

Body image perception and body dissatisfaction among rural Sri Lankan adolescents; do they have a better understanding about their weight?

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(Index words: body image; body dissatisfaction; pubertal development; figure rating; adolescents)

Abstract

Introduction Adolescents have high vulnerability for body image distortions which may result in many psychological and physical problems.

Objectives This study aimed to determine body image perception and dissatisfaction among rural schooling adolescents in Sri Lanka.

Methods Adolescents (aged 13-16 years) were selected using probability-based sampling framework. Self-administered figure rating scale was used to assess perceived current (PCBS) and ideal (IBS) body size and body discrepancy score (BDS = PCBS – IBS). Pubertal stage was assessed with pubertal development scale. Anthropometry was done according to WHO guidelines.

Results Of 3128 students studied, 47.8% were boys. Median PCBS was 4 (inter quartile range 1) for boys and 4 (2) for girls. Boys aspire a larger body size compared to girls and the respective median IBS were 5 (0) and 4 (1). More boys (70.4%, n=1053) than girls (66.4%, n=1084) were dissatisfied about their current body size; $\chi^2=5.5$, $df=1$, $p<0.05$. Overweight students recorded higher PCBS and were more dissatisfied with their body size when compared to others. Nearly half of boys and 29.6% girls wanted to have a larger body size than their current. The main influencing factor of body dissatisfaction was body mass index.

Conclusions Body dissatisfaction is evident even among rural adolescents, affecting boys more than girls. Many students show a desire to have a larger body size than their current. This study also provides valid and reliable tools to assess body dissatisfaction and pubertal development in Sinhala speaking adolescents.

Introduction

Body image is an important aspect of one's psychological wellbeing, distortion of which can lead to psychological as well as physical debilitations. Although body image has been simply defined as "the picture of our own body which we form in our own minds" by Schilder (1951), it is now considered a far more complex concept with multiple dimensions [1]. This picture is further influenced by various factors such as beliefs and expectations, peer and parent perceptions, media, mood, ethnicity, pubertal stage and time [2-4]. Negative body image and body dissatisfaction can result in eating disorders, depression and low self-esteem [5,6]. Adolescents are more vulnerable to such disorders as they undergo rapid physical and psychological change during puberty [7]. Besides, weight underestimation could negatively affect the compliance in weight loss programs.

Body image has been studied extensively in the developed countries. Evidence suggests that white females are more dissatisfied or show more desire to lose weight when compared to Africans and Asians [2,4,8]. This may be due to the "thin ideal" admired in the western society. Some studies contradict the ethnic difference in body dissatisfaction [9-11]. Body image dissatisfaction among adolescents affects girls more than boys [3,12] even in Asian populations [10,13]. Body size underestimation is reported among males while females overestimate [3,5]. However, there is a tendency for underestimation of body weight among adolescents who are overweight [13].

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The only study addressing the concept of body image in Sri Lanka was among adults [14]. In this study, simple direct questions were used to assess the perception of weight and waist circumference rather than using a validated tool. The authors concluded that misperception of weight is common among Sri Lankan adults, with males underestimating their body weight more than females. Although eating disorders are considered rare in Sri Lanka, a recent study reported four cases of anorexia nervosa in a single psychiatry unit [15]. These findings warrant proper assessment of body image perception among Sri Lankan adolescents. Our study is aimed at determining the body image perception and dissatisfaction of rural Sri Lankan adolescents using the Figure Rating Scale [16]. Factors influencing the body image perception, including pubertal stage, were also assessed.

Materials and methods

Study setting

This cross-sectional descriptive study was carried out in Sinhala medium schools in the rural Anuradhapura district, Sri Lanka from April 2013 to November 2014. There were 481 Sinhala medium schools out of a total of 546 in the district. Of this 322 schools had grades up to 11 or above [17].

Study population

The study population included adolescents studying in grade 9 (n=12,175), grade 10 (n=12,150) and grade 11 (n=21,066). School statistics were obtained from Provincial Education Department through personal communication.

Study sample and sampling technique

This study was a part of an epidemiological study to determine the prevalence of overweight and obesity. The sample size was calculated to detect 5% prevalence of overweight and obesity with 20% precision with 95% confidence interval. Design effect was 1.5 because of cluster sampling. Calculated sample size, after adjusting for 10% non-response rate, was 3036. The cluster size was the most frequent number of students (33) per class among 322 selected schools. Using the probability proportionate to size technique, 92 clusters (3036/33), each with 33 students, were selected from 74 schools. When there were several classes with more than 33 students in a single school, a single class was selected by drawing lots.

Study instruments and measurements

The “figure rating scale” [16] was selected to assess the body image perception. The FRS contained nine silhouettes of male and female figures progressively increase in size from very thin to very fat. Perceived current body size (PCBS) and perceived ideal body size (IBS) was assessed. Only two questions were asked using the silhouettes; “select the figure which best represents your

current body size” (PCBS) and “select the figure which best represents your ideal body size” (IBS). The discrepancy between the two scores (PCBS - IBS) was calculated to obtain the body discrepancy score (BDS). BDS ranged from -8 to 8 with positive values indicating desire to lose and negative, desire to gain weight. BDS of zero indicated “satisfaction” with higher the numerical discrepancy, higher the dissatisfaction with current body size. This discrepancy in females had been found to correlate positively with body dissatisfaction subscale of the Eating Disorder Inventory [18]. FRS was often used to measure global body image [2,8-10,13,19-21].

Self, parents and peer described body size: in addition, three questions were included to assess the way the students themselves, parents and peers described the body size of the adolescents; “how do you describe your own body size”, “how do your parents describe your body size and “how do your peers describe your body size”. Answers were in a five-point Likert scale from very thin, thin, normal, fat and very fat.

A self-administered, validated pubertal development scale (PDS) [22] was used to assess the pubertal development after translating into Sinhalese. The questionnaire was composed of five questions, which addressed the physical changes during puberty. Body hair growth, voice change and facial hair in boys and body hair growth, breast development and menarche in girls were considered for pubertal stage [22]. There were five stages of puberty (pre, early, mid, late and post-pubertal). However, for analysis, the last two puberty stages were combined and taken as “post-pubertal stage”. This questionnaire was validated against Tanner's scale for puberty and reported as a valid, reliable and self-administered alternative to pubertal assessment with internal consistency more than 0.67 [6,22].

Socio-demographic data were obtained through a self-administered questionnaire. Anthropometric measurements were carried out according to the WHO guidelines [23] by trained medical graduates. Height was measured to the nearest millimeter using portable stadiometers (Seca 213® – Germany); standing without footwear, with heel, back and occiput touching the measuring board and eyes at the same level as ears (Frankfurt plane). Weight was measured to the nearest 100g with student wearing the uniform and without footwear, using portable digital weighing scales (Seca 803® – Germany). Waist circumference was measured to the nearest millimeter using a flexible tape at the midpoint between the lowest rib and the superior iliac spine during expiration [23]. Observer and instrument error for the measurements were assessed on nine students with the six observers trained on anthropometric measurements using two instruments for each measurement. Separate height and weight measuring scales were used for girls and boys and the same scales were used throughout the study. The two waist measuring tapes were regularly compared with a standard tape for discrepancies in

calibration. When the discrepancy was found to be more than 1 mm, that tape was replaced with a new one.

Validation of the questionnaires

The two questions in FRS were translated to Sinhalese language using the nominal group consensus method for cultural adaptation and translation [24]. Four medical and three non-medical individuals and four experts from fields of public health, medicine and nutrition assessed content validity of the questionnaires. Nine adolescents answered the questionnaire and discussed it during the pretest. Convergent validity was assessed by correlation of PCBS with body mass index (BMI). Questionnaires were administered to a convenient sample of 132 students (from grades 9 -11), two weeks apart, from schools not included in the research to assess the test-retest reliability. Internal consistency of the PDS was assessed using Cronbach's alpha.

Data collection

Each school was visited twice. During the first visit, principals and teachers were briefed and permission was obtained, classes selected and consent forms for parents with information leaflet were distributed to the students. The class teachers collected the completed consent forms. Second visit was one week after, to collect data. Students were briefed on the study and their written consent was obtained. Those who had obtained parents' permission and were willing were recruited. All anthropometric measurements were repeated three times.

Data analysis

Data were analyzed using IBM SPSS-20 version. Z scores of BMI for age were calculated using WHO Anthroplus software [25] and four BMI categories (thin < -2SD, normal = -2SD to +1SD and overweight > +1SD but equals or less than 2SD and obese > 2SD) were defined according to WHO 2007 growth references [26].

The five responses for "self, parent and peer described body size" question, after merging severe thin and thin to single, were matched with the four BMI categories. The discrepancy between BMI category score and self, parent and peer-description category score was calculated to determine the underestimation (minus score), correct estimation and overestimation (plus score) of body size.

Waist to height ratio (WHtR) was used as a measure of central obesity (WHtR \geq 0.5) [27]. Both parents' education level was divided into two categories between "Grade 11" and "Ordinary Level exam passed". Social class was determined in six levels based on the highest-ranking occupation of the two parents.

Ethics approval

Ethics approval for the study was obtained from the

Ethics Review Committee of the Faculty of Medicine and Allied Sciences, Rajarata University of Sri Lanka. All procedures performed in the study were in accordance with the ethical standards of the institutional research committee and with the 1964 Helsinki declaration and its later amendments. Informed written consent was obtained from all the participating students and their parents. Permission was obtained from the provincial and zonal education departments and principals of the selected schools.

Results

Validity of the questionnaire

Content (face) validity and pretest of both questionnaires did not necessitate any modifications in the translations. Both questions in the FRS had good test-retest reliability ($\rho \geq 0.6$) with PCBS having higher correlation than IBS ($\rho = 0.85$ and 0.84 for girls and boys respectively). Test-retest reliability of all the items in the PDS was also satisfactory ($\rho > 0.4$). Internal consistency of PDS for boys was, $\alpha = 0.743$ with mean inter-item correlation of 0.381 and the corresponding figures for girls were, 0.633 and 0.258 . Removal of any item from the scale resulted in a lower alpha value (validated and translated questionnaires will be available on request from the first author).

Description of the sample & PCBS

A total of 3128 students were studied, and of them 1496 (47.8%) were boys and 3116 (99.6%) were Sinhalese. Anthropometric data were available for 3100 (99.1%) students. Mean (SD) age of the adolescents was 14.8 (0.8) years, ranging from 13.0 to 16.9 years. Mean age (SD) at menarche was 12.1 (1.8) years. The majority of girls (97.2%, $n=1559$) were in post pubertal stage and boys mainly were in (57.8%, $n=788$) mid pubertal stage.

BMI, WC and WHtR tended to increase with the increase in PCBS (Table 1) and the correlations between the variables were significant; with BMI, $r=0.795$ and 0.720 , $p < 0.001$; with WC, $r = 0.734$ and 0.746 , $p < 0.001$ and with WHtR, $r = 0.658$ and 0.707 , $p < 0.001$ for boys and girls respectively. Adolescents seldom selected the figures in the extreme ends. Boys had higher PCBS and IBS when compared to girls (Table 2). The negative BDS for boys showed a desire to have a larger body size.

PCBS had a positive correlation (Spearman ρ between 0.32 to 0.51) with self, parent and peer described body size. Self-description of body size correlated with parent (Spearman $\rho=0.506$, $p < 0.001$) and peer description (Spearman $\rho = 0.637$, $p < 0.001$). There was no significant correlation between the IBS and the described body size. Of boys who overestimated their body size, 81% were thin. More girls underestimated ($\chi^2 = 7.4$, $df = 1$, $p < 0.05$) while more boys overestimated ($\chi^2 = 12.1$, $df = 1$, $p < 0.001$) their body size compared to their opposite sex (Table 3).

As the BMI category increased from thin to obese, PCBS too increased. IBS is lower in girls than boys irrespective of their BMI category. Whatever the BMI category in each sex, IBS is the same (Table 4).

Table 1. Age and sex disaggregated mean values of body mass index (SD) and waist circumference (SD) for each figure in the FRS

Age (years)		Perceived current body size (PCBS)									
		1	2	3	4	5	6	7	8	9	
Boys	13	No (%)	2 (1.1)	13 (7.0)	31 (16.7)	58 (31.2)	43 (23.1)	28 (15.1)	9 (4.8)	2 (1.1)	0
		BMI	14.0 (1.4)	14.9 (2.0)	15.3 (1.5)	15.7 (1.4)	17.7 (1.9)	21.3 (2.6)	24.3 (3.7)	33.9 (3.7)	
		WC	52.2 (3.4)	55.8 (4.6)	57.1 (4.4)	58.1 (3.7)	62.6 (5.0)	72.1 (7.0)	78.7 (8.0)	98.0 (5.0)	
	14	No	8 (1.4)	35 (6.1)	89 (15.5)	198 (34.4)	153 (26.6)	65 (11.3)	21(3.7)	5 (0.9)	1 (0.2)
		BMI	14.8 (0.8)	14.3 (1.3)	15.5 (1.7)	16.4 (1.5)	17.9 (2.1)	21.5 (3.4)	26.2 (3.3)	27.7 (3.3)	28.5
		WC	56.0 (2.9)	55.1 (3.7)	57.6 (3.9)	60.4 (4.4)	63.8 (5.1)	73.5 (9.2)	87.3 (8.3)	91.1 (10.1)	84.7
	15	No (%)	12 (2.1)	29 (5.0)	70 (12.1)	179 (31.0)	199 (34.5)	61 (10.6)	22 (3.8)	5 (0.9)	0
		BMI	14.9 (2.0)	14.8 (1.1)	16.0 (1.5)	16.8 (1.6)	18.6 (2.0)	22.7 (3.0)	26.6 (3.3)	27.9 (4.0)	
		WC	57.4 (4.5)	57.8 (2.8)	59.6 (3.6)	61.9 (4.1)	65.7 (5.4)	76.7 (8.2)	87.6 (7.6)	91.7 (7.8)	
	16	No (%)	0	6 (4.2)	18 (12.7)	54 (38.0)	42 (29.6)	15 (10.6)	7 (4.9)	0	0
		BMI		16.9 (1.7)	16.7 (1.7)	17.1 (1.4)	19.5 (1.8)	22.0 (2.3)	27.2 (3.9)		
		WC		63.1 (3.2)	62.5 (3.8)	61.8 (3.5)	67.0 (5.2)	75.5 (6.7)	91.1 (11.6)		
Girls	13	No (%)	3 (1.3)	16 (7.1)	61 (27.2)	75 (33.5)	47 (21.0)	15 (6.7)	7 (3.1)	0	0
		BMI	14.2 (2.1)	15.2 (1.4)	15.8 (1.4)	17.2 (2.0)	19.5 (2.4)	21.7 (2.9)	25.5 (3.2)		
		WC	51.4 (2.2)	54.2 (3.6)	56.9 (3.0)	59.2 (4.4)	63.2 (5.7)	70.3 (9.4)	76.4 (5.8)		
	14	No (%)	5 (0.8)	27 (4.2)	132 (20.7)	225 (35.2)	155 (24.3)	74 (11.6)	19 (3.0)	2 (0.3)	0
		BMI	14.4 (0.9)	15.3 (1.2)	16.2 (1.4)	17.7 (1.7)	19.6 (2.5)	22.7 (2.8)	26.3 (2.8)	26.8 (0.8)	
		WC	53.0 (4.2)	55.6 (3.6)	57.0 (3.7)	60.5 (4.4)	64.6 (5.6)	70.7 (6.4)	79.4 (7.0)	78.7 (0.7)	
	15	No (%)	1(0.2)	39 (6.4)	143 (23.5)	193 (31.7)	152 (25.0)	61 (10.0)	16 (2.6)	3 (0.5)	0
		BMI	16.0	15.6 (1.1)	16.8 (1.4)	18.0 (1.7)	20.1 (2.1)	22.9 (3.2)	25.2 (4.0)	27.3 (0.4)	
		WC	55.0	56.0 (2.9)	58.3 (3.5)	61.4 (4.3)	65.5 (4.9)	72.4 (6.6)	78.9 (8.8)	82.1 (1.4)	
	16	No (%)	0	5 (3.3)	35 (23.0)	49 (32.2)	35 (23.0)	21 (13.8)	7 (4.6)	0	0
		BMI		15.3 (1.1)	16.8 (1.6)	18.2 (1.8)	20.4 (2.0)	22.8 (2.6)	26.8 (2.9)		
		WC		53.8 (1.4)	58.3 (4.1)	61.7 (4.2)	65.8 (4.0)	70.7 (6.2)	80.3 (7.0)		

FRS - Figure rating scale, BMI - Body mass index, WC - waist circumference, No (%) - number of students (%)

Table 2. Descriptive statistics for perceived current body size (PCBS), ideal body size (IBS) and body discrepancy score (BDS = PCBS - IBS)

	Perceived current body size		Ideal body size		Body discrepancy score	
	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)	Mean (SD)	Median (IQR)
Boys	4.4 (1.3)	4 (1)	4.8 (0.6)	5 (0)	-0.4(1.3)	0 (1)
Girls	4.2 (1.2)	4 (2)	4.0 (0.8)	4 (1)	0.2 (1.1)	0 (2)
Mann Whitney U test		U = 1103567		U = 568538		U = 909396
		Z = -4.8		Z = -28.1		Z = -12.8
		p< 0.001		p< 0.001		p< 0.001

SD - Standard deviation; IQR - Inter quartile range

Table 3. Self-described body size compared with BMI z-score category

BMI z-score category	Self-described body size					
	Underestimation (%)		Correct estimation (%)		Overestimation (%)	
	Boys	Girls	Boys	Girls	Boys	Girls
Thin (%)	0	0	188 (46.0)	154 (65.3)	221 (54.0)	82 (34.7)
Normal (%)	78 (9.2)	141 (11.8)	722 (84.7)	906 (76.0)	52 (6.1)	145 (12.2)
Overweight (%)	25 (23.8)	16 (15.2)	80 (76.2)	89 (84.8)	0	0
Obese (%)	0	1 (4.0)	45 (100.0)	24 (96.0)	0	0
Total (%)	103 (7.3)	158 (10.1)	1035 (73.4)	1173 (75.3)	273 (19.3)	227 (14.6)

Percentages are calculated for each gender in a row

Table 4. Comparison of perceived current body size (PCBS), ideal body size (IBS) and body discrepancy scores (BDS) in relation to BMI category and waist to height ratio

			Boys, n = 1478			Girls, n = 1622		
			PCBS	IBS	BDS (PCBS - IBS)	PCBS	IBS	BDS (PCBS - IBS)
BMI Z score category - Median (IQR)								
Thin (B - 429, G - 244)			4.0 (1.0)	5.0 (0.0)	-1.0 (1.0)	3.0 (1.0)	4.0 (0.0)	-1.0 (1.0)
Normal (B - 889, G - 1243)			5.0 (1.0)	5.0 (0.0)	0.0 (1.0)	4.0 (1.0)	4.0 (1.0)	0.0 (1.0)
Overweight (B - 114, G - 108)			6.0 (0.2)	5.0 (1.0)	1.0 (1.0)	6.0 (2.0)	4.0 (1.0)	2.0 (1.0)
Obese (B - 46, G - 27)			7.0 (0.2)	5.0 (0.0)	2.0 (1.2)	7.0 (1.0)	4.0 (1.0)	2.0 (1.0)
Kruskal-Wallis test								
Chi square			616.9*	1.1	594.5*	521.9*	22.7*	459.9*
Mann-Whitney U test								
Thin Vs Normal	U		81518**	-	82378**	54589**	139952	62189**
	Z		-17.6	-	-17.5	-16.5	-2.1	-15.2
	r		0.5	-	0.5	0.4	-	0.4
Normal Vs Overweight	U		10267**	-	11534**	13212**	54581**	17256**
	Z		-14.6	-	-13.9	-14.4	-3.5	-13.4
	r		0.5	-	0.4	0.4	0.1	0.4
Overweight Vs Obese	U		1024**	-	1423**	1006**	1430	1078
	Z		-6.5	-	-4.7	-2.6	-0.2	-2.3
	r		0.5	-	0.4	0.2	-	-
WHR - Median (IQR)								
WHR < 0.5			4.0 (1.0)	5.0 (0.0)	-1.0 (1.0)	4.0 (2.0)	4.0 (0.0)	0.0 (2.0)
WHR ≥ 0.5			7.0 (1.0)	5.0 (1.0)	2.0 (1.0)	6.0 (1.0)	4.0 (1.0)	2.0 (1.0)
Mann-Whitney U test								
U			6750*	73473	8807*	10295*	50703*	14444*
Z			-16.5	-0.6	-15.9	-13.8	-4.2	-12.8
r			0.4	-	0.4	0.3	0.1	0.3

*Significant at 0.001 level, **Significant at 0.017 level (Bonferroni adjustment was done to the alpha value, 0.05/3)

IQR - Inter quartile range, BMI - Body mass index, WHtR - Waist to height ratio, B- number of boys, G - number of girls, U - Mann-Whitney U value,

Z - Z value of Mann-Whitney U test, r - Effect size

More boys (70.4%, $n = 1053$) were dissatisfied about their current body size than girls (66.4%, $n = 1084$); $\chi^2 = 5.5$, $df = 1$, $p < 0.05$. Among normal weight adolescents, 667 (31.3%) desired a larger body size. Among adolescents who were overweight and obese, 10.7% boys and only 1.5% of girls were satisfied with their body size (Table 5). More boys (49.2%, $n=727$) than girls (29.6%, $n=480$) wanted to have a larger body size; $\chi^2=122.8$, $p < 0.001$. Adolescents, who were thin, overweight or obese, were found to be more dissatisfied with their body size (higher BD score) when compared to those with normal BMI (for boys, $\chi^2 = 109.5$, $p < 0.001$ and for girls, $\chi^2 = 82.2$, $p < 0.001$). Girls of all ages who were dissatisfied with their body size had higher mean BMI compared to the respective satisfied groups. Although statistically insignificant, higher BMI was observed among satisfied boys of 14, 15 and 16 age groups, in comparison to boys who were dissatisfied with their body size.

Table 5. Body satisfaction among adolescents in relation to their BMI

	Boys (n=1478)			Girls (1622)		
	Dissatisfied No. (%)		Satisfied No. (%) (BDS=0)	Dissatisfied No (%)		Satisfied No (%) (BDS=0)
	Want to be thin (BDS = +)	Want to be fat (BDS = -)		Want to be thin (BDS = +)	Want to be fat (BDS = -)	
BMI Z score category						
Thin <-2SD	4 (0.9)	360 (83.9)	65 (15.2)	12 (4.9)	179 (73.4)	53 (21.7)
Normal -2SD to +1SD	171 (19.2)	367 (41.3)	351 (39.5)	455 (36.6)	300 (24.1)	488 (39.3)
Overweight > +1SD	99 (87.6)	0	14 (12.4)	105 (97.2)	1 (0.9)	2 (1.9)
Obese > +2SD	43 (93.5)	0	3 (6.5)	27 (100)	0	0
Total	317 (21.5)	727 (49.2)	433 (29.3)	599 (36.9)	480 (29.6)	543 (33.5)
Mean BMI (SD)						
Age (years)						
13	17.7 (4.2)	17 (1.9)	18.07 (3.6)*	16.96 (1.6)		
14	17.49 (3.7)	17.68 (2.4)	19.04 (3.7)**	17.72 (1.7)		
15	18.13 (3.8)	18.48 (2.5)	19.19 (3.5)**	18.09 (1.8)		
16	18.81 (3.5)	18.56 (2.1)	19.79 (3.7)**	18.25 (1.6)		

Factors affecting body satisfaction

Hierarchical multiple regression was used to assess the possible predictors of body dissatisfaction score (BMI, parent education level, social class, peer and parent-described body size) after controlling for age, sex and PDS score. Preliminary analyses were conducted to ascertain non-violation of assumptions of normality, linearity, multicollinearity and homoscedasticity. Age, sex and PDS score were entered at Step 1, explaining 7% of the variance in BDS. After entry of BMI, parent education level, social class, peer and parent-described body size, the total variance explained by the model as a whole was 55.7%, $F(9, 1894) = 264.56$, $P = 0.000$. The modifiable variables BMI, parent education level, social class, peer and parent-described body size, explained 48.7% variance in BDS, after controlling for non-modifiable variables, age, sex and PDS, R squared change = 0.49, F change (6, 1894) = 347.1, $p = 0.000$. In the final model only BMI (beta = 0.64), age (beta = -0.11), sex (beta = 0.14), parent (beta = 0.1), peer (beta = 0.8) described body size and PDS

score (beta = 0.06) were statistically significant with BMI having a large beta value.

Discussion

We report body image perception and dissatisfaction among rural adolescents for the first time in Sri Lanka. Large number of normal weight adolescents (31%) desires larger body size, and this may contribute to the obesity epidemic. Body dissatisfaction is common among rural adolescents even though it may be qualitatively less than other countries. Boys are more dissatisfied with their body size than girls. Girls dissatisfied with their body size have high BMI. Girls underestimate and boys overestimate their body size. Girls aspire thin and boys, larger muscular body.

We translated and validated the "Figure Rating Scale" and "Pubertal Developmental Scale" on Sri Lankan adolescents studying in grades 9 to 11 in Sinhala medium schools in the Anuradhapura district. Results show that the FRS is a valid and reliable tool to be used in Sinhala

speaking adolescents. Further, internal consistency of the scale is satisfactory and quite similar to the previous studies [6,22]. Since this scale has less than 10 items, the Cronbach's alpha can be low. In such instances, mean inter-item correlation will be a better indicator [28]. In this study, mean inter-item correlation lies within the optimal range of 0.2 to 0.4 [29].

The finding that girls aspire thin while boys aspire larger body size is commensurate with the findings across the globe [10,13,30]. Nearly half of the boys with normal BMI show a desire to have a larger body size while one tenth of boys who are overweight, are satisfied with their body size (Table 5). These numbers are less among girls. This desire to be fat may be a reason for the rising incidence of obesity in our population, mostly affecting boys. In CARDIA study of more than 5000 participants in four large American cities, women who were obese and perceived their body size to be obese, lost weight or gained less weight in contrast to those who were stratified with their body size [20].

Understanding adolescents aspired body size is useful in managing anorexia and obesity. The aspiration for larger body size among boys may actually represent the desire to have a muscular body rather than to become fat, which may have led to confusion in selecting the ideal body size.

Although a large number of adolescents are dissatisfied with their current body size, body discrepancy score – the numerical value between PCBS and IBS, – is low compared to other countries. Among the available studies, the smallest value reported for body discrepancy is seen among Asians (in the USA) where females scored 0.7 and males scored 0.1 [10]. Ours are 0.2 and -0.4 for girls and boys. Further, the adolescents in our study population report larger ideal body sizes when compared to those reported by Asians residing in Australia and the USA [10,31]. In contrast to the above studies, instead of a thin figure, adolescents in our study aspire an average figure as the ideal. Literature suggests that adolescents in western countries tend to overestimate their body size to a greater degree while in middle east countries, they grossly underestimate [5,13]. In a Sri Lankan study, gross underestimation of body weight and less desire to engage in weight losing activities have been reported among adults [14]. In that study, “weight perception” was assessed as opposed to “body size perception” in our study and only about half of the participants had the correct perception of body weight. Although misperception of body size is seen in the present study, nearly 75% of adolescents have the correct perception. There is a considerable overestimation of body size among thin individuals. The overestimation of body size by rural adolescents and underestimation by adults may be due to difference in measuring the perception of body size, age and other socio-economic factors.

Factors influencing body image such as weight, BMI, perceived parent and peer opinion and pressure, effects of media, weight related teasing, puberty, age, religious and socio-economic factors have been studied. The results are diverse, but many agree that BMI is a strong predictor of body dissatisfaction [6,21,32]. One study has shown that body image of Asian-Americans is not related to BMI [6]. Strong association of BMI with body dissatisfaction concurs with our findings. Further, our study reveals that students' perception on parents' and peers' opinion on their body size also affects contentment with their body image. This is consistent with previous studies where peer and parent perception and pressure affect body dissatisfaction and engagement in weight losing strategies [33,34]. Results on body dissatisfaction during pubertal development are also diverse. Early pubertal boys are more satisfied than others as the physical changes in puberty make their bodies closer to the societal ideal of male figure with broad shoulders and muscular body. During puberty, girls body strays from their thin ideal with development of breasts, broadening of hips and deposition of fat. Hence, the evidence suggest that body dissatisfaction is seen more during early adolescence [7]. However there is no consistent evidence for correlation between pubertal timing and body dissatisfaction [7]. In the present study, pubertal status shows only small association with body dissatisfaction.

Limitations

Choice of male ideal body size hints confusion between fatness and muscularity. This is a drawback in using silhouette figures. It would have been more productive if we could use separate figure ratings for fatness and muscularity for boys. The study was carried out only in Sinhala medium public schools. Students in private and Tamil medium schools and school dropouts were not included. However, the number of adolescents studying in private schools are less than 500 [17] and nearly 93.5% and 62% of adolescents below 14 years and 15-18 age group attend schools in Anuradhapura district [35]. In Anuradhapura 90.9% population and 88.1% of schools are Sinhalese, hence our sample is a fair representation of the adolescents aged 13 to 16 years in the district.

Conclusions

Body dissatisfaction is seen among rural adolescents, boys being more affected than girls. Large number of normal weight adolescents wants to get fat with boys outnumbering girls. Girls dissatisfied with their body size, have high BMI, underestimate their body size and aspire thinness. BMI is the main influencing factor for body dissatisfaction. Figure rating scale is a valid and reliable tool to assess body image perception and body dissatisfaction in Sinhala speaking adolescents.

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Data availability

Data will be available from the 1st author upon valid request.

Declaration of interest

The authors declare no conflicts of interest.

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