OVERWEIGHT AND OBESITY AMONG HEALTHCARE PROFESSIONALS IN TUNISIA: PREVALENCE AND ASSOCIATED FACTORS

Abstract

INTRODUCTION:

Obesity has become a major public health problem because of its potential impact on health and its alarming increase worldwide.

The objectives were to estimate the prevalence of overweight and obesity among healthcare professionals (HCPs) and to examine their associated factors.

METHODS

We conducted a cross-sectional study during the period August2022-November 2022 among HCPs in the two-university hospital Habib Bourguiba and Hedi Chaker of Sfax governorate, Southern Tunisia. To screen for EDs, we opted for the validated French version of the Eating Attitude Test (EAT-26).

RESULTS

The median age was 30 years (Interquartile range (IQR)=[26-40]). In this study, 253 HCPs were aged 35 years or more (68.4%). Females represented 74.6% of participants (n=276). The mean Body Mass Index (BMI) was 24.79±3.74 kg/m2. The prevalence of overweight was 40.8%.

Among the participants, 24.6% were at high risk of developing eating disorders.

In multivariate analysis, factors independently associated with the prevalence of overweight in HCP were a number of working years ≥ 10 years (adjusted odds ratio (AOR) =5.7; p<0.001), large weight variation ≥25Kg during adulthood (AOR=3.5 ; p=0.038), distortion in body image perception (AOR=2.2; p=0.01), dissatisfaction with the current weight (AOR=5.3; p<0.001) and high risk of developing eating disorders (ED) according to the EAT-26 score (AOR= 1.8; p=0.04).

CONCLUSION:

The high prevalence of overweight among healthcare professionals highlights the urgent need for preventive measures in the workplace, particularly in healthcare settings, to address the long-term health risks associated with obesity. These findings underscore the importance of incorporating weight management and

mental health support into workplace wellness programs. Future research should focus on exploring effective interventions to reduce obesity and promote healthier lifestyles among healthcare workers.

Keywords: [obesity; overweight; healthcare professionals; epidemiology; associated factors]

INTRODUCTION

Obesity is defined by the World Health Organisation (WHO) as an abnormal or excessive accumulation of body fat that can damage health. The notion of risk to an individual's health is part of the very definition of obesity (1). Overweight and obesity are one of the major lifestyle diseases that lead to other health problems and contribute to many chronic diseases, including cancers, diabetes, metabolic syndrome and cardiovascular disease (2). Obesity has become a major public health problem because of its potential impact on health and its alarming rise worldwide (3).

Tunisia does not seem to be spared from this affliction. Indeed, the prevalence of obesity in Tunisia increased between 2005 and 2016 among people aged 35-70, rising from 27.2% to 34.1% (4). The prevalence of overweight and obesity among healthcare professionals (HCPs) in Tunisia is still underestimated, and there is a lack of statistical data on the subject.

An accurate assessment of the prevalence of obesity among HCPs is necessary for several reasons. Firstly, obesity increases the likelihood of musculoskeletal disorders (5) and mental health problems (6), which are the main causes of work-related illness and accidents in the workplace for HCPs. As well as being implicated in the onset of chronic disease, these conditions and their associated absenteeism rates pose a potential problem for the efficiency and sustainability of the healthcare system by potentially reducing the performance of the healthy workforce (7).

Comparing the rate of obesity in HCPs with that in the general population will help to identify the possible contribution of unfavourable factors in the workplace, such as a lack of access to healthy food options (8,9), night work (10,11) and work with high demand but little control over working conditions. These working conditions can lead to increased stress and even burnout, which may increase the risk of overweight in this sub-group (12).

In a recent study (13) published in 2023, involving 709 HCPs in Saudi Arabia, 21% of participants were overweight and 15.5% were obese. These results are not negligible, and effective and early preventive measures should be established in the workplace to prevent overweight among HCPs and avoid its deleterious consequences.

In this perspective, this study aimed to estimate the prevalence of overweight and obesity among HCPs and to examine the factors associated with it.

METHODS

1. Study design and settings

This was a cross-sectional study, conducted over a 4-month period: from August 2022 to November 2022, among nursing staff at the two-university hospital in the governorate of Sfax, Habib Bourguiba and Hedi Chaker, southern Tunisia.

2. Sampling procedure

A representative sample of healthcare professionals from both medical and paramedical cadres working in the two teaching hospitals was randomly selected. Calculation of the minimum sample size based on an expected overweight prevalence of 30.9% from a previous study conducted among HCPs in Italy (14), a confidence level of 95% and a 5% margin of error, giving a sample size of 328 subjects. An additional 10% was required to allow adjustment for some missing data. Finally, from an exhaustive list of all eligible HCP, 370 participants were randomly recruited.

2. Study population and inclusion criteria

All healthcare professionals (doctors, interns, residents, seniors, nurses, anaesthetists, instrument technicians, physiotherapists, etc…) from the two university hospitals were eligible for the study. We did not include people who did not agree to complete the form because they refused or were mentally incapable of answering, or trainees. We excluded people who did not return the questionnaire and those who gave incomplete responses or missing data.

3. Data collection

The study was conducted as follows: data were collected by means of a self-report questionnaire, including questions on socio-demographic characteristics, personal and family history, EAT-26, exercise and sleep habits, exposure to recent stress, as well as position and number of shifts per week. An explanatory note for participants was appended to the questionnaire. We took the time to explain to the participants who agreed to take part in the survey the interest and purpose of this study and to ask them to complete a questionnaire. Each participant was then weighed and tapped by the investigating doctor to calculate their body mass index (BMI). This was defined as the ratio of weight (P) in kg to the square of height (T) in metres. To screen for eating disorders, we opted for the validated French version of the Eating Attitude Test (EAT-26) (15), which is the language of instruction of our population.

The EAT-26 questionnaire, a tool developed by Garner and Garfinkel in 1979, consists of 26 items and participants were asked to rate their responses on a 6-point Likert scale (always = 3, usually = 2, often = 1, sometimes rarely and never = 0 for items 1-25, and the reverse direction of scoring for item 26) (16,17).

The responses to the items were added together and a score was calculated with extremes from 0 to 78.

- A score of less than 20 indicated that the participant was at low risk of developing EDs.

- A score of 20 or more indicated that the participant was at high risk of developing EDs.

4. Statistical analysis

Data entry was performed using SPSS.20 software. For continuous variables, we calculated the means and standard deviations in case of Gaussian distribution. In the case of a non-

Gaussian distribution, medians and interquartile intervals (IQR) were calculated. For the categorical variables, we calculated the frequencies and the percentages. The comparison of frequencies on independent series was done by the Pearson's chi-square test or Fisher's exact test if the conditions of validity were not met. The results of the risk associated with EDs were expressed by the Crude Odds Ratio (COR) with their 95% confidence intervals using the univariate logistic univariate logistic regression method. To compare the means for independent samples, we opted for the student's t-test for variables with a Gaussian distribution, and for non-Gaussian variables, we opted for non-parametric statistical tests. We opted for a multivariate analysis by binary logistic regression analysis (Adjusted odds ratio (AOR), 95% CI) to identify independent factors of EDs. A p value <0.05 was statistically significant.

RESULTS

The median age was 30 years (IQR= [26-40]). Two hundred and fifty-three HCPs were aged 35 years or more (68.4%) and 117 HCPs (31.6%) were aged less than 35 years. Our population was predominantly female (n=276; 74.6%). More than half of the HCPs who took part in our study belonged to the paramedical profession (n=206; 55.7%). In our study, the average BMI of healthcare professionals (HCPs) was 24.79 ± 3.74 kg/m². Of the HCPs who took part in our study, 40.8% were overweight. Ninety-one participants (24.6%) were at high risk of developing AUD. The median value of the score calculated was 10 (IQR= [5-19]) **(Table 1).**

Table 1: Socio-demographic and clinical characteristics of HCPs

		NUMBER	%
GENDER	Male	94	25.4
	Female	276	74.6
AGE GROUPS	≥ 35 years	253	68.4
	< 35 years	117	31.6
LIVING SITUATION	With family	324	87.6
	Alone	28	7.6
	With friends	18	4.9
MARITAL STATUS	Married	194	52.4
	Engaged	33	8.9
	Single	134	36.2
	Divorced	9	2.4
HAVING CHILDREN		169	45.7
PROFESSIONAL CATEGORY	Medical	164	44.3
	Paramedical	206	55.7
OCCUPATION	interns	51	13.8
	Residents	79	21.4
	Seniors	28	7.6
	Nurses	90	24.3
	Anesthetists	14	3.8
	Instrumentalists	7	1.9
	other	101	27.3
NUMBER OF YEARS OF WORK	< 10 years	242	65.4
	≥ 10 years	128	34.6
NIGHTSHIFTS	>1 nightshift/week	89	24.1
	1 nightshift/week	281	75.9
PHYSICAL ACTIVITY	Light-intensity	232	62.7
	Moderate-intensity high-intensity	55 32	14.9 8.6
SLEEP DURATION	<5 hours	25	6.8

	5-8 hours	325	87.8
	>8 hours	20	5.4
PRESENCE OF RECENT STRESSORS CURRENTLY		191	51.6
SMOKING		42	11.4
ALCOHOL CONSUMPTION		14	3.8
CHRONIC DISEASE		63	17
ALREADY CONSULTED A PSYCHIATRIST		311 59	84.1 15.9
CURRENTLY TAKING A PSYCHIATRIC MEDICATION		16	4.3
FAMILY HISTORY OF OTHER MENTAL HEALTH DIAGNOSIS		50	13.5
FAMILY HISTORY OF EATING DISORDER		46	12.4
WEIGHT STATUS	Underweight	8	2.2
	Normal	211	57
	Overweight	114	30.7
	Obese	37	10
WEIGHT VARIATION DURING ADULTHOOD	<25kg	347	93.8
	≥25kg	23	6.2
PERCEPTION	Normal	252	68.1
	Thin	28	7.6
	Obese	90	24.3
SATISFACTION	Satisfied	165	44.6
	Want to reduce weight	173	8.6
	Want to gain weight	32	46.8

N: Number; %: percentage

Univariate analysis showed that the prevalence of overweight and obesity in HCPs was significantly associated with the age group '< 35 years' (COR=2.6 ; p<0.001), marital status 'in couple' (COR=2.7 ; p<0.001), having children (COR=1.8 ; p=0.004), paramedical profession (COR=1.8 ; p=0.004) and number of years working ≥ 10 years (COR=2.8 ; p<0.001), the presence of warning signs of EDs in participants (COR=1.6; p=0.046), the presence of a chronic illness (COR=1.7 ; p=0.047), wide variation in weight ≥25Kg during adulthood (COR=5.7; p<0.0001), abnormal perception of body image (COR=4.7; p<0.001) and dissatisfaction with current weight (COR=5.2; p<0.001). Also, the prevalence of overweight was significantly higher in POC at risk of developing EDs according to the EAT-26 score (35.5% vs 58.2%; COR=2.5; p<0.001) **(table 2).**

Table 2: Association of socio-demographic and clinical characteristics with overweight in HCPs

Variable	Not Overweight	Overweight	COR	p

		n(%) N=218	n(%) N=152	(CI 95%)	
Gender	Male	58 (61,7)	36 (38,3)	1	0,5
	Female	160 (58)	116 (42)	1,8 (0,7-4,6)	
Age group	≥ 35 years	168 (66,4)	85 (33,6)	1	***<0,001***
	< 35 years	50 (42,7)	67 (57,3)	2,6 (1,7-4,1)	
Marital status	No	103 (72)	40 (28)	1	***<0,001***
	Engaged	115 (50,7)	112 (49,3)	2,7 (1,1-5,6)	
Having Children	No	132 (65,7)	69 (34,3)	1	***0,004***
	Yes	86 (50,9)	83 (49,1)	1,8 (1,2-2,8)	
Living situation	No	203 (59,4)	139 (40,6)	1	0,5
	Alone	15 (53,6)	13 (46,4)	1,2 (0,6-2,7)	
Origin	No	178 (59,7)	120 (40,3)	1	0,5
	yes	40 (55,6)	32 (44,4)	1,2 (0,7-1,9)	
Position	Médical	110 (67,1)	54 (32,9)	1	***0,004***
	Paramédical	108 (52,4)	98 (47,6)	1,8 (1,2-2,8)	
Time of work	Dayshift	120 (62,5)	72 (37,5)	1	0,1
	Day and nightshift	98 (55,1)	80 (44,9)	1,4 (0,9-2,1)	
Nightshift	≤ 1 nightshift/week	58 (65,2)	31 (34,8)	1	0,1
	>2 nightshift/week	160 (56,9)	121 (43,1)	1,7 (0,7-2,3)	
Number of years of work	< 10 years	167 (69)	75 (31)	1	***<0,001***
	≥ 10 years	51 (39,8)	77 (60,2)	2,8 (1,4-5,5)	
Smoking		25 (59,5)	17 (40,5)	1	0,9
		193 (58,8)	135 (41,2)	1,1 (0,5-1,9)	
Number of pack-years	< 10 PA	206 (59,7)	139 (40,3)	1	0,2
	≥ 10 PA	12 (48)	13 (52)	1,6 (0,7-3,6)	
Alcohol consumption	Yes	9 (64,3)	5 (35,7)	1	0,6
	No	209 (58,7)	147 (41,3)	1,3 (0,4-3,8)	
Already consulted a psychiatrist	No	187 (60,1)	124 (39,9)	1	0,2
	Yes	31 (52,5)	28 (47,5)	1,4 (0,8-2,4)	
Currently taking a psychiatric	No	210 (59,3)	144 (40,7)	1	0,4

medication	Yes	8 (50)	8 (50)	1,5 (0,5-3,9)	
Chronic disease	No	188 (61,2)	119 (38,8)	1	***0,047***
	Yes	30 (47,6)	33 (52,4)	1,7 (1,1-2,9)	
Family history of other mental health diagnosis	No	192 (60)	128 (40)	1	0,2
	Yes	26 (52)	24 (48)	1,4 (0,8-2,5)	
Family history of eating disorder	No	194 (60,1)	129 (39,9)	1	0,1
	Yes	23 (50)	23 (50)	1,5 (0,8-2,8)	
Weight variation during adulthood	<25Kg	213 (61,4)	134 (38,6)	1	***<0,001***
	≥25Kg	5 (21,7)	18 (78,3)	5,7 (2,1-15,8)	
Perception	Normal	178 (70,6)	74 (29,4)	1	***<0,001***
	Thin or obese	40 (33,9)	78 (66,1)	4,7 (2,9-7,5)	
Satisfaction	Satisfied	131 (79,4)	34(20,6)	1	***<0,001***
	No	87 (42,4)	118 (57,6)	5,2 (3,2-8,3)	
Physical activity	Yes	147 (59,5)	100 (40,5)	1	0,7
	No	71 (57,7)	52 (42,3)	1,1 (0,7-1,7)	
Sleep duration	Sufficient	192 (59,1)	133 (40,9)	1	0,8
	Insufficient or excessive	26 (57,8)	19 (42,2)	1,1 (0,6-1,9)	
Presence of recent stressors Currently	Yes	117 (61,3)	74 (38,7)	1	0,3
	No	101 (56,4)	78 (43,6)	1,2 (0,8-1,8)	

N: Number ;n : Number ; COR: Crude Odds Ratio; 95% CI: 95% confidence interval;

In multivariate analysis, the factors independently associated with the prevalence of overweight in the HCPs who participated in our study were a number of working years ≥ 10 years (AOR=5.7; p<0.001), large weight variation ≥25Kg during adulthood (AOR=3.5 ; p=0.038), abnormal perception of body image (AOR=2.2; p=0.01), dissatisfaction with current weight (AOR=5.3; p<0.001) and high risk of developing EDs according to the EAT-26 score (AOR= 1.8; p=0.041) **(table 3).**

Table 3: Multivariate analysis: factors associated with overweight among healthcare professionals

Variable		AOR	CI 95%	p
Number of years of work	< 10 years	1		***<0,001***
	≥ 10 years	5,7	3,2-10,1	
Weight variation during adulthood	<25Kg	1		***0,038***
	≥25Kg	3,5	1,1-11,4	
Perception	Normal	1		***0,01***
	Thin or obese	2,2	1,2-3,9	
Satisfaction	Satisfied	1		***<0,001***
	No	5,3	2,8-9,9	
High risk of developping EDs	No	1		***0,041***
	Yes	1,8	1,1-3,3	

N: Number ; n : Number ; AOR: Adjusted Odds Ratio; 95% CI: 95% confidence interval;

DISCUSSION

In our study, the mean BMI of HCPs was 24.79±3.74 kg/m2. Of the HCPs in our study, 115 (30.8%) were overweight and 37 (10%) were obese. A recent study conducted in Spain (18) in 2022 also revealed overweight and obesity rates of 33.7% and 7.3%, respectively. Although the rates of overweight and obesity vary considerably across regions and countries, these high rates are consistent with those observed in similar studies (6,9). Rates of overweight and obesity were particularly high in the United States (19) and Brazil (20).

Differences in obesity prevalence between countries may result from a complex combination of factors, including eating habits, levels of physical activity, public health policies and socio-economic disparities.

In our study, a quarter of the participants (24.6%) were at high risk of developing EDs. These results are similar to those found in the Tunisian (21), Lebanese (22) and Bangladeshi (23) studies. However, higher figures were found in Morocco (24) and Egypt (25). We suggest that the variations in prevalence are due to differences in the screening methods for eating

disorders, which may explain the heterogeneity of results, as well as the diversity of the studied population and cultural context, which may directly impact the risk of eating disorders.

We found a significant association between the number of working years and the risk of developing overweight in HCPs. This result was consistent with that of Samhat et al (26). In that study, 56% of nurses reported having gained weight since starting work. However, it is important to note that this result may be influenced by age and menopause, which have been identified in previous studies (3,27) as significantly affecting the prevalence of overweight.

We found that wide weight variation during adulthood was an independent factor associated with the risk of overweight. This result was significantly supported by the study by Marleen A et al (28). In this study, it was shown that variations induced by weight loss, including cellular stress, remodeling of the extracellular matrix, inflammatory responses, secretion of adipokines and lipolysis, appear to be associated with weight regain after successful weight loss. The increased risk of recurrence of overweight could therefore, at least in part, be explained by a combination of these factors (28). A 2023 study (29) highlights that factors like immune cells in fat tissue, hormones controlling hunger and satiety, energy expenditure, and fat metabolism play key roles in weight regain.

We found that abnormal body image perception was an independent factor associated with overweight. This result is consistent with those of other authors (30,31), who have shown that increasing BMI is a key point influencing body image perception. Indeed, overweight and obesity are often associated with serious disturbances in the perception of body shape and weight, as well as a desire to become thinner and obsessive fears of becoming fat (32). A negative body image increases the risk of suffering from eating disorders and developing overweight (33).

In our study, dissatisfaction with current body weight was an independent factor associated with the risk of overweight and obesity in SP. This result is consistent with studies by Toselli et al (34). Indeed, the results of the multiple linear regression analysis of this study also showed that BMI was an independent factor associated with weight dissatisfaction for both sexes, and that its increase led to an increase in the level of body dissatisfaction. This was also well confirmed in the study by Ku et al (19), where it was shown that obese participants, compared with overweight participants, reported lower body satisfaction. For both men and women, body dissatisfaction increased as BMI increased with a desire for smaller body sizes.

We found that eating disorders were an independent factor associated with the risk of overweight and obesity in HCPs. Several studies (24,25) have examined the relationship between eating disorders and the risk of obesity in students and healthcare professionals. This may be explained by a greater preoccupation with food and a tendency to follow inappropriate diets in patients with AUDs (25). Indeed, it has been shown that the weight control strategies used by overweight people are often ineffective and actually lead to weight gain and eating disorders such as binge eating, further increasing the risk of obesity. This suggests that high BMI and disturbed eating attitudes may be mutually reinforcing (35).

To our knowledge, this study provides the first data on the prevalence of overweight among practitioners of different health professions in Tunisia, as well as the predisposing factors. However, our study has certain limitations, including the cross-sectional nature of the study, which limits the interpretation of the causality of the risk factors studied, and the collection of data from a self-administered questionnaire; participants may intentionally under- or

overestimate their attitudes and dietary behaviours in the questionnaire, which may introduce a bias in the interpretation of the responses. The statistical results should be interpreted with caution, as the sample size for some comparisons was insufficient. To better understand the associations between variables, larger-scale studies should be conducted in future research.

CONCLUSION

Our study has highlighted an underestimated but critical issue. The impact of overweight and obesity on healthcare workers is not only a personal health issue but also a broader public health concern. Healthcare professionals are role models for patients and are integral to the prevention and management of obesity-related diseases. Our study suggests that early preventive measures must be implemented in the workplace to combat overweight and obesity. These measures should include regular screening for overweight, creating awareness about healthy lifestyle practices, and providing appropriate interventions such as counselling, nutrition support, and physical activity programs. Additionally, it is essential to establish comprehensive policies that integrate weight management strategies into workplace health programs. The implementation of such policies should be accompanied by continuous monitoring and support to ensure long-term effectiveness.

Future research should focus on exploring targeted interventions and the role of workplace health policies in preventing and managing overweight and obesity among healthcare professionals. Longitudinal studies are needed to evaluate the impact of these interventions over time and assess their cost-effectiveness.

In conclusion, the findings from our study underscore the urgent need for increased awareness, early intervention, and preventive measures to address overweight and obesity within healthcare environments. By prioritizing this issue, we can improve the health of healthcare professionals, reduce the burden of obesity-related diseases, and enhance the overall quality of healthcare services.

CONSENT (WHERE EVER APPLICABLE)

All authors declare that 'written informed consent was obtained from the patient (or other approved parties) for publication of this case report and accompanying images. A copy of the written consent is available for review by the Editorial office/Chief Editor/Editorial Board members of this journal.

ETHICAL APPROVAL (WHERE EVER APPLICABLE)

All authors hereby declare that all experiments have been examined and approved by the appropriate ethics committee and have therefore been performed in accordance with the ethical standards laid down in the 1964 Declaration of Helsinki.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc.) and text-to-image generators have been used during the writing or editing of this manuscript.

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