensive and integrated National Nutrition Programme, aligned with the National Nutrition Strategy and in full accordance with international commitments [8].

On the other hands, different method can assess obesity by using index such as BMI or excess of fat such as bioelectrical impedance analysis (BIA), dilution isotope, dual-energy X-ray absorptiometry (DXA), densitometry, etc. However, these methods either have significant limitations or they are expensive and technically complex, making them less practical for large-scale use, particularly in low-resource settings [10]. As a result, there is a growing need for valid, simple, and cost-effective techniques suitable for routine practice and epidemiological studies, especially in developing countries. To address this, several researchers have developed predictive equations based on conventional methods such as BIA and anthropometry [11, 12]. In our study, we employed a validated anthropometric-based prediction equation developed by El Kari et al. [13] in 2023 to assess the nutritional status of WRA in Morocco. Therefore, the objective of the present study was to evaluate the prevalence of obesity and the impact of socio-demographic and economic risk factor among WRA using both BMI and excess fat.

MATERIAL AND METHODS

Study design and population

This research was conducted within the framework of the National Nutrition Survey organized by the Moroccan MH and implemented nationwide across all 12 regions of Morocco. The survey employed a probability sampling method proportional to population size, as recommended by the WHO [14], and included 180 sampling clusters. Within each cluster, households were randomly selected using a count sheet prepared the day prior to the survey. A systematic sampling technique was applied to select 20 households per cluster, ensuring equal probability for each.

In total, 3,118 households were surveyed, with 60.4% located in urban area and 39.6% in rural area. In each selected household, one WRA, aged 18 to 49 years, was eligible for inclusion if present at the time of the visit. In households with multiple eligible participants, one WRA was selected by the supervisor of the field team using a random draw based on Kish's table [15]. A total of 110 women were excluded from the study, including those under 18 or over 49 years of age; those with chronic or severe illnesses requiring hospitalization or medical treatment; those suffering from severe malnutrition requiring nutritional rehabilitation; those with physical or mental disabilities; and those presenting with fever, diarrhea, respiratory infections, or other acute infections. During a household visit, the study's objectives were explained to the family, and signed informed consent was obtained from each participating woman prior to data collection.

Ethical approval

The survey protocol was validated by a Technical and Steering Committee comprising representatives of all concerned Institutions (MH, Universities, CHU, HCP) then the protocol was approved by the National Ethics Committee for Biomedical Research in Rabat under the refence 321/17.

Socio-economic assessments

A questionnaire consisting of 12 questions, including both open-ended and closed-ended types, was employed to collect pertinent socio-demographic and economic information. This face-to-face survey encompassed details such as age, residence area, marital status, educational level, household-index. The latter is a score assigned to households on the basis of the number and type of goods owned, and housing characteristics such as the source of water supply, sanitary facilities and flooring materials, etc. These scores are generated using principal component analysis. The quantiles of household-index are constructed by assigning the household score to each woman in the same household, and dividing the distribution into 3 equal categories, each representing 1/3 of the population. The household-index allows us to compare the economic well-being of one woman against another within the study population. It does not define poverty in the country or the studied population.

Anthropometric measurement

Trained healthcare professionals conducted anthropometric measurements following the established WHO protocol and using calibrated instruments [16]. These measurements were taken with minimal attire and without footwear. Body weight was determined with precision to the nearest 0.1 kg utilizing an electronic scale (Seca GmbH and Co. KG). Height was measured to the nearest 0.1 cm using a stadiometer (Seca GmbH and Co. KG). Body Mass Index (BMI) was computed by dividing weight in kilograms by the square of height in meters (kg/m^2) and was employed to categorize nutritional status as follows: underweight ($< 18.5\,kg/m^2$), normal weight (18.5-$24.9\,kg/m^2$), overweight (25.0-$29.9\,kg/m^2$), and obese ($\geq 30.0\,kg/m^2$) [17].

Waist circumference (WC) was also measured using a tape measure (Seca 201) to the nearest 0.1 centimeter. The WC was used to class the studied population to different classes of risk of health problems related to abdominal obesity. Based on Han's and Lean's [18, 19] data, the following classification was considered: less than 80 cm: low risk of health problems related to abdominal obesity, between 80 and 88 cm: moderate risk of health problems related to abdominal obesity, more than 88 cm: high risk of health problems related to abdominal obesity.

Estimation of excess fat

For body composition assessment a newly developed Anthropometric-Based Prediction Equation (ABPE) was used [13]. One of the independent variables introduced is body volume (BV). Following Fricke's model, which views the body as a suspension of cells in an electrolyte solution and as a conductive cylinder [20, 21], BV was calculated using the formula for the volume of a cylinder, where V represents the volume, S is the area of the cylinder's base, and H is the cylinder's height. The height was considered as the body's height, and for area calculation, the radius was assumed to be the height/9. Thus, the anthropometric prediction equation of total body water (TBW) used in this study is TBW (kg) = -5.249 + 107.502 BV (l) + 0.289 weight (kg) + 2.015 sex (male: 1, female: 0) [13].

The estimation of fat-free mass (FFM) in kilograms was derived from TBW, taking into consideration that FFM incorporates age- and sex-specific values of hydration factors [22]. Subsequently, the calculation of fat mass (FM) in kilograms was performed by determining the difference between body mass and FFM. Additional variables were computed, including fat mass percentage (FM%), FFM index (FFMI) = $FFM/height^2$ (kg/m^2), and FM index (FMI) = $FM/height^2$ (kg/m^2). Different cut-off points were used to define obesity according to the FM%. In fact, for women < 40 years, excess of fat was defined as FM% > 35% [23]. For subjects aged 40-49 y, the excess of fat was when FM% > 40% [24].

Statistical analysis

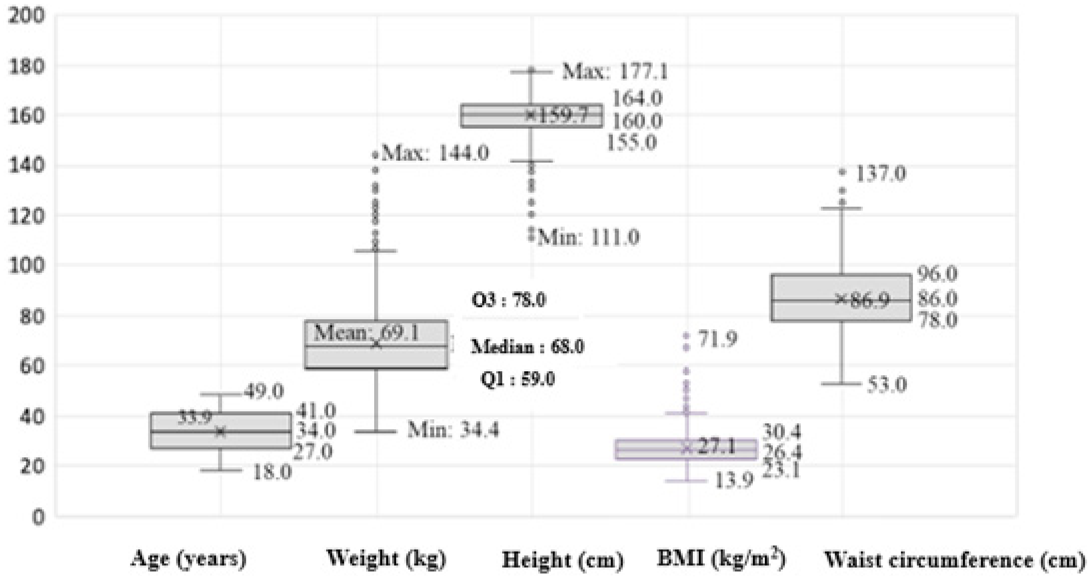
Data were analyzed using IBM SPSS version 21.0. The Kolmogorov-Smirnov test was used to evaluate the normally distributed variables, which are presented as means ± SD, and non-normally distributed variables are presented as median (inter-quartile range (IQR)). Nominal variables are presented as a proportion and 95% confidence interval. A *Chi*-square test was used to test independence between nominal variables. t-test was used to examine the difference in normally distributed variables. A p-value of < 0.05 was considered as statistically significant.

To improve representativeness and obtain more accurate results, weighting factors were calculated to adjust the means and prevalence taking into account the differences between the sample studied and the target population. The weights were calculated on the basis of the demographic characteristics of the sample and the target population. To study the impact of different risk factors, multivariate analysis based on multiple regression was used.

RESULTS

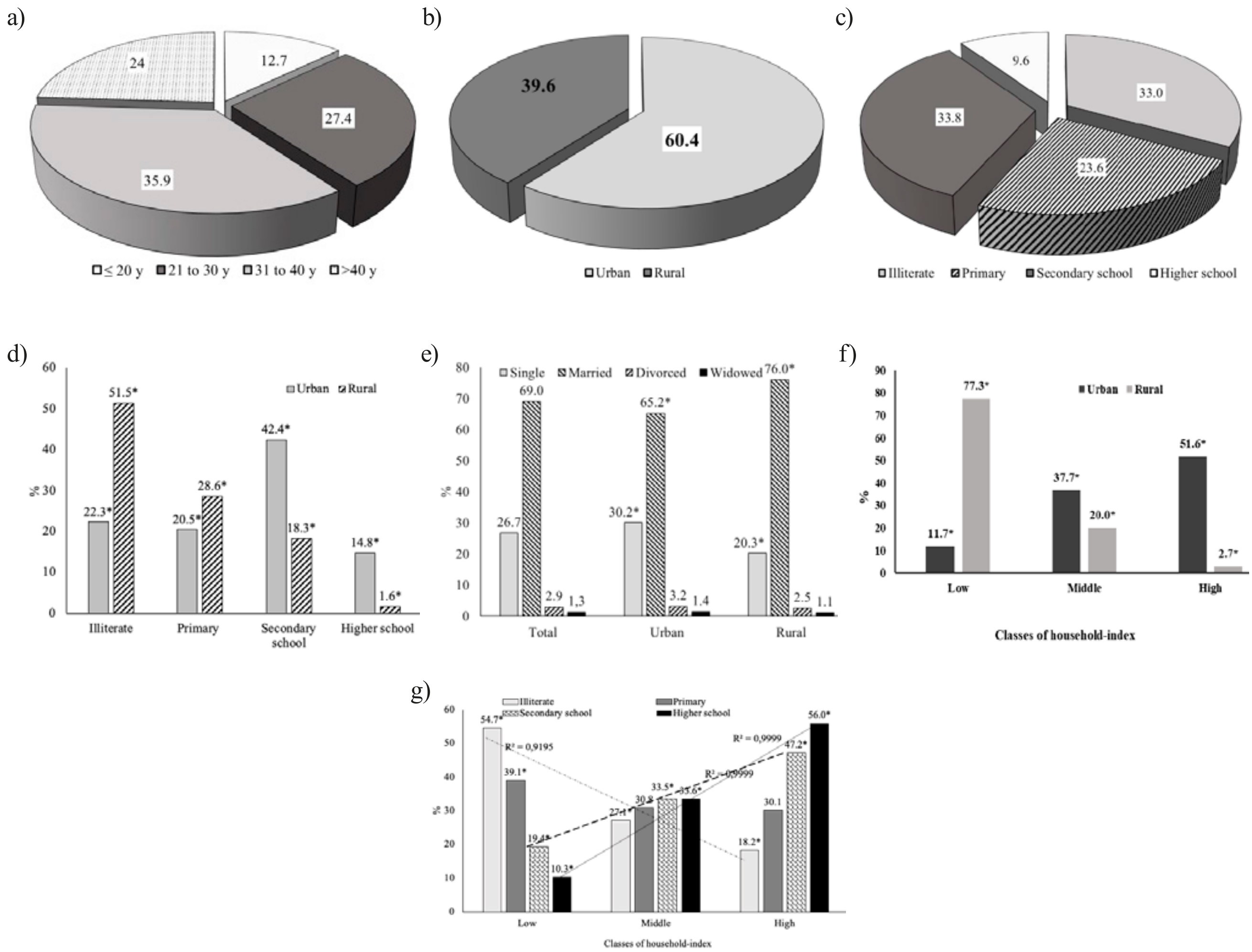
Description of the population

This research enrolled a cohort of 2.172 women aged 18 to 49 years. Their average age was 33.9 ± 8.5 years (Figure 1). Participants aged 20 years or younger, 21 to 30 years, 31 to 40 years, and over 40 years represented 12.7%, 27.4%, 35.9%, and 24.0%, respectively (Figure 2.a). A proportion of 60.4% lived on urban area (Figure 2.b) and the illiteracy represented 33% (Figure 2.c), with a predominance in rural area (51.5%) in comparison to urban area (22.3%) (Figure 2.d). Most of women were married (69%), the single women account for 26.7% (Figure 2.e).



Results are presented as mean ± SD, median (interquartile at Q1:25% and Q3:75%), minimum and maximum

Figure 1. Age and anthropometric characteristics of participants



Values are presented as percentage; p-values were determined using Chi^2 test ; * represents a significant difference ($p < 0.05$)

Figure 2. Socio-demographic and economic characteristics of participants; a. Age group distribution of the study population, b. Distribution of the study population by area of residence, c. Literacy levels of the study population, d. Literacy rates by area of residence, e: Marital status distribution of the study population, f. Household index distribution by area of residence, g. Relationship between household index and education level

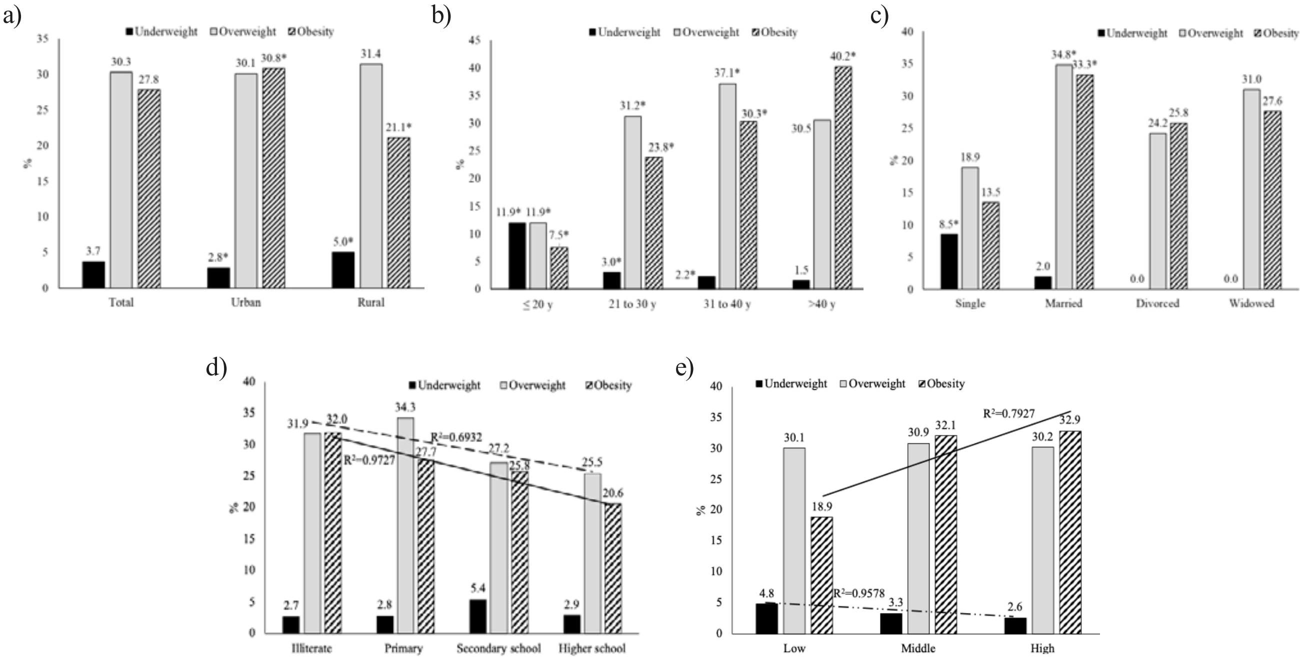
According to household-index, 77.3% and 2.7% of women in rural area belonged to the low and high index class, respectively. While in urban area, 11.7% and 51.6% belonged to the low and high index class, respectively (Figure 2.f). Furthermore, a relationship was observed between the household-index and the education level where more women were educated, more they belonged to the high index class, whereas more women belonged to the low index class, more illiterate they were (Figure 2.g). For anthropometric measurements, the mean of weight was equal to 69.1 ± 14.4 kg, 159.7 ± 7.1 cm for the height, the mean of BMI was equal to 27.1 ± 5.8 kg/m^2 and the mean of waist circumference was equal to 86.9 ± 12.8 cm (Figure 1).

Underweight, overweight and obesity

Using BMI, it was found that 3.7% of WRA were underweight, while 58.1% had an excess of weight, of whom 30.3% were overweight and 27.8% were obese (Figure 3.a). According to the residence area, the results showed that in urban areas, the prevalence of underweight, overweight and obesity were equal to 2.8%, 30.1% and 30.8%, respectively. In rural areas, these percentages were equal to 5.0%, 31.4% and 21.1%, respectively (Figure 3.a). This indicates that obesity was significantly higher in urban areas ($p < 0.001$), whereas the prevalence of underweight was significantly higher in rural areas ($p < 0.01$). Regarding the effect of age on the prevalence of weight problem, it was observed that the older the women, the less underweight they were and the more overweight they were ($R^2 = 0.719$ for underweight, and 0.5316 and 0.9665 for overweight and obesity, respectively; Figure 3.b). The prevalence of underweight decreased from 11.9% in women 20 and younger to 1.5% in women over 40, while the prevalence of excess of weight increased from 19.4% in women under 20 to 70.7% in women over 40 (Figure 3.b). The same observation was made when studying the relationship between household-index and nutritional status. In fact, the higher the women's household-index, the lower the number of women suffering from underweight and the higher the number of obese women (R^2 was 0.9578 in the case of underweight and 0.7927 in the case of obesity) (Figure 3.e).

However, the level of education had an inverse effect on the prevalence of excess of weight, because the higher the level of education, the fewer women were overweight ($R^2 = 0.6932$) and obese ($R^2 = 0.9727$) (Figure 3.d). Furthermore, the highest prevalence of overweight and obesity was observed among married women (34.8% and 33.3%, respectively), while the highest prevalence of underweight was observed among single women (8.5%) (Figure 3.c).

In order to obtain more precise results on the nutritional status of these women, this study also assessed their body composition. The average of TBW was 31.8 ± 5.1 kg, while the average of FFM was



Values are presented as percentage; p-values were determined using *Chi*^{2} test ; * represents a significant difference ($p < 0.05$)

Figure 3. Prevalence of malnutrition among WRA according to socio-economic and demographic factors; a. Nutritional status distribution among WRA, by area of residence, b. Relationship between age and nutritional status among WRA, c. Relationship between marital status and nutritional status among WRA, d. Relationship between literacy and nutritional status among WRA, e. Relationship between household index and nutritional status

Table 1. Body composition and excess body fat

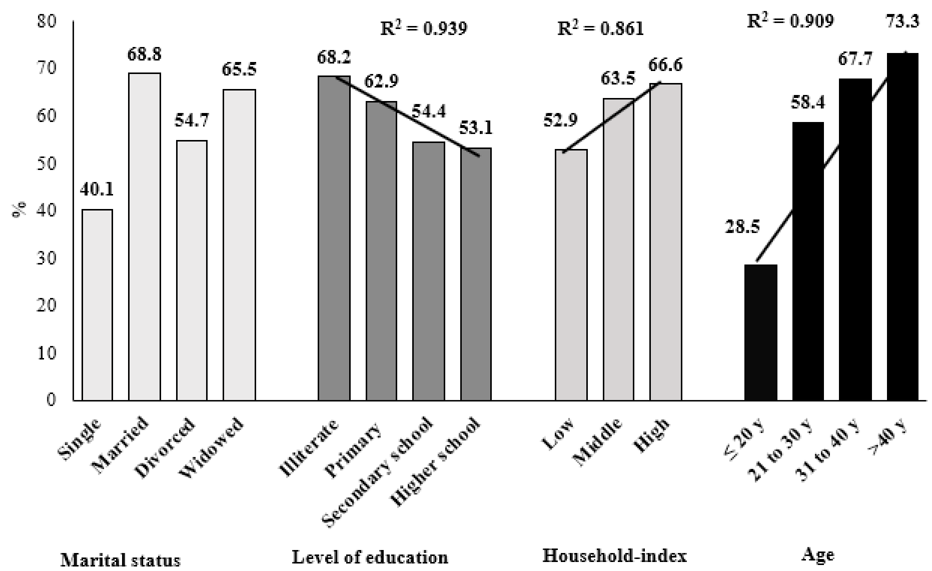
Body composition	Total N = 2172	Urban N = 1312	Rural N = 860	p-value
TBW (kg)	31.8 ± 5.1	32.1 ± 5.2	31.3 ± 5.1	0.5351
FFM (kg)	43.3 ± 7.1	43.8 ± 7.1	42.6 ± 6.9	0.3606
FM (kg)	25.7 ± 8.4	26.6 ± 8.7	24.3 ± 7.8	0.0005
FM%	36.5 ± 5.5	37.1 ± 5.5	35.6 ± 5.5	1
FFMI (kg/m^2)	16.9 ± 2.2	17.1 ± 2.3	16.6 ± 2.0	0.008
FMI (kg/m^2)	10.1 ± 3.6	10.5 ± 3.8	9.6 ± 3.2	0.0003
FM% ≥ 35% (%95 CI)	61.6 (59.5; 63.7)	64.4 (61.8; 67.0)	54.5 (51.2; 57.9)	< 0.001

Results are presented as means ± SD or proportion (%) (95% confidence interval); p-values were determined using t test in the case of means and *Chi*^{2} test in the case of %; TBW – total body water; FFM – fat free mass; FM – fat masse, FM% – fat mass percent, FFMI – fat free mass index; FMI – fat mass index

43.3 ± 7.1 kg, and the average of FM, FM%, FFMI and FMI were 25.7 ± 8.4 kg, 36.5 ± 5.5%, 16.9 ± 2.2 kg/m² and 10.1 ± 3.6 kg/m², respectively. In addition, the prevalence of women with excess body fat was 61.6% (Table 1).

The comparison between the urban and rural areas showed that there was no significant difference in terms of the means of TBW, FFM compartments and the FM%, although these compartments were slightly higher in the case of urban women than in rural women. In addition, the FM, FFMI, FMI and the prevalence of women with excess body fat (64.4% vs. 54.5%) were significantly higher in urban women than in rural women (Table 1). Looking at the prevalence of excess fat in relation to marital status, level of education, household-index and age, it showed that as the level of education increases, the prevalence of excess fat decreases ($R^2 = 0.939$). However, as age and level of household-index increase, so does the prevalence of excess fat, with a R^2 equal to 0.909 and 0.861, respectively (Figure 4).

However, according to marital status, single women had the lowest prevalence (40.1%), while married women had the highest (68.8%) (Figure 4), the difference is statistically significant ($p < 0.0001$). Furthermore, it was observed that 85.0% of women with excess fat were at risk of developing health problems associated with abdominal obesity, given that these women had a WC above 80 cm. Those with a high risk (WC > 88 cm) of developing health problems associated with abdominal obesity represented 58.5% (Figure 5). The comparison between the two residence areas showed that there are more women with excess fat related to health problems risk associated to abdominal obesity in urban area (60.9%) than in rural area (53.7%) ($p < 0.0002$).



Values are presented as percentage; p-values were determined using *Chi*^{2} test; * represents a significant difference ($p < 0.05$)

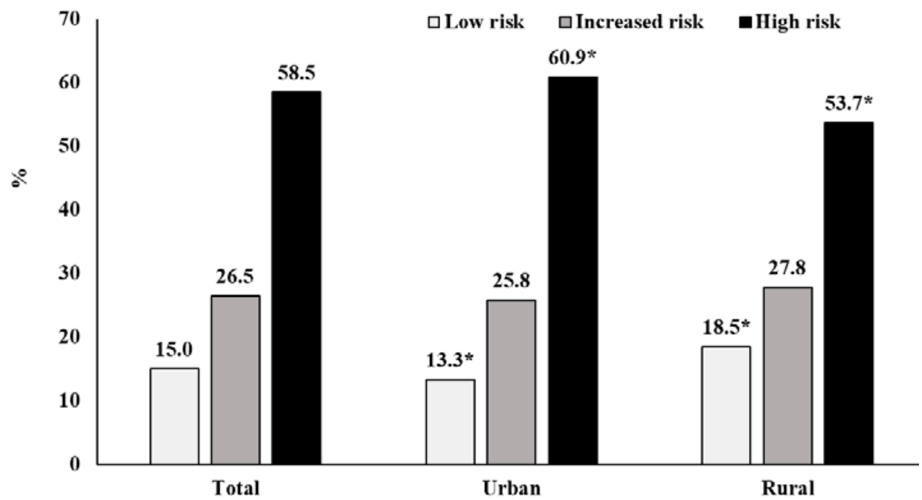
Figure 4. Prevalence of excess fat among WRA according to socio-economic and demographic factors

For a more in-depth analysis of the relationship between body fat and risk factors such as age, place of residence, level of education, marital status and well-being index, a multivariate analysis based on multiple regression was performed (Table 2). The results showed that the model's R^2 was 0.147, meaning that the studied factors were responsible for 14.7% of the variation in fat mass. However, among the studied factors, age was the most significant predictor, with fat mass increasing by 1.8 kg between age groups. Marital status and place of residence also had significant effects of approximately 1.3 kg, but in opposite directions: progressing from one level of marital status to another was associated with a 1.3 kg increase in fat mass, while moving from urban to rural areas corresponded to a 1.3 kg decrease. Additionally, the household well-being index had a positive effect, with fat mass increasing by 1.1 kg for each level of improvement. In contrast, educational level did not have a statistically significant impact on fat mass (p = 0.150) (Table 2).

DISCUSSION

Despite the fact that Morocco has made great efforts to reduce and control obesity in the Moroccan population, its prevalence continues to increase [25]. It increased from 6.4% in 1984 to 29% in 2017 [25, 26]. It is well known that obesity and overweight are characterized by an accumulation of fat in the body, and their definitions are very often based on BMI, which is closely associated to total body fat, but which has also shown an important limitation in terms of differentiating between FFM and FM [27-30]. Thus, the objective of the present study was to determine the prevalence of overweight and obesity using both BMI and excess fat and to study their relationship to socio-demographic and economic risk factor among WRA in Morocco.

In the current study, 35.9% of the WRA were aged between 31 and 40, 69% were married and a third of the women were illiterate, with a predominance in rural areas (51.5%). In the latter, 77.3% of women belonged to the lowest household-index class, which may have an impact on women's health status, given that people with a higher level of education and favorable living conditions tend to be more aware of good health conditions and to have better knowledge of how to maintain it [31]. Although low socioeconomic status (SES) is linked to a higher risk of various diseases regardless of health behaviours [32], studies



Values are presented as percentage; p-values were determined using Chi^2 test; * represents a significant difference ($p < 0.05$)

Figure 5. Prevalence of health problems risk associated to abdominal obesity among obese women

Table 2. Multiple regression model between fat mass as dependent variable and risk factors as independent variables.

Model	Unstandardized ß	Std. Error	t	p-value
Constant	16.7	1.4	12.284	0.000
Age	1.8	0.2	8.760	0.000
Household-index	1.1	0.3	4.094	0.000
Marital status	1.3	0.5	4.748	0.000
Residence area	-1.3	0.5	-2.855	0.004
Education level	-0.3	0.2	-1.441	0.150

Std. Error – Standard Error

have shown that a significant part of health disparities related to SES can be explained by differences in health behaviours between socioeconomic groups [33]. As women enter adulthood and begin forming partnerships and starting families, the SES of their household and partner increasingly influences their health. Marriage, in particular, is often associated with protective effects against various health conditions [34]. In recent decades, the health benefits associated with marriage appear to have become more pronounced. It was initially believed that this trend was driven by declining marriage rates among individuals with lower levels of education and delayed marriage among those with higher education [35]. However, data from the United States [36] and Norway [37] suggest that shifts in the educational composition of married individuals have played only a minor role in the widening health disparity. While a recent meta-analysis involving over 7 million participants found that being unmarried was associated with a higher risk of stroke and mortality in men compared to women [34], other meta-analyses have reported no significant gender differences in the protective effects of marriage on cardiovascular disease (CVD) risk [38].

Regarding the assessment of nutritional status based on BMI, it revealed that 30.3% of women are classified as overweight, while 27.8% were obese. This is roughly in line with the 2017-2018 national survey on common risk factors for non-communicable diseases (NCDs) [25] which showed that the prevalence of excess of weight among women aged over 18 was 63.4% of which 29% were obese. Similarly, the study by Barich et al. [39] on a subsample of Moroccan women aged 19 to 49 showed that 34.3% of women were overweight and 22.7% were obese. In Bangladesh, overweight and obesity rate increased from 24% in 2014 [40] to 32% in 2017 [41]. Another study in Dar es Salaam, Tanzania, found that 27.8% and 22.6% of WRA were overweight and obese, respectively [42]. Also, in various countries in the Middle East and North and South Africa, obesity rates among women have exceeded 30% [43]. The factors behind developing overweight and obesity are varied, multifaceted and can interact with each other in complex ways, making it challenging to address overweight and obesity. They can be categorized as environmental factors (*unhealthy diet:* consuming high-calorie, high-fat, and high-sugar foods and drinks; *food marketing*: aggressive marketing of unhealthy foods, especially to children; *urbanization*: changes in lifestyle and diet associated with urbanization), lifestyle factors (*poor eating habits*: skipping meals, eating on the go, and consuming large portions; *lack of physical activity*: insufficient exercise and physical activity and sedentary lifestyles; *stress*: chronic stress can lead to overeating and weight gain; *sleep deprivation*: lack of sleep can disrupt hormones that regulate hunger and fullness), socioeconomic factors (*low socioeconomic status*: limited access to healthy food options and safe spaces for physical activity; *food insecurity*: limited access to nutritious food, leading to reliance on high-calorie, high-fat foods; c*ultural factors*: cultural norms and values that promote overeating or unhealthy eating habits), medical factors (hormonal imbalances, medications, sleep disorders etc.), genetic factors, pregnancy without forgetting ageing [3, 44-48].

In addition, excess weight appears to be particularly high in urban areas in Africa [49], which was confirmed in this study, as the prevalence in urban areas is significantly higher than in rural areas. Furthermore, it seems that women's level of education has an inverse impact on the prevalence of obesity, indicating that the more educated women are, the less obese they are. On the other hand, women's age and the household-index level have a positive impact on the prevalence of overweight/obesity, since the older they are or the higher their household-index level, the more obese and the fewer underweight they are. Additionally, the problem of overweight/obesity can also be associated to other problems of nutritional deficiency, leading to a double burden of malnutrition at national, household or individual level [50-52].

To estimate excess body fat in the studied population, we used an anthropometric equation developed for the Moroccan population and published in 2023 to assess body composition [13]. In fact, equations for predicting body composition based on anthropometric measurements or bioelectrical impedance analysis tend to be population-specific; applying them to other populations can therefore lead to systematic errors and inaccurate estimates [53, 54]. By applying this equation to the population of WRA, it was observed that the prevalence of excess body fat was 62%, with a disparity according to the residence area, showing that urban areas had more women with excess fat than rural areas.

In addition, the use of multivariate analysis based on multiple regression showed that the age, the marital status and the household-index were factors favoring a positive increase of the excess body fat whereas moving from an urban to a rural area reduces body fat. This confirms the impact of socio-economic factors such as asset-index and access to resources (supermarkets in urban area), which influence access to processed foods, and also the impact of demographic factors such as age, gender, marital status and ethnicity on malnutrition in its various forms [55-57]. From another point of view, the impact of the five risk factors studied in this study represents 14.7% of the global variation of fat mass thus revealing that other factors are more responsible for the rise in obesity among Moroccan women such as diet and inactivity.

A resent publication in July 2025 suggested that between increased caloric intake and reduced energy expenditure, cited as development-related contributors to the obesity crisis, dietary intake plays a far greater role than inactivity in the elevated prevalence of obesity [58].

Furthermore, it seems that by using BMI or excess body fat in the Moroccan women population of reproductive age, we obtained a high degree of similarity in the results, thus confirming the positive relationship between BMI and body fat. This makes BMI useful for population screening for obesity rather than diagnostic measure of it [59].

CONCLUSIONS

In summary, our study underscores the pressing need for targeted public health interventions to address the continue rising rates of overweight and obesity among women of reproductive age in Morocco. These interventions should consider socio-economic factors, educational levels, and urbanization trends as a part of a comprehensive approach that takes into account these multiple factors are often necessary to promote healthy weight management.

Acknowledgement
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Conflict of interest
The authors declare no conflict of interest.

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