

# Association of socio-culture factors with disordered eating behavior: An empirical study on urban young girls of West Bengal, India

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**ABSTRACT:** A shift towards the concept of thin body image is occurring among the urban girls, as an outcome of mass media exposure. A large section of the girls are involved in attaining thin body image which at times develops dissatisfaction over body weight. Body weight dissatisfaction gives rise to the development of body weight concern and disordered eating behavior. The present research aimed to find out the association of socio-cultural factors with disordered eating behavior among a group of urban girls. The study group included 400 girls aged between 14 and 21 years, residing in the city of Howrah, West Bengal, eastern state of India. Information on socio-demographic characteristics, body weight concern, media habits, and family-peer environments was collected using standard pretested questionnaires. A cross-culturally tested questionnaire developed by Srinivasan and colleagues in 1998, was used to measure disordered eating behavior. Bivariate analyses found significant associations between eating behavior and several socio-cultural factors. Multivariate analysis revealed that education level of fathers and birth order of the participants, body weight concern and peers' influence were the significant predictors of disordered eating behavior of the study participants. Socio-cultural factors have significant associations with the disordered eating behavior of the study participants.

**KEY WORDS:** eating distress syndrome, body weight concern, media habits, family-peer environments

## Introduction

In India, the problem of eating disorder does not seem to get manifested in its extreme forms like Anorexia Nervosa and Bulimia Nervosa as found in some western countries (Patton et al., 1990; Srinivasan et al., 1995 and 1998). Srinivasan and his colleagues (1995) identified few (around 14.0%) medical college students of south India having a syndrome of eating distress (EDS) which did not fit into any of the standard diagnostic criteria for major eating disorders. Three years

later, Srinivasan et al. (1998) showed in his study that medical students developed a milder form of eating disorder with the fear of fatness. These students did not show extensive weight loss and restrictive dieting as sign of major disorder like anorexia nervosa. The author termed the symptoms as 'Eating Distress Syndrome' which was commonly reported by females rather than males. Augustine et al. (2003) reported that more than half of the adolescent girls, residing in Ernakulam wanted to lose body weight. Results showed that the weight loss plans

among the study groups included exercise (21%), followed by meal skipping (20%), starvation (16%), binge eating (6%) and consumption of diet pills (2%) and the most commonly skipped meal was breakfast. Mendhekar et al. (2009) studied two cases of anorexia nervosa (a type of eating disorder). Both of them were from middle class urban background. The study showed that factors like parental influence, peer pressure, media habits and preoccupation with thinness were not the only factors responsible for this disease. The author expressed that clinical symptoms of anorexia nervosa in India may be similar in nature to those in western countries but the psychosocial development and psychodynamic aspects may be different in India.

In north India, about 0.4% of college girls, residing in the foot hill regions of Himalaya, practiced binge eating (a form of disordered eating behavior) during festive occasions only to check overeating (Bhugra et al. 2000). In this study, none of the girls reported of taking any diet pills, laxatives, or diuretics. Mishra and Mukhopadhyay (2010) in their study on Sikkimese adolescent girls reported that they often opted for skipping of meals to control their body weight. Some of them reported the habit of snacking between main meals. The same study revealed that girls who remained dissatisfied with their body weight were more inclined to dieting. In Delhi, weight concern and dissatisfaction over bodyweight were prevalent among underweight as well as overweight adolescent girls from affluent family (Chugh and Puri 2001). In this study, about 50% of the adolescent girls showed disorderd eating behavior. Eating behavior like skipping of meals, eating out, and snacking between meals were also common among them.

Although girls had enough knowledge regarding nutritional deficiency, yet they did not follow normal eating behavior. As a result, their diets remain deficient with energy, protein, iron, niacin, vitamin A, and fibre. The study further revealed that adolescent girls who have disordered eating behavior showed lack of interest in their educational assignment than girls with good eating habits. Recently Mandal et al. (2013) studied a classic case of the bulimia nervosa (BN) in a young Indian female. According to author, female gender, metropolitan domicile, family history of depressive disorder has played an important role for the emergence of BN in India.

Literature shows that socio cultural and economic context (Neumark-Sztainer et al. 2008; Abraham and Birmingham 2008), gender (Costa et al. 2008; Seepersad 2012), age (Jones et al. 2001; Yanez et al. 2007), body weight concern (Demarest and Allen 2000; Grabe et al. 2008), media habits (Field et al. 1999 ;2001; Becker et al. 2002), family environment (Hill and Franklin 1998; Smolak et al. 1999; Furnham and Adam-Saib 2001; Yanez et al. 2007; Neumark-Sztainer et al. 2008) and peer pressure (Monge-Rojas et al. 2002; Favor 2007; Meyer and Gast 2012) are some of the key factors that have been associated with eating disorder among adolescents in different settings across the world. The eating disorder was also seen to be associated with a significantly higher prevalence of psychopathology (Pope and Hudson 1989; Braun et al. 1994) and certain genetic factors (Wade et al. 2000; Bulik et al. 2000; Grice et al. 2002).

The present study aims to investigate the association of socio-cultural factors with disordered eating behavior among a group of urban young girls.

## Materials and Methods

### Selection procedure and response rate

#### Study area and population

The present study was conducted in the city of Howrah, district of West Bengal, located in the eastern part of India, whose inhabitants are currently experiencing a significant change in lifestyle and eating habits due to influences associated with rapid urbanization and modernization processes.

The present study involved a group of 400 girls aged between 14-21 years [Bengali speaking Hindu (357) and Muslim (43)]. The inclusion criteria of this study were the age range (14-21 years), were unmarried and residing permanently since birth in the city of Howrah.

Study participants were predominantly females only, because previous literature reveals that the adolescents and/or adult of contemporary period reported to have disordered eating attitude and behavior (Jones et al. 2001; Jennings et al 2006; Neumark-Sztainer et al. 2004; 2008) with girls more frequently having disordered eating attitudes than boys (Demerest and Allen 2000; Jones et al. 2001; Neumark-Sztainer et al. 2008). However, the mean age of the participants was  $16.88 \pm 2.04$ .

There are ten senior secondary schools [with medium of instruction in vernacular language (Bengali)], one high *Madrasah* and two undergraduate colleges located in five of the selected municipal wards. All of these educational institutions were approached for permission. Only four (40%) schools, one high *Madrasah* (100%) and one undergraduate college (50%) gave permission to conduct our study. A total of 600 girls were enlisted on the basis of the criteria fixed for the study. Of them finally 400 girls were available or volunteered of participants. However, the total participation rate was 66.7% (Hindu 71.4% and Muslim 43.0%) (Fig.1).

#### Ethical issues

The study protocol was approved by Institutional Bio Ethics Committee for Human and Animal Research Studies, University of Calcutta (approval number: 2014-23). Before data collection, the objectives and benefits of the study were explained to the respective authorities of the Educational Institution (school, college and *Madrasah*) and to each of the

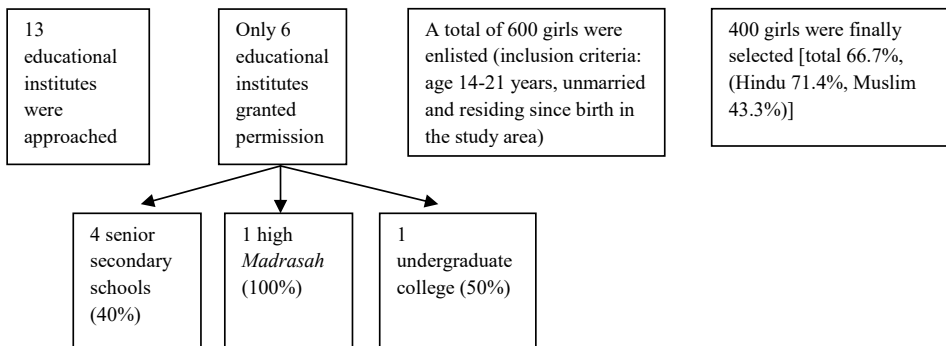


Fig.1. Flowchart showing response rate of the study participants

study participants. Informed consent has been taken from the participants at the time of Interview.

### *Data types*

All the questionnaires were pretested on a small group of the same population prior to the main survey. Moreover, the original version of the questionnaire was in English. As Bengali is the vernacular language of the study population, it was translated into Bengali and back-translated in English for validation by professional translators. However, the main survey was conducted during the period from September 2012 to July 2014.

**Socio demographic profile:** Information on socio-demographic profile such as present age (in years at the time of interview) and birth order of the participants, educational status and occupational type of their parents, socio-economic class: lower, middle and upper (measured with the help of Kuppuswamy's Socio-Economic Status Scale 2014) and religion were collected using pretested questionnaire.

**Disordered eating behavior:** The screening questionnaire- eating distress syndrome (SQ-EDS) is a 15-item questionnaire (Srinivasan et al. 1998) which has been used to assess disordered eating behavior in the present study. Each question has two response options- 'yes' or 'no'. The respond 'yes' is given a score of 1 and that of 'no' as 0. If a participant responds 'yes' to all the 15 items of the questionnaire then the total eating distress syndrome (EDS) score of the participant would be 15. Similarly if a participant responds 'no' for all the 15 item questionnaire, the total score of the participant would be 0. The range of score for a participant may vary between 0 and

15. However, it has to be mentioned here that the participants scoring 5 or more were considered to have disordered eating behavior and those having below 5 were considered to have normal eating behavior. This 15-item scale was tested in the pilot study (Kuder Richardson index  $20 = 0.68$ ) before main survey.

**Body weight concern:** Information on body weight concern was collected using a standard questionnaire used by Mciza et al. (2005) with little modification following cultural norms. Selective questions from the original questionnaire were used for the present study; for example, "Have you ever thought that you are fat?", "Have you ever thought that you are thin?", "Do you worry about being fat?", "Do you worry about being thin?" The response options were 'yes' and 'no'. For other questions, like "How do you satisfy with your present weight?" the response options were 'satisfied', 'not sure' and 'dissatisfied', and for questions, like "What do you think about your current body weight?" the response options were 'underweight', 'normal' and 'overweight'. This 6-item scale was tested in the pilot study (Cronbach's  $\alpha = 0.60$ ) before main survey.

**Media habits:** A suitable questionnaire was designed to assess the information on the frequency of watching television programs (like, advertisement, soap opera, movie and music video), reading newspaper and magazine articles and browsing internet on topics related to body weight concern. Weekly exposure to media was collected. Study participants were divided into three categories on the basis of the frequency of exposure to media: never, infrequent and frequent. The participants who reported 'no exposure' was classified as never, those reported 'once to three days in a week' as infre-

quent, and those 'more than three days in a week' as frequent (Mallick et al. 2015).

Family and peer environment: Parental influence and peer pressure on the issues related to body weight of the participants were obtained by using standard questionnaire (Mciza et al. 2005). Selective questions from the original questionnaire were used for the present study; for example, the questions like, "Have your mom/dad/grand ma/grand pa/sister/brother ever told you that you are thin?", "Have your friends ever told you that you are thin?", "Have your mom/dad/grandma/grand pa/sister/brother ever told you that you are fat?", "Have your friends ever told you that you are fat?", "Do your family give compliments about your body size or shape?" were asked to the participants. The response option for each question was 'yes' or 'no'.

#### *Statistical analysis*

Descriptive statistics were used to calculate the frequency of socio-demographic profile and eating behavior among the participants. Chi square test was also used in bivariate comparison.

Multiple binary logistic regression (stepwise) analysis was performed to study the relationship of socio demographic profiles (such as, age and birth order of the participants, religion, parents' education and occupation) and several other factors (such as, body weight concern, media habits, and family-peer environment (as independent variables) of the participants with their eating behavior (disordered or not) (based on EDS score) (as dependant variable). The reference category for the dependent variables is EDS (score < 5). All the independent variable were in categories. The followings were the reference categories (in

parenthesis) for each of the categorical independent variables: birth order of the participants (more than one child), educational level of the fathers (above secondary), perceived own body weight as (non-overweight), worried of being thin (no), satisfied with present body weight (satisfied), tried to reduce body weight (no) and peers advised them to do physical exercise (no).

The co-linearity of the independent variables was checked and the values were found to be within the acceptable limit. Odds ratios (OR) and respective confidence intervals (95%CI) were calculated. In the text, a *p* value of  $\leq 0.05$  was considered statistically significant. Furthermore, a classification table was used to evaluate the predictive accuracy of the logistic regression model. In this table the observed values for the dependent outcome and the predicted values (at a user defined cut-off value, for example  $p=0.50$ ) was cross-classified.

The tested values for Kuder Richardson index 20 (0.68) and Cronbach's  $\alpha$  (0.60) were calculated to judge the reliability of the 15-item scale (eating distress syndrome questionnaire) and the 6-item scale (assessment of body weight concern) respectively.

The Software Statistical Package for Social Science (SPSS) version 16.0 (SPSS Inc Chicago) was used for analysis of the entire data.

## **Results**

Nearly three-fifth of the participants was aged between 14 and 17 years. About 61.3% of the participants belonged to households with monthly expenditure up to 10,000 (INR), only 7.2% participants belonged to household with monthly expenditure above 20,000 (INR). Majori-

ty of the parents of the study participants studied up to grade 10th (secondary level). Occupational status of the fathers of most of the participants were business, whereas, most of the mothers were home makers. Slightly higher percentage of the participants were from lower socioeconomic class (39.2%) compared to the other two socioeconomic categories. In the present study, most of the participants were single and/or first born child of their parents. Around one-fifth of the study participants showed disordered eating behavior (Table 1).

The participants with disordered eating behavior remain dissatisfied with their present body weight, perceived own body weight as overweight and remain worried of being fat more than those without this behavior. The association was statistically significant for the variables such as, 'satisfied with present body weight' ( $p \leq 0.01$ ), 'perception regarding own body weight' ( $p \leq 0.01$ ), 'perception about self as thin' ( $p \leq 0.05$ ), 'perception about self as fat' ( $p \leq 0.01$ ) and 'worried of being fat' ( $p \leq 0.01$ ) (Table 2).

Table 3 shows that participants with or without disordered eating behavior like to spend most of the time watching television. Interestingly, no significant association was noticed between any of the media habits of the participants and their eating behavior.

Table 4 shows that participants who were worried of being thin showed significant association with watching of advertisements and programs on television compared to those who were not ( $p \leq 0.05$ ).

Significantly higher number of participants without disordered eating behavior reported that their parents and peer group considered them to be thin compared to their respective counterpart ( $p \leq 0.01$ );

whereas, higher number of participants with disordered eating behavior reported that their parents considered them to be fat and advised them to do more physical exercise than those without this behavior. Higher number of participants without disordered eating behavior reported that their parents were satisfied with their present body weight, but wanted them to be healthier compared to those with this behavior ( $p \leq 0.01$ ). On the other hand, significantly higher number of participants with disordered eating reported that their peer group wanted them as thin compared to their respective counterpart ( $p \leq 0.01$ ) (Table 5)

Table 6 shows the association of eating behavior (disordered or not) (based on EDS score) with socio-cultural variables among the participants. The incidence of disordered eating was found to be less among the participants who were the only child of their parents than those who were not. The participants whose fathers attended secondary and below secondary levels of education, were two times more likely to show disordered eating behavior compared to those whose fathers attended above secondary. Participants who perceived their body weight as overweight, were ten times more likely to show disordered eating behavior than those who perceived their body weight as underweight. It has been notable that the chance of having disordered eating was found to be three times more among the participants who were worried about their thin body structure and dissatisfied about their body. The association between weight related behaviors and eating behavior was significant. The participants whose peer groups advised them to do physical exercise were three times more likely to show disordered eating behavior than those whose peer groups did

Table 1. Socio-demographic profile of the study participants

Variable	Study participants (N=400)	
Age groups (years)		
14 -17 (Younger)	258 (64.5)	
18 - 21 (Older)	142 (35.5)	
Religion		
Hindu	357 (89.2)	
Muslim	43 (10.7)	
Monthly household expenditure (INR)		
Below 5,000	119 (29.8)	
5,001-10,000	126 (31.5)	
10,001-15,000	80 (20.0)	
15,001-20,000	46 (11.5)	
Above 20,000	29 (7.2)	
Educational level of parents	Father	Mother
Non literate	12 (3.0)	17 (4.2)
Up to grade X	225 (56.2)	261 (65.2)
Grade XI and grade XII	65 (16.2)	65 (16.2)
Below and up to graduate level	83 (20.8)	49 (12.2)
Above graduate	15 (3.8)	8 (2.0)
Occupation of parents		
Service	138 (34.5)	19 (4.8)
Professional	6 (1.5)	3 (0.8)
Business	184 (46.0)	10 (2.5)
Labour	23 (5.8)	
Home maker		364 (91.0)
Pension holder	9 (2.2)	
Others*	40 (10.0)	
Others**		4 (1.0)
Socio-economic class (study participants/ Mean± SD)		
Lower class	157 (39.2)	
Middle class	126 (31.5)	
Upper class	117 (29.2)	
Birth order of the participants		
Single and/or first child	241 (60.3)	
Second born	117 (29.2)	
More than second born	42 (10.5)	
Eating behavior (EDS scores)		
Normal eating behavior (score<5)	320 (80.0)	
Disordered eating behavior (score≥5)	80(20.0)	
Eating distress syndrome score (Mean±SD)	2.70±2.30	

\* Others: driver, carpenter, mason, factory worker, *jari* worker; \*\*others: domestic help labour; Figures in the parenthesis indicate percentages.

Table 2. Association between body weight concern and eating behavior among participant

Variable	Eating behavior (based on EDS score)		$\chi^2$ p-value
	Normal <5 scores (n=320)	Disordered $\geq$ 5 scores (n=80)	
Satisfied with present body weight			
Satisfied	127 (39.7)	18 (22.5)	$\chi^2=19.74$
Not sure	149 (46.6)	35 (43.8)	$p=0.01^*$
Dissatisfied	44 (13.8)	27 (33.8)	
Perception regarding own body weight as			
Underweight	71 (22.2)	6 (7.5)	$\chi^2=49.87$
Normal weight	214 (66.9)	39 (48.8)	$p=0.01^{**}$
Overweight	35 (10.9)	35 (43.8)	
Perception about self as thin			
Yes	161 (50.3)	25 (31.2)	$\chi^2=9.34$
No	159 (49.7)	55 (68.8)	$p=0.02^*$
Perception about self as fat			
Yes	87 (27.2)	43 (53.8)	$\chi^2=20.58$
No	233 (72.8)	37 (46.2)	$p=0.01^{**}$
Whether worried of being thin			
Yes	48 (15.0)	12 (15.0)	$\chi^2=0.25$
No	272 (85.0)	68 (85.0)	$p=0.88$
Whether worried of being fat			
Yes	63 (19.7)	44 (55.0)	$\chi^2=40.72$
No	257 (80.3)	36 (45.0)	$p=0.01^{**}$

Figures in the parenthesis indicate percentages; \*  $p \leq 0.05$ ; \*\*  $p \leq 0.01$

not.

The classificatory table is a method to evaluate the predictive accuracy of the logistic regression model (table 7) to predict participants having disordered eating behavior by a cross culturally tested questionnaire EDS (with a predicted probability of 0.5 or greater) is 83.8%.

## Discussion

The present cross sectional study aims to investigate the association between disordered eating behavior and socio-cultural factors. The frequency of having disordered eating behavior among study participants appears to be considerably

higher (20.0%) compared to previous Indian studies conducted around one decade ago (Srinivasan et al. 1995; 1998), but in recent years, a cross sectional survey found a high prevalence of eating disorder- about 26.6% among adolescent girls in Uttar Pradesh and about 50.0% among adolescent girls in Delhi (Chug and Puri 2001; Upadhyah et al. 2013). Bivariate analysis of the present study reveals that the socio-cultural factors such as, body weight concern, parental influence and peer pressure were significantly associated with disordered eating behavior of the study participants. It has been observed that the study participants with disordered eating (EDS score  $\geq$ 5) were dis-



Table 3. Association between media exposure and eating behavior among study participants

Variable	Eating behavior (based on EDS score)		$\chi^2$ p-value
	Normal <5 scores (n=320)	Disordered $\geq$ 5 scores (n=80)	
Types of media exposure in a week			
Never*	20 (6.2)	9 (11.2)	$\chi^2=2.40$
Infrequent**	40 (12.5)	10 (12.5)	$p=0.30$
Frequent***	260 (81.2)	61 (76.2)	
Internet browsing			
Never	200 (62.5)	48 (60.0)	$\chi^2=0.47$
Infrequent	59 (18.4)	14 (17.5)	$p=0.78$
Frequent	61 (19.1)	18 (22.5)	
Newspaper-reading			
Never	134 (41.9)	32 (40.0)	$\chi^2=0.31$
Infrequent	63 (19.7)	18 (22.5)	$p=0.85$
Frequent	123 (38.4)	30 (37.5)	
Magazine-reading			
Never	172 (53.8)	45 (56.2)	$\chi^2=0.52$
Infrequent	97 (30.3)	21 (26.2)	$p=0.76$
Frequent	51 (15.9)	14 (17.5)	

\*Never: no exposure; \*\*infrequent: once to three days in a week; \*\*\*frequent: more than three days in a week; Figures in the parenthesis indicate percentages.

Table 4. Body weight concern and frequency of watching television among study participants

Variable	Frequency of watching television			$\chi^2$ p-value
	Never	Infrequent	Frequent	
Satisfied with present body weight				
Satisfied (n=145)	10 (6.9)	17 (11.5)	111 (81.4)	$\chi^2=2.91$
Not sure (n=184)	11 (6.0)	26 (14.1)	147 (79.9)	$p=0.57$
Dissatisfied (n=71)	8 (11.3)	7 (9.9)	56 (78.9)	
Perception regarding own body weight as				
Underweight (n=77)	5 (6.5)	9 (11.7)	63 (81.8)	$\chi^2=2.21$
Normal weight (n=253)	17 (6.7)	35 (13.8)	201 (79.4)	$p=0.69$
Overweight (n=70)	7 (10.0)	6 (8.6)	57 (81.4)	
Perception about self as thin				
Yes (n=186)	4 (6.7)	7 (11.7)	49 (81.7)	$\chi^2=0.09$
No (n=214)	25 (7.4)	43 (12.6)	272 (80.0)	$p=0.95$
Perception about self as fat				
Yes (n=130)	9 (8.4)	12 (11.2)	86 (80.4)	$\chi^2=0.46$
No (n=270)	20 (6.8)	38 (13.0)	235 (80.2)	$p=0.79$
Whether worried of being thin				
Yes (n=60)	8 (4.3)	28 (15.1)	150 (80.6)	$\chi^2=5.9$
No (n=340)	21 (9.8)	22 (10.3)	171 (79.9)	$p=0.05^*$
Whether worried of being fat				
Yes (n=107)	10 (7.7)	13 (10.0)	107 (82.3)	$\chi^2=1.11$
No (n=293)	19 (7.0)	37 (13.7)	214 (79.3)	$p=0.57$

Figures in the parenthesis indicate percentages;  $p \leq 0.05$ .

Table 5. Association of parental influence and peer pressure with eating behavior among participant

Variable	Eating behavior (based on EDS score)		$\chi^2$ p-value
	Normal <5 scores (n=320)	Disordered $\geq$ 5 scores (n=80)	
Parents considered them to be thin			
Yes	229 (71.6)	37 (46.2)	$\chi^2=18.40$
No	91 (28.4)	43 (53.8)	$p=0.001^{**}$
Parents considered them to be fat			
Yes	37 (11.6)	24 (30.0)	$\chi^2=16.83$
No	283 (88.4)	56 (70.0)	$p=0.001^{**}$
Parents' compliments for their body weight			
Yes	106 (33.1)	34 (42.5)	$\chi^2=2.47$
No	214 (66.9)	46 (57.5)	$p=0.116$
Parents' advice to do more physical exercise			
Yes	57 (17.8)	29 (36.2)	$\chi^2=12.89$
No	263 (82.2)	51 (63.8)	$p=0.001^{**}$
Peers considered them to be thin			
Yes	153 (47.8)	25 (31.2)	$\chi^2=7.10$
No	167 (52.2)	55 (68.8)	$p=0.008^{**}$
Peers considered them to be fat			
Yes	66 (20.6)	39 (48.8)	$\chi^2=26.15$
No	254 (79.4)	41 (51.2)	$p=0.001^{**}$
Peers' compliments for their body weight			
Yes	140 (43.8)	34 (42.5)	$\chi^2=0.04$
No	180 (56.2)	46 (57.7)	$p=0.84$
Peers' advice to do physical exercise			
Yes	40 (12.5)	26 (32.5)	$\chi^2=18.58$
No	280 (87.5)	54 (67.5)	$p=0.001^{**}$

Figures in the parenthesis indicate percentages; \*\*  $p \leq 0.001$

satisfied with their current body weight, perceived themselves as fat and overweight, and worried about their body size more than those without this behavior (EDS score <5).

Presently Indians are experiencing nutritional and lifestyle transition due to globalisation. A shift towards the concept of thin body image is occurring among girls of metropolitan cities through mass media campaign (Mallick et al. 2015). In-

terest in attaining thin body image sometimes leads to dissatisfaction over body weight which in turn provokes the development of body weight concern. This may influence many adolescent girls to modify their normal dietary pattern and develop eating disorder (Balhara et al. 2012; Mallick et al. 2014).

Media plays a major role for the high incidence of body weight dissatisfaction among girls (Wiseman 1992; Van

Table 6. Results of multivariate binary logistic regression analyses (stepwise) in study participants: disordered eating behavior based on EDS score as dependent variable and socio-cultural variables considered for disordered eating behavior as independent variables

Independent variables	Exp (B)	95%CI	p-value
Birth order of the participants			
Only child			
More than one child <sup>R</sup>	0.44	0.21-0.90	0.02
Educational level of the fathers			
Secondary and below			
Above secondary <sup>R</sup>	2.16	1.14-4.10	0.01
Perceived own body weight as			
Overweight			
Non-overweight <sup>R</sup>	10.24	3.36-31.21	0.001
Worried of being thin			
Yes			
No <sup>R</sup>	3.65	1.43-9.26	0.01
Satisfied with present body weight			
Dissatisfied			
Satisfied <sup>R</sup>	3.35	1.26-8.87	0.01
Tried to reduce body weight			
Yes			
No <sup>R</sup>	2.80	1.42-5.51	0.003
Peers advised them to do physical exercise			
Yes			
No <sup>R</sup>	3.72	1.92-7.23	0.001

Only significant values have been presented in the table; R: reference category

Table 7. Classification table for EDS questionnaire

Observed	Predicted		Percentage correct
	Normal	Disordered	
Eating behavior			
	n	n	
Normal	304	15	95.3
Disordered	50	31	38.3
Overall percentage			83.8

den Bulk et al. 2000; Groesz et al. 2002; Hill 2006). A significant association has been noticed between the exposure to electronic media (television) and one of the measures of body weight concern in our study. Similar findings have been

explored by other studies from Belgium (Van den Bulck 2000) and in India (Bhattacharya et al. 2014). Television is the most popular and effective medium of information, its approach and accessibility in combination with impressive presen-

tation of issue made it more acceptable to the adolescent girls. Previous studies have demonstrated a direct relationship between media exposure, body dissatisfaction and eating pathology (Stice and Shaw 1994; Utter et al. 2003), though no significant association was observed between any of the media habits of our participants and their eating behavior.

Eating behavior of our participants is influenced by their parents' and peers' attitudes. Higher number of participants with disordered eating behavior (EDS score  $\geq 5$ ) reported that their parents and peer group considered them to be fat and advised them to do more physical exercise than those without this behavior (EDS score  $< 5$ ); whereas, more number of participants without disordered eating behavior reported that their parents and peer group considered them to be thin compared to their respective counterpart. The result further reveals that higher number of participants with disordered eating reported that their peer group preferred them to be thin compared to those without disordered eating.

Research found a significant positive association between peer influence and eating disorder (Maloney et al. 1989; Schutz and Paxton 2007). Baker et al. (2003) studied eating behavior in a sample of 279 adolescents from a midsized catholic girls' school and a large public school of US and showed that adolescents and/or adults were less likely to have a positive attitude or intention about healthy eating and activity, because their parents and peer group may not perceive these behaviors as important part of life.

Multivariate analysis of our study explores that socio-demographic factors like, education level of fathers, religion, birth order of the participants and other factors like, body weight concern and in-

fluence of peers were the significant predictors of disordered eating. In our study, a negative association between disordered eating behavior and parents' level of education indicated that study participants from less educated parents have inadequate knowledge about healthy eating behavior, which may contribute to the development of disordered eating behavior.

Literature revealed that socio-cultural factors and family-peer environment are the most important determinants of the development of eating disorder (Neumark-Sztainer et al. 2003; Bauer et al. 2011; Berge et al. 2012 ; 2015). On the contrary, Jones et al. (2001) in Ontario observed that socioeconomic status (SES) was not significantly associated with eating disorder. According to Abraham and Birmingham (2008), religion plays a significant role in eating habits. Abraham and his colleges found in their study that Muslim adolescent girls and adult women have a higher prevalence of Eating Attitude Test (EAT) scores to detect eating disorder compared to non-Muslims.

It is possible that eating disorders manifested in India in non-severe and mild form rather than in the form of anorexia nervosa or bulimia nervosa because social values and norms sometimes prevent the thoughts regarding extreme eating disorder in India. However, eating disorder may develop into more severe form with the influence of changing socio-cultural milieu through globalization.

We are aware of the limitations of our study. Our results may suffer from some bias, which can be attributed to the small sample size. Moreover, data on parental influence and peer pressure on body weight was entirely based on individual participation only. There remained no scope to check with it further. Informa-

tion on dietary details, body composition measures and psychopathology of the participants also could have enriched the study.

In conclusion, we found that this cross sectional study can be considered important as it explored some important socio-cultural factors that have significant associations with the eating behavior (disordered or not) among a group of girls residing in the small city, Howrah, located at eastern part of India. A large sample size covering a large area and further identification of factors that are predicted of eating behavior is needed for future endeavor.

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### Authors' contributions

All authors are responsible for the set up of the study, analyses and interpretation of data and writing of the manuscript. Data collection was exclusively done by NG.

### Conflicts of interest

The authors have no conflicts of interest to declare.

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