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A prospective study of mental health status in morbidly obese patients.

WP Gillibrand1, C Rajeswaran2, S Zulfikar Raza Zaidi2, S Munirypa, M Mohammadi2, J Stephenson1, S Verma2, C Sloss2, C Covill1, P Holdich1

1. Department of Health Sciences, University of Huddersfield.
2. The Diabetes Centre, Dewsbury District Hospital.

Aims: To determine if co-morbidities have an effect on mood in a cohort of morbidly obese patients.

Methods: A total of 464 patients were recruited for the study. No demographic or co-morbidity data was collected on 54 patients. These patients were deleted from further analysis, leaving 410 patients for analysis. About 0.1% of data on the remaining cases was missing, with complete information available from 406 cases. Imputation was not conducted on the missing data.

The outcome measures of PHQ-9 and GAD-7 were found to be strongly and significantly correlated (r=0.82; p<0.001). The extent of the correlation suggested that a multivariate analysis or independent regression analyses may be conducted to separate scale scores. However, independent regression analyses could lead to inflated family wise error rates. Hence analysis was conducted on a combined outcome.

A Bland-Altman plot derived from the two sets of standardised scores (Figure 1) illustrated good levels of agreement between the scales, with no obvious relationship between agreement level and scale scores. Hence a simple composite measure comprising the unweighted total of item scores was derived for use in a subsequent regression analysis.

The adjusted-R2 statistic for this model was 0.075, indicating that the model is a fairly good fit to the data.

RESULTS

PHQ-9 and GAD-7 scales are closely correlated and show good agreement with each other. Hence analysis was conducted on a simple outcome measure combined from both of these scales.

There is insufficient evidence to conclude that either BMI or gender affects scores measured on the combined PHQ9/GAD7 outcome.

Some substantive association (non-significant) appears to exist between age and combined scale scores; with older patients reporting slightly better functionality.

Of the various co-morbidities reported by patients, arthritis and, particularly, reported anxiety/depression have the greatest effect on combined scale scores. The presence of both these conditions is associated with lower functionality.

There is no evidence that the presence of any other co-morbidity affects the combined scale scores.

There is no evidence for violation of model assumptions or of any individual data point exerting undue influence on the model.

Table 1: descriptive summary of sample (n=410)

<table>
<thead>
<tr>
<th>Variable</th>
<th>Frequency (n)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>Male 207 (22.9%), Female 203 (22.8%)</td>
</tr>
<tr>
<td>Hypertension reported</td>
<td>Yes 203 (24.6%), No 207 (24.8%)</td>
</tr>
<tr>
<td>Sleep apnoea reported</td>
<td>Yes 134 (16.3%), No 276 (33.6%)</td>
</tr>
<tr>
<td>Arthritis reported</td>
<td>Yes 107 (13.2%), No 303 (37.3%)</td>
</tr>
<tr>
<td>IHD reported</td>
<td>Yes 51 (6.1%), No 360 (44.1%)</td>
</tr>
<tr>
<td>Depression reported</td>
<td>Yes 63 (7.6%), No 347 (42.4%)</td>
</tr>
<tr>
<td>COPD/asthma reported</td>
<td>Yes 32 (3.9%), No 378 (46.1%)</td>
</tr>
<tr>
<td>BMI reported</td>
<td>Yes 201 (24.9%), No 209 (25.9%)</td>
</tr>
</tbody>
</table>

Table 2: P-values, parameter estimates and confidence intervals: combined PHQ9/GAD7 outcome

<table>
<thead>
<tr>
<th>Predictor</th>
<th>p-value</th>
<th>Parameter estimate</th>
<th>95% CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>Arthritis</td>
<td>0.055</td>
<td>30.2</td>
<td>(0.31, 66.7)</td>
</tr>
<tr>
<td>Depression</td>
<td>0.005</td>
<td>4.7</td>
<td>(0.38, 7.0)</td>
</tr>
<tr>
<td>BMI</td>
<td>0.017</td>
<td>3.04</td>
<td>(0.06, 5.9)</td>
</tr>
<tr>
<td>IHD</td>
<td>0.084</td>
<td>-1.43</td>
<td>(-3.10, 0.24)</td>
</tr>
<tr>
<td>Age</td>
<td>0.068</td>
<td>-0.99</td>
<td>(-2.00, 0.02)</td>
</tr>
</tbody>
</table>

Figure 1: Bland-Altman plot for agreement between PHQ9 and GAD7 outcomes

Figure 2: residual plot for final model

CONCLUSIONS

PHQ-9 and GAD7 scales are closely correlated and show good agreement with each other. Hence analysis was conducted on a simple outcome measure combined from both of these scales.

There is insufficient evidence to conclude that either BMI or gender affects scores measured on the combined PHQ9/GAD7 outcome.

Some substantive association (non-significant) appears to exist between age and combined scale scores; with older patients reporting slightly better functionality.

Of the various co-morbidities reported by patients, arthritis and, particularly, reported anxiety/depression have the greatest effect on combined scale scores. The presence of both these conditions is associated with lower functionality.

There is no evidence that the presence of any other co-morbidity affects the combined scale scores.

There is no evidence for violation of model assumptions or of any individual data point exerting undue influence on the model.

REFERENCES

Andanaes et al. 2014), personal factors associated with QoL and health related quality of life measures (Andanaes et al. 2012). However none of these studies have examined the relationship of mood to health related quality of life measures (Zimmett et al. 2012). However none of these studies have examined the relationship of mood to health related quality of life measures (Zimmett et al. 2012).

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Outcomes were collected on 464 patients. However, no demographic or co-morbidity data was collected on 54 patients. These patients were deleted from further analysis, leaving 410 patients for analysis. About 0.1% of data on the remaining cases was missing, with complete information available from 406 cases. Imputation was not conducted on the missing data.

Seventy nine patients (19.4%) had no reported co-morbidities. About half of all patients (211; 51.4%) had 1 or 2 reported co-morbidities, of which hypertension and anxiety/depression were the most common. One hundred and seventeen patients (28.2%) reported 3 or more co-morbidities. The number of reported co-morbidities was linked with age; with older patients being more likely to report more co-morbidities (p<0.443, p<0.001). Men reported more co-morbidities than women (mean number of co-morbidities reported by men=2.14 (SD=1.93), mean number of co-morbidities reported by women=1.71 (SD=1.32). There was no relationship between BMI and number of reported co-morbidities, or between any of the reported demographic variables and either outcome score. The sample is summarised descriptively in Table 1.

Women reported significantly more co-morbidities than men (mean number of co-morbidities reported by men=2.14 (SD=1.93); mean number of co-morbidities reported by women=1.71 (SD=1.32)). There was no relationship between BMI and number of co-morbidities, including diabetes, did not exhibit any substantive relationship with the outcome measure.

P-values and parameter estimates with associated 95% confidence intervals (CIs) for all variables in the final model are given in Table 2.