Research Article

Determinants of Misperception of Weight Status among a Community of Adults in the Region of Sousse, Tunisia

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Abstract

Aim: To determine the prevalence of misperception of body weight status among Tunisian adults in the region of Sousse and examine its associated factors.

Materials and Methods: The studied population was randomly selected from three districts of the region of Sousse. Our sample was composed of all adults aged from 18 to 65 years living in these selected districts.

An interviewer-administered questionnaire was used to collect socio-demographic data, and self-reported weight and height. We collected biometric measures of height and weight.

For multivariate analysis, we used Multinomial regression where reference group was composed of participants who well or over estimated their weight status.

Results: Prevalence of obesity based on self-reported weight and height was 15.2%. The prevalence of measured obesity was 31.7% (p<0.001).

Correct estimation of weight status was 74.3%, 65.5% and 90.9% respectively among participants who reported being normal weight, overweight and obese.

Underestimation of weight status was 9.4% among overweight and 9.1% among obese according to their reported weight and height. Multivariate analysis showed that obese participants had higher risk of under estimation. However students had lower risk of under estimation of weight status.

Conclusion: We should take into account social circumstances when designing obesity preventive and treatment interventions.

Keywords: Obesity; Adult; Weight Perception

Introduction

Obesity is a major global health challenge. Its prevalence has increased dramatically worldwide over the last decades and has now reached epidemic proportions[1]. Obesity causes or is closely linked with a large number of health conditions, including cardiovascular diseases, type 2 diabetes mellitus and a variety of cancers and in consequence death[2].

In parallel to this, it appears that a modest weight reduction has been shown to have considerable improvements in cardiovascular disease risk[3]. Treatment of obesity alone is however, not likely to be successful in halting the obesity epidemic because people often regain weight after the treatment program is finished[4].

According to the Trans theoretical Model[5], awareness is important in the earlier stages of change. Thus, people will deliberately make behavioral changes, only when they experience a need to change[4]. Awareness of personal weight status may be an important first step for the motivation to lose weight and to avoid further weight gain[4]. Individuals must recognize that they are overweight or obese and in consequence at risk for negative health outcomes to adopt weight management recommendations[6].

Body weight misperception, a discrepancy between actual and perceived body weight, puts both normal and overweight individuals at risk[7]. Among overweight and obese individuals, underestimation of weight status has been shown to be associated with denial or minimization of current weight being a health risk[8] and may be one explanation for the limited success of obesity prevention interventions[9].

On the other side, among normal weight individuals, perceiving oneself as overweight is associated with eating disorders and unhealthy weight control practices[10].

Given these health risks, it is important to understand discrepancies between perceived and actual weight status. Studies on the determinants of

weight perception, mainly conducted in high and middle income countries[11], have shown that factors such as age, gender, ethnicity, socio-economic status, marital status and education influence estimation of weight status in the general population[12-14].

To our knowledge there was no study conducted in Tunisia examining misperception of weight status. Considering the above and through this work, we aimed to determine the prevalence of misperception of body weight status among Tunisian adults in the region of Sousse and examine its associated factors.

Materials and Methods

Study Design and Sample

This study was part of an assessment of the prevalence of chronic disease risk factors in a community based intervention program conducted in 2014 in the region of Sousse, Tunisia including 1958 participants. The studied population was randomly selected from three delegations of the region of Sousse: delegations of Sousse Riadh, Sousse Jawhara and Msaken. The national institute of statistics of Tunisia selected randomly districts from each delegation and all adults aged 18 to 65 years living in the households of the selected districts were included in the study. Data collectors contacted each selected household at their home to ask them to participate to the study. If they found nobody at home at the first contact, they returned to the same home in the week end. Out of all selected adults, 67.9% participated in data collection. We obtained a sample of 1958 adults.

Data Collection

The questionnaire used in this study was prepared by the Oxford Health Alliance for the Community Intervention for Health Project. We translated this questionnaire to Arabic and pre-tested it before use.

The questionnaires were administrated with personal interview by trained investigators to collect sociodemographic data and self-reported weight and height.

We collected biometric measures of height and weight at participants home. Body weight was recorded to the nearest 0.1kg using a portable electronic scale. Standing height was measured with the participants in bare feet to the nearest 0.5 cm.

Variable Definition

We have calculated BMI based on self-reported anthropometrics (by responding to the questions what is your weight and what is your height) and BMI based on measured anthropometrics.

Body mass index (BMI) which is calculated by dividing the body weight in kilograms (Kg) by the square of the height in meters (m) was used to assess weight status, as adopted by The World Health Organization[15].

Self reported weight status was the weight status evaluated according to reported weight and height.

Measured weight status was the weight status evaluated according to measured weight and height.

Correct estimation was defined when self and measured weight status was the same.

Underestimation was defined when self reported weight status was less than measured weight status.

Overestimation was defined when self reported weight status was higher than measured weight status.

Participants who didn't know their weight and/or their height were classified with did not know their weight status.

Data Capture and Analysis

We used SPSS 10.0 Software for data capture and analysis. A probability of <0.05 was considered statistically significant for all tests. For univariate analysis, Chi square test of Pearson was used to compare percentages and one way Anova test was used to compare means.

For multivariate analysis, we used Multinomial regression where reference group was composed of participants who well or over estimated their weight status.

Ethical Considerations

This study was undertaken with respect for the rights and integrity of the participants. Ethical clearance was obtained from the Ethical Committee of Farhat Hached University Hospital. Participation was voluntary and all the participants gave informed consent.

Results

Our population (1958) was composed of 60.7% of men and 39.3% of women. Their mean age was 39.81 ± 13.78 years old. From the participants, 68.5% were married, 42.7% had secondary level of education and 48.6% were unemployed. Participants whose height and weight was unknown were 479 (32.4%) and 372 (23.4%). The total of participants whose height and weight was unknown are total number 591 (30.2%) (table 1).

Table1: Socio demographic characteristics of participants' adults in the region of Sousse, 2014

Age mean (SD)	39.81 (13.78)
Sex n (%)	
Men	769 (39.3)
Women	1189 (60.7)
Weight and height reported n (%)	1367 (69.8)
Weight and height measured n (%)	1958 (100.0)
BMI according to reported data mean (SD)	26.3 (5.2)
BMI according to measured data mean (SD)	27.7 (5.7)
Marital status n (%)	
Single	504 (25.9)
Married	1336 (68.5)
Widow or divorced	109 (5.6)
Educational level n(%)	
Illiterate or primary	817 (41.8)
Secondary	835 (42.7)
University	303 (15.5)
Professional status n(%)	
Student	176 (9.0)
Worker	829 (42.4)
Workless	951 (48.6)

Prevalence of obesity based on self-reported weight and height was 15.2%. The prevalence of measured obesity was 31.7% (p<0.001) (Table 2).

Table 2: BMI Category derived from self-reported and measured weight and height among Tunisian adults in the region of Sousse, 2014

Weight status	Self-reported		Measured		p
	n (%)	CI$_{95\%}$	n (%)	CI$_{95\%}$	
Normal weight	604 (30.8)	28.8-32.8	679 (34.7)	32.6-36.8	0.009
Overweight	466 (23.8)	21.9-25.7	659 (33.7)	31.6-35.7	<0.001
Obese	297 (15.2)	13.6-16.7	620 (31.7)	29.6-33.7	<0.001
unknown	591 (30.2)	28.1-32.3	-	-	-

Correct estimation of weight status was 74.3%, 65.5% and 90.9% respectively among participants who reported being normal weight, overweight and obese. Underestimation of weight status was 9.4% among overweight and 9.1% among obese according to their reported weight and height. Participants with unknown height / weight were obese in 36% cases. (Table 3).

Table 3: Cross table of reported BMI category and measured BMI category among Tunisian adults in the region of Sousse, 2014

Reported / Measured	Normal weight n (%)	Overweight n (%)	Obese n (%)	unknown n (%)
Normal weight	449 (74.3)	44 (9.4)	6 (2.0)	180 (30.5)
Overweight	135 (22.4)	305 (65.5)	21 (7.1)	198 (33.5)
Obese	20 (3.3)	117 (25.1)	270 (90.9)	213 (36.0)
Total	604 (100.0)	466 (100.0)	297 (100.0)	591 (100.0)

Among participants, 52.3% estimated correctly their weight status, 3.6% over estimated their height/ weight and 272 (13.8%) underestimated their height/ weight.

The mean age of participants who well estimated or overestimated their weight status was significantly lesser than those who underestimated or did not know it. Males overestimated their weight status more frequently than women who underestimated it more frequently. Married and low level education participants underestimated their weight status more frequently. Participants with unknown height/ weight were obese in 64% of cases and workless in 57.6% of cases (Table 4).

Table 4: Factors associated with weight misperception in the univariate analysis among Tunisian adults in the region of Sousse

	Correct estimation	Over-estimation	Under-estimation	unknown	p
Age Mean (SD)**	38.3 (13.8)	38.9 (12.4)	42.1 (12.1)	41.3 (14.2)	<0.001
Gender n (%)*					
Male	436 (42.6)	42 (59.2)	85 (31.3)	206 (34.9)	<0.001
Female	588 (57.4)	29 (40.8)	187 (68.8)	385 (65.1)	
Marital status n(%)*					
Single	311 (30.5)	20 (28.2)	38 (14.0)	135 (23.1)	<0.001
Married	663 (64.9)	50 (70.4)	218 (80.1)	405 (69.2)	<0.001
Widow or divorced	57 (4.6)	1 (1.4)	16 (5.8)	45 (7.7)	0.02
Education level n(%)*					
Illiterate or primary	330 (32.3)	29 (40.9)	114 (42.0)	344 (58.3)	<0.001
Secondary	493 (48.2)	30 (42.3)	105 (38.6)	207 (35.1)	<0.001
University	199 (19.5)	12 (16.9)	53 (19.5)	39 (6.6)	<0.001

Professional status n(%)*					
Student	129 (12.6)	5 (7.0)	7 (2.6)	35 (5.9)	<0.001
Worker	456 (44.6)	40 (56.3)	118 (43.4)	215 (36.4)	<0.001
Workless	438 (42.8)	26 (36.6)	147 (54.0)	340 (57.6)	<0.001
Measured obesity n(%)*					
Obese	754 (73.6)	7 (100.0)	135 (49.6)	378 (64.0)	<0.001
Non obese	270 (26.4)	0 (0.0)	137 (50.4)	213 (36.0)	

** Independent means comparison using one way Anova test.
* Independent percentages comparison using Chi square test.

Multivariate analysis showed that obese participants had higher risk of underestimation. However students had lower risk of underestimation of weight status. Participants whose height/ weight was unknown were more frequently obese, workless and less educated (Table 5).

Table 5: Factors associated with underestimated and unknown BMI category in the multivariate analysis among Tunisian adults in the region of Sousse, 2014

	Under estimation		unknown	
	OR	CI 95%	OR	CI 95%
Measured obesity	2.75	2.07-3.67	1.28	1.01-1.61
Professional status				
Student/workless	0.25	0.11-0.57	0.59	0.39-0.91
Worker/workless	0.9	0.67-1.20	0.77	0.61-0.96
Education level				
Illiterate or primary/University	0.89	0.60-1.32	4.4	3.01-6.45
Secondary/ University	0.78	0.53-1.14	2.1	1.44-3.08

Discussion

Through this work we aimed to determine the prevalence and the determinants of misperception of weight status among Tunisian adults in the region of Sousse. In our study the prevalence of overweight and the prevalence of obesity were underestimated when based on reported data. In the univariate analysis, several sociodemographic patterns such us age, gender, education, employment, marital status were associated to the self-perception of weight status. In the multivariate analysis, obesity and education level were associated to the underestimation of weight status.

In agreement with our findings, in the literature, it was shown that the prevalence of obesity based on self-reported data is underestimated because self-reports overestimate height and underestimate weight[16,17].

In our study, nearly half of Tunisian adults (52.3%) in our sample were accurate in their self-perceptions and the other half did not know their weight status (30.2%) or underestimate it (13.9%) or overestimate it (3.6%).

In the literature, the prevalence of misperception is variable. It was 37% in a sample of young Mexican adults[7]. Among US adults, Chang et al[12] and Duncan et al[17] found that respectively 29.0% and 23% incorrectly classified their weight status. Arantxa Colchero et al[11], found that 62% of adult had an incorrect perception of their BMI.

Differences can be due to sample characteristics or methodological differences given that there is no consensus on how to assess perceptions of body weight status[7]. On the other side, it seems that the probability of a correct classification can be lower than the probability of getting a correct result by chance alone[11].

Approximately, one third of our participants did not know their weight status. Rather than being viewed as a problem, missing values can be treated as meaningful data[18,19]. The relationships between missing data and other variables can be examined to determine potential reasons why young people do not report such data[19]. In their study, examining factors associated with missing values for body mass index (BMI) in a nationally representative sample of Portuguese youth, Fonseca et al[19] found that those with missing values for BMI tend to have poorer body image, poorer health behaviours and poorer social networks.

In our study, women were more likely not to overestimate their own weight status. Our findings were in contrast with several studies conducted almost in American and European countries[4,20-22]. It can be explained by the difference in the standard of beauty between cultures and social norms. This standard differs from the exaggerated slimness fashionable in many Western countries, so normal weight individuals may be less likely than U.S. and European women to perceive themselves as overweight[7].

In our study, older persons were more likely to underestimate their own weight status. This is in agreement with several studies[11,23-25] and it can be explained by the fact that older individuals may consider weight gain a normal aspect of aging[4].

We have found that married participants underestimated their weight status more frequently. Several socio demographic factors may influence self-estimation of weight status such us marital status. Boo et al[20] found that marital status had no significant effect on weight perception for men, but for women, those who had never been marriedwere more likely to overestimate their weight status. In the study of Mogre et al[23], being not married was associated to underestimation of weight status.

In our study we found that students had lower risk of underestimation of weight status. As in other studies, education level influence self-perception of weight status. Several studies suggest that more educated individuals were less likely to have an incorrect perception or to underestimate their weight[11,26,27]. More educated adults, independent of their wealth, may have more health related information that raises awareness of their BMI, and individuals living in urban areas are exposed to more health related information[11].

In the multivariate analysis, we found that obesity was associated with underestimation of weight status. Mogre et al[23] found that overweight/obese participants were several folds at risk of underestimating their weight status compared to their normal weight counterparts. In contrast with our results, McTigue et al[28] reported contrary results in a study among patients with diabetes in which most overweight (95%) or obese (99%) respondents correctly self-perceived their weight status as overweight. The differences may be related to the fact that this is a high risk population and their weight status was already announced by their physicians.

Strength and Limitations

Our study presents strengths and the major one lies in the large representative sample size. The training of investigators and the standardization of data collection were other strengths.

However this study presents some limitations and the major one is that we assessed the weight status perception according to reported weight and height but not according to perceived weight status (normal, overweight or obese). Our methodology was different from studies that examined weight status perception but there is no consensus on how to assess perceptions of body weight status.

It is also interesting to study other determinants such as socio economic status, other cardiovascular risk factors, knowledge about these factors, lifestyle behavior and diagnosis of obesity or overweight.

Conclusion

Distorted self-perceived weight status is attributable to social circumstances. In term of practices, these findings should be taken into account when designing preventive and treatment interventions.

Conflict of interest: Authors declare no conflict of interest.

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