

Psychometric Evaluation of the IWQOL-Lite (Spanish Version) When Applied to a Sample of Obese Patients Awaiting Bariatric Surgery

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Abstract

Background Obesity may have an impact on key aspects of health-related quality of life (HRQOL). In this context, the Impact of Weight Quality of Life (IWQOL) questionnaire was the first scale designed to assess HRQOL. The aim of the present study was twofold: to assess HRQOL in a sample of Spanish patients awaiting bariatric surgery and to determine the psychometric properties of the IWQOL-Lite and its sensitivity to detect differences in HRQOL across groups.

Methods Participants were 109 obese adult patients ($BMI \geq 35 \text{ kg/m}^2$) from Barcelona, to whom the following measurement instruments were applied: IWQOL-Lite, Depression Anxiety Stress Scales, Brief Symptom Inventory, and self-perception items.

Results Descriptive data regarding the IWQOL-Lite scores obtained by these patients are reported. Principal components analysis revealed a five-factor model accounting for 72.05% of the total variance, with factor loadings being adequate for all items. Corrected item–total correlations were acceptable for all items. Cronbach’s alpha coefficients were excellent both for the subscales (0.88–0.93) and the total scale (0.95). The relationship between the IWQOL-Lite and other variables supports the construct validity of the scale. Finally, sensitivity analysis revealed large effect sizes when comparing scores obtained by extreme BMI groups.

Conclusions This is the first study to report the application of the IWQOL-Lite to a sample of Spanish patients awaiting bariatric surgery and to confirm that the Spanish version of the instrument has adequate psychometric properties.

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Introduction

Obesity and overweight pose a major risk for serious chronic diseases such as type 2 diabetes, cardiovascular disease, hypertension and stroke, and certain forms of cancer [1]. Furthermore, obesity may have an impact on key aspects of health-related quality of life (HRQOL), with research showing that obese patients seeking bariatric surgery are more likely to be impaired in terms of HRQOL than are nontreatment-seeking obese patients [2–7]. In this context, the advent of anti-obesity medications and surgical treatments [8, 9] has shown that weight reduction is associated with an improvement in HRQOL [10, 11], and

therefore, its assessment has become important. Although generic HRQOL assessment instruments are available, the use of obesity-specific assessment tools is recommended, since they are capable of assessing particular aspects of quality of life [12]. Disorder-specific questionnaires contain items of particular relevance to a certain disease and, therefore, are better able to detect improvement or deterioration in specific aspects related to it [12, 13].

The Impact of Weight on Quality of Life (IWQOL) questionnaire was the first instrument designed specifically to assess HRQOL in obesity [11, 14]. It was developed in the clinical setting for moderate to severe obesity and measures those aspects of quality of life that were identified by obese persons in treatment to be of greatest concern [15]. Faced with the need for a brief and obesity-specific tool to assess HRQOL in the clinical setting, the IWQOL-Lite, a reduced version of the former, was subsequently developed [15]. To date, the IWQOL-Lite has demonstrated adequate psychometric properties in a variety of populations and settings [15–17], and it has also been validated and adapted for use in Portuguese [18], Brazilian Portuguese [12], and German [13] samples. The factor analysis of the IWQOL-Lite confirmed the existence of five domains and a total score that were related to HRQOL in obesity. These domains are physical function, self-esteem, sexual life, public distress, and work [15].

Greater impairment of quality of life among treatment-seeking obese patients is associated with several factors [19]. For example, a number of studies have reported a gender effect, finding lower HRQOL scores in obese women from several clinical samples, including bariatric surgery candidates [11, 14, 15, 19–21]. Greater impairment of HRQOL was also found to be related to the presence of psychopathology in patients enrolled in a weight loss program and seeking bariatric surgery [19, 22, 23]. Finally, a higher BMI has been reported to be associated with a poorer HRQOL in the domains assessed by the IWQOL-Lite in several community and clinical samples [4, 15–19].

Although the application of the IWQOL-Lite to severely obese patients has been supported by previous research, several studies have highlighted the need for further research regarding its application to severely obese people. Some authors have argued that such research should focus on the relationship between BMI in severely obese patients and the five domains of the IWQOL-Lite. Others, such as Forhan et al. [9], assert that more research is needed regarding the psychometric properties of the IWQOL-Lite when applied to these patients, since this would provide a more in-depth understanding of the tool across different constructs. Furthermore, although the IWQOL-Lite has been validated in several populations, no studies to date have reported the psychometric properties of the Spanish version of the IWQOL-Lite.

The aims of the present study were as follows: (a) to assess HRQOL in a sample of Spanish patients awaiting bariatric surgery and (b) to determine the psychometric properties of the IWQOL-Lite and its sensitivity to detect differences in HRQOL across groups. On the basis of previous literature, we hypothesized that women would obtain lower HRQOL scores than men in the self-esteem, sexual life, and total domains and also that the presence of psychopathology and negative self-perception would be associated with a greater impairment in HRQOL. Finally, we expected to find better HRQOL across lower BMI groups.

Materials and Methods

Participants and Data Collection

A total of 109 consecutive obese adults being assessed for bariatric surgery at the outpatient Obesity Unit of the Vall d'Hebron Hospital in Barcelona were prospectively recruited over a 12-month period. All patients met the eligibility criteria for gastrointestinal surgery established by the guidelines of the National Institutes of Health Consensus Conference [24]. Psychiatric assessment was carried out in all cases in order to identify any disorders that would constitute exclusion criteria: severe depression, schizophrenia, bipolar disorders, and chronic drug and/or alcohol abuse. The study was approved by the Ethics Committee of the Vall d'Hebron Hospital in Barcelona. Patients were invited to participate in the study by their endocrinologist during a routine visit before undergoing bariatric surgery, and written informed consent was subsequently obtained from all those who agreed to take part. Participants were asked to respond to the given questionnaires at home and to return them by post in the complementary envelope.

Measures

Quality of Life

The instrument applied was the IWQOL-Lite [15], a specific measure for assessing the effects of obesity on the quality of life of people who are seeking treatment to lose weight. The IWQOL-Lite is a self-report questionnaire consisting of 31 items that tap patients' weight-related concerns across five domains: physical function, self-esteem, sexual life, public distress, and work. Items are responded to on a five-point scale from "never true" to "always true". Scores for each subscale and a total score are obtained. Previous studies have reported adequate corrected item–total correlations and internal consistency coefficients in bariatric surgery patients, as well as in a variety of

clinical and community samples [12, 13, 15–18, 25]. Factor analysis has also supported the construct validity of the questionnaire [15–18].

Psychopathology

Two questionnaires measuring psychopathological symptoms were applied: the Depression Anxiety Stress Scale, in its brief form (DASS-21) [26] and the Brief Symptom Inventory (BSI) [27], which is the brief form of the SCL-90 questionnaire. The DASS-21 measures the severity of the core symptoms of low positive affect (depression), physiological hyperarousal (anxiety), and negative affect (stress). It consists of 21 items responded to on a four-point scale from “did not apply to me at all” to “applied to me very much, or most of the time”. Scores for each subscale and a total score are obtained. The BSI aims to identify self-reported clinically relevant psychological symptoms. It consists of 53 items covering nine dimensions: somatization, obsession-compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Three global indices are also obtained: the first assesses the level of symptomatology (Global Severity Index, GSI), the second measures the intensity of symptoms (Positive Symptom Distress Index), and the third is the number of reported symptoms (Positive Symptom Total). Items are responded to on a five-point scale ranging from “not at all” to “extremely”. Both questionnaires have been shown to have adequate psychometric properties [26, 27].

Self-perception

Items about self-esteem and satisfaction with current weight were drawn from the self-perceptions section of the Weight and Lifestyle Inventory (WALI) [28]. Patients had to select the option that best represented their self-esteem compared with that of most other people, rating this on a five-point scale from “very good self-esteem” to “very poor self-esteem”. Satisfaction with their current weight was assessed by means of a seven-point scale ranging from “very satisfied” to “very dissatisfied”.

Data Analyses

Analyses were performed using PASW Statistics 17. Means were compared using Student’s *t* test, while the Mann–Whitney *U* test was applied to compare ordinal categorical data. Given that BMI is usually heterogeneous among severely obese people, four groups were established according to participants’ BMI and following the proposal of Sturm [29, 30]: group I (35–39.9 kg/m²), group II (40–44.9 kg/m²), group III (45–49.9 kg/m²), and group IV (≥ 50 kg/m²).

Descriptive analyses were conducted to assess quality of life scores. ANOVA and Tukey’s post hoc comparisons were applied to analyze possible differences in IWQOL-Lite scores across BMI groups. Principal components analysis (PCA) with oblimin rotation was carried out to assess the internal structure of the IWQOL-Lite. Factors were retained according to the scree test and the Kaiser–Guttman rule [31], which suggests retaining those factors with eigenvalues greater than 1.0. Factor loadings of items to the corresponding factor were considered acceptable when reaching 0.30, as suggested by Floyd and Widaman [32].

Cronbach’s alpha for each subscale and total score was calculated to assess the internal consistency of the IWQOL-Lite questionnaire. Discussion of these results follows Nunnally and Bernstein [33], who suggest that values are adequate when >0.80 and excellent when >0.90 . Corrected item-total correlations were also calculated, again applying the criteria of Nunnally and Bernstein [33], who establish as acceptable, values over 0.30. The relationship of the IWQOL-Lite with other variables was assessed by means of Pearson’s correlations. Finally, effect sizes were calculated between adjacent and extreme BMI groups based on estimated means adjusted by gender. Results were interpreted according to Cohen [34], who proposed the following cut-off points for effect size: 0.20 for small, 0.50 for medium, and 0.80 for large.

Results

Sample Characteristics

Table 1 displays the sample characteristics by gender and for the total sample as regards age, BMI, educational level completed, and income compared to the minimum wage (MW). Mean comparisons using Student’s *t* test showed that there were no significant differences between men and women in terms of age ($t_{(27.69)}=0.250$, $p=0.804$) or BMI ($t_{(106)}=-0.240$, $p=0.811$). The Mann–Whitney *U* test revealed no gender differences in educational level ($U=719.000$, $p=0.617$) or income ($U=440.500$, $p=0.203$).

IWQOL-Lite Scores

Scores obtained in the five domains assessed by the IWQOL-Lite, as well as the total score, are shown in Table 2. Also, scores obtained by a sample of North American bariatric surgery candidates [25] are provided in this table. Since all these scores are measured on the same scale from 0 to 100, it can be seen that “physical function” is the domain in which these patients report the lowest quality of life, followed by self-esteem, public distress, and sexual life. The highest scores were obtained on the work subscale. With respect to the normative data presented in

Table 1 Sample characteristics by gender and for the total sample

	Women (<i>n</i> =92)	Men (<i>n</i> =17)	Total (<i>n</i> =109)
Age (years)	42.43 (8.53)	42.88 (6.40)	42.50 (8.21)
BMI (kg/m ²)	47.27 (5.66)	46.89 (7.46)	47.20 (5.94)
Educational level (%)			
Basic education completed	48.28	17.64	49.07
Secondary education completed	34.06	23.53	32.40
Higher education completed	13.18	23.50	14.81
Income (%)			
<1 MW	31.94	20.00	29.88
1–2 MW	58.31	59.99	58.62
3–4 MW	9.71	13.33	10.35
≥5 MW	0	6.67	1.15

Age and BMI cells represent means and SD

the IWQOL-Lite manual [25], women obtained scores ranging between percentiles 18 and 38, while the scores of men ranged between percentiles 12 and 23. No statistically significant differences were found between men and women on any of the subscales, or in the total score. Comparison of the IWQOL-Lite scores obtained in the present study with those reported by Kolotkin and Crosby [25] shows that Spanish bariatric surgery candidates scored slightly higher on HRQOL than did the North American sample (Table 2).

Exploratory Factor Analysis

Kaiser–Meyer–Olkin (KMO) and Bartlett’s test of sphericity indicated the adequacy of the data for factor analysis (KMO=0.848, $\chi^2(465, n=109)=1,999.05, p<0.0001$). The PCA revealed a five-factor solution, corresponding to the five domains assessed by the IWQOL-Lite. Communalities ranged between 0.527 and 0.842 (Table 3), while the percentage of explained variance reached 72.05%. Factor loadings were acceptable in all cases, as shown in Table 3.

However, two cross-loadings were noteworthy: the item “afraid to go to interviews” from the work domain loaded higher on the self-esteem factor (0.508). Similarly, the item

“dressing” from the physical function subscale loaded higher on the work domain (−0.598). At all events, no changes were made to the questionnaire on the basis of these results, since these items were allocated to the correct factor according to their content.

Internal Consistency

Cronbach’s alpha and corrected item–total correlations were calculated to assess the internal consistency of the IWQOL-Lite (Table 4). Adequate values for Cronbach’s alpha were found for the IWQOL-Lite subscales, while excellent internal consistency was obtained when considering the whole scale. Adequate corrected item–total correlations were found for all items, both for subscales and the total score. Consequently, all items contributed to the internal consistency of their subscale and the whole questionnaire.

Relationship between the IWQOL-Lite and other Variables

Scores obtained from the IWQOL-Lite questionnaire were correlated with other external variables in order to obtain more evidence about its construct validity. Firstly, the IWQOL-Lite total score was correlated with scores

Table 2 IWQOL-Lite transformed scores by gender and total

	Spanish bariatric surgery candidates			North American bariatric surgery candidates [25] (<i>n</i> =1,635)
	Women (<i>n</i> =92)	Men (<i>n</i> =17)	Total (<i>n</i> =109)	
Physical function	36.97 (25.34)	36.23 (24.54)	36.85 (25.11)	31.70 (21.70)
Self-esteem	38.14 (27.30)	47.06 (34.12)	39.55 (28.50)	30.40 (25.30)
Sexual life	46.66 (31.83)	59.77 (36.58)	48.68 (32.76)	45.80 (31.80)
Public distress	44.00 (27.24)	44.12 (37.43)	44.02 (28.90)	40.80 (25.40)
Work	65.10 (39.48)	54.35 (32.59)	55.77 (33.53)	49.70 (27.50)
Total	41.94 (21.48)	45.97 (28.53)	42.55 (22.58)	36.90 (19.00)

Cells represent means and SD

Table 3 Factor loadings of the IWQOL-Lite items to factors

	Communalities	Factor loadings				
		Physical function	Self-esteem	Sexual life	Public distress	Work
Physical function						
Picking up objects	0.768	0.742	−0.207	0.122	−0.140	−0.191
Tying shoes	0.787	0.741	−0.231	0.016	−0.134	−0.256
Getting up from chairs	0.799	0.750	−0.111	−0.040	−0.203	−0.202
Using stairs	0.708	0.541	0.150	−0.190	−0.184	−0.355
Dressing	0.778	0.353	0.183	−0.043	−0.104	−0.598
Mobility	0.772	0.537	−0.065	−0.112	−0.044	−0.536
Crossing legs	0.527	0.574	0.293	−0.061	−0.111	0.023
Feel short of breath	0.755	0.778	0.276	−0.157	−0.106	0.072
Painful stiff joints	0.625	0.773	−0.013	0.008	0.012	−0.056
Swollen ankles/legs	0.583	0.687	−0.028	0.153	−0.002	−0.094
Worried about health	0.531	0.692	0.166	0.176	0.174	0.336
Self-esteem						
Self-conscious	0.774	0.029	0.804	−0.029	−0.176	−0.001
Self-esteem not what it could be	0.763	0.030	0.879	0.072	0.157	−0.041
Unsure of self	0.779	0.135	0.856	0.073	0.158	−0.025
Do not like myself	0.636	0.011	0.624	0.184	−0.113	−0.105
Afraid of rejection	0.655	−0.123	0.540	0.238	−0.296	−0.002
Avoid looking in mirrors	0.652	0.059	0.398	0.192	−0.456	0.103
Embarrassed in public	0.761	−0.056	0.596	0.165	−0.378	0.097
Sexual life						
Do not enjoy sexual activity	0.842	0.067	0.203	0.819	0.036	0.057
Little sexual desire	0.795	0.059	−0.040	0.836	−0.156	0.001
Difficulty with sexual performance	0.778	−0.017	−0.004	0.796	0.043	−0.314
Avoid sexual encounters	0.686	−0.070	0.083	0.741	−0.159	0.010
Public distress						
Experience ridicule	0.702	0.018	0.443	−0.014	−0.499	−0.177
Fitting in public seats	0.696	0.101	−0.082	0.146	−0.822	0.222
Fitting through aisles	0.761	0.114	−0.068	0.082	−0.804	−0.078
Worry about finding chairs	0.644	0.069	0.054	−0.066	−0.687	−0.217
Experience discrimination	0.783	−0.056	0.344	0.168	−0.625	−0.013
Work						
Trouble accomplishing things	0.784	0.296	0.147	0.263	−0.058	−0.547
Less productive than could be	0.769	0.161	−0.029	0.326	0.094	−0.721
Do not receive recognition	0.783	0.038	0.196	0.241	−0.040	−0.714
Afraid to go on interviews	0.661	0.000	−0.508	0.038	−0.247	−0.375
Eigenvalues		4.60	12.87	1.94	1.71	1.22

obtained through the assessment of psychopathology. Statistically significant correlations were found between the IWQOL-Lite total score and both the DASS-21 total score ($r=-0.566$, $p<0.0001$) and the GSI from the BSI ($r=-0.552$, $p<0.0001$). These results indicate that people with higher scores on the IWQOL-Lite, and thus with a better quality of life, also present fewer psychopathological symptoms and, therefore, lower scores on the DASS-21

and BSI. More specifically, the different subscales of the IWQOL-Lite were significantly correlated with DASS-21 subscales (ranging from -0.229 to -0.571 , $p<0.05$). Furthermore, statistically significant correlations were also observed between IWQOL-Lite domains and BSI dimensions (ranging from -0.238 to -0.571 , $p<0.05$). Finally, the IWQOL-Lite subscales and total score were correlated with the self-perception items used. Correlations

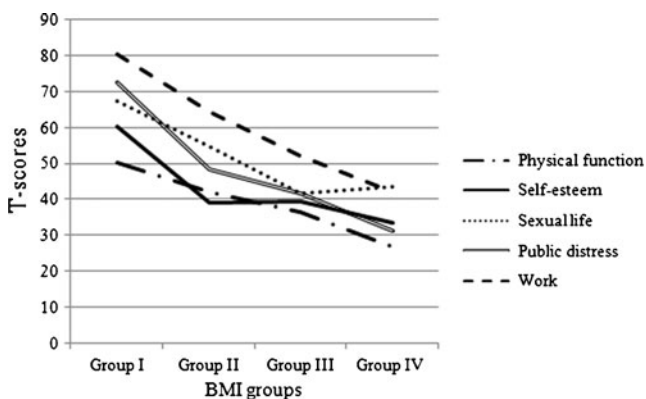
Table 4 Internal consistency of the IWQOL-Lite questionnaire

	α	Corrected item–total correlation (range)	Corrected item–total correlation (mean)
Physical function	0.93	0.42–0.86	0.69
Self-esteem	0.92	0.73–0.80	0.76
Sexual life	0.91	0.76–0.84	0.80
Public distress	0.90	0.71–0.78	0.74
Work	0.88	0.94–0.80	0.74
Total	0.95	0.37–0.78	0.61

between perceived self-esteem and both the IWQOL-Lite total score and its domain scores were statistically significant in all cases (ranging from -0.311 to -0.645 , $p < 0.05$). The correlations between current weight satisfaction and both the IWQOL-Lite total score and subscales were also statistically significant (ranging from -0.201 to -0.409 , $p < 0.05$). Consequently, those patients with a more impaired quality of life reported having lower levels of self-esteem and being more dissatisfied with their current weight.

The relationship between the quality of life measure and BMI was also analyzed. Figure 1 shows IWQOL-Lite transformed scores across BMI groups.

A statistically significant correlation was found between the IWQOL-Lite total transformed score and BMI ($r = -2.98$, $p = 0.002$), indicating that those people with a higher BMI scored lower on quality of life, which was therefore more impaired. BMI accounted for 8.88% of the variance in the IWQOL-Lite total score. Statistically significant correlations were also found between BMI and the following domains: physical function ($r = -0.232$, $p = 0.017$), public distress ($r = -0.386$, $p < 0.0001$), and work ($r = -0.323$, $p = 0.002$). A more detailed analysis (by means of ANOVA) of quality of life scores across BMI groups revealed global differences in physical function, public distress, work, and total score (see Table 5). As expected, Tukey's post hoc comparisons showed that people from group I ($35\text{--}39.9$ kg/m²) scored

**Fig. 1** Profile of the IWQOL-Lite scores across BMI groups

significantly higher on quality of life than did patients from group IV (≥ 50 kg/m²). Patients from group I also obtained higher scores than those from group III ($45\text{--}49.9$ kg/m²) on the public distress domain, as well as in terms of the total score. Finally, patients from group II ($40\text{--}44.9$ kg/m²) showed a better level of quality of life compared with those from group IV in terms of physical functioning.

Sensitivity

Effect size across the BMI groups was calculated in order to assess whether the IWQOL-Lite was sensitive enough to detect differences in the scores obtained across these groups. Mean effect sizes across adjacent groups (I and II, II and III, III, and IV) were as follows: 0.328 for physical function, 0.326 for self-esteem, 0.245 for sexual life, 0.513 for public distress, 0.452 for work, and 0.472 for total score. Consequently, medium effect sizes were found for the public distress and work domains and total score, whereas small effect sizes were found in the physical function, self-esteem, and sexual life domains. When comparing the scores obtained between the extreme groups (I and IV), large effect sizes were found for physical function (0.995), self-esteem (0.994), public distress (1.401), work (1.249), and the total score (1.259), whereas a medium effect size was found in the sexual life domain (0.769). These results indicate that the IWQOL-Lite is sensitive enough to detect differences in HRQOL across BMI groups.

Discussion

The present study is the first to report the application of the IWQOL-Lite to a sample of Spanish patients awaiting bariatric surgery and to confirm that the Spanish version of the instrument has adequate psychometric properties. The first step was to assess HRQOL in this sample of patients before undergoing bariatric surgery. The IWQOL-Lite scores obtained were slightly higher than those of a sample of North American bariatric surgery patients [25]. Similarly, these Spanish patients scored slightly higher on physical function, self-esteem, and work and had higher total transformed scores, than did the severely obese patients studied in the German validation [13] of the IWQOL-Lite (A. Mueller, personal communication). By contrast, the present study found lower quality of life in the sexual life and public distress domains compared with the German data, as well as in comparison to clinical and community samples from Brazil and Portugal [12, 18]. These differences are likely due to the different nature of the samples used in these studies, since subjects seeking surgery to correct their weight problem would be expected to be more

Table 5 IWQOL-Lite transformed scores by BMI groups, ANOVA, and post hoc comparisons

	Group I (n=12) Mean (SD)	Group II (n=30) Mean (SD)	Group III (n=36) Mean (SD)	Group IV (n=31) Mean (SD)	ANOVA	Tukey comparisons
Physical function	50.41 (27.85)	42.32 (26.34)	36.49 (24.74)	26.91 (20.56)	$F(3, 102)=3.34^*$	IV<I*, II*.
Self-esteem	60.39 (28.63)	38.92 (29.87)	39.29 (27.28)	33.41 (26.78)	$F(3, 102)=2.53$	
Sexual life	67.61 (35.33)	54.96 (33.55)	41.91 (32.44)	43.75 (29.36)	$F(3, 99)=2.36$	
Public distress	72.72 (25.82)	48.44 (26.70)	41.86 (28.88)	31.45 (24.74)	$F(3, 102)=6.81^{**}$	III<I**, IV<I***.
Work	80.63 (23.09)	64.58 (30.71)	52.15 (34.77)	42.00 (31.64)	$F(3, 87)=4.35^{***}$	IV<I**.
Total	62.02 (23.99)	46.50 (20.17)	41.46 (22.56)	32.77 (19.97)	$F(3, 103)=5.52^{***}$	III<I*, IV<I***.

Group I, 35–39.9 kg/m²; group II, 40–44.9 kg/m²; group III, 45–49.9 kg/m²; group IV, ≥50 kg/m²

* $p<0.05$; ** $p<0.001$; *** $p<0.01$

negatively affected by obesity than would other obese patients [3, 35]. In this regard, Kolotkin, Crosby and Williams [4] found, in different obese groups, that when treatment modality intensified, all five scales and the total score of the IWQOL-Lite showed greater impairment. The total score and the scores obtained in the five domains of the IWQOL-Lite were also analysed by gender. In contrast to what we expected the results showed no gender differences in relation to HRQOL. However, this is consistent with the findings of Stout et al. [36], who assert that fewer gender differences would be reported in the case of severely obese patients. Similarly, Kolotkin et al. [4] point out that gender differences in the perceived negative impact of weight on quality of life are more obvious among lower BMI groups.

Secondly, the psychometric properties of the IWQOL-Lite were analyzed in relation to its internal structure and internal consistency. The PCA revealed a five-factor model, supporting the hypothesis that the IWQOL-Lite measures five HRQOL domains, as found in previous research [15, 18]. In line with published studies [12, 18], cross-loadings were found for some of the scale items. However, content analysis of these items revealed their adequacy with respect to the subscale to which they belonged. Internal consistency coefficients were adequate for all subscales and the total scale, this being consistent with the results found in a sample of North American bariatric surgery candidates [25]. Furthermore, all items contributed to the internal consistency of the subscale to which they belonged, since corrected item–total correlations were adequate. These results support the adequate internal consistency of the IWQOL-Lite found in clinical and community samples in a variety of settings and languages [12, 15, 16, 18].

Thirdly, the relationship between the IWQOL-Lite domains and other variables was studied. In the present study, the relationship found between the IWQOL-Lite and measures of psychopathology and self-perception supports the construct validity of the instrument. This is

again consistent with previous studies, in which the IWQOL-Lite was significantly inversely correlated with other measures of psychopathology [13, 15]. The analysis of the relationship between the IWQOL-Lite and self-perception items is also consistent with the findings of Masheb et al. [37], who found self-esteem and body dissatisfaction to be more impaired in severely obese patients awaiting bariatric surgery. Statistically significant correlations have also been reported between all the IWQOL-Lite subscales, its total score and BMI in a variety of clinical and community samples and settings [4, 15–19]. As we hypothesized, significant correlations were found between the IWQOL-Lite and BMI, with the exception of the self-esteem and sexual life domains. Previous findings support the lack of correlation between these domains and BMI among severely obese patients [9, 25], indicating that HRQOL in these domains remains stable across higher BMI groups. These results were further supported by the ANOVAs conducted as part of the present study.

Finally, the sensitivity analysis also supported the validity of the IWQOL-Lite, since small and medium effect sizes were found for all subscales and the total score across adjacent groups, while large effects were found when comparing extreme groups, similar to the results reported by Kolotkin et al. [15].

In conclusion, the present study is the first to apply the IWQOL-Lite (Spanish version) to a sample of patients awaiting bariatric surgery and to confirm that the Spanish version of the instrument has adequate psychometric properties. However, further research is needed in order to generalize the present results to other samples and settings. A confirmatory factor analysis in a Spanish sample is also required to confirm the five-factor structure reported here and supported by previous literature. The application of the IWQOL-Lite questionnaire to other samples covering a wider range of BMI would also provide more detailed information about the relationship between these variables.

Conflict of Interest The authors declare that they have no conflict of interest.

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