

“A COMPARATIVE STUDY OF DEVELOPMENT OF VO₂ MAX IN NORMAL AND DEAF AND DUMB GIRLS BETWEEN 8 TO 14 YEARS”

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ABSTRACT

A comparative study of development of VO₂ Max in normal and deaf and dumb girls 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 girls were selected (25 subjects in normal girls 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 VO₂ Max and the same subjects were exposed to the same tests after exactly one year without any formal sports training and the development in their VO₂ Max was noted. After the statistical treatment of data by utilizing 't' test the following findings were noted: An uneven distribution of development in and VO₂ max is observed in deaf dumb girls and normal girls. The reduction in metabolism and VO₂ max is observed after 11th till 14th year in normal and deaf dumb girls.

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 VO₂ Max 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 VO₂ Max among normal girls 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 VO₂ Max 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 VO₂ Max 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 VO₂ Max may fetch platform for establishing training methodology for enhancing performance in specific sports.
5. The comparison of development of VO₂ Max 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.

VO₂ MAX:

It is the aerobic capacity is measured by the maximum amount of oxygen which can be consumed by the working muscles in one minute (VO₂ max). When VO₂ max is divided by the body weight of the sportsman then we get the relative VO₂ max. i.e., the amount of oxygen consumed per kilogram of body weight per minute.

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 (girls) and deaf dumb subjects (girls). 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 girls. (2) Deaf Dumb girls.

Independent Variables: Development of VO₂ Max.

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

TOOLS AND MEANS:

The research scholar has used some of the selected VO₂ Max 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.

VO₂ Max: (1) Canadian Fit Test (20 meters shuttle run).

PROCEDURE:

The subjects were selected from different schools in normal category (girls) and deaf dumb schools (girls). In all 01 test was selected for evaluating the development of VO₂ Max 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:

An uneven distribution of development in VO_2 max is observed in deaf dumb girls and normal girls. The reduction in metabolism and VO_2 max is observed after 11th till 14th year in normal and deaf dumb girls.

RESULTS OF THE COMPARISON OF THE DEVELOPMENT OF VO_2 MAX OF GIRLS (NORMAL AND DEAF-DUMB) BETWEEN 8 YEARS TO 14 YEARS (CANADIAN FIT TEST)

Normal girls:

1. The maximum mean of development of maximum oxygen uptake capacity – VO_2 max in normal girls was found at the age of 13th year, which is -1.3 and the minimum at 8th year, which is -0.21. The average mean of development of maximum oxygen uptake capacity – VO_2 max in normal girls between 8 to 14 years is found to be -0.84.
2. The standard deviation of development of maximum oxygen uptake capacity – VO_2 max in normal girls is found maximum at the age of 10th year, which is 1.85 and minimum at the age of 11th year, which is 1.25. The average standard deviation of development of maximum oxygen uptake capacity – VO_2 max in normal girls between 8 to 14 years is found to be 1.52.
3. The correlation of development of maximum oxygen uptake capacity – VO_2 max in normal girls between 8 to 14 years of age groups is found as high as 0.89.

Deaf-dumb girls:

1. The maximum mean of development of maximum oxygen uptake capacity – VO_2 max in deaf-dumb girls was found at the age of 14th year, which is -1.7 and the minimum at 13th years, which is -0.52. The average mean of development of maximum oxygen uptake capacity – VO_2 max in deaf-dumb girls between 8 to 14 years is found to be -0.94.
2. The standard deviation of development of maximum oxygen uptake capacity – VO_2 max in deaf-dumb girls is found maximum at the age of 14th year, which is 2.06 and minimum at the age of 10th year, which is 1.09. The average standard deviation of development of maximum oxygen uptake capacity – VO_2 max in deaf-dumb girls between 8 to 14 years is found to be 1.37.
3. The correlation of development of maximum oxygen uptake capacity – VO_2 max in deaf-dumb girls between 8 to 14 years of age groups is found as high as 0.90.

COMPARISON OF GIRLS (Normal and deaf-dumb):

The average mean of development of maximum oxygen uptake capacity – VO_2 max of normal girls between 8 to 14 years is -0.84, which is more than -0.94 of the deaf-dumb girls between 8 to 14 years. The difference of mean of development of 'maximum oxygen uptake capacity' – VO_2 max between normal girls and that in the deaf-dumb girls is -0.10, which is insignificant. The maximum mean of development of 'maximum oxygen uptake capacity' – VO_2

max in normal girls is found at the age of 13th year, which is -1.3 and that in the deaf-dumb girls it is at the age of 14th year, which is -1.7.

Table No. IV.18: evaluation of significance of development of VO₂ max in normal and deaf-dumb (girls) by using t-test and F-test.

GIRLS (NORMAL & DEAF-DUMB)	t-Test Results	F-Test Results	COMMENTS
08 NG & DDG	0.179	0.447	Insignificant
09 NG & DDG	0.254	0.160	Insignificant
10 NG & DDG	0.244	0.012	Insignificant
11 NG & DDG	0.380	0.261	insignificant
12 NG & DDG	0.441	0.126	Insignificant
13 NG & DDG	0.035	0.418	Insignificant
14 NG & DDG	0.049	0.034	insignificant

* Significant at 0.05 level.

MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: GIRLS (N & DD)	VO2 MAX INITIAL	VO2 MAX FINAL	VO2 MAX DEVELOPMENT
NORMAL GIRLS 08 YEARS	53.488	53.272	-0.216
DEAF & DUMB GIRLS 08 YEARS	52.036	51.488	-0.548
NORMAL GIRLS 09 YEARS	48.364	47.54	-0.824
DEAF & DUMB GIRLS 09 YEARS	48.156	47.08	-1.076
NORMAL GIRLS 10 YEARS	46.988	46.292	-0.696
DEAF & DUMB GIRLS 10 YEARS	48.724	47.728	-0.996
NORMAL GIRLS 11 YEARS	45.628	44.872	-0.756
DEAF & DUMB GIRLS 11 YEARS	48.752	48.12	-0.632
NORMAL GIRLS 12 YEARS	46.824	45.6	-1.224
DEAF & DUMB GIRLS 12 YEARS	47.064	45.904	-1.16
NORMAL GIRLS 13 YEARS	42.856	41.556	-1.3
DEAF & DUMB GIRLS 13 YEARS	44.284	43.76	-0.524
NORMAL GIRLS 14 YEARS	41.24	40.364	-0.876
DEAF & DUMB GIRLS 14 YEARS	43.54	41.84	-1.7



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).
8. HANIN, L., et al, "Tactile Presentation of Voice Fundamental Frequency as an Aid to the Speech-Reading of Ear and Hearing," 6, 335-340, (1988).
9. HOCHBERG, I., LEVITT, H. and OEBERGER, N. J., "Speech of the Hearing Impaired: Research, Training and Personal Preparation," University Park Press, (1983).
10. FLANAGAN, J. L., "Speech Analysis, Synthesis and Perception," New York: Springer Verlag, (1972).