Short Communication

A comparative study of Head Circumference of Infants in two ethnic groups

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ABSTRACT

Anthropometric parameters serve as useful adjuncts to other observations in evaluating intrauterine as well as infantile growth and development. Determination of measurements with regard to Head Circumference of infants during first year of life is important for the assessment of physical growth. Range of anthropometric measurements in each parameter is different in different races. Earlier reported work indicates that socioeconomic and nutritional status affects the growth even within the ethnic groups. The present study is taken as a longitudinal study conducted periodically in infants (0-12 months) of two contrasting groups- Jat Sikh and Bania communities of Punjab belonging to similar socioeconomic status. Head circumference was measured with the help of measuring tape. Earlier studies indicated that racial factors of growth could be modified to some extent by improved socioeconomic status and nutrition. Since both groups compared in this study were belonging to similar socioeconomic status hence nutritional status of these groups was also similar. It was observed that Bania male as well as female infants had smaller head circumference as compared to their Jat Sikh counterparts. This change may be attributed to sedentary life style among the urban population.

Key Words: *Head circumference, anthropometry*

Introduction

Primordial Anthropometric parameters serve as useful adjuncts to other observations in evaluating intrauterine as well as infantile growth and development. [1] Determination of these measurements with regard to birth weight, body length and head circumference of infants during first year of life is important for the assessment of nutritional status, physical and mental growth in males as well as females. [2, 3] The head circumference is very important measurement because it is related to intracranial volume and permits an estimation of rate of brain growth. Head circumference is defined as the largest diameter of the head passing through the glabella and the inion. [4] Every state in India differs in its socio-cultural, socio-economic, and nutritional factors which are likely to affect the growth patterns. The data

collected in one part of the country cannot be applied all over India. Therefore each state needs its own norms of growth. [5]

Socially people of Punjab have almost similar composition as the rest of Indians, being divided and subdivided into castes and sub castes. The major Punjabi communities are Jat Sikhs (dominant community), Banias, Brahmins, Khatris, Aroras, Sainies, and a large number of backward and scheduled caste communities. The Jat Sikhs constitute a dominant rural population of Punjab who represent primarily farming community, indulge in strenuous physical hard work. Most of the population of Banias community resides in the cities. They are usually shopkeepers or businessman and had sedentary lifestyle. [6]

The study was initiated to compare the ethnic variations in head circumference in specific defined ethnic groups of Jat Sikh and Bania infants.

Material and methods

This was a prospective study for a period of one year conducted in 120 infants. Out of which 60 infants each belonged to Jat Sikh and Bania communities of Punjab. Further 30 males and 30 females infants were studied in either of these communities of similar socio-economic status classifiable as upper middle class. [7] This study was undertaken in infants from birth (zero months) till one year of age at an interval of one month. Their head circumference was measured with the help of flexible stainless steel measuring tape.

The head circumference was measured by placing tape around the largest part of the head. It should pass just above the ridges over the eyebrows, just above the point where the ears are attached to the head and around the occipital prominence at the back of the head to measure the maximum circumference. [8] All metric measurements were done in centimetres (cm). Values were plotted on the National Centre for Health Statistics (NCHS) growth charts. Means and standard deviations were computed and comparisons of groups and subgroups were made by using unpaired t' test.

The data was interpreted as following:

1. Head circumference for age at or above the 95th percentile.
2. Head circumference for age at or below the 5th percentile.
3. Rapid increase in head circumference.
4. Arrested growth, growth curve is flat over period of time, i.e. a change of more than 25 percentiles in a 6 month period.

Results

Mean Head Circumference (MHC) of Jatsikhs was strikingly greater than that of Banias at all age groups and were noted to be significant ($p<0.04$) to highly significant ($p<0.001$). Even in this subgroup it was observed that males had higher MHC than females. After comparing females of two subgroups it was clear that Jatsikh females recorded higher MHC as compared to their Bania counterparts.

Following subgroups within this group were also compared and analyzed statistically. It revealed following results:

Jatsikh Male versus Bania Male

When males of Jatsikhs and Banias were compared for their MHC, it was observed that in all the age groups Jatsikh were ahead of Bania male infants as depicted in their MHC values (Table 1). Statistical analysis revealed that differences found were significant to highly significant except for 2nd and 3rd months, wherein, they were found to be non significant.

Table1. Mean Head Circumference of Infants in different groups and subgroups

AGE (Months)	MEAN HEAD CIRCUMFERENCE					
	Jat Sikh M ± SD	Bania M ± SD	Jat Sikh Male M ± SD	Jat Sikh Female M ± SD	Bania Male M ± SD	Bania Female M ± SD
BIRTH	35.2± 1.5	34.3± 1.2	35.8± 1.3	34.5± 1.2	34.5± 1.3	34.0± 1.3
1	37.4± 1.5	36.6± 1.3	37.8± 1.4	36.9± 1.3	37.1± 1.3	36.1± 1.3
2	38.7± 1.4	38.2± 1.3	39.1± 1.3	38.3± 1.2	38.5± 1.3	37.8± 1.3
3	40.3± 1.3	39.6± 1.2	40.6± 1.4	39.9± 1.2	40.1± 1.3	39.1± 1.2
4	41.5± 1.3	40.8± 1.3	41.9± 1.4	41.0± 1.2	41.2± 1.2	40.3± 1.3
5	42.4± 1.4	41.6± 1.2	42.8± 1.4	42.0± 1.2	42.0± 1.2	41.2± 1.3
6	43.4± 1.4	42.7± 1.3	43.9± 1.3	42.9± 1.3	43.1± 1.2	42.2± 1.3
7	43.8± 1.3	43.1± 1.2	44.3± 1.3	43.2± 1.3	43.6± 1.2	42.6± 1.2
8	44.3± 1.4	43.4± 1.2	44.9± 1.3	43.6± 1.2	43.9± 1.2	42.9± 1.2
9	44.7± 1.2	43.7± 1.2	45.5± 1.3	43.9± 1.2	44.2± 1.3	43.2± 1.3
10	45.2± 1.4	43.9± 1.2	46.0± 1.3	44.3± 1.2	44.4± 1.3	43.4± 1.3
11	45.5± 1.3	44.1± 1.2	46.3± 1.3	44.7± 1.3	44.6± 1.3	43.6± 1.2
12	45.9± 1.2	44.3± 1.3	46.9± 1.3	44.9± 1.3	44.8± 1.3	43.8± 1.3

Jatsikh Female versus Bania Female

Females among these two ethnic groups were no different from males in their MHC pattern. Here again Jatsikh females were leading in all age groups when compared to Bania females. Statistical analysis revealed that differences found were significant to highly significant.

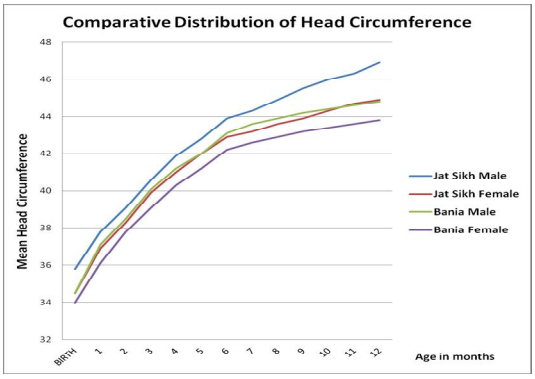

Fig.1 Comparative distribution of Head Circumference in different groups and subgroups

Discussion

At any given age group, MHC of Jatsikhs was greater than that of Banias (Table 1). These values for head circumference of ethnic subgroups were found to be significant ($p<0.04$) to highly significant ($p<0.001$).

Nelhaus reported that there was no significant international or inter racial difference in head circumference of children between 0-18 years of age and proposed head circumference growth curves applicable to all ethnic groups. [9]

Meredith challenged Nelhaus's view by showing various ethnic differences among Caucasian, black and oriental children based upon collective data of 250,000 children. [10]

Tsuzaki inferred from his findings that there is a significant racial difference between Japanese and Caucasians in head circumference. [11] The present study also points to ethnic differences, albeit small, nevertheless significant even, a significant difference in head circumference was found between Jatsikh and Banias- the two different ethnic groups of Punjab.

According to a study conducted by ICMR, infants belonging to Sikhism had larger mean head circumference than those of other religious faiths in India. [12] Dietary factors may also account for or accentuate these differences because most Hindus are vegetarians whereas Sikhs traditionally par take non vegetarian diet more frequently. One study showed that during pregnancy Sikh women had the highest intake of most nutrients and ate a greater variety of foods when compared within Asian subgroups.

Another study by Chetcuti revealed that there is no difference in head circumference when Sikh infants were compared to those of Hindus born in Britain. [13] Because most Hindus even if vegetarian, were consuming nutrition which was recommended by department of health and social security in Leicester, which supports Tsuzaki's findings according to whom the relative head size would become similar in various populations, if nutrition and health of each population are optimal. Also Khanduja et al stated that "irrespective of socio economic and religious groups, babies receiving optimal nutrition, approach comparable growth pattern of the babies of better developed countries." [5]

It was also observed that Bania male as well as female infants had smaller head circumference as compared to their Jat Sikh counterparts, an evident ethnic divide.

The study could establish ethnic group vise standards for anthropometric measurements in first post natal year of life and attempts to clear some misconceptions due to earlier study of random, unorganized mixed populations earlier which nonchalantly showed wrong signals. The present study attempted to find reason and suggests organized ethnic studies to set anthropometric standards for each group at each given socioeconomic status in specific geographic areas.

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