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Profile development for high school male students on the basis of health related physical fitness

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Abstract
The riddle of whether body size, measurements of various body parts, physiological factors, and physical variations influence performance may be addressed by keeping these ideas in mind and ensuring that the growth and development requirements of children in different age groups are satisfied. The present research is being conducted to provide answers to these issues. Health-related factors such muscular strength, muscular endurance, flexibility, and body composition were chosen as research variables. The profile, which was created using a t-scale for three distinct age groups, might be used to gauge how physically fit other students are in terms of their health.

Keywords: Profile, health related physical fitness, age group

Introduction
Physical education's fitness ideas concentrate on children's understanding of fitness as good health and their working knowledge of activities that help them maintain a healthy level of fitness as they become older [1]. Fitness is defined by WHO as "the capacity to properly execute muscular work." "The five health-related components of physical fitness are more vital to public health than athletic ability components," asserts the Centers for Disease Control and Prevention in the United States. Depending on the investigators' goals and demands, operational definitions of physical fitness fluctuate [2]. Fitness: The definition of physical fitness could vary by person but most experts believe that there are five essential components of physical fitness which include your heart, lungs, strength, endurance, and agility or flexibility [3]. A pleased child is a source of national pride. The most important resource on the earth is children. An investment in a child's education is an investment in the near future of a country. The youngsters of today will be the citizens and leaders of tomorrow. Despite the fact that children are the future and the most important resources, the quality of tomorrow's world, and maybe even its survival, will be decided by the well-being, safety, and progress of today's children. Physical fitness instruction and awareness-raising among people are both in great demand. Regular physical exercise has been found in research to benefit mental health. Patients with anxiety and depression benefit more from exercise training when it is used in combination with other therapy. People who exercise on a regular basis report feeling better about themselves and having a better self-image [4].

Role of physical fitness in school students' life
Aspects of physical activity that have an impact on the brain are classified as biological or psychological. All of these elements are connected with children's physical activity, which means that effective treatments must be implemented on numerous levels to be effective. There is no single technique that is likely to be beneficial, as the needs of children change as they get older.

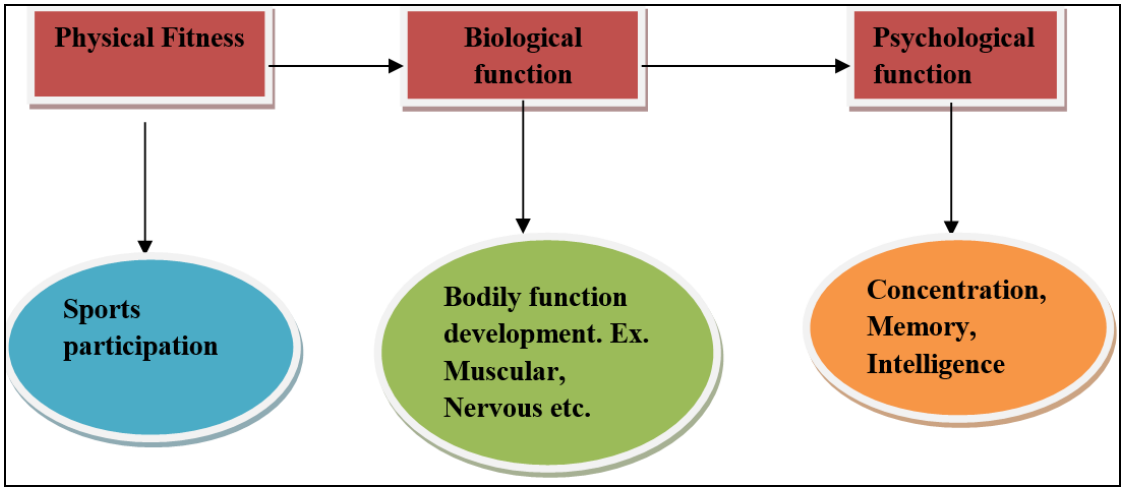

Fig 1: Role of physical fitness in school students' life

Table 1: Common Physical Fitness and Fitness Related Terms

Health-Related Fitness	Skill-Related Fitness
Cardio-vascular Endurance	Agility
Muscular Endurance	Balance
Muscular Strength	Coordination
Flexibility	Power
Body Composition	Speed
	Reaction Time

Physical Fitness

In the words of Bucher, "Physical fitness goes beyond muscle strength. According to him, "Physical Fitness includes soundness of the bodily organs such as the Heart and Lungs, a human system that performs efficiently under exercise or work situations, and reasonable measure of performance in specified physical activities." When describing a person's physical fitness, more than just strength must be taken into consideration. A thorough physical fitness model was provided by Bouchard, Shephard, and Stephens in 1994. (Table-1). We can distinguish between Physiological Fitness, Skill-Related Physical Fitness, and Health-Related Physical Fitness the capacity to exercise regularly on a daily basis and to fend off diseases linked to inactivity. When a person can do well, sport and other hobbies are more pleasurable. The two fundamental categories of physical fitness are fitness related to health and fitness related to motor skills. Motor the physical fitness elements that are linked to improved athletic performance and motor abilities are referred to as skill-related fitness. Among the elements that are most frequently used are speed, reaction time, power, coordination, balance, and agility. Health-Related fitness is defined as physical activity that a person engages in to maintain and improve their physical health. The elements of health-related fitness can be used to gauge our general well-being. Enhancing these talents is the aim of exercise.

The capacity to operate well for a long time at a high level is known as cardio respiratory endurance. To keep the body active for a lengthy period of time, the circulatory and respiratory systems must cooperate, which over time exerts stress on the heart, lungs, and muscles. Regular aerobic exercise can help you develop your cardio-respiratory endurance. It calls on both muscular and cardiovascular endurance, both of which are essential for sports success. Walking, riding a bike, swimming, and running are a few examples of activities when this happens. A person with cardio-respiratory endurance may exercise for extended periods of time at moderate to high levels while engaging all of their primary muscles [4]. Muscular strength is the capacity to apply the most force possible against a resistance. Isometric contractions, also known as static contractions, involve the force applied against an immovable object while there is no movement, as opposed to isotonic contractions, or dynamic contractions, which involve the force applied by a group of muscles as the body part moves (such as most sports skills, weightlifting, push-ups, and curl-ups).

The capacity to carry out a specific muscular action for an extended period of time is known as muscular endurance. It is a measurement of a person's ability to repeatedly exert maximum force, as opposed to muscular strength. Muscular endurance is the capacity to maintain a specific amount of muscle tension, or to repeatedly contract the same muscle over an extended length of time. Muscular endurance is crucial for maintaining proper posture and avoiding injuries. Muscular endurance improves performance in sports and at work while assisting people in adjusting to the physical demands of daily life. The majority of recreational and fitness pursuits also require it. Along with muscular endurance, flexibility is essential.

Flexibility is the range of motion that muscles and tissues have at a joint or group of joints. Flexibility focuses on each joint in your body as opposed to other, more all-encompassing or systemic fitness elements. A multidimensional approach to data collecting and analysis will be necessary for future investigations into the connection between flexibility and health. Flexible muscles and joints can freely move across their full range of motion. It depends in part on the coordinating function of the CNS (Central Nervous System). How much a joint can move is referred to as its range of motion.

Body composition is the term used to describe the chemical make-up of the human body, which includes the proportions of fat, bone, water, and muscle. Leanness is determined by weight and body composition since muscle tissue takes up less space than fat tissue.

During their school years, a person's physical and health-related components started to emerge. There are many schools where a student's capacity for development over time decreases as a result of a lack of infrastructure.

A well-established component of the educational process is physical education. Most students are taught by a trained physical education instructor. There are many institutions and universities that offer instructors of physical education

specialised curriculum. The implementation of PE programmes in schools seems to have received significant support from society in the twenty-first century. In many schools, many administrators have chosen to neglect the subject or use this time for other academic programmes. The state has consistently undermined physical education while imposing fiscal restrictions. Administrators and parents worried about their children's academic development have viewed physical education as a low priority, possibly disposable subject. According to the American College of Sports Medicine, physical fitness programmes for kids should be created with the main objective of encouraging the adoption of appropriate lifelong exercise behaviour in order to develop and maintain sufficient physical fitness for adequate functional capacity and health enhancement. The establishment and maintenance of lifelong exercise habits as well as instruction on how to acquire and maintain adequate physical fitness should receive more attention in school physical education programmes, which are a crucial component of the overall educational process. Although physical fitness exercises are typically allotted instructional time in physical education classes, this is rarely sufficient to develop and maintain optimal physical fitness. The mass accomplishment of students' health-related physical fitness, however, cannot be disregarded. This study was conducted in order to evaluate how this component should be specifically examined through the systematic implementation of school physical education and assessing an individual's success in health-related physical fitness.

Schools are a venue where we can implement a physical exercise programme to raise kids' fitness levels. It has been scientifically demonstrated that sedentary lifestyles in youth or the younger generation are associated with the loss of functional capability of the body, which increases mortality through chronic disease. Continued physical activity from youth reaps several health benefits before the age of adulthood.

By keeping these ideas in mind and making sure that the children's growth and development needs in different age groups are addressed, the mystery of whether body size, measurements of different body parts, physiological variables, and physical differences affect performance can be resolved. The current study is being conducted to provide answers to these questions.

Aim of the study

The study's main aim was to develop a profile on selected health related components for selected age groups.

Methodology

Selection of Subjects

The male subjects (N=1200) selected for this study were from various schools in the Rohtak region. The subject's age ranged from 13 to 18 years old. To develop the profile on health related components, the following age groups were made and represented in table 1

Table 2: Cross sectional groups according to age.

Cross-sectional groups of study		
Class	**Age Group**	**No. of subjects selected**
10th class	13-14	400
11th class	15-16	400
12th class	17-18	400

Selection of Health Related Fitness Variables

The health related fitness variables selected for this research study were- Muscular Endurance, Flexibility, Fat% and Muscular Strength

Data collection

Table 3: Health related fitness Variables and their criterion measures.

Sr. No.	Health related fitness Variables	Measuring Tool	Unit of measurement	"r" value
1.	Muscular Strength	Hand grip dynamometer	Kilograms	0.94
2.	Muscular Endurance	Sit Ups	In numbers	0.90
3.	Flexibility	Sit and Reach Test	1/l0th of the inch.	0.90
4.	Body Composition	Skin fold caliper	1/l0th of the centimeter	0.92

The data was collected on the variables in table no. 2 for the selected age groups. The measuring tool/ test used for measuring health related variables were highly reliable "r" and valid.

Limitations

1. The study was limited by factors such as daily routine, eating habits, and weather circumstances, which were outside the researcher's control.
2. As a result, it was necessary to keep in mind that the present research had limits in terms of both psychological and testing efforts.
3. The subjects came from varied socio economic and cultural background.

Statistical analysis

Descriptive statistics like minimum score, maximum score, mean and Standard deviation were analyzed for all the parameters in Table 3. Minimum and maximum scores were converted into its standard scores by using the following transformation:-

$$Z = \frac{(x-\mu)}{\sigma}$$

Z values were converted into its linear transformed scores by using the transformation Z = 50 + 10 x Z. this way negative value of Z scores can be converted into positive scores.

Table 4: Descriptive statistics of Health related fitness variables

		Mean	Std. Deviation	Minimum	Maximum
Muscular Endurance	13-14 years	13.8200	4.26004	8.00	30.00
	15-16 years	20.0150	3.81131	10.00	48.00
	17-18 years	25.6875	3.02866	12.00	48.00
Flexibility	13-14 years	5.4175	4.85167	-4.80	21.00
	15-16 years	4.5433	5.24153	-11.00	35.60
	17-18 years	4.5533	5.39985	-5.90	21.00
Fat%	13-14 years	20.0013	3.78039	9.00	24.10
	15-16 years	20.6863	3.25575	9.00	23.00
	17-18 years	21.3400	4.07765	9.00	24.60
Muscular Strength	13-14 years	16.1210	4.88029	10.75	41.20
	15-16 years	23.3235	3.36998	14.15	37.85
	17-18 years	29.7816	4.68013	10.55	41.20

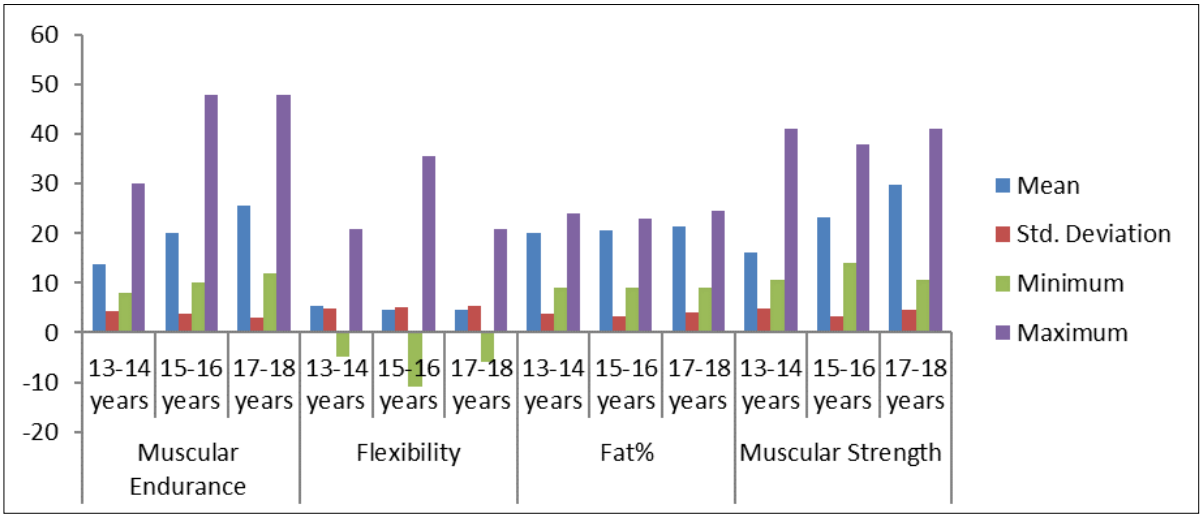

Fig 2: Profile chart of selected variables of health related fitness variable

Fig. 4 is graphically representing the average health related fitness variable of different age groups. Table No. 3 clearly indicates mean and standard deviation of health related fitness variable of different age groups. Where, health related fitness variables mean and standard deviations of three age groups i.e. 13-14 years, 15-16 years and 17-18 years are mentioned.

The mean and standard deviation of muscular endurance for the 13-14 year group was 13.82±4.26, and the maximum and minimum muscular endurance were 30 and 08, respectively. For the 15-16 year group muscular endurance, the mean and standard deviation of muscular endurance was 20.01±3.81 and the maximum and minimum muscular endurance were 48 and 10 respectively. The mean and standard deviation of muscular endurance for the 17-18 year group was 25.68±3.02 and the maximum and minimum muscular endurance were 48 and 12 respectively.

The mean and standard deviation of flexibility for the 13-14 year group was 5.41±4.85 cm, and the maximum and minimum flexibility were 21 cm and 08 cm, respectively. For the 15-16 year group flexibility, the mean and standard deviation of flexibility was 4.54±5.24 cm and the maximum and minimum flexibility were -11 cm and 35 cm respectively.

The mean and standard deviation of flexibility for the 17-18 year group was 4.55±5.39 cm and the maximum and minimum flexibility were 21 cm and -5.9 cm respectively. The mean and standard deviation of fat% for the 13-14 year group was 20±3.78, and the maximum and minimum fat% was 24 and 09, respectively. For the 15-16 year group fat%, the mean and standard deviation of fat% was 20.68±3.25 and the maximum and minimum fat% was 23 and 09 respectively. The mean and standard deviation of fat% for the 17-18 year group was 20±3.25 and the maximum and minimum fat% was 24 and 9 respectively. The mean and standard deviation of muscular strength for the 13-14 year group was 16.12±4.07, and the maximum and minimum muscular strength were 41 and 10.75, respectively. For the 15-16 year group muscular strength, the mean and standard deviation of muscular strength was 23.32±3.3 and the maximum and minimum muscular strength were 37.85 and 14.15 respectively. The mean and standard deviation of muscular strength for the 17-18 year group was 29.78±4.68 and the maximum and minimum muscular strength were 41.20 and 10.55 respectively.

Table 5: Standard score of minimum, maximum and average of all the variables.

Variables		Minimum(Z)	Mean(Z)	Maximum(Z)
Muscular Endurance	13-14 years	-1.366184355	0	3.798086403
	15-16 years	-2.627705435	0	7.342619729
	17-18 years	-4.519325378	0	7.367119452
Flexibility	13-14 years	-2.10597588	0	3.211780686
	15-16 years	-2.965412771	0	5.9251211
	17-18 years	-1.93585007	0	3.04576979
Fat%	13-14 years	-2.910096577	0	1.084200307
	15-16 years	-3.589434078	0	0.710650388
	17-18 years	-3.026252866	0	0.799480093
Muscular Strength	13-14 years	-1.100549353	0	5.138833963
	15-16 years	-2.72212298	0	4.310559707
	17-18 years	-4.109202095	0	2.439761289

Table 6: Transformed standard score of minimum, maximum and average of all the variables.

Variables		Minimum	Mean	Maximum
Muscular Endurance	13-14 years	36.33815645	50	87.98086403
	15-16 years	23.72294565	50	123.4261973
	17-18 years	4.806746218	50	123.6711945
Flexibility	13-14 years	28.9402412	50	82.11780686
	15-16 years	20.34587229	50	109.251211
	17-18 years	30.6414993	50	80.4576979
Fat%	13-14 years	20.89903423	50	60.84200307
	15-16 years	14.10565922	50	57.10650388
	17-18 years	19.73747134	50	57.99480093
Muscular Strength	13-14 years	38.99450647	50	101.3883396
	15-16 years	22.7787702	50	93.10559707
	17-18 years	8.907979052	50	74.39761289

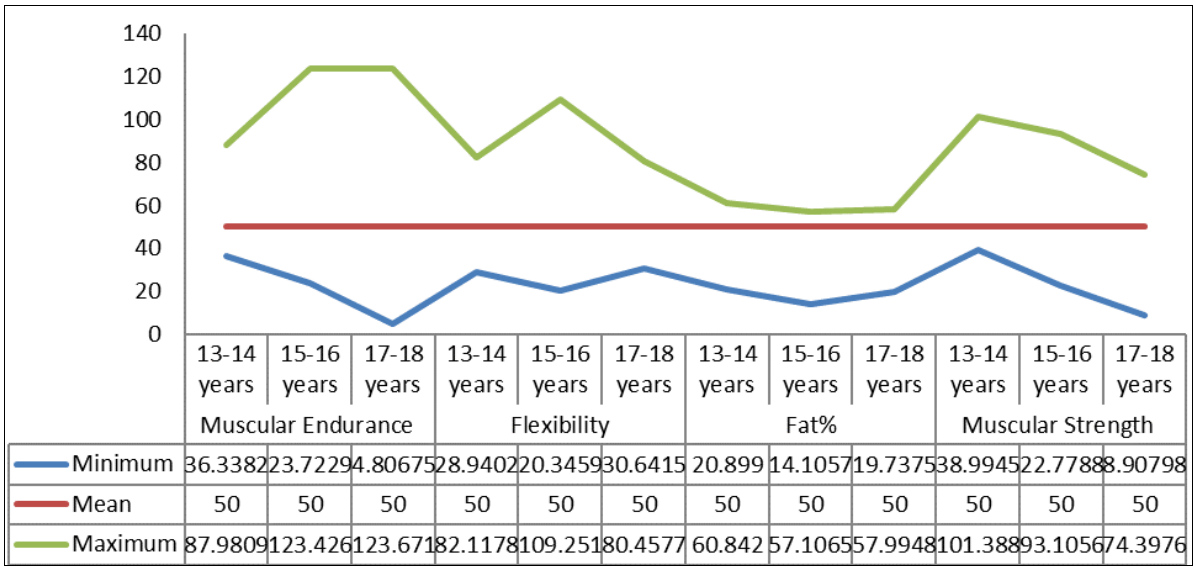

Fig 3: Profile chart of selected variables of health related variable

Developing Profile

Table 3 represents the descriptive statics i.e. mean, standard deviation and range of selected health related fitness variables. After calculation of descriptive statistics Table 4 represent the transformed standardized z-scores for Min, Max and mean. Z-scores were calculated through the following formula Z=(X-MEAN)/S.D. Standardized score were converted into Z-scale (Z=50+10*Z) for comparing the different variables (Table:-3)

Fig 2 represents the graphical range of selected health related variable. For determining fitness of any student for determining fitness levels using this profile selected health related fitness variables data is prerequisites. After obtaining the data for different variables it should be divided by standard deviation for converting the raw score into standard score (z). Calculated z-score is now converted into t-scale for comparing and selecting a player.

Conclusion

The selected research study focused on developing profile on health-related components for three age groups on t-scale. The developed profile can be used to assess the heath related fitness variable status of school students to determine whether, school provides basic physical activity classes for improving fitness or they are nutritional deprived or not.

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