"A COMPARATIVE STUDY OF DEVELOPMENT OF METABOLIC RATE IN NORMAL AND DEAF AND DUMB BOYS BETWEEN 8 TO 14 YEARS"

Dr. Pradeep B. Dube, Principal, M. S. M's. College of Physical Education, Aurangabad, *1
Dr. Shatrunjay M. Kote, Ph.D., Assistant Prof., M. S. M's. College of Physical Education, Aurangabad, *2
Prof. R. S. Rokade, Associate Professor, M. S. M's. College of Physical Education, Aurangabad,*3
Mr. Surendra Modi, Athletics Coach, Dr. B. A. M. University, Aurangabad*4

ABSTRACT

A comparative study of development of Metabolic Rate in normal and deaf and dumb boys between 8 to 14 years is administered on around 350 students of different schools who were taking formal education. Out of 350 students 175 were selected from normal category and 175 from physically challenged i.e., deaf and dumb category. In each 25 boys were selected (25 subjects in normal boys and in each age group i.e., 8, 9, 10, 11, 12, 13 & 14 years totaling to 175; 25 subjects in deaf and dumb in each age group i.e., 8, 9, 10 11, 12, 13 & 14 years totaling to 175). These subjects were tested initially in Canadian Fit Test for Metabolic Rate and the same subjects were exposed to the same tests after exactly one year without any formal sports training and the development in their Metabolic Rate was noted. After the statistical treatment of data by utilizing 't' test the following findings were noted: The steady development in metabolic rate is observed from negative to positive in normal boys till 14^{th} years. An uneven distribution of development in metabolic rate is observed in deaf dumb boys.

INTRODUCTION:

Today's education is not merely a vast sea of mental acrobatics but also a source of physical activity that leads to all round perfection of an individual. Modern thinkers in education, now a day, emphasize that the best individual is one who is physically fit, mentally sound and sharp, emotionally balanced and socially well adjusted and as a result the birth of physical education is witnessed. The broad objectives of physical education are physical development, motor development, mental development and social development.

The three major structural components of the human body include muscle, fat and bone. Because there are marked gender differences in body composition, a convenient basis for evaluation and comparison is to employ the concept proposed by Behnke of the reference man and reference woman. The theoretical model is based on the average physical dimensions obtained from detailed measurements of thousands of individuals from large-scale anthropometric survey. The reference man is taller, heavier, his skeleton weighs more, and he has a larger muscle mass and lower total fat content than the reference female.

Growth and development is a lifelong process. Each and every aspect of human being is subject to the process of growth and development. In sports we consider physical and physiological aspects, psychological and social aspects and motor development aspects. Physical and physiological development is the most important aspect of growth and development for

sports and physical education. It covers the development of height, weight, sitting height, various muscle girths, diameter of bones at different joints, fat percentage which are directly or indirectly related to motor abilities, sports skills, tactical efficiencies, motor performance and motor behavior, which are again the prerequisites of sports performance.

The need today is to search some extraordinary talent in an individual for the laurels in international sports arena. In this case it becomes obvious that the search should not limit only with the normal. The qualities that an individual possess should be innate and may be nurtured with good scientific platform, deaf dumb being no exception to it. Hence the search to prove the innate qualities of the deaf and dumb and bring them to equal stature with normal is the prime aim of the researcher.

NEED OF THE STUDY:

The population of the normal mass is comparatively more to the deaf dumb resulting the opportunities designed are more for normal mass. But at the same time there is a society always struggling to uplift the physically challenged and trying to give them the best and equal opportunities so that the handicapped ability should not be the hurdle in normal and natural unfolding of an individual.

Considering the inability, which has the opportunity to be converted into compensatory ability for excelling in the sports arena the researcher, felt high need to evaluate the development of Metabolic Rate among the deaf dumb and compare with the normal, which is a performance prerequisite.

OBJECTIVES OF THE STUDY:

1. To find out, access and analyze the developments taking in Metabolic Rate among normal boys and that of deaf dumb at particular age group.
2. To understand if any higher or compensatory ability among deaf dumb children is noticed when compared to the normal children.
3. To understand various parameters of Metabolic Rate in certain age group of certain physical abnormality.
4. To understand scientific base for methods of training physically challenged children.
5. To understand how the society would help its weak counterpart.

SIGNIFICANCE OF THE STUDY:

1. The study may reveal the physical and mental problems of deaf dumb children.
2. The study may also profound a training methodology and loading procedure in Metabolic Rate for physically challenged children in specific age group.
3. Results may also be helped to enhance sports terminology communication skills with physically challenged children.
4. Evaluation of development of Metabolic Rate may fetch platform for establishing training methodology for enhancing performance in specific sports.

5. The comparison of development of Metabolic Rate will give clear picture of the positive and negative aspects of strength abilities, which in turn ensure the proper training.

DEFINITION OF THE TERMS:

DEVELOPMENT:

Development is a process of qualitative transformation, which brings about progressive changes towards maturity and functional improvement in the organism of human being.

GROWTH:

Growth is a process anatomical in nature involves structural changes and quantitative to measure.

METABOLIC RATE:

The term intermediary metabolism refers to the vast web of interconnected chemical reactions by which all the cell's constituents, many rarely found outside it, are created and destroyed. Anabolic reactions use energy to build complex molecules from simpler organic compounds (e.g., proteins from amino acids, carbohydrates from sugars, fats from fatty acids and glycerol); catabolic reactions break complex molecules down into simpler ones, releasing chemical energy. For most organisms, the energy comes ultimately from the Sun, whether they obtain it by photosynthesis and store it in organic compounds or by consuming those organisms that do so. In some bacteria in special environments such as deep-sea vents, the energy comes from chemical reactions instead. Energy is transferred within the cell and the organism by ATP; anabolic reactions consume it, and catabolic reactions generate it. Every cellular chemical reaction is mediated by a specific enzyme. The process that breaks down a substance is usually not the reverse of the process that makes it, using a different enzyme. *See also* digestion; fermentation; glycolysis; tricarboxylic acid cycle.

NORMAL CHILD:

Normal: typical; usual; healthy; according to the rule or standard. If a child is found to be disease free, exhibits proper growth and development according to the age in its physical, mental and social health and status, then he/she may be defined as a normal child.

DEAF AND DUMB:

Deaf: is unable to hear; hearing indistinctly; hard of hearing.

Dumb: is mute; speechless; unable to speak.

8 TO 14 YEARS (CHRONOLOGICAL AGE):

Chronological age is the number of years and days elapsed since birth.

METHODOLOGY:

SAMPLE:

The samples of this study is randomly selected from different schools with their date of birth lying between 1999 to 1993 in normal subjects (boys) and deaf dumb subjects (boys). The selected age groups of the subjects were from 8 to 14 years. In each group 30 subjects were selected initially with a margin of ±5. All the selected subjects were non-sportsman staying either in school hostels or at their residence to ensure the untrained development in motor abilities. In all 350 subjects were tested initially and the same 350 subjects were tested finally after one academic year (12 months). The tests were conducted for two days for four hours on each group of 25 subjects approximately. In all 350 subjects were considered for obtaining the difference between development is evaluated by subtracting the initial test from the final test score. Every subject was allotted with a code and a separate self contained form for test results. The tests were selected in the aspects of growth and development. In growth, height and weight is evaluated and in development of motor abilities the researcher has selected the standard test in **endurance** and its complex forms for evaluation. The tests were administered individually under standard conditions applicable for specific tests and the time period required between two tests is amply considered.

VARIABLES:

Dependent Variables: (1) Normal boys. (2) Deaf Dumb boys.

Independent Variables: Development of Metabolic Rate.

Inter-weaning Variable: Age groups (8, 9, 10, 11, 12, 13 & 14)

TOOLS AND MEANS:

The research scholar has used some of the selected Metabolic Rate tests which are applicable to the selected age group and samples and are universally accepted and established standard tests for assessing development of motor abilities.

Metabolic Rate: (1) Canadian Fit Test (20 meters shuttle run).

PROCEDURE:

The subjects were selected from different schools in normal category (boys) and deaf dumb schools (boys). In all 01 test was selected for evaluating the development of Metabolic Rate of the subjects between 8 to 14 years. The tests were administered with all specified and standard conditions starting with warming up exercises, optimum active rest periods in between and cooling down at the end. The conditions of the subjects were observed normal and motivated to take part in the tests. An introductory talk regarding the initial day's workout is assessed for confirmation of tirelessness and recovered state.

STATISTICAL METHODS:

To analyze the collected data the scores are arranged according to the comparison and in sequential order so as to find out the statistical values. The following statistical variables are selected for comparing, analyzing and interpretation of numerical values and basing on which the findings are discussed.

(1) Mean is computed by adding all the scores and then dividing by the number of scores involved. The mean is used in the study to measure the average development.

(2) For testing the hypothesis for the difference between various sample means the t test is used at significance of .05 levels.

(3) For testing the hypothesis for the difference between various sample means the f test is used at significance of .05 levels.

RESULTS AND DISCUSSIONS:

The steady development in metabolic rate is observed from negative to positive in normal boys till 14^{th} years. An uneven distribution of development in metabolic rate is observed in deaf dumb boys.

RESULTS OF THE COMPARISON OF THE DEVELOPMENT OF METABOLIC RATE OF BOYS (NORMAL AND DEAF-DUMB) BETWEEN 8 YEARS TO 14 YEARS (CANADIAN FIT TEST)

Normal boys:

1. The maximum mean of development of metabolic rate in normal boys was found at the age of 14th year, which is 0.352 and the minimum at 12th year, which is 0.012. The average mean of development of metabolic rate normal boys between 8 to 14 years is found to be -0.001.
2. The standard deviation of development of metabolic rate in normal boys is found maximum at the age of 11th year, which is 0.54 and minimum at the age of 9th year, which is 0.03. The average standard deviation of development of metabolic rate in normal boys between 8 to 14 years is found to be 0.40.
3. The correlation of development of metabolic rate in normal boys between 8 years to 14 years of age groups is found as high as 0.93.

Deaf-dumb boys:

1. The maximum mean of development of metabolic rate in deaf-dumb boys was found at the age of 8th year, which is -0.332 and the minimum at 14th year, which is -0.04. The average mean of development of metabolic rate in deaf-dumb boys between 8 to 14 years is found to be -0.06.
2. The standard deviation of development of metabolic rate in deaf-dumb boys is found maximum at the age of 14th year, which is 0.44 and minimum at the age of 9th year, which is 0.22. The average standard deviation of development of metabolic rate in deaf-dumb boys between 8 to 14 years is found to be 0.32.

3. The correlation of development of metabolic rate in deaf-dumb boys between 8 to 14 years of age groups is found as high as 0.96.

COMPARISON OF BOYS (Normal and deaf-dumb):

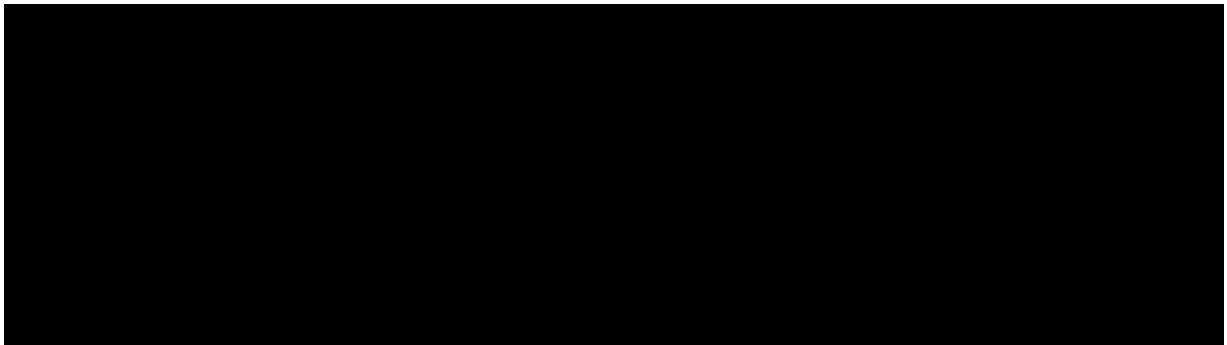
The average mean of development of metabolic rate of normal boys between 8 to 14 years is -0.001, which is less to -0.06 that of the deaf-dumb boys between 8 to 14 years. The difference of mean of development of metabolic rate between normal boys and that in the deaf-dumb boys is -0.059, which is insignificant. The maximum mean of development of metabolic rate in normal boys is found at the age of 14th year, which is 0.35 and that in the deaf-dumb boys it is at the age of 8th year, which is -0.33.

Table No. IV.15: evaluation of significance of development of metabolic rate in normal and deaf-dumb (boys) by using t-test and F-test.

BOYS (NORMAL & DEAF-DUMB)	t-Test Results	F-Test Results	COMMENTS
08 NB & DDB	0.006	0.319	Insignificant
09 NB & DDB	0.656	0.141	Insignificant
10 NB & DDB	0.014	0.036	Insignificant
11 NB & DDB	0.260	0.002	insignificant
12 NB & DDB	0.247	0.208	Insignificant
13 NB & DDB	0.013	0.255	Insignificant
14 NB & DDB	0.0015	0.911	insignificant

* Significant at 0.05 level.

MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: BOYS (N & DD)	METABOLIC RATE INITIAL	METABOLIC RATE FINAL	METABOLIC RATE DEVELOPMENT
NORMAL BOYS 08 YEARS	16.232	16.128	-0.104
DEAF & DUMB BOYS 08 YEARS	14.676	14.344	-0.332
NORMAL BOYS 09 YEARS	15.08	14.8	-0.28
DEAF & DUMB BOYS 09 YEARS	14.34	14.432	0.092
NORMAL BOYS 10 YEARS	14.116	14.008	-0.108
DEAF & DUMB BOYS 10 YEARS	14.18	14.292	0.112
NORMAL BOYS 11 YEARS	14.368	14.348	-0.02
DEAF & DUMB BOYS 11 YEARS	13.9	13.96	0.06
NORMAL BOYS 12 YEARS	13.576	13.588	0.012
DEAF & DUMB BOYS 12 YEARS	13.292	13.384	0.092
NORMAL BOYS 13 YEARS	13.668	13.796	0.128
DEAF & DUMB BOYS 13 YEARS	12.948	12.82	-0.128
NORMAL BOYS 14 YEARS	13.868	14.22	0.352
DEAF & DUMB BOYS 14 YEARS	13.248	13.208	-0.04



REFERENCES:

1. SKINNER, M. W., "Hearing Aid Evaluation," New York: Prentice Hall, (1988).
2. DAVIS, J. M. AND HARDICK, E. J., "Rehabilitative Audiology for Children and Adults," New York: Macmillan Publishing Company (1986).
3. CALVERT, S. R. and SILVERMAN, S. R., "Speech and Deafness: A Text for Learning and Teaching," Washington DC: Alexander Graham Bell Association, (1975).
4. ROSS, M., BRACKETT, D. and MAXON, A. B., "Assessment and Management of Mainstreamed Hearing-Impaired Children: Principles and Practices," Texas: Shoal Creek Boulevard, (1991).
5. SCHOW, R. L., and NERBONNE, M. A., "Introduction to Aural Rehabilitation," New York: Prentice Hall, (1989).
6. BORDEN, G. L., and HARRIS, K. S., "Speech Science Premier," London: Williams and Wilkins, (1988).
7. LEHMAN, M. E., and SCHARF, D. J., "Perception / Production Relationships in the Development of the Vowel Durational Cue to Final Consonant Voicing," Journal of Speech and Hearing Research, 32, 803-815, (1988).