CEPHALOMETRIC, ANTHROPOMETRIC AND I.Q. ASSESSMENT OF NORMAL CHILDREN FROM 6 TO 12 YEARS OF AGE

THESIS

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INTRODUCTION

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In view of the fact that no two persons are ever alike in all their measurable characters. It is desirable to have some means of measuring the dimensions of the body (Ashley, 1960).

Since the time of Broca, (1879), the famous french anthropologist, anthropometric methods were continuously introduced as research means in the field of head and face growth.

The use of anthropometric methods in such researches makes it possible to evaluate growth changes quantitatively. The dimensions of the head are considered along with other physical and also mental features as criteria for assessing the general development of the child. (Boyd, 1945).

In order to make cephalometric standards, other measures that will serve to follow the changes in head growth must be taken into consideration (Ashley, 1960). So, the body weight and height will be measured in this study.

There is a significant correlation between body size and IQ scores (Porter, 1892). Longitudinal studies of intelligence test scores indicate that differences in rates of maturing occur in mental ability just as they do in height and weight (Bayley, 1956; Tanner,1962).

A single IQ test will be done in this study which is Goodenough draw a man test. Farmer, (1964) stated that this test is a standardized psychological test based on the ability to draw a person, even without resorting to detailed standards, the physician can ascertain much from observing such a drawing. Terman, (1928) indicated that Goodenough draw a man test is useful for general surveys and tentative classifications.

Environmental factors are assumed to play a major role in modifying the IQ level (Ellingworth, 1968). The effects of the environment on intelligence are widespread and continue to exert an influece throughout childhood (Elles, 1956).

The environment in which the child lives, the home is the most important in its effect because he is dependent on it physically and psychologically (Loutfy, 1978).

It was found by Vernon, (1951) that children with many sibs in the family were retarded in their height growth compared with children of the same social class with few sibs this is also true in children of poor families who score lower in tests of intelligence.

Gad et al., (1987) found that socio-economic factors including parents education had an effect on the level of the I.Q.

Rural children have usually been found to make lower intelligence test scores than Urban children (Visher, 1937). So, a comparison will be carried out between data obtained from urban children with that from rural children.

AIM OF THE WORK

(A) To report the attained head measurements, stature, body weight and IQ level by age, sex and area of Egyptian children aged 6-12 years examined in the Giza Government in period 1989 - 1990, in both urban and rural areas.

(B) To compare the results by age, sex and area.

(C) To correlate between IQ level.

- and each of the measurements taken
- with some social and environmental factors included in this study as :
  1. Parent's education
  2. Number of sibs.
  3. Order of birth.

REVIEW OF LITERATURE

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Cephalometry

Growth of the Human Skull

The growth of the human skull has been recorded in many ways over the centuries, ranging from the drawings found in the tombs of ancient Egypt to the computer drawn plots of modern time (Sullivan, 1978).

Developmentally the structure of the skull can be divided into two components., the neurocranium, concerned with the support and protection of the brain, and the viscerocranium (nasofacial complex), concerned with the mechanisms of respiration, mastication and speech.

Growth of the human skull has been accompanied by a marked increase in the brain capacity, which has resulted in enlargement of the neurocranium (Moss,1954).

The change in shape between infant and adult skull is related to the relative increase in size of the nasofacial complex (viscercranium) when compared to neurocranium (Calvaria).

Between birth and adult life the volume of the calvaria increases four times, and the volume of the facial region about 12 times. Furthermore about 80% of the postnatal growth of the calvaria occurs during the first two years. (Sullivan, 1978).

Cranial growth follows the dictate of the brain by one year the brain has attained nealry 50% of its total size (in terms of weight). Two years later, this figure is 75%, then 90% by about 7, and it is completed by 10-12 years of age. (Israel,1978).

Growth of the human head

According to Meredith, 1953, the postnatal growth of the human head progresses most intensely in two periods : birth to 7 years, and from pubescence to the middle teens.

This first phase is mainly a reflection of the rapid growth of the brain at this time. The period from 7 years to pubescence is one of relative stagnation.

The subsequent acceleration during adolescence is most conspicuous in the circumference and length of the head, and lasts until the 15th or 16th year. Subsequent growth in all dimensions is minimal and does not exceed 1-2% of the total.

Boyed, 1945 had noticed that even at birth all the dimensions of boys were greater than those of girls. The difference is evident throughout growth, except for its diminution during the earlier pubertal acceleration of growth in girls.

The head and other parts of the body stop growing earlier in girls. At the age of 15 years all dimensions of the head attain about 99% of their mature values, while growth is more or less uninterrupted in boys from 16 to 20 years (Bayley, 1935).

According to Peter et al., 1928 the continuing growth of the head past this age does not exceed 2-4 mm. It is chiefly explained by accumulation of subcutaneous adipose tissue, and perhaps by an increasing bulk of muscles of mastication, especially the temporalis. Very little of it is produced by growth of the skull.

This processes are noticeable during the age range of 20-30 years, but after 35 years some populations exhibit a slight reduction, so that the average figures at 40-50 years are almost identical with those at 20 years.

Regional growth patterns of the skull

The skull is a complex structure formed from many component bones which articulate along an intricate pattern of junctions. Thus any individual change in size of a component bone must be accompanied by a balanced readjustment in the adjacent bones.

The different regions of the skull do vary one from another, not only in the obvious morphologic and functional characteristics, but also in the balance between the growth mechanisms employed to bring about the integrated chang in size and shape (Sullivan, 1978).

Calvaria

The cranial vault is constructed from the frontal and parietal bones and parts of the temporal, occcipital and sphenoid bones. These bones are plate like in structure and are formed by ossification in membrane.

At birth the bones are separated anteriorly, posteriorly and at other locations in the calvarium by six fontanelles. Each fontanelle is bridged by a fibrous membrane, which becomes progressively reduced in size by bone formation around the periphery of the adjacent bones. The anterior fontanelle is the last to close at about 18 months, leaving the bones of the cranial vault in contact along a complex pattern of suture lines.

The increase in size of the cranial vault necessary to accomodate the progressively enlarging brain is accomplished by bone deposition along the lines of the sutural system.

The curvature of the surface of a larger sphere is less than that of a small sphere. The adult's calvarium is larger than the infant's and shows a corresponding reduction in curvature (Frost, 1964).

Thus, in addition to increase in circumference by sutural deposition, the bones of the cranial valut undergo a progressive flattening. The reduction in curvature is carried out by selective bone deposition and resorption at areas over both the inner and outer surfaces of the bones.

Originally, the sutures were regarded as primary growth centers (Weinmann and Sicher, 1956), that is the new bone laid down at the suture interface was thought to be responsible for the movement apart of the adjacent bones.