

Prevalence and profile of females at risk of eating disorders in Singapore

Ho T F , Tai B C, Lee E L, Cheng S, Liow P H

ABSTRACT

Introduction: The objective of this study was to assess the prevalence of young females at risk of developing eating disorders (ED) and the associated socio-demographical variables.

Methods: A set of self-administered questionnaires consisting of an Eating Attitude Test (EAT), an Eating Disorder Inventory (EDI) and a socio-demographical questionnaire was administered to 4,461 young females. Based on scores for EAT and/or EDI-drive for thinness (EDI-DT) subscale, subjects were categorised into either “normal” (NM) or “at risk” (AR) of ED.

Results: Mean age of the subjects was 16.7 years (range 12-26 years). The ethnic composition was 78.8 percent Chinese, 11.7 percent Malay, 6.6 percent Indian and 3 percent other ethnic groups. Prevalence of AR was 7.4 percent (95 percent confidence interval [CI] 6.7-8.2 percent). Mean EAT and EDI-DT scores for AR were significantly higher than that of NM (EAT: mean difference is 22.1, 95 percent CI 20.7-23.4, p-value is less than 0.0001; EDI-DT: mean difference is 10.9, 95 percent CI 10.5-11.4, p-value is less than 0.0001). Female Malays constituted a significantly larger proportion of AR (20.6 percent) as compared to NM (10.9 percent). AR females are more likely to use Malay as a spoken language at home (prevalence rate ratio 1.70, p-value is 0.001) and to be better educated with completion of General Certificate of Education (GCE) “O” levels. However, the parents of AR females are likely to be less well educated (below GCE “A” levels).

Conclusion: The prevalence of females at risk of developing ED is 7.4 percent. Malay ethnic group, using Malay language at home and the educational levels of both the subjects and their parents appear to be associated with an increased risk for development of ED.

Keywords: anorexia nervosa, bulimia nervosa, eating attitude test, eating disorders, socio-demographical variables

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INTRODUCTION

Eating disorders (ED), like anorexia nervosa (AN) and bulimia nervosa (BN), are chronic illnesses defined by disturbances in eating habits or weight-control behaviours. These conditions, when serious, may lead to life-threatening medical complications and may compromise the emotional and social well-being of the patients. It is estimated that 1% to 4% of young women in the West have an eating disorder such as AN or BN⁽¹⁾. Furthermore, subclinical forms of ED that do not meet definite diagnostic criteria may affect 4% to 16% of adolescent girls in Western populations⁽²⁾.

Since the 1980s, an increasing prevalence of ED has been observed in Asian populations⁽³⁾. In recent years, there has also been a gradual rise in the prevalence of ED among young females in Singapore. Such information is derived from studies of smaller groups of patients or subjects⁽⁴⁻⁶⁾. While the prevalence of ED is low, hospital admissions for ED have been found to be on the rise from 1991 to 1996⁽⁶⁾. Examination of the clinical characteristics of ED patients in Singapore reveal marked similarities to that of their Western counterparts. The objectives of this study are: firstly, to determine the prevalence of young females at increased risk for developing ED in Singapore; and secondly, to evaluate the ethnic and socio-demographical profiles of those at risk of developing ED.

METHODS

In this study, we report part of the Phase I data of a larger study that included both Phases I and II. In Phase I, subjects were screened for the possibility of being at risk for developing ED using appropriate questionnaires as described below. Phase II was the diagnostic phase during which those at risk were further interviewed using the Eating Disorder Examination (EDE) to determine those who were positive for ED.

Department of
Physiology
National University of
Singapore
2 Medical Drive
Block MD 9
Singapore 117597

Ho T F, MBBS, MMed,
MD
Associate Professor

Centre for Molecular
Epidemiology
Department of
Community,
Occupational &
Family Medicine
National University of
Singapore
10 Medical Drive
Singapore 117597

Tai B C, BA, MSc, PhD
Research Fellow

Institute of Mental
Health
National Healthcare
Group
Buangkok Green
Medical Park
10 Buangkok View
Singapore 539747

Lee E L, MBBS, MMed
Consultant

Cheng S, MBBS,
MMed, Grad Dip
(Psychotherapy)
Consultant

Liow P H, MBBS, MMed
Consultant

Correspondence to:
Dr Ho Ting Fei
Tel: (65) 6516 3669
Fax: (65) 6778 8161
Email: phshotf@
nus.edu.sg

In Phase I, the study population consisted of a cohort of 5,500 young females (aged 12 to 26 years) of different ethnic groups in Singapore. Females in secondary schools were recruited by random sampling. Most of the females from 17 to 26 years of age were recruited through convenience sampling due to the low yield of random sampling at these age groups. The subjects were from ten randomly selected institutions/schools (eight secondary schools, one polytechnic, one university) with stratification by age. Informed consent was obtained from all subjects. For those who were below 18 years of age, informed consent was obtained from their parents. Subjects were assured of full confidentiality of information collected. A set of self-administered questionnaires consisting of an Eating Attitude Test (EAT), Eating Disorder Inventory (EDI) and a set of socio-demographical questionnaires were administered to each subject.

The EAT⁽⁷⁻¹⁰⁾ is one of the most widely-used screening instruments for ED. It is a 40-item self-report measure designed to evaluate the behaviours and symptoms associated with ED. Each question on the EAT has a 6-point Likert scale response ranging from “never” to “always”. This scale is converted into a score of 0 to 3. The total score is computed by summing up the 40 responses.

The authors of the EAT suggested using 30 as the cut-off score. In this study, the original EAT was slightly modified with the removal of one item from the list. This item (“cut my food into small pieces”) was considered culturally inappropriate in Singapore where the population is primarily Asian. Hence, the EAT used for this study consisted of 39 items. A cut-off score of 29 was used to categorise the subjects into either “normal” (NM) or “at risk” (AR).

EAT has been demonstrated to have a good reliability and a good criterion-related validity in differentiating between ED groups and controls. In a pilot study conducted earlier by our team, the EAT was found to have a strong reliability with a Cronbach alpha coefficient of 0.78. The EDI^(7-9,11), is a widely-used standardised 64-item self-report measure designed to assess psychological and behavioural traits common to AN and BN. The 64 items are distributed into eight subscales where three of the subscales (drive for thinness, bulimia, and body dissatisfaction) measure behaviours and attitudes towards eating, weight, and body shape. The remaining five subscales (ineffectiveness, perfectionism, interpersonal distrust, interoceptive awareness and maturity fears) assess general dysfunctional attitudes and psychopathology associated with ED.

Each of the 64 items is provided with a 6-point Likert scale response similar to that of EAT. As each subscale is intended to measure an independent trait, the subscales are separately scored. A cut-off score of 14 for the drive for thinness subscale (EDI-DT) has been recommended for identification of those at risk of ED. As in the EAT, the EDI is generally reliable and valid with a reliable internal consistency for the subscales. In our earlier pilot study, the reliability of EDI was found to be acceptable with Cronbach alpha coefficients above 0.65 for all subscales.

In this study, a subject was categorised as AR if she had a score of ≥ 29 for EAT and/or ≥ 14 for EDI-DT, thus differentiating the NM and AR groups. By this combination of EAT and EDI-DT scores, the possibility of false negatives can be minimised and the determination of those categorised as AR can be more accurate. The socio-demographical questionnaire comprised 38 questions that were categorised into demographical and social factors for the purpose of analysis. “Social factors” were arbitrarily subdivided into four subcategories, viz. (A) involvement in high-risk behaviours, (B) clinical background of subjects and their family members, (C) interpersonal relationships, and (D) weight-related factors. In this paper, the data on the above will not be discussed.

Other socio-demographical characteristics included “nationality” (Singaporeans or non-Singaporeans), “race” (Chinese, Malay, Indian, Others), “level of education” of subjects and their parents, “socioeconomic status” (based on parental level of education and type of accommodation) and “spoken language” at home (English, Mandarin/dialects, Malay, Tamil, Others). Level of education was dichotomised into whether the subject had or had not completed Cambridge General Certificate of Education (GCE) “O” levels. Parents’ educational level was dichotomised into whether a parent had or had not attained Cambridge GCE “A” levels/polytechnic diplomas/university degrees. Type of accommodation was dichotomised into living in subsidised housing (Housing Development Board [HDB] flats of less than five rooms in size) or larger properties (five- to seven-room HDB flats, executive flats, condominiums and landed property).

Based on the EAT and EDI-DT scores, subjects were categorised into AR (EAT ≥ 29 and/or EDI-DT ≥ 14), or NM (EAT < 29 and/or EDI-DT < 14) groups. NM females were used as reference for comparison with the AR females. Prevalence of AR among the females and its associated 95% confidence intervals (CI) were determined. Socio-

demographical characteristics were analysed by means of chi-square test and independent-sample t-test when assessing differences in proportions and means respectively. All statistical analyses were conducted using Statistical Package for Social Sciences (SPSS) version 11.5 (Chicago, IL USA).

RESULTS

Of the 5,500 questionnaires distributed, 4,461 (response rate 81.2%) sets of questionnaires were returned. Mean age of the entire cohort was 16.7 years (range 12-26 years) (Table I). The ethnic composition was 78.8% Chinese, 11.7% Malay, 6.6% Indian, and 3.0% other ethnic groups. This distribution was consistent with the general ethnic distribution of Singapore (population census 2000). Both the NM and AR females were comparable in their weight and body mass index (BMI). Based on the criteria described above, the prevalence of AR females (n=330) was 7.4%. (95% CI 6.7%-8.2%, p=0.001). As shown in Table I, the AR females had higher mean EAT and EDI-DT scores, as compared to the NM females. The mean differences for EAT and EDT-DT scores were 22.1 (95% CI 20.7-23.4, p<0.0001) and 10.9 (95% CI 10.5-11.4, p<0.0001), respectively.

Table I shows that there was no difference in mean age and nationality between the AR and NM females. In contrast to the NM group (10.9%), there were a higher proportion of Malay females in the AR group (20.6%). Proportionately, there were more AR females with higher education levels (above GCE "O" levels) as compared to the NM females. The proportions of AR females with parents (fathers or mothers) having higher educational status were lower than that of NM females (Table I).

Table II shows the prevalence rate ratios (PRR) for the various socio-demographical characteristics. AR females were twice as likely to be Malay as compared with Chinese (PRR 2.05, 95% CI 1.59-2.65, p<0.001). Overall, the language spoken at home is a significant social factor for AR females (p=0.001). In particular, the AR females were also more likely to use Malay as a spoken language at home (PRR 1.70, 95% CI 1.26-2.30, p=0.001). In terms of education level, AR females were more likely to have completed GCE "O" levels (PRR 1.26, 95% CI 1.02-1.55, p=0.031). AR females were less likely to have parents who were better educated, with educational levels above GCE "A" levels (Fathers' education: PRR 0.71, 95% CI 0.56-0.90, p=0.004; Mothers' education: PRR 0.64, 95% CI 0.49-0.84, p=0.001). The type of housing had no association with being at risk for ED.

Table I. Socio-demographical characteristics and clinical data of females in the at risk (AR) and normal (NM) groups.

	NM (n=4,131)	AR (n=330)	Total (n=4,461)
Age (in years)			
Mean	16.7	16.9	16.7
Range	12-26	12-26	12-26
Nationality			
Singaporean	3,659 (88.8)	296 (89.7)	3,955 (88.7)
Non-Singaporean	462 (11.2)	34 (10.3)	496 (11.1)
Ethnic Group			
Chinese	3,290 (79.6)	224 (67.9)	3,514 (78.8)
Malay	452 (10.9)	68 (20.6)	520 (11.7)
Indian	263 (6.4)	31 (9.4)	294 (6.6)
Others	126 (3.1)	7 (2.1)	133 (3.0)
Level of education: completed GCE 'O' levels			
Yes	1,850 (44.8)	168 (50.9)	2,018 (45.2)
No	2,281 (55.2)	162 (49.1)	2,443 (54.8)
Father's education status: completed GCE 'A' levels & above			
Yes	1,420 (35.6)	89 (27.6)	1,509 (35.0)
No	2,564 (64.4)	233 (72.4)	2,797 (65.0)
Mother's education status: completed GCE 'A' levels & above			
Yes	1,112 (27.6)	62 (19.1)	1,174 (27.0)
No	2,919 (72.4)	262 (80.9)	3,181 (73.0)
Weight (kg)			
Mean	49.4	52.2	49.6
SD	8.8	8.6	8.8
BMI (kg/m²)			
Mean	19.5	20.6	19.6
SD	3.1	3.2	3.1
EAT score			
Mean	10.5	32.7	12.1
SD	5.2	12.0	8.4
EDI-DT			
Mean	2.7	13.7	3.5
SD	3.2	4.3	4.4

GCE: General Certificate of Education

BMI: Body mass index

EAT: Eating attitude test

EDI-DT: Eating disorder inventory-drive for thinness

Note: Numbers in parentheses represent percentages

DISCUSSION

The data reported in this paper is partially derived from Phase I of the first large-scale population study

Table II. Prevalence rate ratios (PRR) of socio-demographical factors related to females at risk of developing eating disorders.

	n	Prevalence (%)	PRR (95% CI)	p-value
Ethnicity				
Chinese	224	6.4	1.00	-
Malay	68	13.1	2.05 (1.59-2.65)	<0.001
Indian	31	10.5	1.64 (1.16-2.36)	0.006
Others	7	5.3	0.83 (0.40-1.72)	0.605
Language spoken at home				
English	120	7.1	1.00	-
Mandarin/dialects	138	6.5	0.92 (0.72-1.16)	0.462
Malay	55	12.0	1.70 (1.26-2.30)	0.001
Tamil	7	10.8	1.52 (0.74-3.13)	0.259
Others	10	9.7	1.37 (0.74-2.53)	0.317
Completed 'O' levels:				
No	162	6.6	1.00	-
Yes	168	8.3	1.26 (1.02-1.55)	0.031
Father's education: completed 'A' levels/polytechnic/tertiary				
No	233	8.3	1.00	-
Yes	89	5.9	0.71 (0.56-0.90)	0.004
Mother's education: completed 'A' levels/polytechnic/tertiary				
No	262	8.2	1.00	-
Yes	62	5.3	0.64 (0.49-0.84)	0.001
Type of housing: 5-7 room HDB flat/private condominium/landed property				
No	139	7.2	1.00	-
Yes	191	7.7	1.06 (0.86-1.31)	0.576

HDB: Housing Development Board

(Phases I and II) of the epidemiology and clinical profile of females at risk of or diagnosed to have ED in Singapore. We note that the prevalence of young females at increased risk of developing ED was 7.4% in our population. This prevalence is comparable to that in the West. In the United Kingdom, prevalence rates of 6.9% in a population of schoolgirls in South London⁽¹²⁾, and 6.8% in a population of females in Leicestershire⁽¹³⁾ were reported. In another smaller study where the study cohort included both genders and had a much wider age range, 8.7% were found to have potential eating disturbances based on their EAT scores⁽¹⁴⁾. The rather high prevalence noted in our study may in part be due to the combined use of EAT and EDI-DT as criteria for identification of those at risk for developing ED. Such a combination may help reduce false negatives and improve the sensitivity and specificity of the screening. In the reports noted

above⁽¹²⁻¹⁴⁾, only EAT was used as the instrument for screening. With the use of EAT alone, only 2.2% of females from our cohort were defined as "at risk".

Few studies have evaluated the socioeconomic and educational factors related to eating disorders. In our study, AR females tended to be significantly more highly educated. Studies conducted in the West⁽¹⁾ as well as in Asia⁽¹⁵⁾ show that the average age of onset for eating disorders in females was from 14 to 18 years. This age range is somewhat lower than that of females in our AR group where 50.9% had completed Cambridge GCE "O" levels and were attending polytechnic or university at the time of study (age range 17-26 years).

Nevonen and Norring⁽¹⁶⁾, in their study of Swedish female patients with eating disorders, reported that these patients tended to have a higher socioeconomic background but have lower social status as indicated by their marital status. Determination of socioeconomic status using educational level of parents may not be highly reliable, even though it is considered to be a fairly good estimate and is used as an indicator of socioeconomic status in public health research in the United States⁽¹⁷⁾. It is significant that AR females in our study were more likely to have parents who were less well educated, possibly indicating a lower socioeconomic status. However, the type of housing was not a significant factor for the AR group. Thus it is uncertain whether socioeconomic status has any association with the development of eating disorders in females of our population.

It is unclear why the prevalence of females at risk for developing ED is higher among Malays. This ethnic factor is further emphasised by the fact that speaking the Malay language at home is a significant risk factor for the AR females. There have been no reported studies of such scale that assessed similar ethnic differences. It may be hypothesised that the high prevalence of obesity among Malays (16.2%) as compared to other ethnic groups in our population may have contributed to this phenomenon⁽¹⁸⁾. In their study on perception of body size and shape in Chinese females in Singapore, Wang et al⁽¹⁹⁾ noted that speaking English at home was positively associated with preference for thinness. This led to her postulation that "Westernisation" may in some way contribute to the distortion of body image. Nevertheless, Wang's study involved a much smaller number of subjects who were entirely Chinese in ethnicity. In our study, speaking English at home did not significantly contribute to the risk of developing ED, but using Malay as a spoken language at home was a significant risk factor.

Perhaps the studies of Mumford and Whitehouse^(20,21) comparing Asian and Caucasian schoolgirls may shed

some light on why Malay females speaking the Malay language at home are significant risk factors for developing ED. The Asian girls in these studies were primarily Muslim (88%), with the remaining being Sikh and Hindu. In one study⁽²⁰⁾, Asian girls had a higher EAT score and higher prevalence of bulimia nervosa, compared to the Caucasian girls. The high EAT scores were associated with more traditional cultural orientation and not with greater Westernisation⁽²¹⁾. Additionally, the higher EAT scores, while reflecting greater concerns with food intake and weight, were not associated with dissatisfaction with body shape. These findings suggest that personal conflicts, family and cultural difficulties are likely factors contributing to the development of ED. In this context, we may postulate that the Malay females in our study, who were better educated than their parents and also exposed to traditional or conservative Muslim culture at home, were more likely to experience sociocultural conflicts and stress. Such conflicts and stress may put them at risk of developing ED. The validity of such concepts and the extent of influence of these sociocultural factors on the various ethnic groups in Singapore are worthy of further investigation.

In conclusion, the observed prevalence of young females at risk of developing ED is 7.4% and is comparable to that in the West. Various ethnic and socio-demographical factors appear to be associated with an increased risk for developing ED, e.g. Malay ethnicity, using Malay as a spoken language at home, high educational status and possibly lower socioeconomic status (as indicated by parents' educational level).

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