

Relationship between Body Composition and Physical Fitness of Physical Education Teacher Trainees

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Abstract – To achieve the purpose of finding out the relationship between body composition and physical fitness of male physical education teacher trainees, fifty six (N=56), male students ranging in age between 20-26 years who were undergoing B. P. Ed., course in the Department of Studies in Physical Education and Sports Sciences, University of Mysore, were drawn as subjects. The sample of subjects selected for the present study were tested and measured for physical fitness and body composition. Body mass index (BMI) was measured and calculated for each subject. The physical fitness test battery that consisted of five items, viz., 50 mts dash (to measure speed); Bent knee sit-ups (to measure abdominal strength and endurance); 9 min Run / walk (to measure cardio vascular endurance); Squat thrust (to measure agility, coordinative ability); Pushups (to measure strength and endurance) was administered to the selected subjects.

Body composition scores as measured by BMI for each subjects and performance scores of each subject in 5 different items of the test battery (y1, y2, y3, y4 and y5) were in numerical form, which represented the data for the present study. The data in respect of the independent variable and dependent variables were statistically analyzed through computation of correlation coefficient. The statistical analysis of data has revealed that,

- **Body composition was not significantly related to any of the five physical fitness variables, 50 mts dash, Bent knee Sit ups, 9 min Run / walk, Squat thrust and Pushups. That is body composition and physical fitness was independent of each other.**
- **Body composition was not significantly related to speed, abdominal strength, strength endurance, agility, cardiovascular fitness.**

INTRODUCTION

Body composition is the study of three components in the body, i.e., bone mass, muscle mass and fat mass. Body composition makes an important contribution to an individual's level of physical fitness, performance, particularly in such activities that require one to carry one's body weight over distance.

There is a relationship between structure and function of the different parts of the human body. Body fat is less metabolically active than the lean body mass. That is why exercise increases lean body mass (LBM) by increasing muscle mass, while reducing body fat. The body composition and energy turnover are highly inter related and closely linked with the functional capacity of the organism. Therefore, evaluation of one's body composition is considerably useful for understanding of the functional aspects of an individual.

Body composition is the body's relative amount of fat or fat free mass; those with optimal body composition are typically healthier, move more easily and efficiently, and in general, feel better than those with less than ideal body composition. Achieving a more optimal body composition goes a long way toward improving your quality of life and overall wellness.

Body composition is expressed as present of body fat mass and percent of lean body mass. Body composition is the technical term used to describe the different body compartments. (lean mass, fat mass, body water and bone mass) that make up a person's body weight.

If body composition is of (higher fat compared to muscle mass) there are many health related disease and illness you have a higher chance of

contracting. It is important to combine healthy eating habits with your exercise program.

PHYSICAL FITNESS

Physical fitness refers to one's ability to perform physical task, especially as they related to a sport or occupation; however, because physical fitness encompasses a wide Variety of abilities, it means different people. The main categories of physical fitness are aerobic endurance, muscular endurance, strength, power and flexibility.

The term "fitness" is perhaps one of the most controversial in the field of measurement in physical education. It is a most elusive quality and frequently has been defined in rather abstract terms. An acceptable definition of it has long eluded the experts.

THE COMPONENTS OF FITNESS

Strength: the extent to which muscles can exert force by contracting against resistance (e.g. Holding or restraining an object or person)

Power: The ability to exert maximum muscular contraction instantly in an explosive burst of movements. The two components of power are strength and speed. (E.g. Jumping or a sprint start).

Agility: The ability to perform a series of explosive power movements in rapid succession in opposing directions (e.g. zig zag running or cutting movements)

Balance: The ability to control the body's positions either stationary (e.g. a handstand) or while moving (e.g. a gymnastics stunt).

Flexibility: The ability achieve an extended range of motion without being impeded by excess tissue i.e., fat or muscle (e.g. executing a leg split).

Cardiovascular Endurance: The heart's ability to delivery blood to working muscles and their ability to use it. (e.g. running long distances).

Strength Endurance: A muscle's ability to perform a maximum contraction time after time (e.g. continuous explosive rebounding through an entire basketball game)

Coordination: The ability to integrate the above listed components so that effective movements are achieved.

COMPONENTS OF MOTOR FITNESS

Definitions of the various components designated in the motor fitness concept presented above are as fallows.

Muscular Strength: Maximum strength applied in a single muscular contraction.

Muscular Endurance: Ability to continue muscular exertions of sub- Maximal Magnitude.

Circulatory Endurance: Moderate contraction of large muscle groups for Relatively long periods of time, which require an adjustment of the circulatory respiratory systems to the activity.

Muscular Power: Ability to release maximum muscular force in the shortest period of time.

Agility: Speed in changing body positions or in changing direction.

Speed: Rapidity with which successive movements of the same kind can be performed.

Flexibility: Range of movements in a joint or sequence of joints.

METHODOLOGY:

The purpose of the present study was to find out the relationship between body composition and physical fitness of physical education teacher trainees. The selection of subject sample for the present study, variable selected procedure of measurement of body mass index and procedure of test administration, collection of date, design of the study and statistical technique employed have been present.

SUBJECT FOR THE STUDY

The subject for the present study was drawn from physical education teacher trainees studying in DOS in Physical Education and Sports Sciences, Mysore. 56 male physical education teacher trainees ranging in age between 20 to 26 years were selected for this study.

Variables Selected for the Study

- Body mass index was considered the independent variables (X)
- Physical fitness was considered as the dependent variable (Y)

Body Mass Measurement

Body Mass Index (BMI)

BMI stands for Body Mass Index. It is a measure of body composition. BMI is calculated by taking a person's weight and dividing by their height squared. For instance, if your height is 1.82 meters, the divisor of the calculation will be $(1.82 * 1.82) = 3.3124$. If your weight is 70.5 kilograms, then your BMI is 21.3 $(70.5 / 3.3124)$ (see calculator links below).

Calculate BMI

For the rest of the world, there is a metric version for entering height in meters and weight in kilograms.

Test Details

Equipment required: Scales and stadiometer as for weight and height.

Procedure: BMI is calculated from body mass (M) and height (H). $BMI = M / (H \times H)$,

Where M = body mass in kilograms and H = height in meters. The higher the score usually indicating higher levels of body fat.

Test Administration Procedure

Physical Fitness Test:

50-Meters Dash

Purpose: To measure speed.

Facilities and Equipment: An area on track, football field, or play ground with a starting line, a 50 meters course, and a finish line. Two stop watches.

Procedure: After a short warm-up period the student takes position behind the starting line. Best results are obtained when two students run at the same time. The starter uses the command, "ready go". The command is accompanied by a downward sweep of the arm as a signal to the timer. The students run across the finish line. One trial is permitted.

Sit-ups (Bent-knee)

Purpose: To measure abdominal strength and endurance.

Facilities and equipment: Mats may be used if they are available; otherwise the floor is satisfactory.

Procedure: The student lies flat on the back with knees bent and the feet on the floor with the heels no more than 30 cms from the buttocks. The knee

angle should not be less than 90 degrees. The fingers are interlocked and placed behind the neck with elbows touching the floor. The feet are held securely by a partner. The student then curls up to a sitting position and touches the elbows to the knees. The exercise is repeated as many times as possible in one minute.

Scoring: One point is scored for each correct sit-up. The score is the maximum number of sit-ups completed in 60 seconds.

9 Minute Run/Walk

Purpose: To measure cardio-vascular fitness

Facilities and Equipment: A track or a football field or any open area and a stop watch. Flags are placed around the runway at 50 meter intervals.

Procedure: The students may be asked to run in a group. The entire class can be divided into two groups. Each student works with a partner. While one student is running the other partner counts laps and notes the number of flags passed when 8 minutes have elapsed, the tester calls out the time left to run. At the end of 8 minutes, the tester blows a blast on his whistle and is an indicator that the time is over.

Scoring: The observing partner gives the scorer the number of completed laps she has run plus the number of flags passed on the last lap.

Squat Thrust

Purpose: To measure agility (Coordinative ability)

Facilities and Equipment: A stop watch

Procedure: The subject starts in a standing position.

- i) He goes to a full squat position placing both hands on the floor about shoulder width apart in front of his feet.
- ii) He thrusts both legs backward to a front leaning rest position with the body resting on both hands and toes and approximately straight from shoulders to feet.
- iii) He returns to full squat position.
- iv) Then the subject stands erect.

Scoring: One squat thrust consists of 4 points. For each position one mark is given. The score is the total number of points in 30 seconds.

Push-ups

Purpose: To measure strength endurance.

Facilities and Equipment: A gymnastic mat or a floor.

Procedure: The subject assumes a front leaning rest position either on a gymnastic mat or on the floor. He lowers his upper body by bending the elbows until his chest touches the floor and then returns to the front leaning rest position. The back must be kept straight and the exercise shall be one continuously.

Scoring: The number of correctly executed push-ups will be the score of a student.

COLLECTION OF DATA:

The body mass index that is a measurement of height and weight was measured as per the instructions given in the literature. The scores were in numerical form. That represented the data in impact of the independent variables (X).

The physical fitness test which is a battery of five items. Viz. : 50-meter run; Squat thrust; Pushups; Bent Knee sit-ups; 9 minute walk/run, was administered to the subject in the present study the measurement was taken as per instruction in the literature. The scores of each subject in each of the five test items that were in numerical form, represented the data in respect of the dependent variables (Y).

DESIGN OF THE STUDY AND STATISTICAL PROCEDURE:

The present study was designed to be a correlation study involving the investing the investigation of the possible relationship of Body Mass Index (X) to physical fitness of physical education teacher trainees co-efficient of correlation 'r' was computed to find out the relationship of independent variable to dependent variable.

ANALYSIS AND INTERPRETATION OF DATA:

The sample of subjects selected for the present study were tested and measured for body mass and physical fitness. Body mass index was calculated for each subject as explained in methodology. The physical fitness test that comprised of five items who administered to the selected subjects as explained in methodology chapter. The items of the test battery were,

- 50 mts dash (to measure speed)

- Bent knee sit-ups (to measure abdominal strength and endurance)
- 9 min Run / walk (to measure cardio vascular endurance)
- Squat thrust (to measure agility, coordinative ability)
- Pushups (to measure strength and endurance)

Body mass index scores and performance scores of each subject in different items of the test gathered were in numerical form that represented the data for the present study. The data in respect of the independent and dependent variables were statistically analyzed computing correlation coefficient.

The details of the analysis and the results of the study have been presented in table 1.

Table Showing Correlation Coefficient Values

		BMI	50 mts Dash	Squat Thirst	Push Ups	Bent Knee Sit ups	Walk / Run - 9 min
BMI	Cor	1	.079	-.062	.051	-.041	-.173
	Sig.		.562	.652	.711	.765	.202
	N	56	55	56	56	56	56
50 mts Dash	Cor	.079	1	.158	.172	-.033	-.353
	Sig.	.562		.244	.204	.807	.008
	N	56	56	56	56	56	56
Squat Thirst	Cor	.062	.158	1	.314	.254	.065
	Sig.	.652	.244		.019	.059	.632
	N	56	56	56	56	56	56
Push ups	Cor	.051	.172	.314	1	.351	.001
	Sig.	.711	.264	.019		.008	.993
	N	56	56	56	56	56	56
Bent knee sit ups	Cor	-.041	-.033	.254	.351	1	.244
	Sig.	.765	.807	.059	.008		.071
	N	56	56	56	56	56	56
Walk / Run- 9 min	Cor	.173	-.353	.065	.001	.244	1
	Sig.	.202	.008	.632	.993	.071	
	N	56	56	56	56	56	56

The figures presented in table 1 reveal the correlation coefficient calculated for finding the relationship of body composition (BMI) to all the five variables selected in the study.

The correction coefficient calculated for finding the relationship of body mass index with 50 meters run test (measure of speed) was .079 which was found to be non-significant (p =.076). The correlation coefficient calculated for finding the relationship of body mass index with squat thrust test (measure of coordinative ability) was - .062 which was found to be non-significant (P=.0652).

The correlation coefficient calculated for finding the relationship of body mass index with pushups test (measure of strength endurance) was .051 which was found to be non significant ($P = .711$).

The correlation coefficient calculated for finding out the relationship of body mass index with bent knee sit ups test (measure of abdominal strength and endurance) was -.055 which was found to be non-significant ($P = .0689$).

The correlation coefficient calculated for finding out the relationship of body mass with 9 minutes run / walk test (measure of cardio vascular fitness) was .104 which was not found to be statistically significant ($P = .445$).

It was concluded from the analysis of data and the results obtained in the present study that body composition was not significantly related to any of the five variables of physical fitness, under consideration in the present study. That is, to say, that body composition and physical fitness were independent of each other. Hence, the hypothesis formulated in the present study was accepted.

The results obtained in the present study may be attributed to the following.

- The body composition of subjects selected may not be at the desirable level. The sample of subjects selected was also too small.
- The body fat is found to be one important factor that affect physical fitness and motor ability elements.
- The relationship of the degree of fatness and physical fitness / motor fitness / or motor ability seem to be rather complicated and a great deal of data should be accumulated for analysis of body composition and its influence on fitness factors.
- It is suggested that intervention strategies to create a desirable level of body mass should be included.

The results of the study seem to agree with the study conducted by Hussey and others who reported in boys, body composition was increasingly related to fitness and to vigorous activity and was positively related to inactivity. In girls body composition was related to fitness but not the specific components of physical activity.

CONCLUSIONS:

It was concluded from the analyses of data that body composition was not significantly related to any of the

five physical fitness variables, 50 mts dash (to measure speed); Bent knee sit-ups (to measure abdominal strength and endurance); 9 min Run / walk (to measure cardio vascular endurance); Squat thrust (to measure agility, coordinative ability); Pushups (to measure strength and endurance). That is body composition and physical fitness was independent of each other.

RECOMMENDATIONS:

- Similar studies may be conducted with a larger sample for reliable results.
- A large number of subjects divided into various categories on their body mass index values maybe considered to find out the difference as well as relationship of BMI to qualities of fitness.
- Intervention strategies for development of desirable BMI values should be recommended and suggested to students.
- Similar studies may be undertaken to find out the relationship of body composition with loco motor skills, individual physical fitness or motor fitness variables.

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