# Assessment of Nutritional Status and Screening for Eating Disorders Among Female Adolescents

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**ABSTRACT**    *Introduction: Adolescence is the period of rapid growth and inadequate diet may adversely affect growth .Body image concerns are common especially in female adolescents and the pressure to remain thin may force them to adapt various unhealthy eating behaviours. The aim of this study was to assess the nutritional status and to screen for eating disorders among female adolescents. Methodology: EDE-Q 6.0 Questionnaire was administered and students were asked to fill the appropriate answers based on their attitude and behaviour in the past 28 days. Height and weight of each individual was checked and BMI was calculated. Results: Out of 507 study subjects, 70% had normal BMI, 14.8% were overweight, 3% were obese, 9.7% were thin and 2.6% were severely thin. The prevalence of eating disorder was 1%. Shape [8.5%] and Weight concern [7.9%] were more prevalent and the scores were significantly higher in overweight and obese group. Scores in Eating concern and Restraint were significant in 2% and 1.6% of the study population respectively. Significant number reported various weight control behaviours. Conclusion: Screening for eating disorders among adolescents may identify at-risk students who would benefit from early intervention.*

## Introduction:

Adolescence is characterized by peak growth and physical maturation. Poor nutritional status during adolescence is an important determinant of health outcomes. Dietary habits and lifestyle influence the health status and may also contribute to the quality of health during adulthood.

Adolescent eating behaviour is a function of individual and environmental influences. The literature shows that adolescent girls are more prone to adopt various forms of eating behaviour than boys because they become preoccupied with and sensitive to their changing physical appearance [1].With the growing sense of ideal body image during adolescence, they try to lose or gain bodyweight to attain the perfect body.

Eating disorders(ED) are among the most common chronic diseases among female adolescents. These disorders are potentially lethal, both physically and psychiatrically. The growing interest in ED has resulted in the development of various assessment tools for screening and clinical evaluation.

Eating Disorder Examination Questionnaire (EDE-Q) is a 28 item self report measure of eating psychopathology. It generates two types of data. First, it provides frequency data on key behavioural features of eating disorders in terms of number of episodes of the behaviour and in some instances number of days on which the behaviour has occurred.  Second, it provides subscale scores reflecting the severity of aspects of the psychopathology of eating disorders. The subscales are Restraint, Eating concern, Shape concern and Weight concern. Research has found EDE-Q to have good test –retest reliability, internal    consistency[2], temporal stability of attitudinal items[3] and criterion validity in distinguishing cases[4].Luce and Crowther reported excellent internal consistencies for EDE-Q Subscales, with Cronbach's  Alfa ranging from 0.78 to 0.93 and the test retest reliability ranged from 0.81 to 0.94[2]

## Aims and Objectives:

1. To assess the nutritional status of school/college going female adolescents

2 .To estimate the prevalence of eating disorders in these adolescents by using EDE-Q

3 .To correlate the subscales of EDE-Q with BMI

## Methodology:

It is a cross sectional observational study conducted on female adolescents  aged 10-19 years studying in randomly selected schools and colleges in Mangalore. Those with pre-existing metabolic, endocrine and other systemic diseases were excluded from the study. A self report EDE-Q 6.0 questionnaire was administered to all enrolled participants. Informed verbal consent was obtained prior to the administration of the questionnaire. Participants were explained all the questions included in the questionnaire and were asked to answer the questions based on the symptoms and behaviours in the last 4 weeks. Following the completion of the form, height and weight of each individual were checked.BMI was calculated by using the formula weight(kg)/ height squared(m2)and plotted on WHO BMI for age z-score chart .Following are the reference ranges used[Table 1].

**Table 1: Classification based on BMI**

| Classification | Z Score(reference range) |
|---|---|
| Severe thinness | <-3 |
| Thinness | -2 to -3 |
| Normal range | -2 to 1 |
| Overweight | 1 to 2 |
| Obese | >2 |

## EDE-Q Questionnaire:

EDE-Q yields scores on 4 subscales as well as global score. It asks specific questions about binging and purging, however those questions are not factored into the scoring. The subscales include restraint(5 items),eating concern(5 items),shape concern(8items),weight concern(5 items).Responses are rated on a 7 point Likert scale, except the items relating to the frequency of behaviour. Most recent update available is version 6.0 of EDE-Q.[5]

To obtain a particular subscale score, the ratings for the relevant items are added together and the sum divided by the total number of items forming the subscale. To obtain an overall or global score, the four subscale scores are summed and the resulting total divided by the number of subscales (i.e. four). A score of ≥ 4 in subscales and global score was taken significant. Binge eating and inappropriate compensatory behaviour frequencies were computed.

**Observation and Results:**
A total of 507 female adolescents were included in the study.

Out of 507 female adolescents, 140(27.6%) were < 15years and 367(72.4%) were ≥ 15years old. 42 females complained of irregular menstruation and 5 of them had not attained menarche. When classified according to BMI, 355(70%) had normal BMI whereas 49(9.7%) had thinness,13(2.6%) had severe thinness, 75(14.8%) were overweight and 15(3%) were obese[Table 2]

**Table 2: Classification of the study population according to BMI**

|  | BMI | | | | | |
|---|---|---|---|---|---|---|
|  | Severe thinness | Thinness | normal | over-weight | obese | total |
| <15yrs | 1(0.7%) | 8(5.7%) | 95(67.9%) | 29(20.7%) | 7(5%) | 140(100%) |
| ≥15yrs | 12(3.3%) | 41(11.2%) | 260(70.8%) | 46(12.5%) | 8(2.2%) | 367(100%) |
| Total | 13(2.6%) | 49(9.7%) | 355(70%) | 75(14.8%) | 15(3%) | 507(100%) |

When BMI was compared in two age groups , overweight and obesity was more common in younger age group.(p=0.009,highly significant)

**Eating subscale scores:**
**Table 3:Eating subscale scores:**

| Subscale | number | percentage |
|---|---|---|
| Restraint(RES) | 8 | 1.6 |
| Eating concern(EC) | 10 | 2.0 |
| Shape concern(SC) | 43 | 8.5 |
| Weight concern(WC) | 40 | 7.9 |
| Global score(GS) | 5 | 1 |

Using a cut off score of ≥ 4, 1% of the study population had significant score indicating the presence of eating disorder. Maximum number(8.5%) had scores in significant range in shape concern subscale followed by weight concern(7.9%),eating concern(2%) and restraint (1.6%) subscales.[Table 3].When compared according to age , subscale and global score differences were not significant between two groups.

When scores were compared with BMI, there were significantly more number of females in the overweight and obese group who had SC, WC and EC compared to those who were underweight. However RES and global scores were not significantly different between the two groups. [Table 4] However studies have to be done on larger number of students as only few students scored significant in RES, EC and global scales.

**Table4:Comparison of subscale and global scores according to BMI**

| Sub-scale | Se-vere thin-ness | thinness | normal | overweight | obese | total | P value |
|---|---|---|---|---|---|---|---|
| | | | | BMI | | | |
| RES | 0 | 1(12.5%) | 4(50%) | 3(37.5%) | 0 | 8 | 0.355 |
| EC | 0 | 0 | 4(40%) | 4(40%) | 2(20%) | 10 | 0.012 |
| SC | 0 | 1(2.3%) | 19(44.2%) | 16(37.2%) | 7(16.3%) | 43 | 0.000 |
| WC | 0 | 0 | 18(45%) | 14(35%) | 8(20%) | 40 | 0.000 |
| GS | 0 | 0 | 3(60%) | 2(40%) | 0 | 5 | 0.439 |

Among the study population,204(40.23%) reported binge eating, 147(40.23%) had experienced a sense of loss of control over their eating, 43(8.46%) reported self induced vomiting,7(1.38%)

had taken laxatives for shape or weight control purposes and 127(25%) indicated that they had exercised hard to control their shape or weight.

**Discussion:**
In India, adolescents constitute for 22.8% of total population and face a series of nutritional challenges that are affecting not only their growth and development but also their livelihood as adults. Also presently Indians are experiencing lifestyle transition due to globalisation. Eating disorders and related behaviours are a common problem in pre adolescents and adolescents. Many of the adolescent girls modify their normal dietary pattern and follow disturbed eating behaviours and also affect their nutritional status[6,7]

In our study, overweight was more prevalent than thinness. A cross –sectional study carried out in the areas of two Rural Health Training Centres of MGIMS, Wardha has found 53.8% of the adolescents thin, 44% normal and 2.2% overweight. [8]

There are few prevalence studies on eating disorders in India. A study conducted by the Child and Adolescent Psychiatry unit, Christian Medical College and Hospital, Vellore had found 1.25% prevalence of eating disorders among adolescents [9].This was in comparison to our study. A survey conducted among psychiatrists in Bangalore to assess whether they were seeing more cases of ED in the last year showed that two-thirds of psychiatrists had seen at least one case of ED indicating that EDs are not uncommon in Urban India[10].

A person's body image is influenced by his/her belief and attitude as well as social standards of appearance and attractiveness. Females show greater discrepancy between their perceived body size and their ideal body size compared to males. Our results suggest that a substantial proportion of school going female adolescents are concerned about their weight and shape. EDE-Q global score was found clinically significant among 1% of female adolescents. Prevalence of shape [8.5%] and weight concern [7.9%] were more than other subscales and was noted to be more common among overweight and obese group. Study by Luce et al on undergraduate females(18-25years) showed significant global score in 5.6%,SC in 14.8%,WC in 10.2%,Restraint in 7.9% and EC in 2.2%[11].Our study showed lower scores compared to study by Luce et al. This may be because of younger age of the study population. In a study conducted by Calzo et al on adolescent girls 9-18 yrs reported that girls with BMI above 50th centile reported greater body dissatisfaction than girls with BMI below 50th centile. [12]

**CONCLUSION:**
Eating disorders are on the rise in adolescent population. Initially considered to be a clinical problem encountered mainly in late adolescents and young adults, it is now well recognized problem at younger age.

- Among the deviations from normal BMI, trend of overweight and obesity was seen more often in female adolescents <15yrs of age whereas trend of thinness and severe thinness was more common in adolescents≥ 15yrs of age.
- Shape and weight concerns were more prevalent than other subscales and were more common in overweight and obese adolescents
- Restraint and global scores failed to reveal any significant differences among female adolescents of different BMI categories.
- Significant number of students manifested disordered eating behaviours.
- These could represent eating disorders as a potential problem requiring medical attention at an earlier age. Recognition of individuals at risk and early intervention can prevent the development of full blown Eating Disorder.

Screening for ED should be integrated into routine well child visits.

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