

## 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: dekankana@gmail.com

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### 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]. Thus, malnutrition also includes over nutrition (consumption of too many calories or too much of any specific nutrient-protein, fat, 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).

Rohrer Index				
Age		Mean	N	Standard Deviation
10	1	1.33	50	0.13
	2	1.163	50	0.112
	Total	1.251	100	0.153
11	1	1.33	70	0.115
	2	1.168	30	0.166
	Total	1.282	100	0.151
12	1	1.24	80	0.121
	2	1.2601	20	0.1255
	Total	1.25	100	0.1214
13	1	1.274	88	0.113
	2	1.253	12	0.088
	Total	1.272	100	0.1103
14	1	1.305	92	0.129
	2	1.22	8	0.162
	Total	1.299	100	0.133
15	1	1.304	97	0.112
	2	1.38	3	0.20
	Total	1.306	100	0.115
16	1	1.312	100	0.114
	Total	1.312	100	0.114
17	1	1.31	99	0.094
	2	1.59	1	
	Total	1.315	100	0.098
18	1	1.3186	99	0.093
	2	1.249	1	
	Total	1.317	100	0.0933
19	1	1.31	101	0.082
	Total	1.3123	101	0.082
Total	1	1.30	876	0.112
	2	1.202	125	0.143
	Total	1.292	1001	0.121

**Table 1:** Comparison of Rohrer index in premenarcheal and postmenarcheal girls.

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	Upper 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	2	
2.00	85	19	104
3.00	132	22	154
4.00	205	10	215
5.00	393	33	426
Total	855	118	973

Range variation Very low  $\leq 1.12$ , 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	
	46	4.5		
Total	1019	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	Rhi					Total
	1.00	2.00	3.00	4.00	5.00	
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 90<sup>th</sup> percentile had a higher mean

ponderal index and higher proportion with ponderal index >the 90<sup>th</sup> percentile (17.1% vs. 10.2%) [9].

		Rohrer Index	Mortality
Rohrer Index	Pearson Correlation	1	0.061
	Sig. (2-tailed)		0.057
	N	1009	965
Mortality	Pearson Correlation	0.061	1
	Sig. (2-tailed)	0.057	
	N	965	965

**Table 7:** Correlations of Rohrer index with mortality.

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 unhygiene due to open defecation and due to walk on bare foot they get worm infestation; this also affects their growth, they even use pond for bath which causes different kinds of reproductive infections eg: vaginal discharge, different skin diseases, so those adolescents need health advice to improve their health. Surakha clinic treats sexually transmitted infections, privacy maintained for that clinic, Anwesha clinic in block level hospital provides free medicines for treatment of sexually transmitted infections and provides counseling for personal hygiene.

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