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# Psychiatric co-morbidities in patients attending specialist obesity services in the UK

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Received 19 January 2006 and in revised form 7 March 2006

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## Summary

**Background:** The prevalence of obesity is rising, but little is known about its psychosocial correlates.

**Aim:** To assess psychological co-morbidities and impairment of quality of life in obese individuals seeking treatment at two specialist centres in the UK.

**Design:** Retrospective analysis of anthropometric and questionnaire data collected at initial clinic visit.

**Methods:** Patients attending for a first visit between April 2004 and March 2005 completed questionnaires that included scales for measurement of anxiety and depression (Hospital Anxiety and Depression Scale), eating disorder-behaviour (Eating Disorder Inventory 2), assessment of body image (Body Image Assessment for Obesity) and quality of life (Impact of Weight on Quality

of Life—Lite). We examined the relationships between variables measured on these scales and anthropometric data.

**Results:** Of 253 questionnaires evaluated, there were elevated scores for depression in 48%, and elevated scores for anxiety in 56%. Twenty-two percent demonstrated scores suggestive of a personality trait that overlaps with an eating disorder; an additional 11.5% had an elevated score for bulimia. About a third of individuals had significant impaired quality of life in the areas of examined.

**Discussion:** Psychological co-morbidities are common in obese individuals attending specialist weight-management clinics, and may merit consideration at (or before) commencement of a weight loss programme.

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## Introduction

The prevalence of excess weight and obesity in the UK continues to rise: ~65% men and 50% of women are overweight, and 25% of men and 20% of women are obese.<sup>1</sup> Concern about the consequent increase in obesity-related disease has focussed on physical co-morbidities, such as type 2 diabetes and cardiovascular disease. The relationship between obesity and mental and psychological health has been more controversial. Early research focussed on obesity as a consequence of an underlying psychopathology; more recently, work

has investigated causal relationships between body weight and psychological distress (especially depression) and the consequent effects on treatment outcome.<sup>2–5</sup>

In one population study in the US, nearly 14% of obese women were depressed, compared to 10% of the general population.<sup>6</sup> By contrast, there was no increase in depressive symptoms in overweight and obese men. However in those with extreme obesity (BMI  $\geq 40$  kg/m<sup>2</sup>), the likelihood of depression in the preceding month was increased four-fold in

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women and eight-fold in men, compared to normal weight women and men. Prevalence estimates of psychopathology are usually higher in obese people seeking weight-management treatment than in the population at large, and data from some uncontrolled studies of treatment-seeking individuals estimate the lifetime prevalence of depressive disorders at 9.2–47.5%.<sup>7,8</sup>

It is also well-recognized that obesity can be associated with disordered eating behaviour, particularly binge-eating disorder (BED). Estimates of the prevalence of binge-eating disorder in obesity vary from 10% to 50%, depending on the severity of the obesity, and numerous studies have reported not only more symptoms of depression, but also greater prevalence of any Axis I mental disorder, including substance abuse or dependence, lower self-esteem, and more symptoms of borderline personality disorder in binge-eaters (compared to obese individuals without this disorder).<sup>9–11</sup> Despite these findings, a recent investigation into the impact of obesity on drug prescribing in UK primary care did not show a significant increase in antidepressant medication (defined as daily drug dosage) in obese compared to normal weight subjects.<sup>12</sup>

Aspects of quality of life, such as physical health, emotional well-being, and psychosocial functioning, have previously been shown to be affected by obesity. Impairment of quality of life varies directly with severity of obesity, with the most obese individuals having the poorest quality of life.<sup>13</sup>

In this study, we aimed to assess the prevalence of psychological co-morbidities and impairment of quality of life in obese individuals seeking treatment at specialist clinics in two UK centres.

## Methods

Individuals were referred for weight-management treatment at two UK specialist centres, Luton and Dunstable Hospital NHS Trust, Luton (LD), and Addenbrooke's Hospital NHS Trust, Cambridge (AH), either by their primary-care physician (>90%) or as a secondary referral from another hospital specialist. Patients were asked to complete a questionnaire as part of their initial clinic assessment to help identify significant psychiatric or psychological disorders, and to plan appropriate weight management plans. The questionnaire was self-completed by patients attending for their initial visit, prior to a nurse-led medical assessment, and included validated scales for assessing the presence of psychological morbidity such as the

Hospital Anxiety and Depression Scale (HADS), and the Eating Disorder Inventory (EDI-2), and a scale to assess the degree of impairment of the individual's quality of life resulting from the presence of obesity, Impact of Weight on Quality of Life scale (IWQOL-Lite).

Onset of obesity was assessed by self-reported weights at various ages (6 years, 14 years, 21 years, 30 years and 40 years) alongside a score from the Body Image Assessment for Obesity scale (BIA-O) developed by Williamson *et al.*<sup>14</sup> There are 18 figures represented in this scale; figures above 9 describe the progression from overweight to severe obesity. In this study, early onset of obesity was regarded as present if individuals indicated a shape similar to or greater than figure 10 at age 14 years.

Anthropometric measurements were made using standard calibrated instruments on the day of questionnaire completion. Height (m) was measured using a wall-mounted stadiometer, weight (kg) using electronic scales with an upper weight limit of 300 kg. Body mass index (BMI) was calculated as  $\text{weight}/(\text{height})^2$ .

## HADS

The HADS was developed in 1983 as a tool to enable clinicians to identify the two most common forms of psychological disturbances in medical patients, namely anxiety and depression.<sup>15</sup> Recommended cut-offs of 7/8 for 'possible', and 10/11 for 'probable' anxiety or depression were suggested in the original study, with a cut-off of 14/15 indicating a 'severe' disorder. Retest reliability shows a high correlation between tests administered 2 weeks apart ( $r > 0.80$ ), suggesting that HADS is sufficiently stable to withstand the influences of acute events. As with all screening tools, a high score on the HADS alone does not allow a definitive diagnosis of anxiety or depression to be made, but should prompt a thorough psychiatric assessment to be arranged, with appropriate treatment as necessary.<sup>16,17</sup> For this study, a value  $>8$  was used as the criterion for the presence of anxiety or depression, and  $>15$  for severe depression or anxiety.

## EDI-2

The Eating Disorder Inventory<sup>18</sup> consists of 90 questions factored into 11 subscales: drive for thinness (DFT), bulimia (B), body dissatisfaction (BD), ineffectiveness (IE), Perfectionism (P), interpersonal distrust (ID), interoceptive awareness (IA), maturity fears (MF), asceticism (AE), impulse

regulation (IR), and social insecurity (SI). The first three subscales (DFT, B, BD) evaluate eating behaviour and perception of body shape; the next five subscales (IE, P, ID, IA and MF) measure psychological aspects of eating disorders that are particularly suggestive of, but not exclusive to, anorexia nervosa, and the final three subscales (AE, IR and SI) measure traits consistent with a borderline personality type that has overlapped with an eating disorder in some studies. There are six possible responses for each of the 90 questions in the EDI-2: 'always', 'usually', 'often', 'sometimes', 'rarely', and 'never', and the range of scores for each scale varies, with higher scores indicating greater symptomatology. Test-retest reliability separated by 1 week showed coefficients of variation of 0.79–0.95. Previous studies suggest that obese individuals have scores above the normative range for an eating disorder on the BD subscale, with frequent elevation of the DFT subscale also seen;<sup>19–21</sup> in such subjects, scores on the other subscales are usually below the lower limit of the range established for eating disorders.

### IWQOL-Lite

The IWQOL-Lite was developed as a brief version of the IWQOL that is more convenient for use as an outcome measure in obesity research.<sup>22</sup> The IWQOL-Lite consists of 31 items and five scales: Physical Function (11 items), Self-Esteem (7 items), Sexual Life (4 items), Public Distress (5 items), and Work (4 items). Reliability coefficients for the individual scales ranged from 0.90 for both Work and Public Distress to 0.94 for Physical Function. Significant differences in IWQOL-Lite scale and total scores have been found among groups of different body mass index supporting its use across the body mass index spectrum.

### Statistical analysis

Statistical analysis used SPSS for Windows (v. 11). Data are presented as means  $\pm$  SD unless otherwise specified.  $p < 0.05$  was used to determine significance. As some measures did not display a normal distribution, both parametric and non-parametric tests were used. Parametric tests included independent *t*-tests, analysis of variance with *post-hoc* Bonferroni testing, and Pearson's correlation analysis. Non-parametric methods used included the Mann-Whitney U-test and Spearman correlation analysis. Where possible, analysis was done after controlling for effects of age, gender and BMI.

## Results

### Baseline characteristics

A total sample of 253 questionnaires were completed by individuals at their first obesity clinic visit over the period from April 2004 to February 2005; 156 (119 women, 37 men) at the LD clinic, and 97 (71 women, 26 men) at the AH clinic. All but one of the individuals attending AH were of Caucasian ethnicity; 92% (144/156) of those attending LD were Caucasian. Baseline characteristics of the individuals evaluated are shown in Table 1.

Although individuals attending AH were on average heavier and had a greater BMI than those attending LD, there were no significant differences between individuals of the same sex at these two sites. As expected, men were of significantly greater weight and height than women ( $p < 0.001$ ), but there were no significant differences in BMI between the sexes. BMI was  $\geq 45$  kg/m<sup>2</sup> in 54% of women (99/182) and 60% of men (37/62).

Of the patients with BMI  $\geq 45$  kg/m<sup>2</sup>, 35% were aged 40–49 years, only 15% were aged  $< 30$  years, and only 6% were aged  $\geq 60$  years (Table 2). This trend was consistent for both men and women (data not shown).

### Early-onset obesity

Of the 230 individuals in whom this question was answered, 29% (47 women, 20 men) reported an early onset of obesity. Individuals of greater BMI ( $\geq 45$ ) at first clinic visit were more likely to report an early onset of obesity than those with a BMI  $< 35$  kg/m<sup>2</sup> at first visit ( $p < 0.05$ ).

### Anxiety and depression

Of the individuals evaluated on the HADS scale, 141/252 (56%) exceeded the minimum criteria for an anxiety disorder and 48% (119/249) the criteria for depression. Women were significantly more likely to be categorized as suffering from anxiety than men (60.5% vs. 42% respectively,  $p < 0.01$ ), but there were no differences for the depression subscale (47.5% men vs. 47.8% women). The likelihood of reaching a score suggestive of 'probable' or 'severe' anxiety or depression increased in both men and women as BMI increased (Figure 1); up to 31% men overall reached scores suggestive of 'probable or 'severe' anxiety, while 37% women scored above this level. For depression, 18% of men and 22% of women scored in the 'probable' or 'severe' range. Thirty-nine individuals met 'probable' or 'severe' thresholds for both anxiety and depression.

**Table 1** Baseline characteristics of individuals attending specialist obesity clinics at two centres

	Men		Women	
	LD (n=37)	AH (n=26)	LD (n=119)	AH (n=71)
Age (years)	41.7 ± 11.9	46.5 ± 11.6	41.7 ± 10.0	38.9 ± 12.2
Weight (kg)	146.0 ± 26.3	160.2 ± 37.3	123.7 ± 24.9	128.1 ± 23.0
Height (m)	1.78 ± 0.07	1.78 ± 0.11	1.64 ± 0.07	1.64 ± 0.08
BMI (kg/m <sup>2</sup> )	45.8 ± 7.3	50.3 ± 10.9	46.4 ± 9.6	48.3 ± 8.3

Data are means ± SD. LD, Luton and Dunstable obesity clinic; AH, Addenbrooke's Hospital obesity clinic.

**Table 2** Age distribution by BMI subgroup

BMI (kg/m <sup>2</sup> )	Age (years)				
	≤29	30–39	40–49	50–59	≥60
<35	1 (9.1%)	7 (63.6%)	2 (18.2%)	1 (9.1%)	0
35–39.9	4 (14.3%)	7 (25.0%)	10 (35.7%)	4 (14.3%)	3 (10.7%)
40–44.9	6 (12.5%)	13 (27.1%)	13 (27.1%)	14 (29.2%)	2 (4.2%)
≥45	18 (15.0%)	37 (30.8%)	42 (35.0%)	16 (13.3%)	7 (5.8%)

Data are means (row percentages).

Scores on the two subscales of the HADS were significantly correlated, consistent with findings from previous studies ( $r=0.6$ ,  $p<0.001$ ).<sup>17</sup>

There was no relationship between early onset of obesity and score for depression or anxiety in either men or women.

### Eating disorder inventory

Of the individuals evaluated with EDI-2, 74% (189/253) had scores for body dissatisfaction above the original, normative range for an eating disorder, consistent with previous studies; 34% individuals (86/253) had a maximal score.<sup>19,20</sup> Seven (2.8%) demonstrated collective abnormal scores on the ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears subscales, a pattern described as central to the diagnosis of an eating disorder. A further 48 (19%) demonstrated abnormal scores for all three subscales of asceticism, impulse regulation and social insecurity: scales that may suggest the presence of a personality trait that may overlap with an eating disorder, or possibly high levels of restraint. In addition, 29 (11.5%) demonstrated a score for bulimia within or above the range consistent with an eating disorder.

There were no significant correlations between the body dissatisfaction scale of the EDI-2 and the HADS score for depression; however, women

demonstrated significantly higher scores for body dissatisfaction than men in most BMI categories and age subgroups (Figure 2).

### Quality of life

Quality of life was more markedly impaired in individuals completing the questionnaires than predicted from their BMI alone. A significant number of patients scored either the maximum score or within 10% of the maximum score, indicating severe impairment in the areas under examination (Table 3).

In contrast to previous studies, in most BMI subgroups, men reported more impairment of quality of life (in all areas of functioning) than women.<sup>22,23</sup> However the difference was significant only in the area of work functioning in men with a BMI >40 kg/m<sup>2</sup>.

In men, early onset of obesity was not associated with worse impairment of quality of life in any area, but women with later onset of obesity reported greater impairment of quality of life in the area of work than women with an earlier onset ( $p<0.05$ ).

There were no significant correlations between BMI and any area of functioning assessed by the IWQOL-Lite in either men or women. However, there was a significant weak correlation between scores for depression on the HADS and scores for self-esteem impairment ( $r=0.3$ ,  $p<0.05$ ) and

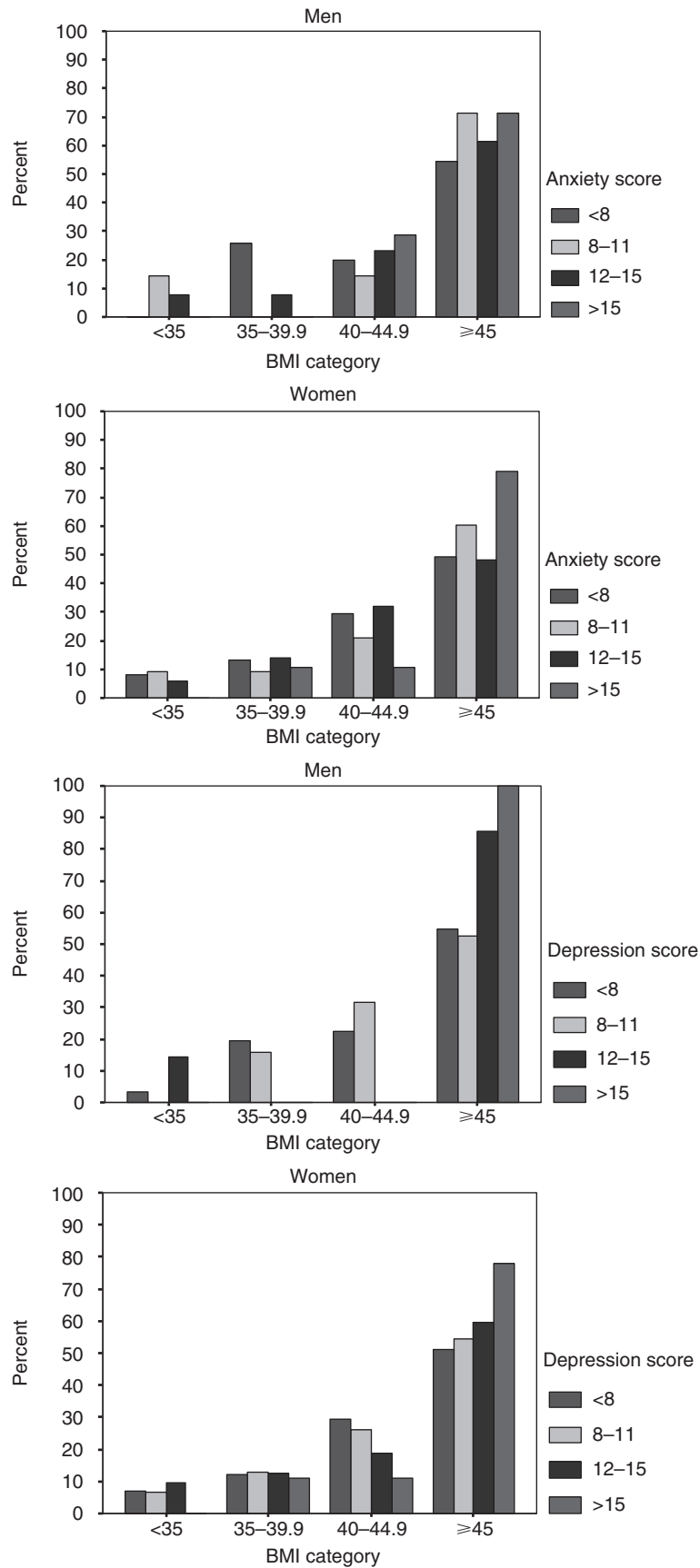
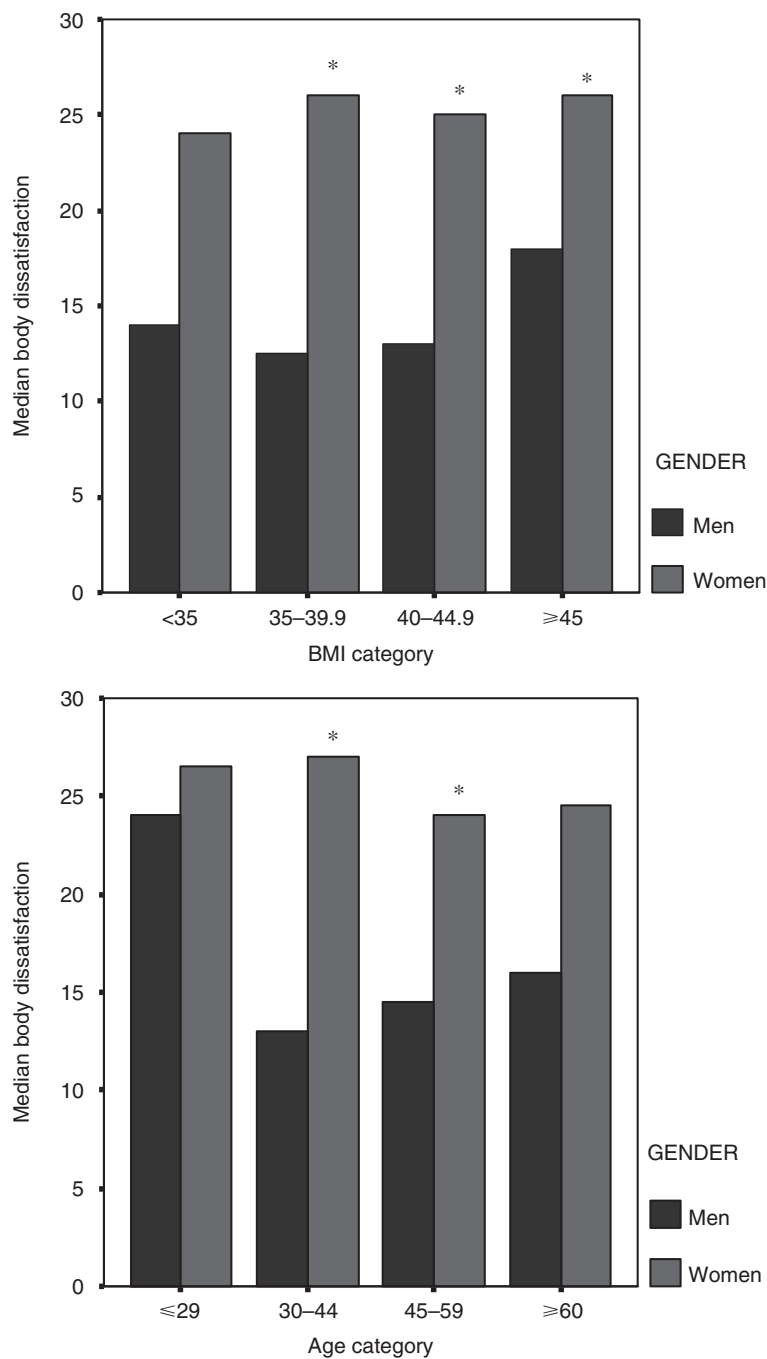


Figure 1. Anxiety and depression scores on HADS in men and women in different BMI categories.



**Figure 2.** Median scores for Body Dissatisfaction on EDI-2 in men and women in BMI and age categories. \* $p < 0.001$  different from men.

impairment of sexual life ( $r = 0.3$ ,  $p < 0.05$ ) in men. No such relationship was observed in women.

## Discussion

We found a high prevalence of psychiatric co-morbidities in obese individuals in the UK referred for specialist treatment: 60.5% of women and 42% of men met the minimum criteria for an

anxiety disorder on the HADS, and 48% of both men and women met the minimum criteria for depression. Elevated scores for body dissatisfaction similar to those seen in individuals with eating disorders were seen in 74%, elevated scores for bulimia in 11.5%, and personality traits that frequently coexist with these conditions in 22%. About a third of individuals scored within the maximum 10% range on the quality of life scale, demonstrating marked impairment in

**Table 3** Men and women scoring within 10% of the maximum score on IWQOL-Lite, by area of functioning

Area of functioning	Men	Women
Physical function	12 (18.8%)	17 (8.7%)
Self-esteem	12 (18.8%)	40 (20.5%)
Sexual life	21 (32.8%)	35 (17.9%)
Public distress	19 (29.7%)	31 (15.9%)
Work	17 (26.6%)	22 (11.3%)

the areas tested. Sexual life, work, and public distress were areas of particular impairment in men; sexual life and self-esteem were the major areas of impairment in women.

The increasing prevalence of obesity has also increased awareness of the potential for associated physical comorbidities,<sup>24,25</sup> but little is known about its possible psychological comorbidities. There are limitations to this analysis. Specialist obesity services are limited in the UK, so referrals may reflect a highly selected population compared to those presenting in primary care. Primary-care physicians may find it more difficult to treat individuals who have both physical and psychological comorbidities in the community.<sup>26</sup> Individuals experiencing marked impairment of quality of life or symptoms of an affective disorder in the presence of obesity may also be more likely to present to their general practitioners in the first place.<sup>27</sup>

The subjects referred for treatment in this study were predominantly of Caucasian ethnicity. Although this would reflect the population demographics of Cambridgeshire (97% Caucasian); 25% of the Luton Borough population in 2001 were of Asian or Black ethnicity, suggesting under-referral of non-Caucasians. The majority of individuals referred were in their fifth decade, and there were three times as many women referred as men. This may reflect the fact that women are more likely to attend their primary care physicians than are men,<sup>28,29</sup> as studies suggest that the UK is one of the minority of countries where the prevalence of obesity is greater among men than among women.<sup>30</sup>

We do not have information on psychotropic medication use at the time of assessment, and due to the cross-sectional nature of this study, we were unable to evaluate whether the mood disorders seen predated the development of obesity or were secondary, but studies suggest that both may occur in different populations.<sup>31–33</sup> We also cannot exclude the possibility that any treatment with psychotropics for premorbid depression might have led to increased obesity. All the data in this study were self-reported, and areas such as obesity

onset were not validated by pursuing medical notes or childhood family photographs, which may have been appropriate.

As some evidence suggests that the presence of mood disorders or eating disorders may affect the response to an active weight-management plan by reducing motivation and adherence to the treatment regimen,<sup>5,34,35</sup> further studies to evaluate the weight response of individuals who differ in severity of score on the HADS may be of interest. On the other hand weight loss, whether achieved by lifestyle change, medically or surgically is often, but not always, associated with improvements in QOL and mood.<sup>36–38</sup>

Only 29% of the sample reported an onset of obesity before the age of 14 years, stressing the importance of extending efforts at obesity prevention from schoolchildren alone to include younger adults.<sup>39,40</sup> Individuals who reported an earlier onset of obesity were also more obese at presentation, consistent with previous studies.<sup>41,42</sup> An earlier onset of obesity was not associated with more impairment of quality of life, but this may have been difficult to detect, due to the uniformly high levels of impairment reported by many individuals. In fact a later onset of obesity was associated with more impairment in work-related quality of life, possibly suggesting that those with an earlier onset had more opportunity to adapt or choose work conditions that were more suitable. There was no relationship observed between early onset of obesity and the body dissatisfaction component of the EDI-2.

Although depressive symptoms are frequently attributed to obese patients, the associations between anxiety disorders and obesity often go unrecognized. Fifty-six percent of the study population met the minimum criteria for an anxiety disorder; 48% met the minimum criteria for depression. In our sample, women demonstrated higher levels of anxiety than men, but there were no differences between the sexes in the prevalence of depression. This contrasts with the distribution of depression in the general population, where it is twice as prevalent in women as in men.<sup>43,44</sup> The increasing prevalence of affective disorders with increasing BMI accords with previous findings,<sup>45,46</sup> but in this study the trend was no longer significant after controlling for age. The incidence of depression in our study was much higher than the 8% recently reported in obese patients with a mean BMI of 36 kg/m<sup>2</sup>.<sup>38</sup>

McCrone *et al.* found a positive correlation between earlier onset of obesity and the presence of an affective disorder in women,<sup>42</sup> but this was not seen in our population.

Over 22% of those examined demonstrated personality features commonly found in individuals with eating disorders, and 11.5% had a score for bulimia within or above the eating disorder range. Previous studies have suggested that these individuals may have a better overall response if treatment strategies focusing on disordered eating behaviours are combined with an active weight management plan.<sup>47,48</sup>

In conclusion, there appears to be a high prevalence of underlying psychological co-morbidities, including mood disorders such as anxiety and depression, symptoms suggestive of eating disorders, and marked impairment of areas of quality of life, in people who seek treatment for obesity in the UK. To increase the effectiveness of a weight management treatment plan and improve the quality of life for these individuals, the presence of underlying psychological diagnoses may need to be considered at (or before) commencement of a weight loss programme, with treatment offered as appropriate.

## Acknowledgements

This work was supported by an EU Framework 6 Diabetes Project Grant.

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