Differences in Body Flexibility of Elite Male Racket Games Players in Nigeria

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ABSTRACT--- ***This study was embarked upon to evaluate and compare the body flexibility components of the elite male racket games (badminton, squash & tennis) players in Nigeria with the view of providing information on the differences that may exist among them. Thirty-six (36) nationally rated racket games players, (twelve from each of the games) were selected for the study through purposive sampling technique. The modified sit and reach test was used to evaluate the trunk flexibility while the goniometer was used to measure the shoulder and wrist flexibility as recommended.***

Descriptive and inferential statistics of mean and standard deviation and one-way Analysis of Various were employed to describe and test for significant differences (P≤0.05) among the groups while the Scheffe's post hoc multiple comparison was applied when an F-statics indicated significant difference.

The results revealed no significant difference on the trunk flexibility while significant differences existed among the racket games players in shoulder and wrist flexibility components.

***Keywords*----** Shoulder flexibility, Trunk flexibility, Wrist flexibility, Cardiorespiratory endurance, Goniometer

1. INTRODUCTION

Body flexibility is one the most important performance characteristics in sports. It has long being recognized as a crucial component of physical fitness and health and also of motor performance. Although often overlooked (Akeredolu, 1997) because most people believe it is a naturally occurring trait, forgetting that no physical trait can attain its peak performance unless a measure of development takes place through one means or another. According to Phillips & Hornak (1979), it is a range of movement about a joint or a sequence of joints. Hockey (1993) in his own word defined it as a functional capacity of the joints to move through a full range of motion during performance. It is the ability of an individual to move the body joints through a maximum range of motion without undue strain. It is also the bending capability of a person to make different types of movements and be proficient especially in sporting events.

Talabi (1992) mentioned two types of flexibility namely dynamic and extent. Extent flexibility refers to the ability to move or stretch the body or some components of it as far as possible in various directions while dynamic flexibility is the ability to make repeated stretching and flexing movements. Out of the two aforementioned types of flexibility, the dynamic flexibility is mostly considered as a great concern in performance.

As important as flexibility is to performance, it is not a general trait all over the body. It is specific to the joint involved in an activity and the type of activity being performed. A high degree of flexibility in one joint of the body does not necessarily indicate a similar level in another. This is primarily determined by the extensibility of the muscles and connective tissue surrounding the joint, which is influenced directly by the kind, and amount of use the body puts it, (Owolabi 1985).

Joint flexibility plays crucial roles in the play regime of racket games (badminton, squash racket & tennis). It is generally agreed that joints must be sufficiently flexible to allow the player to move freely without undue constraints; but not so loose that rigidity is lost and the limb is put in a position where it is susceptible to injury. Moreover flexibility is associated with other performance variables such as cardio-respiratory endurance, strength, agility and speed.

It is in the light of these that the researchers evaluated the flexibility components of the racket games players with the view of determining and providing information on the differences that may exist among the three groups of players.

2. HYPOTHESES

1. There will be no significant difference in trunk flexibility among the elite male racket games players in Nigeria.
2. There will be no significant difference in shoulder flexibility among the elite male racket games players in Nigeria.
3. There will be no significant difference in wrist flexibility among the elite male racket games players in Nigeria.

3. METHODS AND PROCEDURE

The Ex-post-facto research design was employed in the conduct of this work. The population for the study comprised all nationally rated male racket games players out of which thirty-six (36) players were sampled through the purposive sampling technique. Twelve players from each of the games (Badminton, Squash racket & Tennis).

The Sit and Reach test was used to evaluate the trunk flexibility as described by Phillips & Hornak (1979) while the goniometre was used to evaluate the flexibility of the shoulder and wrist joints of the dominant arms as described by Fahey, Insel & Roth (2003).

The mean and standard deviation were used to describe the data while one way Analysis of Variance (ANOVA) was employed to determine the significant differences in the selected variables among the groups at 0.05 level of significance. Scheffe's post hoc multiple comparison method was applied when an F-static indicated significant difference to determine which of the means were significantly different from the other.

4. RESULTS AND DISCUSSION

The results are presented in Tables 1, 2 and 3. The results of the descriptive statistics of the flexibility components of the racket games players appear on Table 1 while the ANOVA summaries for the same components are in Table 2 and Table 3 shows the Scheffe's Post-Hoc comparison of group means.

Table 1: Descriptive Statistics of Flexibility Components of Racket Games Players

Variables	Badminton (N=12)			Squash Racket (N=12)			Tennis (N=12)		
	X	SD	Range	X	SD	Range	X	SD	Range
Trunk flexibility (cm)	17.00	±1.07	15.00-1850	17.00	±0.84	15.00-18.50	16.50	±0.78	15.50-17.50
Shoulder flexibility (flexion) (deg)	96.75	±5.53	90-106	93.75	±2.10	90-97	99.50	±4.42	94-108
Wrist flexibility (deg)									
Flexion	81.42	±3.87	75-88	76-82	±4.45	68-84	70.50	±2.94	66-74
Extension	80.25	±3.27	75-86	76.75	±4.45	70-82	72.42	±5.23	66-88

The mean values for trunk flexibility on Table 1was 17.00cm ± 1.07 with a range of 15.00cm – 18.50cm for Badminton players, 17.00cm ± 0.84 with the range of 15.50cm – 18.50cm for the Squash racket players and 16.50cm ± 0.78 with the range of 15.50cm – 17.50cm for the Tennis players.

The mean values for shoulder flexibility in flexion movement were 96.75^0±5.53 with the range from 90^0 – 106^0 for the badminton players, 93.75^0±2.10 with the range from 90^0 – 96^0 for the squash racket players and 99.50±4.42 with the range from 94^0-108^0 for the tennis players.

The table also shows that the mean values for wrist flexibility in flexion movement were 81.42^0±3.87 with the range from 75^0-88^0 for the badminton players, 76.82^0±4.45 with the range from 68^0-84^0 for squash racket players and 70.50^0±2.94 with a range of 66^0-74^0 for the Tennis players.

In the extension movement of the wrist, a mean value of 80.25^0±3.27 with a range of 75^0-86^0 was obtained for the badminton players, 76.75^0±4.45 with a range of 70^0-82^0 for the squash racket players while the tennis players obtained a mean value of 72.45^0±5.23 with a range of 66^0-80^0.

Table 2: ANOVA Summaries for Flexibility Components of Racket Games Players

Variable	Source of variation	SS	Df	Ms	F. Ratio	Probability
Trunk Flexibility	BG WG Total	0.89 27.27 28.16	2 33 35	0.45 0.83	0.54	0.588
Shoulder Flexibility (Flexion)	BG WG Total	198.50 599.50 798.00	2 33 35	99.25 18.17	5.46	0.009
Wrist Flexibility (Flexion)	BG WG Total	721.17 477.58 1198.75.75	2 33 35	360.58 14.47	24.92	0.000
Wrist Flexibility Extension	BG WG Total	369.56 637.42 1006.98	2 33 35	184.78 19.32	9.57	0.001

F(2,33) = 3.28; P < 0.05

Table 2 shows the one-way Analysis of Variance summaries for the flexibility components of the racket games players. The table shows the variance, degree of freedom and f. value obtained for trunk flexibility (flexion shoulder, flexibility and wrist flexibility (flexion & extension). The computed f. ratio for trunk flexibility was 0.54 which was less than the table value of 3.28 indicating that no significant difference existed in trunk flexibility of the male elite racket games players in Nigeria. Therefore the hypothesis stating that there will be no significant difference in trunk flexibility among elite male racket games players in Nigeria was accepted.

Table 3: Scheffe's Post-Hoc Comparison of Group Means for Flexibility Components

Comparison	1	2a	2b	3
Badminton vs Squash Racket		*	*	
Badminton vs Tennis		*	*	
Squash racket vs Tennis	*	*	*	

*Pairs that are significant at 0.05 level.

Keys
1. Shoulder joint flexibility
2a. Wrist joint flexibility (flexion)
2b. Wrist joint flexibility (Ext.)
3. Trunk flexibility

The computed f. ratio of 5.46 was obtained for shoulder flexibility which was higher than the table value of 3.28 therefore indicating that a significant difference existed among the three groups of players. The null hypothesis that there will be no significant difference in shoulder flexibility among the male elite racket games players in Nigeria was rejected.

Also, computed f. ratios of 24.92 and 9.57 were obtained for wrist flexibility both flexion and extension movements respectively. These values were higher than the table value of 3.28 thereby indicating that significant differences existed in these components. The hypothesis that there will be no significant difference in wrist flexibility among the elite male racket games players in Nigeria was rejected.

The Scheffe's Post-Hoc comparison analysis of the groups on table 3 indicated that the elite male racket games players were all significantly different in shoulder and wrist flexibility components.

5. DISCUSSION

Trunk flexibility

The mean values of 17.00cm, 17.00cm and 16.50cm for badminton, squash racket and tennis players in this study were different from the mean values reported by other researchers on this same variable. Adeagbo (1987) reported mean values of 34.3cm and 29.6cm for the Kwara State squash racket and badminton players while Talabi (1992) reported a mean value of 34.58cm on nationally rated squash racket players. These differences could be due to the various categories of the players sampled or the evaluation when compared with the classification and ratings provided by protocols. Hockey (1993) and Fahey et al (1998), the mean values were in between above average and good.

Meanwhile, the values obtained among the racket games players sampled in this study revealed no significant difference in trunk flexibility but better mean values than others compared. This indicated that racket games players are more flexible at the hip region than other athletes compared. It is also surprising to note that the squash racket players in this study did not obtain higher rating than their badminton and tennis counterparts as have been found by Sharp (1980), Adeagbo (1987) and Talabi (1992) in their studies at various times.

The non-significant differences and the relative high flexibility ratings could be influenced by the nature of the racket games which requires flexibility at the spine on stretching and bending forwards and backwards and may at times be in rotation movements from side to side.

According to Talabi (1992), the nature of the skills in squash playing requires high body coordination and ability to bend forward and backward in response to the directions of the ball. This also agreed with the assertion of Adegun (1985) that active and trained players would have above average trunk flexibility and Hockey (1993) confirmed that adequate flexibility seems to depend on the amount and intensity of movement of the body parts through ranges of motion regularly.

Shoulder Flexibility

The mean values obtained in this study were quite different from the findings of Adeagbo (1987) who reported mean values of 38.2cm for the badminton players, 35.5cm for the squash racket players and 39.9cm for the sprinters using shoulder lift tests. They were slightly similar to the findings of Ogundare (1998) who reported mean values of 96.46cm and 94.72cm for University middle distance and sprint swimmers alike.

Apart from the differences in the calibers of athletes sampled, these differences could be attributed to the test protocols. No doubt there are many test protocols for evaluating shoulder flexibility such as the use of goniometer, tensiometer, flexometer and the field tests of shoulder lift etc.

The results of this study showed significant differences ($F(2,33)=5.46$; $P<0.05$) among the racket games players and that Scheffe's post hoc test analysis on table 3 revealed that the difference between the Squash racket and tennis players accounted for the significant difference observed. This finding highlighted superior shoulder flexibility for the tennis players over and above badminton and squash racket players. Likewise, badminton players possessed a higher mean value than the squash racket players though not significantly different. These findings were supported by the assertion of Sharp (1980) who stated that the racket games players do not require the flexibility of the gymnasts, dancers or high jumpers but they require flexibility at the hamstrings and of the spines and that tennis and badminton players require more shoulder flexibility than players in other two racket games.

Shoulder flexibility should be a paramount importance in sports skills such as found in tennis and badminton where the technical demands of the various strokes and techniques are high. However, the non significant difference observed between badminton and tennis players in this variable might arise from the fact that both groups of players require shoulder flexibility to facilitate the various strokes and the paces needed in their games.

Wrist Flexibility

As important as flexibility at the wrist joint seems to be to the play regime of the racket games, it was surprising that no empirical work could be found by the researchers in relation to tests and measurement of wrist flexibility among the racket games players. This development could be traced to the observation of Talabi (1992) that despite the unanimous agreement on the relative importance of flexibility to performance in sports and its specificity, most people seemed to accept the choice of trunk flexibility tests as good tests for body flexibility. And the usual argument is that the hip joint is of great importance in human motion and of universal importance in any athletic performance and sports.

However, the results of this study as revealed on table 2 showed that significant differences existed among the racket games players in wrist flexibility and the differences were among the three groups of players leaving out more as revealed by the Scheffe's post-hoc test analysis on table 3. The results showed that badminton players were more flexible at the wrist joint than both the squash racket and tennis players and the squash racket players were more flexible than their tennis counterparts.

The findings of this study were not totally surprising when the basic skills needed to excel in each of these games were considered. The nature of the skills in badminton game would require suppleness at the wrist coupled with nimble and well-coordinated hand movements. The sizes and types of racket used in playing the games could also account for the differences between the badminton players and the other two racket games players. The execution of drops, lobs and boasts in squash racket would require a higher level of wrist flexibility that can place squash racket players over and above their counterparts in tennis. The differences among the racket games players could also be accounted for by the high specificity of the variable and the fact that its extent or degree varies from sport to sport and the joints involved.

6. CONCLUSION

From the results of this study, it can be concluded that the elite male racket games players in Nigeria were not significantly different in trunk flexibility but showed significant differences in shoulder and wrist flexibility components. The non-significant difference in the trunk flexibility showed it as a general requirement for the three games while the tennis players would require a greater shoulder flexibility than the badminton and squash racket players. Likewise badminton players would have to develop their wrist flexibility more than both the squash racket and tennis players. The significant differences most especially in wrist flexibility also showed it as a reliable index by which each potential racket games players could be identified from a given population.

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