Female medical students are estimated to have a higher risk for developing eating disorders than male medical students

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ABSTRACT

INTRODUCTION: Studies show that university students are at risk for eating disorders. However, risk behaviour has not been studied among Danish medical students, nor have the gender differences in risk behaviour been described in a Danish context.

MATERIAL AND METHODS: All first-year medical students (n = 979) received a questionnaire related to body perception, exercise habits, eating habits, height and weight in the fall of 2006 and 2007. The response rate was 57% (n = 561). The gender distribution of the study population was 71.8% females and 28.2% males and the average age was 21.5 years.

RESULTS: More males (89.8%) than females (73.1%) were satisfied with their body and more females (34.8%) than males (10.9%) felt too fat. More females (42.7%) than males (19.9%) felt guilty when eating unhealthy food. 2.3% (all females) claimed to feel anxiety when they were about to eat. More males (48.4%) than females (28.6%) stated that they could not keep themselves from exercising. 13.5% of the underweight females (body mass index < 20 kg/m^2) felt too fat, while none of the underweight males had this perception. In average, females and males displayed 2.8 and 2.1 risk behaviours, respectively.

CONCLUSION: Female medical students have a drive for thinness and male medical students want to be muscular. More female than male students have a negative body perception. Female medical students are estimated to have a higher risk for developing eating disorders than male students. Future research in this area should address the causes of such behaviour.

Approximately 5-700 new cases of anorexia nervosa and bulimia nervosa are registered every year in Denmark and it is estimated that approximately 55,650 Danish women aged 15-45 years are living with either diagnosed or undiagnosed anorexia nervosa, bulimia nervosa or binge eating disorder [1]. It is suggested that eating disorders should not only be viewed as the ''classic'' eating disorders that meet the diagnostic criteria, but should be perceived more broadly; i.e. that the concept should include a wider range of risk behaviours for eating disorders [2].

In line with this, studies show that students in higher education show risk behaviours that can develop into eating disorders. Body dissatisfaction, dieting, compulsory exercise and binge eating are reported to be highly prevalent in college populations [3-5]. A Spanish and an American study found that approximately 20% of the female students and 10–15% of the male students were at risk of developing eating disorders as estimated with the Eating Disorder Inventory (EDI)-2 scale and the Eating Among Teens (EAT)-26 scale, respectively [6, 7]. Though often considered a resourceful group, medical students were shown in one study to be at particular risk for eating disorders compared with students in other study programmes [8].

Hence, it is relevant to focus on risk behaviour among students that may later develop into a diagnostic eating disorder. However, only little attention has been given to risk behaviour for eating disorders among university students in a Danish context. Besides a study conducted by Waaddegaard & Petersson in 1995, which investigated the prevalence of bulimia nervosa-related behaviour among Danish medical students [9], no studies have been conducted to examine risk behaviour for eating disorders among Danish university students.

Studies investigating eating disorder often focus on females. However, studies show that males' risk for developing eating disorders is increasing [7]. In order for health professionals to be capable of detecting risk behaviour for eating disorder in both females and males, it is therefore relevant to investigate the risk behaviour of both genders and to highlight how they differ.

The purpose of this article was to estimate the prevalence of risk behaviour that may develop into a diagnostic eating disorder and to describe how such behaviour differs between males and females in a population of medical students.

Risk behaviour was investigated by examining body perception, eating habits and exercise habits among the students. These parameters are suggested as indicators for risk behaviour for eating disorders [10]. Body mass index (BMI) was measured and compared with the parameters for risk behaviour.

ORIGINAL ARTICLE

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TABLE 1

Body perception, eating habits and exercise habits by gender.

	n (%)				
	female	male	total	p value, χ^2-test	Difference in proportion, percentage point (95% CI)
Body perception					
''I like my body'' (n = 551)	288 (73.1)	141 (89.8)	429 (77.9)	< 0.001	16.7 (10.3;23.5)
''I feel too fat'' (n = 553)	138 (34.8)	17 (10.9)	155 (28)	< 0.001	23.9 (17.1;30.7)
Eating habits					
''I avoid fatty constituents in my diet'' (n = 555)	279 (70.1)	83 (52.9)	362 (65.2)	0.002	17.2 (8.2;26.2)
''I am often on a diet'' (n = 553)	67 (16.9)	3 (1.9)	70 (12.7)	< 0.001	15.0 (10.1;19.3)
''I feel guilty when I eat unhealthily'' (n = 552)	169 (42.7)	31 (19.9)	200 (36.2)	< 0.001	22.8 (14.9;30.8)
''I feel anxious when I am about to eat'' (n = 554)	9 (2.3)	0 (0)	9 (2.3)	–	–
Exercise habits					
''I exercise on a daily basis'' (n = 555)	180 (45.2)	81 (51.6)	261 (47)	0.383	6.4 (–2.8;15.6)
''I exercise because it is healthy'' (n = 555)	347 (87)	129 (82.7)	476 (85.8)	0.538	4.3 (–2.5;11.1)
''I can't keep myself from exercising'' (n = 553)	114 (28.6)	75 (48.4)	189 (34.2)	< 0.001	19.8 (10.8;28.8)

CI = confidence interval.

MATERIAL AND METHODS

Data collection

Data derive from the follow-up study ''From Student to Graduate''. This article is based on the data that were collected at baseline.

In the fall of 2006 and 2007, all new medical students at the University of Copenhagen received a paper-based questionnaire (n = 979), which was handed out after a lecture to participating students or sent by mail to the student's home address. In total, 672 females and 307 males were enrolled in 2006 and 2007. Subjects who did not return the questionnaire received up to two e-mail reminders in the form of an electronic version of the questionnaire. The questionnaire was pilot-tested by 20 students who were subsequently interviewed individually about their understanding of the questions. Uncertainties and misleading questions were revised based on the pilot test.

Study population

The response rate was 57% (n = 561). In the study population, the average age was 21.5 years, females comprised 71.8% and males 28.2%, and 81.5% came from social classes 1 and 2 [11]. According to a drop-out analysis reported elsewhere [12], significantly more female than male students responded to the questionnaire, and younger students responded more frequently than older students.

Measurements

Using Likert scales, body perception was quantified by asking the students to declare if they would agree to the statements ''I like my body'' and ''I feel too fat''. Eating habits were quantified by the statements ''I avoid fatty constituents in my diet'', ''I am often on a diet'', ''I feel guilty when I eat unhealthily" and ''I feel anxious when I am about to eat''. Regarding exercise habits, the students were to declare if they would agree to the statements; ''I exercise on a daily basis'', ''I can't keep myself from exercising'' and ''I exercise because it is healthy''.

BMI was measured via the students' self-reported height and weight.

The BMI was calculated for each person using the formula weight/(height^2). Three weight categories were defined; BMI < 20 kg/m^2 = underweight, BMI 20-25 kg/m^2 = normal weight, and BMI > 25 kg/m^2 = overweight. This categorization ensured comparability with results from an earlier study concerning the BMI of medical students at the University of Copenhagen [8]. The results of analyses in which underweight was defined as BMI < 18.5 kg/m^2 are also shown in this article.

Ethics

This study complies with the Helsinki II Declaration about informed consent, voluntariness and anonymity. Permission was given by the Danish Data Protection Agency and the studies were carried out in association with the Study Committee of Medicine at the University of Copenhagen.

Statistical analysis

The statistical analyses were conducted in SPSS 15.0. Correlations were tested with χ^2-test, trends were tested with γ-test, and differences in means were tested with Student's t-test. Logistic regression was used to assess the effect modification of BMI and gender on body perception. All tests were assessed at a 5% significance level.

TABLE 2

Body mass index by gender (n = 55).

	BMI definition 1, n (%)				BMI definition 2, n (%)					
	under-weight: BMI < 20 kg/m²	normal weight: BMI 20-25 kg/m²	over-weight: BMI > 25 kg/m²	p value, γ-test: 0.556	under-weight: BMI < 18.5-25 kg/m²	normal weight: BMI 18.5-25 kg/m²	over-weight: BMI > 25 kg/m²	p value γ-test: 0.309	Mean BMI, kg/m² (CI 95%)	Difference in mean BMI kg/m² (95% CI)
Female	106 (26.8)	260 (65.8)	29 (7.3)	< 0.001	30 (7.6)	336 (85.1)	29 (7.3)	0.016	21.4 (21.2;21.7)	1.3 (0.9;1.7)[a]
Male	6 (3.9)	134 (86.5)	15 (9.7)		3 (1.9)	137 (88.4)	15 (9.7)		22.7 (22.5;23)	

a) Students t-test: p < 0.001.

TABLE 3

Body perception in relation to body mass index (BMI).

	Underweight: BMI < 20 kg/m²		Normal weight: BMI 20-25 kg/m²		Overweight: BMI > 25 kg/m²	
	female	male	female	male	female	male
"I feel too fat"[a] (n = 546)						
Yes, n (%)	14 (13.5)	0 (0)	98 (37.8)	8 (6)	25 (86.2)	9 (60)
Total, n (%)	104 (100)	6 (100)	259 (100)	133 (100)	29 (100)	15 (100)
γ (p value)	–1.000 (0.026)		–0.810, (≤ 0.001)		–0.613 (0.069)	
"I like my body"[b] (n = 544)						
Yes, n (%)	94 (89.5)	6 (100)	179 (70.2)	126 (94)	11 (37.9)	8 (53.3)
Total, n (%)	105 (100)	6 (100)	255 (100)	134 (100)	29 (100)	15 (100)
γ (p value)	1.000 (0.034)		0.740 (< 0.001)		0.303 (0.330)	

BMI = Body mass index.

a) Logistic regression using Wald test: interaction BMI vs gender, p < 0.001.

b) Logistic regression using Wald test: interaction BMI vs gender, p = 0.238.

RESULTS

Body perception

As appears from **Table 1**, 77.9% of the medical students agreed to the statement ''I like my body''. However, this agreement differed significantly among genders: 89.8% of the males and 73.1% of the females were in agreement with the statement (χ^2: p < 0.001). The same pattern applied to the statement ''I feel too fat'': 10.9% of the males and 34.8% of the females agreed to this statement (χ^2: p < 0.001).

Eating habits

52.9% of the males and 70.1% of the females avoided fatty constituents in their diet (χ^2: p = 0.002). A significant gender difference was also observed for diet (χ^2: p < 0.001): 1.9% of the males stated that they often got on a diet, whereas this applied to 16.9% of the females.

Feeling guilty about eating unhealthily was common among the students. This feeling was reported by 36.2% of all students: 42.7% of the females and 19.9% of the males (χ^2: p < 0.001). Even though the feeling of guilt was common among the students, only 2.3% (all females) claimed that they felt anxiety when they were about to eat.

Exercise habits

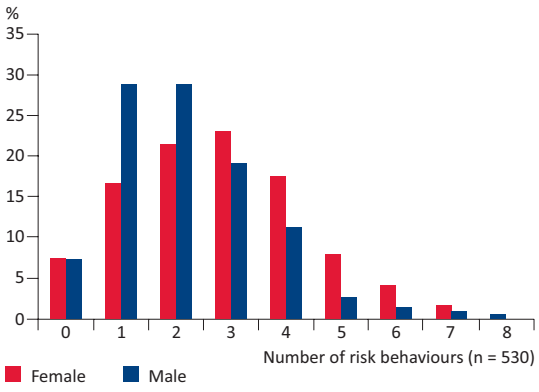
Concerning gender and exercise habits, the overall picture was slightly different from the pattern of body perception and eating habits. Thus, 47% of the students stated to exercise on a daily basis. This applied to 51.6% of the males and 45.2% of the females (χ^2: p = 0.383). Regarding motivation for doing exercise, almost an equal number of males (82.7%) and females (87%) stated that they exercised because it was healthy (χ^2: p = 0.538). Contrary to this, significantly more males than females stated that they could not keep themselves from exercising, viz. 48.4% and 28.6% (χ^2: p < 0.001).

Body mass index

It is seen in **Table 2** that more females than males are found in the lower weight categories (γ: p < 0.001). Females had an average BMI of 21.4 kg/m^2, males an average BMI of 22.7 kg/m^2 (t-test: p < 0.001). A total of 3.9% of the males and 26.8% of the females were underweight. However, these figures are modified if the category ''Underweight'' is defined by a BMI < 18.5 kg/m^2. This would yield an underweight percentage of 7.6% among females and 1.9% among males (γ: p = 0.016). Overweight was seen in 9.7% of the males and 7.3% of the females. **Table 3** shows body perception in relation to BMI. It is noteworthy that 13.5% of the underweight females (BMI < 20 kg/m^2) felt too fat, while none of the underweight males had this perception (γ: p = 0.026). 37.8% of the females who were of normal weight and

FIGURE 1

Distribution of risk behaviours according to gender[a].



a) Female mean (95% CI): 2.8 (2.6;3.0).
Male mean (95% CI): 2.1 (1.9;2.4).
Mean difference (95% CI): 0.6 (0.4;0.9), p > 0.001.
CI = confidence interval.

6% of the corresponding males felt too fat (γ: p < 0.001). A logistic regression showed interaction between gender and BMI on body perception (p < 0.001). 70.2% of the females of normal weight and 94% of the males who were of normal weight liked their body (γ: p < 0.001).

Distribution of risk behaviours

Figure 1 shows the percentage of students in terms of overall risk behaviour. The highest percentage of female students appears in the category with three risk behaviours, whereas the highest percentage of male students lies in the categories with one and two risk behaviours. Generally, females display more risk behaviour (2.8) than males (2.1) (p < 0.001).

DISCUSSION

As assessed from body perception, eating habits, exercise habits and BMI, more female medical students displayed risk behaviours than male medical students. More females than males avoided fatty constituents in their diet, went on a slimming diet, felt guilty when eating unhealthily and felt too fat. Moreover, 2.3% of the females stated that they felt anxiety when they were about to eat. Feeling anxiety when eating indicates the presence of an undiagnosed eating disorder rather than the actual presence of risk behaviour for eating disorder. On the other hand, more males than females stated that they could not keep themselves from exercising. These results mirror those reported in other studies, where it has been concluded that females are striving towards a slim body ideal [3, 4] and therefore are preoccupied with diets and healthy food, whereas males want to be both slim and muscular [13, 14] and therefore are preoccupied with exercising. Excessive weight lifting and steroid abuse have been reported elsewhere among male students [15, 16] and suggests that male students adopt different body-image-related behaviours than female students when they are stressed and unsecure. Still, there is broad consensus that diagnostic eating disorders among males are clinically similar to eating disorders among females [17].

Body ideals exist for both genders and they to some extent define the students' behaviour, but it is noteworthy that far fewer female than male students are satisfied with their body (73.1% versus 89.8%). This result is consistent with an American study, which found that female university students disliked their bodies to a larger extent than their male fellow students. Thus, female students are at higher risk than male students for developing eating disorders like anorexia nervosa and bulimia nervosa [3]. Another American study has shown how young females who pass from high school to college experience a negative change in their self image. This change involves a decreased belief in their academic abilities, decreased social self-confidence and perceived less popularity with boys and men. They found an association between this change and the development of eating disorders [18].

The present study estimated that 26.8% of the females were underweight and that 13.5% of these females felt too fat. In a population of 191 medical students at the University of Copenhagen, Waadegaard & Petersson [9] found that 30% of the female students were underweight and 2.7% of these females felt too fat (estimated from BMI < 20 kg/m^2 = underweight) [9]. Compared with the present study, this suggests that around the same proportion of female medical student are underweight, but among these underweight female students, more feel too fat today compared with female medical students in 1994. The prevalence of obesity has increased over the past decades which have also been seen a stronger idealization of a slim body ideal in the media and

Students in the reading room.

on the part of health authorities [19]. Internalization of the stronger emphasis on thinness may explain why more underweight female medical students perceive themselves as fat today than in 1994. In addition, the proportion of medical students seeking professional help because of psychological problems has increased markedly. In 1992, 6% of the first-year female medical students at the University of Copenhagen reported receiving professional help because of psychological problems [20]. This number has risen to 24.3% among the first-year female medical students in the 2006/2007 population [12] and indicates an increased vulnerability among the students. The average BMI for males and females was approximately the same in this study as in the 1994 study, where the female BMI was in the lower part of the normal weight area (around 21 kg/m^2) and the male BMI in the upper part of the normal weight area (around 23 kg/m^2). It should be considered whether social desirability bias has had an effect on these results as height and weight in this study are self-reported.

Generalization and future research

The results are based on a highly selected group, medical students, the majority of whom derive from social groups 1 and 2. This group differs from the social composition in the rest of the Danish population [12]. However, it is reasonable to extrapolate these results to other Danish medical students and to some extent to other health-care students as well. In doing so, it is important to consider the relatively low response rate (57%). Considering the dropout analysis, there is limited room for generalization of the results of this study to male students and older students.

This study found that Danish medical students to a certain extent showed a behaviour that could lead to eating disorders and that mainly the females were at risk. It is important to note that body-image related behaviour is expressed differently among male and female medical students. The high prevalence of sub-clinical behaviour among the students calls for preventive strategies. However, it is necessary to perform further research addressing the causes of this behaviour in a Danish context in order to design proper preventive strategies.

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