

Research Paper :

Influence of nutrition on physical fitness and talent development among UG boys of University of Agricultural Sciences, Raichur, India

RAJANNA, M.R. KAMMAR, ARNOLD WILSON AND C.N. KOTABAGI

Accepted : April, 2010

ABSTRACT

The study was carried out by selecting 251 under graduate boys of 1st B.Sc. (Ag.) and B. Tech. (Ag. Engg.) of University of Agricultural Sciences, Raichur, enrolled over 3 years period from 2007 onwards. 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., 100 mtrs, 400 mtrs and 1500 mtrs, broad jump and shot put events. Nutritional status of student respondents using BMI as recommended by WHO revealed that about 89.89 per cent of the respondents were below (<20) normal, 17.53 per cent were in normal (20.0-23.00) and about 5.58 per cent were overweight. The students were again classified into three groups based on the range values of height and weight. The spearman's correlation coefficient was computed to see the relation between BMI and track and field events. The results revealed that, there was a positive correlation between all the events except 100mtrs and BMI. Talent identification as revealed using frequency and percentages showed that, only 0.84 per cent in 100 mtrs run, 4.38 per cent in 400 mtrs run, 10.75 per cent in 1500 mtrs run, 36.65 per cent in broad jump and 49.40 per cent in shot-put were identified as talented in terms of track and field events. The study proves that the nutrition has played a vital role in performance of track and field events and talent development.

See end of the article for authors' affiliations

Correspondence to:

RAJANNA

Department of Physical Education, University of Agricultural Sciences, RAICHUR (KARNATAKA) INDIA

Key words : Nutrition, Physical fitness, Talent development

University of Agricultural Sciences (U.A.S.), Raichur which was earlier under the jurisdiction of UAS, Dharwad is offering the physical education (PED 101 and 102) courses for all the under graduates students in the first year. The students undergo a vigorous physical activities through sports and games. During this process, the real talent of the students in sports and games performance is evaluated in each semester. They have to score a minimum of 50% to get through these courses. The main purpose of offering these courses is to identify the talents as well 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-Cachera, 1995; Malina *et al.*, 1998). Some useful, informations about the relationships between body composition and physical fitness in children from developed countries have been published (Malina, 1975; Beunen *et al.*, 1983). 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 and adolescents of developing countries like South Africa. This relationship is relevant for public health because in developing countries low fatness can be seen as a result of under nutrition (Spurr, 1988; Malina and Roche, 1983; Parizkova, 1991), and 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 as an important tool for the improvement of the well-being of children and for the prevention of diseases. Although 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 inter-relationship 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 under graduate students 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 and to identify the talents among the students in sports games

METHODOLOGY

This was a cross sectional study was carried out of 251 under graduate boys of 1st B.Sc. (Ag.) and B.Tech. (Ag. Engg.) of U.A.S., Raichur, enrolled over 3 years period from 2007 onwards. The age range of the students was 18-19 years. Since there were only few girl students, and the norms for boys and girls varied for all the parameters, the study was concentrated only on boys. During this period, they were assessed for anthropometric measurements such as height and weight. These parameters were recorded for all the respondents. Though purposive sampling was done, care was taken to exclude the respondents who do not represent normal population and to select those who were healthy and were not suffering from disease.

Assessments:

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)². 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 centimetre. Weight was measured using an electronic weighing 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 broad jump and shot put and track events such as 100 mtr, 400 mtr and 1500 mtr. 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 standardised by Mr. Wilson Arnold (1995), Associate Prof. Physical Education, UAS, 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 standardised for each track and field events. These measurements were related to well nourished population and was standardised 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 equipment.

Statistical analysis:

The results were analysed using suitable statistical treatments using MS-Excel software. Descriptive statistics (average, 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 167.79 cm, weight 52.89 kg and BMI 18.77. The average time taken to complete 100 mtr run by the students was 15.45 sec., 400 mtr run was 71.91 sec., 1500 mtrs run was 6.77 minutes, broad jump was 3.74 mtr and shot put was 4.82 mtrs. In general, the trend indicated that, the average performance of the students was much below than the norms. But averages were not exclusive indicators of the performance, and there was a need to bridge this gap through research.

It is clear from Table 2a that, majority of students (76.89 per cent) were in category of underweight as per the WHO classification. It was depicted that only 5.58 per cent of the students were overweight but not obese. As per the classification given by James *et al.* (Table 2b), it was disheartening to note that, about 48.21 per cent of the students were suffering from chronic energy deficiency, about 70 per cent of the students were either in chronic energy deficient category or in obesity, except

Table 1 : Descriptive statistics of the parameters

Descriptive statistics	Height (cm)	Weight(kg)	BMI	100M (sec.)	400M (sec.)	1500M (min.)	Broad jump (mtr.)	Short put (mtr.)
Avg	167.79	52.89	18.77	15.45	71.91	6.77	3.74	4.82
Max	185	77.0	30.42	27.47	116	9.85	5.6	8.03
Min	142	33.0	12.60	12.23	56	4.44	1.7	2.55

Table 2a : Classification of students nutritional status of adults using BMI (WHO)

BMI	Nutritional grade	% of students
< 20	Under weight	193(76.89%)
20-23	Normal *	44(17.53%)
23-30	Overweight	15 (5.58%)
30-35	Obesity I	-
35-40	Obesity II	-
?40	Obesity III	-
	Total	251(100)

*For Asian population

Table 2b : Classification of students nutritional status of adults using BMI

BMI	Nutritional grade	No. of students	Percentage of students
<16	III degree CED	25	9.96
16-17	II degree CED	25	9.96
17-18.5	I degree CED	71	28.29
18.5-20	Low normal	70	27.89
20-25	Normal	1	0.40
25-30	Overweight	1	0.40
?30	Obesity	58	23.11
	Total	251	100.00

CED -Chronic energy deficiency

about 30 per cent of the students who were in low normal category. This indicates that, even at the age of 18-19, our children are not fed properly, hence their nutritional status is not optimum.

When the results were analysed and compared with the norms for identification of talents (Talents 3), it was found that, very meagre percentage (0.84%) of students had talent in 100 mtr run, while about 50 per cent of the students were identified as talented in shot put, followed by broad jump(36.65%) and 400 mtrs run (4.38%). In nut shell they had better talent in field events when compared to track events. This fact may be due to the exposure of students in track and field events in their school levels. These results need to be researched for their validation.

The correlation between track and field events with the BMI revealed that, BMI was negatively correlated

with 100 mtr run while, with all other events the correlation was positive. This indicated that, the events which required strength and endurance needed better BMI, while 100 mtrs run was a short time and distance event, and was not much depending upon the BMI. With the better BMI showing talent in 100 mtrs was not possible as it was difficult with the heavy body weight.

Table 3 : Percentage of students identified as talented

Event	Criteria	No. of students qualified	Per cent
100 mtr run	< 13 seconds	3	0.84
400 mtr run	< 61 seconds	11	4.38
1500 mtr run	< 5.5 min	27	10.75
Broad jump	4-5.6 mtr	92	36.65%
Shot put	5-7.79 mtr	124	49.40

Table 4 : Correlation between field and track events and BMI of the students

BMI with	Correlation coefficient
100 mtr	-0.01
400 mtr	0.03
1500 mtr	0.01
Broad jump	0.01
Shot put	0.01

Conclusion:

The students were below the average for their height as well weight. Hence, their performance in track and field event was also not upto the mark. This fact was revealed by classifying them by their BMI. They all belonged to the underweight or CED (Chronic energy deficiency) category. They were better in field events compared to track events. The correlation was positive with all the track and field events except 100 mtrs run. This indicated that, the students were better BMI who were fed with nutritious food were able to perform better in all these events except 100 mtrs run. Influence of nutrition is very obvious in development of talent as well as identification.

The study implied that, the students who were nourished better were fit to perform the physical activities,

hence the better nutrition, regular involvement in sports and games along with the parents encouragement and as a compulsory course in academics would enhance the physical fitness as it is the key to talent development.

The study recommends that the students at school level should be exposed to all the sorts of sports and games to develop talent. The children should be encouraged to eat nutritious food and made to avoid the consumption of junk food to develop healthy habits. The over eating also should be avoided, in order to prevent the complications arising from obesity. The parents may be made aware about the importance of sports and games in developing physical fitness by conducting parent-teacher associations. The recognition and incentives for motivating children's participation as well as convincing parents may be introduced at all the academic levels.

Authors' affiliations:

M.R. KAMMAR, Department of Home Science, University of Agricultural Sciences, RAICHUR (KARNATAKA) INDIA

WILSON ARNOLD, University of Agricultural Sciences, RAICHUR (KARNATAKA) INDIA

C.N. KOTABAGI, Department of Computer, University of Agricultural Sciences, RAICHUR (KARNATAKA) INDIA

REFERENCES

- Beunen, G., Malina, R.M., Ostyn, M., Renson, R., Simons, J. and Van Gerven, D. (1983)** Fatness, growth and motor fitness of Belgian boys 12 through 20 years of age. *Hum. Biol.*, **55** : 599-613
- Immink, M.D.C., Flores, R. and Diaz, E.O. (1992)** Body mass index, body composition and the chronic energy deficiency classification of rural adult population in Guatemala. *Eur. J. Clin. Nutr.*, **46**: 419-427.

Malina, R.M. and Roche, A.F. (1983) *Manual of Physical Status and Performance in Childhood* Vol.2 Physical Performance. New York: Plenum Press.

Malina, R.M., Katzmarzyk, P.T. and Siegel, SR. (1998). Overnutrition, undernutrition and the Body Mass Index: implications for strength and motor fitness. *Basel: Karger; Med. Sport. Sci.*, **43** : 13-26.

Malina, R.M. (1975). Anthropometric correlates of strength and motor performance. *Exerc. Sport Sci. Rev.*, **3** : 249-274.

Monyeki, M.A., Kemper, H.C.G., Koppes, L.L.J. and Twisk, J.W.R. (2005). Body composition and physical fitness of undernourished South African rural primary school children, *European J. Clinical Nutrition*, **59** : 877-883.

Parizkova, J. (1991). Human growth, physical fitness and nutrition under various environmental conditions. *Basel: Karger; Med. Sport. Sci.*, **31**: 1-18.

Rolland-Cachera, F. (1995). Prediction of adult body composition from infants and child measurements. In. *Body Composition Techniques in Health and Disease* eds. PSW Davies & TJ Cole, pp 100-145 Cambridge: Cambridge University Press

Spurr, G.B. (1988). Body size, physical work capacity, and productivity in hard work: Is bigger better? In: *Linear Growth Retardation in Less Developed Countries* ed. JC Waterlow, pp 215-243 New York: Raven Press.

Wilson, Arnold (1995). The norms for evaluation of performance of athletic events for I year students of physical education. M.Phil. Thesis, Alagappa University, Karaikudi (T.N.).
