

ORIGINAL ARTICLE

Content comparison of health status measures for obesity based on the international classification of functioning, disability and health

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Objective: To compare the content covered by twelve obesity-specific health status measures using the International Classification of Functioning, Disability and Health (ICF).

Design: Obesity-specific health status measures were identified and then linked to the ICF separately by two trained health professionals according to standardized guidelines. The degree of agreement between health professionals was calculated by means of the kappa (κ) statistic. Bootstrapped confidence intervals (CI) were calculated. The obesity-specific health-status measures were compared on the component and category level of the ICF.

Measurements: Twelve condition-specific health-status measures were identified and included in this study, namely the obesity-related problem scale, the obesity eating problems scale, the obesity-related coping and obesity-related distress questionnaire, the impact of weight on quality of life questionnaire (short version), the health-related quality of life questionnaire, the obesity adjustment survey (short form), the short specific quality of life scale, the obesity-related well-being questionnaire, the bariatric analysis and reporting outcome system, the bariatric quality of life index, the obesity and weight loss quality of life questionnaire and the weight-related symptom measure.

Results: In the 280 items of the eight measures, a total of 413 concepts were identified and linked to the 87 different ICF categories. The measures varied strongly in the number of concepts contained and the number of ICF categories used to map these concepts. Items on body functions varied from 12% in the obesity-related problem scale to 95% in the weight-related symptom measure. The estimated κ coefficients ranged between 0.79 (CI: 0.72, 0.86) at the component ICFs level and 0.97 (CI: 0.93, 1.0) at the third ICF's level.

Conclusion: The ICF proved highly useful for the content comparison of obesity-specific health-status measures. The results may provide clinicians and researchers with new insights when selecting health-status measures for clinical studies in obesity.

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Introduction

Obesity has become a rapidly growing threat to the health of populations in an increasing number of countries, affecting 300 million people worldwide.¹ In the US, the age-adjusted prevalence of obesity was 30.5% in 1999–2000 compared to 22.9% in 1988–1994.² In developed countries, obesity is

already considered to be the fifth most serious risk factor for disability-adjusted life years¹ and a significant cause of disability.³ The major dangers of obesity are less life expectancy⁴ and an increased risk of hypertension, dyslipidaemia, type 2 diabetes mellitus, coronary artery disease, stroke, gall bladder disease, osteoarthritis, sleep apnoea, respiratory problems, as well as certain types of cancer.^{5,6}

From a societal and patient perspective, obesity is associated with decreased quality of life.^{7–10} In addition, there is growing affirmation by health-care professionals that in chronic health conditions such as obesity, where complete recovery is highly unlikely to occur, quality of life may be one of the most important health outcomes to consider in managing the disease.^{11,12} Consequently, a number of

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organizations such as the American Obesity Association (AOA), the North American Association for the study of obesity (NAASO) and 'Shape Up America' (www.shapeup.org) consider quality of life as the major goal in the treatment of adult obesity.¹³ In a recent supplement, NAASO recommended a number of outcome domains and outcome measures to be considered in trials. Obesity-specific health-status measures like the impact of weight on quality of life questionnaire (IWQOL) may complement generic health-status measures.¹⁴

For researchers planning a study, the selection of the best-suited measures will not only depend on the psychometric properties but also on the content covered by the condition-specific health-status measures. Indeed, obesity-specific health-status measures differ considerably with regard to depth and breadth of concepts covered. For example, not all obesity-specific health-status measures cover appetite, food and eating. Unfortunately, content comparisons of measures are difficult because of the varying use of concepts and operationalizations. With the approval of the new International Classification of Health, Disability and Functioning (ICF) by the world health assembly in 2001, content comparisons can now rely on this universal language of functioning and health. The ICF serves as the common reference to which concepts can be linked.¹⁵

In addition, condition-specific health-status measures and ICF represent two different perspectives from which to look at quality of life of obese patients. Therefore, it may be important to understand the relationship between both health-status measures and ICF.

The objective of our study was to compare the content covered by condition-specific health-status measures using the ICF. The specific aims were (1) to identify the most-widely used condition-specific health-status measures in obesity, (2) to link concepts contained in these measures to the ICF, (3) to examine whether the concepts are represented by the ICF and (4) to examine the similarities and differences in the contents covered by obesity-specific health-status measures.

Materials and methods

Selection of measures

To identify and select obesity-specific health-status measures, we relied on the recommendations of the NAASO^{12,14} and the obesity-specific health-status measures cited in reviews on quality of life measurement in obesity.^{11,16,17} In addition, we included the Bariatric Analysis and Reporting Outcome System (BAROS),¹⁸ the Bariatric Quality of Life Index (BQL),¹⁹ the recently validated Obesity and Weight Loss Quality of Life (OWQOL) questionnaire and the Weight-Related Symptom Measure (WRSM).^{20,21}

International classification of functioning, disability and health

The ICF (formerly ICIDH-2; <http://www3.who.int/icf/icftemplate.cfm>) is designed to record and organize a wide

range of information about health and health-related states associated with all health conditions. As the ICF encompasses all aspects of human health of all people, it has universal applications. The classification provides a description of situations with regard to human functioning and restrictions and serves as a framework to organize this information in a meaningful, inter-related and easily accessible way. As the ICF has been developed in a worldwide, comprehensive consensus process over the last few years and was endorsed in May 2001 by the World Health Assembly as a member of the WHO Family of International Classifications, it is likely to become the generally accepted framework to describe functioning and health. The ICF is intended for use in multiple sectors that include, besides health, education, insurance, labour, health and disability policy, statistics, etc. In the clinical context, it is intended for use in needs assessment, matching interventions to specific health states, rehabilitation and outcome evaluation.

The ICF has two parts, each containing two separate components. Part 1 covers functioning and disability and includes the components Body Functions (b) and Structure (s) and Activities and Participation (d). Part 2 covers contextual factors and includes the components Environmental Factors (e) and Personal Factors (pf). In the ICF classification, the letters b, s, d and e, which refer to the component of the classification, are followed by a numeric code starting with the chapter number (one digit) followed by the second level (two digits), the third and fourth level (one digit each). For example, the component 'Body Functions' of the classification contains the following codes: b1 Mental functions, b180 Experience of self and time functions, b1801 Body image.

Linkage

Concepts contained in obesity-specific health-status measures were linked to the ICF using established linkage rules described in detail by Cieza *et al.*¹⁵ This linking procedure was performed separately by two trained, blinded health professionals working in different teams. To decide which ICF category should be linked to each item of the measures, consensus between the health professionals was required. In case of disagreement, a third independent assessor was consulted to finally decide on the most suitable code. If an item of a measure contains more than one concept, each concept has to be linked separately. For example, in item seven of the Obesity Adjustment Survey-Short Form 'Walking up stairs is especially difficult at my present weight', the concept 'walking up stairs' and 'present weight' would be linked to d4551 'Climbing' and b530 'Weight maintenance functions', respectively. The IWQOL-Lite physical function scale, which contains 11 different global ratings of physical function, all concepts contained in the respective 11 scales are identified and linked to the ICF.

For the sake of comprehensibility of the results of this study, three linking rules require a special annotation.

According to the linking rule 6, if the content of an item is not explicitly named in the corresponding ICF category, the 'other specified' category at the third or fourth coding level of the classification has to be applied.¹⁵ For example, the item 'crossing legs' in the IWQOL-Lite has been linked to d498, that is, 'Mobility, other specified'. The additional information provided by the item and not contained in the ICF has to be documented together with the selected ICF code to avoid loss of information. Rule 9 states that if the information provided by the item/concept is not sufficient to decide which ICF category should be chosen, this item/concept should be labelled nd (not definable). According to rule 10, if an item/concept is not contained in the ICF classification, then this item/concept is labelled 'nc' (not covered by the ICF). The linkage 'nc' does not differentiate between concepts relating to functioning not covered by the ICF, concepts relating to personal factors for which no categories currently exist, and other concepts relating, for example, to time and space.

The degree of congruence between the two health professionals at the component, first, second and third ICFs levels was calculated by means of the κ statistic, which is a measure of the agreement that exists beyond the amount of that expected by chance alone.²² Values of κ by definition are bounded by 1, that is, its sampling distribution becomes progressively skewed to the left as κ approaches 1. As the asymptotic confidence interval (CI) does not take this skewness into account, especially with small sample sizes, and can produce upper confidence limits that exceed 1, bootstrapped intervals, which are produced by percentiles of samples based on the observed data, were calculated.²³

Results

Selected condition-specific health-status measures

Twelve condition-specific health-status measures were identified and included in this study.

The obesity-related problem scale (OP) was constructed to measure the impact of obesity on psychosocial functioning in everyday life.^{24,25} The self-administered questionnaire comprises eight items on a four-point response scale.

The obesity eating problems scale (OE) is a short revised form of the three-factor eating questionnaire.^{26,27} The self-administered questionnaire consists of 18 items, rated on a four- or five-point scale.

The obesity-related coping (OCQ) and obesity-related distress questionnaires (ODQ) define the impact of coping strategies and obesity-related distress.²⁸⁻³⁰ Both are self-administered questionnaires, the OCQ containing 16 items and the ODQ 13 items. All items are rated on a four-step response scale.

The impact of weight on quality of life questionnaire (IWQOL) is a self-reported 74-item measure to assess the effect of weight along eight domains of functioning.³¹ In

order to minimize response burden to subjects, a short version, the IWQOL-Lite (31 items), was recently developed.³² The short version consists of five scales, rated on a five-step response scale.

The Lewin-TAG questionnaire (LEWIN-TAG) consists of 55 items and covers global and disease-specific scales, relevant to obesity.³³ The questionnaire includes yes-no response categories as well as Likert response scales.

The obesity adjustment survey – short form (OAS-SF) was constructed to assess the psychological distress of individuals who are morbidly obese.³⁴ It is a self-reported 20-item questionnaire, rated on a five-point Likert scale.

The short specific quality of life scale (OSQOL) is a self-reported 11-item questionnaire evaluating four dimensions: physical state, vitality, desire to do things, relations with other people and psychological state.³⁵ The items are rated on a five-point Likert scale.

The obesity-related well-being questionnaire (ORWELL 97) represents the intensity and the subjective relevance of physical and psychosocial distress.³⁶ The self-administered questionnaire consists of two subscales, psychological status/social adjustment and physical symptoms/impairment. Each item is scored on a four-point Likert scale.

The BAROS, designed to measure outcomes in the surgical treatment of morbid obesity, is a self-reported seven-item instrument, evaluating three main areas; weight loss, improvement of medical conditions and quality of life.¹⁸ The items are rated on a five-point scale.

The BQL was developed to measure quality of life in relation to weight, weight-related co-morbidity and surgery-related gastrointestinal symptoms. It is a 28-item self-administered questionnaire including yes-no response categories as well as Likert response scales.¹⁹

The Obesity and Weight-Loss Quality-of-Life (OWLQOL) instrument consists of 17 statements about weight and quality of life. The questionnaire is intended to be used together with the Weight-Related Symptom Measure (WRSM), which is a 20-item, self-report measure for the presence and bothersomeness of symptoms associated with obesity.^{20,21} The items are rated on a six- and seven-point scale, respectively.

Linkage process

Altogether, 413 concepts contained in the measures were identified. Ninety six percent ($n=397$) of those concepts were linked to 87 different ICF categories. The results of the κ statistic as well as the bootstrapped CI at the component, first, second and third ICFs levels are presented in Table 1.

The estimated κ coefficients range between 0.78 at the component ICFs level and 0.83 at the chapter level.

The width of the 95% bootstrapped CI, which indicates the precision of the estimated κ coefficient, is narrowest at the third level and widest at the component ICF's level.

Three of the 87 categories belong to the component 'body structure', 36 to the component 'body functions', 40 to

Table 1 Estimated κ coefficient and the bootstrapped confidence intervals at the component, 1st, 2nd and 3rd ICF's levels

	Estimated κ coefficient	95% bootstrapped confidence intervals
Component	0.78	(0.72, 0.84)
Chapter first level	0.83	(0.78, 0.88)
Second level	0.79	(0.73, 0.84)
Third level	0.79	(0.73, 0.88)

Abbreviations: ICF, International Classification of Health, Disability and Functioning.

'activities and participation' and eight to 'environmental factors'.

The concepts 'your weight', 'my weight' or 'being overweight' used in many items of all health-status measures with the exception of three measures (OE, OSQOL and BAROS) were assigned hc (health condition), as they were used as a substitute for the examined health conditions overweight and obesity.

Personal factors such as coping strategies, perception of others, life and oneself are currently not part of the classification, hence concepts like 'I do not receive recognition', 'I fear about how overweight will affect future life', 'I believe that my weight is a sign of personal weakness' were assigned pf. In total, 48 items were identified as pf.

The concepts 'Generally, it is clear to me how to cope with different situations', 'Try to have as clear guidelines as possible for what to do', 'How frequently do you avoid' stocking up' on temping foods?', 'Having major weight problems among the worst things that can happen to you' were considered not to be covered by the ICF, and assigned nc.

Linkage results

Table 2 illustrates the number of items (%) containing concepts that address categories of a particular ICF component. The percentage of items always relates to the total number of items per questionnaire. As one item may represent >1 component, the sum of percentages per questionnaire may sum up to more or less than 100%.

At the component level, all health-status measures covered the ICF components *body functions*. The component *activities and participation* is not contained in the OE, and the WRSM. The component *body structure* is represented in three measures. *Environmental factors* are not covered by the OP, the OCQ/ODQ, the BAROS and the WRSM. *Personal factors* are not covered by the OP, the BAROS and the WRSM. The IWQOL-Lite and the BQL are the only condition-specific health-status measures containing all components (Table 2).

Table 3 shows the linkage of the concepts to the ICF categories for body structures and body functions, Table 4 for activities and participation and Table 5 for environmental factors. The numbers in the tables represent the frequencies with which the ICF categories were represented in the measures. A higher number may indicate that the ICF did

Table 2 Number of items (%) containing concepts that address categories of a particular ICF component

ICF components	Measure												
	OP	OE	OCQ	ODQ	IWQOL-Lite	LEWIN-TAG	OSQOL	OAS-SF	ORWELL 97	BAROS	BQL	OWLQOL	WRSM
Total items	8	18	16	13	31	55	11	20	36	7	28	17	20
Body structures (s)					1 (3%)						1 (4%)		1 (5%)
Body function (b)	1 (12%)	16 (89%)	10 (62%)	6 (46%)	16 (52%)	32 (58%)	3 (27%)	17 (85%)	27 (75%)	3 (43%)	18 (64%)	16 (94%)	19 (95%)
Activity and participation (d) & (100%) ^a			4 (25%)		12 (39%)	13 (24%)	6 (55%)	7 (35%)	13 (36%)	3 (43%)	5 (17%)	1 (6%)	
Environmental factors (e)		9 (50%)			2 (6%)	1 (2%)	2 (18%)	3 (15%)	3 (8%)		1 (4%)	4 (24%)	
Personal factors (pf)		1 (6%)	4 (25%)	7 (54%)	2 (6%)	15 (27%)	1 (9%)	5 (25%)	6 (17%)		3 (11%)	4 (24%)	
Number of items addressing	7 address 1	8 address 1	21 address 1	30 address 1	47 address 1	10 address 1	9 address 1	21 address 1	28 address 1	28 address 1	11 address 1	11 address 1	20 address 1
number of components	1 address 2	9 address 2	5 address 2	2 address 2	8 address 2	1 address 2	11 address 2	14 address 2	6 address 2	6 address 2	4 address 2	4 address 2	2 address 3

Abbreviations: BAROS, Bariatric Analysis and Reporting Outcome System; BQL, Bariatric Quality of Life Index; IWQOL-Lite, Impact of Weight on Quality of Life Questionnaire; LEWIN-TAG Questionnaire; OAS-SF, Obesity Adjustment Survey-Short Form; OCQ, Obesity-Related Coping; ODQ, Obesity-Related Distress Questionnaire; OE, Obesity Eating Problems Scale; OP, Obesity-Related Problems Scale; ORWELL, Obesity-Related Well-being Questionnaire; OSQOL, Short-Specific Quality of Life Scale; OWLQOL, Obesity and Weight-Loss Quality of Life; WRSM, Weight-Related Symptom Measure. ^aPercentage of items always relates to the total number of items per questionnaire (second column of the table). As one item may represent >1 component (see column 'comments'), the sum of percentages per questionnaire may sum up to more than or less than 100%. ^bOne item address comorbid conditions, classified in the complementary ICD 10.

not differentiate in greater detail and, therefore, several items or concepts of items from a specific health-status measure had to be linked to the same ICF category. For example, in the LEWIN-TAG, the ICF category b152 *emotional functions* was chosen to link a number of different feelings: 'frustrated', 'feel burdened', 'discouraged', 'feel despair', 'happy' or 'afraid'. If there were different categories

for different feelings, the named items would have been linked to different categories.

Representation of body structure and body functions

The item 'swollen ankles/legs' represented in the IWQOL-Lite was linked to s7502 and s750 according to 'structure of

Table 3 Linkage of the condition-specific health-status measures to the ICF categories of the component body structure and body function: the table denotes the frequency of items in each health-status measure linked to the ICF category

ICF component and categories	OP	OE	OCQ/ODQ	IWQOL Lite	LEWIN-TAG	OSQOL	OAS-SF	ORWELL 97	BAROS	BQL	QWLQOL	WRSM
<i>Body structures</i>												
S570 Structure of gall bladder										1		
s750 Structure of lower extremity				1								
s7502 Structure of ankle and foot				1								1
<i>Body functions</i>												
b1260 Extraversion			1									
b1265 Optimism			2				1					
b1266 Confidence			1	4	3			2				
b1300 Energy level					2	1	1	2			1	1
b1302 Appetite		6			1							2
b1303 Craving		7										
b134 Sleep functions												1
b1343 Quality of sleep					1							
b140 Attention functions					1							
b1470 Psychomotor control								2				
b152 Emotional functions	1	3	1	1	18	1	1		1	3	7	1
b1520 Appropriateness of emotion												
b1522 Range of emotion			3	4			1	4				
b1602 Content of thought			5		4							
b1801 Body image		1		1	2		5	3		2	3	
b2401 Dizziness												1
b28013 Pain in back												1
b28016 Pain in joints				1						1		1
b420 Blood pressure functions										1		
b440 Respiration functions (apnea)										1		
b450 Additional respiratory functions (snoring)												1
b4550 General physical endurance												1
b460 Sensations associated with cardiovascular and respiratory functions				1		1	1	2				1
b5106 Vomiting										1		
b515 Digestive functions										1		
b525 Defecation functions										3		
b530 Weight maintenance functions		2	6	2	2		11	12	1	2	15	
b535 Sensation associated with the digestive system										2		
b54500 Water retention												1
b5501 Tolerance to cold or heat												2
b6202 Urinary continence										1		2
b6400 Functions of sexual arousal phase				1					1			1
b6401 Functions of sexual preparatory phase				1								
b830 Other functions of the skin (sweating)								2				1
b840 Sensation related to the skin												1
b850 Functions of hair										1		
Total	1	19	19	18	34	3	21	30	3	20	26	20

For abbreviations see Table 2.

Table 4 Linkage of the condition-specific health-status measures to the ICF categories of the component activity and participation: the table denotes the frequency of items in each health-status measure linked to the ICF category

ICF categories	OP	OE	OCQ/ODQ	IWQOL Lite	LEWIN-TAG	OSQOL	OAS-SF	ORWELL 97	BAROS	BQL	QWLQOL	WRSM
d163 Thinking			1									
d175 Solving problems			1									
d230 Carrying out daily routine								3				
d330 Speaking			1									
d350 Conversation					1							
d3551 Discussion with many people			2					1				
d4 Mobility				1			1					
d4101 Squatting						1						
d4103 Sitting				1		1						
d4400 Picking up				1								
d450 Walking					1	1						
d4500 Walking short distances							1					
d4501 Walking long distances						1						
d455 Moving around					1	1						
d4551 Climbing				1		1	1					
d4552 Running					1							
d4554 Swimming					1							
d498 Mobility, other specified				1								
d5 Self-care											1	
d540 Dressing				1								
d5402 Putting on footwear				1								
d5701 Managing diet and fitness									1	1		
D6 Domestic life											1	
d6200 Shopping	1											
d7 Relationships									1			
D7500 Relationships with friends											1	
d760 Family relationships								1			1	
d7702 Sexual relationships	1			2			1	2				
d8450 Seeking employment				1								
d850 Remunerative employment				2	5			2	1	1		
d9 Community, social and civic life					2						2	
d910 Community life	1											
d9100 Informal associations					1							
d920 Recreation and leisure	1				1			1		1		
d9201 Sports					8		1	1				
d9202 Arts and culture					1							
d9204 Hobbies					1							
d9205 Socializing	3				3		2	2				
d9208 Recreation and leisure, other specified	1											
d9300 Organized religion					1							
Total	8		5	12	28	6	7	13	3	8	1	

For abbreviations see Table 2.

Table 5 Linkage of the condition-specific health-status measures to the ICF categories of the component environmental factors: the table denotes the frequency of items in each health-status measure linked to the ICF category

ICF categories	OP	OE	OCQ/ODQ	IWQOL-Lite	LEWIN-TAG	OSQOL	OAS-SF	ORWELL 97	BAROS	BQL	QWLQOL	WRSM
e1100 Food		8					2				2	
e1101 Medication										1		
e3 Support and relationships		1										
e355 Health professionals					1							
e4 Attitudes				2		2		1			2	
e410 Individual attitudes of immediate family members							1					
e420 Individual attitudes of friends							1					
e5600 Media services								2				
Total		9		2	1	2	4	3		1	4	

For abbreviations see Table 2.

ankle and foot' and 'structure of lower extremity'. Another category, 'structure of gall bladder' (s570), was covered by the BQL. The categories *emotional functions* (b152), *appropriateness* and *range of emotion* (b1520, b1522) are covered by all examined measures. In contrast, *energy level* (b1300), which may include positive and negative aspects, such as fatigue or energy, is only represented in the half of the health-status measures. *Function and quality of sleep* (b134, b1343) are only covered by the WRSM and the LEWIN-TAG. Twenty-four of the remaining ICF categories are addressed in only one of the different measures, for example, the BQL is the only measure that covers several aspects of digestive functions, such as *vomiting*, *digestive functions* and *defecation functions*.

Representation of activities and participation

All condition-specific health-status measures contained categories from the components activities and participation, with the exception of the OE and the WRSM. Aspects of *mobility* are only represented in four out of the 12 measures, including the IWQOL-Lite, the LEWIN-TAG, the OAS-SF and the OSQOL. The LEWIN-TAG and the OSQOL contained *walking* in general and only the OSQOL covers *walking long distances*. The category *walking short distances* is represented in the OAS-SF. With respect to self-care, only the IWQOL-Lite covers *dressing* and in more detail the important activity *putting on footwear*. Aspects of *relationships* are contained in half of the measures, and five measures evaluate issues related to employment. At least one of the categories included within the chapter community, social and civic life (d9) is covered by the OP, the OAS-SF, the LEWIN-TAG, the ORWELL 97 and the BQL, but they are covered in more detail by the LEWIN-TAG.

Representation of environmental factors

Categories from the component environmental factors are represented in all condition-specific health-status measures except the OP, the OCQ/OCD, the BAROS and the WRSM. *Food* is addressed by only the OE, and the OAS-SF and the QWLQOL. The IWQOL-Lite, the OSQOL, the ORWELL 97 and the QWQOL address the chapter attitudes (e4) at a very general level, and the OAS-SF at a more detailed level, by addressing individual attitudes of immediate family members and friends. Media services, as television, radio, newspaper or computer-based mass communication including internet, are only addressed by the ORWELL 97.

Discussion

The ICF proved highly useful for the content comparison of obesity-specific health-status measures. With few exceptions and excluding pf that are not classified in the ICF, the concepts contained in the measures could be linked to ICF categories.

Interestingly, *emotional functions* (b152) including subcategories *range* and *appropriateness of emotion* (b1520, b1522) are covered by all measures.

Weight maintenance functions (b530) was the second most frequently addressed category. Almost half of the concepts contained in the measures and relating to the component body function referred to these categories. This may reflect the fact that the question whether or not mood disorders and obesity are related has been a focus of scientific investigation and debate for decades. As the available literature on this aspect does not provide a definitive answer to this question, the investigation of this relationship will probably continue being an objective.³⁷ However, condition-specific health-status measures can be used to address the problems in emotional functions of patients with obesity.

Other important categories contained in different measures were 'body image' (b1801) and 'energy level' (b1300). The categories 'appetite' and 'craving' (b1302, b1303), which are related to 'weight maintenance functions' (b530), were only covered by three measures and among these only the OE covers these aspects in more detail.

Interestingly, 10 out of 12 measures did not address the important and obesity-relevant categories *function* and *quality of sleep*.³⁸ In addition, only the BQL and the IWQOL-lite comprehensively cover digestive functions and sexual functions, respectively.

Limitations and restrictions in *activities* and *participation* are of great relevance to patients with obesity. Regarding the coverage of *activities* and *participation* the heterogeneity of representation is even more pronounced. One-third (35%) of all categories are addressed in the LEWIN-TAG. The OCQ/ODQ showed a unique pattern by exclusively covering the categories 'thinking' (d163), 'solving problems' (d175), 'speaking' (d330) and 'discussion with many people' (d3551). Remarkably, there is no overlap with the ORWELL 97, which intends to cover psychosocial distress.³⁶ Patients with obesity are frequently described as a treatment-seeking population with emotional problems.^{14,39} Although there is little evidence to support the view that obesity is associated with mental problems, nevertheless, obese patients suffer from psychological problems specific to their obesity, including disparagement of the body and body image⁴⁰

The categories 'picking up' (d4400), 'sitting' (d4103), 'dressing' (d540) and 'putting on footwear' (d5402), which are arguably important in more severe obesity, were covered by the IWQOL-Lite but not by the OAS-SF, a measure specifically developed for morbidly obese, and not by the two bariatric measures. Instead and as can be expected from a measure useful for morbidly obese, the OAS-SF is the only measure that covers 'walking short distances' (d4500).

The areas that are covered by some but not all of the measures may represent key issues for patients with obesity, including 'walking' (d450), 'moving around' (d455), 'remunerative employment' (650), 'sexual relationships' (d7702), 'community, social and civic life' (d9) addressing mainly recreation and leisure, sports and socializing.⁴¹

Issues represented with respect to environmental factors refer to attitudes (discrimination, stigmatization and under-standing), food (preferences, temptations and fragrances),

media services (television, internet), health professionals (involving treatment compliance) and support and relationships. The influence of the attitudes of the environment on the involvement in life situations of individuals such as at work, in interpersonal interactions or in social and recreational life is well known.⁴² Discrimination at work, in public and interpersonally is common in obese persons.^{43–45} Only four of the selected health-status measures address the chapter attitudes at a very general level, and the OAS-SF at a more specific level including immediate family members and friends. However, there was again no consistency regarding the representation of important environmental factors in obesity-specific health-status measures.

It could be argued that for obese patients, the patterns of limitations are different with regard to the body mass index (BMI). As has been shown by Fontaine,⁸ Fine⁹ and others, there is an association between BMI and health status. Patients with a higher BMI experience greater limitations in function. However and as it has been shown in this paper, the varying representation of categories cannot be explained by the different targeted populations.

There are a total of 56 categories that are specific to a single measure. The measure with the largest number of specific ICF categories is the BQL with 11 ICF categories, followed by the LEWIN-TAG with 10, the WRSM with eight and the IWQOL-lite with seven. Within this context, it is important to mention that these specific ICF categories may facilitate the selection of the most appropriate measure for a determined, specific clinical purpose.

The almost random representation of the majority of categories for all ICF components raises the question regarding the contents that should be included in an obesity-specific health-status measure. As the selection of an appropriate condition-specific health-status measure depends among other considerations on the study question, the population to be studied and the intervention, there is probably no unique ideal obesity-specific measure existing. However, as the first question when selecting a obesity-specific measure is to decide what should be measured, this ICF-based contend comparison may guide clinicians and researchers when selecting measures for clinical studies.

In conclusion, the ICF provides an excellent framework when comparing the content of health-status measures for obesity. The comparison of the measures provides interesting insights into their differences with respect to the breadth and precision of their coverage of specific concepts. This information can be very useful when selecting measures for clinical studies and for any kind of investigations, in which the health status of obesity patients is a relevant study outcome.

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