RESPIRATORY PERFORMANCE AND GRIP STRENGTH TESTS ON THE BASKETBALL PLAYERS OF INTER-UNIVERSITY COMPETITION

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Summary: The participants of Basketball in the Inter-University competition were tested for assessing the physical efficiency level with special reference to respiratory and strength performances. The simple anthropometric measurements like height and weight of these subjects were noted to be higher than those of average healthy nonathlete populations of India. The socio-economic status of these subjects was assessed by standard questionnaire method and they were from families having income range between Rs. 85/-165/ per capita per month. The respiratory performances viz. FVC, FEV_1, MVV, MEFR, PEFR were all noted to be high in these sportsmen in comparison to those of age-matched healthy Indians. The grip strength test values were similar to those of hockey and soccer players. This study, therefore, indicated more efficiency in basketball players than in the age-matched average non-athlete healthy Indians.

Key Words: basketball, pulmonary functions test, grip strength, physical efficiency, physical fitness, FVC, FEV_1, MVV, MEFR, PEFR

INTRODUCTION

It is well established that sports and games help to improve physical, psychological and social make up of an individual. The physical development as well as the functional improvement are again dependent upon the involvement in the type of sports and games. Participation in different types of sports and games influence the body composition, development of a particular part of the body, overall functional capability etc. (2,3,18,21), However, for assessment of the physical efficiency/fitness of an individual, a battery of tests is performed. Among those tests determinations of various respiratory performance and strength tests hold an important position. The pulmonary function tests (PFT) have been conducted scatteredly on Indian population from various parts of the country (1,4,7,13,16,19,22,23) However, these tests are rarely conducted on the Indian sportsmen and women (4,5,6,8,12, 18,24). The present study was conducted to record the norms of a few physiological parameters of the basketball players of Inter-University competition. These data might be useful for comparison of the intra and inter game participants.

MATERIALS AND METHODS

The present study included the basketball players who volunteered among the participants in the Inter-University competition held at Banaras Hindu University in the year 1978. The following university players cooperated to conduct the study: Utkal, Ravishankar, Madras, Madurai and Ranchi. A total of 47 male participants of age group between 18-23 years were tested. The socio-economic as well as nutritional status were assessed by standard questionnaire method and were found to be within the income range of Rs 500/- to 1000/-p.m. per family (Rs. 85/-to160/- per capita, p.m.). The height and weight of the subjects were noted without shoes and wearing minimum clothes.

Using pen recording wet type of expirograph, the following PFT were performed: forced vital capacity(FVC), forced expiratory volume in one second (FEV_1), Maximum midexpiratory flow rate (MEFR) and maximum voluntary ventilation (MVV). Peak expiratory flow rate (PEFR) was measured with the help of Wrights peak flow meter (Clements Clarks International Ltd., England). The grip strength (GS) for both the hands was recorded by hand dynamometer (Anand Agencies, India). The highest of the three readings are accepted and presented in Table II. All the lung volumes are presented in BTPS, and the tests were performed in the temporary laboratory set up near the play field. Each test was demonstrated to every subject to achieve the maximum coop ration of the subjects.

RESULTS AND DISCUSSION

The results are summarised in Tables I and II. The height and weight of the subjects combined together convey an important index regarding the growth process. The average height and weight of these basketball players were higher than those of the average Indian population (19,20,23) The higher average values of height and weight might be due to the effect of conditioning and training in this game. However, it might also be true that the comparatively tall individuals play the basketball.

TABLE I : Physical characteristics of the subjects.

University	*Age in years Mean±S.D.*	*Height in cm. Mean±S.D.*	*Weight in kg Mean±S.D.*
Ravishankar (10)	19.5±1.4	175.5± 7.0	58.7±9.7
Utkal (7)	20.8±1.7	173.8± 6.3	54.4±4.4
Madras (12)	21.3±1.2	176.0±10.2	61.6±8.6
Madurai (9)	20.3±1.9	175.6± 7.8	61.6±9.7
Ranchi (9)	20.0±2.3	167.6± 6.2	54.9±7.0
All together (47)	20.4±1.7	173.9±8.2	58.6±8.5

The figures in the parenthesis indicate the total number of the subjects studied from that University.

TABLE II : Grip strength and respiratory efficiency of the subjects.

University	FVC (l)	FVC as ml/cm Ht.	FEV_1 (%)	MEFR l/sec.	MVV l/min.	PEFR l/min.	GS (kg)	
							Right	Left
Ravishankar (10)	3.15±0.53	18.4±3.7	96.6± 4.6	4.76±0.90	128.32±15.32	535±42	39.5±10.5	36.3±9.3
Utkal (7)	3.36±0.51	19.3±2.7	86.1±13.8	3.72±0.78	108.79±15.45	487±38	36.8±6.9	36.9±4.1
Madras (12)	3.43±0.57	19.4±2.5	89.5± 4.3	4.32±0.93	117.38±25.00	546±72	42.3±6.4	41.1±7.5
Madurai (9)	3.21±0.28	18.4±1.8	87.6±13.7	4.09±1.01	101.13±16.70	507±38	39.9±5.9	38.4±5.3
Ranchi (9)	3.26±0.29	19.4±1.5	75.4±18.3	3.06±1.01	93.53±14.40	534±65	35.4±8.6	33.2±7.6
All together (47)	3.29±0.45	19.0±2.5	86.9±13.4	4.04±1.07	110.75±21.60	525±56	39.1±7.9	37.4±7.4

They values represent Mean ± Standard deviation.

The data on FVC for similar age group of average Indian population are widely variable. However, it is rather difficult to compare the absolute value of FVC between the two groups, unless it is expressed per unit of height, weight or surface area. The mean value of FVC observed in the present series was similar to those studied by earlier workers (1,13), and lower than Indians who temporarily stayed in U.K. (23), top Indian athletes as well as soldiers (17,18) and PES of Banaras Hindu University (4).

FEV_1 was observed to be on the higher side of the normal range and quite similar to the active physical education students (PES) (4). The FEV_1 observed in the study was higher than the Indians temporarily staying in U.K. (23) as well as to those of Swedish population (10). However, the mean value determined in this study was similar to those observed in Indian population (20).

The value of MEFR observed in this study was higher than those of average Indians (11,12), but lower than those of PES (4) and the Kabaddi players of Inter University standard (our laboratory data).

Mean MVV of the present group was similar to those of average Indians (15,22) as well as of PES (4), but lower than the subjects studied by Singh (23).

PEFR, an easy but well-informative pulmonary efficiency test, in the present study was higher than that of the group studied by Kamat *et al.* (15) and Malik *et al.* (19) as well as those in subjects from other tropical countries (9,14,25). However, this value was lower than that of the group studied by Singh (23) as well as that of top Indian athletes and soldiers (17,18).

The grip strength test, an index of muscle power of the upper limbs, showed to be a little higher in right upper limb than the left one. The GS value of the present series is similar to the value reported by De (7) and Singh (24). However, the data in this regard for the average Indians are very much lacking and therefore, could not be compared with the observations noted in the present study.

In conclusion, it might be mentioned that the basketball players were comparatively tall than the average Indian population. However, the functional efficiency assessed by the tests done in this study indicate, by and large, a higher efficiency level in these subjects than the average Indian population.

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