Objectives. To explore and describe eating attitudes in early pubertal 11-year-old black and white South African girls in an urban environment undergoing transition.

Design. The study was designed as a cross-sectional baseline initiative within a longitudinal study.

Subjects. Two hundred and two subjects were randomly selected; 54 were white and 148 black.

Methods. Subjects completed questionnaires, and anthropometric measurements were taken.

Outcome measures. Variables included body mass index (BMI), eating attitudes (EAT score), dietary intake, socio-economic status, pubertal status and level of physical activity.

Results. As expected, the prevalence rate of abnormal eating attitudes in this group of girls was low (1%). No significant ethnic differences were found in the total EAT scores. White participants displayed greater oral control, while their black peers displayed greater tendencies toward dieting ($p = 0.05$). Girls who scored higher on the dieting subscale had a larger body size and were more inactive than low dieting scorers ($p = 0.05$). A relationship between body size measurements and dietary intake was found only in black girls. Traditionally a larger figure is accepted in black culture. However, our data suggest a move away from this, indicating acculturation, as awareness of increased body size significantly influenced dieting attitudes. However, scores were within the normal range.

Conclusions. There is early evidence suggesting the impact of societal transition on young black girls with regard to eating attitudes. Black girls in this age group are adopting Western ideals of beauty and thinness.

There is a consensus among researchers that abnormal eating attitudes and behaviour predate and increase the predisposition to eating disorders (particularly during adolescence), as these disorders are manifestations of such attitudes and behaviour. There is a paucity of relevant research on early adolescent girls living in a developing country, and few studies have examined ethnic and socio-economic differences.

Findings from the USA and Europe suggest not only that disordered eating behaviours may be increasing in prevalence, but also that the age of onset of these disorders may be decreasing. Lieberman et al. concluded that adolescent body image concerns and dieting prevalence did not change with age; thus girls as young as 12 years old had similar levels of dieting and body dissatisfaction to 16-year-old girls. Moore noted that many of his younger adolescent respondents appeared to be attempting weight control without an accurate perception of what was an appropriate age-related weight.

Although for many decades it has been assumed that eating disorders occur primarily in Western cultures, particularly among adolescents in middle or upper socio-economic groups, there is growing evidence suggesting otherwise. In the past it was believed that non-Western cultures are ‘immune’ to disordered eating attitudes. These cultures tend to embrace plumpness and the larger figure is rewarded with respect as it symbolises beauty, wealth, fertility and femininity, as well as health and strength. This is contrary to Western cultures that tend to overvalue thinness. However, studies of community-based samples conducted in South Africa, Zimbabwe, Egypt and Nigeria during the 1980s and 1990s provide support for the hypothesis that the ‘Western’ epidemic of eating disorders has arrived on the African continent. It has been argued that these developments can largely be attributed to the process of acculturation. Many aspects of self-identity are modified to accommodate information on and experiences within the new culture.
Recent evidence suggests that rates of abnormal eating attitudes in black samples are higher than\textsuperscript{19} or equivalent\textsuperscript{20} to those in white samples, especially in South African urban settings. Caradas et al.\textsuperscript{18} found that the prevalence of abnormal eating attitudes was equally common in black, mixed-race and white urban girls aged between 15 and 18 years.

As a consequence of the political changes that have occurred in South Africa since the late 1980s, communities have undergone a significant demographic transition. The demographic transition in South Africa has included shifts within political, socio-economic, nutritional and lifestyle domains. The present study was designed as a baseline initiative within a longitudinal study aiming to explore and describe eating attitudes in 11-year-old South African girls within an urban environment. Because of growing evidence that there is a decrease in the age of onset of eating disorders, younger girls, of an age not yet investigated, were selected for this baseline study to assess the extent of self-reported abnormal eating attitudes and behaviour before the period of risk for onset of disordered eating. Furthermore, the study examined ethnic and socio-economic differences in eating attitudes and behaviours, as previous work with adolescents has shown these variables to be relevant.\textsuperscript{19,21} It further examined these attitudes and behaviours in relation to exercise behaviour and physiological measures such as body mass index (BMI), nutrition and pubertal development.

**Subjects and methods**

**Study population**

This was a population-based, cross-sectional study of children recruited from the Birth to Twenty birth cohort, which is a longitudinal study of child health and development.\textsuperscript{22} All children born within a 6-week period (23 April - 8 June 1990) in the greater Johannesburg metropolitan area in South Africa were originally recruited into the Birth to Twenty study. A random sample of children \((N = 605)\) stratified by ethnic group (black and white) and gender participating in the birth cohort study, were enrolled into a longitudinal study assessing factors influencing growth and bone mass acquisition during childhood and adolescence (Bone Health Study) in 1999.\textsuperscript{23} Cross-checks were done to ensure that there were no significant differences between the Birth to Twenty and Bone Health cohorts for key demographic variables (residential area at birth, maternal age, gravidity, gestational age and birth weight). A total number of 295 girls and 310 boys were enrolled in the study. The criteria for inclusion into the current study were girls who came in for their annual visit and who had completed all questionnaires and procedures. Data are reported for 202 11-year-old girls participating in the Bone Health study. The sample comprised 54 and 148 white and black girls respectively. All participants and their parents provided written informed consent, and ethical approval was obtained from the University of the Witwatersrand Committee for Research on Human Subjects.

**Measures**

**Eating attitudes test**

Eating-related behaviours were measured using a 26-item version\textsuperscript{24} of Garner and Garfinkel's\textsuperscript{25} Eating Attitudes Test (EAT-26). Questionnaires were piloted and individual structured interviews were conducted in the subjects’ home language by trained interviewers to ensure understanding of the concepts involved. Each item was translated by multilingual interviewers and the validity of each item was verified through back-translation. This self-report instrument measures a broad range of abnormal attitudes toward food and eating, which may be symptoms characteristic of anorexia nervosa and bulimia. It includes questions that deal with attitudes, concerns and behaviours related to food, weight and body shape.\textsuperscript{26} This measure comprises three subscales, namely dieting, bulimia and food preoccupation, and oral control. Each subscale can be seen as an independent variable and the sum of the 3 equals the total EAT score. The test is scored using a Likert scale with a choice of 6 answers ranging from ‘always’ to ‘never’ for each of the 26 items.\textsuperscript{27} Possible scores on the EAT range from 0 to 78; scores greater than or equal to 20 are generally considered characteristic of subclinical eating disorder pathology.

**Dietary intake**

The dietary intake of 168 girls was assessed from 24-hour recalls. The children and/or caregivers or parents were asked by trained interviewers to recall all food items and amounts consumed in the preceding 24 hours. The amounts consumed were recorded in household measures and converted into grams per day. The food items were coded onto computer coding forms using the South African Medical Research Council’s Food Composition Tables and codes\textsuperscript{28} and analysed using SAS.\textsuperscript{29} Descriptive statistics were used to determine the daily mean energy and macro- and micronutrient intakes of the children. Total energy and fat intakes were used in the analysis for this article in order to identify if a relationship existed between abnormal eating attitudes and the amount and type of food consumed.

**Physiological measures**

Height, recorded to the nearest millimetre, and weight, recorded to the nearest 100 g were measured for each child using a stadiometer (Holtaine, UK) and a digital scale (Dismed, USA) respectively. Both devices were calibrated regularly throughout the study. Subjects were measured in light clothing without shoes. The mean of 3 skinfold measurements was determined on the left-hand side of the body at each of the following sites: biceps, triceps, subscapular and supra-iliac. Waist circumference was measured around the smallest
were used for abnormally distributed data. Correlations (Spearman's rank correlation coefficient) and non-parametric analysis (Mann-Whitney tests) and standard deviations were determined for all continuous variables. A Pearson's product correlation matrix was constructed to identify significant relationships between these variables. Normally distributed continuous variables (e.g. BMI, weight, activity, inactivity) were compared between ethnic groups using t-tests and analysis of variance (ANOVA). Non-parametric analysis (Mann-Whitney tests) and correlations (Spearman's rank correlation coefficient) were used for abnormally distributed data.
Table I. Anthropometric, dietary and physical activity characteristics of the cohort of children

<table>
<thead>
<tr>
<th></th>
<th>Black (N = 148)</th>
<th>White (N = 54)</th>
<th>Total (N = 202)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Subjects (%)</td>
<td>73</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Height (m) (± SD)</td>
<td>1.45 ± 0.07</td>
<td>1.49 ± 0.08*</td>
<td>1.46 ± 0.07</td>
</tr>
<tr>
<td>Weight (kg) (± SD)</td>
<td>38.4 ± 8.2</td>
<td>40.8 ± 9.2</td>
<td>39.1 ± 8.5</td>
</tr>
<tr>
<td>Waist-to-hip ratio (± SD)</td>
<td>0.77 ± 0.53</td>
<td>0.8 ± 0.56*</td>
<td>0.78 ± 0.56</td>
</tr>
<tr>
<td>Body mass index (± SD)</td>
<td>18.1 ± 3</td>
<td>18.2 ± 2.8</td>
<td>18.1 ± 2.9</td>
</tr>
<tr>
<td>BMI-for-age category (%)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Underweight (&lt; 5th percentile)</td>
<td>8</td>
<td>7</td>
<td>7</td>
</tr>
<tr>
<td>Risk of overweight (85th percentile)</td>
<td>11</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td>Overweight (≥ 95th percentile)</td>
<td>3</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Obese (≥ 97th percentile)</td>
<td>0.7</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>Menstruation (%)</td>
<td>10.2</td>
<td>9.1</td>
<td>10</td>
</tr>
<tr>
<td>SES score (mode)</td>
<td>5†</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Mean energy intake (kJ/d) (± SD)</td>
<td>5 422 ± 2 242</td>
<td>5 055 ± 1 784</td>
<td>5 337 ± 2 145</td>
</tr>
<tr>
<td>Mean total fat intake (g/d) (± SD)</td>
<td>39 ± 22</td>
<td>42 ± 20</td>
<td>40 ± 22</td>
</tr>
<tr>
<td>Physical activity (h/wk) (± SD)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Formal</td>
<td>4 ± 5</td>
<td>7 ± 5†</td>
<td>5 ± 5</td>
</tr>
<tr>
<td>Informal</td>
<td>14 ± 11†</td>
<td>5 ± 7</td>
<td>12 ± 11</td>
</tr>
<tr>
<td>Sedentary activity (h/wk)</td>
<td>24 ± 11</td>
<td>22 ± 9</td>
<td>23 ± 9</td>
</tr>
</tbody>
</table>

*ANOVA (p < 0.001): ethnic differences.
†ANOVA (p < 0.05): ethnic differences.
‡ANOVA (p < 0.01): ethnic differences.
ANOVA = analysis of variance; SES = socio-economic status.

Table II. Correlations between EAT subscores and body size variables, inactivity and total dietary intake in black girls only. No significant correlations were found in white girls

<table>
<thead>
<tr>
<th></th>
<th>Black girls (N = 148)</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Dieting scores and body size</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Weight</td>
<td>0.05</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>BMI</td>
<td>0.04</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>Hip circumference</td>
<td>0.05</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>Dieting score and inactivity</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total sedentary activity per week</td>
<td>0.05</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>Sedentary activity and total mean daily energy intake</td>
<td>0.07</td>
<td>&lt; 0.01</td>
<td></td>
</tr>
<tr>
<td>Sedentary activity and hip circumference</td>
<td>0.02</td>
<td>Not significant</td>
<td></td>
</tr>
</tbody>
</table>

BMI = body mass index.

Fig. 1. The sub components of the EAT score (0 - 78) by ethnic group. (A) dieting score (0 - 39); (B) oral control score (0 - 21) and (C) bulimia and food preoccupation score (0 - 18). Black girls (--•--), white girls (--•--).
white urban South African girls in early adolescence at age 11 years. No significant ethnic differences in the total EAT scores were apparent; however, a relationship between body size measurement and dietary intake existed only in black girls. Although statistically significant, the relationship between body size and dietary intake in black girls accounted for only 5% or less of the variance in body size. This finding would be considered appropriate in Western cultures; however, as black culture traditionally accepts the larger figure, data suggesting the slightest move away from this indicate signs of acculturation in fatness beliefs with regard to body image at a young age. It appears that these girls are in the process of assimilating Western cultural norms as increased body size awareness has significantly influenced dieting attitudes. White participants displayed greater oral control while their black peers displayed greater tendencies toward dieting. Girls who scored higher on the dieting subscale had a larger body size and were more inactive than low dieting scorers. Nonetheless, these scores were well within the normal range.

Although few studies of this nature have been conducted in developing countries, a recent Malaysian study found a 38% prevalence rate (N = 107) of abnormal eating attitudes among primary school girls aged 8 and 9 years. In developed countries, 8.8 - 14% of young girls scored above the threshold (>20) indicative of disordered eating in studies conducted among 9 - 10-year-old Swedish girls and 8 - 12-year-old Australian schoolchildren. The South African prevalence among 11-year-old girls is low compared with that of similarly aged girls in other parts of the world. Reasons for this are unclear and further research is necessary to elucidate possible influence.

Recent South African findings suggest that schoolgirls between the ages of 15 and 18 years have a similar predisposition to abnormal eating attitudes and body image concerns, regardless of ethnicity. The prevalence in this age group is around 19%. Interestingly, besides differences in ages, the most significant difference between the study conducted by Caradas et al. and ours is school type. All the participants in the present study were in primary school. This could suggest an age-related awareness and increase in abnormal eating attitudes and behaviour as the girls mature and make the transition to high school and are exposed to the pressures associated with this.

It is proposed that an increase in body size could result in increased awareness and possibly a higher abnormal eating attitude as defined by the EAT-26 questionnaire and the potential development of an eating disorder. Body size could be influenced by either early pubertal maturation or lifestyle factors fuelled by environmental instabilities experienced by urban societies undergoing transition. However, this assumption is not reflected in the South African setting. The rates of abnormal eating attitudes and behaviour did not differ between ethnic groups with very different SES scores and environmental circumstances. Not only were there no differences in abnormal patterns of eating behaviour, there were also no differences in energy and fat intake among black and white girls despite socio-economic discrepancies. South African society’s transitional status appears to have had no impact on eating-related pathology in 11-year-old girls, although evidence of dieting and figure consciousness may be present in black girls.

If one compares the 1% abnormal eating attitude prevalence rate among urban South African girls in early adolescence with that of their North American peers (between 10.5% and 12% in a similar age group), a buffering mechanism is apparent. The difference in prevalence rates between 11-year-old and 15 - 18-year-old South African girls, namely 1% and 19% respectively, is intriguing and a finding that warrants further investigation as there appears to be a shift in eating attitudes in girls between 11 and 15 years of age.

This is the first study to be undertaken in a population of ‘normal’ girls in this age group in a developing African country. Cause-effect relationships are difficult to establish in a cross-sectional study, particularly a baseline one as this study was designed to be. It is important to emphasise that according to these data, 11-year-old South African girls generally have normal eating attitudes and that there is no evidence suggesting an impact of societal transition on either black or white girls at this stage. However, the value of this study is that it has highlighted issues warranting further investigation and forms the basis of hypothesis construction for a longitudinal study design which is now in progress. It is imperative that these factors be examined longitudinally throughout adolescence in order to identify precursors and trends in eating-related pathology. Further research should include identifying the effects of transition to high school, peer-related pressure, behavioural changes based on weight fluctuations, body dissatisfaction, and parental and media influence on eating attitudes and weight consciousness in order to identify early markers and develop interventions that could be implemented in pre-adolescence.

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