

A COMPARISON OF ANTHROPOMETRIC AND PERFORMANCE VARIABLES OF MALE AND FEMALE BASKETBALL PLAYERS

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ABSTRACT

The purpose of study was to determine possible anthropometric and performance sex differences in Basketball players. Fifty female and sixty male subjects from Chhattisgarh State Basketball players enrolled in the Basketball training program at the S. A. I. Training Centre Rajnandgaon under day Boarding and Boarding Scheme of Govt. of India volunteered to take part in this study. The mean age of male and female basketball player was 16.02 and 16.21 years respectively. Data were collected on anthropometric measurements i.e. height, weight, body composition during the coaching session 2007-2008. Performance measures included the vertical jump, shuttle run, sprint, and single-limb balance time. We compared anthropometric and performance characteristics using a t-test. The results of the study revealed that male subjects were significantly taller and heavier, while the females had a significantly higher percentage of body fat. Performance testing revealed that the males were able to jump significantly higher and better pro-agility and sprint significantly faster than the female subjects. There was no significant difference between the groups for single-limb balance time.

Key Words: Agility, Flexibility, Body Composition, Performance measures

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INTRODUCTION

Basketball players enjoys immense popularity in all over country. Sports medicine professionals are often asked to comment on the characteristics that contribute to the prevention of injuries and to the overall success of these athletes.

The number of women competing in sports involving physical contact, pivoting, jumping, and sprinting has increased dramatically. Coupled with this growth has been an increased awareness of performance and physiologic characteristics of female basketball players and of the sex differences that exist between them and their male counterparts. Many studies have reported much higher serious knee injury rates in females (Arendt & Dick, 1995., Lindenfeld et.al., 1994)). However, little information has been published regarding sex differences and ankle injuries.

Soft tissue injuries, including ankle ligament injuries, are often overlooked in the research literature. Not only are these injuries the cause of a significant amount of lost playing time for the athlete, but there is also a significant cost to the medical system related to care for and rehabilitation from these injuries. In fact, one study concluded that sprains and strains represent the most frequent type of injury and can account for up to 43% of cases involving work and/or participation loss (Burkett, 1970).

Our purpose was to identify and report anthropometric and performance differences between male and female higher secondary school measure of body composition through the use of skin-fold basketball players. Percentage of body fat was assessed as a caliper measurements. The performance measures were selected to assess overall lower extremity power (vertical jump), agility shuttle run, speed sprint, and proprioception (single-limb balance time). These data will, we hope, provide insight into possible sex-related differences that may help explain injury rates, and perhaps more importantly, predict risk of injury to the ankle.

METHODOLOGY

Sample:

One hundred (Sixty males and Fifty females) from basketball players of higher secondary schools adopted for the basketball training by S. A. I. Training centre, Rajnandgaon, volunteered to take part in this study. Advance consent was obtained from all subjects as well as their parents and coach before the study began. We collected the data at S. A. I. Training centre, Rajnandgaon, during the 2007-2008 basketball coaching season. The mean age of male and female basketball player was 16.02 and 16.21 years respectively.

Administration of Tests and Collection of data:

The anthropometric characteristics were measured by including height, weight, and skin-folds caliper to determine percentage of body fat. The height was measured by using a height measuring stand, weight by standard weighing machine. Skin-fold sites were measured with a Harpendine skin-fold caliper.

Skin-fold sites for males included the triceps, sub-scapularis, and umbilicus. Sites for females included the triceps, suprailiac area, and anterior thigh. Skin-fold thickness was based on the average of 2 trials.

For the functional tests, athletes were asked to perform standard warm-up that consisted of 5 to 10 minutes of stretching and light running. The tests were then administered

in random order for all subjects. The vertical jump is measured using a wall test. Two trials for flat-footed vertical jump were performed. and we recorded the highest jump. Agility was measured by shuttle run having the athlete perform a pro agility run (22.86-m shuttle). Standing at a center line, subjects moved to the right 4.57 meters, touched a line, moved back to the left 9.15 meters to touch a line, and finished by sprinting back to their right for 9.15 meters. Each subject was allowed a single practice attempt before the best of 2 trials was recorded to the nearest hundredth of a second. Speed was measured by 20-yard sprint and time of sprint recorded in seconds. Each subject performed 2 trials, with the fastest time recorded to the nearest hundredth of a second.

The athlete perform a series of single-limb (stork) tests and averaging the scores. Hand-held timers were used to measure the duration of time (± 0.5 s) the subject balanced up to a total of 30 seconds. If athletes lost their balance, the time was recorded when they contacted the ground with the non-weight bearing leg.

RESULTS AND DISCUSSION

To draw the statistical inference from data, the means, and standard deviations. were calculated on all variable separately. The anthropometric and performance characteristics were compared between the males and females using t -test. We used a significant level was set at .05 level of confidence. All analyses were performed by using SPSS 16.0 version and data pertaining to this have been presented in Table 1-4.

TABLE 1
DESCRIPTIVE STATISTICS OF ANTHROPOMETRIC MEASURES OF MALE AND FEMALE BASKETBALL PLAYERS

Variables	Females		Males	
	Mean	SD	Mean	SD
Age (Years)	16.02	1.14	16.21	1.04
Height (Cm.)	167.18	7.39	183.32	7.49
Weight (Kg.)	62.49	8.70	75.89	11.99
Body Fat (%)	21.40	4.59	12.93	4.28

It is clearly evident from Table 1 that male basketball players were found to be taller and heavier than their counter parts. The males also had a lower percentage of body fat in comparison of females.

TABLE 2
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN SCORES OF MALE AND FEMALE BASKETBALL PLAYERS IN THEIR ANTHROPOMETRIC MEASURES

Variables	Sex	Mean	MD	DM	t-ratio
Height	Male	183.32	16.14	1.44	11.42*
	Female	167.18			
Weight	Male	75.89	13.40	1.98	6.77*
	Female	62.49			
Body Fat	Male	12.93	8.47	0.86	9.84*
	Female	21.40			

Significant at .05 level, $t_{0.05 (108)} = 1.98$

It is clearly evident from Table 2 that the statistically significant differences was found between male and female basketball players in their height, weight, body fat, as the obtained t-values of 11.42, 6.77, and 9.84 respectively were higher than the required $t_{.05}(108) = 1.98$ to be significant.

TABLE 3
DESCRIPTIVE STATISTICS OF PERFORMANCE MEASURES OF MALE AND FEMALE BASKETBALL PLAYERS

Variables	Females		Males	
	Mean	SD	Mean	SD
Single-limb balance time (seconds)	26.15	5.11	27.09	3.69
Vertical jump (cm)	42.26	5.53	60.01	10.66
Pro-agility run (seconds)	6.72	0.36	5.77	0.28
Sprint (seconds)	3.51	0.29	3.19	0.23

It is clearly evident from Table 3 that males were better in single-limb balance, jumped higher, run sprint faster, and executed pro-agility run quicker than their female counterparts.

TABLE 4
SIGNIFICANCE OF DIFFERENCE BETWEEN MEAN SCORES OF MALE AND FEMALE BASKETBALL PLAYERS IN THEIR PERFORMANCE MEASURES

Variables	Sex	Mean	MD	DM	t-ratio
Single-limb balance time	Male	27.09	.94	0.87	1.08
	Female	26.15			
Vertical jump	Male	60.01	17.75	0.59	11.16*
	Female	42.26			
Pro-agility run	Male	5.77	0.95	2.02	0.47
	Female	6.72			
Sprint	Male	3.19	0.32	3.25	0.09
	Female	3.51			

Significant at .05 level

$t_{.05}(108) = 1.98$

It is clearly evident from Table 4 that the statistically significant differences was found between male and female basketball players in their vertical jump, as the obtained t-value of 11.16 was higher than the required $t_{.05}(108) = 1.98$ to be significant. No statistically significant difference between male and female basketball players was noted for single-limb balance time, pro-agility run and sprint run, as the obtained t-values of 1.08, 0.47 and 0.09 respectively were lesser than the required t-value to be significant.

DISCUSSION

The literature review on anthropometric and performance measures of basketball players revealed a focus primarily on international and professional athletes. (Arendt & Dick, 1995., Wojtys et.al., 1996). In general, I found that such measures of higher secondary athletic populations have been largely unreported by sport scientists. However, it is generally

accepted that, at all levels, the ability to jump higher, run faster, and demonstrate greater agility are skills that a successful basketball player must possess.

When the male and female basketball players were compared together on body composition by using t-ratio, indicated significantly higher percentage of body fat in females than their male counterparts. This was supported by Clark, Kuta & Oppliger (1992). Male basketball players were also found to be taller and heavier significantly than their counterparts. Sex differences were not observed for all functional measures tested except vertical jump. This was supported Huston and Wojtys (1996).

Such differences could perhaps explain why the females performed significantly worse in our performance testing and illustrate the need for future study to determine if these potential deficits are a risk factor for ankle injury. It may be that female athletes are sustaining injuries to the ankle and other parts of the body at a higher rate as well. Possible reasons that should be investigated include an increase in generalized joint laxity, slower muscle reaction time, less muscle strength, and less muscle endurance.

CONCLUSIONS

1. Male basketball players were found taller and heavier than their counterparts.
2. Females have higher percentage of body fat than their male counterparts.
3. Sex differences were not observed for all functional measures tested except vertical jump.
4. Similarity was found between male and female basketball players in their functional measures i.e. single-limb balance time, pro-agility run and sprint run.

RECOMMENDATION

Our current study documents and sex differences for various anthropometric and performance measures in basketball players, these data are intended for future use in prospective studies to evaluate if these differences have an effect on ankle injury rates.

Further study of anthropometric and performance measures and their relation to the incidence of ankle injury in higher secondary athletes is necessary to facilitate potential ankle injury prevention and overall performance enhancement.

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