



# Weight concerns and food habits of adolescent girls in two contrasting ecological regions: A comparative study in India



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## ABSTRACT

**Objective:** To compare the incidence of weight concerns and food habits between two ethnically different groups of adolescent girls residing in two distinct ecological settings: the plains of Kolkata and the mountains of Sikkim.

**Methods:** Two separate cross-sectional studies were conducted within a period of five years in urban hilly areas of Sikkim and the city of Kolkata, India. A total of 506 girls aged 14–19 years were selected from the study areas of Sikkim ( $n = 224$ ) and Kolkata ( $n = 282$ ). Girls were interviewed for weight concerns and food habits along with socio-demographic characteristics. Weight concerns were assessed with four variables such as, perceptions about own body weight, felt dissatisfied with own body weight, urge for dieting and use of weight reduction diet. Food habits included consumption of major foods during the past one week.

**Results:** Bivariate analyses showed that Kolkata girls perceived themselves as overweight, remained dissatisfied with body weight, expressed perceived need for dieting and followed weight reduction diet more compared to the girls of Sikkim. Food habits indicated that all Sikkimese girls preferred to consume cereals regularly, while Kolkata girls consumed vegetables, pulses, fish, fruits, bread and butter and fried foods more than Sikkimese girls. Multivariate analyses showed that place of residence was significantly ( $p < 0.05$ ) associated with both weight concerns and food habits of girls.

**Conclusion:** Diversity in culture, ethnicity and socio-economic standard perhaps develop the disparity in food habits and weight concerns between girls of urban hilly areas of Sikkim and the city of Kolkata.

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## 1. Introduction

Food habits play an important role in maintaining the level of proper nutrition in individuals at all ages, particularly in adolescents (Kabir, Shahjalal, Saleh, & Obaid, 2010; Samuelson, 2000; Zhou et al., 2003). Balanced nutrition is essential during adolescence for physical and cognitive development and also for preventing chronic illnesses (World Health Organization, 2003). Studies show that cultural tradition and ecology develop food habits and food preferences among individuals since childhood (Furst, Connors, Bisogni, Sobal, & Falk, 1996; Oniang'o, Mutuku, & Malaba, 2003; Piscopo, 2004). Additionally, socio-economic status of the family, parental food choices and knowledge about food types, peer influences, place of residence and availability of foods cause to differ the habits of food consumption among them (Abudayya, Stigum, Shi, Abed, & Holmboe-Ottesen, 2009; El-Gilany & Elkhawaga, 2012; Salvy, Elmo, Nitech, Kluczynski, & Roemmich, 2011; Xavier, Hardman, Andrade, & Barros, 2014). Recently, a rapid increase in shopping malls, food outlets and convenience stores encourage adolescents to consume foods outside home, consequently changing their

taste and preferences on foods (He et al., 2012; King, Mohl, Bernard, & Vidourek, 2007). Eventually, modification in food habits may relate to excess weight gain and obesity among them (Bahreynian, Paknahad, & Maracy, 2013; Swinburn, Caterson, Seidell, & James, 2004).

Literature reveals that the rising rate of obesity develops body image dissatisfaction among adolescents, particularly in girls (Ojala et al., 2007; Pallan, Hiam, Duda, & Adab, 2011; Stice & Whitenton, 2002). Consequently, girls are found to express a perceived need to diet and often follow weight reduction measures such as, skipping meals, starvation and consumption of fewer foods than required (Neumark-Sztainer & Hannan, 2000).

In India, an upcoming trend of being thin is on the rise among girls residing in the megacities such as Delhi, Kolkata and Chennai (Chug & Puri, 2001; Srinivasan, Suresh, & Jayaram, 1998; Stigler et al., 2011; Som & Mukhopadhyay, 2015). Growing concerns over body weight and eating habits are slowly creeping into the minds of girls living in small towns such as Ludhiana and Jalandhar in Punjab (Sadana, Khanna, & Mann, 1997) and in urban hilly areas of Sikkim as well (Mishra & Mukhopadhyay, 2011).

The present study involves urban girls of two distinct ecological regions of the Indian subcontinent — the plains of Kolkata and the mountains of Sikkim. Kolkata girls belong to a Bengali speaking Hindu ethnic group, whereas Sikkimese girls are mostly influenced by Nepalese caste

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culture. Sikkim is a small settlement area; thereby its population strength is less than that of Kolkata City. However, a huge influx of tourists from all over the world influences the culture of Sikkim to a certain extent, so that it would be comparable with the metropolitan city of Kolkata. Thus, it is hypothesized that the food habits and weight concerns of these two distinct ethnic groups of girls belonging to different types of settlement could be influenced by the effect of modernization. An attempt has been made in the present study to compare the incidence of weight concerns and food habits between two ethnically different groups of adolescent girls residing in two distinct ecological settings: the plains of Kolkata and the mountains of Sikkim.

## 2. Materials and methods

### 2.1. Study area and population

Two cross sectional studies, as part of a bigger project were conducted separately within a period of five years on adolescent girls residing in two distinct ecological settings of eastern India. During March, 2007 to February, 2009, the first study was performed in urban hilly areas of Sikkim involving 81 UFS (Urban Frame Survey) blocks of Gangtok, the capital town of Sikkim. The second study was performed in the city of Kolkata, the state capital of West Bengal during August, 2010 to March, 2012.

Kolkata is numerically dominated by the people of a Bengali-speaking Hindu ethnic group; other religious people (Muslim and Christian) belong to the minority groups. In Sikkim, the Nepalese caste group is numerically dominant followed by Bhutia and Lepcha tribes; Nepalese are generally Hindus but few subgroups follow Buddhism.

### 2.2. Study participants

The present study involved a total of 506 participants [282 Bengali-speaking Hindu girls from the city of Kolkata and 224 girls of the Nepalese caste (Hindu) group from urban hilly areas of Sikkim]. The age range of these girls was 14–19 years. The [World Health Organization \(1999\)](#) defined the period of adolescence as the age group 10–19 years. Results of a pilot survey conducted separately in each of these areas revealed that girls below 14 years of age could not comprehend most of the questions well, thereby they were excluded from the studies. Different recruitment strategies were followed in these two areas based on its existing infrastructural facilities. For operational convenience, girls in Sikkim were enrolled from a household survey; and in Kolkata, girls were chosen from public schools. The sole inclusion criterion for the final selection of girls in these two areas was the same (i.e. age 14–19 years).

In Sikkim, a total of 410 girls were invited following a complete enumeration method from 390 randomly chosen households within the area of UFS blocks in Gangtok. Of them, 224 girls (54.6%) were finally involved in the study. Among those ( $n = 186$ ) who could not participate, 25% were outside the age range, while 33% were not present during the time of survey and the rest (32%) did not receive parental consent.

In Kolkata, a list of 60 public schools for girls was initially prepared. These schools are renowned, with a strength of more than 1500 students representing the cross-section of varied socio-economic status. Out of these, 10 schools were randomly chosen and approached for permission. Only three schools granted permission to conduct the survey; seven schools refused to disclose the problems of their students regarding the issue of the study. A total of 560 girls were invited following a complete enumeration method from grades 9 to 12 of those three schools. Of them, 282 girls (50.3%) were finally recruited in the study. Girls, who either failed to satisfy the inclusion criteria (3.5%) or declined to participate (70.5%) or failed to receive parental consent (12%) or remained unavailable (14%) at the time of data collection, were excluded from the study.

In both studies written informed consent was obtained from the girls as well as their parents prior to data collection. Moreover, in the Kolkata study, written informed consent was also obtained from the principal of each school. Protocols and measures used in both studies were reviewed and approved by the Institutional Review Board of the Indian Statistical Institute.

### 2.3. Data types

#### 2.3.1. Socio-demographic data

Girls were interviewed for various socio-demographic characteristics; of those, data on age of girls at the time of interview and monthly household expenditure were used in this study. Age of the girls was recorded in completed years, while, monthly household expenditure was presented in Indian rupees (Rs.).

#### 2.3.2. Weight concerns

Girls were asked to report their concerns over body weight with four different questions that were adapted and slightly modified from the questionnaires used in other western studies ([Neumark-Sztainer & Hannan, 2000](#), [Story et al., 2001](#), [Mciza et al., 2005](#)). These four questions, each with dichotomous response choices (yes or no) measured the cognitive and emotional aspects of weight related issues among girls, for example, (1) How do they perceive their own body weight? (2) Are they dissatisfied with their body weight? (3) Do they feel an urge for dieting? and (4) Do they use a weight reduction diet? This 4-item scale was tested in each of the pilot studies conducted in Sikkim (Kuder Richardson 20 index = 0.69) and Kolkata (Kuder Richardson 20 index = 0.77) prior to the main survey.

#### 2.3.3. Food habits

Data on food habits were collected using a structured food frequency questionnaire that included nine major food items such as cereals, vegetables, pulses, bread and butter, meat, fish, fruits, milk and fried foods. These foods are commonly available within the study areas and generally consumed by Nepalese and Bengali speaking Hindu people. Girls were asked to report how often they consumed these foods in the past one week starting from the date of interview. Thus, for each of these foods there were eight categories of responses ranging from the score 1 (representing never) through the score 8 (all seven days in a week). This 9-item scale was also canvassed and tested in the pilot studies conducted in Sikkim (Cronbach's  $\alpha = 0.64$ ) and Kolkata (Cronbach's  $\alpha = 0.78$ ). The consumption pattern of each of these foods was converted into nominal scale (such as, regular, occasional, and rare/never) on the basis of the following criteria: regular consumption – 5–7 days; occasional consumption – 2–4 days; and rare or never was determined if foods were consumed either less than 2 days or never.

### 2.4. Data analyses

Descriptive statistics were used to portray the socio-demographic profile of adolescent girls. The variables considered for weight concerns were in nominal scale; hence a chi square test was conducted to show the association between each of the variables considered for weight concerns and place of residence. Each food item remained in ordinal scale; therefore, a Mann Whitney U test was conducted to show the association between the consumption of each food and place of residence. Multiple binary logistic regression (stepwise) analysis was performed incorporating place of residence and other socio-demographic variables (such as, age of the girls at the time of interview and monthly household expenditure) in the independent column. Age of the girls at the time of interview showed normal distribution, and was thus used as a continuous variable in the regression analyses. Monthly household expenditure and place of residence were the categorical variables; monthly household expenditure has five categories, and was thus converted into five dummy variables. In these binary logistic regression analyses, Sikkim

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