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PHYSICAL GROWTH AND ASSESSMENT OF SEX DIFFERENCES AMONG RAJPUTS OF GARHWAL REGION

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Abstract

Growth as a process is observed in all living beings. The life of man starts with fertilization of one cell, the ovum. With time, this cell multiplies and the living mass gradually becomes more and more complicated. The final shape which the human body will eventually take, greatly depends upon the genetic makeup as well as external environmental factors. Present study on Rajput school going children is aimed at analyzing the progression of physical growth and identifying the growth based on sex differences.

INTRODUCTION:

Growth and development, although describe the changes occurring in the body mass overtime, are different phenomena. Growth is a quantity increase in size of mass. In other words, growth is measurable change in the size and mass of the body. Therefore, increase in centimeter or kilogram is growth. Development on the other hand is defined as "progressive changes, either quantitative or qualitative, that lead from an undifferentiated or immature state to a highly organized, specialized, and mature state.

In growth we see the interactions between the genetic potentials of the human organism and the effects of the way of life on growth progress and dimensional attainments. We also investigate such variables as family size or maternal age. We discover how children and adolescents of different population groups may differ in the sequence or order of discrete developmental events. Growth covers a wide variety of diverse process, and it is an end product of interaction between two factors, i.e., intra-genic and extra-genic. It is also a product of new biochemical units through metabolic and biological synthesis. There are three main phases in human growth, viz. prenatal postnatal and adolescence.

Adolescence:

Our study is based on adolescence boys and girls aged between 12 to 18 years. Scientifically during adolescence period almost all parts of the body, including the long bones, vertebral column skull and facial bones, hairs, lungs and muscles increase in mass. In adolescent period, sexual maturation also takes place,

particularly the development of secondary sexual characters, viz., development of hairs and accessory sexual characters in boys and development of breasts, etc in girls.

Methods of study about growth:

There are generally three types of methods of studying human growth.

1. Corss- sectional methods.
2. Longitudinal method.
3. Semi or mixed longitudinal method.

Cross-sectional method:

Cross sectional method is such in which a group of children are measured at each age but no individual is measured more than once. For example all the children belonging to 10 years age- groups are different from children at 9 and 11 years age group. According to Folkner (1962), such a method examines a population for certain factors at certain age and information obtained can be considered adequate and reliable for some problems. The cross sectional study is the most common and least time consuming method among and it takes the least time to yield quick results. According to Tanner (1962), such studies are obviously cheaper and quick. A study extending from birth to old age can be completed within a year through this method.

Longitudinal method:

The best way to study the growth of any individual child is to measure him repeatedly. The collection of repeated measurements on the same individual or group of individuals, constitute a longitudinal study. In longitudinal study, each subject is measured repeatedly at each succeeding age. For examples all the subjects at age 9 year are the same as those at age 8. In other words, in the longitudinal type of study a group of children are followed over a period of time. Thus it is also called as "follow up method". Longitudinal data reveals accurately the growth patterns of individuals, which enables us to study changes in speed of growth through constructing velocity curves. But this method is highly time consuming and it demands extreme care and patience on the part of those who do it and those who takes part in it.

Semi or mixed longitudinal method:

It is a mixture of both longitudinal and cross sectional methods. Sometimes, for practical reasons a longitudinal study may be conducted over any number of years, but due to situational factors, it is not possible to measure exactly the same groups of children for a prolonged period as some children leave the study and become non available. If this happens, such a study is called a "semi or mixed longitudinal study" for which special statistical techniques are needed to get the maximum information out of its data.

Some Effective Factors of Growth:

1.There are two factors like- endogenous (intragenic) and exogenous (extragenic). Endogenous is a genetic phenomenon and exogenous is non hereditary factors. It is depend on environment, nutrition and socio-economic factor.

2.Genetics of growth: it is a truism that any particular gene depends for its expression firstly on the internal environment.

3.Growth and Environment: This factor depends on climate, season temperature, humidity, altitude etc.

4.Nutrition: nutrition is a main factor of growth. Because food is essential for normal growth and under famine conditions children lagged ten to twenty months behind normal growth.

AIMS OF PRESENT STUDY:

Present study on Rajput school going children is aimed at analyzing the progression of physical growth and identifying the sex differences pertaining to growth. The aims of present study are as follows.

1. To assess the general patterns of growth among Rajputs of Garhwal.

2. To evaluate sex differences in different body measurements among Rajputs of Garhwal.

3. To identify the period of maximum growth rate (corresponding to adolescent spurt) in different body measurements among male and female Rajput.

4. To assess the sex-wise inter relationship between different body measurements among Rajputs of Garhwal.

MATERIAL AND METHODS:

Data for the present study have been collected from the ten educational institutions.

A total of 479 unrelated normal had healthy adolescent boys and girls have been measured for different (twenty four) body measurement. Before that we took general information by every subject (Name, Father's name, sex, class, roll number, school, date of birth, caste, father's sub-caste/gotra, maternal uncles sub-caste/gotra , village and district.

Mating pattern:

The above general information regarding caste and sub-caste of father and maternal uncle have been used to assess homogeneity among the Rajput's. For physical anthropological studies, it is essential that the population under study should belong to a homogenous group sharing a common gene pool, thus making it a Mendelian population. A mendelian population may be defined as a reproductive community of individuals which share a common gene pool (Dobzhanski, 1951). A mendelian population is a system of individuals united by mating and parentage bonds (Dobzhanski, 1951). In most of the societies, the individuals inhabiting a restricted locality tend to show genetic variations as separate groups or isolates. The term isolate is confined to such populations which are quite discrete from mating point of view. So these isolated populations have got their genes fixed resulting in the population which is genetically different from other.

Age recording and age grouping:

In growth studies, chronological age of the subject is a basic requirement. Chronological age is completely different from the developmental age. For assigning developmental age, rather than a chronological age to a growing child, there are four common methods, that is, skeletal age, dental age, morphological age and secondary sex character age (Tanner 1962).

Table 1 To suit the problem under study, the following measurements have been obtained on each subject.

S. No.	Age range	Mean age	Number of subjects	
			Boys	Girls
1	9.6m – 10.6m (upto 5m & 30 days)	10.0	25	23
2	10.6m- 11.6m " "	11.0	25	21
3	11.6m-12.6m " "	12.0	25	26
4	12.6m-13.6m " "	13.0	25	27
5	13.6m-14.6m " "	14.0	25	21
6	14.6m-15.6m " "	15.0	25	25
7	15.6m-16.6m " "	16.0	25	26
8	16.6m-17.6m " "	17.0	20	22
9	17.6m-18.6m " "	18.0	27	22
10	18.6m-19.6m " "	19.0	25	20

Table 2 Instruments used for various measurements

S. No	Measurements	Instruments used
1.	Standing height	Anthropometer
2.	Sitting height	Anthropometer
3.	Height cervical	Anthropometer
4.	Head and neck length	Anthropometer
5.	Body weight	Weighting machine
6.	Sitting height cervical	Anthropometer
7.	Total right upper extremity length	Rod compass
8.	Total right lower extremity length	Anthropometer
9.	Right upper arm length	Rod compass
10.	Right fore arm length	Rod compass
11.	Right hand breadth	Rod compass
12.	Right hand length	Rod compass
13.	Right foot length	Rod compass
14.	Right foot breadth	Rod compass
15.	Biacromial breadth	Rod compass
16.	Length of the upper leg	Anthropometer
17.	Bicristal breadth	Rod compass

18.	Length of the lower leg	Anthropometer
19.	Maximum hip width	Rod compass
20.	Chest breadth	Rod compass
21.	Chest girth normal	Tape
22.	Head circumference	Tape
23.	Upper arm girth	Tape
24.	Calf girth	Tape

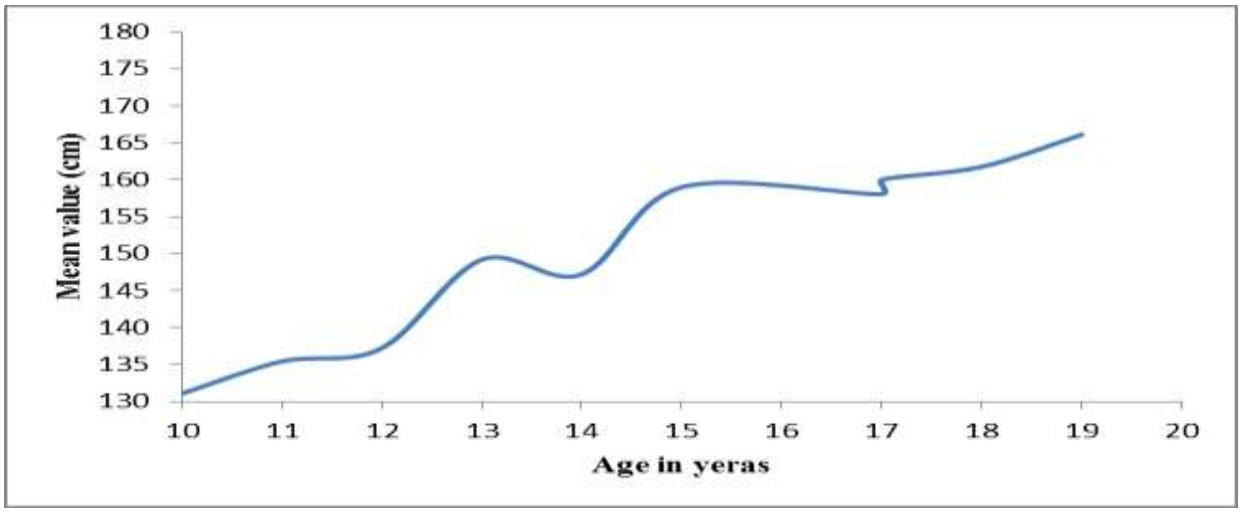

Fig 1 Distance curve for standing height among the Rajput adolescents boys

Table 3 Means and their statistical constituents of standing height among the Rajput adolescents boys

S.No.	Age Group	Number Of Students	Mean	SD Error	SD	C.V	Annual Increment	Growth Gradient
1	10	25	131.052	1.48	7.431	5.71	4.36	78.9
2	11	25	135.412	1.28	6.492	4.72	4.36	81.52
3	12	25	137.2	1.4	7.013	5.11	1.84	82.64
4	13	25	149.189	1.95	7.763	6.54	11.92	89.82
5	14	25	147.201	1.59	7.969	5.39	1.48	88.92
6	15	24	159.002	2.17	10.051	6.69	11.35	95.76
7	16	25	158.06	1.41	5.734	3.61	0.61	94.4
8	17	20	159.98	1.07	4.794	3	0.87	95.92
9	18	27	161.75	1.1	5.739	3.54	2.42	97.38
10	19	25	166.092	1.11	5.52	3.35	4.33	100

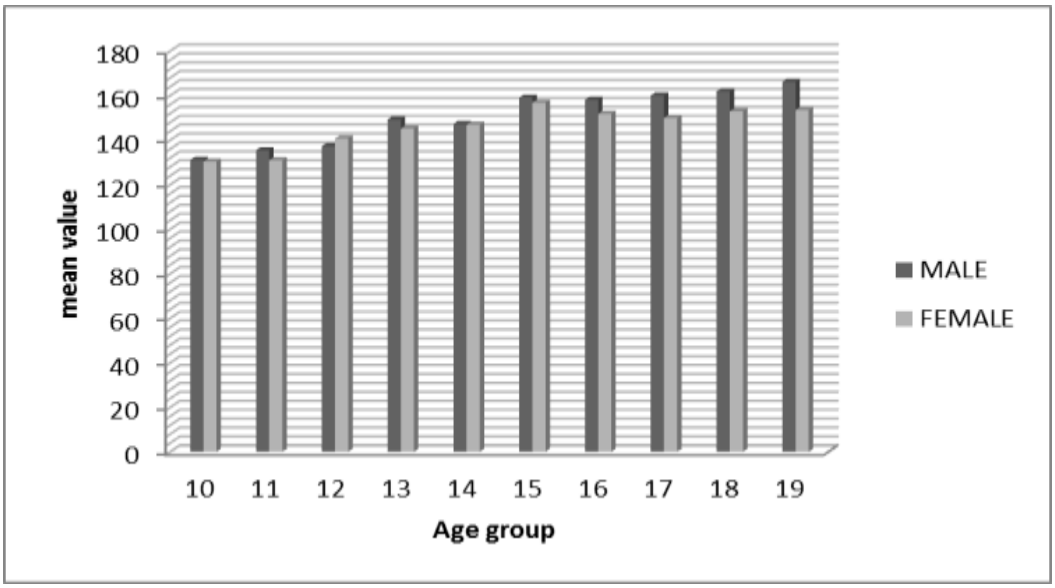

Fig 2 Sex differentiation in standing height

Table 4 Sex differences and 't' value in standing height

Age group	Male			Female			(t) value
	N	Mean	SD	N	Mean	SD	
10	25	131.052	7.431	23	130.343	5.593	0.37
11	25	135.412	6.492	21	130.867	6.985	2.28*
12	25	137.2	7.013	26	140.665	8.393	2.16*
13	25	149.189	7.763	27	145.104	6.884	1.72
14	25	147.201	7.969	21	146.838	6.959	0.39
15	24	159.002	10.051	25	156.712	4.126	7.82**
16	25	158.06	5.734	26	151.746	5.420	4.25**
17	20	159.98	4.794	22	149.845	5.017	6.25**
18	27	161.75	5.739	22	152.886	4.221	8.01**
19	25	166.092	5.52	20	153.44	4.143	8.73**

*Significant at 0.05 level

**Highly significant at 0.01 level

On examining the all measurement- wise, we find that head and neck length along with foot breadth are two measurements where sex-differences show significant differences in all the age-groups. In other words the above two measurements are the best indicators of sex- differences among the adolescent Rajput's of Garhwal. In very poor indicators of sex differences as among these, only one out of ten age-groups shows significant sex differences.

Garhali Rajput males exhibit great military skills and have established themselves as brave daring trusted and illustrious saviours of the honor of the motherland.

Serving the army has always been the first preference of a Garhwali youth. Unprecedented bravery co-exists with humility and honesty in these hills. In other words, the Garhwali Rajput is tough as mountain and kind the holy Ganges.

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