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# Comparative analysis the physical fitness among basketball and handball players at different topography

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**Abstract**
Sports performance has dramatically progressed over the past few decades. Performance levels unimaginable before are now common and the number of athletes capable of outstanding results are increasing. Physical fitness is a general state of good physical health. Obtaining and maintaining physical fitness is a result of physical activities, proper diet and nutrition and of course proper rest for physical recovery. The purpose of the study was to Comparative analysis the physical fitness and Physical fitness of Basketball and Handball players at different topography. To achieve the purpose of the study, a total of three hundred players (Basketball (n=150) and Handball (n=150)) were selected randomly as subjects from the Colleges in Tamil Nadu, India. The age of the subjects ranged from 18 to 25 years, the selected Basketball and Handball players were divided into three groups according to their representation in sports. Each group consisted of 50 players The following variables were selected for this study, Physical fitness Variables Strength, Strength Endurance, Agility, Explosive Power, Speed, Cardiovascular Endurance The static group comparison design was used for this study one way analysis of variance (ANOVA) was used Whenever, the obtained F-ratio was found to be significant, the Scheffe's test was used as post hoc test to find out the difference among the paired means. In all the cases.05 level of significance was used to test the hypothesis. There was significant difference among college, district and university Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance. University Basketball and Handball players found better than the district and college Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance. District Basketball and Handball players performed better than the college Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

**Keywords:** Strength, strength endurance, agility, explosive power, speed, cardio vascular endurance

## Introduction
Sports in the present world have become extremely competitive. It is not the mere participation or practice that brings out victory to an individual. Therefore, sports life is affected by various factors like Physiology, Biomechanics, Sports Training, Sports Medicine, Sociology and Sports Psychology etcetera. All the coaches, trainers, physical education personnel and doctors are doing their best to improve the performance of the players of their country. Athlete or players of all the countries are also trying hard to bring laurels/medals for their countries in International competitions (Charles A. Bucher., & Deborah, A. Wuest., 1987) [1].

In its most general meaning, physical fitness is a general state of good physical health. Obtaining and maintaining physical fitness is a result of physical activities, proper diet and nutrition and of course proper rest for physical recovery. In its simplest terms, physical fitness is to the human body what fine-tuning is to an engine. It enables people to perform up to their potential. Regardless of age, fitness can be described as a condition that helps individuals look, feel and to do their best. Thus, physical fitness trainers describe it as the ability to perform daily tasks vigorously and alertly, with left over energy to enjoy leisure-time activities and meet emergency demands. Specifically true for senior citizens. Physical fitness is the ability to endure, bear up, withstand stress and carry on in circumstances where an unfit person could not continue.

If one should be considered physically fit, the heart, lungs, and muscles have to perform at a certain level for the individual to continue feeling capable of performing an activity.

At the same time, human body directly affects the state of mind, fitness influences to some degree qualities such as mental alertness and emotional expression stimulate heart and lung activity. To produce a benefit, aerobic training must raise the heart rate (pulse) to the exerciser's target level for at least 20 minutes and include at least three sessions a week. The concept of aerobics was pioneered by Kenneth H. Cooper and was popularized in his books aerobics (1968) and the aerobics way (1977) ("To produce", 2012).

Team handball, also sometimes called continental, European and Olympic handball, provides a wealth of possibilities for school and community recreation programs that have as yet gone relatively untried in the English speaking world. This activity which takes its origin from soccer has evolved under the influence of basketball and yet is a unique Olympic sport, second only to soccer as the most popular sport of Europe.

It is fun to play and exciting to watch. The players and spectators alike enjoy the rapid continuous play, the fast-breaks, the fleet and varied hand movements in passes and shots, and the spectacular leaps and dives into the air followed by the lightning reactions of the goalkeeper. It is essentially a simple game, easily played and enjoyed at first attempt by anyone at any age. Even at the highest international level, it is essentially a game of well learned fundamentals. Executed swatted the response to develop situations. The purpose of the study was to analysis the physical fitness and Physical fitness of Basketball and Handball players at different topography.

## Methodology

The purpose of the study was to comparative analysis the physical fitness of Basketball and Handball players at different topography. To achieve the purpose of the study, a total of three hundred players (Basketball (n=150) and Handball (n=150)) were selected randomly as subjects from the Colleges in Tamil Nadu, India. The age of the subjects ranged from 18 to 25 years. The selected Basketball and Handball players were divided into three groups according to their representation in sports. Each group consisted of 50 players.

**Basketball**
Group I - College Players (n=50)
Group II - District Players (n=50)
Group III - University Players (n=50)

**Handball**
Group I - College Players (n=50)
Group II - District Players (n=50)
Group III - University Players (n=50)

### Selection of variables

The physical trainer and coaches were approached to measurement in terms of improved service to sportsman, the priceless product on earth. Each player is a unique problem with his own peculiar background and capabilities, differing from other in innumerable ways. The fundamental function of physical trainer and coaches is to understand each player's qualities and needs in order to give adequate guidance and to adopt programmes to meet necessary needs.

### The following variables were selected for this study

**Physical fitness Variables**

- Strength
- Strength Endurance
- Agility
- Explosive Power
- Speed
- Cardiovascular Endurance

### Selection of tests

The present study was undertaken primarily to analysis the physical fitness of Basketball and Handball players at different topography. As per the available literatures, the following tests were used to collect relevant data on the selected dependent variables and they were presented in the table 1.

**Table 1:** Tests Selection

| S. No | Criterion Variable | Name of the Test | Unit of Measurement |
|---|---|---|---|
| 1. | Strength | Pull-ups | In Numbers |
| 2. | Strength Endurance | Sit-ups | In Numbers |
| 3. | Agility | Shuttle Run | In Seconds |
| 4. | Explosive Power | Standing Broad Jump | In Metres |
| 5. | Speed | 50 yard run | In Seconds |
| 6. | Cardiovascular Endurance | 600 yard run | In Seconds |

## Results and Discussion

**Table 2:** Mean and standard deviation of basketball and handball players at different topography oN physical fitness components

| Variables | Level of Participation | Basketball | | Handball | |
|---|---|---|---|---|---|
| | | Mean | Std. Deviation | Mean | Std. Deviation |
| Strength | College | 7.40 | 0.78 | 6.38 | 1.28 |
| | District | 11.92 | 1.32 | 10.24 | 1.85 |
| | University | 16.88 | 1.77 | 13.68 | 1.86 |
| Strength Endurance | College | 21.38 | 3.50 | 21.06 | 3.79 |
| | District | 28.32 | 2.25 | 27.22 | 3.80 |
| | University | 42.20 | 3.79 | 39.50 | 5.77 |
| Agility | College | 9.72 | 0.59 | 10.16 | 0.58 |
| | District | 9.26 | 0.14 | 9.80 | 0.50 |
| | University | 8.92 | 0.26 | 9.32 | 0.19 |
| Explosive Power | College | 2.15 | 0.12 | 2.04 | 0.15 |
| | District | 2.19 | 0.09 | 2.24 | 0.07 |
| | University | 2.36 | 0.09 | 2.38 | 0.09 |

| | | | | | |
|---|---|---|---|---|---|
| Speed | College | 6.39 | 0.20 | 6.67 | 0.39 |
| | District | 5.93 | 0.20 | 6.25 | 0.13 |
| | University | 5.68 | 0.20 | 5.99 | 0.22 |
| Cardiovascular Endurance | College | 2.39 | 0.17 | 2.52 | 0.19 |
| | District | 2.02 | 0.20 | 2.35 | 0.15 |
| | University | 1.74 | 0.25 | 1.94 | 0.22 |

Figure 1-6 presents the means of each continuous variable by the three groups.

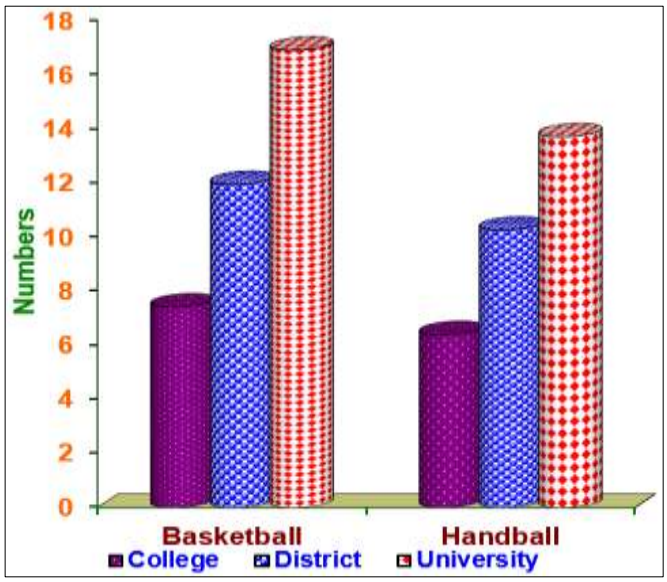


**Fig 1:** Mean values of basketball and handball players at different topography on strength

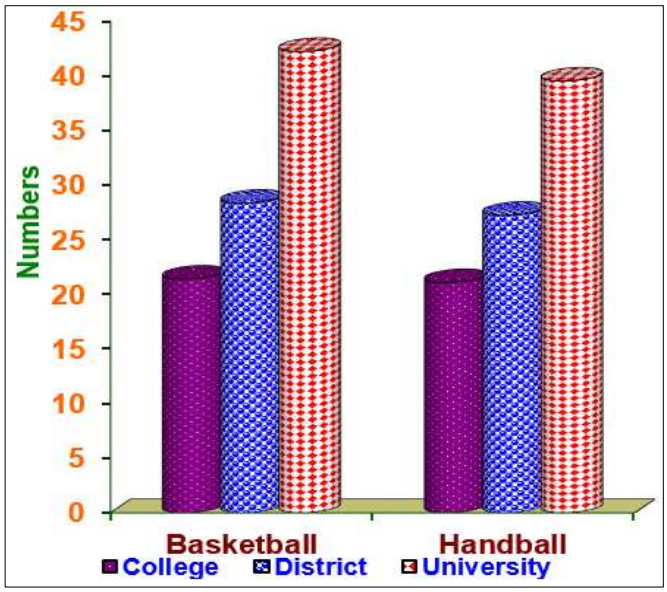


**Fig 2:** Mean values of basketball and handball players at different topography on strength endurance

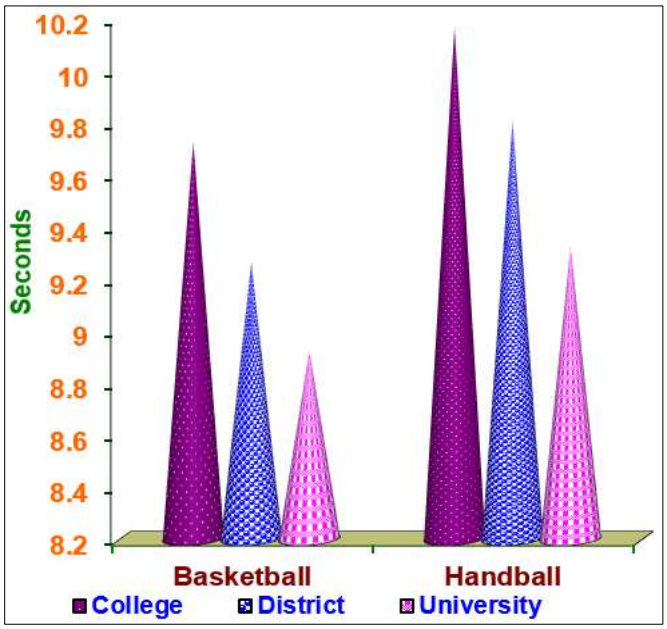


**Fig 3:** Mean values of basketball and handball players at different topography on agility

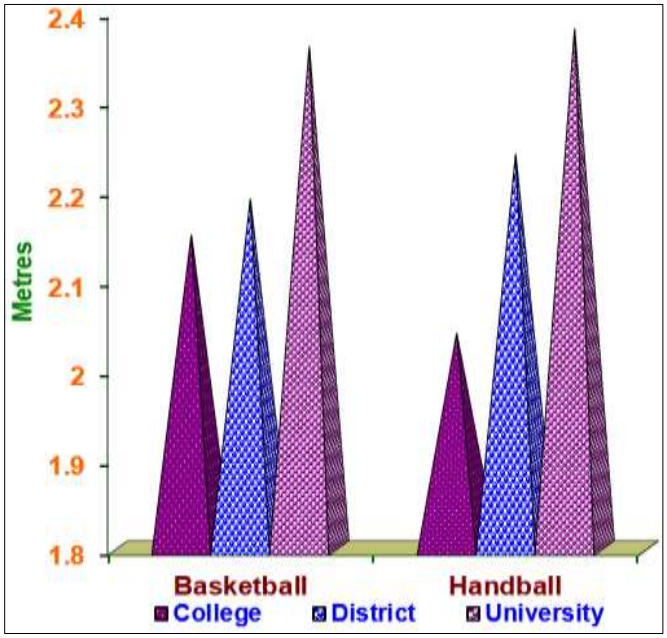


**Fig 4:** Mean values of basketball and handball players at different topography on explosive power

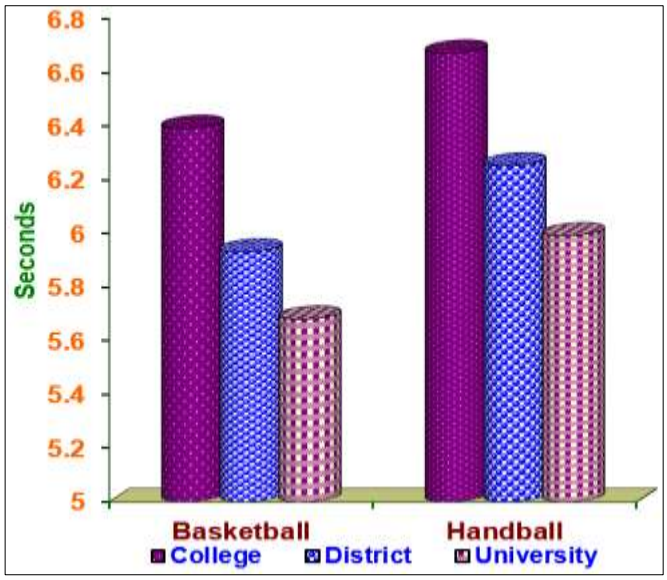


**Fig 5:** Mean values of basketball and handball players at different topography on speed

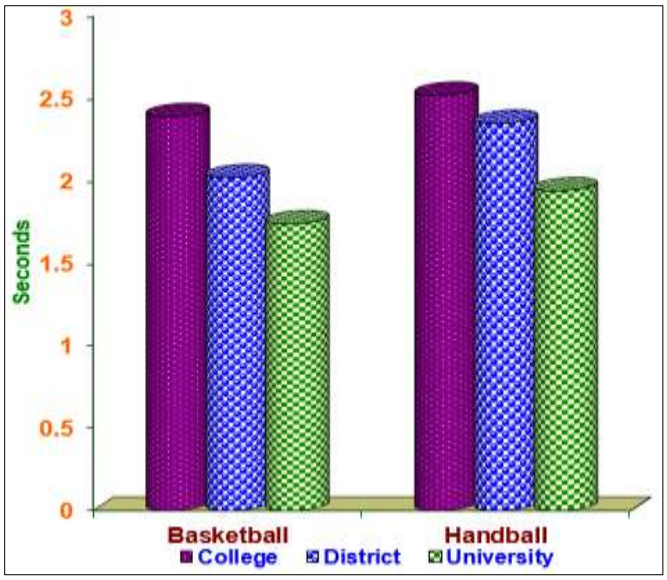


**Fig 6:** Mean values of basketball and handball players at different topography on cardiovascular endurance

**Table 3:** Analysis of variance on the selected physical fitness of basketball players at different topography

| Variables | Source of Variance | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Strength | Between | 2248.37 | 2 | 1124.19 | 614.42* | 0.000 |
| | Within | 268.96 | 147 | 1.83 | | |
| | Total | 2517.33 | 149 | | | |
| Strength Endurance | Between | 11238.17 | 2 | 5619.09 | 531.99* | 0.000 |
| | Within | 1552.66 | 147 | 10.56 | | |
| | Total | 12790.83 | 149 | | | |
| Agility | Between | 16.06 | 2 | 8.03 | 54.28* | 0.000 |
| | Within | 21.75 | 147 | 0.15 | | |
| | Total | 37.81 | 149 | | | |
| Explosive Power | Between | 1.24 | 2 | 0.62 | 64.53* | 0.000 |
| | Within | 1.41 | 147 | 0.01 | | |
| | Total | 2.65 | 149 | | | |
| Speed | Between | 12.98 | 2 | 6.49 | 162.74* | 0.000 |
| | Within | 5.86 | 147 | 0.04 | | |
| | Total | 18.85 | 149 | | | |
| Cardiovascular Endurance | Between | 10.79 | 2 | 5.40 | 122.37* | 0.000 |
| | Within | 6.48 | 147 | 0.04 | | |
| | Total | 17.28 | 149 | | | |

*Significant at.05 level. The table value required for.05 level of significance with df 2 & 147 is 3.04

**Basketball (Physical Fitness)**

Table 2 presents the results of the univariate ANOVA tests of six physical fitness variables (Strength, strength endurance, agility, explosive power, speed, cardio vascular endurance).

From the table 2, the obtained F-ratio values among college, district and university Basketball players on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance are 614.42, 531.99, 54.28, 64.53, 162.74 and 122.37 which are greater than the tabulated F-value of 3.04 with df 2 and 147 required for significance at.05 level of confidence. The result of the study shows that there was significant difference exists among college, district and university Basketball players on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance.

The results of the study indicated that there was a significant difference on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance. Hence, the Scheffe's test was applied as post hoc test to find out the paired means difference, if any and it has been presented in Table 3.

**Table 4:** The scheffe's test for the differences between paired means of basketball with different topography on selEcted physical fitness

| Variables | College Vs District | College Vs University | District Vs University | C.I. Value |
|---|---|---|---|---|
| Strength | 4.52* | 9.48* | 4.96* | 0.67 |
| Strength Endurance | 6.94* | 20.82* | 13.88* | 1.60 |
| Agility | 0.464* | 0.798* | 0.334* | 0.19 |
| Explosive Power | 0.039 | 0.209* | 0.170* | 0.05 |
| Speed | 0.462* | 0.710* | 0.248* | 0.10 |
| Cardiovascular Endurance | 0.374* | 0.654* | 0.280* | 0.10 |

*Significant at.05 level

**Strength:** The University Basketball players (mean = 16.88) significantly outperformed the District Basketball player (mean = 11.92) and College Basketball player (mean = 7.40) in strength with mean differences of 4.96 and 9.48 (CI = 0.67) respectively and also District Basketball players outperformed the college Basketball players in strength with mean differences of 4.52 (CI=0.67).

**Strength Endurance:** The University Basketball players (mean = 42.20) significantly outperformed the District Basketball player (mean = 28.32) and College Basketball player (mean = 21.38) in strength endurance with mean differences of 13.88 and 20.82 (CI = 1.60) respectively and also District Basketball players outperformed the college Basketball players in strength endurance with mean differences of 6.94 (CI=1.60).

**Agility:** The University Basketball players (mean = 8.92) significantly outperformed the District Basketball player (mean = 9.26) and College Basketball player (mean = 9.72) in agility with mean differences of 0.334 and 0.798 (CI = 0.19) respectively and also District Basketball players outperformed the college Basketball players in agility with mean differences of 0.464 (CI=0.19).

**Explosive Power**

The University Basketball players (mean = 2.36) significantly outperformed the District Basketball player (mean = 2.19) and College Basketball player (mean = 2.15) in explosive power with mean differences of 0.170 and 0.209 (CI = 0.05) respectively and however there was no significant difference between district and college Basketball players in explosive power with mean differences of 0.039 (CI=0.05).

**Speed:** The University Basketball players (mean = 5.68) significantly outperformed the District Basketball player (mean = 5.93) and College Basketball player (mean = 6.39) in speed with mean differences of 0.248 and 0.710 (CI = 0.10) respectively and also District Basketball players outperformed the college Basketball players in strength with mean differences of 0.462 (CI=0.10).

**Cardiovascular endurance**

The University Basketball players (mean = 1.74) significantly outperformed the District Basketball player (mean = 2.02) and College Basketball player (mean = 2.39) in cardiovascular endurance with mean differences of 0.280 and 0.654 (CI = 0.10) respectively and also District Basketball players outperformed the college Basketball players in cardiovascular endurance with mean differences of 0.374 (CI=0.10).

**Handball (Physical Fitness)**

Table 4 presents the results of the univariate ANOVA tests of six physical fitness variables (strength, strength endurance, agility, explosive power, speed, cardio vascular endurance).

**Table 5:** Analysis of variance on the selected physical fitness of handball players at different topography

| Variables | Source of Variance | Sum of Squares | df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| Strength | Between | 1333.72 | 2 | 666.860 | 235.770* | .000 |
| | Within | 415.78 | 147 | 2.828 | | |
| | Total | 1749.50 | 149 | | | |
| Strength Endurance | Between | 8812.96 | 2 | 4406.480 | 212.943* | .000 |
| | Within | 3041.90 | 147 | 20.693 | | |
| | Total | 11854.86 | 149 | | | |
| Agility | Between | 17.585 | 2 | 8.792 | 42.179* | .000 |
| | Within | 30.642 | 147 | .208 | | |
| | Total | 48.227 | 149 | | | |
| Explosive Power | Between | 2.815 | 2 | 1.407 | 111.981* | .000 |
| | Within | 1.847 | 147 | .013 | | |
| | Total | 4.662 | 149 | | | |
| Speed | Between | 11.617 | 2 | 5.808 | 79.875* | .000 |
| | Within | 10.69 | 147 | .073 | | |
| | Total | 22.307 | 149 | | | |
| Cardiovascular Endurance | Between | 8.929 | 2 | 4.465 | 124.149* | .000 |
| | Within | 5.286 | 147 | .036 | | |
| | Total | 14.215 | 149 | | | |

*Significant at.05 level. The table value required for.05 level of significance with df 2 & 147 is 3.04

From the table 2, the obtained F-ratio values among college, district and university Handball players on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance are 235.77, 212.943, 42.179, 111.981, 79.875 and 124.149 which are greater than the tabulated F-value of 3.04 with df 2 and 147 required for significance at.05 level of confidence. The result of the study shows that there was significant difference exists among college, district and university Handball players on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance.

The results of the study indicated that there was a significant difference on strength, strength endurance, agility, explosive power, speed and cardio vascular endurance. Hence, the Scheffe's test was applied as post hoc test to find out the paired means difference, if any and it has been presented in Table 5.

**Table 6:** The scheffe's test for the differences between paired means of handball with different topography on selEcted physical fitness

| Variables | College Vs District | College Vs University | District Vs University | C.I. Value |
|---|---|---|---|---|
| Strength | 3.86* | 7.30* | 3.44* | 0.83 |
| Strength Endurance | 6.16* | 18.44* | 12.28* | 2.24 |
| Agility | 0.36* | 0.836* | 0.476* | 0.22 |
| Explosive Power | 0.202* | 0.333* | 0.131* | 0.06 |
| Speed | 0.414* | 0.676* | 0.262* | 0.13 |
| Cardiovascular Endurance | 0.173* | 0.582* | 0.409* | 0.09 |

*Significant at.05 level.

**Strength:** The University Handball players (mean = 13.68) significantly outperformed the District Handball player (mean = 10.24) and College Handball player (mean = 6.38) in strength with mean differences of 3.44 and 7.30 (CI = 0.83) respectively and also District Handball players outperformed the college Handball players in strength with mean differences of 3.86 (CI=0.83).

**Strength Endurance:** The University Handball players (mean = 39.50) significantly outperformed the District Handball player (mean = 27.22) and College Handball player (mean = 21.06) in strength endurance with mean differences of 12.28 and 18.44 (CI = 2.24) respectively and also District Handball players outperformed the college Handball players in strength endurance with mean differences of 6.16 (CI=2.24).

**Agility:** The University Handball players (mean =9.32) significantly outperformed the District Handball player (mean = 9.80) and College Handball player (mean = 10.16) in agility with mean differences of 0.476 and 0.836 (CI = 0.22) respectively and also District Handball players outperformed the college Handball players in agility with mean differences of 0.36 (CI=0.22).

**Explosive Power:** The University Handball players (mean = 2.38) significantly outperformed the District Handball player (mean = 2.24) and College Handball player (mean = 2.04) in explosive power with mean differences of 0.131 and 0.333 (CI = 0.06) respectively and however there was no significant difference between district and college Handball players in explosive power with mean differences of 0.202 (CI=0.06).

**Speed:** The University Handball players (mean = 5.99) significantly outperformed the District Handball player (mean = 6.25) and College Handball player (mean = 6.67) in speed with mean differences of 0.262 and 0.676 (CI = 0.13) respectively and also District Handball players outperformed the college Handball players in strength with mean differences of 0.414 (CI=0.13).

**Cardiovascular endurance:** The University Handball players (mean = 1.94) significantly outperformed the District Handball player (mean = 2.35) and College Handball player (mean = 2.52) in cardiovascular endurance with mean differences of 0.409 and 0.582 (CI = 0.09) respectively and also District Handball players outperformed the college Handball players in cardiovascular endurance with mean differences of 0.173 (CI=0.09).

## Conclusion

- There was significant difference among college, district and university Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.
- University Basketball and Handball players found better than the district and college Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.
- District Basketball and Handball players performed better than the college Basketball and Handball players on selected physical fitness such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

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