# Perceived Body Image Among Young Girls Residing in Urban Slums and Reality : A Cross Sectional Study

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## ABSTRACT

**Introduction:** In the last two decades, percentage of underweight has been not much changed while prevalence of obesity is increased by four to eight folds.(1)(2)(3) Having an incorrect perception about one's body weight could make one unlikely to seek intervention. This study was aimed to assess nutritional status of the young girls, the agreement between the perceived and actual weight category and to identify how the socio-demographic determinants affect nutritional status and its perceptions.

**Methodology:** This was a cross sectional study conducted between December 2013 to July 2014 among 660 young girls (15-25 years) living in the slums of Surat. Study tools were a pretested, semi-structured questionnaire, weighing machine and stadiometer.

**Results:** Thirty two percent were under weight. 7.9% were overweight and 0.8% was obese. Correct perception about body weight was seen among 56.14%. When person agreement was done for perception and reality towards their weight, observed kappa is 0.21 with CI 0.14-0.28. This showed very poor agreement between the reality of their BMI and their perception towards their weight. Pallor was present among 44.4% participants

**Conclusion:** Awareness drive is needed to correct their perception by about BMI, healthy body and healthy diet to prevent malnutrition.

**Keywords:** BMI, Body Image, Malnutrition, Kappa statistic

## BACKGROUND

Issues with weight among the youth are a global phenomenon since long in either form of malnutrition. In India under nutrition has remained a major public health problem since long. And if we look at the NFHS data from NFHS II to NFHS IV, we can see Percentage of underweight has been not much changed in 2 decades while prevalence of obesity is increased by four to eight folds.[1,2,3]

With the increasing food security[4] and with number of the programmes to combat malnutrition, nutritional status of the person would not only determined by the availability of the food, but it has become a multi-dimensional concept and maybe influenced by age, education, anthropometry, psychological factors and socio-cultural environment.

| Age group | NFHS 2 | | NFHS 3 | | NFHS 4 | |
|---|---|---|---|---|---|---|
| | 15-19 | 20-24 | 15-19 | 20-29 | 15-19 | 20-29 |
| UW | 38.8% | 41.8% | 46.8% | 38.1% | 41.9% | 25.3% |
| BMI>25 | 1.7% | 3.6% | 2.4% | 8.2% | 4.2% | 14.2% |
| OW | 1.6% | 2.8% | 2.2% | 6.8% | 3.4% | 11.3% |
| Obese | 0.1% | 0.8% | 0.2% | 1.4% | 0.8% | 2.9% |

One important determinant of malnutrition could be body image. Body weight perception may or may not be the same as actual BMI. Having an incorrect perception about one's body weight could probably make them unlikely to seek intervention. This may constitute an important barrier to self-lead dietary and lifestyle change and may have consequences for the potential effectiveness of interventions to address weight status.[5] For example a young girl who wrongly perceives her to be overweight could be indulging in unhealthy weight control behaviors including eating disorders. These young girls are the soon to be mothers and being underweight, they run the risk of delivering low birth weight babies or their children could be undernourished.

Thus, there is a need to understand the relationship between weight perception and actual weight among these young girls which could help to target public health strategies more effectively.

This study was aimed to assess nutritional status of the young girls (15-25 years) who live in the slums of Surat, the agreement between the perceived and actual weight category and to identify how the socio-demographic determinants affect nutritional status and its perceptions.

## METHODS

This was a cross sectional study conducted among young women aged 15 to 24 years living in urban slums of Surat city. The study was conducted between December 2013 to July 2014. There were 399 slums in 7 zones of Surat city according to the list provided by the Slum Upgradation Cell of Surat Municipal Corporation (SMC). The list of these slums (399) was obtained. Cluster sampling method was done to select 30 slums (clusters) from the 399 slums in the 7 zones. The clusters were selected by population proportional to size sampling.

To calculate the sample size, the total slum population of 353,915 in Surat City was considered. Then taking the proportion of youth aged between 15 and 24 as 20% of the total population, the population in the age group 15-24 years was calculated as 70,783. As per Census 2011, sex ratio of Surat City is 758 per 1000. So out of the total population in this young age group, total girls were 30,520. Sample size was calculated by OpenEpi software taking total population size 30520, anticipated frequency 39.4% (girls who have already begun child bearing in 15-24 years as per NFHS III), absolute precision 5% and design effect as 1.8. The sample size calculated by Open Epi was *653*. A total of 22 participants were interviewed from each of the 30 clusters.

To select participants in the field, the first house from the cluster was selected randomly and then the houses were selected consecutively from that cluster till 22 participants were selected. Following selection, a mutually convenient time was selected to conduct the interview. In one day, 10-11 participants were interviewed. In case a participant could not be contacted even after 3 attempts, she was excluded and the next participant was selected by extending the consecutive sampling after the last house.

Study tools used were a pretested, semi-structured questionnaire, weighing machine and stadiometer. The questionnaire had five domains which covered socio-demographic profile, education, nutrition, menstrual hygiene and sexual health.

In this study, young girls aged between 15 and 24 years, residing in the urban slums within Surat city limits and those who gave consent were included in the study. The girls who were not fulfilling the inclusion criteria or could not be contacted after 3 attempts were excluded from the study.

The primary outcome of this study was the correctness or agreement between the perceived weight and actual BMI measured. The perception about body weight among the participants was established based on a question where the participants chose whether they considered themselves as overweight, normal weight or underweight. Actual weight and height were directly measured, BMI was calculated and categorized as per the WHO guidelines mentioned before. Comparison was done between participants with a correct perception with those who underestimated (actual BMI higher than selected) and overestimated (actual BMI lower than selected) their BMI category. The secondary outcome measures were anaemia, perception of diet, waist hip ratio, age at menarche, menstrual disorders and self reported STD symptoms.

Ethical clearance from the Human Research Ethical Committee, Government Medical College, Surat had been obtained. Prior permission from Deputy Commissioner, Health & Hospitals, SMC was taken to collect data and use the Anganwadi Centre (informal education centre for under 5 children within a slum) for interviewing. Informed verbal consent of participants was taken. To ensure confidentiality and privacy of the participants, interview of each participant was taken at the Anganwadi Centre in strict privacy. All the forms were given unique ID number for identification thereby reducing the threat of participant identification. All the data was maintained in strict confidentiality with access to only the researcher and the guide.

## RESULTS

The girls, in current study, of age > 18 years were classified as per WHO classification of BMI for adults[6] and of age 15-18 years were classified as per IAP guidelines[7].

Amongst study participants, one third of the girls (32.6%) were underweight. Overweight was seen in 7.9% girls and 0.8% girls were in class I category of obesity. However, an interesting point to note is that, although overweight / obesity was seen in only 5.9% girls, altered waist hip ratio considered to be an important precursor to cardiovascular illnesses was seen in 29% girls.

In this study, conjunctival pallor is used as an indicator of micronutrient deficiency as nutritional anaemia is the commonest form of malnourishment among adolescents and pallor is the easiest tool to measure which was present in 44.4% girls.

Higher age group and married girls are showing statistically significant increase in mean BMI of the group as well as presence of pallor. In bivariate analysis, age and sex come out to be no predictors of BMI but higher age group (OR = 0.68, p=0.01) and marital status (OR = 1.7, p=0.0005) significantly predict presence of anaemia. There is no signifi-cant difference in BMI and pallor based on their socio-economic class and education.

Out of 627 participants, 352 (56.14%) had a correct perception about their bodyweight. Among them, the highest correct perception about their weight category was seen in the normal category (66%).

**Table 1: Nutritional status of study participants based on BMI, Waist Hip ratio, conjunctival pallor, IFA consumption and weight perception**

| Criteria | Participants |
|---|---|
| **BMI (n = 660)** | |
| Underweight | 215 (32.6%) |
| Normal | 388 (58.8%) |
| Overweight | 52 (7.9%) |
| Obese | 5 (0.8%) |
| **Waist/Hip Ratio (n = 606)\*** | |
| *Currently pregnant women were excluded | |
| <0.85 | 430 (71%) |
| >0.85 | 176 (29%) |
| **Conjunctival Pallor (n = 660)** | |
| Present | 293 (44.4%) |
| Absent | 367 (55.6%) |
| **Perception towards weight compared to BMI (n=627)** | |
| Correct | 352 (56.1%) |
| Incorrect | 275 (43.9%) |

**Table 2: Relationship between the socio-demographic determinants and Abnormal BMI and pallor**

| Indicators | BMI Abnormal\* (n=272) | Normal (n=388) | Total | OR (CI) | p value | Pallor Yes (n=293) | No (n=367) | Total | OR (CI) | p value |
|---|---|---|---|---|---|---|---|---|---|---|
| **Age group** | | | | | | | | | | |
| 15 – 19 | 159 (40.2) | 237 (59.8) | 396 | 0.89 (0.65–1.23) | 0.49 | 161 (40.7) | 235 (59.3) | 396 | 0.68 (0.5-0.93) | 0.01 |
| 20 – 24 | 113 (42.8) | 151 (57.2) | 264 | | | 132 (50.0) | 132 (50.0) | 264 | | |
| **Marital status** | | | | | | | | | | |
| Married | 112 (42.7) | 150 (57.3) | 262 | 1.11 (0.8–1.52) | 0.51 | 138 (52.7) | 124 (47.3) | 262 | 1.7 (1.27-2.39) | 0.0005 |
| Unmarried | 160 (40.2) | 238 (59.8) | 398 | | | 155 (38.9) | 243 (61.1) | 398 | | |
| **Socio – Economic class** | | | | | | | | | | |
| SEC – I | 9 (50) | 9 (50) | 18 | | 0.36 | 12 (66.7) | 6 (33.3) | 18 | | 0.346 |
| SEC – II | 61 (48.4) | 65 (51.6) | 126 | | | 51 (40.5) | 75 (59.5) | 126 | | |
| SEC – III | 85 (38.1) | 138 (61.9) | 223 | | | 99 (44.4) | 124 (55.6) | 233 | | |
| SEC – IV | 93 (39.9) | 140 (60.1) | 233 | | | 105 (45.1) | 128 (54.9) | 233 | | |
| SEC – V | 24 (40) | 36 (60) | 60 | | | 26 (43.3) | 34 (56.7) | 60 | | |
| **Education** | | | | | | | | | | |
| Illiterate | 22 (57.9) | 16 (42.1) | 38 | | 0.59 | 26 (61.9) | 16 (38.1) | 42 | | 0.09 |
| Primary | 166 (54.2) | 140 (45.8) | 306 | | | 145 (44.5) | 181 (55.5) | 326 | | |
| Secondary & Higher Secondary | 150 (58.1) | 108 (41.9) | 258 | | | 113 (42.3) | 154 (57.7) | 267 | | |
| Graduate & Above | 14 (56) | 11 (44) | 25 | | | 9 (36) | 16 (64) | 25 | | |
| **Body image perception** | | | | | | | | | | |
| Incorrect perception | 135 (49.1) | 140 (50.9) | 275 | 2.09 (1.51-2.90) | <0.0001 | 128 (46.5) | 147 (53.5) | 275 | 1.18 (0.86-0.62) | 0.29 |
| Correct perception | 111 (31.5) | 241 (68.5) | 352 | | | 149 (42.3) | 203 (57.7) | 352 | | |

*Under weight or Over weight

**Table 3: Correctness of weight perception among the participants**

| Perceived Weight Category | Actual Weight Category based on BMI Normal | Overweight | Underweight | Total | KAPPA Value; Confidence Interval |
|---|---|---|---|---|---|
| **Normal** | 241 (66.0) | 64 (17.5) | 60 (16.5) | 365 (100) | 0.21 (0.14 – 0.28) |
| **Overweight** | 29 (51.8) | 26 (46.4) | 1 (1.8) | 56 (100) | |
| **Underweight** | 111 (53.9) | 10 (4.9) | 85 (41.2) | 206 (100) | |
| **Total** | 381 (60.8) | 100 (15.9) | 146 (23.3) | 627 (100) | |

**Table 4: Relationship between the socio-demographic determinants and the correctness of weight perception**

| Determinants | Responses | | | Odds Ratio; CI | P value |
|---|---|---|---|---|---|
| | Correct (n=315) | Incorrect (n=312) | Total (n=627) | | |
| **Age** | | | | | |
| Aged between 15 to 19 yrs | 204 (54) | 174 (46) | 378 | 1.249; (0.90 to 1.72) | 0.17 |
| Aged between 20 - 24 yrs | 148 (59.4) | 101 (40.6) | 249 | | |
| **Education** | | | | | |
| Illiterate | 22 (57.9) | 16 (42.1) | 38 | | 0.82 |
| Primary | 166 (54.2) | 140 (45.8) | 306 | | |
| Upto Higher Secondary | 150 (58.1) | 108 (41.9) | 258 | | |
| Graduate & Above | 14 (56) | 11 (44) | 25 | | |
| **Dropped out of school** | | | | | |
| Yes | 223 (54.5) | 186 (45.5) | 409 | 1.21; (0.87 - 1.68) | 0.26 |
| No | 129 (59.2) | 89 (40.8) | 218 | | |
| **Socio economic classification** | | | | | |
| 1 | 13 (72.2) | 5 (27.8) | 18 | | 0.11 |
| 2 | 68 (59.1) | 47 (40.9) | 115 | | |
| 3 | 109 (51.7) | 102 (48.3) | 211 | | |
| 4 | 122 (54.5) | 102 (45.5) | 224 | | |
| 5 | 40 (67.8) | 19 (32.2) | 59 | | |
| **Occupation of the participant** | | | | | |
| Student | 93 (55.7) | 74 (44.3) | 167 | | 0.94 |
| Unskilled worker | 21 (58.3) | 15 (41.7) | 36 | | |
| Skilled worker | 83 (56.8) | 63 (43.2) | 146 | | |
| Housewife | 104 (57.5) | 77 (42.5) | 181 | | |
| Unemployed | 51 (52.6) | 46 (47.4) | 97 | | |

Wrong perception was again the highest among participants in the normal category who thought themselves to be either overweight (51.8%) or underweight (53.9%) in the normal weight category.

When person agreement was done for perception and reality towards their weight, observed kappa is 0.21 with CI 0.14-0.28 which showed very poor agreement between the reality of their BMI and their perception towards their weight.

Wrong perception regarding weight is equal among all the girls regardless of their age, education, socio economic class or occupation in this study.

## DISCUSSION

The study shows high percentage of both sides of malnutrition, where undernourished girls (32.6%) outnumbers overweight and obese girls (8.7%). Different studies in similar context show same kind of mal nourishment distribution among different study groups either in rural or urban. Devgun et al has shown that 67.6% girls were having normal BMI while 23.3% girls were underweight and 11.1% girls were overweight.[8] In Lanerolle-Dias et al, 32.8% of girls were underweight and 6.1% were overweight.[9] Gupta et al showed that, 60.9% were girls underweight and 3.1% were overweight as per BMI.[10] In Jaiswal et al, the Body Mass Index of the adolescent girls revealed that 36.3% and 4.8% of the girls from gov-

ernment and matriculation school respectively were severely undernourished and 19% and 48% of them were identified as obese.[11]

While some of the studies done in past reported no overweight or obese girl unlike this study. Indupalli et al reported[12] and Kalhan et al[13], study done in a district of Hariyana showed similar prevalence of undernutrition but none of the girls was found to be overweight or obese in both the studies. This further confirms the rising trend of malnutrition at opposite edge.In this study the abnormal waist hip ratio was noted among 29% girls which is precursor as well as independent risk factor for cardiovascular diseases[14].

Anaemia has remained a consistent public health issue since long and not much of the outcome has been achieved with all the available strategies. The most recent NFHS 4 shows, 52.3% women are anaemic.[1] Goswami et al shows[15] anaemia in 19% girls and Lanerolle-Dias et al[9] found 17%anaemia prevalence. Such a comparatively low prevalence of anemia might be due to observation variation as clinical examination has high variation in term of sensitivity and specificity.The other studies shows very high prevalence of anaemia as in Kulkarni et al (90.1%)[16] and in Indupalli et al (94%)[12] In current study, anaemia is diagnosed by conjunctival pallor due to feasibility and easy acceptance by study participants as compared to invasive technique. Pallor was present among 44.4% participants of this study and probability of getting high

prevalence of anaemia cannot be excluded in this if the laboratory diagnosis had been done.

In bivariate analysis, no sociodemographic indicator independently affects abnormal BMI in girls. Higher age group and married girls are showing statistically significant increase in BMI as well as presence of pallor. But they are not predictor of abnormal BMI. Higher age group and marriage are significantly affecting pallor. Higher age leads to marriage which exposes the girls to pregnancies which may aggravate iron deficiency among them. There is no significant difference in BMI and pallor based on their socio-economic class and education. In contrast, NFHS 4 shows increasing percentage of undernourishment and anaemia in lower wealth quintile.[1]

The main focus of the study was about the perception of the young girls towards their body. Out of the 627 participants, 352 (56.14%)had a correct perception about their bodyweight. But wrong perception was again the highest among participants in the normal category who thought themselves to be either overweight (51.8%) or underweight (53.9%).In contrast Musaiger et al shows 26.2% and 35.2% of non-overweight/obese girls perceived themselves as thin.[17] In Stigler et al, 10.8% normal/underweight girls considered themselves as overweight and 41.4% girls who were obese considered themselves as normal.[18]

The kappa statistics further confirms the findings. In this study, the girls' reality of BMI and their perception show very poor agreement as per kappa statistics.Other studies in different countries and ethnicity reveals similar scenario. In Cheung et al, the strength of agreement between BMI and perceived weight was poor in females (Kappa=0.137).[19]A systematic review done with 42 reference studies world-wide concluded that the agreement between body weight perception and actualbody mass index was relatively poor.[20]

Lots of outside influences, often incorrect, shape perception about body image and health among these young girls. Blindly following their desire for thinness in these girls in normal weight category lead them to nutritional deficiencies which go undetected and resulted in malnutrition.

This kappa statistics shows the adolescents need to be taught about healthy weight and body as incorrect perception here comes out to be the independent risk factor for abnormal BMI where the probability of having abnormal BMI is twice among girls having incorrect perception regarding their BMI (OR= 2.09, CI = 1.51 to 2.90, P<0.0001). The finding seems to be plausible as various studies report in-

correct body image perceptions lead to unnecessary dieting practices which are hazardous.[21,5]

Wrong perception regarding weight is equal among all the girls regardless of their age, education, socio economic class or occupation in this study. A similar study conducted in Kenya among slum residents in which sex was a significant predictor of underestimation of BMI among normal-weight participants, whereas age and sex were significant predictors among overweight or obese participants but not education, SEC or marital status.[22] Goswami at al has shown almost similar finding where type of family, education and cast has no significant relation with body image perception even though study did not check the correctness of perception.[23]

The above picture of malnourishment compels the public health professionals to direct the multiprong strategies towards not only providing protein energy and micronutrient supplements but also spreading the awareness about healthy weight, wholesome diet and micronutrients as well as life style changes to maintain healthy waist hip ratio.

## CONCLUSION

The findings of the study conclude that, malnutrition, the basic problem of a lot of public health issues is prevalent and its epidemiology is changing rapidly with technological advances. The abnormality in Body Mass Index among the young girls of the slums mainly depends upon their body weight perceptions which are far removed from reality. Either BMI or wrong perceptions are independent of any socio demographic indicator which indicates a new perspective in the strategy formation to combat malnutrition. We, public health experts have to look into the psyche of these young girls, what forms their perception and body image. We have to correct their perception by intensive awareness drives of healthy body and healthy diet to prevent the generation as well as upcoming generations from malnutrition.

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