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CLINICAL RESEARCH

Weight-Related Quality of Life in Spanish Obese Subjects Suitable for Bariatric Surgery is Lower Than in Their North American Counterparts: a Case–Control Study

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Abstract
Background Obesity impairs quality of life, but the perception of the impairment could be different from one country to another. The purpose was to compare weight-related quality of life (QOL) between cohorts from Spain and North America.
Methods A cross-sectional case–control study was performed between two populations. Four hundred Spanish and 400 North American obese subjects suitable for bariatric surgery closely matched for race, gender, age, and body mass index (BMI) were included. Two non-obese control groups matched for gender, age, and BMI from each population were also evaluated (n=400 in each group). The participants completed the Impact of Weight on Quality of Life—Lite (IWQOL—Lite) questionnaire, a measure of weight-related QOL.

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Results Spanish morbidly obese patients showed poorer QOL than their North American counterparts in physical function, sexual life, work, and total score. By contrast, Spanish non-obese control subjects reported better QOL in all domains than their North American counterparts. Women, both in Spain and North America, reported reduced QOL compared to men on the domain of self-esteem. In addition, North American women reported reduced QOL on the sexual life domain compared to men. BMI correlated negatively with all domains of QOL except for self-esteem in both national groups.
Conclusions Spanish obese subjects suitable for bariatric surgery report poorer weight-related quality of life than their North American counterparts, and obese women, regardless of nationality, perceive a reduced quality of life compared to men.

Keywords Quality of life · Morbidly obese · Spanish · American · Impact of Weight on Quality of Life—Lite (IWQOL—Lite)

Introduction

Obesity is a chronic disease of high prevalence, and in the last decades it has been considered a true epidemic with the emergence of new cases in both developed and developing countries [1]. In Spain, data from the recently published ENRICA study shows that obesity (IMC≥30 kg/m^2) affects 22.9 % of the general population, with a relative increase of more than 200 % from 1993 to 2006 [2, 3].

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Obesity associates many related diseases such as depression, poor family and social functioning, as well as inadequate global self-esteem and poor perception of physical appearance. In addition, impact on key aspects of health-related quality of life (HRQOL) in obese individuals is associated with the proper degree of obesity and is lower among obese persons seeking treatment [4, 5].

In recent years, specific tools have been developed to assess HRQOL in obesity. These include the Bariatric Analysis and Reporting Outcomes System [6], the Obesity and Weight Loss Quality of Life questionnaire [7], the Obesity Related Well-Being [8], and the pioneer in this field, the Impact of Weight on Quality of Life (IWQOL) [9, 10]. The latter and its short form the IWQOL—Lite were developed in the USA and were used for diverse degrees of obesity and in various treatment settings [5]. In American samples, the IWQOL—Lite has been shown to have excellent psychometric properties and considerable utility as an HRQOL assessment tool. The IWQOL—Lite has good internal consistency [11], good test–retest reliability [12], sensitivity to weight loss and regain [13, 14], and a scale structure derived with exploratory factor analysis and replicated by confirmatory factor analysis [11].

The IWQOL—Lite has been translated into various languages, among them Spanish for Spain, and it has been confirmed that the Spanish version of the instrument had adequate psychometric properties [15]. However, no data exist regarding the HRQOL in obese Spanish subjects in comparison with other countries. On this basis, the aim of this case–control study was to evaluate the weight-related quality of life, using the IWQOL—Lite, in two cohorts of obese patients suitable for bariatric surgery from Spain and North America.

Methods

Study Design

A total of 400 Caucasian Spanish obese subjects attending the outpatient Obesity Unit of 16 university hospitals (25 subjects from each one) were recruited for the study over a 6-month period. All subjects were suitable for bariatric surgery according to the eligibility criteria for gastrointestinal surgery as established by the guidelines of the National Institutes of Health Consensus Conference [16]. We aimed to select one American control for every Spanish case and, consequently, four hundred Caucasian North American obese subjects seeking treatment and appropriate for bariatric surgery served as a control group. The controls were individually matched to cases by race, gender, age, and body mass index (BMI). Non-obese control groups matched for race, gender, and age from each population were also evaluated (n=400 in each group).

Participants and Data Collection

Data collection was carried out between June 2010 and December 2010 for the Spanish patients and controls in 16 centers from different autonomous communities in Spain (Andalucía, Asturias, Cataluña, Galicia, Islas Baleares, Madrid, and País Vasco). Exclusion criteria included chronic diseases other than those associated with obesity, cancer, and physical disabilities. Non-obese Spanish subjects were recruited from hospital or university staff, acquaintances, or relatives with the same exclusion criteria as those of the patients. Data about educational degree, current employment, presence of psychopathology (defined as presenting at least one of the following: depression, anxiety, bipolar disorder, or schizophrenia), and eating disorders (bulimia nervosa or binge eating disorder) were also available in this population.

Data from obese and non-obese North American subjects were obtained from a larger database of patients who had previously filled in the IWQOL—Lite questionnaire to collaborate with the development of IWQOL—Lite Manual [17]. This database belongs to the Duke University and includes different cohorts (healthy persons, overweight and obese subjects, and community and treatment-seeking samples) from several centers all over the country. Obese North American subjects were selected from a cohort seeking help for obesity treatment and were all suitable for bariatric surgery. Non-obese subjects were community volunteers. African American, Hispanic, Asian, or native American were excluded.

The self-administered questionnaires were distributed along with the informed consent form. It took a maximum of 20 min to fill in the self-report, and the practitioner or the nurse administered them in the outpatient room. Informed written consent was obtained in both countries from all subjects included in the study. The study was approved by the Ethics Committee of Fundació Parc Taulí (no. 2009/566) and was conducted according to the principles of the Helsinki Declaration.

Instrument

The IWQOL—Lite is a 31-item self-report measure that provides scores on five domains (physical function, self-esteem, sexual life, public distress, and work) and a total score to capture the impact of weight on quality of life [11]. Items begin with the phrase "Because of my weight", and the participants were asked to rate the items to the past week on this questionnaire. There are five response options for each item, ranging from "always true" to "never true." Scores range from 0 to 100, where 100 represents the best HRQOL and 0 represents the worst. A domain score was calculated only if the participant responds to at least 50 % of the items, and the total score was calculated only if the participant responds to at least 75 % of the domains of the instrument [12]. To date, the IWQOL—Lite has demonstrated adequate psychometric properties in a variety of populations and settings (community sample, psychiatric subgroups) [17], and it has also been validated and adapted for use in Spain from Spanish [15], Portuguese [14], Brazilian Portuguese [18], and German [19].

Statistical Analysis

Data are expressed as mean ± SD for quantitative variables and as percentages for categorical variables unless otherwise indicated. All variables were symmetrically distributed. Independent sample *t*-tests were used for comparing differences between groups. Pearson's correlation tests were used to evaluate the relationship between variables. Multivariate linear regression models were established using the score of all domains of quality of life as dependent variables and sex and BMI as independent variables. All p values were two-sided and a p value <0.05 was considered to be significant. All analyses were performed with SPSS 17.0 version (SPSS, Chicago, IL, USA).

Results

The main clinical features of the study population are displayed in Table 1. Among the Spanish population, obese subjects had less education (42.9 vs. 72.5 % with high school degree, $p<0.001$) and lower percentage of current employment (55.6 vs. 85.3 %, $p<0.001$) than non-obese controls. In addition, higher percentages of psychopathology (at least one of the following: depression, anxiety, bipolar disorder, or

Table 1 Main clinical characteristics of the obese and non-obese Spanish and North American subjects

	Spanish		*p*	North American		*p*
	Obese subjects	Non-obese controls		Obese subjects	Non-obese controls	
n	400	400	–	400	400	–
Gender (% female)	75	75	n.s.	75	75	n.s
Age (years)	43.1±11.6	43.0±11.1	n.s.	44.8±11.5	44.7±7.1	n.s
BMI (kg/m^2)	45.9±5.59	22.8±2.2	<0.001	45.8±5.9	26.5±2.9	<0.001

Table 2 Results of the Impact of Weight on Quality of life in Spanish and North American obese and non-obese population

	Spanish		North American	
	Obese subjects	Non-obese controls	Obese subjects	Non-obese controls
Physical function	41.8±24.5[&]	96.1±7.1*	50.9±22.7[#]	86.2±13.3**
Self-esteem	45.2±31.4	97.7±8.1*	47.1±28.2[#]	75.0±24.4**
Sexual life	56.8±35.0[$]	99.3±4.3*	63.2±30.0[#]	83.2±24.0**
Public distress	54.6±30.1	99.7±2.4*	57.1±26.2[#]	96.4±7.2**
Work	63.5±30.1[$]	97.1±3.2*	68.4±25.4[#]	89.6±16.7**
Total score	49.3±23.0[&]	97.6±4.3*	54.9±20.2[#]	85.2±13.6**

[&] $p<0.001$, [$] $p<0.05$ Spanish vs. North American obese patients; * $p<0.001$ obese vs. non-obese Spanish population; [#] $p<0.001$ obese vs. non-obese North American population; ** $p<0.001$ Spanish vs. North American non-obese controls

schizophrenia) (32.3 vs. 8.5 %, $p<0.001$) and eating disorders (bulimia nervosa or binge eating disorder) (10.9 vs. 0 %, $p=0.001$) were observed in obese Spanish subjects.

The IWQOL—Lite scores for Spanish and North American obese and non-obese subjects are presented in Table 2. As expected, in both countries, obesity had a significantly deleterious effect on all domains of IWQOL—Lite. In addition, Spanish obese subjects suitable for bariatric surgery showed a poorer total score than their North American counterparts (49.3±23.0 vs. 54.9±20.2, $p<0.001$), specifically in the following domains: physical function (41.8±24.5 vs. 50.9±22.7, $p<0.001$), sexual life (56.8±35.0 vs. 63.2±30.0, $p<0.05$), and work (63.5±30.1 vs. 68.4±25.4, $p<0.05$). However, there were no differences in self-esteem or public distress scores when comparing obese subjects in both countries. By contrast, Spanish non-obese subjects presented better QOL in all domains of IWQOL—Lite test than their North American counterparts.

Table 3 presents the IWQOL—Lite scores accounted by gender in Spanish and North American obese subjects. In both countries, women showed a lower quality of life than men in the domain of self-esteem. Besides, North American women also showed lower sexual life and total scores than men.

Concerning the significant association of BMI with the IWQOL—Lite domains, a negative correlation with physical function, public distress, and work, as well as with total score, was detected in both Spanish and North American obese subjects (Table 4). In addition, the score of these three domains decreased (poorer QOL) as BMI increased in both Spanish and North American obese subjects. However, no correlation between BMI and self-esteem was observed. Finally, BMI had a significant negative correlation with sexual life only in Spanish obese subjects.

Using multivariate linear regression models, BMI and gender explained the differences in all domains of quality of life and in the total score in both groups ($p\leq0.001$). For example, in the Spanish sample: for every point that BMI increased, total IWQOL—Lite score decreased by −1.95; for the same BMI, women showed decreases of −4.75 points less than men. In the North American sample, for every point that BMI increased, total score decreased by −1.49; for the same BMI, women showed decreases of −9.19 points less than men.

Discussion

The present cross-national case–control study is the first to compare HRQOL using the IWQOL—Lite in Caucasian obese patients suitable for bariatric surgery between Spain and North America. In addition, we report for the first time that Spanish obese subjects show significantly poorer scores in the domains of physical function, sexual life, and work than

Table 3 Results of the Impact of Weight on Quality of life accounting for gender in both Spanish and North American obese subjects

	Spanish		*p*	North American		*p*
	Male	Female		Male	Female	
Physical function	45.1±24.7	40.7±24.5	0.128	51.0±24.3	50.0±22.3	0.978
Self-esteem	53.1±30.9	42.5±31.2	0.004	59.2±30.3	43.6±26.6	<0.001
Sexual life	59.7±33.1	55.8±35.7	0.337	68.9±28.9	61.6±30.1	0.047
Public distress	55.8±30.8	54.1±30.0	0.645	61.0±29.0	56.0±25.3	0.114
Work	64.0±31.0	63.3±30.6	0.860	71.6±26.9	67.5±25.0	0.183
Total score	52.9±22.5	48.1±23.0	0.074	59.3±22.9	53.6±19.3	0.035

Table 4 Correlations of BMI with all domains of quality of life in Spanish and North American obese subjects

	Spanish		North American	
	R	*p*	*R*	*p*
Physical function	−0.242	<0.001	−0.245	<0.001
Self-esteem	−0.014	0.392	−0.028	0.285
Sexual life	−0.147	0.002	−0.043	0.204
Public distress	−0.246	<0.001	−0.290	<0.001
Work	−0.227	<0.001	−0.211	<0.001

their obese North American counterparts. In a similar way, Engel SG described how overweight and obesity had a greater impact on quality of life in Portuguese women compared to American women [14], suggesting that increasing BMI may have a more adverse effect on the HRQOL in both Spanish and Portuguese subjects when compared to Americans.

A possible explanation for these differences is that South European countries have fallen into the obesity epidemic some decades after than North USA. Therefore, their population is probably less used to overcome the handicaps of obesity and, in consequence, have a poorer perception of HRQOL than a population which has been coping with obesity for a longer time now. On the other hand, it has been shown that factors other than BMI (such as pain, educational level, current employment, ethnicity, binge eating disorder, and comorbid conditions) can influence HRQOL [20]. Since we did not investigate the role of these factors in the HRQOL of North American participants, we are unable to comment on whether they play less of a role in North American obese subjects. However, we speculate that this may be the reason for a stronger relationship between BMI and IWQOL—Lite scores among Spanish participants.

Previous research has found a more impaired HRQOL for treatment-seeking overweight and obese individuals than for individuals of comparable BMI who are not seeking treatment [4]. Since we have recruited obese subjects from a clinical population who aim to lose weight, one might ask whether the results of the present study could be translated to those of a community sample. In addition, HRQOL differs among obese individuals depending on treatment seeking status, with greater impairments in all five scales and the total score of the IWQOL—Lite found in obese individuals seeking treatments of greatest intensity [5, 20]. In our study, although all obese patients included in both national groups were seeking advice for weight loss, differences in the proportion of patients seeking for different modality treatments could also influence the results.

When exploring the role of gender, obese women from Spain and North America experienced the effects of their weight more profoundly than men did in the total score as well as in some of the five domains of the IWQOL—Lite. As in previous research on IWQOL—Lite [11], significant differences were found between obese men and women on the self-esteem scale in both countries, indicating a poorer quality of life in this area for women. In this way, feeling fat and dissatisfied with one's body has been significantly related to percent overweight, perceived social pressure toward thinness, and social comparison regarding weight in women [21, 22]. By contrast, other studies in overweight and obese subjects not suitable for bariatric surgery failed to find differences between genders [15, 23], suggesting that the effect of gender on quality of life could be less obvious among lower-BMI groups [24]. In any case, it seems important to assess men and women separately when evaluating the impact of weight on quality of life.

There are some potential limitations that should be taken into account in evaluating the results of our study. First, although both obese populations (Spanish and North American) were closely matched by race, gender, age, and BMI, the lack of sociodemographic data from the North American cohort may influence our final results. In this regard, it is well known that obesity affects the lower social layers of western society all over the world [24], and data from the Spanish group (75 % women, 55.6 % employed, and 43 % with high school degree) may not differ from those of American centers or from those reported in other populations [16, 25]. Second, we have considered a selected population of morbidly obese individuals and, consequently, further studies in subjects with lower degrees of obesity are required.

In summary, this is the first study to compare HRQOL between Spanish and North American obese subjects suitable for bariatric surgery in two similar samples. Our findings show that obesity may have a more adverse effect on the HRQOL of Spanish subjects as compared to Americans. In addition, regardless of their nationality, women perceive a worse quality of life than men. Future research should address whether these cross-national differences in the impact of weight on quality of life exist in other countries and cultures.

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Conflict of interest All of the authors (A. Caixàs, A. Lecube, MJ. Morales, A. Calañas, J. Moreiro, F. Cordido, MJ. Díaz, L. Masmiquel, B. Moreno, J. Vidal, A. Goday, JJ. Arrizabalaga, PP. García-Luna, P. Iglesias, B. Burguera, MA. Rubio, S. Monereo, R. Crosby, and RL. Kolotkin) declare that there is no conflict of interest that could be perceived as prejudicing the impartiality of the research reported.

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