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Social anxiety in orthognathic patients

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Abstract. There is evidence that patients seeking orthognathic treatment may be motivated by social anxiety disorder (SAD). The aim of this study was to investigate SAD in orthognathic patients using the Brief Fear of Negative Evaluation Scale (BFNES) and to compare these findings with those of the general population. This was a cross-sectional, questionnaire study conducted in two parts. Firstly, a national survey was conducted to yield data for the BFNES from a large, random sample of the UK general population. Secondly, orthognathic patients completed the BFNES. The BFNES scores are reported in two formats: the original 12-item scale (O-BFNES) and a shorter eight-item version (S-BFNES). With regards to the national survey, 1196 individuals participated. The mean O-BFNES score was 29.72 (standard deviation (SD) 9.39) and S-BFNES score was 15.59 (SD 7.67). With regards to the orthognathic sample, 61 patients participated. The mean O-BFNES score was 39.56 (SD 10.35) and the mean S-BFNES score was 24.21 (SD 8.41). Orthognathic patients had significantly higher scores than the general UK population ($P < 0.001$), and multiple linear regression revealed that age, gender, and patient status were all independent predictors of BFNES scores. From the results of this study, orthognathic patients experience significantly higher levels of social anxiety than the general population.

Key words: social anxiety; orthognathic; fear of negative evaluation; psychology; dentofacial deformity.

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It has been estimated that approximately one in 100 people in the UK have a significant visible facial defect, and that over 400,000 people will acquire a facial disfigurement in the period of a year.[1] Concerns about physical appearance are often associated with social anxiety, with individuals who perceive themselves as being unattractive exhibiting greater levels of social anxiety.[2] This may result in problems in social interaction, leading to lowered self-esteem and a tendency to become introverted and reclusive.[3] In addition, in a clinical setting, individuals who seek surgical intervention for their problem may be motivated by social anxiety and this could have negative implications for satisfaction and psychological outcomes as physical treatment may not alleviate psychological issues.

Social anxiety disorder (SAD) has been defined as 'an enduring fear of social situations where the individual may be subject to evaluation by others'.[4] It is the most common type of anxiety disorder, with a prevalence of up to 18% in the general population.[5] Fear of negative evaluation is said to be the trademark of social anxiety, as this fear often leads to an illogical and exaggerated anxiety in social situations.[6,7] This may be a factor motivating orthognathic patients to seek treatment.[8]

Orthognathic patients have been shown to suffer from higher levels of state anxiety, but there is a paucity of information regarding social anxiety.[9] Indeed, there is only one published study to date assessing the level of social anxiety in patients

receiving orthognathic treatment for non-cleft or craniofacial conditions.[10] The authors of that study found that there was a small improvement in social avoidance and distress following orthognathic treatment, but no statistically significant change in fear of negative evaluation. A small number of studies have investigated social anxiety and fear of negative evaluation in patients with clefts and other types of facial deformity and have generally found that patients exhibit higher levels of social anxiety than unaffected groups.[11,12] Thus, the available evidence suggests that patients who are visibly different, with either acquired or congenital dentofacial conditions, may well exhibit higher levels of social anxiety than the general population, and this may have implications for treatment outcomes.

The aim of this study was to ascertain the extent and severity of fear of negative evaluation in orthognathic patients compared with the general population. However there are limited general population data available and the majority of these study samples have been relatively small, restricted to college students/undergraduates, and have not been nationally recruited; thus they have limited generalizability.[13,14] Therefore a range of general population values for the Brief Fear of Negative Evaluation Scale (BFNES) stratified on the basis of key demographic data in a large, randomly recruited, national community population was required first. The null hypothesis for this study was that there is no difference in mean social anxiety, as measured by the BFNES, in orthognathic patients and the general UK population.

Subjects and methods

Instrument

The BFNES measures the core construct in social anxiety and is thought to be the most commonly used measure of social anxiety in clinical studies[4,13,14] (Appendix 1). It is a self-report questionnaire, consisting of 12 items related to worrying or fearful cognition.[15] Eight of the items are positively scored and four are negatively scored (items 2, 4, 7, and 10), in order to reduce the risk of response bias.[16] However, the reverse-worded items have caused some problems with the reliability and validity of the scale and, therefore, recent research has suggested using the original 12-item scale (O-BFNES) but including only the eight straightforward (S-BFNES) items in calculating the final score.[4,16] Despite the reservations mentioned, most researchers continue to use the scale in its original format. This may be because there are limited general population data available for the revised scale and this restricts its use.[16]

Part 1: General population sample

Ethical approval for this study was granted by the relevant research ethics committee (Ref. 2035/001). In order to obtain an unbiased, large, representative, random sample of the general population, a national survey was conducted. This was undertaken via the Office for National Statistics (ONS), which runs an omnibus survey in the UK called the Opinions Survey. The ONS uses the Royal Mail Postcode Address File to draw the sample, and over 2000 addresses are selected for each survey.[17] This file contains the addresses for approximately 27 million private households in the UK and is updated every 3 months. It is the most up-to-date and complete address database in the UK.[17] By using this method of random sampling, there is an equal chance of any individual being selected and thus bias is reduced. A rigorous methodology was used to achieve the best possible response rate and sample size, including making up to eight attempts at face-to-face participant contact at different times of the day, followed by telephone contact. Participants were asked to complete the BFNES questions themselves. Demographic data including age, gender, and ethnicity were also collected during the survey.

Part 2: Clinical cohort

Ethical approval was granted by the relevant research ethics committee (09/H0719/10). All participants were recruited from one major teaching hospital site and had been accepted for orthognathic treatment but had not yet commenced presurgical orthodontics. Patients were recruited consecutively as they attended routine appointments between January 2010 and June 2011. Inclusion criteria were any patient undergoing combined orthodontic/orthognathic surgery, aged $\geq$16 years, and able to give informed consent. Exclusion criteria were patients with congenital craniofacial anomalies (e.g. due to syndromes or clefts of the lip and/or palate), patients with acquired facial defects, and those who had previously received orthognathic treatment. As for the general population sample, patients were given the BFNES to complete, and demographic data, including age and gender, were also collected.

Statistical analysis

The statistical analysis was undertaken using IBM SPSS Statistics for Windows, version 19.0 (IBM Corp., Armonk, NY, USA). Demographic data were analyzed descriptively and the results from the 12-item scale (O-BFNES) and the eight-item straightforward worded scale (S-BFNES) were tested for normality. All analyses were conducted at the 0.05 level of significance. Comparisons between groups were made using Student *t*-tests and one-way analysis of variance (ANOVA) with Bonferroni post hoc tests. Multiple linear regression was undertaken to investigate the influence of group, age, and gender on the BFNES score and to assess if there was an age/gender interaction.

The Opinions Survey data were weighted to correct for selection bias and non-response bias. This weighting system has been developed by the ONS based on Census data. In addition, weightings were applied to the raw data to correct for response bias. The weighted data were used for descriptive analyses in order to estimate population parameters, whereas the unweighted data were used in the analytical statistical tests in order to compare groups.

An a priori sample size calculation was performed with nQuery Advisor version 7.0 (Statistical Solutions Ltd, Cork, Ireland) using data from a similar study.[16] The calculation assumed unequal sized groups, with an anticipated minimum of 1000 participants in the general population group. This estimate was based on the minimum average response rate for the monthly ONS Opinions surveys.[17] The clinically significant difference in the BFNES scores was set at 10% of the total score based on clinical experience, as there was no supporting literature to guide this decision. A sample size of 31 orthognathic patients was needed to detect a difference in means of 10% on the O-BFNES scale (4.8 points) using an unpaired *t*-test with a power of 80% at the 5% level of significance. A sample size of 46 orthognathic patients was needed to detect a difference in means of 10% on the S-BFNES scale (3.2 points) using an unpaired *t*-test with a power of 80% at the 5% level of significance. Therefore, it was decided to recruit a minimum of 50 orthognathic patients to detect a clinically relevant difference for both scales, allowing for some questionnaires to be incorrectly completed or not returned.