

# A COMPARATIVE STUDY OF PHYSICAL GROWTH PATTERN AMONG SCHOOL BOYS OF DELHI

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## Abstract

Physical growth is one of the more overt and impressive indication of children's development. The main objective of the study was to compare the physical growth pattern among government and private school boys of Delhi. The study was conducted on 700 adolescent boys of govt. and private schools. Out of which 350 children were taken from government schools and 350 from private schools. Body weight and height in fact is the most frequently used single measurement in determining the growth and health status of the children. Growth monitoring in children has been known as the best index for assessment of growth status among children. Findings of the study are: a gradual increase in mean body weight and height has been observed at all successive period of growth in Govt. and Private school adolescent boys. The body weight among private school boys was found higher than Govt. school boys and the ICMR (2000) recommendation at all successive period of age group. BMI was observed higher in Private school boys than Govt. school boys in at successive period of growth, which indicates more relative growth in body height and weight.

**Key words:** Physical Growth, Height, Weight, Body Mass Index (BMI)

## INTRODUCTION

The school going-children form the most important segment of our society; their physical growth is of utmost significance and presents a general health status of a community and nation as a whole. Thus there is a need for ongoing studies of growth in children to see the appraisal of the progress of a country in the field of health. Different environmental factors including nutrition, socio-economic status, physical activity, ethnic origin climatic conditions, psychological stress and disease are known to effect manifestations of growth and development in size, shape and body composition (Garn and Clark, 1975; Hirata, 1979; Dick, 1980; Gilliland, 1985).

There are many endogamous groups in India; therefore, a greater emphasis is needed on studies regarding growth patterns of the Indian children hailing from various endogamous groups. Unfortunately, only few studies have been undertaken on growth and development of children in India. The growth assessment is the best single measure to define the health status of children. Growth monitoring should effectively be done to ensure optimum development in children. Physical growth of children is reflected by different anthropometric measurements especially weight and height. There is a

definite relationship between children's age, weight and height (NIH, 1997); any deviation from the established relationship reflects negligence in the upbringing of the child. This has drawn the attention of the present research to study the physical growth pattern among school boys of Delhi and make efforts for the health promotion of the society. Growth monitoring in children has been known as the best index for assessment of growth status among children.

## OBJECTIVES OF THE STUDY:

The main objectives of the present study are :-

- (1) To study the physical growth pattern among the government school boys of Delhi.
- (2) To study the physical growth pattern among the private school boys of Delhi
- (3) To study the comparison of physical growth pattern among government and private school boys of Delhi.

## DELIMITATIONS

- (1) The investigation was delimited to twenty selected government and private schools (affiliated to CBSE Delhi) by random sampling. (2) The study was delimited to the age group of 11-17 year old boys.

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## PROCEDURE

The study was conducted on a cross-sectional sample of 700 adolescent boys falling in the age range of 11-17 years attending govt. and private schools of Delhi. Out of which fifty percent (i.e.350) children were taken from government schools and an equal number of children (350) from private schools. In the first stage the schools were randomly selected. Thereafter, the subjects from each school were also randomly selected Efforts were made to choose the govt. and private schools from all regions of Delhi state. The five regions of Delhi state studied were as follows: 1) North 2) West 3) East 4) South and 5) Central Delhi.

## CRITERION MEASURED

All the subjects were tested for their age, height; weight patterns. The age was computed on the date of examination from the date of birth of the respective subject. On the basis of decimal age of the subjects, seven, one yearly age groups were made. Decimal age of the subjects was calculated by taking into account the date of their birth and the date of examination as per decimal age calculation table of Weiner and Laurie (1969). Age group 11 year contained all subjects ranging from 10.501 to 11.500, age group 12 year contained subjects from 11.501 to 12.500 and so on, and thus the last age group i.e. 17 year included boys from 16.501 to 17.500. The data were grouped in 7 age groups with an interval of one year between the successive groups as exemplified below:

**Table No. - 1 Mean value of age of seven one yearly age groups of boys**

Age group	Age - range	Mean Age (In Decimal Years)		N (Number of Students)	
		Govt. School	Private School	Govt. School	Private School
11	10.501 to 11.500	11.01	11.12	31	37
12	11.501 to 12.500	11.95	12.04	38	46
13	12.501 to 13.500	13.05	13.03	38	49
14	13.501 to 14.500	14.03	13.83	61	48
15	14.501 to 15.500	14.88	14.89	50	50
16	15.501 to 16.500	16.08	15.95	51	53
17	16.501 to 17.500	17.05	16.97	81	67
Total subjects from govt. and private school				350	350

Dates of birth were checked from the institutional records which are maintained with the help of documentary proofs of one's date of birth while an individual enters an educational institution. In doubtful cases parents were contacted for getting the correct age, as per birth certificate of their concerned son otherwise, the subject was excluded from the study. Body weight and stature (standing height) was measured by standard anthropometric method. (Kansal, 1996). The physical growth status of school boys was studied with the help of distance and velocity curves. The following developmental indices were computed for studying growth pattern in body form of school boys from age 11 to 17 years:-

$$BMI = \frac{\text{Body weight (kg)}}{(\text{Height, meters})^2}$$

### Body Mass Index (BMI)

BMI indicates ones weight relative to his height. Though it is more accurate than height weight tables, BMI is also based on the concept that a person's weight should be proportional to his height. In the present study the subjects are non-athletes and therefore the BMI approach is likely to provide important information regarding the prevalence of overweight/underweight trends in boys of the present study.

## STATISTICAL TECHNIQUE

Mean, Standard Deviation (S.D.), Standard Error of Mean (SEM), Co-efficient of Variation (C.V.), Velocity (V), Co-relation

## ANALYSIS OF DATA

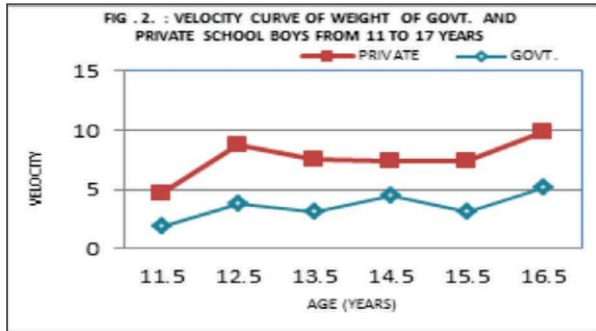
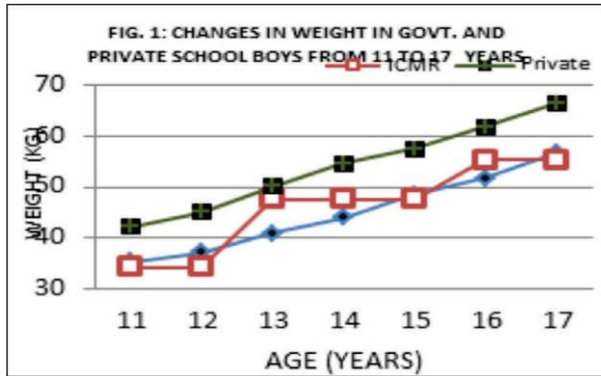
### (i) Body Weight

**Table No. - 2 Mean Values of Weight (Kg) (along with statistical constants) of 11-17 Years Government and Private School Boys of Delhi and India (ICMR\*, 2000)**

Age		N	Mean	Velocity	S.D.	S.E.M.	C.V.	ICMR
11	Govt.	31	35.3	-	12.85	2.30	36.3	34.3
	Private	37	42.4	-	10.33	1.70	24.4	
12	Govt.	38	37.2	1.9	9.23	1.49	24.7	34.3
	Private	46	45.2	2.8	8.59	1.26	19.0	

Age		N	Mean	Velocity	S.D.	S.E.M.	C.V.	ICMR
13	Govt.	38	41.0	3.8	6.28	1.01	15.3	47.6
	Private	49	50.2	5.0	9.44	1.35	18.8	
14	Govt.	61	44.1	3.1	8.19	1.04	18.5	47.6
	Private	48	54.7	4.5	8.72	1.26	15.9	
15	Govt.	50	48.6	4.5	11.34	1.60	23.3	47.6
	Private	50	57.6	2.9	12.00	1.70	20.8	
16	Govt.	51	51.7	3.1	9.55	1.33	18.4	55.4
	Private	53	61.9	4.3	10.12	1.39	16.3	
17	Govt.	81	56.9	5.2	10.55	1.17	18.5	55.4
	Private	67	66.5	4.6	11.37	1.39	17.1	

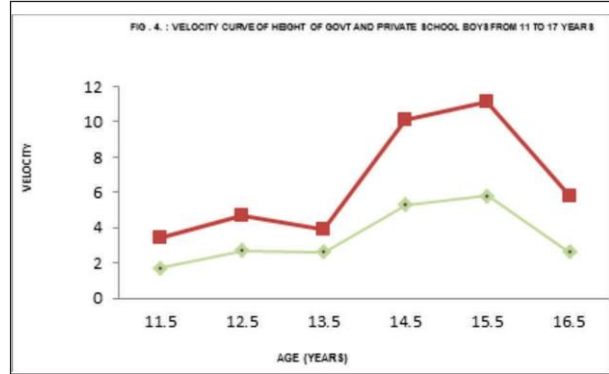
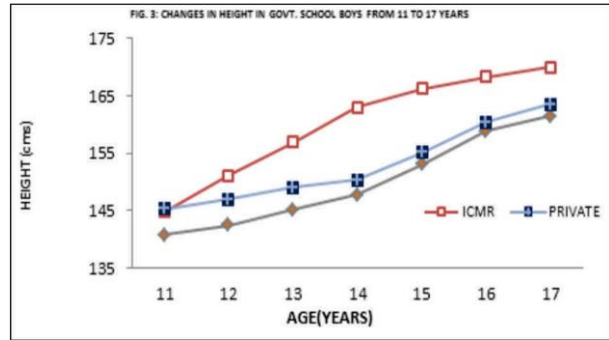
\*Indian Council of Medical Research



## (ii) Height

TABLE NO.3 Mean Values of Height (cm) 11-17 Years Government and Private School Boys

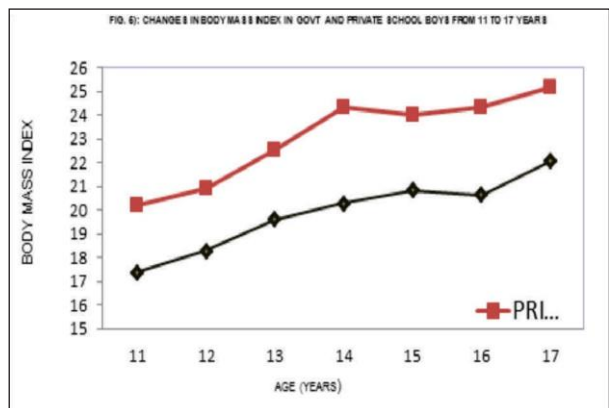
Age	School	N	Mean	Velocity	S.D.	S.E.M.	C.V.	ICMR
11	Govt.	31	140.8	-	10.85	1.49	7.7	144.8
	Private	37	145.3	-	5.63	0.92	3.8	
12	Govt.	38	142.5	1.7	6.34	1.02	4.4	151.1
	Private	46	147.0	1.7	3.21	0.47	2.1	
13	Govt.	38	145.2	2.7	8.11	1.31	5.5	157.0
	Private	49	149.0	2.0	3.26	0.46	2.1	
14	Govt.	61	147.8	2.6	7.81	1.00	5.2	163.0
	Private	48	150.3	1.3	6.26	0.90	4.1	
15	Govt.	50	153.1	5.3	8.29	1.17	5.4	166.3
	Private	50	155.1	4.8	6.49	0.91	4.2	
16	Govt.	51	158.9	5.8	8.77	1.23	5.5	168.3
	Private	53	160.4	5.3	7.78	1.07	4.9	
17	Govt.	81	161.5	2.6	8.93	0.99	5.5	170.0
	Private	67	163.6	3.2	9.01	1.10	5.5	

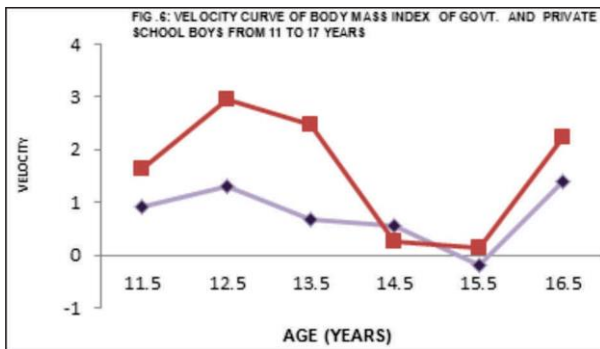


## iii) BMI

Table No. - 4 Mean values of BMI in boys from 11-17 years of age of Government and Private School

Age	School	N	Mean	Velocity	S.D.	S.E.M.	C.V.
11	Govt.	31	17.37	-	4.14	0.74	23.9
	Private	37	20.18	-	5.18	0.85	25.7
12	Govt.	38	18.29	0.92	4.34	0.70	23.7
	Private	46	20.88	0.70	3.75	0.55	17.9
13	Govt.	38	19.61	1.32	3.76	0.61	19.2
	Private	49	22.52	1.64	3.93	0.56	17.5
14	Govt.	61	20.28	0.67	4.08	0.52	20.1
	Private	48	24.31	1.79	4.48	0.65	18.4
15	Govt.	50	20.84	0.56	5.08	0.72	24.4
	Private	50	24.01	-0.3	5.05	0.71	21.0
16	Govt.	51	20.65	-0.19	4.38	0.61	21.2
	Private	53	24.35	0.34	5.20	0.71	21.4
17	Govt.	81	22.04	1.39	5.09	0.57	23.1
	Private	67	25.18	0.83	5.76	0.70	22.9





## MAIN FINDINGS

1. A gradual increase in mean body weight and height has been observed at all successive period of growth in Govt. and Private school adolescent boys.
2. The body weight among private school boys was found higher than Govt. school boys and the ICMR (2000) recommendation at all successive period of age group.
3. The body weight is less than the recommendation of ICMR (2000) in the age group of 13, 14 and 16 in Govt. school boys.
4. The height was found lower in both private and Govt. school boys than ICMR (2000) recommendation but in private school boys the height was found higher than Govt. school boys in all age groups.
5. A steep rise in height velocity at the age of 15 and 16 years among government and private adolescent school boys has been noticed. But the rise in velocity was higher in private school boys than Govt. school boys.
6. BMI was observed higher in Private school boys than Govt. school boys in at successive period of growth, which indicates more relative growth in body height and weight.

## EDUCATIONAL IMPLICATION

The study may bring awareness among the teachers, parents and students so they can

know about their health status and which help them to maintain ideal body weight. The findings of the present study may be useful for those who are associated in policy making and deciding different types of health related programs for the school children.

## CONCLUSION

Body weight and height is the most frequently used single measurement in determining the

growth and health status of the children. A gradual increase in mean body weight and height has been observed at all successive period of growth in Govt. and Private school adolescent boys. The body weight among private school boys was found higher than Govt. school boys and the ICMR (2000) recommendation at all successive period of age group. BMI was observed higher in Private school boys than Govt. school boys in at successive period of growth, which indicates more relative growth in body height and weight.

## REFERENCES

- Bajpai S (1975) Age changes as seen in some measures sub-coetaneous fat and physiological variables among Rajput females in Rajasthan. Ph.D. Thesis. Punjab University, Chandigarh (Unpublished).
- DickFN (1980) Growth and exercise: In sports training principals, Lupus Book, London.
- Garn SM and Clark DC (1975) Nutrition, growth, development and maturation: findings from the ten states nutrition survey of 1968-1970. Paediatrics, 56: 306-319.
- Gilliland J (1995) the effect of race sex and socio-economic status on growth patterns and physical fitness of Alabama adolescents. Am. J. Phys Anthrop 66 (2).
- Hirata K I (1979) Selection of Olympic champions. Vol-I, Department of Physical Education, Chukyo University Toyota.

Kansal DK (1981) A study of age changes in physique and body composition in males of two communities of Punjab (Unpublished),

Ph.D thesis, Punjabi University  
Patiala.(Punjab).

Kansal DK(1996) Test and Measurement  
in Physical  
Education and Sports.DVS Publication,  
New Delhi

Kansal DK (2008) Text book of  
Measurement,  
Evaluation and Sports Selection. Sports  
and  
Spiritual Science Publication, New Delhi

Tanner JM(1962) Tanner JM (1962)  
Growth at  
adolescence. 2<sup>nd</sup> edition, Blackwell  
Scientific Publisher, Oxford.

Tanner JM (1978) Fetus into man-  
physical growth  
from conception to maturity, Harvard  
University Press.