BODY COMPOSITION AND PHYSICAL FITNESS OF GIRL STUDENTS OF PHYSICAL EDUCATION

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Abstract:

The present study was carried out to assess the physical fitness and body composition of the girl students of physical education. Thirty students within the age range 22-25 years without any kind of major illness of cardiovascular problems were selected for each activity as sample of the study. The mean age of girl students was 23.06 years with the mean height of 155.70 cm and mean body weight 51.10 kg. The blood pressure and pulse rate of the respondent were found to be normal. The selected age group subjects had high average to very good range of oxygen consumption i.e. VO_2 max (ml/kg.min.). Majority of the girl students (96.67%) had mesomorph body type as per Quetlets Index. Highly significant and positive correlation was observed between weight, body mass index, per cent fat and lean body mass while body density and per cent of fat had shown perfectly negative correlation.

Keywords: Physical Fitness, Aerobic Capacity, Body Composition & BMI.

Introduction:

Human body is composed of four basic chemical constituents these are water, protein, mineral and fats. Body size and composition are constantly changing throughout the major stages of life. An understanding of the direction and magnitude of changes in body size, composition, health implication are necessary and to provide approximately health care and nutritional support. Measurements of body composition are more complex than body size. It is important in many human metabolic and physiological studies. For many purposes anthropometric measurements such as body mass index provide satisfactory information but for detailed studies, more precise method for analysis of body composition is required.

Body composition includes information concerning the amount and distribution of human subcutaneous fat. It is the direct measurement of fat deposits on various parts of the body. It assumes that the total body mass is composed of two major components i.e. body fats and the fat free mass (Jayashree, 1999). Fat is one of the basic components built into all models of body composition. Fat has also received much emphasis for determining physical fitness. Methods to measure body fat can be considered either reference or prediction techniques. The reference methods are body density, total body water and some physical properties of body. Prediction method considers the skin fold thickness. The measurement of skin folds is the most commonly used indicator fatness and is used to describe subcutaneous fat distribution. The skin fold

measure consists of a double layer of skin and subcutaneous fat and measured at many sites on the body with the triceps, biceps, sub-scapular and suprailiac being perhaps the most common regions. The most appropriate 'pinch' sites depend on the purpose of the study and age of the population.

Objective of the Study:

The present study was carried out to assess the Physical Fitness and Body Composition of the Girl Students of Physical Education.

Methodology:

Thirty girl students of physical education from the academic years (2013-2015) were selected for the study. The physical parameters like height, weight and blood pressure were Measured using anthropometric rod, weighing balance and digital blood pressure apparatus respectively. Based on the above measurements the physiological parameters like the body mass index and aerobic capacity were estimated to assess the health status, body type and physical fitness of the girl students of physical education.

Body Mass Index (BMI)

It was determined based on body height and weight by using the formula:

BMI (kg/m^2)= weight (kg)/height^2 (m)

The subjects were classified into various health conditions based on the Garrow (1987) classification table.

Aerobic capacity:

The consumption of maximum volume of oxygen (VO_2max)was estimated based on the body weight and age of the subjects by using the following formula:

VO_2 max (l/min)=0.023 x Body weight (kg)-0.034x Age (yrs) + 1.652

VO_2 max (ml/kg.min)= VO_2 max (l/min)/(Body weight x 1000)

The subjects were classified into various physical fitness categories according to the classification given by Saha *et al*. (1996)

Body type:

The subjects were classified into different body types based on the Quetelets Body Mass Index classification table.

Body fat:

The body fat estimation was done by using skin fold thickness measurements. Skin fold thickness of the girl students of physical education at four sites biceps, triceps, subscapular and supreilac muscles were measured using Herpenden Ski fold calipers. The measurements were taken in two replications at both right and left side of body and the results were averaged. At all sites a lengthwise skin fold was firmly grasped and slightly lifted up between fingers and thumb of the left hand. Care was taken not to include underlying muscles. The calipers were applied about 1 cm below the operator's fingers at a depth about equal to the skin fold.

Lean body mass and fat mass was calculated by using the following formula:

Body density (D)=1.1599-(0.0717 x log of sum of 4 skin folds)

Per cent fat = (4.95/D-4.5) x 100
Fat weight = Body weight x Per cent fat /100
Lean body mass (kg) = Body weight – fat weight

The correlation co-efficient test was used to know the relationship between age, weight, height, body mass index, body density and fat weight.

Observations and Discussion:

The physical parameters of the fame women selected for the experiment are presented in Table 1. The mean age of the selected age group was 23.06 years with the height of 155.70 cm. and body weight of 51.10 kg. The blood pressure and pulse rate were found to be normal i.e. 102.66/69.1 and 82.46. The average dimensions of the muscles bicep, triceps, subscapular and supraliac were found 4.56, 9.03, 11.13 and 9.3 respectively.

Table No-I

Mean Physical Parameters of the Subject (n=30)

Sr.No.	Physical characteristics	Average	Standard deviation
1	Age (22-25 years)	23.06	4.88
2	Height (cms)	155.7	11.76
3	Weight (kg)	51.1	15.70
4	Blood Pressure	102.66/69.1	10.89/7.91
5	Pulse	82.46	10.26
6	Biceps	4.56	2.71
7	Triceps	9.03	4.35
8	Subscapular	11.13	3.66
9	Supraliac	9.3	4.5
10	Body density	1.05	0.001
11	Fat mass	10.94	3.55
12	Lean body mass	40.15	12.17
13	Per cent fat	21.41	4.50

The majority of the subjects selected for the study were falls in mesomorph body type (96.67%) while as per BMI 96.67% subjects are under the normal category. The aerobic

capacity of the selected girl students of physical education was ranging from good to very good category. It may be due to regular work out during the practical classes (Table II).

Table No: II

Distribution of Subjects according to their Physical Parameters (n=30)

Sr.No.	Physical fitness	Frequency (%)
	Body type	
1	Ectomorph (<20)	1(3.33)
2	Mesomorph (20-25)	29 (96.67)
3	Endomorph (>25)	0
	Body Mass index	
1	CED gradeIII- Severe (<16.0)	0
2	CED gradeII- Moderate (16.0- 17.0)	0
3	CED gradeI- Mid (17.0-18.5)	0
4	Low weight normal (18.5-20.0)	1 (3.33)
5	Normal (20.0-25.0)	29 (96.67)
6	Obese grade I (25.0-30.0)	0
7	Obese grade II (>30.0)	0
	VO_2 max. (l/min.)	
1	Poor (<15.0)	0
2	Lower average (15.0-22.5)	0
3	High average (22.6-30.0)	0
4	Good (30.1-37.5)	1(3.33)
5	Very good (37.6-45.0)	29 (96.67)
6	Excellent (>45.0)	0

Body composition for assessing the physical fitness of the selected subject body density, fat mass, % fat and lean body mass was determined and the average values with standard deviation are given in the Table III.

Table No: III

Body Composition of the Subjects (n=30)

Sr.No.	Body composition	Age (22-25) years
1	Body density	1.05±0.001
2	Fat mass	10.94±3.55
3	Lean body mass (kg)	40.15±12.17
4	Per cent fat	21.41±0.77

Table No: IV

Correlation matrix between Physical Parameters, Body Density, Body Mass Index, Percent , Fat Mass, and Lean Body Mass

Physical and physiological characteristics	Age	Weight	Height	BMI	Body density	% Fat	Fat mass	Lean body Fat
Age	1							
Weight	0.492	1						
Height	0.101	0.75	1					
BMI	0.622	0.88	0.36	1				
Body density	-.004	-0.40	-0.31	-0.35	1			
% Fat	0.004	0.40	0.31	0.35	-1	1		
Fat mass	0.469	0.99	0.75	0.87	-0.49	0.49	1	
Lean body mass	0.498	0.99	0.75	0.88	-0.37	0.37	0.99	1

The correlation between various variable was studied and the correlation coefficients are given in the Table 4.Highly significant and positive correlation was observed between weight, body mass index, per cent fat and lean body mass. While body density and per cent of fat had shown perfectly negative correlation. Each variable was calculated in the terms of other variable with the help of regression line. The equations of regression lines showing the interdependence of the variables considered for physical fitness are given in the Table V.

Table No: V

Equation of Regression Lines showing the Interdependence of the variables considered for Physical Fitness

Sr.No.	Variables		Equation of the regression line
	X	Y	
1	Age	Height	Y=0.022X+156.0
2	Age, Weight, Height, Body density	Lean body mass	Y=0.020X+39.83
3	Age, Height	Weight	Y=0.026X+50.68
4	Age, Weight, Height	BMI	Y=0.017X+20.79
5	Age, Weight, Height, BMI	Body density	$Y=(-3x10^{-6})X+1.050$ (Y=0.000003X+1.050)
6	Age, weight, Height, Body density, BMI	Per cent of fat	Y=0.001X+21.39
7	Age, weight, height, BMI, Body density, Lean body mass	Fat mass	Y=0.006X+10.84

Conclusion:

Body fat has received much emphasis for reasons that, it is the most variable component of the body composition, concern for overweight and obesity, disease mortality correlates to excess fatness. Body fat and fat free mass are having greater influence on the physical performance. In the age range from 20-60 years, there is tendency towards the accumulation of body fat and fat free mass significantly declines with advancing age. The study investigated the physical fitness and body composition of girl students of physical education. Results revealed that the maximum percentage of girl students of physical education were in normal body mass index range. Significant and positive relation was observed between age and weight of the respondents. Highly significant and positive correlation was observed between weight and body mass index and per cent fat. Whereas negative and highly significant correlation was observed between body density, weight and body mass index and percent of fat.

References:

- Andrew, W.G. and Eric, T.P. 1993. Physical activity is a significant predictor of body density in women. American J. Clinical Nutrition, **57**(1):8-14.

- Chui, Edward F. "Effect of Isometric and Dynamic Weight Training Exercises Upon Strength and Speed of Movement", 1964.
- Daniel P. McNair, "Effect of Different Exercise Programme on the Development of Cardio-Vascular Fitness, Strength and Muscular Endurance", Completed Research in Health, Physical Education and Recreation, X (1968).
- Garrow, G.H. 1987. Quetlets index as measure of fitness. International J. Obesity, **9**:147-
- 153.
- Hasalkar, S.,Shivalli, R. and Nandi, S. 2010. Body Composition and Physical Fitness of farm women, International Journal of Physical Education, **3**(1and 2):5-8.
- J. Rowlands, "The Effect of Weight Training Exercise Upon the Throwing Power and Strength of College Baseball Players", Unpublished Master's Thesis, Washington: 1968.
- University of Washingon M.S. in Physical Education, 1962, Completed Research in Health Physical Education and Recreation, Vol.5, 1963.
- Saha, P.N.1996. Work physiology. Paper presented in Advanced Training course in Ergonomics at SNDT Women's University, Mumbai, 22-27 Feb.1996.