COMPARISON OF CARDIOVASCULAR ENDURANCE AND FLEXIBILITY AMONG VOLLEYBALL BASKETBALL AND HANDBALL PLAYERS

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ABSTRACT

The purpose of the study was to compare the cardiovascular endurance and flexibility among volleyball, basketball and handball players. For the purpose of the study 30 female students who were pursuing Bachelor of Physical Education and Master of Physical Education course from Lakshmibai National University of Physical Education, Gwalior, Madhya Pradesh and Department of Physical Education, Institute of Professional Studies, Gwalior, Madhya Pradesh, who had participated in different National as well as State level tournaments were randomly selected as the subject for this study. The subjects age was ranged between 20 to 25 years. All the subjects were residents of the hostel and regular participated in all activity classes of their course and all were physically fit and thus were capable to performing the tests efficiently. The necessary data of cardiovascular endurance and flexibility were collected at the time of match practice sessions. The data of cardiovascular endurance and flexibility were collected with the help of Harvard Step Test and Sit and Reach Test. In order to find out the significance effects of cardiovascular endurance and flexibility on volleyball, basketball and handball players, "One Way Analysis of Variance" (ANOVA) was applied and the level of significance was set at 0.05. The study reveals that there were no significant difference found in cardiovascular endurance and flexibility among volleyball, basketball and handball players.

Keywords: Cardiovascular Endurance, Flexibility and Players.

INTRODUCTION:

Sports are usually governed by a set of rules or customs. Physical events such as scoring goals or crossing a line first often define the result of a sport. However, the degree of skill and performance in some sports such as diving, dressage and figure skating is judged according to well-defined criteria. This is in contrast with other judged activities such as beauty pageants and body building, where skill does not have to be shown and the criteria are not as well defined.

Cardiovascular endurance is the most important aspect of fitness. It is basically how strong your heart is, which can potentially add years to your life. The heart is the most important muscle in the human body and if it is kept healthy then you can avoid numerous health problems. Another

reason that cardiovascular endurance is important is because your heart controls the oxygen flow to all your muscles - meaning cardiovascular health has a direct impact on your performance, both endurance and strength wise. Cardiovascular endurance is also frequently called cardio-respiratory endurance, cardiovascular fitness, aerobic capacity, and aerobic fitness or is sometimes more broadly termed "endurance" — although endurance may also refer to the ability of the muscle to do repeated work without fatigue.

Flexibility is definitely one of the most important aspects of fitness and has a very substantial role in every other part. It is extremely important to maintain a high flexibility, as it will reduce the risk of injury in any sport ten-fold and will also improve your performance. For some, flexibility does not come naturally, but even so it should still be strived for. Flexibility is determined basically by how for a muscle can stretch its fibres. As the fibres can stretch more, the muscles become more flexible. In general, flexibility means the range of movements around the skeletal joints of the body.

Precisely, flexibility may be defined as "the range of motion around a joint as determined by the elasticity of the muscles, tendons and ligaments associated with the joint under consideration." In other word flexibility is the ability of a person to move the parts of the body through as wide a range of motion as possible without undue strain to the joints and its muscle attachments.

OBJECTIVE:

The purpose of the study was to compare the cardiovascular endurance and flexibility among volleyball, basketball and handball players.

METHODOLOGY:

Selection of Subjects-

In this study 30 female students were randomly selected from volleyball, basketball and handball players of Lakshmibai National University of Physical Education, Gwalior, Madhya Pradesh and Department of Physical Education, Institute of Professional Studies, Gwalior, Madhya Pradesh as subjects for the study.

Selection of Variables-

The variables selected for the study were as follows:-

1- Cardiovascular Endurance

2- Flexibility

Criterion Measures-

The following physical variables were taken on each subject by using standard technique.

Physical Variables-

1- Cardiovascular Endurance- Cardiovascular endurance was measured by Harvard Step Test and score was recorded in beats per seconds.

2-Flexibility- Flexibility was measured by Sit and Reach Test and score was recorded in inches.

Tools of the Study-

Stopwatch, 20 inch high bench, metronome, flexomeasure and yard stick were used for data collection.

Collection of Data-

The data was collected for each variable by administering their respective tests. To ensure that the data collected was reliable, sufficient number of trials was given to each subject.

Statistical Techniques-

To compare the cardiovascular endurance and flexibility of female players of volleyball, basketball and handball. The one way analysis of variance (ANOVA) was applied at 0.05 level of significance.

RESULTS:

The analysis of data on selected variables that were cardiovascular endurance and flexibility collected on thirty (30) female players. Ten (10) players from each ball games i.e. volleyball, basketball and handball from Lakshmibai National University of Physical Education, Gwalior,

Madhya Pradesh and Department of Physical Education, Gwalior, Madhya Pradesh. The data were analysis by one way analysis of variance (ANOVA) to compare the cardiovascular endurance and flexibility among volleyball basketball and handball players.

Table No.1

DESCRIPTIVE ANALYSIS OF CARDIOVASCULAR ENDURANCE OF DIFFERENT BALL GAMES PLAYERS

Games	Mean	Standard Deviation	Minimum	Maximum	Range
Volleyball	78.03	3.57	72.81	82.87	11.06
Basketball	78.43	3.57	72.81	82.87	11.06
Handball	77.24	3.23	72.46	81.97	10.51

Table no.1 indicates that descriptive analysis of volleyball, basketball and handball game players mean, standard deviation, minimum, maximum and range were described in details. For volleyball players mean is 78.03, standard deviation is 3.57, minimum is 72.81, maximum is 82.87and range is 11.06. For basketball players mean is 78.43, standard deviation is 3.57, minimum is 72.81, maximum is 82.87and range is 11.06. In case of handball players mean is 77.27, standard deviation is 3.23, minimum is 72.46, maximum is 81.97and range is 10.51.

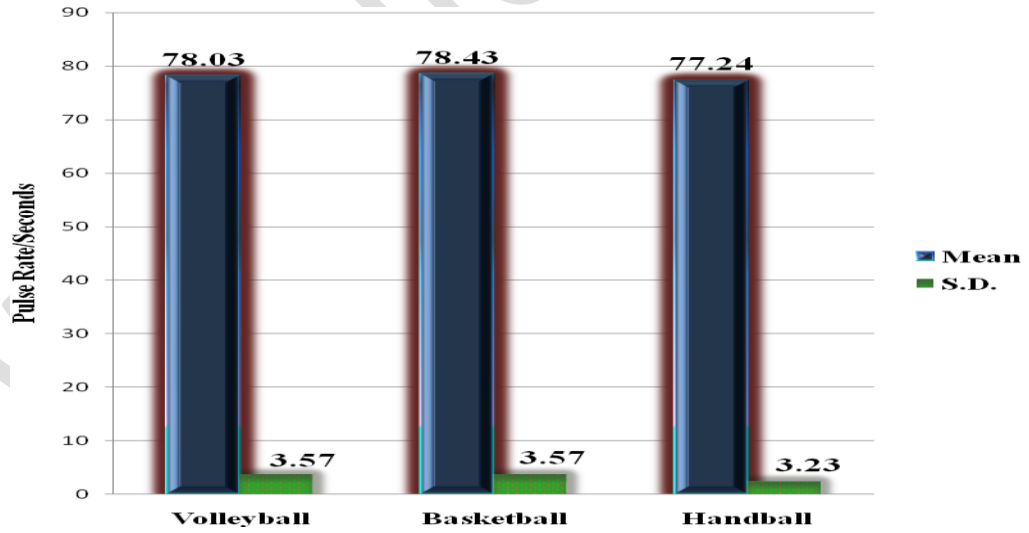

Figure No.1 Mean and Standard Deviation Values of Volleyball, Basketball and Handball Players

Table No.2

ONE WAY ANALYSIS OF VARIANCE OF CARDIOVASCULAR ENDURANCE OF DIFFERENT BALL GAMES PLAYERS

Source of Variance	Degree of Freedom	Sum of Square	Mean Square	'F'
Between Groups	2	9.47	4.73	0.39
Within Groups	27	324.58	12.02	

*Significant at 0.05 level of significance $_{(2,27)\,(0.05)}$ = 3.35

Table no.2 indicates that comparison of cardiovascular endurance among volleyball, basketball and handball players which are not significant as compared 'F' ratio 0.39 is less than the tabulated 'F' ratio 3.35 at 0.05 level of significance.

Table No.3
DESCRIPTIVE ANALYSIS OF FLEXIBILITY OF DIFFERENT BALL GAMES PLAYERS

Games	Mean	Standard Deviation	Minimum	Maximum	Range
Volleyball	7.60	1.14	5.91	9.49	4.59
Basketball	7.36	1.34	5.51	9.84	5.33
Handball	7.17	1.35	5.12	9.04	4.94

Table no.3 indicates that descriptive analysis of volleyball, basketball and handball game players mean, standard deviation, minimum, maximum and range were described in details. For volleyball players mean is 7.60, standard deviation is 1.14, minimum is 5.91, maximum is 9.49 and range is 4.59. For basketball players mean is 7.36, standard deviation is 1.34, minimum is 5.51, maximum is 9.84 and range is 5.33. In case of handball players mean is 7.17, standard deviation is 1.35, minimum is 5.12, maximum is 9.04 and range is 4.94.

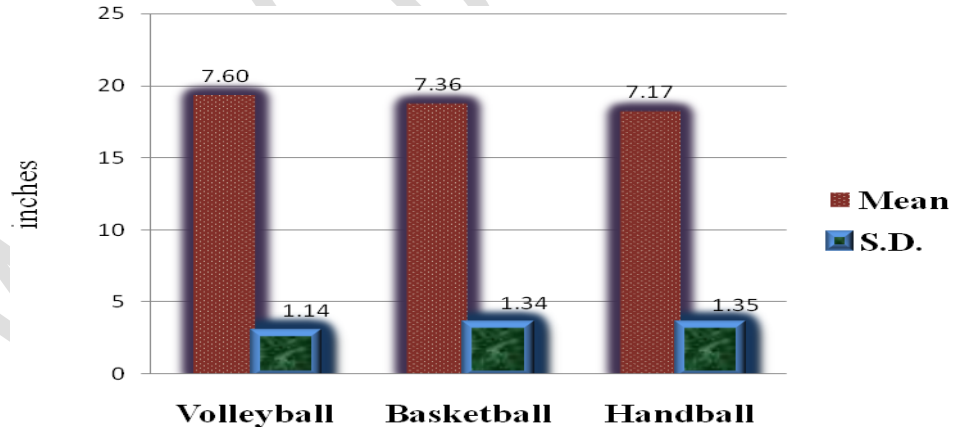

Figure No.2 Mean and Standard Deviation values of Volleyball, Basketball and Handball Players

Table No.4

ONE WAY ANALYSIS OF VARIANCE OF FLEXIBILITY OF DIFFERENT BALL GAMES PLAYERS

Source of Variance	Degree of Freedom	Sum of Square	Mean Square	'F'
Between Groups	2	0.95	0.48	0.29
Within Groups	27	44.08	1.63	

*Significant at 0.05 level of significance $_{(2,27)(0.05)}$ = 3.35

Table no.4 indicates that flexibility comparison among volleyball, basketball and handball players which are not significant as compared 'F' ratio 0.29 is less than the tabulated 'F' ratio 3.35 at 0.05 level of significance.

DISCUSSIONS OF FINDINGS:

The statistical findings of the present study revealed that the cardiovascular endurance and flexibility of volleyball, basketball and handball players are not significantly different because volleyball, basketball and handball players have same demand of cardiovascular endurance and flexibility. Dimensions of the play field of all the selected ball games are more or less same. As the play field dimensions are more or less same they cover same distance during play.

CONCLUSIONS:

Within the limitations of the present study it may be concluded that in relation to cardiovascular endurance and flexibility no significant differences were found among volleyball, basketball and handball players.

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