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Original Article

Study of anthropological parameters, body composition, strength & endurance in Basketball players

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ABSTRACT

Introduction & Background: Basketball is one of the most popular ball games throughout the world. It is the game in which more things occur per second like any other game. More than 70million people play basketball and over 210 countries are members of FIBA. The performance of Indian athletes, players, sportsmen at various national and international competitions has been poor and this is of great concern especially to the coaches, physical educationists, sports scientists, doctors and researchers. Efforts have been made to improve the standards of our sportsmen since long, however a very little success has been achieved in this respect. The performance of any player will depend upon his physical fitness. Aims & objectives: The present study was undertaken to assess, analyze and compare height, weight, arm span, body segments, muscular strength and endurance in basketball players and age matched controls. Also compare these results with national and international standards available. Material & methods: Parameters like height, weight, arm span, upper segment, lower segment, body-composition, strength using bench squat (1 RM method), leg and back dynamometry & endurance using push-up & sit-ups scores were assessed. In the view of paucity of scientific assessment of Indian basketball players regarding their fitness and game specific skills, this study was under taken. We observed that as compared to the age matched controls the basketball players had significantly more height, height of upper segments of body. Strength of shoulder as well as leg muscles endurance was significantly more in basketball players than controls. We also found that there was a significant decrease in weight, fat percent, and fat mass of basketball players than controls. There was no significant change in height of lower body segment, static strength of leg and back muscles. Summary & conclusion: Basketball players in our study group still lag far behind in different study variables like weight, lean body mass, strength (static as well as dynamic), flexibility and agility when compared with national and Olympic basketball players. Hence there is a need to improve the physical fitness parameters so as enhance the player s performance. Suggestions: Exercise and games should be mandatory at all levels of education. Talent identification programs should be implemented at various levels such as schools, colleges, universities and state.

1. Introduction

Basketball is one of the most popular ball games throughout the world. It is the game in which more things occur per second like any other game. More than 70million people play basketball and over 210 countries are members of FIBA. The performance of Indian athletes, players, sportsmen at various national and international competitions has been poor and this is of great concern especially to the coaches, physical educationists, sports scientists, doctors and researchers. Efforts have been made to improve the standards of our sportsmen since long, however a very little success has been achieved in this respect. The performance of any player will depend upon his physical fitness [1].

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Successful game of basketball needs ability of the players to generate good speed, agility and tremendous power during the play of game. Skills like dribbling, shooting and passing are of utmost importance for a player at any level of play. Not merely skills but also physical and physiological characteristic of a player will contribute to the success of the player as well as of the team [2].

Highly skillful techniques in basketball are dribbling, passing, laying up shooting, shooting at basket, rebounding including faking etc. But these skill need to be enriched with physical and physiological determinants like anthropological measurements, body composition, strength, endurance & power of leg muscles, aerobic capacity, flexibility and agility. All of these technical skills and fitness parameters are interdependent onto each other. Putting scientific approach in understanding the game and finding out deficiencies in the technical skills and interdependent fitness parameters was of interest in undertaking this study.

3.Results:

The present study was undertaken to assess, analyze and compare height, weight, arm span, body segments, muscular strength and endurance in basketball players and age matched controls. Also compare these results with national and international standards available (if any).

2.1. Methodology:

Thirty basketball players from different basketball clubs in Solapur were selected for this study. Age of these selected players ranged from 16 – 18 yrs.

The physical and physiological parameters were assessed in Exercise and Sports Physiology Lab in Department of Physiology, Dr.V.M.Govt.Medical College, Solapur.

Parameters like height, weight, arm span, upper segment, lower segment, body-composition, strength using bench squat (1 RM method), leg and back dynamometry & endurance using push-up & sit-ups scores were assessed.

2.2. Proforma

A) Anthropometric measurements:

Weight: Kg

Height: cm (total)

Upper segment- cms.

Lower segment - cms.

Arm span: cms.

B) Body Composition:

Skin fold thickness: mm.

Body fat: % Fat mass: kg

Lean body mass: kg

C) Strength:

Bench press (Upper body) –

Bench Squat (lower body)-

Dynamometer – Leg - kg

Back - kg

G) Endurance:

Push ups (upper body) -

Sit ups (lower body) –

3. Results and Discussion

Basketball players	Controls		P value	Sig.
	Mean ± SD	Mean ± SD		
Height (Cms)	174.5±7.9	169.9±5.7	<0.01	MS*
Weight (kg)	56.7±10.6	62.9±12.7	<0.01	MS*
Arm span(cms)	90±4.1	88±3.7	<0.05	S**
Upper Seg. (Cms)	71.3±7.7	66.3±4.4	<0.01	MS
Lower Seg.	103 ±4.3	103.8±4.9	<0.1	NS***

The height, arm span and upper segment are significantly higher than controls whereas the weight of players is significantly less than controls. But change in lower segment was not significant.

Table 2. Body composition

	Basketball players	Controls	P value	Sig.
	Mean ± SD	Mean ± SD		
Percent Fat	11.5±2.5	14.05±4.4	<0.01	MS*
Fat mass (kg)	6.6±2.5	9.2±4.3	<0.01	MS*
LBM (kg)	50.1±8.6	53.7±9.1	<0.1	NS***

The fat percent and the fat mass is significantly less in the basketball player than the controls. There is no significant change in lean body mass.

Table 3. Strength

	Basketball players	Controls	P value	Sig.
	Mean ± SD	Mean ± SD		
Bench press (Relative)	0.59±0.1	0.52±0.1	< 0.05	S**
Bench squat (Relative)	1.46±0.3	1.14±0.5	< 0.01	MS*
Leg Dynamo. (kg)	127.33±25.1	122.9±14.9	0.4	NS***
Back Dynamo. (kg)	121.73±24	117.6±12.1	0.39	NS***

Values of bench press and bench squat tests are significantly more in basketball players. The difference in leg and back dynamometry was not significant.

Table 4. Endurance

	Basketball players	Controls	P value	Sig.
	Mean ± SD	Mean ± SD		
Push-ups (no.)	24±16	16±5.9	< 0.001	HS*
Sit ups (no.)	29±6.6	21±7.4	< 0.001	HS*

The general muscular endurance was highly significant in basketball players.

*MS=More significant;**S=Significant; ***NS=Not significant

In the view of paucity of scientific assessment of Indian basketball players regarding their fitness and game specific skills, this study was under taken. We observed that as compared to the age matched controls the basketball players had significantly more height [3], height of upper segments of body [4]. Strength of

shoulder as well as leg muscles [5, 6, 7] was significantly more in basketball players than controls. Endurance was at good and fair grade for push-ups and sit-ups respectively [8]. We also found that there was a significant decrease in weight [9, 10], fat percent [11], and fat mass of basketball players than controls. There was no significant change in height of lower body segment, static strength of leg and back muscles.

The game of basketball is recreational and a competitive game. It helps promotion of health, body control, alertness, co-ordination and team spirit [12].

In the present study we observed that as compared to the controls there was a significant increase in height, arm span, upper body segment, dynamic strength, muscular endurance, flexibility, reaction time and power of leg muscles in basketball players. But we did not find any significant change in the lean body mass, static strength, agility in basketball players as compared to control group. The weight and the percent body fat was significantly less as compared to the controls.

4. Summary & Conclusion

Basketball players in our study group still lag far behind in different study variables like weight, lean body mass, strength (static as well as dynamic), flexibility and agility when compared with national and Olympic basketball players. Hence there is a need to improve the physical fitness parameters so as enhance the player's performance.

Suggestions

Exercise and games should be mandatory at all levels of education. Talent identification programs should be implemented at various levels such as schools, colleges, universities and state. To improve the performance of players to reach at an optimal level not only on the physical, but psychological, social and spiritual health of the sportsperson should be regularly assessed, analyzed to prepare a training schedule accordingly.

Overall scientific studies in various aspects of different games and the players are deficient in India, so there is a need to encourage such studies to collect and analyze the data, to prepare different training schedules for the upliftment of player's performance to reach the National and International standards.

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