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## A comparison of health related physical fitness among volleyball, handball and basketball players

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### Abstract

The main purpose of the study was to compare the health related physical fitness of Volleyball, Handball and Basketball Players. For the purpose of the study total 60 subjects were selected, 20 male players from each of Volleyball, Handball and Basketball Players randomly from Degree College of Physical Education Amravati. The minimum status of subjects was of inter-collegiate level and the age of the subjects was ranged from 18-28 years.

The data pertaining to this study were collected on the selected subjects by using pull-ups test to measure muscular strength of arm and shoulder and the score was recorded in numbers; abdominal strength and endurance was measured by sit up test and score was recorded in numbers, cardio-respiratory endurance was measured by 600 yard run/walk test and the score was recorded in seconds. Flexibility of joints of trunk sit and reach test was applied and the score was recorded in centimeters and measurement of body composition was assessed by adopting four sites skinfold measurements of Durnin and Rehman and the score was recorded in Kilogram. The collected data were analyzed by using one way analysis of variance statistics (F-ratio) Findings of statistical analysis revealed that the pull ups ( $F=7.41$ ), 600 yard run/walk ( $F = 19.84$ ) sit and reach test ( $F = 6.88$ ) showed significant difference among the Volleyball, Handball and Basketball players whereas bent knee sit ups ( $F = 2.19$ ) and body composition skin fold ( $F = 2.30$ ) did not show significant difference among the Volleyball, Handball and Basketball players.

**Keywords:** Pull-ups, sit-ups, endurance, flexibility, lean body mass

### Introduction

Physical Fitness is one's richest possession, it cannot be purchased, it has to be earned through a daily routine of physical exercise. Physical activity is as natural and essential to humans as eating is whether you are awake or asleep, muscular contractions permits your lungs to breaths. Your heart to beat your eyes to move, and your body to twin.

Movement of a body part or of the whole body in the primary function of the human muscular system, but because no system operates independently, movement also involves the skeletal nervous, circulatory and respiratory systems These systems support muscular movements, and conversely physical activity contributes to their effective functioning and well-being.

Researches have shown that a physical fit person is able to withstand fatigue for longer period than the unfit, that the physically fit person is better equipped to tolerate physical stress, that the physically fit person has strong and more efficient heart and that there is a good relationship between good mental alertness, absence of nervous tension and physical fitness.

There are many concepts regarding health related physical fitness, it has been an important subject for many years. This term has been given interpretations by many of the authorities in the field of physical education and sports. Still today, there is a controversy existing about the meaning of the term. Fitness is competency or preparedness for life.

Different authors and researchers did many studies and researchers on various health related fitness level of different players of different games and sports, such as Basketball, Handball and Volleyball etc. and brought out many study results and many conclusions, are made which proved out to be very useful to different future studies.

The study of the health related physical fitness of inter-college players in volleyball, handball and basketball is very useful and helpful process for the physical education teacher to know the level of fitness of the players. By knowing that the physical education teacher will find it easily well players of their games and sports. Therefore, the researchers thought to find out the physical fitness level in between Volleyball, Handball and Basketball players.

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**Purpose of the Study**

The main purpose of the study was to compare the health related physical fitness of Volleyball, Handball and Basketball players studying in Degree College of Physical Education, Amravati.

**Hypothesis**

It was hypothesized that there might be significant difference in health related physical fitness among Volleyball, Handball and Basketball players.

**Methodology**

**Selection of subjects**

For the present study Sixty 60 male subjects Twenty (20) each from game i.e. Volleyball, Handball and Basketball players from the Degree College of Physical Education, Amravati (MS). The age group was ranging between 18 to 28 years. Simple random sampling method was adopted for the selection of subjects.

**Selection of test and Criterion Measures**

The criterion measures chosen for testing the hypothesis in this study was in numerical scores obtained from the strength, endurance, flexibility and body composition test.

1. To measure muscular strength of arm and shoulder pull-

- ups test was applied and the score was recorded in number.
2. To measure abdominal strength sit ups test was applied and score was recorded in number.
3. To measure cardio-respiratory endurance 600 yard run and walk test was applied and the score was recorded in seconds.
4. To measure the flexibility of the joints and trunk sit and reach test was applied and the score was recorded in centimeters.
5. For the measurement of body composition skinfold thickness method was applied and the score was recorded in kilogram.

**Collection of Data**

Data were collected by administrating the above mention test to measure the health related physical of Volleyball, Handball and basketball players.

**Analysis and Interpretation Data**

In order to calculate measures of central tendency and variability measures descriptive statistics was utilized. One-way ANOVA were applied for variance homogeneity and between group differences respectively.

**Table 1:** ANOVA for the Data on Pull ups among the Volleyball, Handball and Basketball Players.

Source of Variance	Sum of Squares	Degree of Freedom	Mean sum of Square	F-ratio
Between Groups	60.03	2	30.01	7.41*
Within Groups	230.90	57	4.05	

\*Significant at 0.05 level  
Tabulated  $F_{0.05}(2,57) = 3.162$

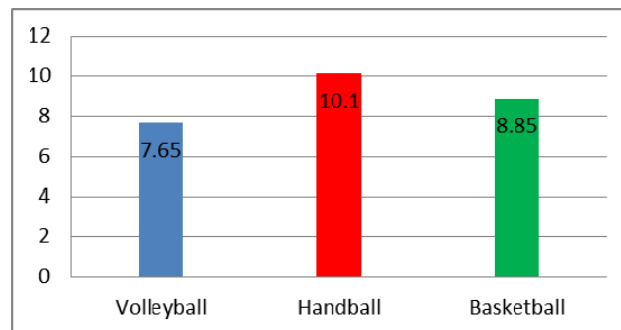
The findings of table-1 reveals that the performance of Pull ups differ significantly among the Volleyball, Handball and Basketball players because the calculated F-value of 7.41 is higher than that of tabulated F-value of 3.16 at 0.05 level. hence Least Significant Difference (LSD) Post Hoc Test was employed to determine the paired mean difference among the groups. The ordered of means is shown in table - 2.

**Table 2:** Paired Mean Difference of Pull Ups among the Volleyball, Handball and Basketball Players.

Mean			Mean Difference	Critical Difference
Volleyball	Handball	Basketball		
7.65	10.1		2.45*	1.27
7.65		8.85	1.20	1.27
	10.1	8.85	1.25	1.27

\*Significant at 0.05 level.

The findings of table-2 reveals that the mean of Pull ups significantly differs in between Volleyball and Handball (MD = 2.45) as the mean difference values are greater than the critical difference value of 1.27 at 0.05 level of confidence. It is also learnt from the above table that the mean difference value of Volleyball and Basketball players (MD = 1.20) and Handball and Basketball players (MD = 1.25) is less than the critical difference value of 1.31, hence there is no significant difference in Pull ups between the Volleyball and Basketball players and handball and Basketball. The mean differences are graphically in represented in fig 1.



**Fig 1:** Mean Difference of Pull-ups performance among the Volleyball, Handball and Basketball Players

**Table 3:** ANOVA for the Data on Bent Knee Sit-ups Among the Volleyball, Handball and Basketball Players.

Source of Variance	Sum of Squares	Degree of Freedom	Mean sum of Square	F-ratio
Between Groups	96.933	2	48.467	2.19@
Within Groups	1256.050	57	22.036	

@ Not Significant at 0.05 level  
Tabulated  $F_{0.05}(2, 57) = 3.162$

An analysis of table-3 shows that performance on Bent Knee Sit ups does not differ significantly among the Volleyball, Handball and Basketball Players as the calculated F-value of 2.19 is less than that of tabulated F-value of 3.162 at 0.05 level.

Since the F-ratio is observed to be in insignificant, hence, LSD post hoc test was not employed.

**Table 4:** ANOVA for the Data on 600 Yard Run/Walk among the Volleyball, Handball and Basketball Players.

Source of Variance	Sum of Square	Degree of Freedom	Mean sum of Square	F-ratio
Between Groups	1757.700	2	878.850	19.84*
Within Groups	2523.950	57	44.280	

\* Significant at 0.05 level  
Tabulated  $F_{0.05}(2,57) = 3.162$

The findings of table 4 reveals that the performance on 600 Yard Run/Walk differ significantly among the Volleyball, Handball and Basketball Players because, the calculated F-value of 19.84 is higher than that of tabulated F-value of 3.162 at 0.05 level.

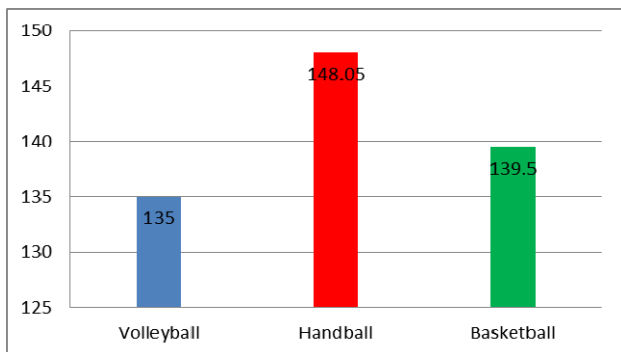
Since the F-ratio is observed to be significant, hence Least Significant Difference (LSD) Post Hoc Test was employed to determine the paired mean difference among the groups. The ordered of means is shown in table - 5.

**Table 5:** Paired Mean Difference of 600 Yard Run/Walk among the Volleyball, Handball and Basketball Players.

Mean			Mean Difference	Critical Difference
Volleyball	Handball	Basketball		
135.00	148.05		13.05*	4.21
135.00		139.5	4.5*	4.21
	148.05	139.5	8.55*	4.21

\* Significant at 0.05 level.

The findings of table 5 reveal that the performance on 600 Yard Run/Walk significantly differ in between Volleyball and Handball (MD = 13.05), Volleyball and Basketball (MD=4.5) and Handball and Basketball players (MD = 8.55) as the obtained mean difference values are higher than the critical difference value of 4.21 at 0.05 level of confidence. The mean differences are graphically represented in fig. 2.



**Fig 2:** Mean Difference of 600 yard Run/Walk performance Among the Volleyball, Handball and Basketball Players.

**Table 6:** ANOVA for the Data on Sit and Reach Test among the Volleyball, Handball and Basketball Players.

Source of Variance	Sum of Square	Degree of Freedom	Mean Sum of Square	F-ratio
Between Groups	274.300	2	137.150	6.88*
Within Groups	1136.050	57	19.931	

\* Significant at 0.05 level.  
Tabulated  $F_{0.05}(2, 57) = 3.162$

The findings of table 6 reveal that the performance on Sit and Reach Test differs significantly among the Volleyball, Handball and Basketball Players because, the calculated F-

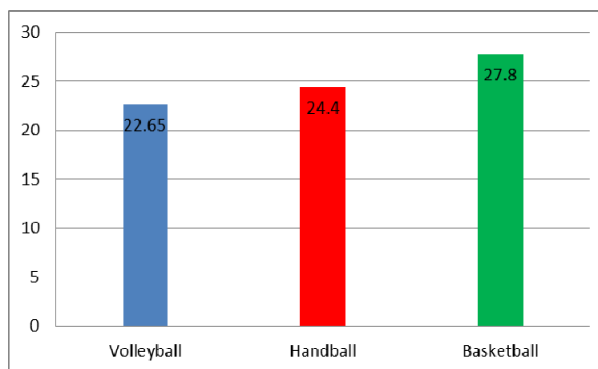
value of 6.88 is higher than the Tabulated F-value of 3.162 at 0.05 level needed to be significant. Hence Least Significant Difference (LSD) Post Hoc Test was employed. The ordered of means is shown in table - 7.

**Table 7:** Paired Mean Difference of Sit and Reach Test performance Among the Volleyball, Handball and Basketball Players.

Mean			Mean Difference	Critical Difference
Volleyball	Handball	Basketball		
22.65	24.4		1.75	2.82
22.65		27.8	5.15*	2.82
	24.4	27.8	3.4*	2.82

\*Significant at 0.05 level.

The findings of table 7 reveals that the mean performance of Sit and Reach Test does not differ significantly in between Volleyball and Handball (MD = 1.75) as the mean difference value is less than the critical difference value of 2.82 at 0.05 level of confidence. The table also indicates that the mean difference value of Volleyball and Basketball players (MD = 5.15) and Handball and Basketball players (MD = 3.4) are higher than the critical difference value of 2.82, hence there is significant difference in the performance on Sit and Reach Test in volleyball and Basketball Players, and Handball and Basketball players. The mean differences are graphically represented in fig. 3.



**Fig 3:** Mean Difference in the Performance of Sit and Reach Test Among the Volleyball, Handball and Basketball Players.

**Table 8:** ANOVA for the Data on Lean Body Weight among the Volleyball, Handball and Basketball Players

Source of Variance	Sum of Square	Degree of Freedom	Mean Sum of Square	F-ratio
Between Groups	198.056	2	99.028	2.30@
Within the Groups	2449.709	57	42.977	

@Not Significant at 0.05 level  
Tabulated  $F_{0.05}(2, 57) = 3.162$

The findings of table 8 reveals that Lean body weight does not differ significantly among the Volleyball, Handball and Basketball because, the calculated F-value 2.30 is less than that of tabulated F-value of 3.162 at 0.05 level.

**Discussion on Findings**

On the basis of findings from the above tables it was revealed that there were significant mean differences in health related physical fitness among the volleyball, Handball and Basketball players.

On the basis of findings from table-1 it was revealed that there was significant difference in Pull-ups among Volleyball, Handball and Basketball Players. The muscular strength of

the Handball players are superior than the Volleyball and Basketball players.

The findings also revealed that there was no significant difference in abdominal strength and endurance among the Volleyball, Handball and Basketball players. The result also revealed that volleyball players are superior in Cardio-respiratory endurance than Handball and Basketball players.

The result also revealed that trunk flexion of Basketball players were superior than the Volleyball and Handball players.

The findings also revealed that there was no significant difference in Lean body weight among the volleyball, handball and Basketball players. The results revealed that Basketball players were superior in health related physical fitness than Volleyball and Handball players.

### **Conclusion**

Within the limitations of the present study and on the basis of findings the following conclusions are drawn:

- 1) There was significant difference in Pull ups, 600 yard run/walk, sit and reach test and composite score among the Volleyball, Handball and Basketball players.
- 2) There was no significant mean difference among Volleyball, Handball and Basketball players in Bent knee sit-ups and Lean Body weight
- 3) Basketball players had shown significantly superior in flexibility and overall health related fitness than the Volleyball and Handball players.
- 4) Volleyball players had shown superior in 600 yard Run/walk test performance than Handball and Basketball Players.
- 5) Handball players had shown superior in Pull-ups test performance than volleyball and Basketball Players.

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