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Comparative Study on Cephalic Index of Mentally Retarded Children with Normal Children in Southern Odisha.

Dr Sunita Patro[1], Dr Ramkristna Sahu[2] , Dr Sadananda Rath[3]
[1](Assistant Surgeon/Tutor, Department Of Anatomy, M.K.C.G. Medical College, Berhampur, Odisha, India)
[2](Associate Professor, Department Of Anatomy, M.K.C.G. Medical College, Berhampur, Odisha, India)
[3](Professor And Head Of Department Of Anatomy, M.K.C.G. Medical College, Berhampur, Odisha, India)

Abstract: *Mental retardation is associated with deformities of head shapes. The study was undertaken to compare the mean cephalic index of mentally retarded children with apparently normal children in Southern Odisha. The study was carried out on 150 children of age ranging from 8-16 years. Of which 75 were normal and 75 were mentally retarded children who were taken from "MONOVIKAS KENDRA", Berhampur(A school of mentally handicapped children). Maximum head length and maximum head breadth were recorded using the spreading callipers. Cephalic indices of both normal and mentally retarded children were calculated using the formula (Maximal head breadth/ Maximal head length) x 100. Basing these indices the head shapes were classified as dolicocephalic, mesocephalic and brachycephalic. From this study, it was observed that 40% of normal children were mesocephaly whereas 74% mentally retarded children were dolicocephaly. There was a significant (p<0.001) association between low cephalic index with mentally retarded children when compared with normal group. The mean cephalic index points to dolicocephaly amongst mentally retarded children while mesocephaly amongst normal children. On the basis of anthropometric measurements it was possible to conclude that mentally retarded children have a specific and recognisable anthropometric pattern with significantly expressed deviation from normal control group.*

I. Introduction

Mental retardation – Defined as sub-average general intellectual functioning which is developmental in origin and is associated with impairment in adaptive behaviour. It ranks 4th in the list of the leading causes of disabilities. It was estimated that 2% of Indian population suffer from mental retardation[1].

Morphology of all living being undergo changes in varying degrees during their life and the features are variable in the individuals of the same species. No two persons are similar in their measurable character. Anthropometry evolved as a standard scientific technique for measuring human body dimensions[2]. Human body dimensions are affected by ecological, geographical, racial, gender and age factors[3,4]. On the basis of above factors, anthropometric studies are conducted on the age, sex, caste and racial groups in certain geographical zones[5,6].

The study was undertaken to compare the mean cephalic index of mentally retarded children with apparently normal children in Southern Odisha.

II. Materials And Methods

The present work, 150 chilren of 8-16 years were selected as subjects. Out of 150 children, 75 mentally retarded children were from MONOVIKASH KENDRA, Ganjam, Odisha and other 75 normal chidren were from a coaching centre. Study was carried out with ethical committee clearance. All measurements were taken after obtaining written consent of adult in-charge. Any subject who had any obvious physical deformity, craniofacial trauma & obstructive hairstyle affecting the results was excluded from the study.

The anatomical landmarks i.e. glabella, inion and euryon were marked. The anatomical landmarks were defined as fallows :

Glabella : A point above the nasal root between the eyebrows and intersected by mid-sagittal plane.
Inion: The distal most point placed on the external occipital protuberance in the mid-sagittal plane.
Euryon: The lateral most point placed on the side of the head.

All the measurements were taken with the subject sitting in chair, in relaxed condition & the head in the anatomical position. The method used for assessing cranial index was Hrdlicka's method[7]. The maximum head length was measured as the maximum antero-posterior diameter by spreading callipers from glabella to inion. The maximum head breath was measured as the maximum transverse diameter between two euryons using spreading callipers. All measurements were taken in centimetres and to an accuracy of 0.10.The cephalic indices were calculated by multiplying the head breadth with 100 and dividing it with the head length. Depending upon these indices the types of head shapes were classified as given by Williams et al, 1995[8].

SERIAL NO.	HEAD SHAPE	CEPHALIC INDEX RANGE
1	Dolicocephalic	<74.9
2	Mesocephalic	75.0 ---79.9
3	Brachicephalic	80.0 --- 84.9
4	Hyperbrachicephalic	85.0 --- 89.9

Statistical Analysis: The data was analysed by Microsoft Excel and all the statistical tests and calculations were performed using the software Graph-pad Prism Version 5. From the observations of the present study the parametric data were analysed using unpaired 't' test (for two unmatched population). The non-parametric data (number of subjects) were analysed by chi-square test to find the association. P value < 0.05 was considered as the minimum level significance[9].

Spreading Callipers

Taking Measurements Of Head By Spreading Callipers

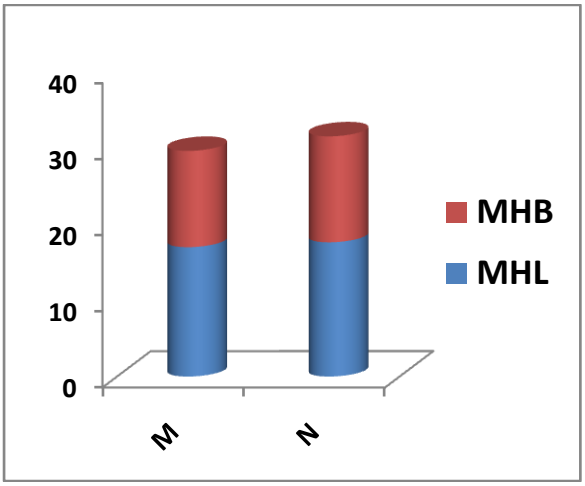
III. Observations And Results

From the collected data, the mean values and standard deviation (SD) were calculated for maximum head length (MHL), maximum head breadth (MHB) and cephalic index (C.I.). The summary of the results of these parameters are presented in Table 1 and 2. Comparison of cephalic index with other population was presented in Table - 3.

TABLE – 1 Cephalic dimensions and cephalic indices of mentally retarded and normal children

Serial No	Types of children	Mean ± SD		
		Maximum head length (cm)	Maximum head breadth (cm)	Cephalic index
1	Mentally retarded	17.01±1.40	12.66±1.04	71.57±4.67
2	Normal	17.65±0.77	13.93±0.78	78.97±4.54

GRAPH-1



GRAPH-2

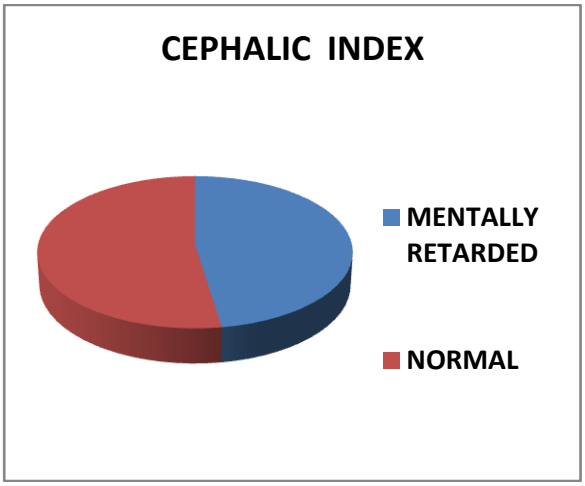


Table-2 Distribution Of Head Shapes In Different Groups Of Children

Serial no	Types of children	Dolicocephalic	Mesocephalic	Brachycephalic	Hyperbrachycephalic
1	Mentally retarded	56(74%)	16(21%)	3(4%)	0
2	Normal	17((23%)	30(40%)	22(29%)	6(8%)
Chi-square value : 31;df: 2 p< 0.0001					

GRAPH-3

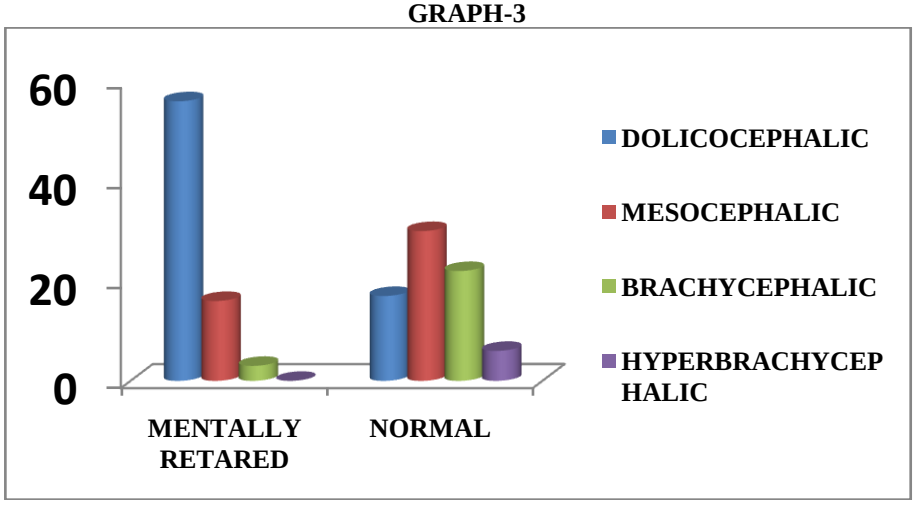


Table-1 shows that the mean cephalic index of mentally retarded children was 71.57±4.67 but the mean cephalic index of normal children was 78.97±4.54. The difference between mean cephalic index of mentally retarded children and normal children was significant ($p < 0.001$). Similarly, the mean head length and mean head breadth for mentally retarded children were 17.01±1.40 and 12.66±1.04. The head length and head breadth for normal children were 17.65±0.77 and 13.93±0.78. The mean head length and mean head breadth of mentally retarded children were significantly less that of normal children.

Table-2 shows that maximum number of mentally retarded children (56/75) (74%) were dolicocephalic, then (16/75) mesocephalic followed by (3/75) brachycephalic. But in normal children maximum number of children (30/75) (40%) were mesocephalic, then brachycephalic(%) followed by dolicocephalic(%) and hyperbrachycephalic. Chi-square test revealed that there was a significant association between different groups of children and head shapes as calculated from the cephalic indices.

IV. Discussion

Serial no	Name of worker	Dominant head shape	
		Mentally retarded children	Normal children
1	Jayaraj et al, 2011, Bangalore[10]	Hyperbrachycephaly	Brachycephaly
2	Shailaja et al, Karnataka[11]	Brachycephaly	
3	Manjunath et al, Karnataka[12]	Brachycephaly	Mesocephaly
4	Present study	Dolicocephaly	Mesocephaly

Mental retardation is an important social as well as health problem in India where >500 million individuals were suffered from mental retardation. The result of present study shows that dolicocephaly is the predominant head shape among subjects with mental retardation whereas mesocephaly is the predominant head shape amongst normal children. Similar type of study done by Jayaraj et al, 2011 at Bangalore observed that hyperbrachycephaly was the predominant head shape in mental retardation children whereas brachycephaly was the predominant head shape among normal children. Also Shailaja et al at Karnataka found that brachycephaly (47%) and hyperbrachycephaly(21%) were the predominant head shape in mentally retarded children of Ashakiran (a school for mentally retarded children) at Devngere, Karnataka. The study by Manjunath showed mesocephaly among normal Indians but brachycephaly in mentally retarded individuals.

V. Conclusion

The mean cephalic index points to dolicocephaly amongst mentally retarded children while mesocephaly amongst normal children in southern Odisha. On the basis of anthropometric measurements, it was possible to conclude that mentally retarded children have a specific and recognisable anthropometric pattern with significantly expressed deviations from normal control group.

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