

Relation of Body Image perception and Nutritional status of School going and Not school going Adolescents

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Abstract

Background: Adolescents are very much concerned regarding their body image. Body image concerns indirectly affect the social relations and scholastic performance. It has an important relation with nutritional status. There is paucity of data regarding body image among adolescents with different BMI groups. **Objective:** To assess the perceived body image and degree of dissatisfaction among different BMI group of adolescents and study the other factors associated with it. **Method:** A cross sectional survey was done among 1600 different BMI group of adolescents to assess their body image perception and degree of dissatisfaction using Body Image Questionnaire (BIQ). Additional data regarding their socio-demographic profile were collected. **Results:** Overall 49% with BMI >90 percentile whereas 34% adolescents with BMI < 3rd percentile were unsatisfied with their body image. Overweight adolescents had the maximum discrepancy and maximum dissatisfaction for their body image factors followed by optimum weight adolescents and least among the underweight adolescents. There was significant association of height with mean BIQ among overall and school going adolescents, whereas no variation in non school going adolescents was observed. Lower paternal education was associated with high BMI of adolescents whereas graduate level of maternal education had a peak BMI. **Conclusion:** Large proportion of overweight adolescents are unsatisfied with their body image. Adolescents mean BIQ was significantly associated with height. Lower paternal education was associated with more mean BIQ and vice versa.

Keywords: Body Image, Body Image Questionnaire (BIQ), Body Mass Index (BMI), Adolescence.

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Introduction

The development of a nation depends upon the youth of a country especially the adolescents. The mental status of the adolescents will hugely affect the growth of the nation. Body image is considered a multidimensional dynamic construct which involves internal biological and psychological factors as well as external cultural and social determinants. A healthy body image conveys that a person has accepted his body with its virtues and flaws. An adolescent with a healthy body image grows up to be a balanced and confident individual, who contributes better to the nation's social and economic well being. An adolescent with a negative body image, in turn can suffer with numerous health problems and he is more prone to anxiety and depression. Various studies have found a strong relation between body Image and Nutritional status.[1-5]

In Indian society these days there is a trend and competition for being more and more fit. Still there are many adolescents who are away from school and none of the studied done in past includes them. Thus there is a need to include them also to assess the actual nutritional status and degree of body image dissatisfaction.[6] The present study was an attempt to explore the actual body size, perceived body image and difference from ideal and dissatisfaction for various body image parameters using the BIQ among the school going and non school going adolescents.

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Method

Study place: It's a cross sectional study was conducted amongst adolescents a tier II city of Madhya Pradesh with a population of around 20 lakh including about 20% adolescents.

Duration of Study: 1 year.

Sample size:

The sample size was calculated to be 1600.using the formula

Sample size = $4PQ/L^2$.

[P= Prevalence (50%)

Q = (1-P)

L= Allowable error (5%)]

Sample collection

This study was done including both school going and non school going adolescents. Random selection of schools on the basis of the lottery system was done from the 117 total secondary schools of the city. 4 public and 4 private schools were selected to represent lower and higher Socioeconomic Section (SES). In the next stage random selection of adolescents and consent from the parents of was taken on a suitable day such as on the day of parent teacher meet. Those who gave consent were included into the study. The parents of the student filled and signed the demographic profile of student. After distribution of proforma, a thorough description was given regarding the type and motive of the study and students were motivated to give their own views in the Proforma.

All the data collection sessions were conducted in designated classroom in presence of the respective gender of teachers to ensure privacy regarding physiological measures.

Non school going adolescents were searched at their working places locally. Working places such as tea stalls, garage workers, garbage cleaners, household working adolescents & small self business doing

etc were searched and contacted personally. Proper written consent was taken from parents and those who gave consent were enrolled. Those who couldn't read or write were helped personally by asking the questions verbally and filling in the Performa accordingly.

Anthropometric Measurement

Weight and height measurements were done for each student and was written on the Performa before filling it by the student. Anthropometric equipment was checked and calibrated before every assessment session. Body weight was measured to the nearest 0.1 kg in light clothing on a digital scale. Height was measured without shoes using a stadiometer. BMI was calculated as weight (kg)/height (m²) and evaluated using Revised IAP Growth Charts for Height, Weight and Body Mass Index for 5- to 18-year-old Indian Children to determine adolescent weight status: underweight, desirable weight, overweight, and obese[2].

The students were given at least 20 minute of time for filling the proforma and it was collected after they had filled it completely.

Body Image Assessment

With permission of the author, Body image satisfaction was assessed using the Body- Image Ideals Questionnaire (BIQ) which was obtained from the author Thomas F cash¹ who was actually a psychologist. He suggested that body image should be evaluated by asking about physical features difference from ideal (Part A: -1, 1, 2 & 3) and how important to him that parameter is (Part B: 0, 1, 2, 3). Product of A and B (A*B) was composite BIQ. A total of 11 characteristics were questioned. Each question had two parts. Part A- how much you resemble your personal ideal & it was given a score of -1 to +3 for a response of exactly as I am, almost as I am, fairly unlike me, very unlike me. Part B of each item- rate how important your ideal is to you by circling a number on the 0 to 3 scale for a response of not important, somewhat important, moderately important and very important respectively.

This questionnaire assess 11 physical attributes (facial features, hair texture and thickness, skin complexion, height, muscle tone and definition, body proportion, weight, chest size, physical strength, physical coordination, and overall appearance) using a 4-point Likert scale. The range for composite BIQ score is from -3 which suggest very important congruence across all physical attributes to +9 i.e very important and maximum discrepancies across all physical attributes. Thus, higher BIQ scores indicate higher body image dissatisfaction.

Quantitative assessment of Body image perception was also done by asking directly to the adolescents in the questionnaire whether the adolescent is satisfied or unsatisfied with their body.

Statistical Analysis

Statistical analysis was done using the SPSS 20 software. Different subgroups were made and compared applying the ANOVA and T test wherever applied. P value was calculated considering 95% CI.

Results

The study included 1600 adolescents (Male 1061 & Female 539) with School going adolescents (1230) & non school going (370). Male school going adolescents were 808 and non school going were 253, whereas females school going were 422 and non school going 117. The non school going adolescents were categorised into 4 categories broadly and 189 of these non school going adolescents were sweepers(12%), 119(7.5%) were solid waste collecting, 35(2.2%) were garage workers & 27(1.7%) were small business workers.

Quantitatively 49% adolescents with BMI >90 percentile for male and >95 percentile for female were unsatisfied with their body

image, 35% between 72 percentile for male/76 percentile for female to 91 percentile for male/95 percentile for female(equivalent to 27 adult BMI), 44% between the BMI range of 3-71 percentile for male/75 percentile for female(equivalent to 23 adult BMI), whereas 34% adolescents with BMI < 3rd percentile were unsatisfied with their body image.(Fig 2)

Overweight adolescents had the significant from ideal for height, hair texture, weight and overall appearance, optimum weight adolescents were having significant from ideal for muscle tone and strength whereas underweight were having significant from ideal for chest size[Table 1].

Overweight adolescents had maximum mean BIQ for height, hair texture, weight and overall appearance. Optimum weight had maximum mean BIQ for strength and muscle tone. Underweight adolescents were having maximum significant mean BIQ for chest size and coordination. [Table 2].

According to height, mean BIQ score among male was 2.01 for mean BMI < 3 percentile, 2.16 between 3-10 percentile, 1.73 between 10-25 percentile, 1.37 between 25-50 percentile, 2.19 between 50-75 percentile and 1.44 in >90 percentile. (p<0.00). Mean BIQ among school going male in the same height percentile ranges were 2.07, 2.18, 1.81, 1.29, 2.28 & 1.44 respectively. (p<0.00).According to height, mean BIQ score among female was 1.89 for mean BMI < 3 percentile, 2.12 between 3-10 percentile, 2.56 between 10-25 percentile, 1.75 between 25-50 percentile, 2.23 between 50-75 percentile, 1.24 between 75-90 percentile and 0.49 in >90 percentile of height for age IAP standards. (p<0.00). Mean BIQ among school going female in the same height percentile ranges were 1.94, 2.12, 2.59, 1.70, 2.20, 1.24 & .31 respectively. All these values were statistically significant.(p<0.00). The variation of height with mean BIQ among non school going adolescents in both male and female was not statistically significant. [Table 3].

The mean BIQ among the male adolescents < 3percentile BMI for age was 1.88, 3-71 percentile was 1.97, 71-90 percentile was 1.60 and > 90 percentile was 2.04. The mean BIQ among the female adolescents for < 3 percentile BMI for age was 1.98, 3-75 percentile was 2.02, 71-90 percentile was 1.93 and > 90 percentile was 2.07p<0.05). [Table 4].

On comparing the mean BIQ with the BMI range, the adolescents with mean BMI <12 had mean BIQ 3.10, 12-14 had mean BIQ 1.82, 15-17 had mean BIQ 2.19, 18-20 had mean BIQ 1.74, 21-23 had mean BIQ 2.08, 24-26 had mean BIQ 2.14 and >27 BMI had mean BIQ 2.04. (p<0.05).among school going adolescents, mean BIQ was 3.10, 1.79, 2.22, 1.74, 2.11, 2.20, 2.09 in the same BMI range respectively. Non school going adolescents had no significant variation of mean BIQ with BMI.[Fig.1].

Education of parent was directly associated with mean BMI of adolescents. Adolescents with paternal education upto postgraduate had mean BMI 18.18, graduate 18.98, higher secondary 20.95, high school 21.23, middle school 20.81, primary 21.32 and illiterate 20.93.(p<0.05). Adolescents with maternal education up to postgraduate had mean BIQ 18.20, graduate 17.92, higher secondary 23.30, high school 20.32, middle school 20.84, primary school 21.36 and illiterate 20.90.(p<0.05).

In this study around 5% adolescents were underweight, 84% were among the optimal BMI group and 11% among the obese side.

The composite Mean BIQ(SD) score in this study was 1.95(1.61). Mean BIQ (SD) for male was 1.92(1.58) & female 2.00(1.66). Mean BIQ (SD) for school going was 1.96(1.67) while for non school going it was 1.91(1.38).

Table 1: Body Image Questionnaire difference from ideal

S no	BIQ factor	Mean BIQ in Male	Mean BIQ in Female	P value	Underweight	Optimal BMI group	Overweight/Obese	P value
1	Height	1.11	1.15	0.236	1.22	1.05	1.77	0.000

		(1.24)	(1.27)		(1.19)	(1.28)	(0.84)	
2	Skin complexion	0.87 (1.28)	0.96 (1.22)	0.01	0.73 (1.17)	0.93 (1.24)	1.02 (1.31)	0.23
3	Hair texture	0.95 (1.42)	0.77 (1.37)	0.840	0.55 (1.24)	0.81 (1.39)	1.12 (1.40)	0.003
4	Facial features	0.89 (1.39)	0.83 (1.34)	0.608	0.80 (1.39)	0.85 (1.35)	0.87 (1.36)	0.92
5	Muscle tone	0.99 (1.25)	1.02 (1.21)	0.497	0.91 (1.24)	1.07 (1.21)	0.59 (1.20)	0.00
6	Body proportions	1.05 (1.16)	0.90 (1.23)	0.034	0.87 (1.19)	0.98 (1.19)	0.79 (1.32)	0.12
7	Weight	1.12 (1.28)	1.13 (1.26)	0.495	1.21 (1.01)	0.98 (1.25)	2.24 (0.80)	000
8	Chest size	1.04 (1.27)	1.03 (1.20)	0.061	1.23 (1.02)	1.06 (1.21)	0.67 (1.35)	000
9	Strength	1.11 (1.28)	1.14 (1.23)	0.166	1.12 (1.03)	1.18 (1.24)	0.75 (1.31)	00
10	Coordination	1.04 (1.20)	0.96 (1.23)	0.577	1.03 (0.98)	1.00 (1.24)	0.85 (1.15)	0.27
11	Overall appearance	1.11 (1.27)	1.24 (1.23)	0.296	0.97 (1.17)	1.14 (1.25)	1.78 (1.08)	000
			F=1.405					
			P=0.236					

Table 2: Degree of dissatisfaction (composite score) among adolescents for various BIQ factors.

S no	BIQ factor	Mean BIQ (SD)	Male	Female	P value	Under weight score (SD)	Optimal group Score (SD)	BMI Over weight/Obese Score (SD)	P value
1	Height	2.21 (2.88)	2.14(2.93)	2.25(2.86)	0.665	2.97 (3.05)	2.02 (2.88)	3.31 (2.51)	0.000
2	Skin complexion	1.73 (2.72)	1.67(2.70)	1.75(2.74)	0.358	1.16 (2.26)	1.75 (2.76)	1.84 (2.64)	0.147
3	Hair texture	1.56 (3.02)	1.94(3.30)	1.36(2.86)	0.004	0.76 (1.82)	1.54 (3.03)	2.08 (3.33)	0.004
4	Facial feature	1.56 (2.88)	1.78(3.06)	1.45(2.78)	0.005	1.63 (2.92)	1.60 (2.93)	1.24 (2.39)	0.303
5	Muscle tone	1.90 (2.80)	2.04(2.98)	1.83(2.70)	0.003	1.50 (2.44)	2.05 (2.85)	0.93 (2.29)	0.000
6	Body proportions	1.73 (2.60)	1.96(2.65)	1.62(2.57)	0.498	1.33 (2.53)	1.79 (2.60)	1.46 (2.63)	0.107
7	Weight	2.03 (2.73)	2.10(2.99)	1.99(2.59)	0.000	2.23 (2.43)	1.77 (2.65)	3.90 (2.77)	0.000
8	Chest size	1.81 (2.44)	1.84(2.53)	1.79(2.40)	0.162	2.15 (2.35)	1.87 (2.45)	1.16 (2.34)	0.001
9	Strength	1.99 (2.86)	2.09(3.13)	1.94(2.72)	0.001	1.72 (2.04)	2.11 (2.90)	1.19 (2.79)	0.000
10	Coordination	1.62 (2.50)	1.79(2.60)	1.53(2.45)	0.404	1.75 (2.16)	1.71 (2.56)	0.90 (2.07)	0.000
11	Overall appearance	2.65 (3.16)	2.44(3.11)	2.76(3.18)	0.860	2.13 (2.97)	2.46 (3.07)	4.35 (3.34)	0.000

Table 3: BIQ score according to Height

Height percentile	Male			Female		
	Mean BIQ score (SD)	Mean BIQ score		Mean BIQ score (SD)	Mean BIQ score	
		SCHOOL Going (SD)	NOT SCHOOL Going (SD)		SCHOOL Going (SD)	NOT SCHOOL Going (SD)
<3	2.01(1.42)	2.07(1.51)	1.94(1.30)	1.89(1.42)	1.94(1.36)	1.79
3-10	2.16(1.44)	2.18(1.49)	2.01(0.85)	2.12(1.41)	2.12(1.41)	00
10-25	1.73(1.69)	1.81(1.74)	1.52(1.40)	2.56(1.76)	2.59(1.92)	2.45
25-50	1.37(1.86)	1.29(1.91)	2.24(0.66)	1.75(1.46)	1.70(1.40)	1.95
50-75	2.19(1.93)	2.28(1.95)	0.63	2.23(2.15)	2.20(2.12)	2.38
75-90	00	00	00	1.24(1.75)	1.24(1.75)	00
>90	1.44(2.25)	1.44(2.24)	00	.49(2.15)	0.31(2.17)	2.45
Total	1.92(1.58)	1.94(1.67)	1.87(1.28)	2.00(1.66)	2.00(1.69)	2.00(1.58)
	P=0.00	p=0.00	P=0.202	P=0.00	P=0.00	P=0.479

Table 4: BIQ score according to BMI of subjects

BMI	Male				Female			
	Mean BIQ (SD)	School going status			Mean BIQ (SD)	School going status		
		SCHOOL BIQ score (SD)	NOT SCHOOL BIQ score (SD)	P value		SCHOOL BIQ score (SD)	NOT SCHOOL BIQ score(SD)	P value
<3 rd %	1.88(1.79)	2.05(1.86)	1.31(1.42)	0.207	1.98(1.22)	1.99(1.23)	1.90(1.67)	0.955
3-71/75%	1.97(1.67)	1.98(1.75)	1.92(1.23)	0.647	2.02(1.75)	2.02(1.78)	2.13(1.54)	0.549
71/76-90/95%	1.60(1.46)	1.73(1.55)	1.40(1.28)	0.153	1.93(1.63)	2.14(1.61)	1.74(1.64)	0.230
>90/95%	2.04(1.12)	1.83(1.06)	2.43(1.12)	0.002	2.07(1.06)	1.89(0.95)	2.80(1.24)	0.108
	1.92(1.58)							
	P=0.044							

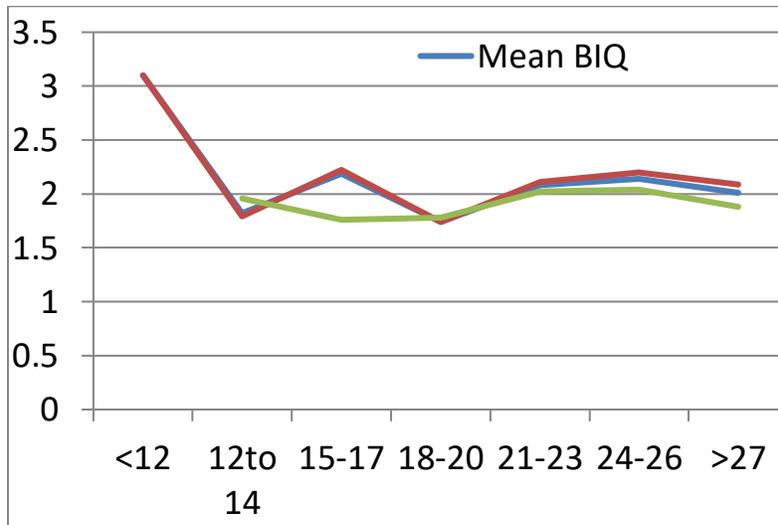


Fig.1: Relation of BMI with BIQ

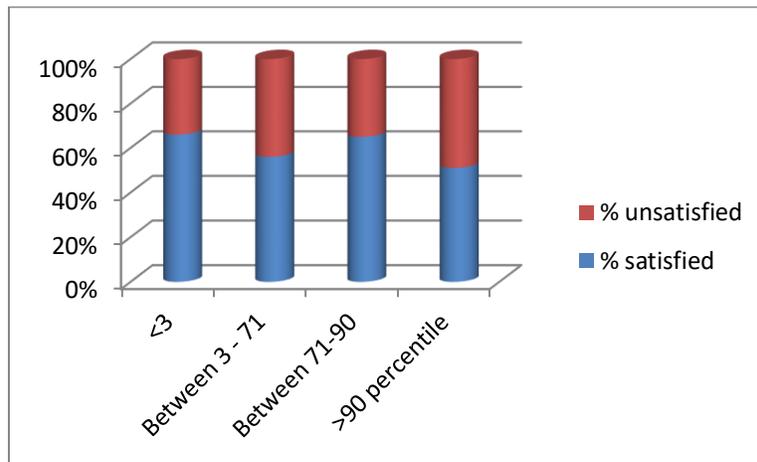


Fig. 2: Percentage of body image dissatisfaction depending upon the BMI range

Discussion

Nutrition of the adolescents not only affects the body look but also affects the self esteem of adolescents. The adolescent body image according to nutritional status of adolescent is an important factor and there is paucity of data among the various adolescent groups which includes non school going adolescents as well.

A total of 49% of obese adolescents were unsatisfied with their body image, 35% of overweight, 44% of optimum weight and 34% of the underweight were dissatisfied with their body image.

Overweight adolescents had the maximum discrepancy from ideal maximum parameters of BIQ factors i.e. for height, hair texture, weight and overall appearance. Optimum weight adolescents had

maximum discrepancy from ideal for muscle tone and strength whereas underweight had maximum discrepancy from ideal for chest size among both male and female adolescents. This shows that apart from overweight of these adolescents, they are most dissatisfied for various other factors as well as compared to optimum weight and underweight adolescents. Although underweight adolescents are categorised malnourished nutrition wise, they feel most satisfied for their body image.

Mean BIQ among male was maximum 2.04 in >90 percentile BMI range, 1.97 in 3-71 BMI, 1.88 in < 3 BMI & 1.60 in 71-90 BMI. Thus obese adolescents were found to be most dissatisfied from their body image, followed by optimal and lean category and overweight were the most satisfied adolescents. B M Rashmi et al [7] in their study found that majority of participants who were underweight or overweight, perceived themselves as normal weight (72% and 88.9% respectively). Singh Mannat M et al [9] (2015) found that body mass index [OR=4.65,95 % CI] were found to be independently associated with body image perception. Kotecha PV et al[6] (2013) found in their study that about 10 to 15 percent of boys and girls were below the 5th percentile of BMI suggesting they were underweight. Out of these 70% of girls perceived themselves to be normal.

Pokhrel S et al[10] (2015) in Nepal found no significant association between body mass index and body image dissatisfaction

Fathers' education was associated directly with decrease in mean BMI level whereas the mothers' education also had a direct relation with the mean BMI level. The mean BMI was lower than 20 in adolescents with maternal education either graduate or postgraduate standard. Adolescents with maternal education illiterate or primary, middle or high school had a mean BMI of above 20. This suggest that level of parents education affects the nutritional status of the adolescent. BM Rashmi et al[7] (2016) in Bijapur Karnataka also reported that maternal education status was significantly associated with body image satisfaction in study subjects. But there was no significant association of body image perception of girls with their father's education status.

In this study around 5% adolescents were underweight, 84% were among the optimal BMI group and 11% among the obese side. The mean BIQ score among the adolescents of overweight category was found to be significantly higher(2.04) as compared to underweight and least(1.60) among the optimal BMI group. Thus the optimal BMI group was found to be significantly more satisfied as compared to underweight and obese adolescents. Goswami et al[8] in 2012 also reported that students with a low weight had a significantly higher prevalence of body image satisfaction while overweight students had a significantly higher prevalence of dissatisfaction.

Among school going, Dissatisfaction level was significantly more in male adolescents for Weight(2.19) as compared to female adolescents.(p<0.05). Raufelder D et al[4] in 2014 and Chen L. J et al[5] in 2010 found that boys are more satisfied with their bodies on average.

Conclusion

Large proportion of adolescents with BMI in under nutrition range are satisfied with their body image and wants to be the same. On the other hand huge proportion of adolescents have a normal range BMI and are still dissatisfied with their body image. On subgroup analysis

of school going and non school going adolescents, there was no difference in body image dissatisfaction among the non school going adolescents but body image dissatisfaction status of school going adolescents was highly influenced by their nutritional status. Parents education status was inversely associated with BMI in adolescents. Overweight adolescents were found to be overall dissatisfied for more number of BIQ factors followed by optimum weight and underweight adolescents. There is a suggestion of underweight adolescents being more satisfied than overweight. Urgent interventions & counseling for improvement in physical health of adolescents need to be done.

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