Psychological Distress in Morbid Obesity in Relation to Weight History

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Background: Very few data are available on psychological distress in morbidly obese subjects in relation to the history of their weight. In subjects with childhood obesity, psychological distress might be better than in adult-onset obesity, because of progressive adaptation to the social stigma.

Methods: Psychological distress was tested in relation to BMI at age 20 years (*BMI-20*), weight history and somatic co-morbidities in 632 treatment-seeking, morbidly obese participants from the QUOVADIS cohort (130 men, 502 women; mean age 45.5 years). The number of dieting attempts/year, BMI increase and cumulative BMI loss since age 20 were calculated as weight cycling parameters. The Symptom Check List-90 (SCL-90), the Psychological General Well-Being (PGWB), the Binge-Eating Scale, and the ORWELL-97 questionnaire were used to score psychometry and health-related quality of life (HRQL). Complications were quantitatively assessed by a modified Charlson's score.

Results: BMI-20 was normal in 35% of cases and >35 kg/m^2 in only 14%. Psychometric scores were not different in relation to BMI-20, when corrected for age, with the exception of the General Health scale of PGWB, showing a greater distress in subjects with normal BMI-20. In most cases, the prevalence of pathological results of questionnaires showed a J-shaped curve, with participants with normal BMI-20 or those with Class II-III obesity in early adulthood having the highest prevalence of psychological/psychiatric distress and poor HRQL. Weight cycling was a risk factor for binge-eating, depression and interpersonal sensitivity in SCL-90, whereas somatic co-morbidities adversely affected most SCL-90 and all PGWB scales.

Conclusion: Weight cycling and somatic co-morbidities, but not age of onset of obesity, are the main factors negatively influencing psychological health in treatment-seeking, morbidly obese subjects.

Key words: Morbid obesity, quality of life, complications, weight cycling, psychometry

Introduction

Obesity is a complex disease where somatic and psychological/psychiatric factors contribute to severe distress and poor health-related quality of life (HRQL). The burden of somatic co-morbidities is generally associated with the severity and duration of obesity; psychological distress may be both the cause and effect of obesity, generated by the social stigma of obesity and contributing to the low self-esteem, which is a leading cause of treatment failure.[1]

Subjects with Class III obesity (Body mass index – BMI ≥40 kg/m^2) are a category particularly prone to co-morbidities. Cross-sectional studies have

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shown that class III obesity is characterized by a high prevalence of features of the metabolic syndrome,[2] including cardiovascular complications, by osteoarticular and respiratory diseases, and by high rates of psychiatric/psychological distress.[3] Also disorders in eating behavior are common,[4] and weight cycling contributes to progressive weight gain.[5] Finally, their HRQL and psychological well-being may be extremely poor.[6-8]

The weight history of adult subjects with morbid obesity who seek treatment at medical centers, may be extremely variable. Adult obesity may be the consequence of childhood obesity, but in most cases weight gain is observed from early adulthood, either progressive or with recurrent weight-cycling episodes. Thus, when entering a weight-reducing program, either medical or surgical,[9] the psychiatric/psychological profile of the patient may thus be extremely altered,[10] but variable, and two scenarios may be hypothesized: 1) participants with childhood obesity might have progressively adapted to the social stigma, thus limiting the psychological burden of disease in adulthood; 2) in the same patients, weight cycling associated with longstanding obesity and the related somatic co-morbidities might have further increased the psychological distress and HRQL, rendering these patients extremely difficult to treat.

The QUOVADIS study is a large cross-sectional analysis of obese patients seeking treatment at medical Italian centers.[3] Its large database provides a unique opportunity to test the differences in psychiatric and psychological distress in morbidly obese patients in relation to their BMI in early adulthood (age 20 years), to their weight history and to the presence of somatic comorbidities.

Materials and Methods

Patients

The philosophy of the QUOVADIS study and the general characteristics of the population have been partly published in a previous report.[3] Briefly, all participants entering the study were interviewed as to their weight history, previous somatic and mental diseases, hospital admission during the previous year, self-evaluation of physical activity and eating pattern, and completed a set of self-administered questionnaires. We report an analysis based on 632 participants (130 men and 502 women) with morbid obesity (BMI $\geq$40 kg/m^2) whose complete data were available. Their characteristics are reported in Table 1. Their mean age and BMI at entry did not differ according to gender.

The weight history was checked according to a pre-defined structured interview including questions about body weight at the age of 20 years (BMI at the age of 20 years – *BMI-20*), age of first dieting and the number of times patients had lost weight as a result of dietary programs, as previously reported.[5] All weight data were transformed into BMI units to facilitate comparison between genders. The values reported by systematic interviews were used to compute the total number of dieting programs and total BMI loss because of dieting programs. The number of dieting attempts was normalized for age difference since first dieting; all other parameters of diet history were normalized for age difference since the age of 20 years. The following parameters of weight cycling were then identified: number of dieting attempts/year, BMI change since age 20 and cumulative BMI loss, both expressed in kg/m^2/year.[5] The cut-offs corresponding to the 75th percentile of each of these three parameters in the whole QUO-VADIS population were selected to identify patients with a weight history more indicative of weight cycling.[5] A weight cycling score (WCS) (from 0 to 3) was therefore assigned to each patient, according to the number of weight cycling parameters above the cut-off value of the 75th percentile. No attempt was made to characterize the weight history before the age of 20 years.

To facilitate handling of data, all measured or reported items had been implemented in an extranet database provided by CINECA (Casalecchio di Reno, Italy), an Interuniversity Consortium of 15 Italian Universities, using the AMR (Advanced Multicenter Research) methodology, which allows the management of the whole research using standard web-browsers.

All participants signed an informed consent to take part in the study, which was approved by the ethics committees of the individual centers, after approval by the committee of the coordinating center (University of Bologna).

Table 1. Demographic and weight history characteristics of the study population, in relation to BMI at the age 20 years; numbers are expressed as mean ± SD or as prevalence

	All cases (n = 632)	BMI <25 (n = 221)	BMI 25-30 (n = 198)	BMI 30-35 (n = 126)	BMI >35 (n = 87)	P*
Male (%)	21	13	23	25	26	0.006
Age (years)	45.5 ± 5.3	48.7 ± 9.0	44.0 ± 9.7	41.1 ± 11.9	35.3 ± 10.9	<0.001
Education						0.006
Primary/ Secondary/ Commercial or vocational/ Degree (%)	21/38/36/5	28/31/38/3	20/35/39/6	17/38/36/9	11/45/42/2	
Civil status						<0.001
Single, divorced/ Married, co-habiting/Widoved (%)	24/71/5	16/78/6	23/72/5	28/68/4	43/56/1	
Employment status						<0.001
Student/Self-employed/Employee/ Housewife/Unemployed/ Retired/ (%)	3/14/36/30/5/11	1/9/33/38/3/16	1/19/35/29/5/11	2/14/43/25/8/8	16/16/35/20/8/4	
BMI at entry (kg/m^2)	45.5 ± 5.3	44.5 ± 4.5	45.4 ± 4.7	45.8 ± 5.2	47.9 ± 7.3	<0.001
BMI at age 20 (kg/m^2)	28.3 ± 6.1	22.5 ± 1.8	27.2 ± 1.5	32.1 ± 1.4	39.8 ± 4.0	<0.001
BMI gain from age 20 (kg/m^2)	17.2 ± 7.2	22.0 ± 5.0	18.1 ± 4.9	13.7 ± 5.3	8.0 ± 7.4	<0.001
Cumulative BMI loss since age 20 (kg/m^2/year)	1.00 ± 1.11	0.70 ± 0.66	1.00 ± 1.13	1.17 ± 1.36	1.59 ± 1.34	<0.001
Age at first dieting (years)	25.4 ± 10.4	30.0 ±10.2	25.5 ± 9.2	22.8 ± 9.4	18.0 ± 8.8	<0.001
No. of dietary attempts/year	0.45 ± 0.45	0.37 ± 0.32	0.45 ± 0.47	0.51 ± 0.52	0.54 ± 0.54	0.214
Somatic disease score	1.58 ± 1.20	1.77 ± 1.19	1.55 ± 1.12	1.65 ± 1.28	1.12 ± 1.14	<0.001

*Kruskall-Wallis or Chi-square test

Methods

Questionnaires

The Symptom Check List-90 questionnaire was used to identify participants with a psychopathological distress.[11] For each item, the patients score how much that problem has distressed them during the last week, with responses ranging from 0 (not at all) to 4 (extremely). The 90 items of the test are summarized into 9 domains (somatization, obsessive-compulsive thoughts, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid conceiving, psychotic behavior), and into a general symptom index (GSI), which is used as an indicator of the overall psychological distress.[12] A value ≥1 in GSI or in any specific subscale is suggestive of psychopathology (1.00 - 1.49, mild; 1.50 - 1.99, moderate; ≥2.00, severe).

The Psychological General Well-Being (PGWB) questionnaire was used to score psychological distress.[13] The responses to 22 questions are arranged in 6 affective states: anxiety, depressed mood, positive well-being, self-control, general health and vitality. The Italian version of the questionnaire has been recently validated, and normative values are available to compare the results with population standards.[14]

The Binge Eating Scale was used to detect binge eating,[15] and values ≥17 were considered suspect of binging, whereas values ≥27 were considered highly predictive of a binge eating disorder.

Finally, *The Obesity-Related Well-being 97 (ORWELL-97) questionnaire* was used to determine the impact of obesity on health-related quality of life (HRQL). The questionnaire was specifically developed to score the intensity and the subjective relevance of physical and psychological distress generated by overweight.[16]

Scores

Weight history was scored according to previously-published, 75th percentile cut-offs.[5] Three items were considered: 1) recurrent dieting (cut-off, number of dieting attempts >0.56/year); 2) BMI gain since age 20 years (cut-off, 0.706 kg/m²/year); 3) cumulative BMI loss (cut-off, 0.964 kg/m²/year).

The presence of somatic diseases was used to calculate a composite score, according to Charlson et al,[17] with modifications. For this purpose, one point was added for the reported presence of any of the following states: diabetes, hypertension, other endocrine disorders, liver or biliary disease, hip or knee pain. The presence of cardiovascular disease (any condition, including angina, previous myocardial infarction or stroke, peripheral or carotid vascular disease) and a previous diagnosis of neoplasia were given 2 points.

Statistical Analysis

Initially, differences between groups were tested for statistical significance using unpaired *t*-test or Kruskall-Wallis test, due to non-gaussian distribution of data, as appropriate. Differences in the prevalence of categorical data were tested by R x C Chi²-test.

Logistic regression analysis was performed using dichotomized scores of GSI and individual domains of the SCL-90 as dependent variables. The cut-off value was set at 1.0 for all scales, but a sensitivity analysis using the cut-offs of 1.5 was also performed, and the results were qualitatively confirmed (not reported in detail). Values in the total score and in the individual domains of PGWB were transformed into Z-scores (difference between patient value and control mean, divided by control standard deviation), using age and gender matched values of a general Italian population.[14] Z-scores ≤1.0 were considered the cut-offs of psychological distress. The prevalence of pathological BES values was tested at the two different cut-offs of ≥17 and ≥27. The ORWELL-97 was dichotomized considering a score ≥70, corresponding to the 75th percentile of the population, as indicative of a clinically significant burden of obesity on HRQL. Independent variables were BMI-20, the clinical score of somatic diseases and the three individual components of weight history. All analyses were adjusted for age, gender and BMI at presentation.

Data in the text and in the Tables were presented as means ± SD or as prevalence. *P* values <0.05 were considered statistically significant.

Results

At time of enrolment, 35% of cases reported a BMI-20 in the normal range; in only 14% of cases, BMI was >35 kg/m² in early adulthood, reflecting childhood obesity. The prevalence of male gender was lower in participants who were normal weight at age 20 years, and there was a progressive trend towards younger age at time of enrolment with increasing BMI at age 20 (Table 1). Participants who were already obese at young age were more frequently students, in keeping with their younger age. They were also characterized by higher educational levels, and were more frequently single or divorced. Their BMI at time of enrolment was moderately higher, but BMI increase from age 20 was much lower.

Age at first attempt to lose weight was only 18 years in participants with Class II or III obesity at 20 years, and 30 years in those with normal body weight. The weight history was remarkably different among groups. The average number of dieting attempts was not different when related to the time-span from early adulthood, but the cumulative weight loss per year increased with the obesity grade at age 20 years. By contrast, the presence of somatic diseases was more common in participants who were normal weight at age 20, but the difference was no longer present after adjustment for differences in age (ANOVA, *P*=0.143).

The scores of BES, SCL-90, PGWB and ORWELL-97 were not different in relation to BMI at age 20 (Table 2), with the notable exception of the Somatization scale of SCL-90 and the General Health scale of PGWB, which showed a more severe distress in those who were normal weight at age 20. These data were confirmed by correlation analysis. BMI-20 was negatively correlated with the Somatization scale (r = 0.118; *P*=0.003), and positively with the General Health domain (r = 0.117; *P*=0.003). Also in this case, the association of BMI-20 with the Somatization scale was no longer significant after adjustment for age (ANOVA, *P*=0.612), whereas the association was maintained

Table 2. Scores of the Binge Eating Scale, Symptom CheckList-90 and ORWELL 97, according to BMI at the age 20 years (mean ± SD)

	BMI-20, <25 (n = 221)	BMI-20, 25-30 (n = 198)	BMI-20, 30-35 (n = 126)	BMI-20, >35 (n = 87)	P*
Binge Eating Scale	15.7 ± 9.1	15.6 ± 9.4	16.1 ± 8.5	16.9 ± 10.2	0.704
Symptom CheckList-90					
General Symptom Index	0.91 ± 0.57	0.88 ± 0.64	0.89 ± 59.6	0.89 ± 0.70	0.556
Somatization	1.35 ± 0.51	1.16 ± 0.53	1.16 ± 0.63	1.10 ± 0.84	0.006
Obsessive-compulsive thoughts	0.95 ± 0.49	0.90 ± 0.52	0.94 ± 0.65	0.89 ± 0.92	0.516
Interpersonal sensitivity	0.89 ± 0.50	0.96 ± 0.60	1.03 ± 0.76	1.08 ± 0.10	0.549
Depression	1.05 ± 0.05	1.01 ± 0.81	1.00 ± 0.76	1.04 ± 0.90	0.495
Anxiety	0.92 ± 0.69	0.87 ± 0.72	0.82 ± 0.70	0.84 ± 0.74	0.345
Hostility	0.70 ± 0.66	0.71 ± 0.71	0.79 ± 0.77	0.77 ± 0.73	0.727
Phobic anxiety	0.47 ± 0.61	0.46 ± 0.64	0.41 ± 0.57	0.51 ± 0.70	0.659
Paranoid conceiving	0.92 ± 0.74	0.90 ± 0.76	1.01 ± 0.76	0.89 ± 0.69	0.487
Psychotic behavior	0.52 ± 0.53	0.56 ± 0.64	0.53 ± 0.57	0.61 ± 0.71	0.297
Psychological General Well-Being					
Total score	63.6 ± 18.1	65.8 ± 20.4	66.2 ± 18.6	66.3 ± 20.8	0.344
Depressed mood	10.8 ± 3.0	11.1 ± 3.2	11.1 ± 3.1	11.0 ± 3.3	0.331
Anxiety	14.7 ± 4.9	15.0 ± 5.6	15.3 ± 5.1	14.8 ± 5.5	0.604
Positive well-being	9.3 ± 3.8	9.9 ± 4.3	9.6 ± 3.7	10.0 ± 4.1	0.334
Self-control	10.1 ± 3.4	10.3 ± 3.3	10.4 ± 3.5	10.6 ± 3.6	0.490
General health	8.5 ± 2.7	9.1 ± 3.0	8.9 ± 3.0	9.3 ± 3.2	0.042
Vitality	10.2 ± 3.7	10.4 ± 4.3	10.7 ± 4.0	10.7 ± 4.3	0.526
ORWELL-97	60.5 ± 30.2	57.4 ± 29.4	58.3 ± 26.2	56.6 ± 32.1	0.602

*Kruskall-Wallis test.

with the General Health of PGWB (*P*=0.031).

The prevalence of cases exceeding the selected cut-offs is reported in Table 3. Significant differences were only observed in the Somatization scale of SCL-90, but in most cases the data showed a J-shaped curve, with participants with normal BMI-20 or those with Class II-III obesity in early adulthood having the highest prevalence of psychological/psychiatric distress and poor HRQL at ORWELL-97.

Step-wise logistic regression analysis identified either diet history (cumulative BMI loss) or somatic score as factors significantly associated with psychological/psychiatric distress and poor HRQL (Table 4). In particular, weight cycling was significantly associated with binge eating, depression, interpersonal sensitivity and HRQL, whereas the somatic score was the leading cause of poor performance in several scales of SCL-90 and all scales

of PGWB. BMI-20 was not associated with any of the various domains tested in data adjusted for age, gender and BMI.

Discussion

To our knowledge, this is the first study to address the relation between age at onset of obesity and psychological profile in morbid obesity. The underlying hypothesis was that subjects who are obese before the age of 20 years might undergo an adaptation process, which allows them to cope better with the psychological distress linked to the stigma of obesity. This hypothesis was not fully verified in the large QUOVADIS database. Small differences in the Somatization scale of SCL-90 were demonstrated, but they were entirely cancelled out after correction

Table 3. Prevalence (%) of scores of the Binge Eating Scale, Symptom CheckList-90 and ORWELL 97 above the selected cut-offs, according to BMI at the age 20 years (mean ± SD)

	BMI-20, <25 (n = 221)	BMI-20, 25-30 (n = 198)	BMI-20, 30-35 (n = 126)	BMI-20, >35 (n = 87)	P*
Binge Eating Scale					
Score 17-26	29.2	21.9	34.7	28.7	0.162
Score ≥27	14.6	17.7	11.3	18.4	0.629
Symptom CheckList-90 (scores >1.0)					
General Symptom Index	38.8	33.5	33.9	38.8	0.612
Somatization	64.4	51.8	55.6	50.6	0.036
Obsessive-compulsive thoughts	42.9	38.1	36.3	41.2	0.606
Interpersonal sensitivity	41.6	42.6	43.6	45.9	0.920
Depression	47.0	41.1	46.0	41.2	0.584
Anxiety	39.7	35.0	33.9	36.5	0.676
Hostility	30.6	29.4	33.9	35.3	0.717
Phobic anxiety	18.3	17.8	9.7	20.0	0.659
Paranoid conceiving	42.5	41.6	48.4	42.4	0.656
Psychotic behavior	15.5	20.8	15.3	21.2	0.370
Psychological General Well-Being (Z-score ≤1.0)					
Total score	40.7	37.1	36.0	42.5	0.679
Depressed mood	29.0	24.8	27.2	34.5	0.414
Anxiety	33.0	27.9	22.4	33.3	0.149
Positive well-being	34.9	32.5	29.6	40.2	0.431
Self-control	37.1	30.5	31.2	35.6	0.463
General health	43.4	39.1	42.4	42.5	0.832
Vitality	36.7	41.1	34.4	36.8	0.639
ORWELL-97	37.3	35.4	33.9	35.6	0.935

*Kruskall-Wallis test.

for age. Age at onset of obesity did not appear to influence any of the subscales of SCL-90, with the only exception of the Somatization scale, which was significantly more impaired in those with normal weight at early adulthood. According to Rosik,[18] an Axis I disorder is present in about half of morbidly obese candidates for bariatric surgery treatment, and somatization represents the most common aspect of psychiatric distress in this cohort. However, the higher Somatization score in the subjects with normal weight at age 20 years is largely dependent on the more prolonged obesity history and associated somatic burden. In the Swedish Obese Subjects study, where the age at onset of obesity was on average 20 years, the participants had evidence of severe obesity-related distress and reported poor coping strategies.[19] We conclude that early-onset obesity *per se* is neither a protective nor a worsening factor for major psychiatric co-morbidity.

General Health at PGWB remains the sole scale independently associated with early-onset obesity. The General Health domain reflects the global perceived health status in the last 4 weeks, the possibility to carry out everyday activities and the concern for present health. It is the domain more closely associated with somatic diseases.[13] A history of higher-than-normal BMI at age 20 years was associated with a better score, independently of age differences. Although the prevalence of subjects with a pathological score was not different in relation to BMI-20, these data may support our initial hypothesis that subjects living with morbid obesity since their childhood may partly adapt to the distress generated by their disease.

Table 4. Step-wise logistic regression analysis of factors predicting psychiatric/psychological distress in Class III obese participants (odds ratio and 95% confidence intervals). All data are adjusted for age, gender and BMI

Dependent variables	Independent variables	OR	95% CI	*P**
Binge Eating Scale				
Score 17-26	Cumulative BMI loss	1.80	1.18 – 2.75	0.006
Score ≥27	Cumulative BMI loss	2.33	1.40 – 3.89	0.001
Symptom CheckList-90 (scores >1.0)				
General Index	Somatic score	1.26	1.08 – 1.47	0.003
Somatization	Somatic score	1.34	1.14 – 1.56	< 0.001
Obsessive-compulsive thoughts	Somatic score	1.31	1.10 – 1.57	0.003
Interpersonal sensitivity	Cumulative BMI loss	1.64	1.07 – 2.51	0.022
Depression	Cumulative BMI loss	1.51	1.00 – 2.29	0.050
Anxiety	Somatic score	1.25	1.03 – 1.51	0.021
Hostility	Somatic score	1.44	1.17 – 1.76	< 0.001
Phobic anxiety	Somatic score	1.50	1.16 – 1.96	0.002
Paranoid conceiving	-------------	----	----------	-----
Psychotic behavior	-------------	----	----------	-----
Psychological General Well-Being (Z-score ≤1.0)				
Total score	Somatic score	1.38	1.18 – 1.60	< 0.001
Depressed mood	Somatic score	1.25	1.06 – 1.47	0.006
Anxiety	Somatic score	1.28	1.09 – 1.51	0.002
Positive well-being	Somatic score	1.31	1.12 – 1.52	< 0.001
Self-control	Somatic score	1.22	1.05 – 1.42	0.010
General health	Somatic score	1.52	1.30 – 1.78	< 0.001
Vitality	Somatic score	1.35	1.16 – 1.57	< 0.001
ORWELL-97	Recurrent dieting	1.69	1.13 – 2.54	0.011

*Kruskall-Wallis test.

The major determinants of psychological/psychiatric distress in our series were largely expected, on the basis of the association of weight cycling with psychological symptoms[20] and the effects of both psychiatric distress[21] and somatic diseases on perceived health status in obesity.[22] In keeping with our data, the large Swedish experience pointed out that psychosocial functioning of morbidly obese subjects is significantly related to the number of previous dieting attempts.[23] There is also a wide consensus about the association between weight cycling and binge eating.[5,24,25] On the contrary, an association between weight cycling and depression in obesity in general has been reported in a few cohorts,[20,26,27] but denied in other settings.[28,29] There is no unequivocal definition for weight cycling. In a recent paper, we defined a few surrogate markers for weight cycling,[5] including cumulative BMI loss. According to this definition, weight cycling appears to be a risk factor for a pathological Depression scale of SCL-90, at least in this cohort of morbidly obese participants.

Also increased interpersonal sensitivity represents a core psychological feature of morbid obesity. It was defined as an "undue and excessive awareness of, and sensitivity to, the behavior and feelings of others".[30] Our study gives evidence to weight cycling as a key component of interpersonal oversensitivity, which is known to be favorably affected by weight loss following bariatric surgery.[31]

Finally, binge eating was associated with weight cycling, as repeatedly demonstrated in various obese cohorts,[32,33] including the general QUO-VADIS database,[5] but this specific psychopathological feature was not different in relation to early *vs* late-onset morbid obesity.

The most relevant finding of the present study is that obesity-related somatic diseases, evaluated by the modified Charlson score,[17] mainly account for psychological distress measured by the various domains of PGWB and for most impaired domains of SCL-90. Somatic diseases were the leading risk factor of poor performance also for scales, such as Anxiety, Hostility and anger or Obsessive-compulsive thoughts, which are expected to be primarily associated with mental health more than somatic health. Unexpectedly, their HRQL, measured by the obesity-specific instrument ORWELL-97, was not influenced by the score of somatic diseases. The ORWELL-97 considers both the occurrence and the severity of obesity-related symptoms and their subjective importance in everyday life,[16] but only the occurrence of symptoms is related to BMI. The ORWELL-97 was not specifically developed for morbid obesity. The relatively unsatisfactory performance of this instrument in our hands might reflect a general difficulty in measuring HRQL in these highly-complicated patients, or the high heterogeneity of this subpopulation. A large number of questionnaires have been developed or adapted for use in morbid obesity, and new ones add to the list every year, thus indirectly confirming how far we are from an exact definition of what specifically impairs quality of life in a morbidly obese person.[34] Again, weight cycling may have a definite role, as expressed by the association with recurrent dieting.

In conclusion, this study suggests that the psychological/psychiatric traits of morbidly obese subjects are scarcely influenced by the age of onset of obesity. The possibility that early-onset obesity might either produce a systematic adaptation or further increase psychiatric distress due to long-term stigma is largely ruled out by the QUOVADIS data. Physicians in charge of these treatment-seeking patients must be aware of the large heterogeneity of these patients' psychological traits and perceived health status,[10,35,36] and of the importance of the burden of somatic disease and weight cycling as factors negatively influencing their mental distress and HRQL.

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