



Original/*Ancianos*

Relationship between sex, body composition, gait speed and body satisfaction in elderly people

P.A. Latorre Román, F. García-Pinillos, J.A. Huertas Herrador, M. Cózar Barba and M. Muñoz Jiménez
University of Jaen, Department of Health Sciences. Campus de Las Lagunillas, Jaen (Spain).

Abstract

The purpose of this study is to analyze body satisfaction in non-institutionalized old people and its association with sex, body mass index (BMI) and gait speed.

Methods: Hundred six people have participated, 38 men (age=74.60 ±6.67 years old) and 68 women (age=72.76 ±4.68 years old). The Body Shape Questionnaire (BSQ) has been used together with body composition and a gait speed test.

Results: Prevalence of body dissatisfaction in old people is about 5.6 %. Women have higher body fat percentage and less muscle mass. Significant differences were not found ($p \geq 0.05$) in the BSQ relating with sex. Obese old people with less gait speed showed higher score in BSQ. The Total BSQ is positively correlated with BMI ($r=0.487$, $p<0.01$), fat percentage ($r=0.371$, $p<0.01$) and negatively correlated with gait speed ($r=-0.215$, $p<0.05$) and perceived health status ($r=-0.269$, $p<0.05$).

Conclusion: Older people's body satisfaction is positively associated with the perception of health and gait speed and negatively with BMI.

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Key words: elderly, body image dissatisfaction, physical fitness, obesity.

RELACION ENTRE SEXO, COMPOSICION CORPORAL, VELOCIDAD DE LA MARCHA Y SATISFACCION CORPORAL EN ANCIANOS

Resumen

El objetivo de este estudio es analizar la satisfacción corporal en personas mayores no institucionalizados y su asociación con el sexo, el índice de masa corporal (IMC) y la velocidad de la marcha.

Métodos: Ciento seis personas participaron en el estudio, 38 hombres (edad =74.60 ±6.67 años) y 68 mujeres (edad =72.76 ±4.68 años). Se empleó el Cuestionario de forma física (CFF) junto con un test de la composición corporal y la velocidad de la marcha.

Resultados: La prevalencia de insatisfacción corporal en ancianos se sitúa entorno al 5.6 %. Las mujeres tienen un mayor porcentaje de masa corporal y menos masa muscular. No se encontraron diferencias significativas ($p \geq 0.05$) en el CFF en relación al sexo. Los ancianos obesos con menor velocidad de la marcha mostraron un resultado superior en el CFF. El total del CFF está positivamente relacionado con el IMC ($r=0.487$, $p<0.01$), porcentaje de grasa ($r=0.371$, $p<0.01$) y negativamente relacionado con la velocidad de la marcha ($r=-0.215$, $p<0.05$) y el estado de salud percibido ($r=-0.269$, $p<0.05$).

Conclusión: La satisfacción corporal de los ancianos está positivamente relacionada con la percepción de la salud y la velocidad de la marcha y negativamente con el IMC.

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Palabras clave: *ancianos, insatisfacción con la imagen corporal, forma física, obesidad*

Abbreviations

BMI: body mass index
BSQ: Body Shape Questionnaire
WHO: World Health Organization
2D: 2Dimensions.
ANOVA: Analysis of variance

Correspondence: Pedro Ángel Latorre Román.
Calle Chiclana de la Frontera, Úbeda (Jaén), 23400.
Email: platorre@ujaen.es

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Introduction

Old people have increased their interest and participation to improve their aged body using physical activity, diet and body care, which is all associated with the increasing of life expectancy. Body satisfaction has not been studied enough in elderly populations despite evident changes in weight, form and function of body with aging. A positive body image promotes physical and emotional health, strengthens self-esteem and reduces vulnerability to damage¹. With aging and body deterioration; it becomes increasingly difficult to maintain the social ideal of beauty leading to a possi-

ble negative impact on quality of life and nutritional status². Among the factors directly associated with the presence of dissatisfaction with one's body is the body mass index (BMI)³. Also body size satisfaction may be an important factor associated with physical activity⁴.

The aging process is accompanied by changes in body composition⁵. Body changes caused by aging produce physical transformations with are inconsistent that current standards of beauty. Other studies suggest that aging increases tolerance so is considered acceptable for size and shape of a body¹. Therefore, the analysis of the body image can be important for understanding aspects of aging and identity. Body satisfaction can also vary during the different phases of adult life, and possibly patterns differ between men and women⁶. Different studies have analyzed body dissatisfaction in adolescents and especially in females, more sensitive to the culture of thinness than males^{7,8,9}. But despite changes in both the appearance and function of the body while aging, little is known about the evolution of body dissatisfaction and desire for thinness in men and women throughout their life cycle¹⁰. In addition, the number of studies of body satisfaction in the elderly is scarce^{11,12} and their results are inconclusive. Recently, Roy and Payette (2012)¹³ show that despite numerous body image research focusing on children, adolescents, young and middle-aged adults, there is a dearth regarding the body image of Western senior people. All this indicates the importance of advancing the study of body satisfaction with aging.

Therefore, the objective in this study is to analyze body satisfaction in not institutionalized old people and its association with sex, body composition and physical fitness.

Methods

Participants

A hundred and six residents of the province of Jaen (Andalusia, Spain), participated in this study, all selected from several home retired. By sex, 38 men (age=74.60±6.67 years old) and 68 women (age=72.76±4.68 years old). To be eligible to take part in this study, participants were required to be more than 65 years old. Moreover, all the subjects were not institutionalized and had no history of mental or intellectual disorders. Each participant signed an informed consent for the study which was conducted in compliance with the Declaration of Helsinki (version 2008) and following the guidelines of the European Community for Good Clinical Practice (111/3976/88 July 1990) and the Spanish legal framework for clinical research in humans (Royal Decree 561/1993 on clinical trials). Informed consent and the study were approved by the Bioethics Committee of the University of Jaen, Spain.

Instruments

Sociodemographic information was collected using a self-report instrument that included date of birth, marital status, educational status and healthy habits, among other questions.

The Body Shape Questionnaire (BSQ)¹⁴, in its Spanish version¹⁵ was employed for the assessment of body dissatisfaction. This is a self-administered questionnaire composed of 34 items that are evaluated using the following scale (1=Never, 2=Rarely, 3=Sometimes, 4=Often, 5=Very often, 6=Always), range test is 34-204. There are five factors to be evaluated in the Spanish version for the questionnaire: BSQ 1: Concern about weight, BSQ 2: Concern about unsightly aspects of obesity, BSQ 3: Overall body dissatisfaction and concern, BSQ 4: Body dissatisfaction regarding the lower part of the body, BSQ 5: Use of vomiting or laxatives to reduce body dissatisfaction. Following Cooper and Taylor (1988)¹⁶, from the total score, four categories or levels of concern for body image have been established: no concern (score <80), mild concern (score between 81 and 110), moderate concern (score between 111 and 140) and extreme concern (score >141 points).

The body composition was analyzed by means of a portable eight-polar tactile-electrode impedance meter (InBody R20, Biospace, Gateshead, UK). This device was used to measure weight (kg), fat mass (%) and skeletal muscle mass (kg). BMI was calculated as weight (kg) divided by height squared (m). Height (m) was measured with a stadiometer (Seca 222, Hamburg, Germany). The measurement was done under the following conditions: at least two hours after the last meal, without clothes on, without any metallic objects on the body, and after remaining in standing for a minimum of 5 minutes before the test. The recommendations of the World Health Organization (WHO, 2003)¹⁷ have been used to establish the degree of obesity: underweight (BMI<18.5 kg/m²), normal weight (BMI=18.50-24.99 kg/m²), overweight (BMI=25.00-29.99 kg/m²), and obesity (BMI>30 kg/m²).

The gait speed is part of the evaluation tests of physical condition in elderly¹⁸. The "gait speed test" involves walking 10 meters in the shortest possible time, at maximum speed. To analysis, the first and the last meter were eliminated due to acceleration and deceleration. The best time of two trials was recorded and used in the analysis. For recording, a Casio Exilim EXZR-10 high speed camera (Dover, NJ, USA) with a sampling frequency of 240 Hz was used. It was installed in a fixed sagittal plane. Then the scrolling speed was measured using 2D photogrammetry software (VideoSpeed vs.1.38, ErgoSport, Granada).

Finally, item 1 (the perception of health) of the Healthy Survey Short-Form 36 (SF -36)¹⁹, which is scored with a rating of 1(poor)-5 (excellent) was also included.

Procedure

Subjects were requested once and individually in home retired. Once the person signed an informed consent, was proceeded to evaluate the bodycomposition and gait speed test. Then, the questionnaires were completed (BSQ and sociodemographic questionnaire), researchers helped the people to fill out the questionnaires.

Statistical Analysis

Data analysis was performed using SPSS (version 20, SPSS Inc., Chicago, Ill). The results are shown using descriptive statistics-the mean and standard deviation (SD). For the comparison of groups by sex, analysis of variance (ANOVA) was used with age as a covariate and age and sex on the comparison between the cluster analysis K-medias made with gait speed. A post hoc test with Bonferroni adjustment was also used. Nominal variables were analysed using Chi-squared test. U Mann-Whitney test was used in perception of health status variable. Finally, Pearson and Spearman correlations were performed between the variables analysed. Linear regression was performed using the BSQ as dependent variable and the remaining variables as independent. In all cases the level of significance was set at $p < 0.05$.

Results

In Table I, the results of the sociodemographic variables are shown. Men have a higher consumption of alcohol and tobacco than women.

In the Table II the descriptive statistics of the variables analysed by sex and gait speed are shown. Results show how men have a significantly higher gait speed than women. Women, on the other hand, have a higher percentage of fat and less muscle mass. Moreover, women score higher body dissatisfaction regarding the lower part of the body. Prevalence of body dissatisfaction in old people is about 5.6 %. Also, two groups were analysed concerning high and low gait speed established by cluster analysis K-means. Significant differences ($p < 0.05$) in group of high gait speed compared to group low gait speed are shown. Group of high gait speed show lower BMI, lower percentage of fat, greater amount of skeletal muscle mass and less body dissatisfaction. Similarly, there are significant differences ($p < 0.05$) in relation to perceived health among subjects with high and low gait speed.

Table III shows significant differences ($p < 0.05$) in gait speed in relation to weight status. The post hoc test (Bonferroni) notes that the overweight group presents higher gait speed than the obese group ($p < 0.05$). Also, there are significant differences in the total BSQ ($p < 0.001$), normalweight andoverweight subjects express less body dissatisfaction than obese group ($p < 0.01$).

Table IV shows the Pearson correlation between variables. Age is correlated with gait speed ($r = -0.219$, $p < 0.05$). Total BSQ is positively correlated with BMI ($r = 0.487$, $p < 0.01$), fat percentage ($r = 0.371$, $p < 0.01$) and negatively with gait speed ($r = -0.215$, $p < 0.05$) and perceived health status ($r = -0.269$, $p < 0.05$).

Linear regression analysis adjusted to sex and age shows that BMI is a useful factor for predicting BSQ

Table I
Socio demographic results

		Men %	Women %	p-value
PhysicalActivity	Yes	55.3	67.6	0.205
	Non	44.7	32.4	
TobaccoConsumption	Never	42.1	100.0	<0.001
	Occasionalsmoker	7.9	0.0	
	ExSmoker	50.0	0.0	
Alcohol Consumption	Abstemious	26.3	76.4	<0.001
	ExDrinker	7.9	0.0	
	ModerateDrinker	65.8	23.6	
Studies	No Studies	26.3	29.1	0.528
	Primary	63.2	61.8	
	High School	10.5	5.5	
	University	0.0	3.6	
BMI	Normoweight	13.2	8.8	0.546
	Overweight	50.0	44.1	
	Obesity	36.8	47.1	

Table II
Results of the analyzed variables between men and women, high gait speed and lower gait speed

	Men Mean (SD)	Women Mean (SD)	p-value	High Gait Speed Mean (SD)	Lower Gait Speed Mean (SD)	p-value
Gait speed 8m (m/s)	1.97 (0.33)	1.67 (0.28)	0.005	2.02 (0.20)	1.51 (0.21)	<0.001
BMI (kg/m ²)	28.90 (3.95)	30.40 (4.28)	0.073	28.86 (3.85)	31.14 (4.27)	0.006
Fatpercentage (%)	33.27 (5.66)	43.77 (6.01)	0.005	36.51 (7.39)	44.20 (5.95)	<0.001
Muscle mass (Kg)	28.23 (4.06)	21.12 (2.67)	0.005	25.24 (5.23)	21.83 (3.51)	<0.001
BSQ 1	11.36 (6.23)	13.59 (5.89)	0.087	11.04 (4.85)	15.07 (6.75)	0.002
BSQ 2	5.13 (1.64)	5.82 (2.77)	0.141	5.09 (1.64)	6.17 (2.96)	0.041
BSQ 3	3.47 (1.08)	3.46 (1.21)	0.960	3.44 (0.88)	3.56 (1.44)	0.652
BSQ 4	2.10 (0.47)	2.86 (1.38)	0.005	2.11 (0.39)	3.07 (1.50)	<0.001
BSQ 5	2.00 (0.00)	2.05 (0.30)	0.182	2.00 (0.00)	2.07 (0.34)	0.169
Total BSQ (34-204)	48.73 (18.40)	55.05 (19.26)	0.118	48.41 (13.62)	58.80 (22.70)	0.014
Health perception (1-5) [#]	3.05 (0.56)	2.91 (0.83)	0.175	3.25 (0.75)	2.72 (0.65)	0.001

SD (Standard Deviation). BMI: Body Mass Index. BSQ1: Weight Concern. BSQ 2: Concern unsightly aspects of obesity. BSQ 3: General Body Dissatisfaction and concern. BSQ 4: Body Dissatisfaction with the lower body. BSQ 5: Job vomiting or laxatives to reduce body dissatisfaction. [#]U Mann-Whitney.

in old people (R^2 Linear=0.266, $Y=26,951+2,117X$). It should be noted that this factor better predicts in men than in women (Figure 1).

Discussion

Evidence supporting the role of body dissatisfaction in chronic disease risk and wellbeing among older adults^{20,21} (Fiske, Fallon, Blissmer & Redding, 2014; Jankowski, Diedrichs, Williamson, Christopher & Harcourt, 2014). However, little is known about older adults' body image, despite that ageing causes unique

bodily changes and that sociocultural pressures to resist these changes abound (Jankowski et al., 2014)²¹, therefore, it is necessary to study body satisfaction in elderly. In this study, the relationship between body satisfaction, sex, IMC and gait speed in old people was analyzed. The main finding is that participants analyzed show a prevalence of about 5.6% in body dissatisfaction, results as those obtained by Reboussin et al., (2000)²², showed an improvement in body satisfaction with aging. Results are reduced to 3.3% considering scores >105 in BSQ, and lower than those obtained by Cobo (2012)²³ who obtained a prevalence of 72.3% in people older (>65 years old, scores >105 in BSQ).

Table III
Results of the analyzed variables between BMI categories

	Normalweight Mean (SD)	Overweight Mean (SD)	Obesity Mean (SD)	p-value	Post-Hoc
Gait Speed 8m (m/s)	1.78 (0.43)	1.86 (0.30)	1.66 (0.31)	0.013	OB < OV*
BSQ 1	9.77 (3.70)	10.46 (4.58)	15.55 (6.71)	<0.001	NOR < OB* OV < OB***
BSQ 2	5.22 (1.78)	5.09 (1.42)	6.05 (3.10)	0.194	-----
BSQ 3	3.22 (0.44)	3.24 (0.69)	3.75 (1.53)	0.100	-----
BSQ 4	2.55 (1.33)	2.19 (0.51)	2.90 (1.46)	0.037	OV < OB*
BSQ 5	2.00 (0.00)	2.02 (0.15)	2.05 (0.31)	0.815	-----
Total BSQ (34-204)	43.11 (12.52)	46.02 (12.60)	61.00 (22.25)	<0.001	NOR < OB** OV < OB***
Health Perception (1-5) [#]	3.11 (0.92)	3.04 (0.68)	2.85 (0.75)	0.390	-----

SD (Standard Deviation). BMI: Body Mass Index. BSQ1: Weight Concern. BSQ 2: Concern unsightly aspects of obesity. BSQ 3: General Body Dissatisfaction and concern. BSQ 4: Body Dissatisfaction with the lower body. BSQ 5: Job vomiting or laxatives to reduce body dissatisfaction. *p<0.05 / ** p<0.01 / *** p<0.001. OV = Overweight. OB = Obesity. NOR = Normalweight. [#]U Mann-Whitney.

Table IV
Correlations between the variables analysed

	Age	BMI	Fatpercentage	Musclemass	Gaitspeed	Total BSQ	Healthperception [#]
Age	1	0.024	0.017	-0.011	-0.219*	-0.177	-0.129
BMI		1	0.733**	0.178	-0.273**	0.487**	-0.197
Fatpercentage			1	-0.482**	-0.466**	0.371**	-0.178
Musclemass				1	0.370**	0.125	-0.051
Gaitspeed					1	-0.215*	0.399**
Total BSQ						1	-0.269*
Healthperception [#]							1

BMI: Body Mass Index. BSQ: Body Shape Questionnaire [#]Spearman correlation. *p<0.05. **p<0.01.
Figure 1. Scatter plot graph between total BSQ and BMI.

Concern to body image show no differences between sexes but it does in BMI categories and gait speed. Other authors have found that positive results in body dissatisfaction in old people have been higher in women²³. This finding is consistent with the dissatisfaction of young females²⁴. Roy and Payette (2012)¹³ showed that older women express a lower body dissatisfaction than younger women, moreover, men decrease significantly (p<0.001) their worry about body image with aging. Algars et al., (2009)⁶, found an increase in body satisfaction with age, also, women were in general less satisfied with their bodies than men. Reboussin et al., (2000)²² discovered that age is positively associated with body satisfaction. A recent similar study shows with higher body dissatisfaction in females and the data evidence show about 43% of adults are dissatisfied with their own body weight (50% of women and 35% of men) and 72% think they need to lose weight (80% of women and 63% of men)²⁵. Other authors suggest that Body dissatisfaction exists in wo-

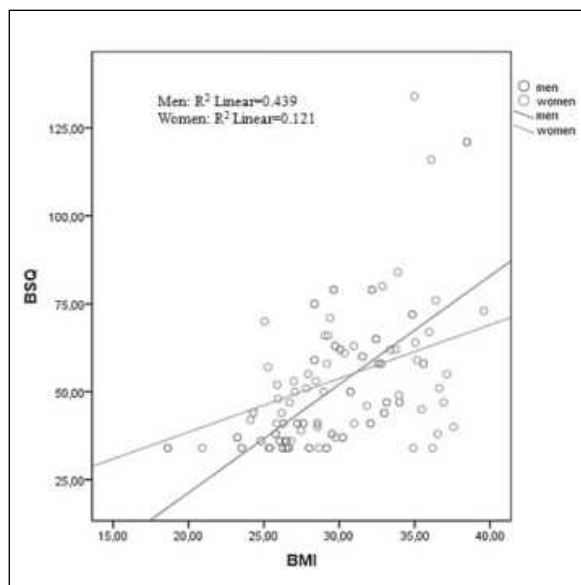


Fig. 1.—Scatter plot graph between total BSQ and BMI.

men across the adult life span and is influenced by BMI²⁶. Also, Matthiasdottir, Jonsson, and Kristjansson, (2012)²⁷ showed significant differences between men and women in body dissatisfaction in adult population of 18 at 79 age, women showing higher scores in body dissatisfaction.

Furthermore, another important finding in this study points out that BMI, adjusting with age and sex, is a body dissatisfaction predictor in old people, but has more predictive power in men than in women. Varnardo et al., (2006)²⁸ identified an association between BMI and body dissatisfaction in men and women and de Souto, Ferrandez and Guihard (2011)²⁹ in similar populations (women =70.3 ± 7.9 years old, men= 70.9 ± 7.5 years old), also, these researchers showed that BMI is a body dissatisfaction predictor in both sexes. With age, BMI increased and decreased the routine monitoring of the body, resulting in a change in body dissatisfaction¹⁰. Kruger et al., (2008)⁴ found that normal-weight individuals had higher satisfaction in their body size than overweight or obese individuals. Arroyo et al., (2008)³⁰ observed a positive correlation between the degree of dissatisfaction with body fat percentage and BMI (p<0.01). Casillas et al., (2006)³¹ indicate a positive correlation between the degree of body dissatisfaction and BMI (r=0.544, p<0.01). Furthermore, BMI is associated with greater body dissatisfaction, lower peer recognition and attempts to lose weight³². Recently, other authors³³ confirm the positive association between BMI, percentage of fat mass and body dissatisfaction, particularly in women. Not considering the association between body dissatisfaction and BMI could obviate relationship with other variables, such as age³⁴. In addition, Rodriguez and Cruz (2008)³⁵, comparing the BSQ and BMI for different age(Age=18-19 years, BSQ total=79.71±31.98; BMI=23.37±3.47 Kg/m²), showed difference between those results obtained in the present study.

As we have noted above, physical fitness is a fundamental component in the perception of body satisfaction. In this study, subjects with increased gait speed and, therefore, better physical fitness have a lower

body dissatisfaction, lower BMI, a lower fat mass and a greater muscle mass. Kruger et al., (2008)⁴ indicate that people who were satisfied with their body size were more likely to engage in regular physical activity than those less satisfied. In this same way, Sarabia (2012)³⁶ highlights that those people who have maintained active through physical activity, feel more satisfied with themselves and their physical fitness. Najam and Ashfaq (2012)³⁷ found a positive association between physical fitness and BSQ.

In this study, body satisfaction is associated with health status and subjects with greater body satisfaction have higher self-perceived health, an aspect also associated with a high gait speed and less tendency towards obesity. Roy y Payette (2012)¹³ describe the association between physical and mental health and body satisfaction. The perception of being overweight was related to reduce scores for general health and vitality³⁸. In women, body dissatisfaction is associated with marked impairment in aspects of quality of life relating to mental health and psycho-social functioning and at least some aspects of physical health³⁹. In this regard, Renée, Wilcox and Dowda (2011)⁴⁰ showed that in elderly (mean age=69 years) there are greater improvements in body function satisfaction and were associated with better baseline health ratings, greater reductions in BMI and greater increases in physical activity.

The main limitation of this study was that it does not consider the influence of other factors such as psychological (depression, mood state, disorders food), nutritional, and physical activity level. More researches are needed in this topic.

Conclusions

In conclusion, it should be noted that older people have a proper body satisfaction, which is positively associated with perceived health status and gait speed and negatively with BMI. From a practical point of view, the results obtained in this study suggest that body satisfaction could be considered as a health and wellbeing indicator. Promote proper body satisfaction is important, even in older people, through programs of healthy food and physical activity, enabling a healthy BMI and optimum physical fitness, parameters associated with the body satisfaction.

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