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## Prevalence of Eating Disorders in a Sample of Rural and Urban Secondary School-Girls in Sharkia, Egypt

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### ABSTRACT

**Introduction:**

Eating disorders (ED) research has come mostly from developed countries suggesting a greater prevalence of ED in urban settings. Data from developing countries are scarce and conflicting.

**Aim of the study:**

To evaluate the frequency of ED in rural as compared to urban secondary school girls in Sharkia.

**Subjects and methods:**

In this two-stage cross-sectional study, we screened 1200 secondary school-student girls (600 from Zagazig city; 600 from Sharkia villages) using the Eating Attitudes Test (EAT40). Those scoring more than 30 (N=105) and a control group randomly selected from those scoring lower than 30 (N=100) were assessed using the eating disorders module of the Structured Clinical Interview for DSM-IV axis-I Disorders (SCID-I).

**Results:**

The difference between EAT40 mean scores for urban (15.1±6.09) and rural (14.9±5.14) samples was not statistically significant. A logistic regression analysis showed that the probability of being EAT positive was associated with age, religion, absence of siblings and body mass index (BMI). Prevalence of ED was 3.3% (2.8% for urban and 3.8% for rural students). There were no cases of anorexia nervosa (AN) identified in either group. The difference between total number of students with ED in urban and rural settings was not significant, but there were significant more cases of eating disorders not otherwise specified (EDNOS) among rural participants (21 cases) compared to urban participants (12 cases) especially among controls ( $\chi^2 = 9.013$ ;  $p = 0.003$ ).

**Conclusion:**

Although AN is absent in Sharkia governorate, bulimia nervosa (BN) and EDNOS have emerged as comparable prevalent disorders, as in Cairo and in Western countries. The analysis of the rural/urban differences, however, seems to be affected by the level of analysis: no difference between the two groups when using a dimensional approach, but more EDs are found among urban than rural population when the analysis is conducted on a categorical level. It seems that the factors influencing the distribution of EDs by place of residence are far more complex than currently thought. Previous research that showed EDs to be particular to the culture should be examined again.

**Key words:**

Eating disorders | Eating Attitudes Test-40 | female | prevalence | Sharkia | secondary schools | Egypt

*Current Psychiatry; Vol.17, No.4 2010: 1-12*

### INTRODUCTION:

Eating disorders (ED), including anorexia nervosa (AN) and bulimia nervosa (BN), along with their variants, are serious illnesses that often have a variety of medical complications, some of them being irreversible and life-threatening, and have significant psychiatric comorbidity<sup>(1,2)</sup>.

Until recently, these disorders have been often regarded as 'Western culture-bound syndromes', arising in societies with excessive emphasis on weight, shape and appearance<sup>(3)</sup>. They are far more common among females than males, mirroring cross-cultural differences in the importance of thinness for women. The thin-ideal of feminine beauty is widely promoted by the media

images that have flooded western societies since the second half of the twentieth century, during a period when icons of American beauty (Miss America contestants) have become thinner and women's magazines have published significantly more articles on methods for weight loss. Research suggests that exposure to Western mass media depicting the thin-ideal body is linked to body image disturbance in women and plays a central part in ED<sup>(4)</sup>.

On the other hand, it is generally believed that AN and BN are uncommon in the non-Western world, although the evidence from various studies is contradictory. The literature review comparing the prevalence of EDs between Western and non-Western countries showed that the prevalence of EDs in non-Western countries is lower than that of Western countries but appears to be increasing<sup>(5)</sup>. More recently, a systematic analysis of data collected by the Eating Disorder Inventory (EDI) revealed that symptoms of ED are more pronounced in non-Western than in Western samples in contrary to expectations<sup>(6)</sup>. However, ancient Arab culture regarded plumpness as a symbol of family care, fertility and womanhood<sup>(7)</sup>. One survey suggests that Egyptian society accept large female body sizes and consider plumpness as a sign of beauty<sup>(8)</sup>. These values were thought to provide protection against eating disorders, however, with the rapid social changes and acculturation occurring in many of the Arab countries, the attitudes and behaviors of the younger generation in these countries appear to be swinging more towards the Western values. In this regard, few studies have examined ED among Arabs indicating the role of contact with the West<sup>(9)</sup> and the influences of globalization and mass media<sup>(10)</sup>. A recent study of 432 Jordanian school girls (age range 10–16 years) from Amman, using screening tools and DSM-IV-TR criteria, found that one third of participants had ED, including BN (0.6%), binge eating disorder (BED) (1.8%) and eating disorder not otherwise specified (EDNOS) (31%), but found no AN cases<sup>(11)</sup>. In a study involving female students attending universities in London and Cairo, students were recruited to determine the prevalence of ED within an Arabic culture and to investigate the possible effects of exposure to Western culture upon ED<sup>(12)</sup>. While no clinical cases were found in the Cairo group, the rate of BN in the London group was 12%, which was the highest rate of BN ever reported for any group of women living in Britain. Okasha<sup>(13)</sup> reported an Egyptian study of 371 adolescent girls (age range 13–18 years) that found only two atypical cases of AN (0.54% of the sample), 26 atypical cases of BN (8.6% of the sample), and 32 cases of unspecified ED (9.7% of the sample). In another school-based study assessing 420 secondary school Egyptian

students (15-year-old) from Cairo using the EAT40 questionnaire found that dieting was present and there was excessive concern about weight. Twelve partial and three full cases of BN were found, keeping with the outcome of a screening survey carried out previously on non-Western populations<sup>(15, 12)</sup>. To date, however, studies of prevalence of ED in Egypt have been mostly restricted to Cairo, with little information about rural populations outside the capital city. In one of the very few available studies, Jackson et al<sup>(16)</sup> examined a sample of 340 Egyptian adolescent schoolgirls representing Cairo and surrounding rural areas. Overweight was observed to be more prevalent in urban and in those with higher socio-economic status girls<sup>(16)</sup>. The majority of studies, however, have come from developed countries suggesting that EDs are more prevalent among adolescent females in urban settings<sup>(17)</sup>, though the role of socioeconomic variables (place of residence) has not been sufficiently studied<sup>(18)</sup>.

The aims of the present study were (a) to evaluate the frequency of ED in a sample of secondary school girls from Sharkia, one of the largest and a prototype of rural governorates of Egypt, (b) to identify the background characteristics of the study population as predictors of ED psychopathology, and (c) to compare the distribution of eating disorders by rural/ urban place of residence.

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## SUBJECTS AND METHODS

### Design and procedures

This is a cross-sectional study conducted during the academic year 2009/2010. The identification of cases was performed in two stages. First stage, all participants were asked to complete the demographic and the EAT40 questionnaires administered in a single session during their class breaks; in another session the anthropometric measures were obtained to estimate the body mass index (BMI). Second stage, all subjects scored at or above the cut-off point of 30 on the EAT40 (EAT40 positives) were examined face to face by a psychiatrist with the eating disorders module of the Structured Clinical Interview for DSM-IV axis I Disorders (SCID-I). A control group was selected randomly from students who scored lower than 30 on the EAT40 (EAT40-negatives) and paired with the EAT40 positives by age. They were, like the EAT40-positives, assessed with the eating disorders module of the SCID-I. The general design of the study, with number of participating students at each stage, is shown in Figure 1.

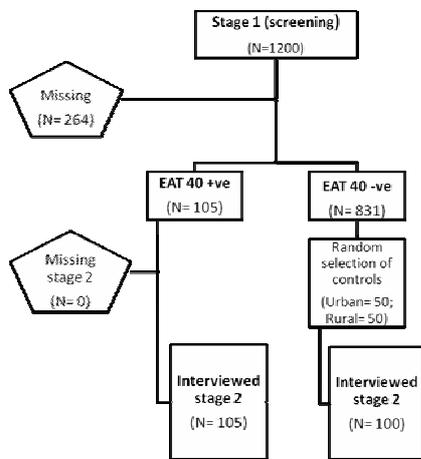


Fig. 1. Study design and number of participants involved

Most of the interviews were carried out within a week after the first stage to minimize changes in ED symptomatology. Before proceeding with the study, parents were given letters informing about the research and questionnaires which will be carried on their children and asked to sign the attached consent form. Girls were informed that the questionnaire was not an 'examination', there is no right or wrong answer, they did not have to take part in it if they did not want to, and that they could withdraw from the survey at anytime. Parental consent, student assent, formal permission from each school and approval of Research Ethics Committee (at Faculty of Medicine, Zagazig University) were obtained.

### Participants

A total of 1200 secondary school-student girls, in their first, second or third grade level, were recruited from eight single-sex secondary schools. These included four schools in Zagazig city, representing the urban sample: two language private schools that required the payment of substantial tuition and two public schools for which attendance was free. The rural sample was drawn from four public schools in Shalashalomon, El-Aziziya, El-Sa'diene and Sanhout villages. There were no language private schools available in the villages. Fifty girls were selected randomly from each of the three academic grades of the eight secondary schools participating in the study.

### Measures

#### Demographic characteristics questionnaire

A constructed questionnaire was used to derive information from self-reported data on age, educational level and socioeconomic status because we were not allowed to access the official records. Information on

parental education, occupation and income, as well as family ownership of material goods such as appliances was used as a proxy for socioeconomic status.

#### Eating Attitudes Test (EAT40)

This is a tool (add reference number) was used as a diagnostic test for anorexia nervosa, but nowadays, it is frequently used to detect ED in general. It contains 40 questions with 6 graduated answers in Likert style. The score varies between 0-120. Ones who obtained 30 points or over were considered at high risk of having Eating Disorders. Higher scores from the items indicated that the severity of pathology get worse. EAT40 has been validated and found to discriminate well between subjects with ED and normal females<sup>(19)</sup>. Nasser confirmed the validity and reliability of this tool in Egypt<sup>(20)</sup> founding that EAT40 has a sensitivity of 100%, specificity of 89% and a positive predictive value (PPV) of 55%<sup>(12)</sup>.

#### Antropometry

Girls' heights and weights were measured by trained research assistants following the questionnaire session. Weight was taken to the nearest 0.1 kg and height was measured to the nearest 0.1 cm. The body mass index (BMI) was calculated by dividing the weight (kg) by the height (m) squared.

#### Eating disorders module of the Structured Clinical Interview for DSM-IV axis-I Disorders (SCID-I)<sup>21</sup>

In Egypt, SCID-I has been adapted and successfully used by psychiatric patients and non-patient community subjects<sup>(22, 23)</sup>. The diagnosis of partial syndromes (EDNOS)<sup>(24, 25)</sup> was applied to cases which met all the DSM-IV criteria for AN and/or BN with one exception.

#### Statistical analyses

Descriptive statistics (frequencies, percentages, means, and SDs) were carried out using *t* test for continuous variables and  $\chi^2$  analyses (using Yates correction when indicated) for categorical variables. The association among variables was evaluated by correlation coefficients. Cronbach's Alpha which is a measure of how well each individual item in a scale correlates with the sum of the remaining items was used to measure the internal consistency of EAT40. Cronbach's Alpha values of 0.90 or greater are considered excellent, values of 0.7 to 0.90 are acceptable/good, while values below 0.5 are unacceptable. Logistic regression analysis was undertaken to identify significant predictors of EAT positivity. Models fit analysis was evaluated using the Hosmer-Lemeshow goodness-of-fit statistic. To estimate the sample size, we used the index:  $n=(z/e)^2 [p(1-p)]$ , where *z* is the statistical coefficient for the

established confidence level (0.05),  $p$  is the prevalence of ED in the population, and  $e$  is the precision F1%. In agreement with the data provided by DSM-IV and previous studies in the Egyptian secondary school-girls population<sup>(12, 14)</sup>, being around 3%, we needed 926 participants for our sample. We included 1200 subjects to allow the drop-outs (because of refusal to participate, absenteeism from school, etc.) Statistical analyses were carried out using the computer software package Statistical Package for Social Sciences (SPSS, Chicago,

IL, USA) for Windows version 16.0. Probabilities below 0.05 were regarded as significant.

## RESULTS

### The sample

Of the 1200 students who originally approached, 936 (78%), 504 urban and 432 rural students, returned their parental informed consent forms signed and answered the questionnaires. Table-1 summarizes their demographic data.

**Table 1.** Background characteristics of the sample

	Urban		Rural	
	N	(%)	N	(%)
<b>School</b>				
Public	219	(43.5)	432	(100.0)
Private	285	(56.5)	--	
Total	504	(100.0)	432	(100.0)
<b>Age</b>				
≤16	151	(30.0)	139	(32.2)
17	182	(36.1)	143	(33.1)
≥18	171	(33.9)	150	(34.7)
<b>Age at menarche, yr</b>				
≤10	48	(9.5)	36	(8.3)
11	147	(29.2)	114	(26.4)
12	201	(39.9)	134	(31.0)
≥13	108	(21.4)	139	(32.2)
Not yet	--		9	(2.1)
<b>Religion</b>				
Moslem	441	(87.5)	395	(91.4)
Christian	63	(12.5)	37	(8.6)
<b>Father's education, yr</b>				
≤6	19	(3.8)	50	(11.6)
7- 12	193	(38.3)	264	(61.1)
≥13	292	(57.9)	118	(27.3)
<b>Mother's education, yr</b>				
≤6	59	(11.7)	125	(28.9)
7- 12	246	(48.8)	262	(60.7)
≥13	199	(39.5)	45	(10.4)
<b>Father's occupation</b>				
Professional/skilled	185	(36.7)	78	(18.1)
Semi-skilled	144	(28.6)	105	(24.3)
Unskilled	97	(19.2)	217	(50.2)
Unemployed	78	(15.5)	32	(7.4)
<b>Mother's occupation</b>				
Professional/skilled	83	(16.5)	22	(5.1)
Semi-skilled	47	(9.3)	9	(2.1)
Unskilled	26	(5.1)	30	(6.9)
House-wife	348	(69.1)	371	(85.9)
<b>Number of siblings</b>				
Only child	66	(13.1)	49	(11.3)
1	246	(48.8)	77	(17.8)
2	153	(30.3)	91	(21.1)
3	24	(4.8)	102	(23.6)
≥4	15	(3.0)	113	(26.2)
<b>BMI</b>				
<16 (too thin)	65	(12.9)	76	(17.6)
16- 17.5 (thin)	79	(15.7)	133	(30.8)
17.6- 21.5 (normal)	203	(40.3)	172	(39.8)
21.6- 27.5 (overweight)	136	(27.0)	37	(8.6)
>27.5 (obese)	21	(4.1)	14	(3.2)

Average age of students from the urban schools was 17.05±0.47 years and from the rural schools was 17.09±0.61 years. The difference was not statistically significant (t=1.556, p>0.05). The mean menarcheal age for the urban group (12.9±0.73 years) was significantly younger than for the rural group (13.3±0.91 years) (t=2.398, p=0.021). No significant difference was found between urban and rural schools as regards the religion of students ( $\chi^2=2.237$ , p=0.135).

The mean number of years of education of the participants' fathers from the urban schools (14.1±5.37 years) was much higher than the fathers' education in the rural area (11.4±4.13 years) and there was a significant difference between the two (t=4.16, p=0.000).

Similarly, the mean number of education years of the participants' mothers who live in the urban area (11.6±5.15) was much higher than that of mothers living in the rural area (9.8±4.43) and there was a significant difference between the two (t=3.87, p=0.000). In contrast, the mean number of siblings in the urban group (2.5±0.96) was much smaller than that of the rural group (4.1±1.3) (t=3.54, p=0.000). Body weight of the participants in the urban area was in the range between 37 kg and 82 kg with a mean 52.1±12.32 kg while in the rural area it was between 35 kg and 91 kg with a mean

46.3±14.71 kg. Mean BMI for urban participants was 21.1±4.16 kg/m<sup>2</sup> while for those in the rural area it was 19.8±3.94 kg/m<sup>2</sup>. BMI of the majority of the participants in both urban (40.3%) and rural (39.8%) was normal. However, more respondents from urban (27%) were having BMI which was categorically being overweight as compared to rural participants (8.6%). It was found that the rural participants (30.8%) were thinner than the urban participants (15.7%). On the whole, however, there was no significant difference between the BMI of the participants who went to urban and rural schools (t=1.284, p=0.21).

### The EAT40 questionnaire

The internal consistency of the EAT40, as we measured by Cronbach's alpha, was acceptable (0.81).

### Screening results

The mean EAT40 total score was 15.0 (SD±5.62). The total scores on the EAT were higher in the urban (15.1±6.09) than in the rural sample (14.9±5.14), though the difference was not statistically significant. EAT +ve students in the urban sample outnumbered those in the rural sample (p=0.049) (Table 2).

**Table 2.** Frequencies of eating disorders in urban and rural samples detected in stage 1 (screening).

	Urban N (%)	Rural N (%)	Total N (%)	Significance
EAT40 +ve*	66 (13.1)	39 (9.0)	105 (11.2)	$\chi^2=3.864$ p=0.049
EAT40 -ve**	438 (86.9)	393 (91.0)	831 (88.8)	

\*Score on Eating Attitudes Test ≥30

\*\* Score on Eating Attitudes Test <30

In order to identify which of the background characteristics of the study population predicted the occurrence of ED psychopathology, in terms of association with EAT40 positivity, regression analysis was used. Since the dependent variable was dichotomous (EAT +ve assumed as 1; EAT -ve assumed as 0), binary logistic regression analysis was the method of choice. Results showed that the probability of being EAT +ve was significantly associated with the following variables: age, Islamic religion, absence of siblings and BMI. No statistically significant association was found with the other variables (Table 3).

Significance was determined by the Hosmer and Lemeshow test (a modified chi-square test) used to test the overall model of goodness-of-fit. When the Hosmer and Lemeshow test is significant (p-value<0.05) it means the model does not describe the data well indicating that the null hypothesis of data fitting the model can be rejected. Conversely, when the p-value gets larger the model fits better to the data. In our SPSS output the Hosmer-Lemeshow p-value was =0.341, which is large enough not to give a significant evidence that our model is not fitting our data. In other words, the model adequately describes the relationship between the EAT positivity and some predictor variables in the data.

**Table 3.** Results of logistic regression analyses

Dependent variable	Independent variable	OR <sup>(1)</sup>	95%CI <sup>(2)</sup>	P
EAT +ve/ EAT -ve	<b>School</b> Rural/ urban	1.2	0.6- 2.3	0.381
	<b>Age</b> ≤16/ 17/ ≥18	1.5	1.01-2.4	0.040*
	<b>Age at menarche, yr</b> ≤10 / 11/ 12/ ≥13/ Not yet	0.8	0.4- 1.9	0.767
	<b>Religion</b> Moslem/ Christian	2.4	1.1- 4.6	0.013*
	<b>Father's education, yr</b> ≤6 / 7- 12/ ≥13	0.9	0.02-1.2	0.155
	<b>Mother's education, yr</b> ≤6 / 7- 12/ ≥13	0.3	0.5- 2.3	0.678
	<b>Father's occupation</b> Professional/skilled Semi-skilled Unskilled Unemployed	0.6	0.3- 1.1	0.075
	<b>Mother's occupation</b> Professional/skilled Semi-skilled Unskilled House-wife	0.9	0.4- 0.8	0.473
	<b>Number of siblings</b> Only child 1 sibling 2 siblings 3 siblings ≥4 siblings	3.8	1.07- 4.8	0.008*
	<b>BMI</b> <16 (too thin) 16- 17.5 (thin) 17.6- 21.5 (normal) 21.6- 27.5 (overweight) >27.5 (obese)	4.1	1.57- 6.13	0.001*

<sup>(1)</sup> OR= Odds Ratio

<sup>(2)</sup> 95%CI= 95% confidence interval

\*= Significant

### Interview results

EAT +ve students were further assessed by the eating disorders module of SCID-1 (First 1997). (Add reference number). None of these students refused to be interviewed. Also, all randomly selected controls (100 EAT negatives: 50 from urban schools and 50 from rural schools) participated in the interview. Of the 205 total participants at this stage, 40 students (17 urban; 23 rural) fulfilled the ED diagnostic criteria. Extrapolating these data to the entire sample (N=1200; 600 urban and 600 rural), assuming that the observed prevalence would be observed in the missing cases, the global prevalence of ED in the total sample was 3.3% (2.8% for urban and 3.8% for rural students). Table-4 shows the frequency of ED distribution (AN, BN, and EDNOS) among urban and rural groups.

The rural-urban difference in the total diagnoses was not statistically significant ( $\chi^2=2.715$ ;  $p=0.10$ ). However, BN cases in the total urban group were Two and half as frequent as in the total rural group but this difference failed to reach statistical significance ( $\chi^2=1.648$ ;  $p=0.20$  using Yates correction). Comparisons confined to the diagnosis of EDNOS provided the following results; a) Significant difference between total EAT 40 (+ve and -ve) interviewed urban (12/111) and rural (21/94) participants ( $\chi^2 =5.009$ ;  $p=0.025$ ), b) Significant difference between EAT -ve (control) urban (6/50) and rural (19/50) participants ( $\chi^2 =9.013$ ;  $p=0.003$ ) and c) Insignificant difference between EAT +ve urban (6/61) and rural (2/44) participants ( $\chi^2=0.404$ ;  $p=0.527$  using Yates correction).

**Table 4.** Distribution of eating disorders (ED) diagnosed in stage 2 (psychiatric interview) among urban and rural students.

	Urban (N= 111)	Rural (N= 94)	Total (N= 205)
<b>ED diagnosis: present</b>			
<b>AN</b>			
EAT +ve			
EAT -ve (controls)	0	0	0
Total	0	0	0
<b>BN</b>			
EAT +ve			
EAT -ve (controls)			
Total	4	0	4
<b>EDNOS</b>			
EAT +ve	1	2	3
EAT -ve (controls)	5	2	7
Total	6	2	8
<b>Total</b>			
EAT +ve	6	19	25
EAT -ve (controls)	12	21	33
Total	9	3	12
	8	20	28
	17	23	40
<b>ED diagnosis: absent</b>			
EAT +ve			
EAT -ve (controls)	57	31	88
Total	37	40	77
	94	71	165

## DISCUSSION

Using the EAT40, in the screening stage of this study, we found that 11.2 % of a sample of secondary school girls, from Sharkia governorate, had a score above the threshold of 30 (EAT +ve) with insignificant difference between rural and urban groups. Using a similar cut-off point of the same screening tool on a population of secondary school girls in Cairo, showed a very close figure of 11.4%<sup>14</sup>. The rate we obtained is also broadly concordant with the results of studies in other Arab countries<sup>(10, 25)</sup> as well as in Western societies<sup>(26)</sup>. Although this is quite similar with an earlier suggestion that morbid eating patterns are emerging with similar rates in Egyptian societies to those found in Western cultures<sup>(14)</sup>, result interpretations at this screening stage may require some caution<sup>(27)</sup>. It is argue that it might not be possible with the exclusive reliance on a self-report inventory to separate from the results the part played by social desirability, denial, or unwillingness to disclose personal information<sup>(28)</sup>. However, despite such limitations, self-reported findings on eating habits seem to be reliable indicators of abnormal eating patterns, and possess a sufficiently robust predictive value for the risk of developing an eating disorder<sup>(29)</sup>.

However, to overcome inherent problems of self-report inventories, many studies used a double-stage design with a diagnostic interview in the second stage to provide a more precise measure of ED pathology<sup>(31)</sup>.

Yet, it may be noted that such studies tended not to interview participants whose scores in the first phase were lower than the cut-off point. It is presumed, therefore, that a percentage of ED cases was not detected in previous Egyptian studies. In the current study, we assess all EAT +ve subjects as well as a random sample of controls derived from EAT-ve participants. This may be why in stage 2, the rate of 3.3% for clinically diagnosed eating disorders was higher than what previous Egyptian studies reported<sup>(see, e.g., 14)</sup>. It approached, however, other studies in the West that depended on clinic-based estimates<sup>(32)</sup>.

In the present study, background characteristics of participants were different in some respects by place of residence. Parents of rural students had significantly less number of formal years of education than those of urban students. Number of formal years of education is a parameter that is frequently used as a proxy for socioeconomic status<sup>(33)</sup>. Though rural students tended to have lower BMI than urban students, the difference was not statistically significant in the current study. The overweight in urban girls and in those with higher socio-economic status was more pronounced in an earlier study in Cairo<sup>(16)</sup> and was explained as due to having a more sedentary life with the availability of modern facilities, like washing machine, microwave oven, etc., because of the high socioeconomic status

among the urban females<sup>(34)</sup>. This contradicts, however, many earlier studies which reported that adolescents from lower socio-economic classes tended to be more overweight<sup>(e.g., 35, 36)</sup>. Most of previous studies in Egypt were also characterized by providing minimal data about the relation between ED diagnosis and sociodemographic characteristics (e.g., age, number of siblings, occupation of the parents, and residence area) or, in other words, the contributions or risks associated with these variables in the development of ED. Studies from other countries suggest some connection between demographic data (high or low socio-economic status) and eating disorder patients<sup>(37)</sup>. In the current study, however, logistic regression analysis revealed no association between disordered eating and social status as implied by parental education and occupation. Yet, there was an association between disordered eating and a number of other sociodemographic variables, namely, age, religion and absence of siblings.

As for age, some previous studies had failed to find significant differences at specific ages, this is likely due to the reduced statistical power, with the smaller sample sizes present when examining individual age categories<sup>(38)</sup>. Although our study was restricted to the age range of secondary school students, results were consistent with most research which recognized that disordered eating is most likely to occur during late adolescence and emerging adulthood<sup>(39)</sup>. As indicated twenty years ago, disordered eating attitudes are most likely to emerge in adolescence, because at this stage cultural norms for body shapes have been already internalized<sup>40</sup>. Vulnerable adolescent girls (either because of predisposing characteristics or environmental emphasis on physical attractiveness, maintaining thinness as the standard for female beauty, etc) may respond to developmental challenges with a disordered eating attitude. While Western societal pressures of thinness have assigned worth to the ideal body, contributing to body dissatisfaction and increased dieting, religion may serve as an alternative avenue of worth than the body. We would think that religion may promote healthy body image and discourage dieting by providing a source of worth other than the body. A comparison of the eating attitudes and behaviors, among three religious subgroups (Moslems, Druze, and Christians), of Israeli-Arab adolescent females, found no significant differences between the religious subgroups<sup>(41)</sup>. Our results failed to support this, but were in keeping with cross-sectional studies, case studies, and anthropological commentaries reporting eating disorders in various cultures and religions claiming an association between Islamic affiliation and positive screening for eating disorder behaviors<sup>(42)</sup>. On the other hand our findings could still support the hypothesis that the effect

of culture on eating disorders may be religious. We also must admit that the current study was not planned to investigate the complex and multidimensional relationships between eating attitudes and religion.

As regards our finding of an association between disordered eating and absence of siblings, we were disappointed by the dearth of systematic research on the siblings of eating disordered individuals that could support or oppose our observation. Reports on variables such as family, birth order, and sibling rivalry, etc., seem to occupy a marginal position in the bulk of the literature and provide far more anecdotal than empirical evidence. Bruch's described one of her patients, Annette<sup>(43)</sup> as always craving the approval of her big sister Josie, to whom she always related "in terms of superiority and inferiority," but who had always ignored her existence. Thoma's patient, Sabine B.<sup>(44)</sup> displayed raging hatred towards her four siblings and she stated that "When people asked me how many sisters and brothers I had, I used to say I was an only child. My mother had no right to have any other children". Whether participants in our study were displaying something of that sort, or they were telling the truth, we cannot be sure as data were derived from self-reports and were not checked with parents. If our finding were true, we could try to explain it by the temperamental conditions and mood disturbances that are more prevalent among only children than non-single children<sup>(45)</sup> because these are more commonly encountered in subjects with ED<sup>(46,47)</sup>. Some patterns of familiar interaction as criticism, judgments of morality, or perceived expressed emotions which are considered risk factors for ED<sup>(48)</sup> and which are more common among parents with a single child compared with parents of siblings, could also explain the greater ED prevalence among single children. As regards the association between disordered eating and BMI, our positive finding is consistent with previous literature<sup>(49)</sup>.

The major point that we should like to raise in our rural/urban comparisons is the lack of difference between the two groups when using the EAT40 mean total scores, but when the comparison of EAT40 scores was made using categorical data, that is, those scoring higher than 30, which is the suggested cut-off score for the identification of clinically relevant cases of eating disorder, we found significantly more cases in the urban group than in the rural one. In other words, the analysis of the rural/urban differences in the distribution of eating disorder symptoms was affected by the level of analysis. Thus, we got very different results depending on whether the comparison was conducted at the dimensional or the categorical level.

Results of individual clinical interviews were also interesting. In confirmation of the EAT 40 total score results of this study, they showed that the overall ED diagnoses were as prevalent among rural as among urban girls. Previous research reported that AN was not associated with urbanization<sup>(50)</sup>. In the current study, cases fulfilling diagnostic criteria of AN were equally absent in urban and rural samples. Some studies from other countries have reported a similar finding of no patients with AN diagnosis in their series<sup>(51)</sup>. Since AN occurs approximately 1–2 per thousand in Western samples, failure to detect AN in not too large epidemiological samples is the norm in the Western studies. On the other hand, results of our interviews showed, in line with the EAT 40 (categorical data) results, more BN cases in the urban group than in the rural one. We think that urban girls tend to exhibit the full BN criteria more than rural girls. Our failure, however, to detect significance between the two groups, is most likely due to the too small number of diagnosed BN to provide sufficient statistical power. Van Son et al.<sup>(50)</sup> found that BN was significantly higher in cities than in rural areas and suggested that urban life is a potential environmental risk factor for BN as it is known for a number of mental disorders such as schizophrenia, psychosis and depression. However, when it comes to the diagnosis of EDNOS, which is a residual category for EDs not meeting the criteria for a specific ED, significantly more rural girls received the diagnosis, especially when the comparison was restricted to the control subjects (EAT–ves). This high EDNOS prevalence may reflect the low specificity of ED categories based on DSM criteria<sup>(52)</sup> and suggests that, in contrast to BN, EDNOS is more frequent among rural than urban girls. The predominance of EDNOS is in line with many studies<sup>(53, 54, 55)</sup> which indicate that EDNOS is the most common ED diagnosis and criticize the consideration of EDNOS as a “residual” diagnostic category.

The present study has a number of limitations. It has a cross-sectional design, which precludes inferences of causality among variables and disallows assessments of the progression or stability of the diagnostic categories of EDs or the measured dysfunctional eating attitudes (EAT40 scores) over time. Another limitation is that the sample of the current study comprised a special population of secondary school girls, but no boys selected from a rather limited geographical area, which may limit the generalizability of the results. Further, despite the high acceptance rate to participate in the study, it is possible that girls were reluctant to reveal their eating attitudes and/or felt too embarrassed to discuss relevant issues. About half of the interviews were conducted by male psychiatrists and it is likely in

this situation that the respondents were giving answers they thought would please the patriarchal, authority figure. However, despite these concerns, several strengths can be noted. The study included relatively large number of girls (N=1200). Another strength of this study is that it involved a two-stage design. Previous Egyptian studies tended to include smaller numbers and composed of a single stage only. When they do have a second stage, only the positive scorers are interviewed<sup>(12)</sup>, an approach which leads to a very high rate of false negatives with a significant underestimation of the prevalence of eating disorders, particularly of EDNOS<sup>(56)</sup>. To reduce missing the false negatives, we interviewed a random sample (control group) selected from the negative scorers.

Overall, this study has important clinical and research implications. While few school girls in the current study met full criteria for a diagnosable ED, many endorsed symptoms that warrant intervention to avert development of an ED and associated complications. It is concerning that these young girls may not be identified or eligible for treatment that could be beneficial to their well-being and, potentially, decrease the likelihood of progression to full threshold ED. Health professionals need to be aware of the high prevalence of subclinical disordered eating behaviors among secondary school girls, not only in urban but, according to this study, also in rural areas. Further research on the assessment and treatment of eating disorders is essential for this Egyptian population. Research implications suggest a need to extend this study to other groups (clinical subjects, males, adult women, etc.) for generalization.

Further research is also warranted to replicate the present findings and to examine more closely variables, such as religion and absence of siblings, which have been suggested by this study as risk factors for EDs. If findings are replicated, future research may have to investigate potential mechanisms of action.

*To conclude*, prevalence of EDs in Sharkia seems to be as high as in Cairo and in Western countries. EDNOS, in particular, is more frequent in the rural setting. Although caution is required when interpreting our findings, we agree with the suggestion that factors influencing the distribution of EDs by place of residence are far more complex than currently thought<sup>18</sup>. We also suggest that previous researches showing EDs as particular to the culture should be examined again.

Conflict of interest: None

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