

Eating attitudes in a group of 11-year-old urban South African girls

Medical Research Council Mineral Metabolism Research Unit and Department of Paediatrics, University of the Witwatersrand, Johannesburg

Carmen D Petersen, BA Hons

Shane A Norris, PhD

John M Pettifor, MB BCh, PhD

Medical Research Council/University of the Witwatersrand, Birth to Twenty Research Programme, Johannesburg

Jenny M MacKeown, MB BCh, PhD

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^{1,2} 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.^{3,4} Lieberman *et al.*⁵ 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. Moore⁶ 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,^{7,8} as well as health and strength.⁹ This is contrary to Western cultures that tend to overvalue thinness.¹⁰ However, studies of community-based samples conducted in South Africa, Zimbabwe, Egypt and Nigeria during the 1980s and 1990s¹¹⁻¹⁹ 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 than²⁰ or equivalent¹⁵ to those in white samples, especially in South African urban settings. Caradas *et al.*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.^{18,21} 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.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 1999.²³ 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 version²⁴ of Garner and Garfinkel's²⁵ 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.²⁴ 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.¹⁸ 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 codes²⁶ and analysed using SAS.²⁷ 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

circumference below the rib cage and above the navel, and hip circumference was measured at the widest part of the hips and buttocks. Body composition was determined using dual-energy X-ray absorptiometry (Hologic 4500A, USA). Height-for-age, weight-for-age, weight-for-height and BMI-for-age were determined using Centers for Disease Control (2000) growth curves. Pubertal stage was determined through self assessment using the Tanner method validated in this population group.^{28,29} Age of menarche, and duration and frequency of menstruation were also recorded.

Physical activity

Level of physical activity was estimated using a structured retrospective interview taking into consideration all physical activity and inactivity over the previous 12 months. The questionnaire was based on questionnaires validated in previous studies.^{30,31} The questionnaire assessed the following parameters: the child's participation in physical education classes at school; the time spent in sedentary activity (TV and video watching, music, drawing and reading); passive (car/taxi/bus) and active (walk/bicycle) commuting to and from school; the number of hours of sleep per night, and the intensity, frequency and type of sport played. Activity was divided into two subsections, namely formal and informal. Formal activity was defined as organised physical activities arranged by a school or external body. Informal activity was defined as unorganised, unstructured activity that occurred spontaneously such as riding a bike, playing games with friends or playing with a ball. Total activity and inactivity were calculated (hours per week) to determine the amount of time each child spent being sedentary and active.

Socio-economic status

Primary caregivers answered a number of questions regarding their social and economic status. This study utilised an asset indicator³² by formulating a composite score from 11 bivariate factors (house type, and the presence or absence of: electricity, an indoor flush toilet, indoor running water, television, motor vehicle, refrigerator, microwave, washing machine, video machine and telephone). From the asset indicator score we divided the sample into quartiles ranging from low to high socio-economic status.

Statistical analysis

Data were analysed using the SPSS³³ program. Means 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.

Results

Sample characteristics

Complete data were collected for 202 girls (148 black participants and 54 white). Anthropometric measures (height, weight, BMI), socio-economic status, menstruation status, and level of sedentary and physical activity are shown according to ethnicity in Table I. BMI-for-age cut-off points are in accordance with CDC classifications. White girls were significantly taller ($p < 0.001$) and had a greater waist-to-hip ratio ($p < 0.05$) than their black peers. They participated in significantly less informal physical activity ($p < 0.05$) and in more formal physical activity. Black girls had a significantly lower SES score than white girls ($p < 0.001$). There were no significant ethnic differences in weight, BMI, or total mean daily energy and fat intakes.

Ethnic differences in scores on the EAT questionnaire

No ethnic differences were found for scores on the EAT questionnaire and only 1% of participants ($N = 2$) had total scores above the cut-off of 20, which represents possible eating disorder pathology. The significance of examining the subscores is that this provides greater insight into the subscore (and behaviour) contributing the most to the total EAT score. Oral control subscores were significantly higher in white girls ($p < 0.05$), while black girls scored significantly higher on the dieting subscore than white girls ($p < 0.05$) (Fig. 1).

Eating attitudes, anthropometric measures and dietary intakes

The dieting subscale for black girls showed a positive relationship with body size measurements and the degree of inactivity (Table II). Similarly, sedentary activity was related to an increase in energy intake and in hip circumference. No relationships were found between anthropometric measures, dietary intakes and the total EAT score or the other subscales in either ethnic group. No relationships were found between these variables in white girls.

Menstruation status and body size

The stages of puberty in this study were defined by whether or not the girls had had their first menstrual period – 89.8% of the girls had not, and were considered to be in early puberty (Tanner stage 2).

Ten per cent of the girls had started menstruating and the presence of the menarche was associated with increased body size such as weight, hip and waist circumference ($p < 0.05$). No relationships were found between menstruation and waist-to-hip ratio, SES and EAT scores and subscales.

Our data indicate that the prevalence rate of abnormal eating attitudes is low ($N = 2$, 1%) among black and

Table I. Anthropometric, dietary and physical activity characteristics of the cohort of children

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

^{*}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

	Black girls (N = 148)	
	r ²	p-value
Dieting scores and body size		
Weight	0.05	< 0.01
BMI	0.04	< 0.01
Hip circumference	0.05	< 0.01
Dieting score and inactivity		
Total sedentary activity per week	0.05	< 0.01
Sedentary activity and total mean daily energy intake	0.07	< 0.01
Sedentary activity and hip circumference	0.02	Not significant

BMI = body mass index.

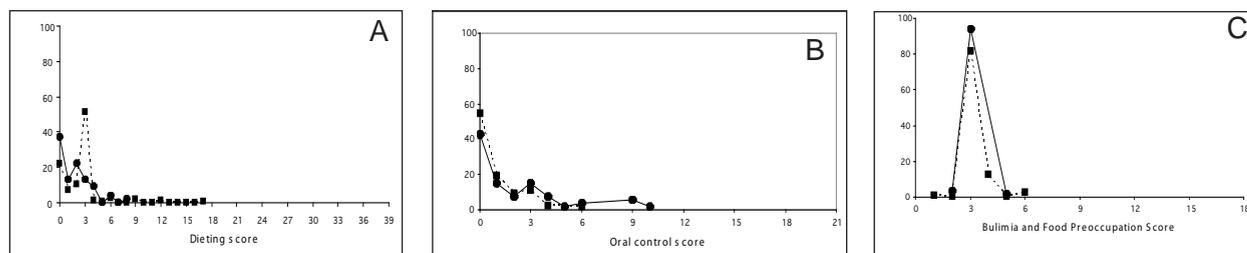


Fig. 1. The sub components of the EAT score (0 - 78) by ethnic group. (A) dieting score (0 - 39); (B) oral control score (0 - 21) and (C) bulimia and food preoccupation score (0 - 18). Black girls (---■---), white girls (—●—).

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 study³⁴ 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.^{35,36} 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%.¹⁸ Interestingly, besides differences in ages, the most significant difference between the study conducted by Caradas *et al.*¹⁸ 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.

This study was supported by the Medical Research Council of South Africa and the Wellcome Trust, UK.

1. Whitaker AH. An epidemiological study of anorexic and bulimic symptoms in adolescent girls: implications for paediatricians. *Pediatr Ann* 1992; **21**: 752-759.
2. Lucas AR. The eating disorder 'epidemic': more apparent than real? *Pediatr Ann* 1992; **21**: 746-751.
3. Bryant-Waugh R, Lask B. Eating disorders in children. *J Child Psychol Psychiatry* 1995; **3**: 541-548.
4. Kaltiala-Heino R, Rissanen A, Rimela M, Rantanen P. Bulimia and bulimic behaviour in middle adolescence: more common than thought. *Acta Psychiatr Scand* 1999; **100**: 33-39.
5. Lieberman M, Gauvin L, Bukowski WM, White DR. Interpersonal influence and disordered eating behaviours in adolescent girls: The role of peer modeling, social reinforcement and body-related teasing. *Eating Behaviours* 2001; **2**: 215-236.
6. Moore D. Body image and eating behaviour in adolescent girls. *Am J Dis Child* 1988;

- 142:** 1114-1118.
7. Nasser M. Culture and weight consciousness. *J Psychosom Res* 1988; **32:** 573-577.
 8. Nasser M. *Culture and Weight Consciousness*. New York: Routledge, 1997.
 9. Davies S. Blame it on Barbie: Body figure preferences and disordered eating amongst adolescent South African females, a cross-cultural study. Master's thesis, University of the Witwatersrand, 1995.
 10. Dolan B. Cross-cultural aspects of anorexia nervosa and bulimia: A review. *Int J Eat Disord* 1991; **10:** 67-78.
 11. Hooper MSH, Garner DM. Application of the eating disorders inventory to a sample of black, white, and mixed race schoolgirls in Zimbabwe. *Int J Eat Disord* 1986; **5:** 161-168.
 12. Nasser M. Comparative study of the prevalence of abnormal eating attitudes among Arab female students of both London and Cairo universities. *Psychol Med* 1986a; **16:** 621-625.
 13. Oyewumi LK, Kazarian SS. Abnormal eating attitudes among a group of Nigerian youths: I bulimic behaviour. *East Afr Med J* 1992; **69:** 663-666.
 14. Nasser M. Screening for abnormal eating attitudes in a population of Egyptian secondary schoolgirls. *Soc Psychiatry Psychiatr Epidemiol* 1994; **29:** 25-30.
 15. Le Grange D, Telch CF, Tibbs J. Eating attitudes and behaviours in 1 435 South African Caucasian and non-Caucasian college students. *Am J Psychiatry* 1998; **155:** 250-254.
 16. Wassenaar D, le Grange D, Winship J, et al. The prevalence of eating disorder pathology in a cross-ethnic population of female students in South Africa. *European Eating Disorder Review* 2000; **8:** 225-236.
 17. Senekal M, Steyn NP, Mashego TB, Nel JH. Evaluation of body shape, eating disorders and weight management parameters in black female students of rural and urban origins. *South African Journal of Psychiatry* 2001; **31:** 45-53.
 18. Caradas AA, Lambert EV, Charlton, KE. An ethnic comparison of eating attitudes and associated body image concerns in adolescent South African schoolgirls. *J Hum Nutr Dietet* 2001; **14:** 111-120.
 19. Oyewumi LK, Kazarian SS. Abnormal eating attitudes among a group of Nigerian youths: II anorexic behaviour. *East Afr Med J* 1992b; **69:** 667-669.
 20. Szabo CP, Hollands C. Factors influencing eating attitudes in secondary schoolgirls in South Africa, a preliminary study. *S Afr Med J* 1997; **87:** 531-534.
 21. Szabo CP. A cross-cultural study of eating attitudes in adolescent South African females: possible implications for the epidemiology of eating disorders in South Africa. PhD thesis, University of the Witwatersrand, 2002.
 22. Richter LM, Norris SA, DeWet T. Transition from Birth to Ten to Twenty: The South African cohort reaches 12 years of age. *Paediatric and Perinatal Epidemiology* 2004; **18:** 290-301.
 23. Norris SA, Pettifor JM. Birth to ten: new research initiative investigating factors influencing bone health in black and white children in South Africa. *South African Journal of Epidemiology and Infection* 2000; **15:** 113-117.
 24. Garner DM, Olmsted MP, Bohr Y, Garfinkel PE. The Eating Attitudes Test: psychometric features and clinical correlates. *Psychol Med* 1982; **12:** 871-878.
 25. Garner DM, Garfinkel PE. The eating attitudes test: an index for the symptoms of anorexia nervosa. *Psychol Med* 1979; **9:** 273-279.
 26. Langenhoven ML, Kruger M, Gouws E, Faber M. *Research Institute of Nutritional Diseases (RIND) Food Composition Tables*. 3rd ed. Cape Town: South African Medical Research Council, 1991: 248.
 27. SAS Institute Inc. *SAS/STAT User's Guide*. Version 6. 4th ed. Vol. 1. Cary, NC: SAS Institute, 1989.
 28. Tanner JM. *Growth at Adolescence*. 2nd ed. Springfield, Ill: Charles C Thomas, 1962.
 29. Norris SA, Richter L. Application and validation of Tanner pubertal self-rating to urban Black adolescents in South Africa. *J Adol Res* **15:** 609-624.
 30. Pate RR, Heath GW, Dowda M, Trost SG. Associations between physical activity and other health behaviors in a representative sample of US adolescents. *Am J Public Health* 1996; **86:** 1577-1581.
 31. Gordon-Larsen P, McMurray RG, Popkin BM. Adolescent physical activity and inactivity vary by ethnicity: The National Longitudinal Study of Adolescent Health. *J Pediatr* 1999; **135:** 301-306.
 32. Bradshaw D, Steyn K, eds. *Poverty and Chronic Diseases in South Africa: Technical Report*. Cape Town: Medical Research Council South Africa, 2001.
 33. Statistical Processing Software System (SPSS) Institute Inc. *Statistical Software. User's Guide*. Version 12.0. Chicago, Ill: John Wiley & Sons, 2004.
 34. Zailah MS, Zaidah MY. Correlates of children's eating attitude test scores (CHEAT) among a sample of female primary school children. *Asian Pac J Clin Nutr* 2004; **13:** S124.
 35. Halvarsson K, Sjoden P. Psychometric properties of the Dutch Eating Behaviour Questionnaire (DEBQ) among 9 - 10 year old Swedish girls. *Eur Eat Disord Rev* 1998; **6:** 115-125.
 36. Rolland K, Farnill D, Griffiths RA. Body figure perceptions and eating attitudes among Australian schoolchildren aged 8 - 12 years. *Int J Eat Disord* 1997; **21:** 273-278.