ORIGINAL

Anthropometric profile in 1.350 well being and beauty professionals

Perfil antropométrico en 1.350 profesionales del bienestar y la belleza

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Abstract

Introduction: Obesity and overweight are two important public health problems that affect more and more people, and not only in the developed world. The aim of this work is to assess the anthropometric profile of workers who deal with people's well-being and beauty.

Material and methods: A descriptive, cross-sectional study of 1,350 wellness and beauty workers in which the anthropometric profile is assessed using scales such as body mass index, waist to height ratio, conicity index, body roundness index and body shape index. Scales estimating body fat percentage such as CUN BAE, ECORE-BF. Deuremberg formula or relative fat mass.

Results: The percentage of obesity in women ranges between 13.1% if we apply the criteria of the body mass index and 33.7% if we apply the body fat percentage with CUN BAE. In men these percentages are 8.1% and 29.7% respectively.

Conclusions: The prevalence of high values of anthropometric parameters in wellness and beauty workers is lower than those found in other workers who also act on people's wellbeing, such as health workers.

Keywords: Obesity, overweight, body fat.

Resumen

Introducción: La obesidad y el sobrepeso son dos importantes problemas de salud pública que cada vez afectan a más personas y no sólo del mundo desarrollado. El objetivo de este trabajo es valorar el perfil antropométrico de trabajadores que se ocupan del bienestar y de la belleza de las personas.

Material y métodos: Estudio descriptivo y transversal en 1.350 trabajadores del bienestar y de la belleza en los que se valora el perfil antropométrico mediante escalas como el índice de masa corporal, el índice cintura/altura, el índice de conicidad, índice de redondez corporal o el índice forma del cuerpo. También se incluyen escalas que estiman el porcentaje de grasa corporal como CUN BAE, ECORE-BF. Formula de Deuremberg o la masa grasa relativa.

Resultados: El porcentaje de obesidad oscila en las mujeres entre el 13,1% si aplicamos los criterios del índice de masa corporal y el 33,7% si lo que aplicamos es el porcentaje de grasa corporal con CUN BAE. En los varones estos porcentajes son del 8,1% y 29,7% respectivamente.

Conclusiones: La prevalencia de valores elevados de los parámetros antropométricos en los trabajadores del bienestar y la belleza son inferiores a los encontrados en otros trabajadores que también actúan sobre el bienestar de las personas como son los sanitarios.

Palabras clave: Obesidad, sobrepeso, grasa corporal.

Introduction

Overweight and obesity are two major health problems that have cohabited with us for many years and considering their current prevalence it seems that the efforts that have been made to control them have not been effective.

The World Health Organization (WHO) in 2016 issued a report on the global prevalence of overweight and obesity[1], the results of which were very worrying:

The global prevalence of obesity in the last 40 years has tripled and more than 1250 million adults are overweight and 650 million obese. In adolescents, 18% are overweight. According to the WHO, obesity causes more deaths than malnutrition and is no longer a problem exclusive to developed countries.

Unfortunately, the increase in the prevalence of overweight or obesity worldwide seems irreversible. By 2030 a large increase is expected almost everywhere in the world with figures as high as 65.8% in Oceania, 45.5% in Asia, 44.5% in North America, 42.1% in Africa and 35.2% in South America[2].

Obesity can lead to major health problems including lung disease, metabolic syndrome, cardiovascular disease, diabetes mellitus, cancer, liver disease, gynaecological disorders, as well as venous and periodontal disease[3-6] and even psychosocial problems[7]. Other conditions such as gout, high blood pressure (HBP), skin problems and osteoarthritis are also more common in people with excess fat. People with obesity also have a higher surgical risk.

The aim of this study is to find out the anthropometric profile of people working in the health and beauty care environment.

Methods

A retrospective and cross-sectional study was carried out in 1,457 workers of beauty between January 2019 and December 2019. Of these, 107 were excluded (29 for not accepting to participate and 78 for not having some of the parameters needed to calculate the different scales, thus a total of 1,350 workers were finally included in the study. (See Flowchart in **figure 1**)

Workers were selected from among those who attended periodic occupational medical examinations.

Inclusion criteria
  • Aged between 18 and 69 years old.
  • Accept to participate in the study.

Figure 1: Flow chart of the study participants.
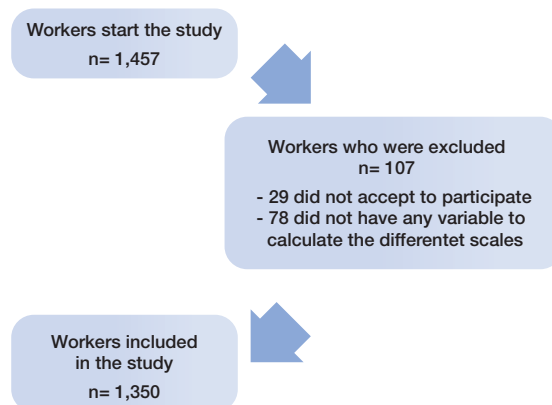
All anthropometric measurements and clinical tests were carried out by the health personnel of the different occupational health units participating in the study, after homogenizing the measurement techniques.

Weight and height were determined with a scale-height rod using a SECA 700 scale and a SECA telescopic height rod 220. Waist and hip circumference was measured with a SECA 20. Values were considered to be high when >88 cm in women and >102 cm in men[8]. The cut-off point for the waist to height ratio is 0.50.

Blood pressure (BP) was measured with OMRON M3 automatic sphygmomanometer and after 10 minutes of rest. Three measurements were made at one minute intervals, obtaining the mean value of the three. An individual was considered to have hypertension if they presented blood pressure values over 140 mm Hg systolic BP[8].

Lipid profile values were classified as following: high cholesterol >200 mg/dl, high LDL >130 mg/dl, and high triglycerides >150 mg/dl. Uric acid was considered high when values were >5.60 in women and 7.00 in men. If an individual was taking medication for any of these, they were also classified as having altered values. Basal blood glucose results were classified based on the recommendations of the American Diabetes Association[9], whereby it was considered that the individual presented diabetes if values were >126 mg/dl in two different determinations, if they also presented HbA1c ≥ 6.5% or if the individual was receiving hypoglycemic treatment.

An individual was considered a smoker if they had regularly consumed at least 1 cigarette/day in the last month, or had stopped smoking less than a year ago.

Social class was obtained from the 2011 National Classification of Occupations (NCO-11) based on the proposal made by the social determinants group of the Spanish Society of Epidemiology[10]. We opted for

classification in three categories: Class I. Directors/ managers, university professionals, athletes, and artists. Class II. Intermediate occupations and self-employed workers without employees. Class III. Unskilled workers. People in social class I and II are considered white collar and those in social class III are considered blue collar.

BMI is calculated by dividing weight by height in meters squared. Obesity is considered to be over 30.

We have used 4 formulas to estimate the percentage of body fat:

- CUN BAE[11] (Clínica Universidad de Navarra Body Adiposity Estimator) The formula is:

-44.988 + (0.503 x age) + (10.689 x gender) + (3.172 x BMI) - (0.026 x BMI^2) + (0.181 x BMI x gender) - (0.02 x BMI x age) - (0.005 x BMI^{2}x gender) + (0.00021 x BMI^{2}x age).

Where male sex equals 0 and female sex equals 1.

The CUN BAE cut-off points for obesity are from 25% in men and 35% in women.

- ECORE-BF[12] (Equation Córdoba for Estimation of Body Fat) It is calculated by the formula: -97.102 + 0.123 (age) + 11.9 (gender) + 35.959 (LnIMC).

Being male is valued as 0 and female as 1. The same cut-off points as CUN BAE are proposed.

- Deuremberg fat mass index[13].

Fat mass %= 1.2 x (BMI) + 0.23 x (Age in years) - 10.8 x (gender) - 5.4

Women are given a value of 0 and men a value of 1. Obesity is considered to be 25% or more in men and 32% or more in women.

- The normalized weight-adjusted index[14] (NWAI) is calculated by the formula : (weight/10) - (10 x height) + 10] weight is expressed in kg and height in meters.

- Visceral adiposity index (VAI)[15]

Female:

$$VAI = \left(\frac{WC}{36,58 + (1,89 \times BMI)} \right) \times \left(\frac{TG}{0,81} \right) \times \left(\frac{1,52}{HDL} \right)$$

Male:

$$VAI = \left(\frac{WC}{39,68 + (1,88 \times BMI)} \right) \times \left(\frac{TG}{1,03} \right) \times \left(\frac{1,31}{HDL} \right)$$

- Body roudness index (BRI)[16]

BRI = 364.2-365.5x√1-[(WC/(2π)2)/(0.5 x Height)2]

- Body Surface Index (BSI)[17] and Body Surface Area (BSA).

w is weight and h is height

- Relative fat mass[18]

Women: 76- (20 x (height/waist)) Men: 64- (20 x (height/ waist))

Conicity index[19]

$$\frac{\text{waist circumference (in metres)}}{0,109} \times 1 \sqrt{\frac{\text{Weight (in kilogram)}}{\text{Height (in metres)}}}$$

Body shape index[20] (ABSI)

$$ABSI = \frac{WC}{BMI^{2/3} \times height^{1/2}}$$

Metabolic Score for Visceral Fat (METS-VF)[21]

METS-VF = 4.466 + 0.011*(Ln(METS-IR))^3 + 3.239*(Ln(WHtr))^3 + 0.319*(Sex) + 0.594*(Ln(Age))

where METS-IR = (ln ((2 × fasting plasma glucose) + triglyceride) × body mass index)/(ln (HDL-cholesterol)).

Statistical analysis
A descriptive analysis of the categorical variables was performed, calculating the frequency and distribution of responses for each of them. For quantitative variables, the mean and standard deviation were calculated, and for qualitative variables, the percentage was calculated. The bivariate association analysis was performed using the 2 test (with correction of Fisher's exact statistic when conditions required it) and Student's t test for independent samples. Statistical analysis was performed with the SPSS 27.0 program, with an accepted statistical significance level of 0.05.

Ethical considerations and aspects
The study was approved by the Clinical Research Ethics Committee. All procedures were performed in accordance with the ethical standards of the institutional research committee and with the 2013 Declaration of Helsinki. All patients signed written informed consent documents before participating in the study.

Results

Table I shows the anthropometric, clinical, analytical and socio-demographic characteristics of the study participants. Sixty-nine percent are women, the average age is about 35 years. The majority group is between 30 and 39 years old. 31.9% are smokers (slightly higher percentage in women). The values of all clinical and analytical parameters are higher in men.

The mean values of all the anthropometric scales analysed in this study (BMI, WtHR, Body Surface index, NWAI, BRI, ABSI, VAI, CI and METS-VF) show higher values in men. The scales assessing body fat percentage (CUN BAE, ECORE-BF, RFM and Deuemberg formula) show higher values in women as women have a higher amount of body fat. The complete data can be found in **table II**.

Table I: Characteristics of the population.

	Women (n=932) mean (SD)	Men (n=418) mean (SD)	Total (n=1350) mean (SD)	p-value
Age (years)	35.1 (8.9)	34.4 (8.7)	34.9 (8.9)	0.159
Height (cm)	163.1 (6.1)	176.2 (6.5)	167.1 (8.7)	<0.0001
Weight (kg)	64.3 (13.9)	77.5 (11.7)	68.4 (14.6)	<0.0001
Waist circumference (cm)	73.6 (10.7)	83.8 (9.5)	73.7 (11.4)	<0.0001
Systolic blood pressure (mmHg)	112.7 (13.5)	124.8 (13.2)	116.4 (14.5)	<0.0001
Diastolic blood pressure (mmHg)	70.0 (9.3)	74.4 (10.3)	71.3 (9.8)	<0.0001
Total cholesterol (mg/dl)	181.4 (34.0)	184.5 (35.3)	182.4 (34.4)	0.121
HDL-cholesterol (mg/dl)	58.1 (8.3)	53.6 (8.9)	56.7 (8.8)	<0.0001
LDL-cholesterol (mg/dl)	107.0 (32.8)	109.6 (32.8)	107.8 (32.8)	0.184
Triglycerides (mg/dl)	81.5 (38.1)	109.7 (75.4)	90.2 (54.1)	<0.0001
Glycaemia (mg/dl)	85.9 (12.4)	90.7 (12.6)	87.4 (12.6)	<0.0001
AST (U/L)	18.4 (9.5)	24.8 (9.4)	21.1 (9.9)	<0.0001
ALT (U/L)	18.7 (10.5)	28.6 (18.0)	21.9 (14.2)	<0.0001
GGT (U/L)	17.6 (11.3)	31.7 (28.0)	22.2 (19.6)	<0.0001
	%	%	%	p-value
< 30 years	271 (29.1)	154 (36.8)	425 (31.5)	0.027
30-39 years	407 (43.6)	154 (36.8)	561 (41.5)	
40-49 years	187 (20.1)	84 (20.1)	271 (20.1)	
50-69 years	67 (7.2)	67 (6.3)	93 (6.9)	
Blue collar	587 (63.0)	148 (35.4)	735 (54.4)	<0.0001
White collar	345 (37.0)	270 (64.6)	615 (45.6)	
Non smokers	614 (65.9)	306 (73.2)	920 (68.1)	0.004
Smokers	318 (34.1)	112 (26.8)	430 (31.9)	

Table II: Mean values of overweight and obesity indicators.

	Women n=932 Mean (SD)	Men n=418 Mean (SD)	p-value
Body mass index	24.2 (5.1)	25.0 (3.5)	0.005
Waist to height ratio	0.45 (0.06)	0.48 (0.05)	<0.0001
CUN BAE	33.0 (7.2)	22.4 (5.5)	<0.0001
ECORE-BF	33.0 (7.1)	22.5 (5.1)	<0.0001
Relative fat mass	30.9 (5.6)	21.5 (4.5)	<0.0001
Deuremberg formula	31.7 (6.7)	21.7 (4.7)	<0.0001
Body fat index	26.1 8.0)	20.6 (6.8)	<0.0001
Body surface index	49.2 (8.1)	55.5 (6.3)	<0.0001
Normalized weight adjusted index	0.12 (1.4)	0.13 (1.1)	0.922
Body roundness index	2.6 (1.2)	3.0 (0.9)	<0.0001
Body shape index	0.069 (0.01)	0.074 (0.01)	<0.0001
Visceral adiposity index	2.4 (1.3)	5.9 (5.3)	<0.0001
Conicity index	1.1 (0.1)	1.2 (0.1)	<0.0001
METS-VF	5.2 (0.8)	5.9 (0.7)	<0.0001

**Table III:** Prevalence of elevated values of overweight and obesity indicators.

	Women n=932 % (IC 95%)	Men n=418 % (IC 95%)	p-value
Waist to height ratio >0,5	16.8 (15.2-18.4)	25.8 (24.0-27.6)	<0.0001
Overweight BMI	18.7 (17.1-20.3)	36.8 (35.0-38.6)	<0.0001
Obesity BMI	13.1 (11.6-14.7)	8.1 (6.9-9.3)	
Overweight CUN BAE	25.5 (23.9-27.1)	34.9 (33.1-36.7)	0.002
Obesity CUN BAE	33.7 (32.1-35.3)	29.7 (27.9-31.5)	
Overweight ECORE-BF	26.4 (24.8-28.0)	38.3 (36.5-40.1)	<0.0001
Obesity ECORE-BF	33.2 (31.6-34.8)	28.7 (26.9-30.5)	
RFM obesity	38.8 (37.2-40.4)	20.6 (18.8-22.4)	<0.0001
Overweight Deuremmberg formula	37.3 (35.7-38.9)	40.7 (38.9-42.5)	<0.0001
Obesity Deuremmberg formula	51.0 (49.4-52.6)	22.0 (20.2-23.8)	
METS-VF alto	0.9 (0.5-1.3)	1.9 (1.1-2.7)	0.086

The prevalence of high values, indicating overweight or obesity, of the different scales analysed in this study show in most cases higher values in men (WTHR, BMI, CUN BAE, ECORE-BF and METS-VF). Only RFM and Deuremberg formula show higher prevalences in women. The prevalence of obesity according to BMI is 8.1% in men and 13.1% in women. All data are presented in **table III**.

In the multivariate analysis using binary logistic regression, the covariates age, male sex, being blue collar and being a smoker were established as covariates. Of these, only age and sex increase the risk of having high values for the different scales. The complete data can be found in **figure 2**.

Figure 2: Multivariate análisis with Logistic binary regression.
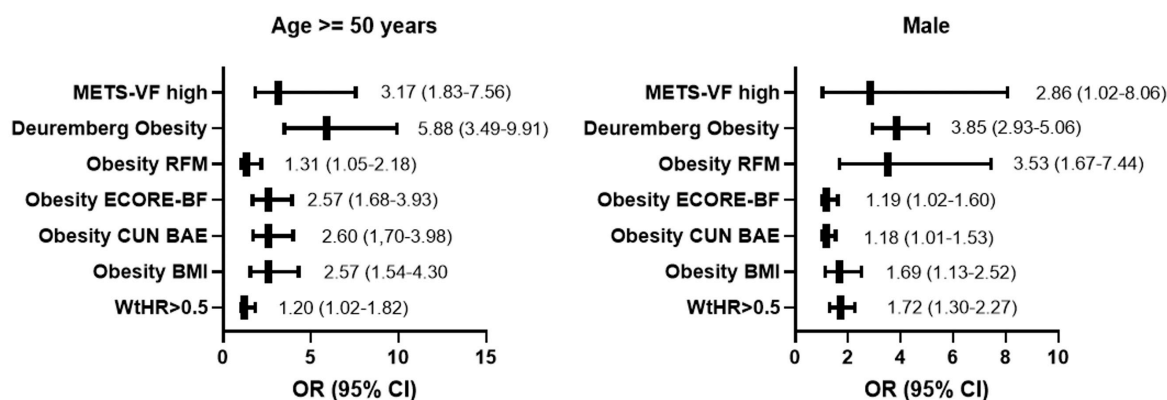
Discussion

The anthropometric profile found in the people working in aesthetics and beauty of the people analysed in this study shows a prevalence of obesity that is not too high in any of the scales used.

No hemos encontrado ningún estudio que valore el perfil antropométrico o cardiovascular de los trabajadores del bienestar y de la belleza por ello no podemos comparar nuestros resultados con los obtenidos por otros autores. Sin embargo si podemos establecer comparaciones con otros colectivos que también se encargan del bienestar de las personas como es el personal sanitario. Un estudio realizado en trabajadores sanitarios de atención primaria de España[22] mostró que los valores de IMC eran superiores a los encontrados por nosotros, aunque la edad media de los profesionales era casi 10 años mayor que la nuestra. Datos similares al estudio español se encontraron en trabajadores hospitalarios de Portugal[23].

As strengths of the study we would highlight the large sample size (more than 1300 people) and the large number of scales used to assess overweight and obesity, specifically[14].

As weaknesses we find that the estimation of body fat has not been carried out with objective methods such as bioimpedance but with indirect estimators.

The absence of studies of this type in this group of workers makes our work pioneering and could constitute a starting point for future research, as well as a reference with which to compare new work that may be carried out.

Conclusion

The anthropometric profile of beauty-related workers is better than that of workers in other productive sectors.

Interests conflict

The researchers declare that they have no conflict of interest.

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