Health Status Evaluation of Adolescent Girls by Rohrer Index

Kankana De*
Department of Anthropology, Vidyasagar University, West Bengal, India

*Corresponding author: Kankana De, Department of Anthropology, Vidyasagar University, West Bengal, India, Tel: +919474714273; E-mail: dekankan@gmail.com

Received date: December 13, 2016; Accepted date: February 04, 2017; Published date: February 24, 2017

Abstract

Poor nutritional status during adolescence is an important determinant of health outcomes found more than half of the adolescents were thin but only 2% were overweight. One tenth of adolescent girls are part of Indian population. Under-nutrition among these girls is associated with reduced lean body mass, lack of muscular strength and decreased work capacity 47% adolescent girls are found stunted. This study is to evaluate health status of adolescent girls of 10-19 years who belongs Tosalboni block of Paschim Medinipur, West Bengal. Different anthropometric data are collected by anthropometric tools height, weight and different circumferences. A total of 21.1% girls in high range 418 girls belong to healthy range 178 girls are from unhealthy range based on RI range. Rohrer index has significant relation with body mass index, 30% girls of post-menarcheal girls of Hoogly belongs to low health status 40.8% of girls are very low health status. To improve health status adolescent girls need adequate nutrition, need counseling for health hygiene.

Keywords: Rohrer index; Body mass index; Menarche; Under-nutrition

Introduction

Undernutrition is usually thought of as a deficiency primarily of calories (that is, overall food consumption) or of protein. Deficiencies of vitamins and minerals are usually considered separate disorders. However, when calories are deficient, vitamins and minerals are likely to be also. Undernutrition, which is often used interchangeably with malnutrition, is actually a type of malnutrition. Malnutrition is an imbalance between the nutrients the body needs and the nutrients it gets [1]. Thrice, malnutrition also includes over nutrition (consumption of too many calories or too much of any specific nutrient-protein, fat, etc.). Undernutrition also occurs in older people. About 1 of 7 older people who live in the community consume fewer than 1,000 calories a day— not enough for adequate nutrition. As many as half of older people in hospitals long-term care facilities do not consume enough calories vitamin, mineral, or other dietary supplement).

The Corpulence measure (not to be confused with corpulence index, which is measured by actual weight/desired weight) or Ponderal Index (PI) is a measure of leanness (corpulence) of a person [1] calculated as a relationship between mass and height [2]. It was first proposed in 1921 as the "Corpulence measure" by Rohrer and hence it is also known as Rohrer’s Index.

Reports on comparative nutritional status between pre-menarcheal and post-menarcheal girls are very few from India. Most of these studies however; represented by urban and semi-urban populations [1]. High prevalence of undernutrition in children and adolescents is an acute crisis in global point of view especially in developing countries like India. Menarche is the major indicator of growth and maturation during puberty in girls. Rohrer Index (RI) or Index of Corpulence was computed using standard equations and classifications are done following international standards. Measurements were taken thrice at a time and the difference between the values of measurement is found to be within standard acceptable limits. The range variation of RI (According to Pignet, cited in Bhasin and Singh, 2004) is also mentioned in this study: Rohrer Index=(Body weight (gm)/Stature 3 (cm)) × 100

Range variation
• Very low ≤ 1.12
• Low (1.13-1.19)
• Middle (1.20-1.25)
• Upper middle (1.26-1.32)
• High (1.33-1.39)
• Very high=1.40
• Healthy range 1.2-1.6

Materials and Methods

This is a cross-sectional study and all the available students were selected from the adolescent counseling center. Height and weight were measured with light clothes and bare-footed, using standard Martin’s anthropometer. Standard weighing scale (Libra, New Delhi) was used to record the weight to the nearest 0.5 kg. Self-reported morbidity information collected by interview methods.

Sample

This study is done on adolescent girls of Chaktarini area of Salboni Grama Panchayat; this cross sectional study done on over 1000 girls.

Results

In this study mean age at menarche 11.88(1.23), Table 1 represents age wise mean and Standard deviation (Tables 1-5).
Table 1: Comparison of Rohrer index in premenarcheal and postmenarcheal girls.

| Age | Mean   | N   | Standard Deviation |
|-----|--------|-----|--------------------|
| 10  | 1.33   | 50  | 0.13               |
|     | 1.63   | 50  | 0.112              |
|     | 1.251  | 100 | 0.153              |
|     | 1.33   | 70  | 0.115              |
|     | 1.168  | 30  | 0.166              |
|     | 1.282  | 100 | 0.151              |
| 11  | 1.24   | 80  | 0.121              |
|     | 1.2601 | 20  | 0.1255             |
|     | 1.25   | 100 | 0.1214             |
| 12  | 1.274  | 88  | 0.113              |
|     | 1.253  | 12  | 0.088              |
|     | 1.272  | 100 | 0.1103             |
| 13  | 1.305  | 92  | 0.129              |
|     | 1.22   | 8   | 0.162              |
|     | 1.299  | 100 | 0.133              |
| 14  | 1.304  | 97  | 0.112              |
|     | 1.38   | 3   | 0.20               |
|     | 1.306  | 100 | 0.115              |
| 15  | 1.312  | 100 | 0.114              |
|     | 1.312  | 100 | 0.114              |
| 16  | 1.31   | 99  | 0.094              |
|     | 1.59   | 1   |                    |
|     | 1.315  | 100 | 0.098              |
| 17  | 1.3186 | 99  | 0.093              |
|     | 1.249  | 1   |                    |
|     | 1.317  | 100 | 0.0933             |
| 18  | 1.31   | 101 | 0.082              |
|     | 1.3123 | 101 | 0.082              |
|     | 1.30   | 876 | 0.112              |
|     | 1.202  | 125 | 0.143              |
|     | 1.292  | 1001| 0.121              |

A total of 41.8% girls are in healthy range and 21.1% girls in high range. Out of 418 girls belong to healthy range. 178 girls are from unhealthy range based on RI range. Table 6 represent Rohrer index has significant relation with body mass index, but table 7 had shown no significant relation with mortality.
| Age | N   | Mean | Standard Deviation | Std. Error | 95% Confidence Interval for Mean |
|-----|-----|------|--------------------|------------|---------------------------------|
|     |     |      |                    |            | Lower Bound                      |
| 10  | 95  | 3.38 | 1.58               | 0.16       | 3.06                            | 3.71 |
| 11  | 95  | 3.60 | 1.43               | 0.14       | 3.30                            | 3.89 |
| 12  | 93  | 3.40 | 1.40               | 0.14       | 3.12                            | 3.69 |
| 13  | 96  | 3.62 | 1.32               | 0.13       | 3.35                            | 3.89 |
| 14  | 97  | 3.74 | 1.44               | 0.14       | 3.45                            | 4.03 |
| 15  | 99  | 3.91 | 1.25               | 0.12       | 3.66                            | 4.17 |
| 16  | 94  | 4.23 | 1.10               | 0.11       | 4.00                            | 4.45 |
| 17  | 97  | 4.16 | 0.99               | 0.10       | 3.96                            | 4.36 |
| 18  | 99  | 4.08 | 1.02               | 0.10       | 3.87                            | 4.28 |
| 19  | 100 | 4.08 | 0.99               | 0.09       | 3.88                            | 4.27 |
| Total | 965 | 3.82 | 1.29               | 0.041      | 3.74                            | 3.91 |

Table 2: Age wise change in Rohrer index in adolescent girls.

| Rohrer index | Menarcheal status | Total |
|--------------|-------------------|-------|
| 1.00         | 74                | 7.3   |
| 2.00         | 104               | 10.2  |
| 3.00         | 154               | 15.1  |
| 4.00         | 215               | 21.1  |
| 5.00         | 426               | 41.8  |
| Total        | 973               | 95.5  |

Range variation: Very low ≤ 1.12, Low (1.13-1.19) Middle (1.20-1.25) Upper middle (1.26-1.32) High (1.33-1.39) Very high=1.40 Healthy range (1.2-1.6)

Table 3: Prevalence health status by Rohrer index of premenarcheal and postmenarcheal girls.

| Different RI indicator | Frequency | Percent | Valid Percentage | Cumulative Percentage |
|------------------------|-----------|---------|------------------|-----------------------|
| 1.00                   | 74        | 7.3     | 7.6              | 7.6                   |
| 2.00                   | 104       | 10.2    | 10.7             | 18.3                  |
| 3.00                   | 154       | 15.1    | 15.8             | 34.1                  |
| 4.00                   | 215       | 21.1    | 22.1             | 56.2                  |
| 5.00                   | 426       | 41.8    | 43.8             | 100.0                 |
| Total                  | 973       | 95.5    | 100.0            |                       |

Table 4: Frequency of different RI range in studied girls.
Discussion

A total of 55 girls experience delayed menarche whose RI range is shown lower. In this study range of menarche is from 9 years to 17 years. In this study it is shown under nutrient has experience delayed menarche, study group has 112 girls. 84 girls of service holder parents experience menarche on 13-13.9 years, 28 girls of daily wage labour experience delayed menarche at 14.1-14.9 years [3]. In other study of Salboni shown 5.87% Body Fat is increasing from 10 years to 19 years [4].

| Age | Rhl 1.00 | Rhl 2.00 | Rhl 3.00 | Rhl 4.00 | Rhl 5.00 | Total |
|-----|---------|---------|---------|---------|---------|-------|
| 10  | 20      | 9       | 18      | 10      | 38      | 95    |
| 11  | 11      | 16      | 9       | 23      | 36      | 95    |
| 12  | 10      | 18      | 20      | 14      | 31      | 93    |
| 13  | 7       | 15      | 21      | 17      | 36      | 96    |
| 14  | 12      | 12      | 8       | 22      | 43      | 97    |
| 15  | 6       | 11      | 13      | 24      | 45      | 99    |
| 16  | 3       | 6       | 12      | 18      | 55      | 94    |
| 17  | 2       | 3       | 20      | 24      | 48      | 97    |
| 18  | 2       | 6       | 18      | 29      | 44      | 99    |
| 19  | 1       | 8       | 15      | 34      | 42      | 100   |
| Total| 74     | 104     | 154     | 215     | 418     | 965   |

Range variation Very low ≤ 1.12, Low (1.13-1.19) Middle (1.20-1.25) Upper middle (1.26-1.32) High (1.33-1.39) Very high=1.40 Healthy range (1.2-1.6)

Table 5: Age wise RHI index of study adolescent girls.

| Model             | Unstandardized Coefficients | Standardized Coefficients | t     | Sig. |
|-------------------|-----------------------------|---------------------------|-------|------|
|                   | β                           | Standard Error            | β     |      |
| Age               | -0.031                      | 0.011                     | -0.069| -2.736| 0.006|
| BMI               | 0.619                       | 0.017                     | 0.804 | 35.961| 0.000|
| FM                | -0.021                      | 0.018                     | -0.033| -1.140| 0.255|
| Percent body fat  | 0.008                       | 0.012                     | 0.020 | 0.723 | 0.470|

Table 6: Multiple regression shown relation of Rohrer index with other anthropometric variables.

Rohrer index can work as substitute to health status of adolescent. Health profile of the adult males is evaluated by Rohrer Index (RI). It is documented that 66.89% of the Oraons had subnormal health the condition (RI:1.19) [5]. In addition, 51.57% of Dhimals and 39.87% of the Saraks also have exhibited to have subnormal state of health in this appraisal [6,7], 21.1% girls in high range, 418 girls belong to healthy range. A total 178 girls are from unhealthy range based on RI range. Table 6 represents that Rohrer index has significant relation with body mass index; 30% girls of postmenarcheal girls of Hooghly belongs to low health status, 40.8% girls have very low health status (Table 7).

Health profile of the adult males evaluated by Rohrer Index (RI) documented that 66.89% of the Oraons had subnormal health the condition (RI: 1.19) [8]. On the other hand, 76 infants who had a prior sib with ponderal index >the 90th percentile (17.1% vs. 10.2%) [9].

Table 7: Correlations of Rohrer index with mortality.

| Rohrer Index     | Pearson Correlation | Sig. (2-tailed) | N   | Mortality | Pearson Correlation | Sig. (2-tailed) | N   |
|------------------|---------------------|-----------------|-----|-----------|---------------------|-----------------|-----|
|                   |                     |                 |     |           |                     |                 |     |

Table 7: Correlations of Rohrer index with mortality.

Citation: Kankana D (2017) Health Status Evaluation of Adolescent Girls by Rohrer Index. J Community Med Health Educ 7: 508. doi: 10.4172/2161-0711.1000508
Adolescent girls may be at risk for inadequate intake of iron and calcium. The main nutritional problems of adolescents are under nutrition and Iron deficiency anaemia along with other micronutrient deficiencies [10]. Poor body composition and nutritional status can lead to increased morbidity, poor physical activity and performances [11] and a 37% of total bone mass. Nutrition influences growth and development throughout infancy, childhood and adolescence [12]. Central obesity had significant effect on chronic heart disease [13]. Adolescence of higher income parents has higher anthropometry. Under nutrition is outcome of insufficient food intake and repeated infected disease, among total adolescent population 88% belong to developing country.

Conclusion

At adolescence period girls need sufficient nutrient with lack of it's growth delayed and girls experienced delayed puberty due to under nutrient, in rural environment they become exposed to un hygiene due to open defecation and due to walk on bare foot they get worm infestation; this also affect their growth, they even use pond for bath which cause different kind of reproductive infections eg: vaginal discharge, different skin disease, so those adolescence need health advise to improve their health. Surakha clinic treat sexually transmitted infection, privacy maintained for that clinic, Anwesha clinic in block level hospital provide free medicines for treatment sexually transmitted infection and provide counseling for personal hygiene.

References

1. Bharati S, Bharati P (1998) Relationship between menarcheal age and nutritional anthropometry in urban girls of Howrah District, West Bengal, India. Anth Anz 56: 57-61.
2. Rogol AD, Clark PA, Roemmich JN (2000) Growth an American Society for Clinical Nutrition and pubertal development in children and adolescents: effects of diet and physical activity. Am J Clin Nutr 72: 521s-528s.
3. Bhasin MK, Singh IP (2004) A manual of biological anthropology. Kamla-Raj Enterprises, Delhi, India.
4. Kankana D (2016) Influence of socio-economic status on nutritional status of rural adolescent girl. Anthropo 4: 168.
5. Banik SD (2011) Evaluation health status by rohrer index premenarcheal and postmenarcheal girls, Purulia, West Bengal, India. J public health epidemiol 3: 13-16.
6. Banik SD (2007) Age-sex and diurnal variation of blood pressure in different nutritional states among the adult Telegas of Kharagpur in West Bengal, India. Collegium anthropologicum 31: 717-722.
7. Banerjee PPS, Dutta S (2015) Health status of pre-menarcheal and post-menarcheal adolescent girls in West Bengal, India. Int J Res Med Sci 3.
8. Khoury MJ, Berg CJ, Calle EE (1990) The ponderal index in term newborn siblings. Am J Epidemiol 132: 576-583.
9. Kankana D (2017) Measurement of body composition by upper arm anthropometry. Current Pediatric Research 21: 112.
10. Kankana D (2017) Anthropometric status of rural India. J Tradit Med Clin Natur 6.
11. Kankana D (2017) Study of nutritional status by waist circumference and waist hip ratio. J health Med Informat 8: 248.
12. Kankana D (2017) Effect of parents economic status on teenage school girls growth. Epidemiology (Sunnyvale) 7: 291.
13. Kankana D (2016) Assessment of nutritional status of adolescent girls by mid-upper arm circumferences of Paschim Medinipur, India. Primary Health Care 6: 242.