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Effect of nutrition in physical fitness and talent development among students of physical education

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Abstract

The study was carried out by selecting 120 boys of B.P.Ed. from Sardar Patel Institute of Technology, Shikarpur, Bulandshar, Uttar Pradesh. Nutritional status was assessed by computing BMI (Body Mass Index) using height and weight parameters. Physical fitness was assessed by the performance of respondents in track and field events *viz.*, 100M, 400M and 1500M track events and Hop step jump, high jump and Discuss Throw as field events. Nutritional status of student respondents using BMI as recommended by WHO revealed that about 13.33% of the respondents were below (<20) normal. 85.01% were in normal (20-23) and about 1.66% only were overweight. The Spearman's correlation coefficient was computed to see the relation between BMI and sport events such as track events and field events. The results revealed that, there was a positive correlation between all events except 100M, 400M run and BMI. Talent identification revealed using frequency and percentage showed that 28.33% in 100M, 37.50% in 400M and 70.83% in 1500M track events. While talented students in field events were as 55.83% in Hop step jump, 54.16% in high jump and 79.16% in Discuss Throw. The study proves that the nutrition has played a vital role in performance of track and field events for identification of talent.

Keywords: Nutrition, physical fitness, talent development, BMI

Introduction

Sardar Patel Institute of Technology, Shikarpur, Bulandshar, Uttar Pradesh, is under the jurisdiction of Choudhary Charan Singh University, Meerut, Uttar Pradesh. This college is offering B.P.Ed., in physical education. The students undergo vigorous physical activities through sports and games. During this process, the real talent of the students in sports and games performance is evaluated in academic year. They have to score a minimum 40% to get through these courses. The main purpose of offering these courses is to identify the talents as well as to cultivate the healthy life styles among the future generation. As it is found that, in the modern society, inactivity or low level of physical activity combined with changes in eating habits are believed to be the main reasons for the increased prevalence of overweight/obesity among adolescents, because physical activity is an important component in weight control and also associated with other major health benefits, its role in youth health is fundamental. Health, nutrition and physical development go hand in hand.

Nutritional anthropometry is concerned with the measurement of variations of the physical dimension and the gross composition of the human body at different age levels and degrees of nutrition. Body composition is an important indicator of health status in children and adolescents (Immink *et al.*, 1992, Rolland-Cahera, 1995, Malina *et al.* 1998) [2, 3, 5, 6, 11]. Some useful information about the relationships between body composition and physical fitness in children from developed countries have been published. These studies revealed that excessive fatness has a negative impact on performance tasks in which the body is projected through space as in long jump, sprint and on tasks in which the body must be lifted in space as in bent arm hang. In contrast with developed countries, little is known about the relationship between body composition and physical fitness in children, adolescents and adults also in developing countries. This relationship is relevant for public health because in developing countries low fatness can be seen as a result of under nutrition. Under nutrition likely is an important risk factor for general health outcomes. From a public health perspective, improvement of both nutritional status and physical fitness can be seen an important tool for the improvement of the wellbeing of the population and for prevent

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diseases. Although the improvement of nutritional status is the most important, improving physical fitness can play an important additional role. As a result, it is important to investigate the determinants of physical fitness. Data on the interrelationship between BMI and physical activity are limited. A clear understanding of the effect of physical activity on BMI is lacking. Thus the present study aimed at the following objectives- to assess the fitness of students of physical education in terms of track and field events, to assess the BMI using the weight and height parameters, to see the relationship between the BMI and performance of the students in track and field events to identify the talents among the students in sports and games.

Physical fitness can mean many things. To a physician, physical fitness may simply mean the absence of disease. To a weight lifter, it may be synonymous with large bulging muscles. To a health or physical educator, physical fitness may mean the ability to perform a specific number of calisthenics activities or to run or walk one mile in a certain time. To a health fitness professional, physical fitness means being able to acquire and maintain specific health standards. When people are asked to define or to describe the term fitness, their most common replies deal only with the physical part of fitness. Two other parts of fitness that are often overlooked are mental-emotional fitness and social fitness. Total fitness is said to be achieved when people possess all three parts of fitness - mental-emotional, social and physical. Mental-emotional fitness is a combination of many qualities. Two of these qualities are the ability to control emotions and the ability to handle stress. A positive self-concept and the ability to feel and to show love and concern for others are other qualities of mental-emotional fitness. Social fitness is the ability to get along with people in many kinds of situations. Behaving in ways that are socially acceptable are signs of social fitness. Physical fitness is achieved when people are able to carry out their daily activities with vigour, alertness and without undue fatigue. Physically fit people also have enough energy to participate in leisure activities and to meet the stresses that are part of many emergency situations.

Physical fitness is one's richest possession; it cannot be purchased and has to be earned through a daily routine of physical exercise. People, who possess optimal physical fitness, tend to look better, feel better and experience good health; all of which contributes to the quality of life. Physical fitness is necessary for success in most of the games and sports. Without a high level of physical fitness, an individual will not be able to withstand the stress and strain caused on the body by various games and sports. Physical fitness, in addition to bringing about performance in games and sports also helps in prevention of injuries in the long run and is an inseparable part of sports performance and achievement. The quality of an individual sportsman's fitness in terms of its utilitarian value is directly proportional to the level of performance. That means greater the level of fitness, the greater is the ability of a person to attain higher level of performance.

Physical fitness has been defined in various ways. Some define it as an absence of disease, and some rate this according to the amount of musculature developed, and few define physical fitness as the ability to perform certain sports skills. The American College of Sports Medicine (1990) has defined that, "fitness is the ability to perform moderate to vigorous levels of physical activity without

undue fatigue and the capability of maintaining such ability throughout life".

Neimann (1990) defines physical fitness as "a dynamic state of energy and vitality that enables one not only to carry out daily tasks, active leisure time pursuits, and to meet unforeseen emergencies without undue fatigue, but also to avoid hypokinetic diseases, while functioning at an optimum level of intellectual capacity and experiencing the joys of life".

Factors affecting physical fitness

- Anatomical factors: In order to be fit, the individual must possess all the body parts essential to the performance of the task and also appropriate body size and shape for the task. Genetic imperfections in organs and tissues are responsible for weakness in structure and function. These limit an individual's capacity for strength, endurance and skill.
- Physiological factors: In order to be fit the physiological system of the human organism must function effectively to sustain the particular activity that the individual is performing. Since different activities make different demands on the organism relating to neurological, respiratory, circulatory, metabolic and temperature. Physiological fitness is specific to each activity.
- Psychological factors: Psychological factors like perception, emotional stability, motivation and intelligence are of vital importance in determining one's fitness level. Anxiety can become a barrier to performance by contributing tension, elevated heart rate and blood pressure and endocrine disturbances that add to the stress of the task and therefore affect one's fitness level.

Methodology

This was a cross sectional study carried out of 120 boys of B.P.Ed. from Sardar Patel Institute of Technology, Shikarpur, Bulandshar, Uttar Pradesh. For the study 40 students from each year for three consecutive years (2011-2012, 2012-2013 and 2013-2014) were taken. The age group of the students was 21-25 years. During the study, they were assessed for anthropometric measurements such as height and weight. These parameters were recorded for all the respondents. Though purposive sample was done, respondents were selected from normal population excluding those who were suffering from any disease and medical treatment.

Body mass index

Nutritional status of the respondents was assessed by computing the body mass index (BMI). Height and weight were recorded for each participant to determine their BMI. Body mass index was derived by Quetelet's index from body weight/(height). It is one of the useful tools for diagnosing obesity or malnutrition. Height was measured on a scale marked to a wall and rounded down to nearest centimeter. Weigh balance, subject standing on it with minimum clothing and bare feet and was rounded up to nearest kilogram. Cut-off points according to WHO were used to define the prevalence of overweight. The body weight indicates the body mass and gives a rough estimate of body volume, while height gives a picture of nutritional status and deficit in height indicates chronic and prolonged

under nutrition resulting often in permanently stunted physical status.

Measurement of physical fitness

The physical fitness was assessed by measuring the performance of the respondents in track and field events. The field events such as Hop Step Jump, high jump, Discuss Throw and track events such as 100 m, 400m and 1500m were conducted. The norms for evaluation of performance of the athletic events for I year students of physical education using 1/100 stop watch and steel tape. The norms developed and standardized by Mr. Wilson Arnold (1995)^[13], Associate Prof. Physical Education, University of Agricultural Sciences, Dharwad for his M.Phil. degree, thesis submitted to Alagappa University, Karaikudi were used. Norms measured the performance and identified the students as talented. This tool was developed using the data from 15 years based on the performance of UAS, Dharwad students. These norms were standardized for each track and field events. These measurements were related to well-nourished population and was standardized including 1200 students in the age group of 18-19 year boys and these measurements were taken on a cross sectional population, sampling procedures were reproducible and measurements were carefully made and recorded by trained people in anthropometric techniques using well tested, designed and calibrated equipments.

Statistical analysis

The results were analyzed using suitable statistical treatment using MS- Excel software. Descriptive statistics (averages, range, minimum and maximum) were computed. Karl Pearson's Correlation coefficient was computed for

assessing the relation between BMI and performance of students in track and field events.

Observations and Discussion

Table 1 reveals that the students had an average height of 171cm, weight 60. kg and BMI 20.37. The average time taken to complete 100M run by the students was 13.77 sec., 400M run was 1.037 min., 1500M run was 4.82 min., Hop Step Jump was 11.39 m, high jump was 1.28 m. and Discuss Throw was 18.28 m. In general, the trend indicated that, the average performance was nearly equal to the norms and sometime slightly higher than norms. But averages are not exclusive indicators of the performance and there was need for further research.

Majority of the students (85.01%) were in category of normal as per the WHO classification as shown in Table 2. It was depicted that only 2% of the students were overweight but not obese. As per the classification given by James *et al.* (Table 3) also only 2.50% of the students were suffering from chronic energy deficiency while 97.5% students were either low normal or normal categories. This indicates that most of the students of physical education are oriented for proper nutrition and exercise for physical fitness. Their nutritional status was optimum.

When the results were analyzed and compared with the norms for identification of talents, it was found that, 28.33% of the students has talent in 100M run while highest per cent of the talented student was in Discuss Throw 79.16% followed by in Hop Step Jump 55.83% students were found talented. Broadly, the students of physical education were better in field event than in track events in talent in their college level.

Table 1: Descriptive statistics of the parameter

Descriptive statistics	Height (cm)	Weight (kg)	BMI	100M (sec.)	400M (Min.)	1500M (Min.)	Hop step jump (m)	High jump (m)	Discuss throw (m)
Avg.	171	60	20.37	13.77	1.037	4.82	11.39	1.28	18.28
Max.	188	73	22.72	14.00	1.165	4.97	12.40	1.44	20.00
Min.	156	45	17.36	12.90	0.902	4.62	10.60	1.20	14.00

Table 2: Classification of student's nutritional status of adults using BMI (WHO)

BMI nutritional grade	No. of students	% of students
<20 Under weight	16	13.33
20-23 Normal	102	85.01
23-30 Overweight	2	1.66
30-35 Obesity I	-	-
35-40 Obesity II	-	-
>40 Obesity III	-	-
Total	120	100

* For Asian population

Table 3: Classification of student's nutritional status of adults using BMI

BMI	Nutritional grade	No. of students	% of students
<16	III degree CED	-	-
16-17	II degree CED	-	-
17-18.5	I degree CED	3	2.50
18.5-20	Low normal	37	30.80
20-25	Normal	80	66.70
25-30	Overweight	-	-
>30	Obesity	-	-
	Total	120	100

CED- Chronic energy deficiency

Table 4: Percentage of students identified as talented

Event	Criteria	No. of students qualified	Percent
100M run	<13.7 seconds	34	28.33
400M run	< 61 seconds	45	37.5
1500M run	<296 seconds	85	70.83
Hop Step jump	>11.40 m	67	55.83
High jump	>1.26 m	65	54.16
Discuss	> 18 m	95	79.16

The correlation between track and field events with BMI revealed that, BMI was negatively correlated with 100M & 400M run while with all other events the correlation was positive. This indicates that, the events which required strength and endurance needed better BMI, while 100M & 400M run was short time and distance event was not much depending upon the BMI. With the better BMI showing talent in 100M & 400M run was not possible as they find difficulty with heavy body weight.

Table 5: Correlation between field and track events and BMI of the students

BMI with	Correlation coefficient
100M	-0.006
400M	-0.106
1500M	0.176
Hop Step Jump	0.0496
High Jump	0.140
Discuss Throw	0.295

Conclusion

The students were having normal height and weight with average BMI. Hence their performance in track and field events was satisfactory. Most of the students were belong to low normal and normal category. They were better in field events than track events. This indicated that, the students were better BMI who were fed with nutritious food were able to perform better in all these events field and track events. Influence of nutrition is very obvious in development of talent as well as identification.

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