DISCUSSION

4.1 An overview

The cultural context of body image in India has changed in the past few years (Srinivasan et al., 1998). A shift towards the concept of thin body image is occurring among the urban adolescent girls, as an outcome of mass media exposure. A large section of the girls is 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 concerns and unhealthy eating behaviours. Among the adolescents unhealthy eating behaviours may induce increased risk of eating disorders during later period of life. The whole process is being governed by global economic forces at macro levels. For example, India is passing through a transitional phase in dietary pattern due to influence of economic changes, rapid urbanization, women’s participation in work force and globalization. This transition is marked by a shift from traditional diet to modern western diet, which is much varied, involving food of animal origin, with high sugar and fat content and also pre-processed food more than before (Pingali, 2004). These foods are naturally very popular among the adolescents due to its vast availability in the market (Vaida, 2013). Moreover, these popular fast foods have high promotional coverage in mass media advertisements (Vaida, 2013). A study carried out in America showed that increase in women’s work participation at a large scale restrained working mothers to spend sufficient time with their families. With an effort to make up their non-attendance at home, they sometimes purchase cooked/packaged foods from restaurants or grocery stores (Boscia, 2012) which could modify their children’s food consumption pattern.
Changes in the dietary pattern might lead to a shift from cereal based diet towards high fat and high sugar rich food items that might lead to obesity and other metabolic disorders.

The present study, thus, aims to evaluate the current eating behaviours and its associated factors among a group of adolescent girls. Assessment of their nutritional status and its relationship with eating behaviours were also studied.

4.2 General characteristics

The study participants are all residents of the city of Howrah. The trend in the result shows that most of the participants were aged between 14 and 17 years, fall in the monthly household expenditure category of 10,000 (INR) and below 10,000 (INR). Parents of the participants mostly attended higher secondary level of education. Data reveal that the overall literacy rate is better in West Bengal, compared to many other states of India (Census of India, 2011). Majority of the mothers of the participants were home makers and fathers were mostly in business and service.

4.3 Eating behaviours and factors associated with it

A section (around one-fifth) of the participants of the present study showed disordered eating behaviours (in the form of abnormal eating attitudes or eating distress syndrome), a result which corroborates with the trends reported in several other studies across the globe (Fisher et al., 1994; Pastore et al., 1996; Stein et al., 1997). However, few studies reported relatively high rate (above 20%) of disordered eating behaviours (Apter et al., 1994; Maor et al., 2006; Eapen et al., 2006; Madanat et al., 2011). The disordered eating
behaviours in its severe form are quite common among the girls particularly in western countries (Rooney et al., 1995; Bemporad, 1997; Miller and Pumariega, 2001).

There are several factors responsible for the development of disordered eating behaviours. For example, previous studies showed that greater body image dissatisfaction often leads to the development of disordered eating behaviours among the adolescents (Attie and Brooks-Gunn, 1989; Killen et al., 1996; Keel et al., 1997; Ohring et al., 2002; Soo et al., 2008). In the present study, factors like, body image perception and attitudes, body weight concern, family environment, peer pressure, weight related behaviours, media exposure and physical activity were found to be associated with eating behaviours among the participants. It is observed that the study participants with disordered eating habits (EAT Score ≥20 and EDS Score ≥5) were dissatisfied with their current body weight, perceived themselves as fat and overweight, and worried about their body size more than those with normal eating behaviours (EAT Score<20 and EDS Score <5). A good number of studies revealed that girls are more dissatisfied with their body image and have higher rates of dissatisfaction over body weight compared to boys of similar age (Gustafson-Larson and Terry, 1992; Demarest and Allen, 2000; Jones et al., 2001; Neumark-Sztainer et al., 2008). Internationalization of societal pressure to remain thin plays a significant role in the development of body weight dissatisfaction among girls in general (Stice and Whitenton, 2002; Myers and Crowther, 2007; Rodgers and Chabrol, 2009). The present study also identifies that overweight participants were more likely to express dissatisfaction over own body weight compared to their normal - and underweight counterparts. The growing incidence of obesity among the adolescent girls develops a discrepancy between their body image perception and cultural expectations
(Paxton et al., 2006; Quick et al., 2013). As a result, overweight and obese girls remain excessively concerned with their body weight.

Interestingly, most of the study participants who tried to reduce body weight followed disordered eating behaviours. In order to reduce their body weight, they exercised more and consumed less food compared to those who showed normal eating behaviours. However, the finding suggests that the study participants were in favour of weight reduction, corroborating with the findings of Augustine and Poojara (2003) in India and Weiss et al. (2006) in USA. In the present study, binary logistic regression analysis reveals that factors such as age and body mass index of the participants and mothers’ education level are some significant predictors of body weight related behaviours. Earlier studies show that the rates of adopting weight-reducing strategies are higher among the overweight girls compared to their non overweight counterparts across world (Neumark-Sztainer et al., 2002; Boutelle et al., 2002; Stigler et al., 2011). These findings corroborate with the present study also. It could be an indication of their perceived hopelessness towards weight reduction. Skipping of breakfast and urge for dieting were also found to be high among the participants showing disordered eating behaviours. Skipping of meals is common among adolescents (Kelder et al., 1996; Chauliac and de Beco, 1996; Calderon et al., 2004), especially during middle and late adolescence period. Breakfast is the most commonly skipped meal and is attributed to lack of time, desire to sleep longer in the morning, lack of appetite, and a measure of dieting to lose weight. Studies revealed that skipping of breakfast may affect the ability of concentration, learning, and school performance (Rampersaud et al., 2005; Widenhorn-Müller et al. 2008; Gajre et al., 2008; Adolphus et al., 2013).
Eating behaviours of the participants of the present study is influenced by their parents’ and peers’ attitudes. Higher number of participants with disordered eating behaviours (EAT Score ≥20 and EDS Score ≥5) reported that their parents and peer group considered them to be fat and advised them to do more physical exercise than those with normal eating behaviours (EAT Score <20 and EDS Score <5); whereas, more number of participants showing normal eating behaviours reported that their parents and peer group considered them to be thin compared to their respective counterparts. The result further reveals that higher number of participants with disordered eating behaviours reported that their peer group preferred them to be thin compared to those with normal eating behaviours. Baker et al. (2003) examined that US adolescents were less likely to have a positive attitude or intention about healthy eating and activity if their parents and peer group do not perceive these behaviours as important in life.

The present study participants have high exposure to media (both electronic and print). Particularly, watching various television programs and advertisements are the most preferred choices among them. Several studies have shown that media exposure of thin body image is a major source of current high incidence of body weight dissatisfaction among the girls (Wiseman et al., 1992; Groesz et al., 2002; van den Bulk et al., 2006; Hill, 2006). In the present study, a significant association was noticed between the exposure to electronic media and body weight concern. Previous studies have demonstrated a direct relationship between media exposure, body dissatisfaction and eating pathology (Stice and Shaw, 1994; Utter et al., 2003). Although the media exposure was significantly associated with body weight concern of the participants of the present
study, yet there was no significant association between any of the media habits and their eating behaviours.

Physical activity is useful to reduce body weight by burning excess calories (NIN, 2011). Few of the participants of the present study, irrespective of their eating behaviours, were purposively engaged in physical exercise, dancing and sports regularly, but these activities was found to be comparatively higher among the participants with disordered eating behaviours.

4.4 Assessment of nutritional status

Generally Indians take three major meals in a day. These meals usually include cereals, pulses of different types, green vegetables, oil and animal protein (meat/fish) depending on the economic condition of the household (Shetty, 2002). In eastern India, including West Bengal, rice is the staple food and is taken in major meal. The usual meal pattern of the Bengalis include tea, biscuit, puffed rice, and bread as breakfast and boiled rice, vegetables, and one nonvegetarian item (usually fish) as lunch. For snacks and refreshments they prefer puffed rice, noodles, small cakes, and other fast foods. Dinner usually include wheat bread (roti), vegetables and sweets. It is assumed that the difference in religion will not affect the food habit in a major way since the study participants of the present study, belong to one cultural zone. A large proportion of the study participants consumed cereal, bread, pulses, vegetables and fish everyday, whereas, daily intake of fruits, milk and green leafy vegetables were found to be less among them. This finding corroborates with the studies, carried out in the other states of India (Choudhary et al., 2006; Malhotra and Passi, 2007; Goyle, 2009). We know that calcium
intake is essential for adolescents to attain their full genetic potential for peak bone mass and height. Adequate intake can reduce the risk of fracture and osteoporosis in later life. Therefore, it is suggested that the adolescents should consume plenty of milk to fulfill the high calcium requirements, though studies have found that the calcium and potassium intake of adolescents often remains below recommended levels. (Quann et al., 2015). National Nutrition Monitoring Bureau (NNMB) surveys (2006) indicate that the daily intake of all food items except cereals and millets in Indian households is lower than the Recommended Dietary Allowances (RDA). In the present study, calorie consumption was found to be less than that of RDA among majority of the participants.

The present study participants prefer to consume foods outside home. This includes tasty fast food items like fried noodles (chowmin), burger, pizza, sandwich, etc. Similar trend has also been found in several other studies (Sadana et al., 1997; Sharma, 1998; Pereira et al., 2005; Washi and Ageib, 2010). Small/nuclear family set up, working status of women and economic condition are some of the factors responsible for the increase in the intake of such food items. Advertisements of such food items also influence the preference. Snacking between meals was also common among the participants of the present study. Such habits may help reduce their desire and appetite for regular meals. This could be one of the reasons for high intake of snacks between major meals.

Malnutrition is of public health significance among the adolescents across the world. The coexistence of overweight/obesity and underweight is rather common in developing countries and is found to be increased proportionally over time (Doak et al., 2000; Caballero, 2005). Now-a-days, obesity is a major public health problem. Being
obese and overweight are associated with substantial increased risks of mortality and morbidity. Adolescent obesity is associated with serious health outcomes including coronary heart disease, hypertension, diabetes and certain types of cancer (Must, 1996; Power et al., 1997; Freedman et al., 2007). The most widely used anthropometric measure of obesity is body mass index (BMI). However, BMI does not consider the distribution of body fat. Other measures which are being increasingly used are waist circumference (WC) (Pitanga and Lessa, 2005; Hermann et al., 2011; Cherqaoui et al., 2012), waist-hip ratio (WHR) (Kaur and Mogra, 2006) and conicity index (CI) (Kaur and Mogra, 2006; Flora et al., 2009; Cordeiro et al., 2010). The present study shows that nearly two-fifth of the participants was underweight, while about one-fifth of them were overweight. Majority of the participants belonged to the normal category for both WC and WHR. The results of the present study infer that the prevalence of underweight and overweight is higher among the study participants compared to the adolescents of other developing countries (Bazhan et al., 2005). The prevalence of overweight or obesity, however, was less than the adolescents of developed countries (Hedley et al., 2004), which may be the result of difference in lifestyles and eating habits. Several studies conducted in different states of India (Kapoor and Aneja, 1992; Chaturvedi et al., 1996; Singh and Mishra, 2001; Patanwar and Sharma, 2013) show higher prevalence of underweight than the present study, but the prevalence of overweight/obesity (Subramanyam et al., 2003; Mehta et al., 2007; Sood et al., 2007) was less compared to the present study.

4.5 Relationship between eating behaviours and nutritional status

It is evident that diet of the adolescent girls remains deficient with macro and micro nutrients due to their unhealthy eating behaviours (Chug and Puri, 2001). Present study
demonstrates that the participants with normal eating behaviours consumed variety of
food items such as, rice, bread, vegetables, fish and milk more than those with disordered
eating behaviours. On the other hand, consumption of proteins (animal) was higher
among the participants with disordered eating behaviours compared to their respective
counterpart. Possibly, the participants with disordered eating behaviours replaced
carbohydrates with protein based foods in major meals to remain thin and slim.

Multinomial logistic regression analyses show that the participants with
disordered eating behaviours were more likely to consume animal protein during main
meals. They also prefer to have fast foods and street foods outside home than those with
normal eating behaviours. The analyses also revealed that socio-demographic factors are
significant predictors for the dietary pattern of the participants as found by Riediger et al.
(2007). Two comparatively recent studies demonstrate that adolescents with a low socio-
-economic status (SES) consumed less fruit and vegetables than adolescents with a high
SES (Rasmussen et al., 2006; Bere et al., 2008). A study on 8817 adolescents in Norway
shows that with increase of parents’ education and social class, a decrease in
consumption of high calorie foods. However, an increase in consumption of fruits and
vegetables are also noticed (Nilsen et.al, 2010). Mann-Whitney U-test reveals that the
calorie intake from various food items was significantly associated with socio-
demographic variables, weight reduction behaviours and participants’ eating behaviours.

Interestingly, the mean values for most of the anthropometric measurements were
significantly higher among those who have disordered eating behaviours compared to
those who do not. It shows that instead of low body weight, truncal or central adiposity
was higher among the participants with disordered eating behaviours. This could be a
result of poor energy balance due to less physical activity. Studies in the past indicated that BMI was positively associated with poor eating habits (Ma et al., 2003; Rohrer et al., 2009; Al-rethaiiaa et al., 2010; Washi and Ageib, 2010). In Canada, a recent study by Azagba and Sharaf (2012) revealed that eating behaviour of an individual has a great impact on obesity prevalence. One of the reasons may be that the habits like, skipping of breakfast, snacking between major meals, consumption of calorie dense foods are commonly found among those with disordered eating behaviours (Story et al., 2002; Shi et al., 2005). Such behaviours are conducive to weight gain (Niemeier et al., 2006; Neumark-Sztainer et al., 2006; Rouhani et al., 2012). On the other hand, two exploratory studies revealed that overweight adolescent girls tend to engage in unhealthy eating habits more compared to their normal weight and underweight counterparts (Chug and Puri, 2001; Som and Mukhopadhyay, 2014).

The present study further suggests that the nutritional status (measured in terms of anthropometric traits) can best be predicted by the model which combines both socio-demographic variables and eating behaviours as independent variables. The results of the hierarchical linear regression analyses demonstrate a significant association between mothers’ education and occupation (as indicator of socio-economic status) and nutritional status of the participants. This finding also conforms to the findings of earlier studies (Miller and Rodgers, 2009; Ogden et al., 2010; Srivastava et al., 2012; Selvaraj et al., 2016). The role of mother in rearing a child is very important and her socio-economic status becomes an impediment for proper nutrition. Birth order of the participants is found to be another significant predictor of nutritional status. For example, study by Moreno et al. (2013) revealed that family structure has strong association with high BMI
scores among children, where a single child showed higher BMI scores than those who have siblings. The study presumed that perhaps siblings provided more opportunities to engage in physical activities during the normal course of family life. In the present study, association between study participant’s age and nutritional status indicates that anthropometric measures increase with advancement of age. The findings corroborate with the results of other studies also (Minhas et al., 2013; Sekhon and Minhas, 2014). However, the present study clearly indicates that eating behaviours alone is not the significant predictor of nutritional status. Socio-demographic factors do have an important role to play in determining the nutritional status of the participants. Therefore, it is observed that a close association remains between eating behaviours and nutritional status of the participants, where socio-demographic factors play an important role.

**Health problem and eating behaviours**

Interestingly it is notable in the present study that the general health problems like, anemia and dental caries/ spongy or bleeding gums were found to be significantly higher among the participants with disordered eating behaviours than those with normal eating behaviours. Studies revealed that unhealthy eating habits can lead to a number of immediate health problems, such as iron deficiency, deteriorating bone health and dental caries, under-nutrition, obesity and eating disorders (Story, 1992; Centers for Disease and Prevention, 1996). Iron is an essential element necessary for the formation of hemoglobin (the red pigment present in the red cells of blood). Hemoglobin plays an important role in the transport of oxygen to the tissues. Similarly, calcium is an essential nutrient required for healthy bones and teeth. During adolescence, development of critical bone mass is essential as this forms the ground for maintaining mineral integrity of the
bone in later life (NIN, 2011). However, it is suggested that adolescent girls should consume plenty of green leafy vegetables, milk and fruits which provide micronutrients such as iron and calcium.

### 4.6 Strengths and limitations of the study

To the best of our knowledge, this study is a maiden attempt to assess the eating behaviours (disordered or not) as well as nutritional status of a group of urban adolescent girls. Quantitative assessment of the consumption pattern (by using 24 hours recall) has provided a better picture on the present issue. Further, inclusion of anthropometric measures can be considered as strength of the study which predicts nutritional status of the participants more accurately. Additionally the population based sample, which allowed more generalization than clinical samples or convenience samples recruited for the purpose of examining eating behaviours.

In spite of the above strengths, the present study has certain limitations, as well. It cannot access the progress over time due to its cross sectional design. Considerations of family data, hence the genetic factors responsible could provide better understanding of the study objectives. Finally, because of limitations of sample size, the findings do not necessarily reflect general population trends.

### 4.7 Concluding remarks

With the advent of globalization, a major change is noticed in the overall lifestyle of people with the changed socio-cultural milieu. This could be one of the major reasons of development of disordered eating behaviours among a section of adolescent girls residing
in the city of Howrah. As evident from the result, motivating factors behind this development are socio-economic status, body weight dissatisfaction, excessive concern over body weight, parental influence and peer pressure. Dissatisfaction over their own body weight appears to be one of the major concerns on weight and eating pattern. As a consequence, in order to remain thin, they unknowingly develop disordered eating habits.

The present study also focused on nutritional status of these girls. Generally these girls consumed cereal, bread, pulses, vegetables and fish in their major meals. Daily intake of fruits, milk and green leafy vegetables were less. Snacking between meals and consumption of foods (mostly calorie rich) outside home were also common among them. Anthropometric profiles of the present study participants revealed that malnutrition, both under nutrition and over nutrition prevailed among these girls.

Selection and consumption patterns of different food items of adolescent girls with disordered eating habits revealed their intention of changing own body shape and size. To bring a change in body shape and size, they often followed or adopted unhealthy measures like, skipping of meals or breakfast, snaking between meals, avoidance of taking certain food groups and consumption of calorie laden foods outside home. Such behaviours are conducive to weight gain leading to obesity, instead of weight loss. Eating behaviours play a significant role on the nutritional status of this group of adolescent girls. Interestingly, it is evident from the present study that socio-demographic factors such as age, religion, birth order of these girls, and educational status and occupational level of their parents do have a significant role to play in determining nutritional status of these girls.
Present study would be an important step in making public health recommendations in helping young generation to develop positive attitudes or behaviours related to their consumption of foods. Furthermore, this study may help develop meaningful and/or effective nutritional intervention by the government.