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Meena P
Department of Child Health
Nursing, Saveetha College of
Nursing, SIMATS, Chennai,
Tamil Nadu, India

Preethi Priyadharshini
B.Sc (N) IV Year, Saveetha
College of Nursing, SIMATS,
Chennai, Tamil Nadu, India

A study to assess effectiveness of aerobic exercise on anthropometric measurement among school children

Meena P and Preethi Priyadharshini

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Abstract

Background: Anthropometric measurements are non-invasive quantitative measurements of the body. Provides a valuable assessment of nutritional status in children and adults. They are typically used to assess a child's general health status, nutritional adequacy, and growth and developmental pattern.

Objectives

1. To assess the pre- test level of the anthropometric measurement among school children in experimental group and control group.
2. To determine the effectiveness of aerobic exercise on anthropometric measurement among school children in experimental group.
3. To compare the pre-test and post- test level of anthropometric measurement among school children between the experimental and control group.
4. To associate the post-test level of anthropometric measurement with selected demographic variables among school children on aerobic exercise in experimental group and control group.

Methodology: An Experimental and Quantitative research approach with cross sectional design used in the study was adopted to children in the age around 12-16 years with a sample size of 60 were selected. Data was collected by using demographic variables in structured questionnaire on anthropometric in the pre-test and demonstrated to perform aerobic exercise 30 minutes every day for 5 days with routine care and conducted post-test on 5th day. Confidentiality was maintained throughout the procedure. Collected data were analysed using descriptive and inferential statistics.

Result: We evaluated, a total of 30 students, aged 12-16 years of which 14 boys and 16 girls. Height, Weight, BMI, Waist circumference were calculated for both school girls and boys. The study shows an the aerobic exercises play an vital role and maintain the anthropometric measurement like height, weight, waist circumferences.

Keywords: Conducted post-test, experimental, quantitative

Introduction

Anthropometric measurements are non-invasive quantitative measurements of the body. Anthropometry, according to the Centres for Disease Control and Prevention (CDC), provides a valuable assessment of nutritional status in children and adults. They are typically used in the paediatric population to assess a child's general health status, nutritional adequacy, and growth and developmental pattern. Growth measurements and normal growth patterns are the gold standards by which clinicians assess a child's health and well-being. Body measurements in adults can help assess health, dietary status, and future disease risk. These measurements can also be used to determine body composition in adults to help determine underlying nutritional status and diagnose obesity. Anthropometry is the study of the measurement of the human body in terms of the dimensions of bone, muscle, and adipose (fat) tissue. Anthropometry's core elements are height, weight, head circumference, body mass index (BMI), body circumferences to assess adiposity (Waist, hip, and limbs), and skinfold thickness. Accurate serial anthropometric measurements can help identify underlying medical, nutritional, or social problems in children, according to the American Academy of Pediatrics and the Child Health and Disability Prevention (CHDP) Program Health Assessment Guidelines. Abnormal anthropometric measurements, particularly in the paediatric population, should be investigated further. Anthropometric measurements can also be used to assess body composition in athletes, which has been shown to improve competitive performance and help identify underlying medical issues such as eating disorders.

Corresponding Author:
Meena P
Department of Child Health
Nursing, Saveetha College of
Nursing, SIMATS, Chennai,
Tamil Nadu, India

Anthropometry-driven fitness programmes in athletes have been shown to improve cardiorespiratory fitness and strength. Anthropometric Weight was measured with a portable digital scale (SECA 804, Hamburg, Germany) to 0.1 kg precision, height with a portable stadiometer (SECA 213, Hamburg, Germany) to 0.1 cm precision, and waist circumference was measured over the iliac. Crest, and through the umbilicus with inextensible, metal, self-locking tape (Lufkin W606PM; Cooper Tools, Raleigh, North Carolina), with a 0.1 cm precision. Weight (kg) / height (m)² was used to calculate body mass index (BMI) and participants were divided into two groups Following the WHO reference 200723, individuals are classified as underweight, normal weight, overweight, or obese. Metric measurements are also widely used.

Materials and methods

An Experimental and Quantitative research approach with cross sectional design used in the study was adopted to children in the age around 12-16 years with a sample size of 30 were selected. Data was collected by using demographic variables in structured questionnaire on anthropometric in the pre-test and demonstrated to perform aerobic exercise 30 minutes every day for 5 days with routine care and conducted post-test on 5th day. Confidentiality was maintained throughout the procedure. Collected data were analysed using descriptive and inferential statistics.

Results and Discussion

Section A: Description of the demographic variables of school children.

Table 1: Frequency and percentage distribution of demographic variables of school children in the experimental and control group. N = 60(30+30)

Variables	Experimental Group		Control Group	
	F	%	F	%
Age				
6 – 7 years	11	36.7	13	43.3
7 – 8 years	9	30.0	7	23.3
9 – 10 years	6	20.0	8	26.7
10 – 12 years	4	13.3	2	6.7
Sex				
Male	17	56.7	19	63.3
Female	13	43.3	11	36.7
Religion				
Hindu	21	70.0	19	63.3
Christian	5	16.7	8	26.7
Muslim	4	13.3	3	10.0
Others	-	-	-	-
Economic status				
Upper	6	20.0	7	23.3
Upper middle	17	56.7	14	46.7
Lower middle	7	23.3	9	30.0
Upper lower	-	-	-	-
Lower	-	-	-	-
Type of family				
Nuclear family	21	70.0	18	60.0
Joint family	8	26.7	11	36.7
Extended family	1	3.3	1	3.3
Education of father				
Graduate or post graduate	11	36.7	12	40.0
Intermediate or post high school diploma	14	46.7	14	46.6
High school certificate	3	10.0	2	6.7
Middle school certificate	2	6.7	2	6.7
Primary school certificate	-	-	-	-
Illiterate	-	-	-	-
Education of mother				
Graduate or post graduate	8	26.7	10	33.3
Intermediate or post high school diploma	10	33.3	10	33.3
High school certificate	9	30.0	7	23.3
Middle school certificate	3	10.0	3	10.0
Primary school certificate	-	-	-	-
Illiterate	-	-	-	-
Occupation of father				
Profession	8	26.7	7	23.3
Semi-profession	11	36.7	11	36.7
Clerical, shop owner, farmer	5	16.7	7	23.3
Skilled worker	3	10.0	2	6.7
Semi-skilled worker	1	3.3	2	6.7
Unskilled worker	2	6.7	1	3.3
Unemployed	-	-	-	-
Occupation of mother				

Profession	4	13.3	3	10.0
Semi-profession	5	16.7	6	20.0
Clerical, shop owner, farmer	6	20.0	5	16.7
Skilled worker	6	20.0	6	20.0
Semi-skilled worker	4	13.3	4	13.3
Unskilled worker	3	10.0	4	13.3
Unemployed	2	6.7	2	6.7

The table 1 shows that in the experimental group, 11(36.7%) were aged between 6 – 7 years, 17(56.7%) were male, 21(70%) were Hindus, 17(56.7%) belonged to upper middle class, 21(70%) belonged to nuclear family, 14(46.7%) of fathers had intermediate or post high school diploma

education, 10(33.3%) of mothers had intermediate or post high school diploma education, 11(36.7%) of fathers were semi-professionals and 6(20%) of mothers were clerical, shop owner, farmer and skilled workers.

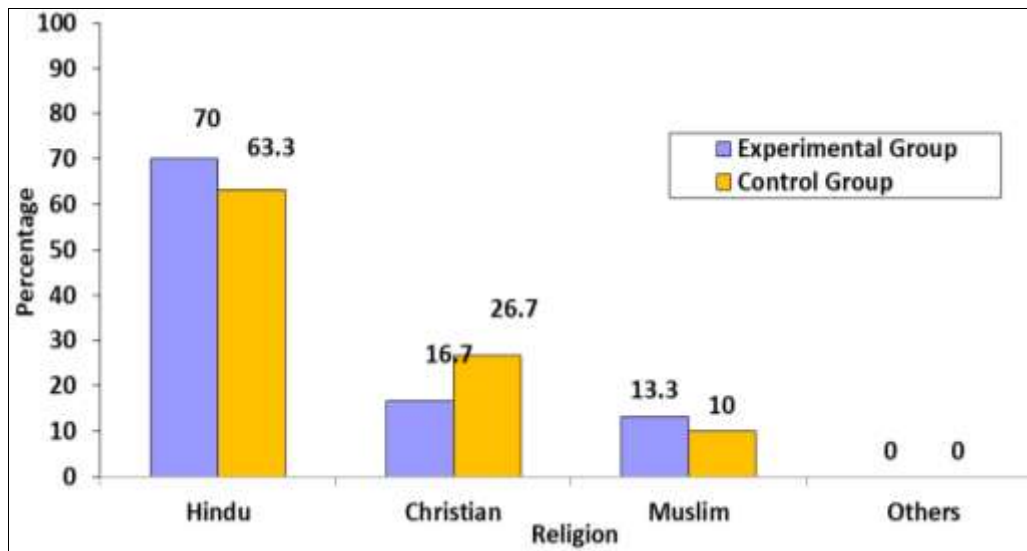


Fig 1: Percentage distribution of religion of the school children in the experimental and control group

Section B: Assessment of anthropometric measurements in the experimental and control group.

Table 2: Assessment of mean and standard deviation of anthropometric measures in the experimental and control group. N = 60(30+30)

Anthropometric Measurements	Experimental Group				Control Group			
	Pretest		Post Test		Pretest		Post Test	
	Mean	S.D	Mean	S.D	Mean	S.D	Mean	S.D
Height	130.40	6.39	130.40	6.39	129.87	5.92	129.87	5.92
Weight	40.37	4.76	35.20	3.31	40.90	4.38	40.80	4.30
BMI	23.89	3.69	20.83	2.72	24.37	3.34	24.31	3.26
Waist	25.37	4.12	23.26	2.28	25.11	3.66	25.07	3.69

The above table 2 shows that in the pre-test of experimental group, the mean score of height was 130.40±6.39 and the post-test mean score was 130.40±6.39. The pre-test mean score of weight was 40.37±4.76 and the post-test mean score was 35.20±3.31. The pre-test mean score of BMI was 23.89±3.69 and the post-test mean score was 20.83±2.72.

The pre-test mean score of Waist was 25.37±4.12 and the post-test mean score was 23.26±2.28.

Section C: Effectiveness of aerobic exercise on anthropometric measurements among school children in the experimental and control group.

Table 3: Comparison of pre-test and post-test Height among school children within and between the experimental and control group. N = 60(30+30)

Group	Pretest		Post Test		Mean Difference Score	Paired 't' test value
	Mean	S.D	Mean	S.D		
Experimental Group	130.40	6.39	130.40	6.39	-	-
Control Group	129.87	5.92	129.87	5.92	-	-
Mean Difference Score	0.53		0.53		N.S – Not Significant	
Student Independent 't' test & p-value	t = 0.335 p=0.739, N.S		t = 0.335 p=0.739, N.S			

The table 3 depicts that there was no significant difference between the pretest and post test height score within and between the experimental and control group.

Section D: Association of anthropometric measurements among school children with selected demographic variables.

Table 4: Association of post-test anthropometric measurements among school children with their selected demographic variables in the experimental group. N = 60(30+30)

Demographic Variables	F	Height	Weight	BMI	Waist Circumference
		Oneway ANOVA & p-value	Oneway ANOVA & p-value	Oneway ANOVA & p-value	Oneway ANOVA & p-value
Age					
6 – 7 years	11	F=1.313 p=0.291 N.S	F=0.711 p=0.554 N.S	F=1.123 p=0.358 N.S	F=1.455 p=0.250 N.S
7 – 8 years	9				
9 – 10 years	6				
10 – 12 years	4				
Sex					
Male	17	t=0.885 p=0.384 N.S	t=1.889 p=0.070 N.S	t=0.604 p=0.551 N.S	t=0.448 p=0.658 N.S
Female	13				
Religion					
Hindu	21	F=3.754 p=0.036 S*	F=2.810 p=0.078 N.S	F=2.766 p=0.081 N.S	F=0.848 p=0.439 N.S
Christian	5				
Muslim	4				
Others	-				
Economic status					
Upper	6	F=3.485 p=0.045 S*	F=2.873 p=0.074 N.S	F=0.496 p=0.614 N.S	F=2.521 p=0.099 N.S
Upper middle	17				
Lower middle	7				
Upper lower	-				
Lower	-				
Type of family					
Nuclear family	21	F=0.491 p=0.617 N.S	F=0.798 p=0.506 N.S	F=0.719 p=0.496 N.S	F=0.235 p=0.792 N.S
Joint family	8				
Extended family	1				
Education of father					
Graduate or post graduate	11	F=0.874 p=0.467 N.S	F=3.572 p=0.028 S*	F=0.391 p=0.761 N.S	F=0.426 p=0.736 N.S
Intermediate or post high school diploma	14				
High school certificate	3				
Middle school certificate	2				
Primary school certificate	-				
Education of mother					
Graduate or post graduate	8	F=0.313 p=0.816 N.S	F=0.998 p=0.440 N.S	F=2.344 p=0.096 N.S	F=0.020 p=0.996 N.S
Intermediate or post high school diploma	10				
High school certificate	9				
Middle school certificate	3				
Primary school certificate	-				
Illiterate					
Illiterate					
Occupation of father					
Profession	8	F=2.501 p=0.059 N.S	F=0.911 p=0.491 N.S	F=3.110 p=0.026 S*	F=3.042 p=0.029 S*
Semi-profession	11				
Clerical, shop owner, farmer	5				
Skilled worker	3				
Semi-skilled worker	1				
Unskilled worker	2				
Unemployed	-				
Occupation of mother					
Profession	4	F=1.578 p=0.199 N.S	F=0.572 p=0.748 N.S	F=0.502 p=0.800 N.S	F=1.016 p=0.440 N.S
Semi-profession	5				
Clerical, shop owner, farmer	6				
Skilled worker	6				
Semi-skilled worker	4				
Unskilled worker	3				
Unemployed	2				

*p<0.05, S – Significant, N.S – Not Significant

The table 7 shows that the demographic variables religion ($\chi^2=3.754$, $p=0.036$) and economic status ($\chi^2=3.485$, $p=0.045$) had shown statistically significant association with post-test height scores among school children in the experimental group at $p<0.05$ level. The other demographic

variables had not shown statistically significant association with post-test height scores among school children in the experimental group.

Conclusion

The study shows that aerobic exercises play a vital role and maintain the anthropometric measurement like height, weight and waist circumferences.

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Authors contribution

All the authors actively participate in the work of study. All the authors read and approved the final manuscript.

Conflict of interest

The authors declare no conflict of interest.

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