Eating problems in Irish children and adolescence – EPICA

Fiona McNicolas, Barbara Dooley, Leonie Keogh, Alma Lydon, Ruth Lennon, Sinead Ahern, Ciaran Coyle, Aoife Whelan, Linda O Donoghue

Abstract

Objectives: To examine eating concerns in a cohort of Irish adolescents.

Methods: Students from a stratified random sample of post primary schools were screened using the EAT-26, the EDI-III and a study specific questionnaire.

Results: A total of 3,031 students (mean age 14.74, range 12-19) enrolled in the study. The majority of respondents felt popular (91%), happy (75.2%) and perceived themselves to have a good quality of life (86.8%). Despite this, 32% of females dieted, 29.4% were dissatisfied with their bodies, and 10.8% scored above 20 on the EAT-26. Adolescents always on a diet reported a lower quality of life (QoL) X^2(16, N=2,961) =144.43, p <.000, perceived themselves to be less popular X^2(15, N=2,963) =53.26, p <.000 and less academically able X^2(16, N=2,297) =43.96, p<.000, than those who never dieted. Comparing EPICA values to published norms,[6] Irish males had significantly lower EAT scores, females had comparable total EAT-26 scores but significantly lower levels of dieting and higher levels of bulimic features and oral control. Girls in mixed schools had higher rates of body dissatisfaction F (1,2855) = 16.61, p <.001 and drive for thinness F (1,2860) = 11.78, p <.005 than girls attending same sex schools.

Conclusions: Weight and body image concerns were high among Irish adolescents, especially females, with higher than expected levels of bulimia and oral control scores on the EAT but lower scores on the dieting subscale. Females attending mixed sex schools appear most at risk of eating pathology.

Key words: Eating disorders; Anorexia nervosa; Bulimia nervosa; Adolescence; Irish students.

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Eating disorders pose a considerable threat to the health and wellbeing of adolescents and adults in the western world. When compared with other major psychiatric disorders, eating disorders have the highest mortality rate resulting from medical complications and by completed suicides.[1] The prevalence rates in adolescent females may have increased over recent years but the severity decreased, with estimates of approximately 0.5-1% for anorexia nervosa, 2% for bulimia nervosa and 4-5% for partial presentations of these syndromes.[2] Preoccupation with weight and shape and dieting behaviours are far more prevalent. Dieting has been found to be the most significant predictor of new cases of eating disorders[3,4] and to predict the onset of binging, purging and bulimia in non-clinical adolescent females.[5] Despite receiving increased attention in psychiatric literature internationally in recent years, there is little information on eating concerns and dieting behaviours in Irish adolescents. This study was developed to establish the eating, dieting and exercise habits of secondary school children in Ireland.

Methodology

Ethical approval was received from the national ethics committee. Schools were randomly selected from the Department of Education and Science database of 743 second level schools in order to provide a representative sample of Irish post-primary students. Schools were broken down into health board area and classified according to size (< 100 to 800+), single/mixed gender and fee paying/non-fee paying categories. A total of 136 schools were approached to reach the pre-determined sample of 48 schools, yielding a 35.29% participation rate. To ensure the schools that opted into the study fitted the national distribution of schools a series of chi-square analyses was conducted to determine the goodness of fit of the sample. It emerged that the sample was a good fit for health board region X^2(7, N=743) = 8.52, p > .05; single/mixed gender X^2(1, N=743) = 4.01, p > .05; and fee/non fee paying X^2(1, N=743) = 1.8, p > .05. School size was found to have over representation of middle sized schools (size=< 500) X^2(5, N=743) = 23.8, p <.05; (31% nationally versus 54% in current sample).

Principals were contacted, the aims of the study explained to them, and an information pack sent out. Following principal agreement, information leaflets were sent to the school for distribution to parents. For administrative purposes the principal chose which year groups became involved in the study and how many classes were targeted. Leaflets were distributed to each student within the selected classes. Once signed parental and adolescent consent forms had been returned, a researcher travelled to the school and administered the questionnaire pack in a classroom setting. Students who had

Table 1: BMI and demographic variables of the sample

	All participants (2,598)	Boys (1,049)	Girls (n= 1,549)
BMI mean (unadjusted)	20.67 (sd= 3.66)	20.73 (sd=3.47)	20.63 (sd=3.79)
% Overweight/ Obese (age adjusted)	27.4% (705)	30.4% (315)	25.4% (390)
% Normal weight (age adjusted)	52.6% (1,353)	51.7% (536)	53.2% (817)
% underweight/emaciated (age adjusted)	20% (705)	17.9% (186)	21.5% (330)
Mean age menarche	–	–	12.36 (range: 7-18yrs old)
QOL: A little/lot worse than my friends	13.2% (n= 392)	10% (n= 117)	15.2% (n= 275)
QOL: The same/better as my friends	86.8% (n= 2,588)	90% (n= 1,055)	84.8% (n= 1,533)
Mood: I feel "quite happy" or "very happy"	75.2% (n=2252)	77.7% (n=920)	73.6% (n=1332)
Mood: I don't feel happy or sad	20.4% (n=610)	18.9% (n=224)	21.3% (n=386)
Mood: I feel "quite sad" or "very sad"	4.4% (n=132)	3.3% (n=39)	5.1% (n=93)
Mood: Not popular at all or not very popular	9% (n=268)	7.6% (n=90)	9.8% (n=178)
Popular or very popular	91% (n=2713)	92.4% (n=1083)	90.2% (n=1630)
Very poor or Poor school work	8.3% (251)	9.2% (109)	7.8% (142)
Average school work	32.6% (977)	33.3% (393)	32.2% (584)
Good school work	43% (1286)	43.3% (511)	42.7% (775)
Very Good school work	16% (480)	14.1% (166)	17.3% (314)

not returned consent forms were unable to participate in the study and sat quietly doing other class work. Response rate is difficult to ascertain due to gate-keeping at school level and obtaining signed opt in consent from both parent and adolescent. However, as an estimate of response rate the following data represent the return percentage based on total school enrolment. Overall response rate 20% (minimum 3% maximum 62%). This pattern was similar for single sex schools M=20% (minimum 3%, maximum 62%) and mixed sex schools M=19% (minimum 3% and maximum 59%).

The questionnaire pack comprised the EAT-26[6], the EDI-III[7] and a brief study specific demographic questionnaire (SSQ) eliciting demographic details, ie. gender, age, social class, class year, type of school attending, body image and exercise habits, age at menarche and menstruation. The EAT-26 is a self-report measure consisting of 26 forced choice questions assessing abnormal eating attitudes and behaviours. It has good psychometric properties and scores above 20 are regarded as clinically significant. The Eating Disorders Inventory (EDI-III) is another well-recognised self-report measure of symptoms commonly associated with eating disorders. Three main subscales of interest to this study were drive for thinness, bulimia and body dissatisfaction. Suggested cut offs are described for 'clinical' (at risk) and 'elevated clinical' levels. The participants were asked to report their height and weight. Body mass index (BMI) was calculated and then classified using age adjusted BMI categories.

Results
General demographics
Completed consents were received from 1,841 females (mean age = 14.75 years, sd =1.67) and 1190 males (mean age = 14.72, sd = 1.58) with an age range 12-19 years. School type data included the following: 78.2% of respondents attended a rural school and 54.3% of respondents attended a single sexed school, 70.8% (2,106) were attending Roman Catholic schools and 25.3% (751) attending

multi-denominational schools. Some 94.5% of the students were attending a non-fee paying school.

The mean unadjusted BMI of the sample was 20.67 (sd=3.66). Some 52.6% were in the normal BMI range while 27.4% were classified as overweight or obese and 20% as underweight or emaciated *(see Table 1)*. The mean age of menarche was 12 years old, and the age range was from seven to 18 years old.

The majority of adolescents surveyed reported a good quality of life. A total of 86.8% (2,588) felt that their quality of life was "the same as" or "better than" their friends, and 91% (2,713) felt that they were "moderately popular" or "very popular". Some 75.2% (2,252) rated themselves as feeling "quite happy" or "very happy" and 43% (1,286) of the sample reported that their school work was "good".

Exercise, dieting and body satisfaction
Almost a third (32%, 583) of females reported dieting "sometimes", "often", or "always", with 19.6% (356) of the females currently on a diet and a further 32.7% (596) wanting to lose some weight. Fewer males (14.1%, 166) reported dieting "sometimes" or "frequently". Only 10.8% (128) of the males reported to being on a diet currently. A total of 17.5% (206) males felt that they should lose some weight while 9.3% (110) of males wanted to gain weight. Only 3.2% (59) of females reported wanting to gain some weight.

Students were asked to rate their level of body satisfaction in general. More than a fifth of the sample, (22%, N=655) were 'not' satisfied. Altogether 29.4% (533) of females reported being dissatisfied with their bodies compared to only 10.4% (122) of males who reported the same.

Students were also asked to rate how frequently they exercised. Some 71% (1,291) of females and 88.3% (1,038) of males exercised at least 2-3 times per week. Almost 10% (9.8%, 179) of females and 3.1% (30) of males exercised once per month or less.

Adolescents who never dieted were more likely to exercise

Table 2. Mean scores of total, male and female participants and published norms on all subscales of the EAT-26

EAT-26 Total (& subscales)	Total Mean (sd)	Male Mean (sd)	Male Norms Garner (1982)	Female Mean (sd)	Female Norms Garner (1982)
Total score (range 0-78)	6.52 (7.96)	4.54 (5.53)	7.60 * t (1,172) = -18.94, p <.000	7.8 (8.96)	8.05 t (1,828) = -1.18, p >.05
Dieting (subscale 0-39)	3.46 (5.64)	1.84 (3.65)	4.85 * t (1,120) = -27.57, p < .000	4.5 (6.39)	5.26 * t (1,753) = -4.94, p <.000
Bulimia (subscale 0-18)	1.35 (1.87)	1.1 (1.54)	1.21* t (1,123) = -2.27, p <.05	1.5 (2.04)	1.28 * t (1,768) = 4.7, p < .000
Oral control (subscale 0-21)	1.74 (2.43)	1.62 (2.15)	1.55 t (1,137) = 1.17, p >.05	1.82 (2.6)	1.53 * t (1,777) = 4.69, p <.000

frequently X^2(24, N=2,981) = 50.82, p<.001 Conversely adolescents always on a diet reported a lower quality of life X^2(16, N=2,961) = 144.43, p<.000, perceived themselves to be less popular X^2(15, N=2,963) = 53.26, df=16, p<.000) and less academically able X^2(16, N=2,973) = 43.96, p<.000, than those never dieted.

Eating psychopathology: EAT-26

A total of 3,002 students (99%) completed the EAT-26 questionnaire. The mean score for the total sample was 6.52 (sd=7.96) with females' mean scores being higher than males', t (3,000) = 11.17, p <.000; 7.8 (sd=8.96, range 0-68) and 4.54 (sd=5.53, range 0-72) respectively. 7.6% of the total sample (n= 227) scored above the clinical cut off (>20) on the EAT-26. Some 10.9% (n=199)of girls scored > 20 on the EAT and 2.4% (n=28) of boys. Females consistently showed significantly higher eating concerns than males in each of the three EAT-26 subscales (bulimia t (2,809) =6.02, p< .000; oral control t (2,728) = 2.20, p <.000 dieting t 2,839) =14.20, p <.000).

Comparing EPICA values to published norms,[6] Irish females had comparable total EAT-26 scores but significantly lower levels of dieting and higher levels of bulimic features and oral control. Irish males had significantly lower overall scores, lower levels of dieting and lower bulimic features *(see Table 2).*

Factors associated with EAT Scores

Adolescents who scored above the cut off on the EAT-26 were significantly more likely to: be a frequent dieter X^2(3, N=2,968) = 596.65, df=4, p<.001, be currently on a diet X^2(3, N=2,971) 353.08, p <.000. They were also more likely to be overweight or obese X^2=(5, N=2,553) = 35.82, p<.000 and attend a multi-denominational school F (2, 2965) =5.342, p <.05. Further analysis was conducted comparing students, who were actively engaged in behaviour to lose weight, ie. currently dieting as opposed to believing they should. Students actively engaged in trying to lose weight

were significantly more likely to score above 20 on the EAT-26 when compared to students who were not on a diet but reported wanting to lose weight X^2(1, N=2,968) =252.67, p <.000.

Eating psychopathology: EDI-III

Female responses on the EDI-III showed that 34% (581) exhibited significant body dissatisfaction, 27.2% (473) exhibited clinical and elevated clinical levels of bulimia and 16.9% (291) showed a significant drive for thinness. The corresponding scores for males were: 7% (75), 12.1% (132), and 2.9% (32) respectively. Females also showed significantly higher levels of eating concerns than males on all 3 subscales of the EDI-III; bulimia t (2,782) =9.91, p <.000; drive for thinness t (2,824)=20.41; p <.000 and body dissatisfaction t (2,678) =24.17, p <.000.

School environment and eating psychopathology

The school environment was looked at both in terms of its location (urban/rural) and gender mix (single/sexed/mixed). As gender and school location (urban/rural) were associated X^2(1, N=3,031) = 15.47, p<.05, with more girls in urban schools than expected, gender was entered as a covariate in analysing eating psychopathology with respect to school location. When controlling for gender it was observed that adolescents in urban schools reported higher bulimia scores F (1,3006) = 7.24, p <.01 (M=3.45, vs M=2.81) than rural adolescents. School location was not found to have an effect on any other eating pathology variable. To look at the factors associated with bulimia more closely regression analysis was used. Using a stepwise method to predict bulimia the order of prediction was as follows: gender, BMI, frequency of exercise and school location. Higher scores on bulimia were associated with being female t (2,768) = 9.53, p <.001; higher BMI t (2,767) = 6.02, p <.001; lower frequency of exercise t (2,766) = -4.92, p <.001 and urban school t (2,765) = -3.16, p <.005. The percentage of variance accounted for by the model was 6%.

Table 3: EDI subscale, mean scores and pathological for gender

Subscale	Total	Typical clinical or elevated clinical range	Males	Typical clinical or elevated clinical range	Females	Typical clinical or elevated clinical range
Body dissatisfaction	13.2 (sd=11)	23.7% (656)	7.71 (sd=8.26)	7% (75)	16.65 (sd=11.12)	34% (581)
Bulimia	2.9 (sd=4.5)	21.4% (606)	2.01 (sd=3.56)	12.1% (133)	3.60 (sd=4.94)	27.2% (473)
Drive for thinness	5.9 (sd=6.8)	19.4% (323)	3.09 (sd=4.53)	2.9% (32)	7.71 (sd=7.52)	16.9% (291)

*The cut-off scores (typical clinical range and elevated clinical range) are based on the EDI-3 interpretive guidelines and guide tables listing the clinical ranges. (There are 3 clinical ranges in total: Elevated clinical, typical clinical and low clinical). The reference group that the EDI authors use for the interpretive guide tables is the US Adult Combined clinical sample.

To look at the role gender mix of the school had on eating pathology the gender of the adolescent and gender mix of the school were entered into the factorial analysis. An ordinal interaction was observed for body dissatisfaction $F_{(1,2855)}$ = 7.28, p <.01. Tests of simple effects found that girls in mixed gender schools reported significantly higher levels of body dissatisfaction than girls in single sexed schools $F_{(1,2855)}$ = 16.61, p <.005; (M=15.8 vs M=18.89). Gender mix of school did not affect boys $F_{(1,2855)}$ = 1.74, p >.05; (single sex M=7.81, mixed gender M=7.78). The same ordinal interaction was observed for drive for thinness $F_{(1,2860)}$ = 5.82, p <.05. Using tests of simple effects again the effect was only observed in the girls $F_{(1,2855)}$ = 11.78, p <.005; (single sex M=7.1 vs mixed M=8.2). No interaction was observed for bulimia $F_{(1,2855)}$ = 1.80, p >.05. Overall, girls reported significantly higher levels of body dissatisfaction F ((M=16.85 vs M=7.79), drive for thinness (M=7.67 vs M=3.19) and bulimia (M=3.57 vs M=2.04) than boys. Finally looking at total EAT scores and gender mix, no interaction was observed $F_{(1, 2844)}$ =2.27, p >.05. Overall, a significant main effect was observed for gender $F_{(1,2844)}$ =111.26, p <.000, where females (M=7.55) reported higher EAT scores than males (M=4.58). No main effect was observed for the gender mix of school $F_{(1,2844)}$ =1.23, p >.05. An inspection of the cell means noted that girls in single-sexed school (M=7.39) were reporting lower scores on the EAT than those attending mixed gender schools (M=8.2). To test if this effect was statistical an independent t-test was carried out on girls only and school type. Using a two tailed test an approaching significant effect was observed, $t_{(1652)}$ =1.89, p=.058.

Students who scored higher on the EAT generally also scored higher on the EDI subscales. Specifically, an association existed between students who scored in the clinical range of the EAT-26 and between students who scored significantly higher on the EDI drive for thinness subscale $t_{(2,986)}$ =36.46, p <.000, the EDI bulimia subscale $t_{(230)}$ =14.80, p < .000, and the EDI body dissatisfaction scale $t_{(2,981)}$ =23.34, p <.000. Participants who scored in the clinical range of the EAT-26 also displayed higher levels of interpersonal difficulties as indicated by significantly higher levels on the following EDI-III measures: personal alienation $t_{(240)}$ =13.21, p < .000; interpersonal insecurity $t_{(246)}$ =5.27 p < .000; and interoceptive deficits $t_{(239)}$ =15.33, p < .000. The clinical EAT-26 group exhibited significantly lower self-esteem $t_{(243)}$ =15.29; p <.000 and higher levels of asceticism $t_{(232)}$ =15.25, p < 000; emotional dysregulation $t_{(237)}$ =10.91, p < .000]; perfectionism $t_{(250)}$ =8.06, p < .000 and maturity fears $t_{(230)}$ =6.13, p < .000, when compared to the control EAT-26 students (df adjusted to reflect lack of homogeneity of variance).

Discussion

EPICA is the first Irish large scale study of a representative sample of school going population. Through the use of a stratified random sampling technique and a large sample size (>3,000), this study provides useful information about Irish school children which can be readily generalised to the larger population.

Describing Irish adolescents

Some 75.2% (2,252) of adolescents studied rated themselves as quite happy or very happy, 91% (2,713) perceived themselves to be quite or very popular, 59% (1098) felt that they were doing well or very well in school and 86.8% (2,588) felt that their quality of life was the same as, or better than, their friends. This is consistent with the findings of Murrin, McNicholas and colleagues who also observed that, in general, Irish adolescents are quite satisfied with life.[8] However, there is a group of Irish adolescents who were less likely to rate their quality of life as good and who perceived themselves to be less popular and less academically able than their peers. This group was more likely to have significant eating concerns as demonstrated by higher EAT-26 scores.

Dieting and body dissatisfaction

Two measures were used to estimate body dissatisfaction; the EDI-III body dissatisfaction subscale and a study specific measure. On either measure approximately one third of females reported significant dissatisfaction with their body weight and shape. Over half of the female sample (52.3%, N= 952) were trying to or wanted to lose weight. Wanting to lose weight, even if not on a diet, has been found to be a significant predictor of ED pathology, with a correlation between intensity and risk.[3] In their study, Patton reported that while a 'moderate' diet increased the risk of later ED pathology by five times, 'intense' dieting increased the risk 18 fold.[3] This is consistent with other international studies.[9,10] In the *Commonwealth Survey of Health for Adolescent Females*, one third of high school females believed they were overweight, 58% had gone on a diet.[11] Some 60% of 15 years olds in a Swedish study wished to be thinner, with 34% were actively dieting.[12] In a younger sample McVey and colleagues found that as many as 30.8% of 10-14 year old girls were actually dieting.[13] This is alarming as a longitudinal study of

Table 4: EDI subscale Mean scores and standard deviations for EAT categories		
Subscale	EAT <20 (SD)	EAT >20 (SD)
Body dissatisfaction	11.99 (10.17)	28.42 (9.63)
Bulimia	2.37 (3.51)	10.02 (7.76)
Drive for thinness	4.47 (5.62)	19.21 (6.16)
Low self esteem	4.14 (4.09)	9.76 (5.46)
Personal alienation	4.76 (4.69)	10.95 (6.88)
Interpersonal insecurity	6.68 (4.95)	8.94 (6.25)
Interpersonal alienation	3.85 (3.35)	9.76 (5.68)
Interoceptive deficits	5.81 (5.41)	14.28 (8.12)
Emotional dysregulation	4.94 (4.69)	10.12 (6.69)
Perfectionism	7.18 (5.06)	10.49 (5.98)
Ascetism	3.85 (3.35)	9.76 (5.68)
Maturity fears	9.57 (4.94)	12.41 (6.32)

nearly 15,000 children found that dieting to control weight is associated with weight gain.[14] Males seemed to express lower levels of body dissatisfaction, with only 1 in 10 rating themselves as 'dissatisfied' or 'very dissatisfied' with their bodies, and the majority of males (68.6%, 806) in this study reported never dieted.

Body mass index

Whilst nearly 52% (N=1,353) of the sample were classified as being of a normal weight a significant number is either at risk of 76-85th centile (11.5%, N=295)) or are overweight 86-95th centile (10.8%, N=279)) or > 96th centile obese (5.1%, N=131). This 15.9% prevalence is higher than the 7.5% determined by the 2002 *Health Behaviour in School Aged Children Survey*,[15] but similar to that found by McLaughlin et al[16] in 2004 and not dissimilar (23% overweight) to a study of similar age adolescents in 1998.[17] Coupled with this, particularly for females, is a relatively low level of exercise frequency with 6.6% rarely or never exercising and 25% exercising once per week or less.

Obesity is now recognised as one of the leading chronic disorders of childhood with prevalence rates having trebled in Irish adolescents between 1990 and 2000.[18] Being heavier was found, in the current study and in others,[19,20] to be a risk for eating pathology; it follows that efforts to reduce weight should have positive effects on both the risk for ED and on minimising subsequent medical problems in later life. However, given the poor success rates of dieting, and the knowledge that dieting has been shown to be the most significant predictor of new cases of eating disorders[3,4] and abnormal eating behaviour,[5] great care is needed when considering what interventions are required in young children who are overweight.

Eating pathology

Some 10.9% of females reached pathological levels on the EAT-26. Unfortunately, there are (to date) no reliable, published data on the prevalence of eating disorders in Ireland. However, a recent study by Menton[21] found that 10.6% (n= 82) of a sample of 755 Irish adolescents reported engaging in significant levels of disordered eating as measured by the EAT-26, rising to 15.5% (n= 53) when females were reported on separately. This group also reported significantly lower self esteem and family functioning and reported exercising for weight management and appearance reasons. A rate of 13-16% has been reported in international studies.[22,23] Levels of eating concern are lower among males, with 2.4% scoring in the clinical range of the EAT-26. Although the global EAT-26 scores of the Irish sample did not differ significantly from established norms,[6] the Irish female sample showed significantly higher scores on the bulimia and oral control subscales of this measure, and lower scores relating to dieting, suggesting that Irish female teenagers may be more prone to bulimic-type pathology rather than anorexic-type pathology. This is further evidenced by the finding that the group showing highest pathology on the EAT-26 were more likely to be overweight and exercise less frequently. The males in this study had overall lower total EAT, dieting and bulimia subscale scores than published norms.

Those adolescents scoring in the clinical range of the EAT-26 had a number of non-eating related features in common. They were typically in the overweight BMI category, were more likely to perceive themselves to be less popular, less academically able and reported a lower quality of life than their peers. Their poor self concept was also reflected in their lower score on the self-esteem subscale of the EDI-III and lower mood rating on the SSQ. They had higher levels of interceptive deficits and emotional dysregulation, suggesting difficulty identifying and regulating emotions. Interpersonal skills and relationships have been shown to have an influence on the development of ED pathology. Females in the Commonwealth study who had depressive symptoms had more destructive eating patterns and females who had lower self confidence dieted almost twice as frequently as the more confident females.[11] The adolescents in the present study who exhibited significant eating pathology (ie. high EAT scores) were also more likely to feel more alone in the world (EDI- personal alienation), feel that they can not communicate with other people (EDI- interpersonal insecurity) and have difficulties trusting others (EDI interpersonal alienation).

Popularity and peer acceptance have also been associated with disordered eating, dieting and poor body image. Thomsen and colleagues, in 2002, found that the risk of anorexia nervosa in college women was predicted by the desire to increase one's popularity among friends.[24] Body image disturbances in anorexic females have been associated with a change of peer group, or position in the group, with a view that "[popular females] are thin and pretty and people idealise them".[25] Not only are young people experiencing eating pathology more likely to want to increase their popularity, adolescent females who diet are more concerned about peer acceptance than those who do not.[26] In our study dieters perceived themselves to be less popular. Fairburn et al[5] suggest that low self-esteem seems to be an antecedent to eating pathology. Girls with low self-esteem at age 11-12 have been shown to be at significantly greater risk of developing eating disorders, as well as other psychological problems, when followed up the age of 15-16).[27] High EAT scorers in this study also showed lower levels of self-esteem (EDI) and lower quality of life.

Interpersonal skills and relationships have been shown to have an influence on later ED pathology. Evans and Wertheim[28] reported that women with eating difficulties experience difficulties with personal relationships. In the present study adolescents who exhibited significant eating pathology were more likely to perceive themselves to be less popular, feel more alone in the world (EDI- personal alienation), feel that they could not communicate with other people (EDI- interpersonal insecurity) and had difficulties trusting others (EDI interpersonal alienation).

Scores on the bulimia subscale of the EDI were generally higher in urban school settings compared to rural areas in both boys and girls, and remained even when controlling for the fact that there were relatively more girls in urban schools than boys This is at odds with work by Hoek et al[29] in which they found a higher incidence of bulimia nervosa in rural compared to urban areas. Previous studies have also reported differences in levels of adiposity based on geographical location in both adults and adolescents[30,31,32] with increased levels of obesity amongst rural dwellers. This occurred even in the presence of increased physical activity. Even in these studies, the authors comment about the difficulty in knowing what to attribute this association to, given that other important confounders such as lifestyle, dietary intake, SES were not measured. Given the universality of TV, internet, facebook, it is unlikely that peer and media pressures are limited to urban areas. Our study is also limited by lack of measurement of other factors, particularly binge drinking which might be linked to both urban dwelling and bulimic features.

It would be expected that girls scored higher on the EAT than boys, and this was the case in this study (mean EAT score for girls = 7.8, SD 8.96; compared to mean score for boys =4.54, SD 5.53). However girls attending a mixed sex school were significantly more likely to report higher levels of body dissatisfaction and higher levels of drive for thinness than girls attending single sex schools and a trend to score higher on total EAT scores. It may be that the presence of boys in a school setting creates both an increased opportunity and pressure to form heterosexual relationships, and the associated pressure to perceive one self as physically attractive to the opposite sex. It could also follow from the 'social contagion' hypothesis of eating disorders, first described by Crandall[33] in the 1980s, and supported by Forman-Hoffman and Cunningham[34] where cohesion among individuals (in this case the girls) is increased by modelling of like behaviours. Gilbert and Meyer[35] describe increasing similar eating attitudes and behaviours in long-term friendships, and Paxton and colleagues[36] found eating pathology more similar within cliques of friends than between them. Being female in a mixed school may increase identification with certain groups, social cohesion and socially valued (pathological) attitudes.

Given that some literature exists about girls performing academically better when in an all girls school, and of the strength of peer influence, there is a persuasive argument to be made to reconsider type of school at an individual level if a child is recognised to be at high risk for eating pathology.

Limitations
Methodological considerations

The study used a stratified random sample ensuring that the proportion of urban and rural schools sampled reflected the distribution of adolescents in urban and rural schools in Ireland. Some 23.2% of the current sample attended schools in Dublin and its surrounding area. The 2006 census[37] data suggests that 28% of Irish people currently reside in this area hence our school selection reflects a representative sample of young people. The sample was also a good fit for gender mix of school and fee status. The study employed standardised, valid and reliable measures such as the EAT-26 and the EDI-III and made comparisons between the current Irish sample and appropriate normative samples, both Irish when available, and international. This allowed for the finding of Irish female adolescents being more 'bulimic' in type that other adolescents from other countries and needs further investigation.

One of the key methodological weaknesses of the present study is the use of self report height and weight. Although several studies have found that self reports correlate highly with measured data in adolescents,[38] other studies have shown that adolescents either do not report weight or typically under report.[39] Reported BMI should therefore be considered estimates rather than accurate figures. It is also difficult to allow for responder bias. The study initially hoped to recruit 4,000 students but due to low up-take and difficulties recruiting within the timeframe of the study, a smaller number of 3,031 (76%) enrolled.

A second major limitation applies to conducting research survey in a school setting. While the schools which agreed to take part in the study represent Irish post-primary schools, the methodology was such that the principal in the school acted as ultimate gatekeepers, and it is not possible to be confident that the final sample is in fact nationally representative. Principals chose whether the school participated in the research or not, and if so which age groups were approached, how the students were informed of the study, what efforts were made to get students to return completed consent forms. The principal chose whether information leaflets were sent to non-attendees, whether each student is given a leaflet to take home, or where they opt into requesting one. It becomes impossible to establish how many students and parents were made aware of the study and therefore to establish participation rate or sampling bias. For example, principals in the schools where there had been recent clustering of eating disorders may have been more or less interested in participating in the study; students who chose to opt in might have been more or less likely to have abnormal eating concerns. Although the estimated response rate is very low at 20%, given the almost universality of school attendance, and the overall large number in this study, it is hoped that any such bias is reduced.

Conclusions

This study shows a high level of body dissatisfaction, desire to be thinner and eating concerns in a significant number of Irish female students. Such concerns appear to be strongest in mixed sex schools. There is a significant link between quality of life, mood, perceived popularity and academic ability with dieting and body dissatisfaction, with those who diet frequently and are dissatisfied with their body reporting the lowest quality of life. Although the global levels of eating concern among Irish adolescents are comparable to those internationally, there is a suggestion that Irish female adolescents are characterised by having less dieting but higher

bulimia and oral control pathology. Bulimia was also found to be more prevalent in urban schools compared with a rural location. They are also characterised as being overweight and exercise infrequently. It is important therefore to intervene early with sensible weight reducing strategies and school based programmes to increase both global self-esteem and body confidence in order to prevent mild eating concerns developing into clinical eating disorders.

Eating and weight related concerns exist on a continuum from sensible concerns at one end, to extreme unhealthy behaviour and eating disorder at the other. Children and adolescents need to be educated about healthy eating and exercise attitudes, healthy ways of keeping weight within medically healthy ranges and building self-esteem and a positive self concept that is not overly influenced by physical attributes such as body weight and shape. Research findings suggest that, in addition to depression and low self-esteem being more prevalent in adolescents with eating disorders, these are also key mediating factors in determining whether or not young people with sub clinical or partial eating concerns go on to develop full syndromes. In particular targeting low self-esteem and depression in overweight children or children with body image concerns may help to reduce the rate of conversion to an eating disorder. Further research is warranted to consider possible clustering effects of abnormal eating attitudes and social pressures across schools and geographical areas.

Declaration of interest: None.

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