

Secular Growth Trend in Western Orissa

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INTRODUCTION

The most important biological phenomenon in human being is changes in body size that has taken place generation after generation. It is known as "Secular Change". The pattern of growth of a particular population is not a static one, but it usually changes with time. This change is secular change. The word secular is derived from the Latin word 'seculum' which means generation or age, hence secular trend is said to refer to long term tendency of a phenomenon.

It is observed that variability in height of a population at any point in time is partly genetic and partly environmental. But changes in average heights of an endogamous population over time are mainly due to environmental factors, such as changes in the nutritional status of mothers and their children and health of the children (as childhood disease can stunt growth). The positive secular trend is an important bio-indicator of economic and social condition of society. The sudden increase in stature in Europe after the industrial revolution drew attention of different scholars. Up to the present, the focus of this research has been on the various populations of European countries, Japan and North America.

In India, however, anthropologists have focused on using height and other anthropometric evidence to investigate the physical differences among the Indian. During the second five year plan, the Indian council of Medical Research initiated a country wide cross-sectional survey on "growth and physical development" of Indian infant, children and adolescent.

Ganguly (1977) studied the stature of sixty population groups in India. His work is based on anthropometric data collected by various authors at different time of the same population. He has shown that the greater body height in later generation is not a universal phenomenon. The dominant trend in India is toward decrease in height. But his work is not an inter-generational study.

In India, inter-generational secular change in growth was studied by some scholars (Singhal

and Siddhu, 1981; Kapoor et al., 1985; Shaturgna et al., 1988; Balakrishna, 1990; Rahdaiah, 1990; Satyanarayan, 1990).

Daughters and sons were found to be taller than their mothers and fathers respectively by these scholars. Another inter-generational study was conducted by Arya and Rao (1988) to find out secular trend in height of rural Hyderabad adult. It was observed that sons above 30 years of age were taller than their fathers. Adult daughters of poor socio-economic groups in urban Hyderabad were found with smaller stature than their mothers. In India the study on secular growth trend is few in number, particularly in Orissa.

Population of Orissa, as well as India, is not homogenous but is composed of different ethnic elements. The population is divided into different castes. Sometimes the castes are divided into different sub-castes. The sub-castes are actually the breeding units. So these are the small population with varying degree of reproductive isolation.

PRESENT STUDY

It is a study of secular trend of growth in two generations of two different populations, in the same regional environment. Their geographical environments are same but their own contribution towards growth is different due to differences in occupation, and culture. These groups of population are the Jharua Brahmin (sub-caste) and the Agaria (caste).

These two populations are dominant caste in western Orissa. In Orissa, the sub-caste Jharua Brahmin and the Agaria (caste) are completely isolated from the rest of populations of Orissa. These two groups are rigidly endogamous. It is assumed that any change in an isolated group is due to environment like economic conditions, better nutrition, medical care and pattern of food sharing in the family.

The Jharua or Aranyak Brahmin are found in western Orissa, mainly in the districts of Sambalpur, Bargarh, Bolangir, Sonepur,

Kalahandi and Sundargarh and some parts of Boudh. They are identified by their surnames viz. Badapanda, Panda, Pandia, Padhi, Pujari, Purohit, Panigrahi, Supakar, Hota, Joshi, Behera, Mishra & Naik. They are different in their physical appearance and culture from other dominant sub caste of Brahmin i.e. the Utkalya Brahmin of western Orissa.

Morphologically the Jharua Brahmin can be identified from other Brahmins by their tall stature and fair complexion. Almost all the Jharua Brahmins are rich and educated.

Agaria is another rich, educated and dominant caste in western Orissa, particularly in Sundargarh district of Orissa. The Agaria are agriculturists and traditional. The caste is rigidly endogamous like the Jharua Brahmin. The general surnames of Agarias are like Patel, Naik, Choudhury and Pandey. They are tall, good looking and fair complexion people. Sickle cell anemia is present in higher proportion among the Agarias.

The main aim of the study was to find out whether there is any positive secular growth in the filial generation and whether the change observed is of same type in both the sexes of these genetically isolated groups. The study also throws light on gender discrimination among them.

MATERIAL AND METHOD

The study was conducted on both sexes by two groups of cohort i.e. 'father-son' and 'mother-daughter' of Jharua Brahmin and Agaria population. It is an inter-generational study of growth in two endogamous group in similar ecological setting. The Brahmin samples are collected from Sambalpur, Bargarh and Sundargarh district of western Orissa.

The Agaria samples are collected only from Sambalpur and Sundargarh district of western

Orissa.

The climatic condition of the district Sambalpur, Bargarh and Sundargarh is of extreme type with hot dry summer and extreme cold in winter.

Sample size is of following type

	Father-Son Pairs	Mother-Daughter Pairs
Jharua Brahmin	95 (Ninty five)	100 (Hundred)
Agaria	80 (Eighty)	90 (Ninty)

Four measurements on body were selected to assess the secular growth of two generations. These measurements are Stature, Height Radiale, Height Tibiale and Bi-acromial Breadth. Certain precautions were taken while selecting the sample. These are as follows-

(a) Male parents who were above 50 years and female parents who were above 45 years were not included in the sample for natural decrease of height due to shrinkage of inter-vertebral discs.

(b) The minimum age for son and daughter subjects in the sample was maintained 22 years and 18 years respectively.

(c) Physically handicapped persons, pregnant mothers, adopted sons and daughters were also excluded from the study.

Measurements were taken after Singh and Bhasin (1989). All the subjects were measured by the same set of "Anthropometer" by the author herself. Usual statistical methods are used for the calculation of Mean, Standard Deviation, Standard error of mean, Standard error of standard deviation and 't' test was done to assess the relationship of parents and offsprings.

RESULTS

Brahmin

Ninty five pairs "father and Son" were

Table 1: Statistical constants of somatometric measurements of Jharua Brahmin fathers and sons

Measurements	Father	Son	Differences for mean (S-F) in cms	t-test Father/son	S > F %	S < F %	F = S %
	Mean ± S. E. in cms	Mean ± S. E. in cms					
Stature	163.71 ± 0.55	166.60 ± 0.60	+ 2.89	3.53*	71.58	23.15	5.27
Height Radiale	102.90 ± 0.46	104.73 ± 0.45	+ 1.83	2.81*	70.52	23.16	6.32
Height Tibiale	47.82 ± 0.27	48.66 ± 0.27	+ 0.84	5.54*	54.75	33.68	11.57
Bi-acromial Breadth	32.04 ± 0.22	32.54 ± 0.20	+ 0.50	1.65	51.58	25.26	23.16

* Significant at 0.01 level S = Son F = Father

selected for study they were from different places of Sambalpur, Bargarh and Sundergarh. It was observed that the mean of Stature, Height Radiale, Height Tibiale and Bi-acromial Breadth is higher in case of Sons (Table 1). In case of stature the difference of mean (Son-father) is 2.89 cms. From 't' value, it is observed that the differences is significant.

The difference of mean height radiale of sons and fathers is 1.83 cms. From the value of 't' it is found that the difference is significant.

The mean difference between sons and fathers in case of height tibiale and bi-acromial breadth is 0.84 cms and 0.50cms respectively. As observed from the 't' value the difference is significant in case of height tibiale. So all these long measunts of sons show significant increase.

Hundred Brahmin "mother-daughter" pairs of different places of Sambalpur, Bargarh and Sundergarh districts were selected for study. There is increase in stature, height radiale, height tibiale and bi-acromial breadth in case of Brahmin daughters (Table 2). But the increase in stature and height radiale is statistically significant.

Agaria

Eighty pairs "Father and son" of Sundergarh and Jharsuguda were selected for study. The mean of stature, height radiale, height tibiale and bi-

acromial breadth is higher among the sons (Table 3). The difference of mean stature of sons and fathers (Son-Father) is 3.44 cm. As observed from the "t" test, the difference is significant. The difference of mean height radiale of sons and fathers is 2.05 cm. This difference is also significant as observed from the 't' test. The mean difference between sons and fathers in case of height tibiale and bi-acromial breadth is 0.93 cm and 0.93 cm. These difference are also significant as observed from 't' test (Table 3).

Ninty pairs "Mother and daughter" of Sundargarh and Jharsuguda were selected for study.

The increase in stature and bi-acromial breadth is found among the Agaria daughters. The increase is 1.39 cms. and 0.40 cms. respectively but the increase is not statistically significant as observed from 't' test. There is no increase in height radiale and height tibiale among the daughters (Table 4). Though the Agaria sons show significant increase in filial generation, the daughters do not share the same type of increase.

DISCUSSION

The rule of endogamy in this social group does not permit any inflow of gene from outside i.e., hybridization or admixture is very rare in

Table 2: Statistical constants of somatometric measurements of Jharua Brahmin mothers and daughters

Measurements	Mother		Daughter		Differences for mean (D-M) in cms	t-test M/D son	D>M %	D< M %	D= M %
	Mean ± S. E.		Mean ± S. E.						
	in cms		in cms						
Stature	150.40 ± 0.55	153.10 ± 0.58	+ 2.70	3.39*	68.00	28.00	4.00		
Height Radiale	94.50 ± 0.35	95.88 ± 0.45	+ 1.38	2.40*	57.00	40.00	3.00		
Height Tibiale	44.10 ± 0.23	44.74 ± 0.29	+ 0.64	1.71	58.00	36.00	6.00		
Bi-acromial Breadth	28.82 ± 0.15	28.84 ± 0.14	+ 0.02	0.09	37.00	45.00	18.00		

* Significant at 0.01 level D = Daughter M = Mother

Table 3: Statistical constants of somatometric measurements of Agaria fathers and sons

Measure- ments	Father		Son		Differences for mean (S-F) in cms	t-test Father/ son	S > F %	S < F %	F = S %
	Mean ± S. E.		Mean ± S. E.						
	in cms		in cms						
Stature	162.56 ± 0.67	5.99 ± 0.47	166.00 ± 0.73	6.58 ± 0.52	+ 3.44	3.45*	81.25	18.75	0.00
Height Radiale	102.22 ± 0.56	5.05 ± 0.39	104.27 ± 0.55	4.97 ± 0.39	+ 2.05	2.59*	72.50	18.75	8.25
Height Tibiale	47.77 ± 0.32	2.82 ± 0.22	48.70 ± 0.29	2.64 ± 0.20	+ 0.93	2.15*	66.25	25.00	8.75
Bi-acromial Breadth	32.62 ± 0.27	2.46 ± 0.19	33.55 ± 0.28	2.52 ± 0.20	+ 0.93	2.35*	48.75	30.00	21.25

* Significant at 0.01 level S= Son F = Father

traditional society, like the Jharua Brahmin and Agaria. Though these Jharua Brahmin and Agaria Societies allow cross-cousin marriages, still then this cross-cousin marriage is not preferred type. But parallel cousin marriage is not at all accepted.

In case of Brahmins more than 71% of sons are taller than their fathers and more than 70% of sons demonstrate greater height radiale. More than 54% of sons demonstrate higher height tibiale and also more than 51% of sons demonstrate higher bi-acromial breadth (Table 1).

In case of daughters, 68% of daughters are taller than their mothers. Fifty Seven (57%) of the daughters demonstrate greater height radiale than their mothers. The percentage of higher height tibiale among the daughters is 58%. Only 37% of daughters demonstrate higher bi-acromial breadth (Table 2).

It is found that among the Agaria more than 81% of sons are taller than their fathers and more than 72% of the sons demonstrate greater high radiale than their fathers. The percentage of higher height tibiale among the sons is more than 66%. More than 48% of sons demonstrate higher bi-acromial breadth (Table 3).

Among the daughters only 50% of them are taller than their mothers, though the difference of mean of daughters and mothers is insignificant as observed from 't' test. More than 44% of the daughters possess higher bi-acromial breadth, but the difference of mean bi-acromial breadth of daughters and mother is 0.40 cm which is statistically insignificant. In case of Agaria, more than 47% of daughters possess higher height radiale, but the difference in mean of height radiale between the daughters and mothers is zero. Similarly more than 41% daughters possess higher height tibiale but the difference in mean height tibiale is zero (Table 4).

So it is observed that positive trend of growth

is there among the Brahmin women and men. In case of Agaria, the positive secular growth is there, but it is significant only in case of sons. In case of daughters the positive secular growth is not significantly observed.

Studies on secular trend of growth through generational studies are very few. There are some studies from Andhra Pradesh only. Most of the studies are again undertaken only among the males and only on stature. Other body dimensions were not taken into account. From the studies in Andhra Pradesh, it has been found that the increase in stature in the filial generation is quite high among the high income group, but moderate in the low income group. The increase in the stature among the rural population of Andhra Pradesh, around Hyderabad, is not of similar dimension. The rural sample studied by Radhaiah definitely show much higher increase in stature in filial generation than that of the rural sample studied by Satyanarayana (1990).

Levinson (1974) found that, while gender was the most statistically significant determinant of nutritional status and male – female differentials were great among the lower socio-economic caste group.

There are also some social phenomenon which control the distribution of nutrition in the family. In the book, 'The lesser child' published by the social welfare Board, Government of India, it has been described how the "Girl Child" in a family is not given proper attention. The Girl child is weaned out of breast feeding at an earlier age. Even in some area it is believed that baby girls need less breast milk than baby boys and male children receive larger quantities of cereals, fats, milk and sugar than female children. A survey of some food-hit west Bengal villages in 1978 showed that females of all ages up to 72 years had higher malnutrition than males.

Table 4: Statistical constants of somatometric measurements of Agaria mothers and daughters

Measurements	Mother	Daughter	Differences for mean (D-M) in cms.	t-test M/D son	D>M %	D< M %	D= M %
	Mean ± S. E. in cms.	Mean ± S. E. in cms.					
Stature	151.72 ± 0.54	153.11 ± 0.54	+ 1.39	1.80	50	43.33	6.67
Height Radiale	95.23 ± 0.39	95.23 ± 0.48	+ 0.00	0.00	47.78	41.11	11.11
Height Tibiale	43.98 ± 0.29	43.98 ± 0.31	+ 0.00	0.00	41.11	48.88	10.01
Bi-acromial Breadth	29.98 ± 0.22	29.68 ± 0.23	+0.04	1.23	44.44	32.22	23.34

* Significant at 0.01 level D = Daughter M = Mother

CONCLUSION

Positive secular growth among the Jharua Brahmin and Agaria in filial generation is there. But in case of Agaria the increase in filial generation is more marked among the male offsprings. The Brahmins of western Orissa are proportionately better educated. The traditional dowry system is not prevalent among the Jharua Brahmin which has been deep rooted in the Agaria community.

The Brahmin girls are beautiful. Marriage of the daughter is not a difficult task for the parents. The girl child is not a liability for the parents. The Brahmins of western Orissa are most probably have deviated from the Agaria's traditional pattern of paying less attention to the girl child. This might be the cause, that both the male and female off springs in filial generation demonstrate significant improvement in body measurements.

The Agaria is an agricultural and traditional group. In traditional agricultural society a male child is more helpful and gets more attention than a female child in his growing period. In the western industrialised countries and even in Japan, the observed positive secular trend was almost same nature in both sons and daughters. In India there is a tendency to neglect women from childhood. This is also observed in case of Agarias. The difference in growth trend among the daughters and sons can be only explained the assuming that the parents did not pay more attention to the female children in their period of growth. In case of higher caste like Brahmins the increase in filial generation is there but it is not of so high degree as that of the industrialised developed counties like Japan, United States of America and United Kingdom. No study or research on human being is fool proof. To justify

the statement, more studies in this aspect particularly on nutritional intake among the Agaria and Brahmin are needed.

KEY WORDS Secular Growth, Caste, Bisexual Variation.

ABSTRACT The assumption was that the positive secular trend of growth cannot be a universal phenomenon also not of the same rate in case of men and women. To measure the validity of this assumption four selected somatometric measurements were taken on "father-son" and "mother-daughter" pairs of Jharua Brahmin and Agaria population of western Orissa. It is an inter-generational study of growth in similar ecological setting of two endogamous populations. There is variation in the positive secular trend of growth and also there is bisexual variation due to pattern of food sharing in traditional society.

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