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**Bela Mandi**  
MPEd Scholar, State Institute of  
Physical Education for Women,  
Hastings House

**Dr. Pintu Sil**  
Assistant Professor, State  
Institute of Physical Education  
for Women, Hastings House,  
Alipore, Kolkata, West Bengal,  
India.

## Body Fat Percentage of pubescent school girls belong to schedule TRIBE: A developmental perspective

**Bela Mandi and Dr. Pintu Sil**

### Abstract

**Introduction:** The studies of the age trend development of different anthropometric parameters and physical abilities in different stages of human life are one of the important areas in physical education. Study on development of pubescent stage is most important among them.

**Purpose:** Present study was designed to investigate the rate and magnitude of age-associated changes of body fat percentage (PBF) of 12 to 17 years old school going girls belong to schedule tribe of West Bengal.

**Methodology:** A total of 595 school-going girls were selected randomly for the present study from different secondary schools of Paschim Midnapur and Bankura districts. Among them 283 were from schedule tribe and 312 were from general community. Body Fat Percentage (PBF) was considered as criterion in this study. Standard skinfold caliper and AAHPARD equation was used to calculate the PBF of the subjects. Single group design was formed for the present study. Mean value and standard deviation were computed for each parameter as descriptive statistics and comparison between general girls was done using t-test. Only 0.05 level of significance was considered for the present study.

**Results:** Result revealed continues development of PBF throughout the pubescent period and the rate of magnitude was higher at 13-14 yrs age for tribal girls and for general girls magnitude of increase in PBF was higher for 15-16 yrs. When mean value of PBF of tribal girls was compared with general girls it was found that mean values of PBF were always lower level for tribal girls throughout the pubescent period. The mean difference of PBF between tribal and general girls was significantly differ for the age of 16 yrs but the differences were not significant for other age span.

**Conclusion:** From the above findings it was concluded that the PBF developed throughout the pubescent period among tribal girls and rate development was higher for 13-14 yrs span. The development rate of PBF was always lower level when it compared with general girls of same age group.

**Keywords:** Physical Growth, Health status, Pubescent period, Metropolitan city, Percentage value

### Introduction

The studies of the age trend growth and development of different anthropometric parameters and physical abilities in different stages of human life are one of the important areas in physical education. Study of pubescent stage is most important among them. Many studies conducted worldwide on anthropometry and body composition among pubertal girls [1-4]. Growth is an increase in the size of an organism or part of an organism, usually as a result of an increase in the number of cells and development stands for qualitative changes in behavior. Growth of an organism may stop at maturity, as in the case of humans and other mammals, whereas development may continue throughout life. In humans, growth of certain body parts, like hair and nails, continue to grow throughout life [5].

Percent body fat is the total mass of fat divided by total body weight. Essential body fat (EBF) and storage body fat (SBF) jointly formed PBF. EBF is very much necessary to maintain life and reproductive functions. Because of childbearing and other hormonal functions women posses more PBF than the men. The average value of PBF for women is 10-13% as per NASM norm. Accumulation of adipose tissue makes storage body fat part of which protects internal organs of human body [6].

The Purposes of the present study was to investigate the rate and magnitude of physical growth in respect of increase in body fat of female pubescent school girls (12-17 years) belong to schedule tribe. The growth was studied in respect of percentage value of the increase in body

**Correspondence**  
**Dr. Pintu Sil**  
Assistant Professor  
State Institute of Physical  
Education for Women  
Hastings House, Alipore,  
Kolkata, West Bengal, India.

fat of as their age increase and compared it with the general school going students of same age.

## Methodology

### Subject

A total of 595 school-going girls were selected randomly for the present study from different secondary schools of Paschim Midnapur and Bankura districts. Among them 283 were from schedule tribe and 312 were from general community. The range of the age of the all subjects was 12-17 years and studying from class VII to XII.

### Criterion measure

Body Fat Percentage (PBF) was considered as criterion in this study.

### Tools and Tests used

Standard skin fold caliper (Harpenden Holton) and AAHPARD Health related Fitness Test equation <sup>[7]</sup> was used to calculate the PBF of the subjects.

### Statistical procedure

Multiple group design with independent mean was used for the present study. Mean value and standard deviation were computed for each parameter as descriptive statistics. To analyze the difference between tribal girls and general girls t-

test was computed. All calculations were done using standard statistical software and only 0.05 level of confidence was considered for the present study.

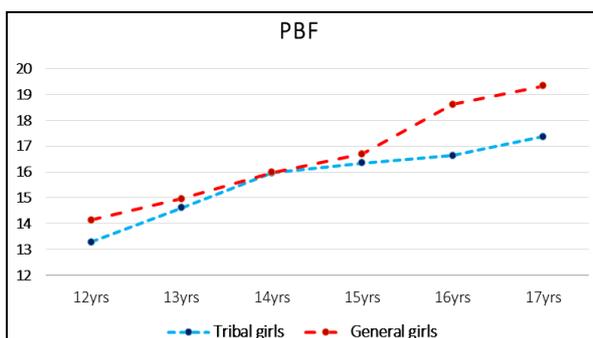
## Results and Findings

Mean and standard deviation of body fat percentage of pubescent tribal girls have presented in Table-1. The mean and standard deviation of body fat percentage of general school girls also have present in same table. The difference in mean value between pubescent tribal girls and general school girls was analyzed by t-test and result stipulated in Table-1 also. Result revealed that PBF increased continually as the age increased from 12 to 17 years for both tribal girls and general school girls. Increase in PBF for both tribal girls and general girls have presented graphically in Figure-1. Figure-1 clearly shows that throughout the selected pubescent age tribal girls' PBF value was always lower than the general girls' PBF value. A spurt was observed in increase in PBF in the age span of 13-14 years as the mean difference in between age was highest for 13 -14 years for tribal girls (1.36). Mean difference in PBF between pubescent tribal girls and general school girls was found statistically significant only for 16 years of age. After the age of 15 years a spurt was observed for the general girls student in development of PBF but at the same age span no such spurt was observed in PBF for tribal school girls.

**Table 1:** Result of statistical analysis of development in PBF for pubescent tribal girls and general school girls

Age span	Statistical Parameters	Mean	SD	N	t-value	Remarks
12 years	Tribal girls	13.29	2.33	31	1.57	NS*
	General girls	14.14	2.29	44		
13 years	Tribal girls	14.61	2.49	48	0.58	NS
	General girls	14.96	3.20	44		
14 years	Tribal girls	15.97	3.18	47	0.03	NS
	General girls	15.98	2.53	52		
15 years	Tribal girls	16.34	2.699	36	0.55	NS
	General girls	16.69	2.79	37		
16 years	Tribal girls	16.63	2.70	40	2.58	S <sup>#</sup>
	General girls	18.62	4.13	41		
17 years	Tribal girls	17.37	2.83	18	1.83	NS
	General girls	19.33	4.37	27		

#S=Significant; \*NS=Not Significant.



**Fig 1:** Graphical representation of development of PBF for pubescent tribal girls and general school girls

Pradhan, Kaibarta and Sil (2016) conducted a study on school girls and found that mean value of PBF for rural school girl was significantly different from urban school girls <sup>[8]</sup>. Bhadra, M. Mukhopadhyay, A. Bose, K. (2005) reported that fat mass (FM) increases at different rate during menarche <sup>[9]</sup>. Not only in FM but they found that Bengalee MG girls had significantly greater mean height, weight, BMI, triceps and calf skin folds, and sum of skin folds, compared with PMG

girls. Few study reported about ethnic variation of fat distribution among girls in adolescent stage <sup>[4, 10, 11]</sup>. The lower amount of body fat percentage in pubescent tribal girls found in this study than the general school going girls might be due to the ethnic variation of tribal girls.

## Conclusion

From the above findings following conclusion were drawn in this study:

1. PBF of tribal school girl and general school girl increased as the age increases from 12 to 17 years.
2. PBF of general school girl was always higher than the tribal school girl and inter group difference was significant at the age of 16 year span.

## References

1. Ramirez ME. Subcutaneous fat distribution in adolescents. *Human Biology*. 1993; 65:771-782.
2. Morrison JA, Guo SS, Specker B, Chumlea WC, Yanovski SZ, Yanovski JA. Assessing the body composition of 6–17 year old Black and White girls in field studies. *American Journal of Human Biology*,

- 2001a; 13:249-254.
3. Tahara Y, Moji K, Aoyagi K, Nishizawa S, Yukawa K, Tsunawake N *et al.* Age-related pattern of body density and body composition in Japanese males and females, 11 and 18 years of age. *American Journal of Human Biology.* 2002; 14:327-337.
  4. Sampei MA, Novo NF, Juliano Y, Colugnati FAB, Sigulem DM. Anthropometry and body composition in ethnic Japanese and Caucasian adolescent girls: considerations on ethnicity and menarche. *International Journal of Obesity.* 2003; 27:1114-1120.
  5. Casperson CJ, Powell KE, Christenson GM. Physical activity, exercise and physical fitness: definitions for health-related research. *Public Health Rep,* 1985; 100:126-131.
  6. WIKIPEDIA Percent body fat- Internet, 2016, source: [https://en.wikipedia.org/wiki/Body\\_fat\\_percentage](https://en.wikipedia.org/wiki/Body_fat_percentage)
  7. AAHPERD. AAHPERD Health related physical fitness test technical manual: Reston, Virginia: American Alliance of Health, Physical Education and Recreation and Dance. 1984, 23-32.
  8. Pradhan M, Kaibarta LN, Sil P. Health Related Fitness of Urban And Rural Adolescent Girls: A Comparative Analysis, Proceedings of Global Conference on Scientific Culture in Physical Education and Sports (GLOCOSPES-2016), Dept. of Physical Education, Punjabi University, Patiala, Punjab, 2016, 1061-1063.
  9. Bhadra M, Mukhopadhyay A, Bose K. Differences in body composition between pre-menarcheal and menarcheal Bengalee Hindu girls of Madhyamgram, West Bengal, India, *Anthropological Science.* 2005; 113(2):141-145.
  10. Wang MC, Bachrach LK. Validity of the body mass index as an indicator of adiposity in an ethnically diverse population of youths. *American Journal of Human Biology.* 1996; 8:641-651.
  11. Kimm SYS, Barton BA, Obarzanek E, McMohan RP, Sabry ZI, Waclawiw MA *et al.* Racial divergence in adiposity during adolescence: the NHLBI Growth and Heart Study. *Pediatrics.* 2001; 107:e34.