The prevalence of eating disorders in female health care students

S. Szweda and P. Thorne

Occupational Health Department, Pendeen House, Treliske Hospital, Truro TR1 3LZ, UK

Previous research has suggested a raised prevalence of eating disorders amongst female medical students. This study aimed to test the belief, commonly held by occupational physicians, that there is also an increased prevalence of eating disorders amongst female applicants to nurse training. If correct, it implies the need for additional support and may predict increased failure to complete the course. Three groups of female students were compared: applicants to a university nurse training course, first-year medical students and a comparison group of first-year university students on courses not related to health care. Possible eating disorders were identified using two self-report instruments, the EAT-26 and the BITE questionnaires, and the body mass index. No significant statistical difference was found in the prevalence of eating disorders between the three groups, using the above measures. After controlling for age and ethnicity, 20% of the nurse applicants were found to have disordered eating patterns meriting further investigation, compared with 19% of medical students and 21% of arts students. The nursing students are being followed up to compare the progress of those with and without disordered eating patterns.

Key words: Anorexia nervosa; bulimia; eating disorders; nurse training.

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Introduction

An eating disorder is a cause of concern for occupational physicians, since it may indicate the presence of psychological illness, with consequent implications for health and work performance. Bulimics, for example, have been found to have more depression, impulsive behaviour, suicide attempts, hospitalizations, drug and alcohol abuse, and social maladjustment [1]. Anorexia nervosa is associated with considerable morbidity and mortality [2]. An 84% lifetime diagnosis of affective disorder has been reported amongst anorexia patients [3]: 65% of patients in this study had an anxiety disorder, most commonly obsessive-compulsive disorder or social phobia, and 68% had major depression. Earlier studies of anorexia nervosa found lifetime prevalence rates for major depression of 36 and 38%.

Those with eating disorders are also at risk of physical illness and injury. Individuals with severe anorexia may develop hypotension, oedema, cardiac failure, seizures, dental erosions and pancreatitis. Those with anorexia will be less strong and more prone to physical injury, e.g. to their backs. Binge–vomit syndrome (cf. bulimia) has been associated with physical complications such as dental decay, potassium depletion, urinary infections, renal failure, swollen parotids, epileptic seizures and cardiovascular failure in extreme cases.

Although eating disorders can constitute serious ill-health, they may be hidden, making it difficult to estimate their prevalence. There is evidence that they are over-represented among those who choose not to cooperate with prevalence studies, suggesting that the figures obtained may underestimate the true rate [4].

There is wide variation in the prevalence reported in the literature, and response rates have frequently been low. It is difficult to compare the results of studies, as case finding has often used measuring instruments formulated from very different diagnostic criteria. Anorexia and bulimia have been variously defined in both the International Classification of Diseases, Injuries and Causes of Death (ICD) and the Diagnostic and Statistical Manual of Mental Disorders (DSM) in the USA. Unlike earlier versions, ICD-10 (1993), the current edition, includes both diagnostic guidelines for everyday clinical use and
separate diagnostic criteria for research, bringing it closer to the DSM, which has provided operational definitions for its diagnostic terms since 1980. However, the DSM criteria for eating disorders have undergone several revisions (e.g. DSM-III 1980, DSM-IIIR 1987 and DSM-IV).

The terms ‘anorexic tendencies’ and ‘bulimic tendencies’ are used when one or more features of the disease are absent (partial syndromes) or the symptoms are not of sufficient severity (sub-threshold disorders), or both. This concept also has relevance in the question of whether these eating disorders are discrete illnesses or part of a continuum.

For the purposes of the present study, the term ‘eating disorders’ is used to include anorexia and anorexic tendencies, bulimia and bulimic tendencies, and also those significantly under- or overweight, although these may have a cause other than an eating disorder.

Prevalence within the community and within specific groups


Among female high school students, prevalences of 1% for full-syndrome eating disorders and 5% for partial-syndrome eating disorders have been reported [6]. Although care should be taken in extrapolating these results to the community at large, they are in accordance with other studies that have suggested that while ~1.5% of women have an eating disorder in its full form, another 7–10% have some, but not all, of the features of an eating disorder, i.e. full to partial disorder is in a ratio of 1:5.

The prevalence of bulimia nervosa among adolescents and young adult women was found to be ~1% in a 1990 review of over 50 research papers [4]. Other studies based on student populations have reported figures of 2.0–3.8% [7], 3.9% [8] and a lifetime prevalence of 18.6% [9].

Certain groups may have an increased prevalence of eating disorders. A study of 49 students at a ballet school [10] found that 4.1% had a diagnosis of anorexia nervosa and a further 8.2% had partial-syndrome anorexia nervosa. This was a very small sample study, given the low prevalence of anorexia nervosa, but the findings are in agreement with the 6.5% [11] and 7.0% [12] found in previous studies of dance/ballet schools. It has also been suggested that female medical students have a high prevalence of eating disorders, one study [13] reporting a 4% frequency of bulimics in this group. The lifetime history of eating disorders amongst medical students (15%) exceeded that found in a sample of shoppers in a mall [14].

Some occupational physicians believe that there is an increased prevalence of eating disorders among applicants to nurse training, though there has been little attention to this group in the literature. If this hypothesis is correct, it would imply that these nursing students, and indeed medical students, need greater support compared with their peers. Increased failure to complete the course is a possibility in those with eating disorders [1, 15, 16]. The present study is in two parts, the first of which is reported here.

The aims of the complete study are:

1. To compare the apparent prevalence of eating disorders in the applicants to a university September 1997 Project 2000 nurse training course with that found in female first-year medical students and a comparison group comprising first-year students of a university faculty of arts, media and design.
2. To allow identification of those nursing students who have a disordered eating pattern and thus permit their follow-up through training, to investigate if there is an adverse effect on the outcome of their course.

Materials and methods

Study population

The three groups studied were:

1. 235 female nurse applicants to the Project 2000 course at a local university, who had passed the interview stage but were awaiting medical clearance for the September 1997 intake. The study therefore included those who were accepted for nurse training at interview but subsequently excluded due to reasons of illness, which, in the case of nurse applicants, would include an identified eating disorder.
2. 112 female first-year university medical students, about to embark on their degree course for the September 1997 intake.
3. 185 female first-year students undertaking courses at a university faculty of arts, media and design. These formed a comparison group composed of students not undertaking courses related to the health care profession.

All three groups were at an equivalent stage of their university career. Male students were excluded from the study as they constitute only a small proportion of the nurse applicants; also, the prevalence of eating disorders amongst males is less than in females [5].

The questionnaire

The questionnaire comprised the Eating Attitudes Test (EAT-26) [17] and the Bulimic Investigatory Test, Edinburgh (BITE) [18], together with a short demographic questionnaire.
The EAT-26 is an abbreviated form of the Eating Attitudes Test (EAT-40) [19]. Both the EAT-26 and the EAT-40 are self-report measures, intended as screening instruments for identifying eating disturbances in the general population.

Based specifically on symptoms observed in anorexia nervosa, identified from a survey of clinical literature, the original EAT was developed in a 40-item, 6-point, forced-choice format, validated on two groups of female patients with anorexia nervosa (32 and 33 patients) and two groups of female controls (34 and 59 patients). A further refinement of the EAT; the EAT-26 consists of 26 of the original 40 questions. In its development, using anorexia patients and psychology students, a cut-off score of 20 was found to correctly identify 83.6% of cases. The EAT-26 was used in the present study with the same cut-off score of 20.

The BITE is a 33-item self-report measure of eating disorders devised for use in epidemiological studies concerned with incidence rates in various populations. It was formulated for use with binge eaters, and to assess the symptoms and behaviour associated with bulimia nervosa, and includes the diagnostic criteria of the DSM-III. The questionnaire is divided into two sub-scales: the symptom sub-scale, in which a score of ≥10 is taken to be suggestive of an unusual eating pattern, and the severity sub-scale, a score of ≥5 being considered clinically significant.

In validation studies [18], no subjects were misclassified using a symptom cut-off score of 20 and a severity cut-off score of 5. In the present study, the lower cut-off score of 10 was used for the BITE symptom sub-scale. This lower cut-off score is suggested by the authors as likely to reflect a sub-clinical group of subjects who have a disordered eating pattern. In the BITE severity sub-scale, a cut-off score of 5 was used.

The Short Modified Demographic Questionnaire was adapted from the optional front sheet of the BITE, in order to gather further demographic data for ascertaining the comparability of the three groups. It does not contribute to the test score.

For the purposes of this study, it was proposed that an individual would be identified as having an eating disorder if:

(a) she scored ≥20 on the EAT-26;
(b) she scored ≥10 on the symptom scale of the BITE;
(c) she scored ≥5 on the severity scale of the BITE;
(d) she had a body mass index (BMI) of ≤17.5 (this particular Quetelet’s BMI being in the ICD-10 diagnostic criteria for anorexia nervosa).

A further sub-group (e) was also identified, comprising those who had a BMI of >30 [20]. The prevalence of obesity, so defined, was not used in the statistical comparison of the groups in this study since obesity may be due to causes other than a primary eating disorder. However, this group was identified for a proposed follow-up study.

**Procedure**

**Group 1: female nurse applicants**

The study questionnaire, together with an explanatory letter, was sent to all applicants accepted on the Project 2000 course. Those students who required further assessment by a doctor following the return of their pre-employment health questionnaires were asked to bring the completed questionnaire to their appointment and the remainder returned them at the clinical session for routine immunizations, held at the start of their course.

**Group 2: female medical students**

These students were given the questionnaire on their registration day, and it was collected 1 or 2 days later at the routine student health and immunization session.

**Group 3: female arts students (comparison group)**

The questionnaire was posted to these students with their course joining documents and collected by a nurse when they registered at the university during the first week of term.

For each group, an occupational health nurse checked that the questionnaire had been completed and offered the student the opportunity to discuss any problems highlighted or to make a doctor’s appointment. Consenting students’ weight and height were measured.

To ensure the best possible response rates, those who did not return their form were contacted again and asked to complete the questionnaire, anonymously if they wished, and return it in a stamped reply envelope. They were invited to add their reasons for not taking part in the initial survey. The students were also asked to give their own height and weight measurements.

The data were entered onto a Microsoft Excel database and analysed using the Statistical Package for Social Scientists (SPSS).

**Results**

Initial response rates from the first questionnaire mailing were 73% from the nurses, 95% from the medical students and 58% from the control group. After subsequent approaches, final response rates of 90, 95 and 75%, respectively, were achieved.

The total prevalence of eating disorders in each of the three groups was calculated by identifying every individual student who had an abnormal score found by any of the measures (a–d) defined earlier.
χ² tests showed no significant difference in prevalence of eating disorders between the groups (Table 1).

Analysis of demographic factors showed that the groups were not strictly comparable in some respects. The three groups of students differed significantly in age [analysis of variance, \(F(2,436) = 22.4943, P < 0.001\)]. Nurse applicants had an average age of 23.35 (range 18–47) years, medical students 19.03 (range 18–26) years and arts students 25.11 (range 18–55) years.

There was also a difference between the groups with regard to ethnic group (\(\chi^2 = 32.415, \text{d.f.} = 2; P < 0.001\)) and social class (\(\chi^2 = 31.5475, \text{d.f.} = 2; P < 0.001;\) Tables 2 and 3).

In order to overcome the possible confounding effect of age and ethnicity, the analysis comparing prevalence was repeated on those aged ≤22 years and those of Caucasian origin only. Controlling for age and ethnicity in this way made no difference to the results. There was still no significant difference in the number of individuals in each group found to have an eating disorder identified by abnormal scores on the EAT-26 or BITE questionnaires, or the BMI (Table 4).

The groups did not differ statistically in the prevalence of eating disorders within any of the separate categories.

Group mean scores for each measure were compared using Kruskal-Wallis non-parametric tests. There was no significant difference between the means of the three groups for the BMI calculated from measured height and weight, or between their mean EAT scores. There was, however, a significant difference in the means of the three groups for both the BITE symptom and BITE severity scores (Table 5).

On the BITE symptom score, the three groups were significantly different (\(P = 0.0031\)), the medical students and the control group both having a higher score than the nurse students. The BITE severity score also differed significantly between the three groups (\(P = 0.0102\)), the control group having the greatest score (Table 5).

### Discussion

No increased prevalence of eating disorders was found amongst nurse applicants when compared with female medical students and a control group of first-year arts students. After controlling for age and ethnicity, the prevalence of eating disorders as identified by the chosen measures did not differ significantly between the three groups, and was compatible with that found in previous research.

When the mean scores of the individual measures were compared, there was no significant difference between the three groups on EAT-26 scores, but there were highly significant differences for both the BITE symptom score and the BITE severity score. These scores alone did not differentiate between the groups on the prevalence of eating disorders. The BITE questionnaire comprised only part of the measuring instruments used in this study to identify the discrete number of affected individuals in each group. The mean scores of the questionnaires for each group should not be taken as an index of pathology, but they do indicate a difference in attitudes to food, eating pattern or diet between the three groups, though this is unlikely to be clinically significant. However, attitudes may vary with time and with factors such as age, social class and peer group.

The three groups were not strictly comparable with regard to age, social class and ethnic background, these factors varying independently of each other between the

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**Table 1.** Total number of individuals in each group with an eating disorder identified by abnormal scores on the EAT-26 or the BITE questionnaires, or the BMI

<table>
<thead>
<tr>
<th>Group 1: nurse applicants (n = 212)</th>
<th>Group 2: medical students (n = 95)</th>
<th>Group 3: control group (n = 139)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. with an eating disorder (^a)</td>
<td>29</td>
<td>14</td>
</tr>
<tr>
<td>% of group</td>
<td>13.7</td>
<td>14.7</td>
</tr>
</tbody>
</table>

\(x^2 = 3.377, \text{d.f.} = 2, P = 0.185\).

**Table 2.** Ethnic origin by group

<table>
<thead>
<tr>
<th>Group 1: nurse applicants</th>
<th>Group 2: medical students</th>
<th>Group 3: arts students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caucasian</td>
<td>158 (100%)</td>
<td>74 (81.3%)</td>
</tr>
<tr>
<td>Other</td>
<td>17 (18.7%)</td>
<td>8 (6.3%)</td>
</tr>
</tbody>
</table>

**Table 3.** Social class by group

<table>
<thead>
<tr>
<th>Group 1: nurse applicants</th>
<th>Group 2: medical students</th>
<th>Group 3: arts students</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manual</td>
<td>55 (44.4%)</td>
<td>7 (8.2%)</td>
</tr>
<tr>
<td>Non-manual</td>
<td>69 (55.6%)</td>
<td>78 (91.8%)</td>
</tr>
</tbody>
</table>

**Table 4.** Number of individuals in each group, aged ≤22 years and of Caucasian origin, with an eating disorder identified by the EAT-26 or the BITE questionnaire, or the BMI

<table>
<thead>
<tr>
<th>Group 1: nurse applicants (n = 86)</th>
<th>Group 2: medical students (n = 69)</th>
<th>Group 3: control group (n = 61)</th>
</tr>
</thead>
<tbody>
<tr>
<td>No. with an eating disorder (^a)</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>% of group</td>
<td>19.8</td>
<td>18.8</td>
</tr>
</tbody>
</table>

\(x^2 = 0.126, \text{d.f.} = 2, P = 0.939\).
three groups. This must be acknowledged as a weakness in an epidemiological study, as a control group should be as similar to the study group as possible, differing only on the variable of interest—in this case the university course undertaken. With hindsight, the differences between the student groups chosen might have been predicted by scrutiny of the intake in previous years. However, we were able to control for some of these differences in the statistical analysis. Since both the nurse applicants and arts student group had age distributions skewed by a small number of older students, all students over the age of 22 were excluded, since disordered eating patterns are more common in the younger age groups. All those of an ethnic origin other than Caucasian were also excluded, partly because women of Asian origin tend to be lighter and shorter, and also because it was felt that the questionnaire had not distinguished between ethnic origin and cultural association. Eating disorders are more common in Western culture, but people from other origins may adopt the cultural patterns, including dietary ones, of a new group.

### The use of questionnaires to identify those with eating disorders

The questionnaire instruments used here—the EAT-26 and the BITE—have both been suggested, and widely used, as screening instruments for identifying eating disturbances in non-clinical samples. The questionnaires do not in themselves diagnose an eating disorder, but are viewed as a measure of concern about weight and food intake [21]. The suggested cut-off scores identify an individual as having a disordered eating pattern that warrants further investigation. In order to make the clinical diagnosis of an eating disorder, that person would need to be seen individually so that her attitudes, concerns and lifestyle could be explored further in conjunction with a medical examination.

Both the EAT and the BITE are easily and quickly completed by the subject and scored by the physician or researcher. They both have a high sensitivity, but, because both anorexia and bulimia are rare conditions, they also have low specificity, giving rise to some concern regarding their positive predictive value. The two instruments and the BMI were used here in combination in order to increase the positive predictive value in identifying those with apparent eating disorders.

Consideration also needs to be given to the question of whether questionnaires are completed truthfully. Both the EAT-26 and the BITE are forced-choice questionnaires in which the ‘normal’ answers for most of the questions are easily found. Issuing the questionnaire some time prior to collection provided an opportunity for collusion, but in this case all the students were ‘freshers’ in the first week of their course, who would not have had time to form friendships among themselves. Eating disorders are very personal to the sufferer and an individual may wish to hide a disordered eating pattern from herself, others or both. Although the students received written assurances that the results of the survey would be confidential and would have no effect on their careers, anxiety persisted that there was an ulterior motive for the study. It is common knowledge, for example, that eating disorders can be a barrier to becoming a student nurse. However, the questionnaires identified eating disorders in each group, hopefully refuting any speculation of untruthful answers from any specific group.

The interpretation of the statistical analysis assumes that the results from the respondents are representative of the groups as a whole and that those with an eating disorder are no more likely to choose not to respond to the questionnaire [4]. Some bias may have been introduced by the inclusion of posted questionnaires from those who did not hand them in as first requested. These responses did, however, yield additional information in the reasons for not responding the first time. These included embarrassment about perceived obesity, dislike of forms in general and forms about eating habits in particular, and concerns about the confidentiality and truthfulness of replies.

### The use of the BMI to identify those with an eating disorder

The student’s BMI was also used to identify those with anorexia nervosa and anorexic tendencies (BMI < 17.5) and those who were obese (BMI > 30). Those with bulimia and bulimic tendencies would not be so identified as they are often of normal weight.

In some cases, actual measurements of height and
weight for calculating the BMI were not available, but the students had reported these measures themselves. Since there is a tendency, particularly amongst young women, to overestimate height and underestimate weight [22], the validity of self-declared measurements was tested by comparing measured and self-reported height and weight for those students for whom both were available. No statistical difference was found, and so in this study, BMIs calculated from either measured or declared height and weight were used.

Implications for future health and performance

Previous research tends to support the hypothesis that those who suffer with an eating disorder will suffer from an increase of ill-health, both psychiatric and physical, and associated sickness absence. There is an increased risk of non-completion of the course [1, 15]. Nurse training and medical studies are both demanding courses, and those who suffer with an eating disorder may also be more vulnerable to a recurrence or exacerbation of their illness if under stress or pressure. However, ‘eating disorders’ is a broad term, and those who suffer with them should not be considered a homogeneous group. A recent 5 year study of patients with eating disorders [2] identified very different predictors of outcome for the different diagnostic groups. More research is needed into the effects of these disorders on careers, and in particular those in the caring professions, where stress can be increased by caring for patients who are themselves vulnerable.

A follow-up study of the nurses from the September 1997 intake to the Project 2000 course is planned, which will compare the progress of: (i) those identified in this study as possibly having an eating disorder; (ii) those significantly overweight, as identified by BMI, but not included in category (i) above; and (iii) those not included in categories (i) and (ii).

Conclusion

The prevalence of eating disorders as determined using the EAT-26, BITE and student’s BMI was not found to differ statistically between nurse applicants, female medical students and a control group from the faculty of arts, media and design. However, this method has identified a sub-group of student nurses who have unusual eating attitudes, and a follow-up study is planned to examine the outcome of these students and their peers in the same group.

Acknowledgements

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