

“A COMPARATIVE STUDY OF GROWTH OF WEIGHT IN NORMAL AND DEAF DUMB BOYS AND GIRLS BETWEEN 8 TO 14 YEARS”

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ABSTRACT

A comparative study of growth in weight in normal and deaf and dumb boys and girls between 8 to 14 years is administered on around 700 students of different schools who were taking formal education. Out of 700 students 350 were selected from normal category and 350 from physically challenged i.e., deaf and dumb category. In each 25 boys and girls were selected (25 subjects in normal boys and girls and in each age group i.e., 8, 9, 10, 11, 12, 13 & 14 years totaling to 350; 25 subjects in deaf and dumb in each age group i.e., 8, 9, 10, 11, 12, 13 & 14 years totaling to 350). These subjects were tested initially in height and weight and the same subjects were exposed to the same tests after exactly one year without any formal sports training and the growth in their height and weight were noted. After the statistical treatment of data by utilizing 't' and 'f' test the following findings were noted: A gradual increase in weight is observed in both boys and girls (normal and deaf dumb) from 8th year to 14th year. The weight spurt of boys is found in the 14th year whereas it is observed in 12th year in case of girls. The proportionate growth in weight with respect to height is observed in both sexes and variables.

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 life long 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.

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 growth of weight among the deaf dumb and compare with the normal, which is a performance prerequisite.

OBJECTIVES OF THE STUDY:

1. To find out, assess and analyze the growth taking in weight among normal boys and girls and that of deaf dumb at particular age group.
2. To understand if any higher or compensatory growth quality among deaf dumb children is noticed when compared to the normal children.
3. To understand various parameters of growth in weight 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 according to the growth in weight 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 growth in weight may fetch platform for establishing training methodology for enhancing performance in specific sports.
5. The comparison of growth in weight will give clear picture of the positive and negative aspects of growth, 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.

WEIGHT:

Growth refers to measurable changes in body size, for example, height, weight.

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.

REVIEW OF RELATED LITERATURE:

- (1) Adams, J., et al.: Total body fat content in a group of professional football players.
- (2) Behnke, A.R., and Wilmore, J.H.: Evaluation and Regulation of Body Build and Composition.
- (3) Behnke, A.R., et al.: Routine anthropometry and arm radiography in assessment of nutritional status.
- (4) Caton, J. R., et al.: Body composition by bioelectrical impedance: effect of skin temperature.
- (5) Freedson, P.S., et al.: Physique, body composition, and psychological characteristics of competitive female body builders.
- (6) Hsieh, S., et al.: Measurement of residual volume sitting and lying in air and water (and during underwater weighing) and its effects on computed body density.
- (7) Jackson, A.S., and Pollock, M. L.: Prediction accuracy of body density, lean body weight, and total body volume equations.
- (8) Katch, F.I., et al.: The ponderal somatogram: evaluation of body size and shape from anthropometric girths and stature.
- (9) Wilmore, J. H.: The use of actual, predicted and constant residual volumes in the assessment of body composition by underwater weighing.

METHODOLOGY:

SAMPLE:

The samples of this study is randomly selected form different schools with their date of birth lying between 1999 to 1993 in normal subjects (boys and girls) and deaf dumb subjects (boys and 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 growth in weight. In all 840 subjects were tested initially and the same 840 subjects were tested finally after one academic year (10 months). The tests were conducted for two days for four hours on each group of 30 subjects approximately. In all 700 subjects were considered for obtaining the difference between growth is evaluated by subtracting the initial test score 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. In growth, weight is evaluated. The tests are administered individually under standard conditions applicable for specific tests and the time period required between two tests is amply considered.

III.2 – VARIABLES:

DEPENDENT VARIABLES: (1) Normal boys. (2) Deaf dumb boys. (3) Normal girls. (4) Deaf dumb girls.

INTERWEAVING VARIABLES: (1) Sex: Boys and Girls. (2) Age: 8 years to 14 years. (3) Criteria: Non sportsman. (4) Times: Initial and Final.

INDEPENDENT VARIABLES: GROWTH: (1) Height. (2) Weight.

TOOLS AND MEANS:

MEANS USED:

Personal data bank: It is used to collect the information of an individual. Personal data bank consists of the following aspect: Full name, name and address of the school, date of birth and age, gender, deaf dumb/ normal, diet (vegetarian/ mix), sportsman / non-sportsman, physical maturity, and weight.

PROCEDURE:

The subjects were selected from different schools in normal category (boys and girls) and deaf dumb schools (boys and girls). In all 2 testes were selected for evaluating the growth of the subjects between 8 to 14 years. The tests were administered with all specified and standard conditions. The condition of the subjects was observed normal and motivated to take part in the tests. An introductory talk regarding the initial day's workout is assessed for confirmation of tireless and recovered state.

COLLECTION OF DATA:

The subjects were selected from different schools in normal category (boys and girls) and deaf dumb schools (boys and girls). In all 2 testes were selected for evaluating the growth in weight of the subjects between 8 to 14 years. To have the difference of data

for assessing the development it was decided to organize the test on 840 subjects; 30 in each group; 28 groups in all and the same subjects to be evaluated after a gap of one academic year. The subjects were tested initially for their growth from 02nd January 2006 to 15th March 2006 and the second test on the same subjects was organized from 01st November 2006 to 15th January 2007 for evaluating the natural growth in height and weight. Much of the samples were collected from the regions of Maharashtra and Andhra Pradesh. The scores are then entered individually in the forms provided accordingly. For identification of variables different colors are used: Normal boys- yellow; Normal girls- green; Deaf dumb boys- blue; Deaf dumb girls- pink.

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 in growth and development.

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

(3) For testing the hypothesis for the difference between sample means, the F-Test is used and also to evaluate the significance of the difference.

RESULTS AND DISCUSSIONS:

A gradual increase in weight is observed in both boys and girls (normal and deaf dumb) from 8th year to 14th year. The weight spurt of boys is found in the 14th year whereas it is observed in 12th year in case of girls. The proportionate growth in weight with respect to height is observed in both sexes and variables.

RESULTS OF THE COMPARISON OF THE GROWTH OF WEIGHT OF BOYS AND GIRLS (NORMAL AND DEAF-DUMB) BETWEEN 8 YEARS TO 14 YEARS (WEIGHING SCALE)

Normal boys:

1. The maximum mean of growth of body weight in normal boys was found at the age of 14th year, which is 2.88kg and the minimum at 8th year, which is 1.36kg. The average mean of growth of weight in normal boys between 8 to 14 years is found to be 1.95kg.
2. The standard deviation of growth of weight in normal boys is found maximum at the age of 10th year, which is 1.11 and minimum at the age of 13th year, which is 0.62. The average standard deviation of growth of weight in normal boys between 8 to 14 years is found to be 0.93.
3. The correlation of growth of weight in normal boys between 8 to 14 years of age groups is found as high as 0.97.

Deaf-dumb boys:

1. The maximum mean of growth of weight in deaf-dumb boys was found at the age of 13th year, which is 2.08kg and the minimum at 8th year, which is 0.80kg. The average mean of growth of weight in deaf-dumb boys between 8 to 14 years is found to be 1.42kg.
2. The standard deviation of growth of weight in deaf-dumb boys is found maximum at the age of 9th year, which is 1.25 and minimum at the age of 10th year, which is 0.74. The average standard deviation of growth of weight in deaf-dumb boys between 8 to 14 years is found to be 1.03.
3. The correlation of growth of weight 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 growth of weight of normal boys between 8 to 14 years is 1.95kg, which is more than 1.42kg of the deaf-dumb boys between 8 to 14 years. The difference of mean of growth of weight between normal boys and the deaf-dumb boys between 8 to 14 years is 0.53kg, which is insignificant. The maximum mean of growth of weight in normal boys is found at 14th year, which is 2.88kg and that in the deaf-dumb boys it is found at the age of 13th year, which is 2.08kg.

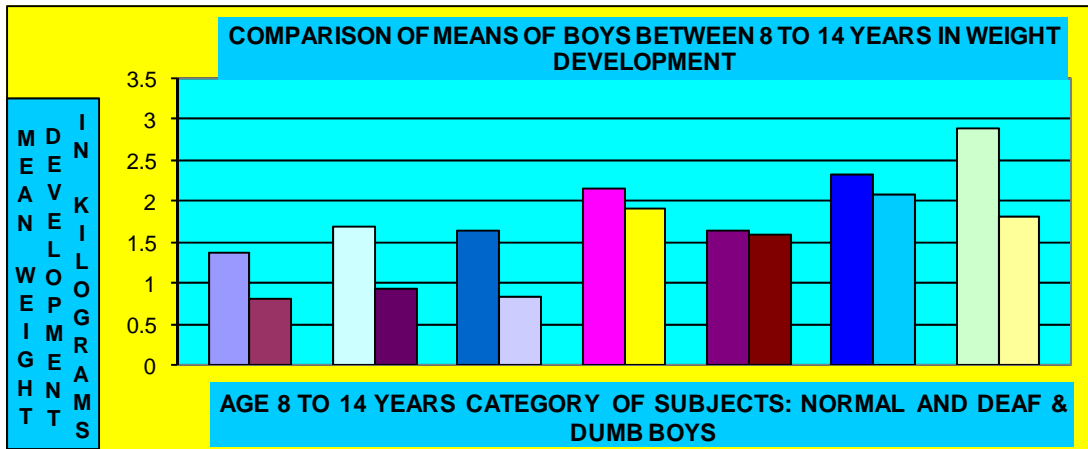
Table: evaluation of significance of growth in weight in normal and deaf-dumb (boys) by using t-test and F-test.

BOYS (NORMAL & DEAF-DUMB)	t-Test Results	F-Test Results	COMMENTS
08 NB & DDB	0.011	0.747	Insignificant
09 NB & DDB	0.007	0.063	Insignificant
10 NB & DDB	0.002	0.055	Insignificant
11 NB & DDB	0.228	0.402	insignificant
12 NB & DDB	0.450	0.623	Insignificant
13 NB & DDB	0.141	0.074	Insignificant
14 NB & DDB	0.0004	0.773	insignificant

* Significant at 0.05 level.

MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: BOYS (N & DD)	WEIGHT INITIAL	WEIGHT FINAL	WEIGHT DEVELOPMENT
NORMAL BOYS 08 YEARS	22	23.36	1.36
DEAF & DUMB BOYS 08 YEARS	20.52	21.32	0.8
NORMAL BOYS 09 YEARS	27.2	28.88	1.68
DEAF & DUMB BOYS 09 YEARS	20.96	21.88	0.92
NORMAL BOYS 10 YEARS	26.44	28.08	1.64
DEAF & DUMB BOYS 10 YEARS	23.6	24.44	0.84
NORMAL BOYS 11 YEARS	27.08	29.24	2.16
DEAF & DUMB BOYS 11 YEARS	30.64	32.56	1.92
NORMAL BOYS 12 YEARS	30.24	31.88	1.64
DEAF & DUMB BOYS 12 YEARS	27.2	28.8	1.6
NORMAL BOYS 13 YEARS	35.48	37.8	2.32
DEAF & DUMB BOYS 13 YEARS	31.44	33.52	2.08

NORMAL BOYS 14 YEARS	42.36	45.24	2.88
DEAF & DUMB BOYS 14 YEARS	37.76	39.56	1.8



Normal girls:

1. The maximum mean of growth of weight in normal girls was found at the age of 12th year, which is 3.24kg and the minimum at 8th year, which is 1.32kg. The average mean of growth of weight in normal girls between 8 to 14 years is found to be 2.10kg.
2. The standard deviation of growth of weight in normal girls is found maximum at the age of 13th year, which is 1.52 and minimum at the age of 8th year, which is 0.85. The average standard deviation of growth of weight in normal girls between 8 to 14 years is found to be 1.02.
3. The correlation of growth of weight in normal girls between 8 to 14 years of age groups is found as high as 0.95.

Deaf-dumb girls:

1. The maximum mean of growth of weight in deaf-dumb girls was found at the age of 13th year, which is 1.92kg and the minimum at 11th year, which is 0.68kg. The average mean of growth of weight in deaf-dumb girls between 8 to 14 years is found to be 1.25kg.
2. The standard deviation of growth of weight in deaf-dumb girls is found maximum at the age of 13th year, which is 2.30 and minimum at the age of 11th year, which is 0.62. The average standard deviation of growth of weight in deaf-dumb girls between 8 to 14 years is found to be 1.20.
3. The correlation of growth of weight in deaf-dumb girls between 8 to 14 years of age groups is found as high as 0.94.

COMPARISON OF GIRLS (Normal and deaf-dumb):

The average mean of growth of weight of normal girls between 8 to 14 years is 2.10kg, which is more than 1.25kg of the deaf-dumb girls between 8 to 14 years. The difference of mean of growth of weight between normal girls and the deaf-dumb girls

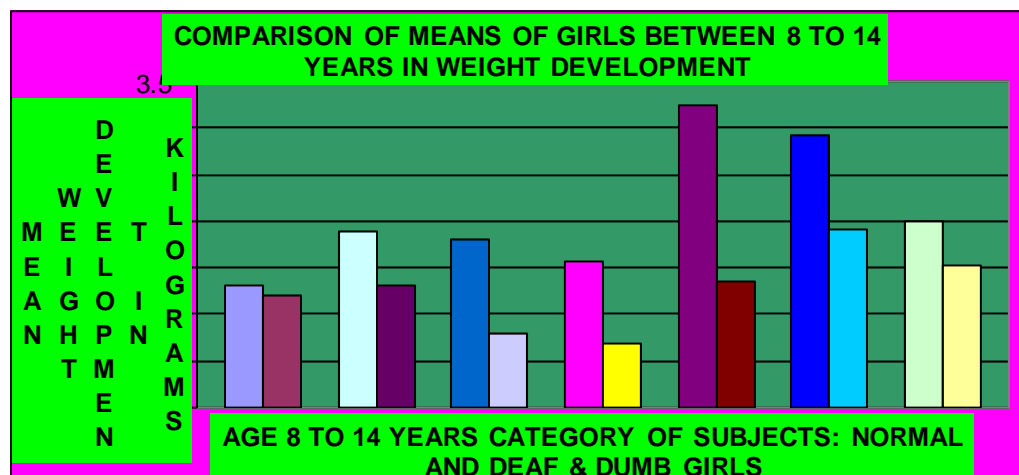
between 8 to 14 years is 0.85kg, which is insignificant. The maximum mean of growth of weight in normal girls is found at 12th year, which is 3.24kg and that in the deaf-dumb girls it is found at the age of 13th year, which is 1.92kg.

Table: evaluation of significance of growth in weight in normal and deaf-dumb (girls) by using t-test and F-test.

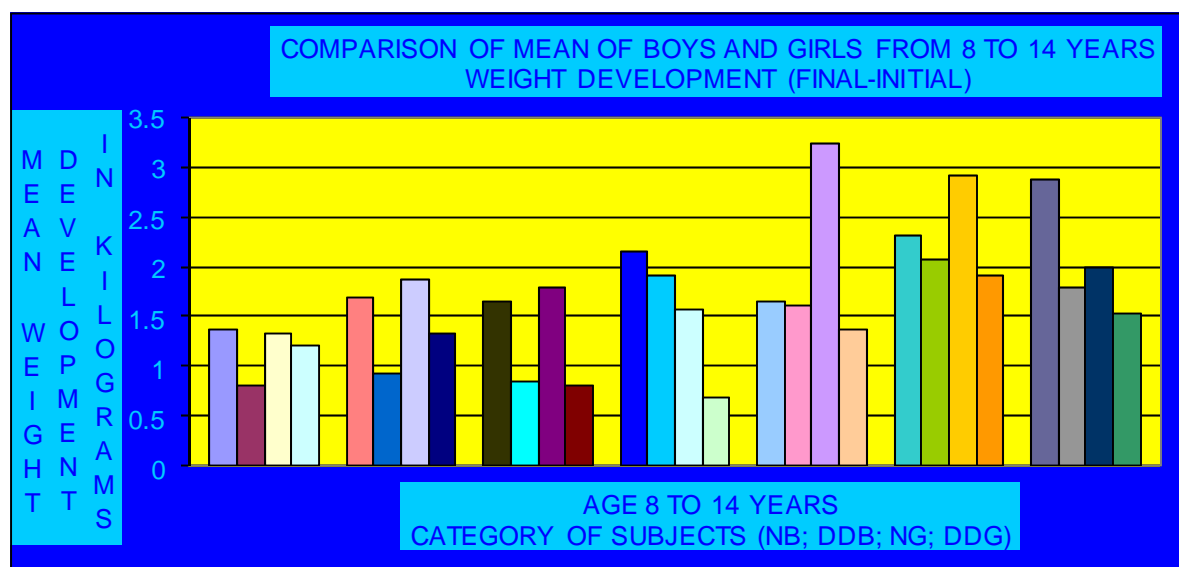
GIRLS (NORMAL & DEAF-DUMB)	t-Test Results	F-Test Results	COMMENTS
08 NG & DDG	0.332	0.253	Insignificant
09 NG & DDG	0.041	0.581	Insignificant
10 NG & DDG	0.0001	0.999	Insignificant
11 NG & DDG	0.0003	0.015	insignificant
12 NG & DDG	1.5E-05	0.670	Insignificant
13 NG & DDG	0.038	0.047	Insignificant
14 NG & DDG	0.058	0.379	insignificant

* Significant at 0.05 level.

MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: GIRLS (N & DD)	WEIGHT INITIAL	WEIGHT FINAL	WEIGHT DEVELOPMENT
NORMAL GIRLS 08 YEARS	19.28	20.6	1.32
DEAF & DUMB GIRLS 08 YEARS	21.44	22.64	1.2
NORMAL GIRLS 09 YEARS	22.08	23.96	1.88
DEAF & DUMB GIRLS 09 YEARS	20.6	21.92	1.32
NORMAL GIRLS 10 YEARS	22.64	24.44	1.8
DEAF & DUMB GIRLS 10 YEARS	23.28	24.08	0.8
NORMAL GIRLS 11 YEARS	27.08	28.64	1.56
DEAF & DUMB GIRLS 11 YEARS	27.04	27.72	0.68
NORMAL GIRLS 12 YEARS	30.96	34.2	3.24
DEAF & DUMB GIRLS 12 YEARS	32.8	34.16	1.36
NORMAL GIRLS 13 YEARS	31	33.92	2.92
DEAF & DUMB GIRLS 13 YEARS	33.96	35.88	1.92
NORMAL GIRLS 14 YEARS	33.56	35.56	2
DEAF & DUMB GIRLS 14 YEARS	36.8	38.32	1.52



MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: BOYS AND GIRLS (N & DD)	WEIGHT DEVELOPMENT (FINAL-INITIAL)	MEAN VALUES AND COMPARISON OF THE CATEGORY OF SUBJECTS: BOYS AND GIRLS (N & DD)	WEIGHT DEVELOPMENT (FINAL-INITIAL)
NORMAL BOYS 08 YEARS	1.36	NORMAL BOYS 12 YEARS	1.64
DEAF & DUMB BOYS 08 YEARS	0.8	DEAF & DUMB BOYS 12 YEARS	1.6
NORMAL GIRLS 08 YEARS	1.32	NORMAL GIRLS 12 YEARS	3.24
DEAF & DUMB GIRLS 08 YEARS	1.2	DEAF & DUMB GIRLS 12 YEARS	1.36
NORMAL BOYS 09 YEARS	1.68	NORMAL BOYS 13 YEARS	2.32
DEAF & DUMB BOYS 09 YEARS	0.92	DEAF & DUMB BOYS 13 YEARS	2.08
NORMAL GIRLS 09 YEARS	1.88	NORMAL GIRLS 13 YEARS	2.92
DEAF & DUMB GIRLS 09 YEARS	1.32	DEAF & DUMB GIRLS 13 YEARS	1.92
NORMAL BOYS 10 YEARS	1.64	NORMAL BOYS 14 YEARS	2.88
DEAF & DUMB BOYS 10 YEARS	0.84	DEAF & DUMB BOYS 14 YEARS	1.8
NORMAL GIRLS 10 YEARS	1.8	NORMAL GIRLS 14 YEARS	2
DEAF & DUMB GIRLS 10 YEARS	0.8	DEAF & DUMB GIRLS 14 YEARS	1.52
NORMAL BOYS 11 YEARS	2.16		
DEAF & DUMB BOYS 11 YEARS	1.92		
NORMAL GIRLS 11 YEARS	1.56		
DEAF & DUMB GIRLS 11 YEARS	0.68		



REFERENCES:

- (1) ADAMS, J., et al.: Total body fat content in a group of professional football players. Can. J. Appl. Sport Sci., 7:36, 1982.
- (2) BEHNKE, A.R., AND WILMORE, J.H.: Evaluation and Regulation of Body Build and Composition. Englewood Cliffs, NJ, Prentice-Hall, 1974.
- (3) BEHNKE, A.R., et al.: Routine anthropometry and arm radiography in assessment of nutritional status: its potential. J. Parent. Enteral. Nutr. 2:532, 1978.

- (4) CATON, J. R., et al.: Body composition by bioelectrical impedance: effect of skin temperature. *Med. Sci. Sports Exerc.* 20: 489, 1988.
- (5) FREEDSON, P.S., et al.: Physique, body composition, and psychological characteristics of competitive female body builders. *Phys. Sportsmed.*, 11:85, 1983.
- (6) HSIEH, S., et al.: Measurement of residual volume sitting and lying in air and water (and during underwater weighing) and its effects on computed body density. *Med. Sci. Sports Exerc.*, 17:204, 1985.
- (7) JACKSON, A.S., AND POLLOCK, M. L.,: Prediction accuracy of body density, lean body weight, and total body volume equations. *Med. Sci. Sports*, 9:197, 1977.
- (8) KATCH, F.I., et al.: The ponderal somatogram: evaluation of body size and shape from anthropometric girths and stature. *Hum. Biol.*, 59:439, 1987.
- (9) WILLMORE, J. H.: The use of actual, predicted and constant residual volumes in the assessment of body composition by underwater weighing. *Med. Sci. Sports*, 1:87, 1969.

WEBSITES:

1. WWW: <http://fairtest.org/facts/readiness.html>
2. WWW: <http://geocities.com/athnes/acropolis/7103/slacq.html>
3. WWW: <http://newswise.com/articles/1999/1/signlang.osu.html>
4. WWW: <http://nidcd.nih.gov/health/parents/speechandlanguage.html>
5. WWW: <http://polity.org.za/html/govdocs/discuss/curricl.html>
6. WWW: <http://www.aap.org/policy/00649.html>
7. WWW: http://www.bris.ac.uk/does/teaching/psy/psydeaf_lecture_10.html
8. WWW: <http://www.ci.shrewsbury.ma.us/sps/schools/beal/readiness.html>
9. WWW: <http://www.deafmess.about.com/library/weekly/aa07100.html>
10. WWW: <http://www.deafsa.co.za/education/edu4.html>
11. WWW: <http://www.deafsa.co.za/education/edu5.html>
12. WWW: <http://www.deafworldweb.org/pub/b/bibi.mason.html>
13. WWW: <http://www.ecrp.uiuc.edu/v2n2/saluja.html>
14. WWW: <http://www.epnet.com/citation.asp.html>
15. WWW: <http://www.geocities.com/babysigning/advantages.html>
16. WWW: <http://www.geocities.com/babysigning/whysign.html>
17. WWW: http://www.kidsource.com/kidsource/content/readiness_for_K.html
18. WWW: http://www.littlepeople.co.za/education_guide/article_01.html
19. WWW: <http://www.suntimes.co.za/2002/01/13/news/news05.asp.html>
20. WWW: <http://specialed.about.com/od/multipliedisabilities/amultiple.htm> 2006.
21. WWW: <http://www.fairtest.org/facts/readiness.html> 1982.