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Psychometric and Cross-National Evaluation of a Portuguese Version of the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) Questionnaire

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Objective: To evaluate the properties of a Portuguese version of the Impact of Weight on Quality of Life-Lite (IWQOL-Lite) questionnaire and to compare quality of life scores between samples of Portuguese and American women.

Research Methods and Procedures: IWQOL-Lite scores were obtained from 138 Portuguese participants who were enrolled in a 2-year lifestyle weight management programme ('Portuguese clinical sample') and 250 Portuguese volunteers from the community ('Portuguese community sample'). Subjects were matched on gender (all female), BMI, age and treatment-seeking status to American individuals from the IWQOL normative database who completed the IWQOL-Lite in English. In addition, Portuguese community subjects completed the SF-36 and their scores were compared to American individuals' scores from the normative database. The psychometric properties of the Portuguese version of the IWQOL-Lite were determined, and Portuguese and American samples were compared on quality of life.

Results: The Portuguese and English versions of the IWQOL-Lite appeared psychometrically very comparable. The Portuguese IWQOL-Lite demonstrated excellent psychometric properties (internal consistency, correlations with BMI, factor structure, correlation with SF-36, discriminant validity). Comparison of Portuguese and American subjects suggested that increasing BMI may have a more adverse effect on quality of life in Portuguese individuals as compared to Americans.

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Discussion: The results suggest that the Portuguese translation of the IWQOL-Lite is a reliable and valid measure of obesity-specific quality of life. Obesity may have a greater impact on quality of life in Portuguese women compared to American women.

Keywords: IWQOL-Lite; Portuguese; health-related quality of life; cross-national; cross-cultural; psychometric; obesity

INTRODUCTION

Measurement of health-related quality of life (HRQOL) has gained acceptance in recent years as a valuable outcome for a wide variety of disease states. Many randomized controlled trials are now utilizing HRQOL measures as a standard endpoint (Fayers & Machin, 2000). Research on quality of life is now conducted worldwide, and in many cases HRQOL instruments are used in multinational clinical trials. Cross-national use of quality of life instruments brings with it a need to develop or translate instruments that are valid in each of the countries for which the instrument is being utilized. Three approaches to cross-national assessment of HRQOL have been identified: (1) a measure of HRQOL that was developed and used in one country is translated into another language for use in another country; (2) the conception and development of an instrument occurs by consensus between international teams in order to ensure intercultural relevance and conceptual equivalence; and (3) an instrument is developed that is applicable to a large variety of cultures, with equivalent versions developed simultaneously in several languages and questions possibly differing from one country to another (Acquadro, Jambon, Ellis, & Marquis, 1996).

The present study involves an obesity-specific quality of life measure, the Impact of Weight on Quality of Life-Lite (IWQOL-Lite), which has been translated from the original English into numerous languages, including Portuguese. 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 (Kolotkin, Crosby, Kosloski, & Williams, 2001). 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 (Kolotkin, Crosby, Kosloski, & Williams, 2001; alphas ranging from 0.90 to 0.96), good test–retest reliability (Kolotkin & Crosby, 2002; 0.83–0.94), sensitivity to weight loss and regain (Kolotkin, Crosby, Williams, Hartley, & Nicol, 2001; Engel et al., 2003) and a scale structure derived with exploratory factor analysis and replicated by confirmatory factor analysis (Kolotkin, Crosby, Kosloski, & Williams, 2001). Although the IWQOL-Lite has been translated into a number of languages, there have been no studies to date on the psychometric properties of a non-English version of the IWQOL-Lite. Validating non-English versions of the IWQOL-Lite would allow for cross-national comparisons of HRQOL.

The aims of the current study are: (1) to evaluate the psychometric properties of a Portuguese version of the IWQOL-Lite; (2) to compare the psychometric properties obtained from the Portuguese version of the IWQOL-Lite to those obtained in a comparable sample of American subjects who completed the English version of the IWQOL-Lite; and (3) to compare obesity-related quality of life across American and Portuguese samples.

METHOD

Participants

HRQOL data for the present analyses were obtained from 138 Portuguese participants (all women) who were enrolled in a 2-year outpatient lifestyle weight management programme ('portuguese clinical sample') and 250 Portuguese volunteers (all women) from the community ('portuguese community sample'). Subjects in both of these Portuguese samples met the following inclusion criteria: over age 24, premenopausal, free from current major chronic disease (cardiovascular disease, cancer, etc.), and without limiting physical disability. In addition, subjects in the Portuguese clinical sample had to be non-smokers and have a body mass index (BMI) higher than 24.5. Smoking status was not controlled in the community sample.

Subjects from the Portuguese clinical sample were matched on gender, BMI, age and treatment status (i.e. outpatient weight loss treatment) to 138 American individuals ('American clinical sample') from the IWQOL normative database (Kolotkin & Crosby, 2002). Similarly, subjects from the Portuguese community sample were matched on gender, BMI, age and treatment status (i.e. individuals not in weight loss treatment) to 250 American community volunteers ('American community sample') from the same normative database.

Procedures

The IWQOL-Lite was initially translated into Portuguese for use in Brazil by an independent company which performed forward and backward translations between English and Portuguese. The backward translation (from Portuguese back to English) was then verified for discrepancies against the original (English) form by the original author of the questionnaire (RLK). As no major issues arose, the newly translated Portuguese version was subsequently reviewed for use in Portugal by two bilingual Portuguese researchers with experience in obesity (PJT and LBS), as well as a Portuguese language expert. Minor adjustments were made to improve grammar and readability for Portuguese persons. Finally, the questionnaire was used in a sample of 167 college students for pilot-testing of psychometrics and overall acceptability. Internal consistency was high (Cronbach's alpha between 0.70 for the work scale and 0.92 for the self-esteem scale) and no further problems were detected in readability.

Both the original (i.e. English) and the Portuguese version of the IWQOL-Lite consist of 31 self-report items that provide scores on five HRQOL subscales (physical function, self-esteem, sexual life, public distress and work), as well as a total score. Participants are asked to rate each item on a five-point scale ranging from 'never true' (1) to 'always true' (5) with respect to the past week. Scores on all IWQOL-Lite scales range from 0 to 100, with 100 representing the best and 0 representing the most impaired quality of life.

All subjects completed the IWQOL-Lite, either in the original English version or in the Portuguese version. In addition, all Portuguese subjects in the community sample completed a generic measure of HRQOL (SF-36) in a Portuguese version (Ferreira, 1998). Scores from the SF-36 were analysed using only the component summary scores (i.e. physical component summary and mental component summary), which are derived from the eight SF-36 scales (Ware & Kosinski, 2001). Assessments from all clinical participants were obtained at baseline or before treatment.

Statistical Analysis

All analyses were performed using SPSS Version 12.0 (SPSS, 2004). Differences in demographic characteristics between Portuguese and American samples were compared separately for clinical and community samples using independent samples *t*-tests for age and BMI and chi-square for ethnicity.

Internal consistency reliability coefficients were computed separately for the combined (i.e. clinical and community) Portuguese and American samples using Cronbach's alpha (Cronbach, 1951). Item-to-scale correlations and correlations of IWQOL-Lite scales with BMI were computed separately for the combined (i.e. clinical and community) Portuguese and American samples using Pearson correlations. Differences in BMI/IWQOL-Lite correlations between groups were tested by comparing the regression coefficients between groups using multiple regression procedures (Cohen & Cohen, 1983).

Ideally, a confirmatory factor analysis (CFA) on the Portuguese dataset would be used to confirm the factor structure reported in an American sample (Kolotkin, Crosby, Kosloski, & Williams, 2001). However, given the large number (36) of free parameters that must be estimated in the higher-order model, the Portuguese sample size was not sufficient to provide stable parameters estimates using CFA (Bentler, 1989). Consequently, a principal components factor analysis with an oblimin rotation was used to assess the factor structure of the IWQOL-Lite in the Portuguese version.

One test of the validity of an HRQOL instrument is its ability to distinguish between groups expected to differ on HRQOL. Because previous research on the English version of the IWQOL-Lite found differences between clinical and community samples, separate multivariate analyses (MANOVA) were performed for Portuguese and English versions of the IWQOL-Lite comparing similar BMI groups of clinical and community participants on the IWQOL-Lite. Partial eta-squared values were examined to determine the per cent of criterion variance accounted for by clinical/community sample differences. Univariate analyses were performed only after obtaining significant multivariate effects.

Construct validity of the Portuguese version of the IWQOL-Lite was assessed by calculating Pearson correlations between IWQOL-Lite and SF-36 scores

for subjects in the Portuguese community sample. In order to examine differences in IWQOL-Lite scores as a function of nationality and BMI, separate multivariate analyses of variance (MANOVA) were performed for clinical and community samples. The clinical analysis compared Portuguese and American samples across three BMI groups (25–29.9, 30–34.9, 35+), while the community analysis compared samples across four BMI groups (18–24.9, 25–29.9, 30–34.9, 35+). Again, univariate analyses were performed only after obtaining significant multivariate effects. *Post-hoc* tests for comparisons across BMI levels were performed using Tukey's honestly significant difference procedure (Winer, 1971) based on an alpha level of 0.05.

RESULTS

Sample Characteristics

Table 1 presents demographic and BMI information for Portuguese and American samples, subdivided by the clinical and community sample. By design, the Portuguese and American clinical samples and the Portuguese and American community samples are almost identical in terms of gender, age and BMI. The per cent of white Portuguese participants was significantly higher for both the clinical ($\chi^2 = 106.8$, $df = 1$, $p < 0.001$) and community ($\chi^2 = 102.4$, $df = 1$, $p < 0.001$) samples.

Psychometric Evaluation of the Portuguese IWQOL-Lite

Table 2 displays results of psychometric tests of internal consistency, item-to-scale correlations and correlation of each scale with BMI for the Portuguese and American samples. Alpha coefficients for the Portuguese version of the IWQOL-Lite ranged from 0.77 (work) to 0.95 (total) and for the English version from 0.82 (work) to 0.96 (total). Both alpha coefficients and item-to-scale correlations were comparable between Portuguese and English versions. All correlations between IWQOL-Lite scale scores and BMI were significant ($p < 0.001$) for both Portuguese and English versions. Correlations between IWQOL-Lite scores and BMI were somewhat higher for the Portuguese version. However, the difference in correlations between the Portuguese and English versions approached significance only for sexual life ($t = -1.87$, $df = 762$, $p = 0.062$).

Factor Analysis of the Portuguese IWQOL-Lite

The factor analysis in the Portuguese dataset produced findings strikingly similar to those reported by Kolotkin and colleagues (Kolotkin, Crosby, Kosloski, & Williams, 2001) in an American sample (see Table 3). All items, with one minor exception, loaded highest on the anticipated factor. One personal distress item ('Ridicule and teasing') loaded slightly higher on the self-esteem factor (−0.461) than on the personal distress factor (0.413). In general, the results suggest that the factor structure for the IWQOL-Lite is markedly similar for both versions.

Comparison of Clinical and Community Groups: A Test of Discriminant Validity

In an effort to demonstrate the discriminant validity of both versions of the IWQOL-Lite, we compared our clinical and community samples on scale and total scores. To control for disparities in BMI between the clinical and community samples, we did not include the participants who fell in the lowest BMI group (18–24.9) of the community sample (this more appropriately controls for BMI than simply using BMI as a covariate). MANOVA analysis comparing clinical and community groups across BMI groups revealed a significant main effect for sample (clinical vs community) for both Portuguese (multivariate $F = 5.23$, $df = 6, 224$, $p < 0.001$, partial eta-squared = 0.125) and English (multivariate $F = 2.33$, $df = 6,209$, $p = 0.034$, partial eta-squared = 0.063) versions of the IWQOL-Lite. For both Portuguese and English versions, clinical participants reported poorer quality of life, as would be

Table 1. Demographic and BMI information by sample

	Portuguese		American	
	Clinical	Community	Clinical	Community
N	138	250	138	250
%female	100%	100%	100%	100%
Age (mean, SD)	38.3 (5.8)	36.1 (6.9)	38.3 (9.4)	36.1 (8.5)
BMI (mean, SD)	30.8 (3.7)	24.8 (4.6)	30.7 (4.7)	25.0 (5.1)
%white	100%	100%	75.3%	66.8%

Table 2. Comparison of psychometric properties across IWQOL-Lite versions

	Portuguese version ($N = 388$)	English version ($N = 388$)
Physical function	Alpha = 0.91, r with BMI = 0.64	Alpha = 0.90, r with BMI = 0.57
Picking up objects	0.730	0.694
Tying shoes	0.745	0.677
Getting up from chair	0.688	0.734
Using stairs	0.737	0.729
Dressing	0.695	0.665
Mobility	0.765	0.740
Crossing legs	0.744	0.659
Short of breath	0.692	0.660
Painful stiff joints	0.617	0.523
Ankles and legs swollen	0.458	0.503
Worried about health	0.566	0.599
Self-esteem	Alpha = 0.93, r with BMI = 0.52	Alpha = 0.94, r with BMI = 0.45
Self-conscious	0.766	0.840
Self-esteem	0.844	0.884
Unsure	0.859	0.882
Do not like self	0.774	0.806
Being rejected	0.810	0.761
Avoid looking in mirror	0.723	0.761
Embarrassed in public	0.665	0.723
Sexual life	Alpha = 0.89, r with BMI = 0.48	Alpha = 0.94, r with BMI = 0.26
Don't enjoy sex	0.749	0.850
Little sexual desire	0.800	0.821
Sexual performance	0.757	0.854
Avoid sexual encounters	0.743	0.883
Public distress	Alpha = 0.90, r with BMI = 0.55	Alpha = 0.86, r with BMI = 0.43
Ridicule and teasing	0.662	0.589
Fit in public seats	0.797	0.710
Fit through aisles	0.809	0.775
Find chairs	0.772	0.757
Discrimination	0.707	0.592
Work	Alpha = 0.77, r with BMI = 0.40	Alpha = 0.82, r with BMI = 0.37
Getting things accomplished	0.681	0.757
Less productive	0.660	0.674
Recognition	0.506	0.683
Job interviews	0.538	0.557
Total	Alpha = 0.95, r with BMI = 0.66	Alpha = 0.96, r with BMI = 0.54

expected (see Table 4). Univariate analyses revealed significant ($p < 0.05$) differences between clinical and community samples for the self-esteem and sexual life scales and approached significance for the IWQOL-Lite total score ($p = 0.09$) in the Portuguese sample. All scales were significantly different ($p < 0.05$) in the American sample. A main effect for BMI group was also found for both versions of the IWQOL-Lite (Portuguese, multivariate $F = 12.92$, d$f = 12$, 450, $p < 0.001$, partial eta-squared = 0.256; American, multivariate $F = 4.57$, d$f = 12$, 420, $p < 0.001$, partial eta-squared = 0.116). Groups with higher BMI had lower HRQOL. Although sample membership (clinical vs community) did not interact with BMI group in the Portuguese group, these variables did significantly interact in the American group (multivariate $F = 2.85$, d$f = 12$, 420, $p = 0.001$, partial eta-squared = 0.075). For those with lower BMIs (25–29.9) in the American sample, community participants reported higher HRQOL than clinical patients. However, this was not the case for the American participants with higher BMIs for which HRQOL scores did not differ between clinical and community participants.

Correlations Between IWQOL-Lite and SF-36: Evidence for Construct Validity

Table 5 presents correlations between IWQOL-Lite scores and the two SF-36 composite scores for

Table 3. IWQOL-Lite factor loadings for the Portuguese sample

Scale and item	Factor				
	Physical function	Self-esteem	Public distress	Sexual life	Work
Physical function					
Picking up objects	0.724	0.088	0.051	−0.195	−0.098
Tying shoes	0.807	0.119	0.003	−0.152	−0.086
Getting up from chair	0.670	0.061	0.173	−0.090	−0.063
Using stairs	0.658	−0.070	0.019	−0.110	−0.189
Dressing	0.616	−0.014	0.012	−0.238	−0.113
Mobility	0.622	−0.048	0.036	−0.157	−0.249
Crossing legs	0.550	−0.099	0.116	−0.204	−0.128
Short of breath	0.624	−0.088	0.084	−0.128	0.005
Painful stiff joints	0.699	−0.123	−0.012	0.231	−0.032
Ankles and legs swollen	0.527	−0.177	0.167	0.273	0.074
Worried about health	0.486	−0.348	0.021	0.076	0.111
Self-esteem					
Self-conscious	0.240	−0.780	−0.063	−0.036	0.101
Self-esteem	0.162	−0.855	−0.108	0.017	−0.043
Unsure	0.107	−0.836	−0.015	0.009	−0.049
Do not like self	−0.054	−0.843	−0.050	−0.092	−0.061
Being rejected	−0.065	−0.797	0.032	−0.101	−0.129
Avoid looking in mirror	0.037	−0.664	0.140	−0.206	0.041
Embarrassed in public	−0.098	−0.638	0.197	−0.120	−0.077
Public distress					
Ridicule and teasing	−0.129	−0.461	0.413	0.032	−0.217
Fit in public seats	0.118	0.036	0.875	−0.090	0.056
Fit through aisles	0.100	0.043	0.899	−0.017	0.008
Find chairs	0.104	0.072	0.775	−0.149	−0.107
Discrimination	−0.150	−0.355	0.477	0.062	−0.354
Sexual life					
Don't enjoy sex	0.110	−0.163	0.206	−0.705	0.120
Little sexual desire	0.157	−0.184	0.079	−0.763	0.117
Sexual performance	0.153	−0.123	0.202	−0.552	−0.178
Avoid sexual encounters	0.019	−0.201	0.045	−0.650	−0.224
Work					
Getting things accomplished	0.150	−0.077	−0.037	−0.014	−0.742
Less productive	0.210	0.016	−0.124	−0.096	−0.791
Recognition	0.049	0.065	0.219	0.071	−0.652
Job interviews	−0.088	−0.294	0.151	0.097	−0.562

Notes 1. Cell shading represents anticipated factor loading.
2. Bold cell border indicates item cross-loading.

Portuguese community participants. Also included in the table are comparable correlations reported from an American sample of community volunteers by Kolotkin and Crosby (2002; while the analyses reported from Kolotkin and Crosby are from both male and female participants, analyses on just the female portion of these data resulted in a very similar pattern of correlations). The pattern of results is comparable in the Portuguese and American samples, with the physical function scale of the IWQOL-Lite correlating highest with the SF-36 physical component. Likewise, the self-esteem scale from the IWQOL-Lite correlates highest with the SF-36 mental component.

Comparison of Portuguese and American Samples on the IWQOL-Lite

Clinical Patients

MANOVAs comparing the Portuguese clinical sample and the American clinical sample on IWQOL-Lite scores across BMI groups revealed significant multivariate effects for BMI group (multivariate $F = 7.94$, $df = 12, 518$, $p < 0.001$, partial eta-squared $= 0.155$), nationality (multivariate $F = 6.53$, $df = 6, 258$, $p < 0.001$, partial eta-squared $= 0.132$) and nationality-by-BMI group interaction (multivariate $F = 3.47$, $df = 12, 518$, $p < 0.001$, partial eta-squared $= 0.074$). With the exception of the sexual

Table 4. IWQOL-Lite scores by BMI group for Portuguese and American samples

	Portuguese BMI group				American BMI group			
	18–24.9	25–29.9	30–34.9	35+	18–24.9	25–29.9	30–34.9	35+
Clinical	$N=0$	$N=69$	$N=52$	$N=17$	$N=0$	$N=105$	$N=10$	$N=23$
Physical function		82.3 ± 12.9	66.7 ± 14.9	56.3 ± 23.0		77.9 ± 14.7	73.4 ± 18.2	75.5 ± 15.3
Self-esteem		70.3 ± 18.4	67.9 ± 23.0	54.6 ± 26.7		62.5 ± 24.3	57.1 ± 25.4	52.6 ± 23.5
Sexual life		89.2 ± 17.1	79.3 ± 22.5	71.3 ± 26.9		72.8 ± 25.8	72.5 ± 27.8	81.5 ± 17.3
Public distress		95.6 ± 8.4	91.3 ± 11.5	67.4 ± 25.3		91.8 ± 12.0	90.0 ± 10.8	78.7 ± 20.1
Work		95.3 ± 8.6	90.9 ± 14.0	85.7 ± 23.0		85.4 ± 17.0	87.5 ± 7.2	86.1 ± 18.4
Total		84.3 ± 10.1	75.6 ± 12.4	63.4 ± 20.8		76.9 ± 15.0	74.1 ± 13.9	72.6 ± 15.1
Community	$N=146$	$N=78$	$N=19$	$N=7$	$N=157$	$N=60$	$N=15$	$N=18$
Physical function	91.2 ± 9.4	80.2 ± 16.5	67.7 ± 15.4	47.1 ± 17.1	95.7 ± 6.2	91.3 ± 11.6	80.4 ± 15.4	62.8 ± 21.4
Self-esteem	91.8 ± 12.1	77.6 ± 22.9	71.8 ± 28.0	52.6 ± 27.2	87.7 ± 18.0	82.6 ± 21.3	66.2 ± 28.5	59.7 ± 27.6
Sexual life	97.7 ± 6.6	93.5 ± 11.5	83.2 ± 21.1	69.6 ± 29.8	95.7 ± 13.9	93.3 ± 14.3	84.6 ± 17.0	84.4 ± 21.4
Public distress	98.5 ± 4.5	94.9 ± 8.7	82.9 ± 23.4	50.0 ± 25.0	97.8 ± 8.7	98.6 ± 4.6	94.3 ± 6.8	82.2 ± 26.0
Work	98.7 ± 5.1	94.3 ± 8.6	88.9 ± 16.7	78.6 ± 13.4	97.7 ± 8.4	95.7 ± 11.1	88.3 ± 17.7	80.5 ± 18.0
Total	94.2 ± 6.7	85.5 ± 11.5	75.8 ± 17.1	55.8 ± 18.3	94.5 ± 8.3	91.3 ± 10.0	80.9 ± 15.0	70.2 ± 18.0

Table 5. Correlations between IWQOL-Lite and SF-36 scores

IWQOL-Lite Scale	Portuguese community sample ($N=250$)		Kolotkin and Crosby (2002) ($N=494$)	
	SF-36 Physical	SF-36 Mental	SF-36 Physical	SF-36 Mental
Physical function	0.514**	0.122	0.659**	0.091*
Self-esteem	0.201**	0.287**	0.250**	0.346**
Sexual life	0.341**	0.131*	0.278**	0.283**
Public distress	0.337**	0.151*	0.357**	0.097*
Work	0.381**	0.199**	0.479**	0.151**
Total	0.439**	0.219**	0.534**	0.239**

*$p < 0.05$; **$p < 0.01$.

life and work scales in the American clinical sample, all IWQOL-Lite scales showed increasing impairment with increasing BMI (see Table 4). In most cases, the 35+ BMI was significantly more impaired than the lower BMI groups. Although the multivariate effect for nationality was significant, only the physical function scale was significantly different in univariate tests ($F = 12.10$, d$f = 1, 268$, $p = 0.001$), with Portuguese patients reporting greater impairment than Americans. Significant univariate nationality-by-BMI group interactions were obtained for all scales except self-esteem. The same general pattern emerged across scales. At the lowest BMI category, Portuguese patients reported less impairment than American patients. In contrast, at the highest BMI category, Portuguese patients reported greater impairment than American patients. These results are illustrated for IWQOL-Lite total score in Figure 1. In comparison to American clinical patients, increasing BMI was more closely and more linearly associated with HRQOL in Portuguese clinical patients.

Community Participants

MANOVAs comparing the Portuguese community sample and the American community sample on IWQOL-Lite scores across BMI categories similarly revealed significant multivariate effects for BMI group (multivariate $F = 16.95$, d$f = 18$, 1389, $p < 0.001$, partial eta-squared $= 0.180$), nationality (multivariate $F = 24.79$, d$f = 6$, 461, $p < 0.001$, partial eta-squared $= 0.244$) and nationality-by-BMI group interaction (multivariate $F = 5.52$, d$f = 18$, 1389, $p < 0.001$, partial eta-squared $= 0.067$). All IWQOL-Lite scales and total score demonstrated increasing impairment with higher BMI in both Portuguese and American community samples. Portuguese participants reported significantly more impairment on

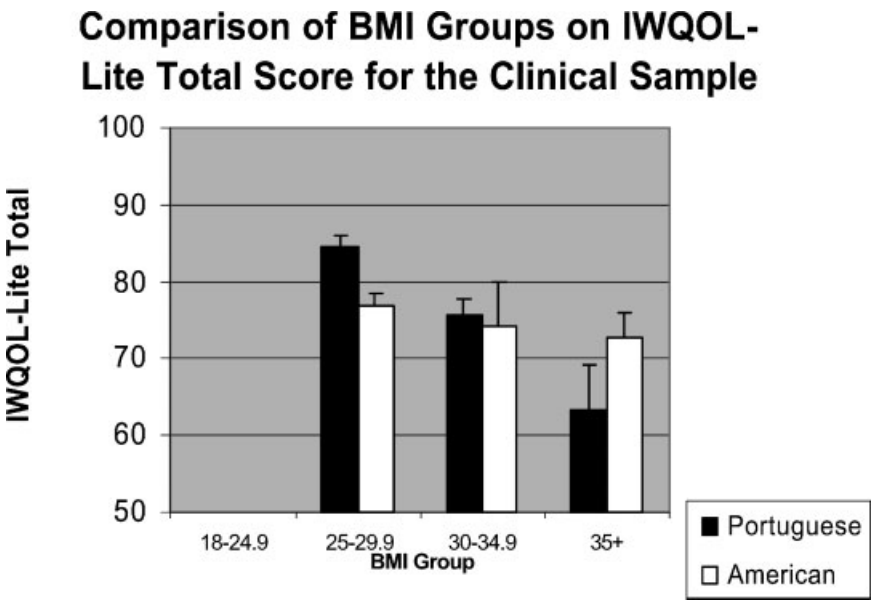

Figure 1. Comparison of BMI groups in the clinical sample on the IWQOL-Lite total score

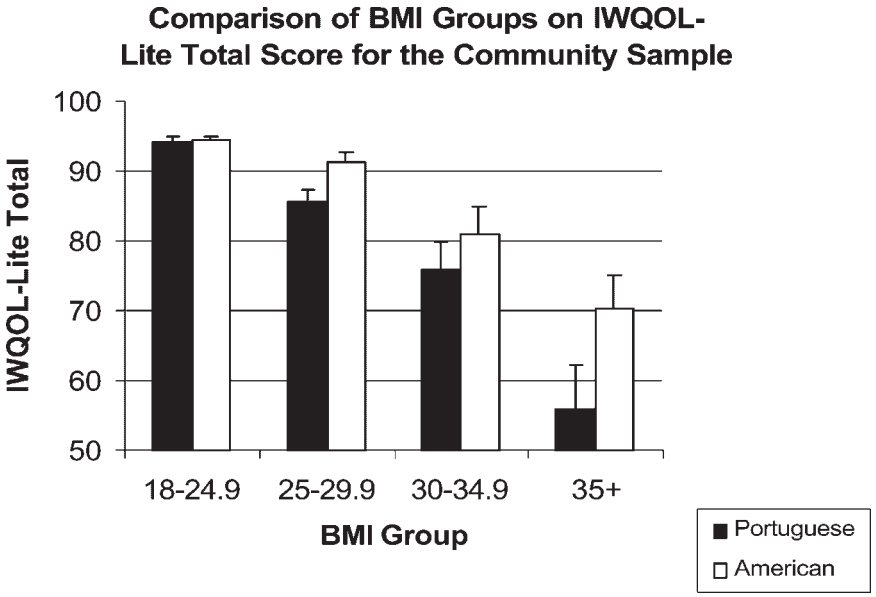

Figure 2. Comparison of BMI groups in the community sample on the IWQOL-Lite total score

physical function ($F = 39.88$, d$f = 1$, 473, $p < 0.001$), public distress ($F = 59.76$, d$f = 1$, 473, $p < 0.001$) and total score ($F = 17.20$, d$f = 1$, 473, $p < 0.001$). Significant univariate nationality-by-BMI group interactions were obtained for physical function ($F = 4.47$, d$f = 3$, 473, $p < 0.001$), sexual life ($F = 2.66$, d$f = 3$, 473, $p = 0.048$), public distress ($F = 19.42$, d$f = 3$, 473, $p < 0.001$) and total score ($F = 5.02$, d$f = 1$, 473, $p = 0.002$). The pattern of interaction is comparable across the four BMI groups. At normal weight (i.e. BMI = 18–24.9), there is little difference between Portuguese and American participants. However, comparable to the findings reported above in the clinical samples, Portuguese community participants report much greater impairment than American community participants in the highest BMI group. This pattern is illustrated for IWQOL-Lite total score in Figure 2.

DISCUSSION

One of the aims of this study was to evaluate the psychometric properties of a Portuguese version of the IWQOL-Lite. The data indicate that the Portuguese version of the IWQOL-Lite has strong psychometric properties, comparable to those found in previous studies using American participants (Kolotkin, Crosby, Kosloski, & Williams, 2001; Kolotkin & Crosby, 2002) and to those found in the American samples reported in this study. Internal consistency reliability (alpha) for the Portuguese IWQOL-Lite ranged from 0.77 to 0.95. Correlations between Portuguese IWQOL-Lite scales and BMI were significant and in the expected range (0.40–0.64 for scales; 0.66 overall). In addition, factor loadings were moderate to high for the Portuguese version of the IWQOL-Lite (0.48–0.78) and all items except one loaded on the appropriate factor. The IWQOL-Lite was also able to discriminate between community and clinical samples, both in the English version and also relatively well in the Portuguese version. Finally, IWQOL-Lite scores in the Portuguese version exhibited a significant correlation with SF-36 scores in all but one case (physical function and the SF-36 mental component summary). As would be expected, the Portuguese IWQOL-Lite physical function scale had a moderately high (0.51) correlation with the Portuguese SF-36 physical component summary score, and the self-esteem scale was more strongly related to the mental component summary score of the SF-36 than to the physical component summary score.

The second goal of this study was to compare the psychometric properties obtained from the Portuguese version of the IWQOL-Lite to those obtained in a comparable sample (in terms of gender, BMI, age and treatment status) of American subjects who completed the English version of the IWQOL-Lite. Internal consistency reliability (alpha), item-to-scale correlations, relationship to the SF-36, discriminant validity and overall factor structure were quite similar between the Portuguese and English versions of the instrument.

The third goal of this study was to compare obesity-related quality of life across Portuguese and American samples. One finding of particular interest was that at higher BMI levels (35+), both Portuguese clinical patients and Portuguese community volunteers had poorer quality of life (i.e. more impairment) than comparable subjects from American samples. In addition, overweight and obese subjects in the Portuguese community sample reported poorer quality of life than their American counterparts. These results suggest that increasing BMI, in general, may have a more adverse effect on the HRQOL of Portuguese individuals when compared to Americans.

Correlations between IWQOL-Lite scores and BMI were somewhat higher for Portuguese women as compared to American women, suggesting that the relationship between HRQOL and BMI may be more 'straightforward' and less complex in Portugal than in the United States (i.e. increasing BMI more linearly associated with decreasing quality of life). In support of this interpretation, the data show that as BMI increases, IWQOL-Lite scores decrease in both the Portuguese clinical sample and the Portuguese community sample, whereas this is not always the case in the American samples. Studies on US subjects have shown that factors other than BMI (such as pain, ethnicity, binge-eating disorder and comorbid conditions) can influence HRQOL (Higgs et al., 1997; Fontaine, Bartlett, & Barofsky, 2000; Kolotkin, Crosby, & Williams, 2002; Kolotkin et al., 2003; Katz, McHorney, & Atkinson, 2000; Carpenter, Hasin, Allison, & Faith, 2000; Laferrere et al., 2002). Since we did not investigate the role of these factors in the HRQOL of Portuguese participants in this study, we are unable to comment on whether they play less of a role in Portuguese subjects. However, we speculate that this may be the reason for a stronger relationship between BMI and IWQOL-Lite scores among Portuguese participants. Previous research on the IWQOL-Lite has shown that American women have more impaired quality of life than men, particularly on the sexual life scale (Kolotkin, Crosby, Kosloski, & Williams, 2001). It is unknown whether we would have found differences between Portuguese and American samples of men in an examination of the effects of BMI on quality of life.

Previous research on the HRQOL of obese persons in American samples has demonstrated that treatment-seekers may have more impaired HRQOL than community volunteers who are not seeking treatment (Fontaine et al., 2000; Kolotkin & Crosby, 2002; Kolotkin et al., 2003). Furthermore, obese persons who seek treatment are more likely to experience psychological disturbance and eating disorders (Fitzgibbon, Stolley, & Kirschenbaum, 1993). The present study confirms the finding of poorer quality of life in obese treatment-seekers as compared to community volunteers matched for BMI and age in the Portuguese, and especially in the American sample. An avenue for further research in Portugal is the investigation of differences in HRQOL between obese persons seeking

outpatient treatment and those seeking bariatric surgery. In American samples, patients seeking bariatric surgery had much poorer quality of life than obese persons seeking outpatient treatment (Kolotkin et al., 2003).

One of the limitations of this research is that there were no data collected on men in the Portuguese samples. As a result, we are only able to report on the psychometric properties of the IWQOL-Lite in Portuguese women. Gender differences in HRQOL have been found among obese persons (Fitzgibbon et al., 1993; Sullivan et al., 1993), including differences on the IWQOL-Lite (Kolotkin, Crosby, Kosloski, & Williams, 2001). Nonetheless, in spite of gender differences on the IWQOL-Lite in American samples, strong psychometric properties have been demonstrated in both women and men (Kolotkin, Crosby, Kosloski, & Williams, 2001; Kolotkin & Crosby, 2002). It is likely that we would find empirical support for the validity of the IWQOL-Lite in a sample of Portuguese men, but without the data this is admittedly speculative.

In summary, the Portuguese version of the IWQOL-Lite has been shown to have strong psychometric properties, and the Portuguese and English versions appear comparable psychometrically. Thus, the newly developed Portuguese version of the IWQOL-Lite can be used in future studies with Portuguese clinical and non-clinical samples. As is true in much of the world, the prevalence of overweight and obesity is increasing in Portugal (Santos & Barros, 2003; do Carmo et al., 2000), making the assessment of HRQOL increasingly relevant. This study also found that increasing BMI, in general, may have a more adverse effect on the HRQOL of Portuguese individuals as compared to Americans. Future research should address whether these cross-national differences in the impact of weight on quality of life exist in other Portuguese samples, in samples from other countries in Europe and elsewhere and in samples of men.

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