



## ADOLESCENT NUTRITION IN RANI DEVELOPMENT BLOCK, KAMRUP, ASSAM: PREVALENCE AND DETERMINANTS OF MALNUTRITION

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### ABSTRACT

Adolescence is a part of life between childhood and adulthood, from ages 10 to 19 years. It is usually divided into early adolescence (10–14 years) and late adolescence (15–19 years). It is a crucial stage of human development and an important time for starting the foundation of good health. Malnutrition refers to deficiencies, excesses or imbalances in a person's intake of energy and/or nutrients. Malnutrition covers two groups of conditions. One is 'undernutrition'—which includes stunting, wasting, underweight and micronutrient deficiencies or insufficiencies. **Objective:** To determine the prevalence of underweight and overweight and the factors influencing the nutritional status among the early adolescents. **Methods/ Study Design:** Community based Cross-sectional study was carried out at Rani Development Block, Kamrup (Assam) over a period of 1 year. 800 adolescents of age 10-14 years were examined during that period. Data was collected by interviewing the adolescents using predesigned, pre tested, semi-structured schedule. Anthropometric measurements were recorded using standardized methodology as recommended by World Health Organization (WHO). **Statistical Analysis:** Done by using SPSS 16.0 version. **Results/Findings:** A total 800 adolescents were studied. Total 40.5 % were in the age group 11-12 years. This study estimates the prevalence of undernutrition to be 28.25% and that of overnutrition to be 16%. Mal-nutrition was most common among the ST adolescents. Among the respondents, 55.75% had normal BMI, 28.25% had chronic energy deficit while 16% were overweight or obese. **Conclusion:** It is concluded that there is a high prevalence of under nutrition and overnutrition among adolescent in Rani Development Block (Kamrup). The present study calls for Health education and nutrition interventions to reduce the serious health problem on priority basis.

### KEYWORDS : Undernutrition, Over nutrition.

#### INTRODUCTION:

The World Health Organization defines adolescence as the period of human growth and development that occurs between the ages of 10 and 19, following childhood but before adulthood. The ages of 10 to 14 years, known as early adolescence, are marked by dramatic physical, cognitive, and social changes; however, researchers regard it as one of the most neglected periods of life. [1] Poor nutrition can begin before birth and continue through adolescence and adulthood; it may even last generations. Adolescent nutrition is important because it is a time of dramatic physical growth and development, as well as changing nutrition due to socio-cultural factors.

If environmental conditions and nutrient intake are favourable, adolescence provides a second chance to catch up on growth. [2] According to Comprehensive National Nutrition Survey (2016-18) Adolescents in India of the age group 10-14 years who are moderate or severely thin are 31.8% and 22.8% males and females respectively, on other hand adolescents aged 10-14 years who are overweight or obese are 5.3% and 5.2% males and females respectively. [3] When adolescents are well nourished, they can make optimum use of their skills, opportunities and energies today, and become healthy and responsible adults. Thus, they make better parents of healthy babies' tomorrow which forms a progressive cycle.

To accomplish such a task, and in order to break the intergenerational cycle of malnutrition, a special focus for overcoming adolescent malnutrition is needed. [4] Very little attention has been paid to adolescent nutrition in research as well as in programming for adolescent health. The study was done to determine the prevalence of underweight and overweight and the factors influencing the nutritional status among the early adolescents.

#### MATERIALS & METHODS:

The current study is a cross sectional study undertaken to assess the nutritional status and correlates among the early adolescents of Rani Development Block, Kamrup, Assam.

Population was Adolescents of the age group 10-14 years residing in the villages of Rani Development Block, Kamrup (Rural), Assam for more than 6 months, including migrant population who were living in the area for more than 6 months. Both boys and girls in the age group 10-14 years who were willing to participate in the study and present at the time of study were included in the study. Both boys and girls in the age group 10-14 years who were suffering with any serious illness were excluded.

#### Sample Size And Sampling Technique:

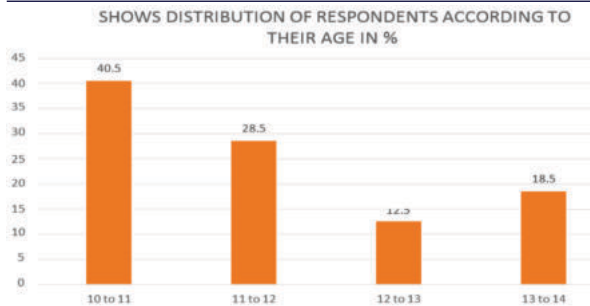
Taking prevalence of thinness 11.3 % [5] with relative error 20 % the sample size was estimated to be 754 using the formula  $n = Z^2 pq / L^2$ , where, n= required sample size, p = expected or assumed prevalence q=100-p, L= allowable error (20% of p), z = 1.96 (considering 95% confidence level). The Rani Development Block has 95 villages, considering each village, a cluster, 30 clusters are chosen by applying Probability Proportionate to size (PPS) method. From each cluster 26 adolescents of age 10-14 years (13 boys and 13 girls) were selected which will form the sample size equals to 780 rounded off to 800. (400 male adolescents and 400 female adolescents were selected for the study, making sample size equals to 800).

The interviews were carried out through house-to-house visits in the selected villages. The data was gathered using a pre-designed and pre-tested interview schedule. The first house in each of the pre-selected villages was chosen at random.

The study includes all of the adolescents who meet the inclusion criteria. Following that, house to house visits were conducted in adjacent houses one after the other until the desired sample of 26 adolescents from each village was met. For subjects who were absent during the interview schedule, a maximum of three attempts were made. The data was gathered from the study subjects and their parents. Analysis of data was done using Microsoft word and Excel and SPSS (Statistical Package for Social Sciences) Software version 20.

#### RESULTS AND OBSERVATIONS:

Study Period was 1 year, from September 2021 to August 2022. Study



**Figure 1: Distribution of respondents according to their age (n=800)**

**Table 1: Distribution of respondents according to educational qualification of their parents.**

| Mothers Education  |           |                |
|--------------------|-----------|----------------|
| Educational Status | Frequency | Percentage (%) |
| Illiterate         | 15        | 1.88           |
| Primary School     | 52        | 6.5            |
| Middle School      | 310       | 38.75          |
| High School        | 320       | 40             |
| Sr. Secondary      | 98        | 12.21          |
| Graduate           | 5         | 0.66           |
| Postgraduate       | 0         | 0              |
| Total              | 800       | 100            |
| Father's Education |           |                |
| Illiterate         | 4         | 0.5            |
| Primary School     | 40        | 5              |
| Middle school      | 310       | 38.70          |
| High School        | 335       | 41.30          |
| Sr. Secondary      | 100       | 12.5           |
| Graduation         | 11        | 1.34           |
| Post-Graduation    | 5         | 0.66           |
| Total              | 800       | 100            |

[% denote column-wise percentage]

**Table 2: Age Distribution of respondents in relation to nutritional status and their association (n=800)**

| Age Group | Normal Nutrition | Undernutrition | Overnutrition | Total | p- value |
|-----------|------------------|----------------|---------------|-------|----------|
| 10-11     | 208 (64.20)      | 77 (23.77)     | 39 (12.03)    | 324   | 0.0016   |
| 11-12     | 104 (45.61)      | 76 (33.33)     | 48 (21.05)    | 228   |          |
| 12-13     | 50 (50.00)       | 32 (32.00)     | 18 (18.00)    | 100   |          |
| 13-14     | 84 (56.76)       | 41 (27.70)     | 23 (15.54)    | 148   |          |
| Total     | 446 (55.75)      | 226 (28.25)    | 128 (16.00)   | 800   |          |

[% denote row-wise percentage]

**Table 3: Distribution of malnutrition among early adolescents according to parents' education and their association**

|                    | Mother's Education |                |               |            | p- value |
|--------------------|--------------------|----------------|---------------|------------|----------|
|                    | Normal             | Undernutrition | Overnutrition | Total      |          |
| Illiterate         | 4 (26.67)          | 6(40)          | 5(33.33)      | 15(1.88)   | <0.0001  |
| Primary School     | 17(32.70)          | 25(48)         | 10(19.23)     | 52(6.5)    |          |
| Middle School      | 180 (58.06)        | 90 (29.03)     | 40 (12.90)    | 310(38.75) |          |
| High School        | 188(58.74)         | 64(20)         | 68(21.25)     | 320(40)    |          |
| Sr. Secondary      | 55 (56.12)         | 40(40.81)      | 3(3.06)       | 98(12.25)  |          |
| Graduate           | 2(40)              | 1(20)          | 2(40)         | 5(0.62)    |          |
| Postgraduate       | 0                  | 0              | 0             | 0          |          |
| Total              | 446(55.75)         | 226 (28.25)    | 128(16)       | 800(100)   |          |
| Father's Education |                    |                |               |            | p- value |
|                    | Normal             | Undernutrition | Overnutrition | Total      |          |
|                    | Frequency          | Frequency      | Frequency     | Frequency  |          |
| Illiterate         | 2(50)              | 2(50)          | 0             | 4(0.5)     | 0.6241   |
| Primary School     | 21 (52.5)          | 13(32.5)       | 6(15)         | 40(5)      |          |

|                 |            |            |           |            |  |
|-----------------|------------|------------|-----------|------------|--|
| Middle school   | 175(56.45) | 90(29)     | 45(14.52) | 310(38.75) |  |
| High School     | 184(55.76) | 95(28.79)  | 51(15.46) | 330(41.25) |  |
| Sr. Secondary   | 57(57)     | 23(23)     | 20(20)    | 100(12.5)  |  |
| Graduation      | 5(45.45)   | 2(18.18)   | 4(36.36)  | 11(1.38)   |  |
| Post-Graduation | 2(40)      | 1(20)      | 2(40)     | 5(0.62)    |  |
| Total           | 446(55.75) | 226(28.25) | 128(16)   | 800(100)   |  |

[% denote row-wise percentage]

**Table 4: Distribution of malnutrition among early adolescents according to physical activity and their association**

| Playing outside/week | Nutritional Status of study subjects (n=800) |                |               | Total       | p- Value |
|----------------------|----------------------------------------------|----------------|---------------|-------------|----------|
|                      | Normal                                       | Undernutrition | Overnutrition |             |          |
| Daily                | 66(59.46)                                    | 26(23.42)      | 19(10.12)     | 111(13.88)  | <0.001   |
| >3 times             | 240(55.68)                                   | 145(33.64)     | 46(17.67)     | 431(53.88)  |          |
| < 3 times            | 62(52.10)                                    | 28(23.53)      | 29(24.37)     | 119(14.88)  |          |
| Sometimes            | 78(56.16)                                    | 27(19.42)      | 34(24.46)     | 139(17.375) |          |
| Total                | 446(55.75)                                   | 226(28.25)     | 128(16)       | 800(100)    |          |

[% denote row-wise percentage]

**Table 5: Distribution of respondents in relation to nutritional status and receipt of Weekly Iron & Folic acid supplementation.**

| Weekly iron and folic acid supplementation | Normal Nutrition | Undernutrition | Over nutrition | Total |
|--------------------------------------------|------------------|----------------|----------------|-------|
| Received                                   | 348 (60.63)      | 144 (25.09)    | 82 (14.29)     | 574   |
| Did not receive                            | 98 (43.36)       | 82 (36.28)     | 46 (20.35)     | 226   |
| Grand Total                                | 446 (55.75)      | 226 (28.25)    | 128 (16.00)    | 800   |

[% denote row-wise percentage]

In this study the out of 800 adolescents, 324 (40.5%) are of 10-11 years age, followed by 228 (28%) in the age group of 11-12 years, and the least only 100 (12.5%) are of 12-13 years old. Among these parents of respondents; 335 (41.30%) fathers are educated till High school, followed by 310 (38.70%) educated till middle school, 100 (12.5%) were educated till higher secondary level and only 40 (5%) were educated till primary level. 40% mothers are studied up-to high school followed by middle school 310 (38.75), sr. secondary 98 (12.21%) and primary school 52 (6.5%). The majority of 11-12-year-old adolescents 124 (54.39%) are malnourished. The majority of undernourished adolescents, 76 (33.33 %) are between the ages of 11-12 years. The majority 48 (21.05%) of over-nourished adolescents also belongs to 11-12 years category. The relationship between nutritional status and age is found to be significant. The majority of malnourished adolescents' parents have completed middle school. The majority of undernourished and over-nourished adolescents have parental education up to the middle school level. The relationship between nutritional status and mother's educational status is significant. Distribution of malnutrition among early adolescents according to physical activity and their association. Information was collected on physical activity such as participation in sports and games, involvement in household chores and frequency and duration of participation in physical activity. In our study, the prevalence of overnutrition was less among the students who were involved in daily physical activity 19 (10.12%) when compared with those who were involved less than three times/week 29 (24.37%) and who were sometimes involved in any physical activity 34 (24.46%). And a statistically significant association was found between physical activity and nutritional status of the study subjects with p value <0.05. The majority 128 (56.63%) of adolescents who do not receive weekly iron and folic acid supplements are malnourished. The most of the malnourished 228 (39.37) are among those who received WIFS. Furthermore, the majority 144 (25.09%) and 82 (14.29) of undernourished and over-nourished adolescents receive WIFS. The relationship between nutritional status and weekly iron and folic acid supplementation is found to be significant.

## DISCUSSION:

In this study the out of 800 adolescents, 40.5% are of 10-11 years age. The relationship between nutritional status and weekly iron and folic acid supplementation is found to be significant. Kumar P. and others in their study have taken 2085 (34.9%) of adolescent boys and 1653 (11.3%) adolescent girls in their study of age group 10-14 years. [5] In a study done by Nafis Faizi and others, it is seen that out of 207

adolescents 71 (34.3 %) were 13 years of age, 76 (36.7%) were 14 years of age. [6] A study done by Dipayan choudhuri on adolescent schoolchildren in Tripura shows Highest (14.61%) and lowest (2.07%) prevalence of thinness was seen in 14 years age group of Bengali and Tripuri male subjects, respectively. On the other hand, 18 years and 14 years age group of Bengali females was found to have highest and lowest prevalence for overweight (20% and 11.2%, respectively) compared to other groups. [7] Prevalence of undernutrition in rural Goa by Banerjee S et. al.[8] conducted among school going adolescents (40.2%) and increased when compared with the study done in Tamilnadu by Syamala AP et al.[9] that showed a prevalence of undernutrition to be 30%. But the studies that were conducted in the northern parts of India showed a relatively higher prevalence of undernutrition when compared with southern India. 19,68 Comparison of prevalence of undernutrition between present study and other studies shows. In a study done by Thekdi K et al.[10] in Gujarat and by Abuya BA et al. [11] that showed the better literacy status of the mothers played a significant role in better nutritional status of their children. Fathers' working status did not have a statistically significant association with the nutritional status. But, in a study did by Vohra R et al. in the city of Lucknow even fathers' educational status and occupation played a significant role in the nutritional status of their children. [12] In our study, the prevalence of overnutrition was less among the students who were involved in daily physical activity 19 (10.12%) when compared with those who were involved less than three times/week 29 (24.37%) and who were sometimes involved in any physical activity 34 (24.46%). And a statistically significant association was found between physical activity and nutritional status of the study subjects with p value <0.05. This is similar to the study done by Kotian MS et al. [13] that showed the prevalence of overweight was higher among the adolescents who had physical activity of <one hour/day, watched television.

## CONCLUSION:

Our study emphasizes the impact of lifestyle practices on the nutrition of developing adolescents. Mal-nutrition was most common among the ST adolescents. Again, most of the adolescents of joint families were mal-nourished and those belonging to Class II socio-economic status. Educating adolescents and their parents for proper nutrition and prevention of nutrition related illnesses and health checkup of adolescents should be done periodically to detect and treat accordingly for nutritional related illnesses. Also, adolescents should be told the value of physical activity, games, and sports in achieving good health and should be encouraged to promote breakfast consumption since, as our study demonstrates and confirms, eating breakfast regularly is negatively associated with being overweight or obese. It is required to teach parents about correct meal timing and the value of supplying at least a third of the day's needs during breakfast.

## Ethical Clearance:

As obtained from the Institutions Ethical Committee, Gauhati Medical college and Hospital, Guwahati

**Conflict of Interest:** No conflict of interest.

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