

## **Chapter IV**

### **ANALYSIS AND INTERPRETATIONS OF THE DATA**

#### **4.1 OVERVIEW**

The analysis of data and detailed results of the study have been discussed in this chapter. The purpose of the present study was to analyse the selected physical fitness and personality traits at different topography among selected college, district and university level Basketball and Handball players of Kerala State, India. To achieve the purpose of the study, one hundred fifty male players from each category (college, district and university) of Basketball and Handball and a total of 300 players in Kerala State, India, who had their credit in participating tournaments in their respective games were selected randomly.

The continuous variables selected for this study were strength, strength endurance, agility, explosive power, speed, cardio vascular endurance and personality traits (16 personality factor). All the subjects were tested on the selected criterion variables.

The static group comparison design was used for this study. The collected data were analysed by using independent t-test to find out the difference, if any, between the basketball and handball players and one way analysis of variance (ANOVA) was used to find the difference if any among the intercollegiate, interdistrict and interuniversity handball and basketball players on the selected physical fitness variables and personality traits. 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.

#### **4.2 LEVEL OF SIGNIFICANCE**

This is crucial portion of the thesis in arriving at the conclusion by examining the statistical hypotheses and either by accepting the null hypotheses or rejecting the same in accordance with the results obtained in relation to the level of significance fixed by the investigator. The probability level below which to reject the hypotheses is termed as level of significance. The independent t- test and F-ratio obtained were compared to .05 level of significance which was considered adequate.

#### **4.3 TEST OF SIGNIFICANCE**

In using analysis of variance, F ratio of 3.04 was needed for significant at .05 level with the degrees of freedom 2 and 147. T-Test of 1.98 was needed for significant at .05 level with the degrees of freedom 98. The present study, if the obtained value were equal and greater at .05 level, the null hypothesis were rejected and if the obtained values were less than the required value at .05 level, the hypotheses were accepted to the effect that there existed no significant difference the means of the groups under study.

#### **4.4 ANALYSIS OF DATA**

The analyses were carried out through various statistical techniques such as the descriptive, the univariate analysis of variance (ANOVA) and the post hoc pair wise comparison using the Scheffe's test analysis. The data were compiled and analyzed using the *Statistical Package for the Social Science (SPSS)* for windows computer software (Version 16).

Hypothesis regarding the effect of different games on participants' physical fitness and personality traits were tested, and the findings of testing this hypothesis were presented. Each hypothesis tested is followed by a summary of testing that hypothesis was also presented. Finally, the summary of findings to research questions was presented.

#### **4.4.1 Testing of Hypothesis 1 & 2**

**Hypothesis 1:** There would be significant difference among college, district and university Basketball players on selected physical fitness variables such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

**Hypothesis 2:** There would be significant difference among college, district and university Handball players on selected physical fitness variables such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

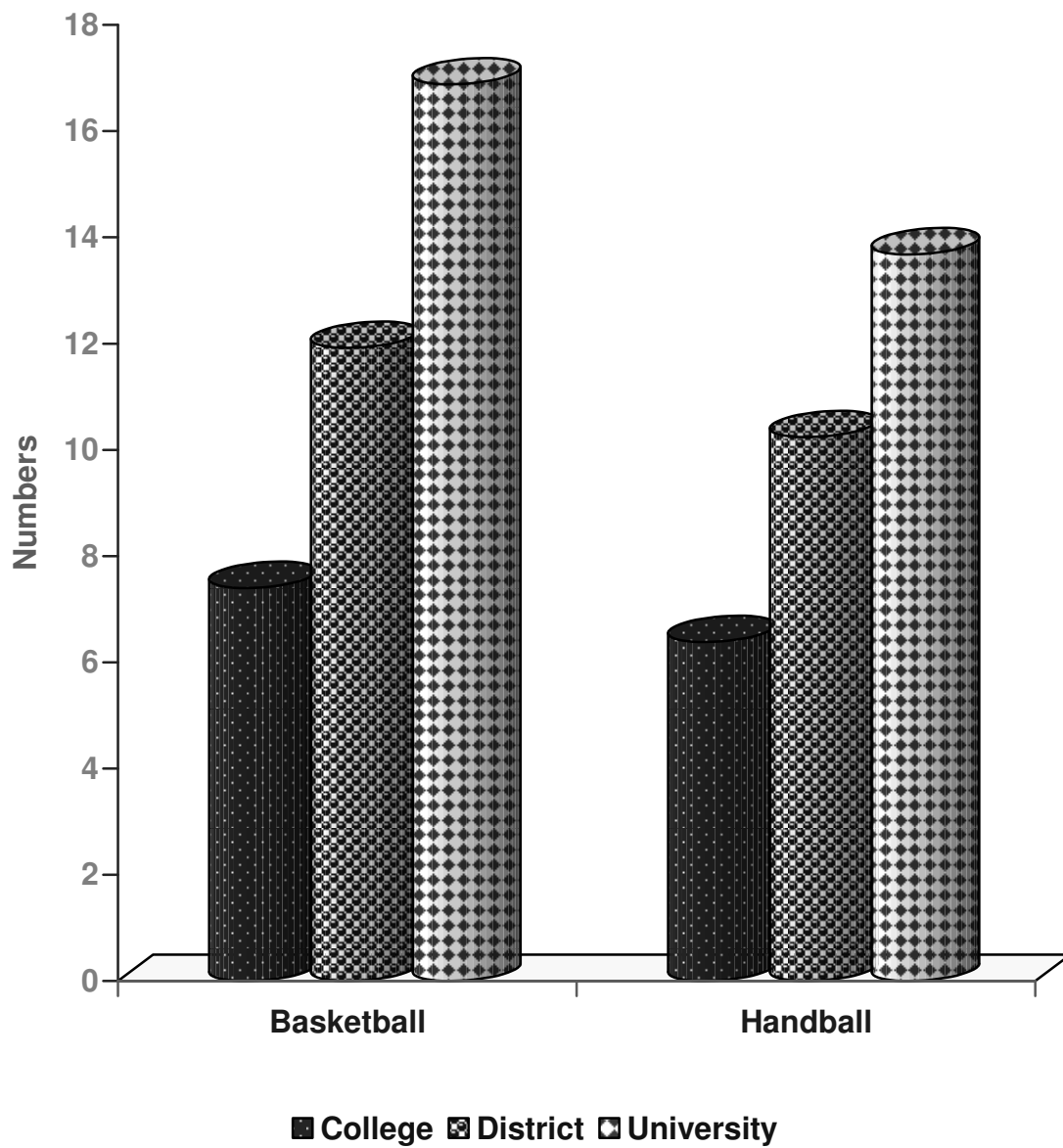
#### 4.4.1.1 Physical Fitness Variables

Table 4.1 presents the means and standard deviations of each continuous variable by the three groups.

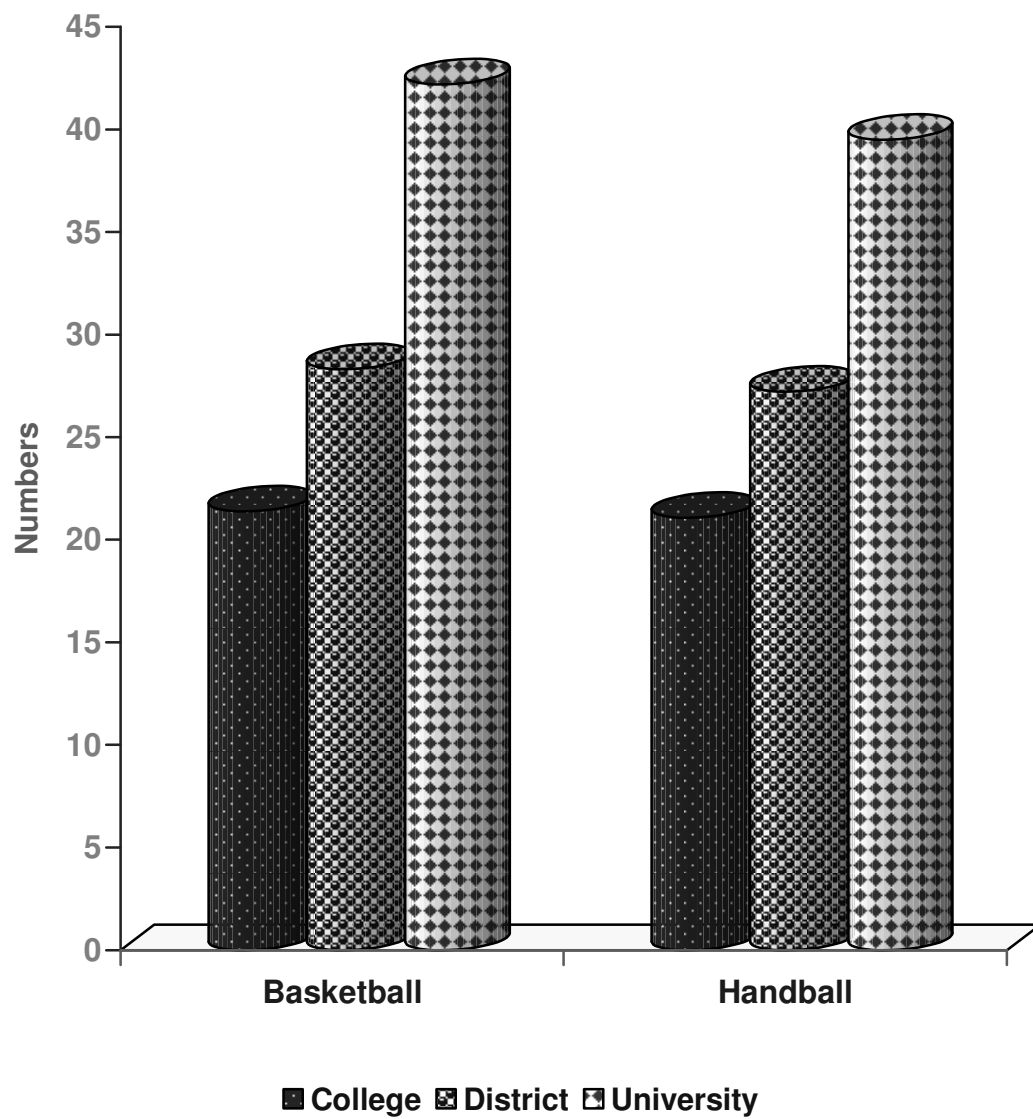
**TABLE-4.1**  
**MEAN AND STANDARD DEVIATION OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON PHYSICAL FITNESS COMPONENTS**

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

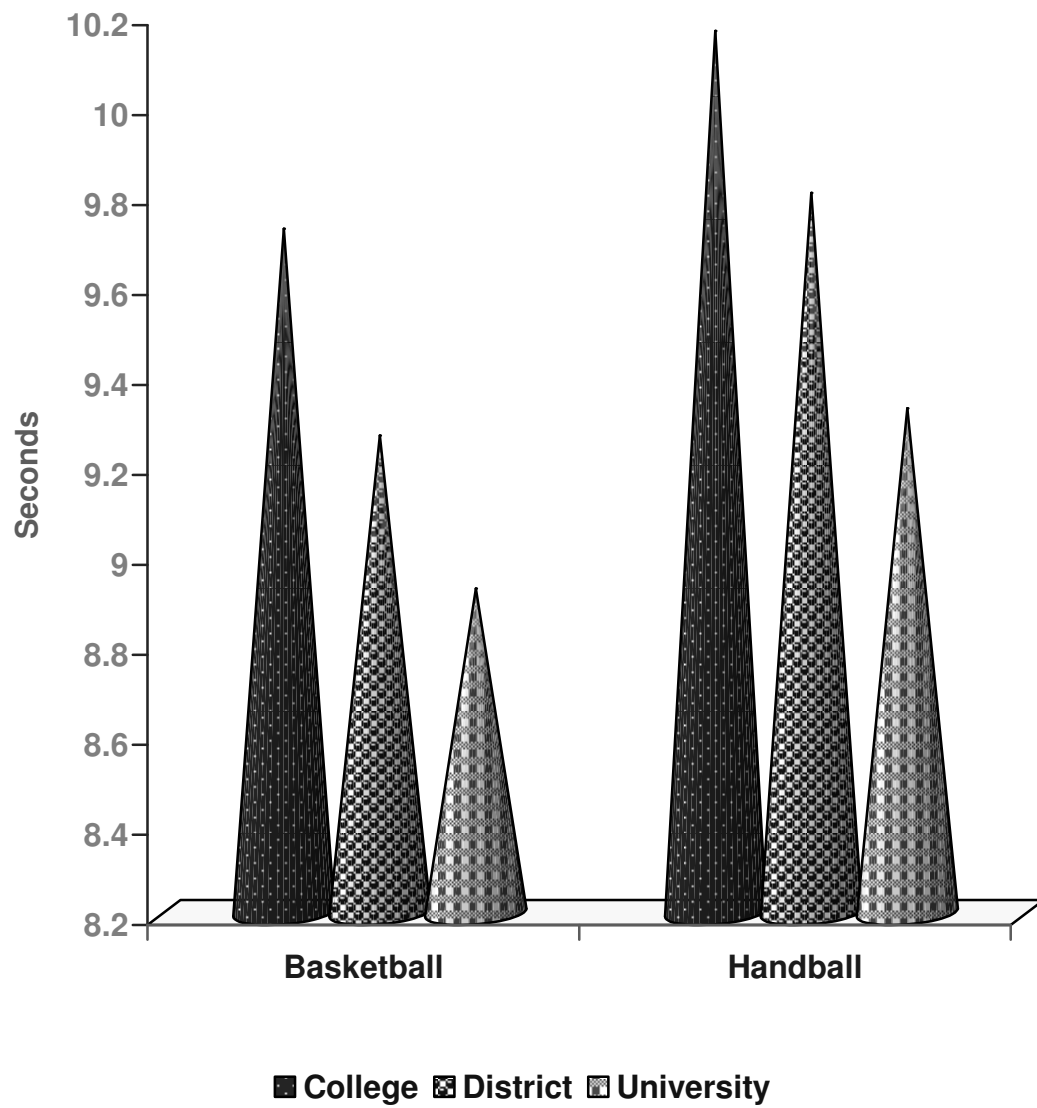
Figure I-VI presents the means of each continuous variable by the three groups.



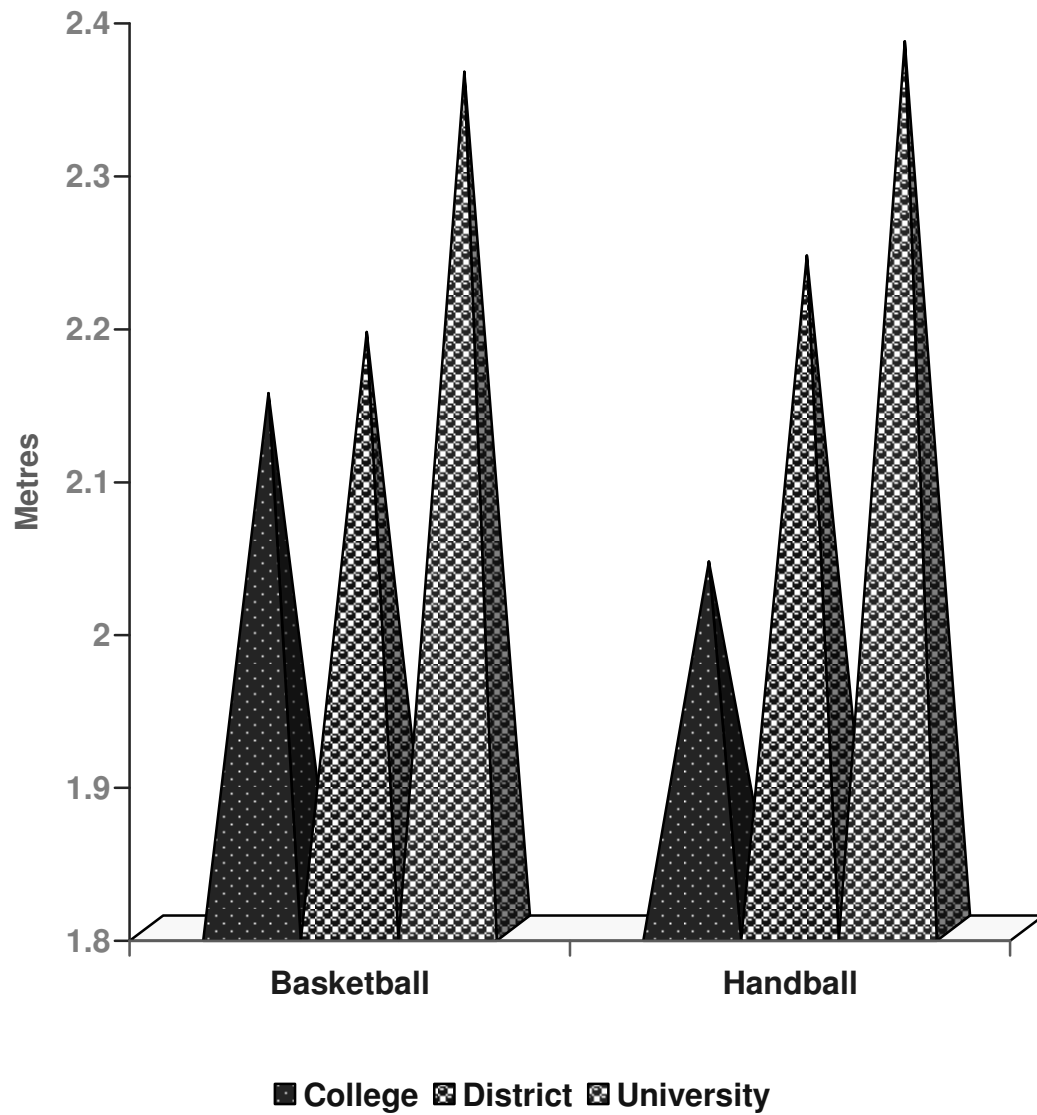
**FIGURE 1: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON STRENGTH.**



**FIGURE II: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON STRENGTH ENDURANCE.**

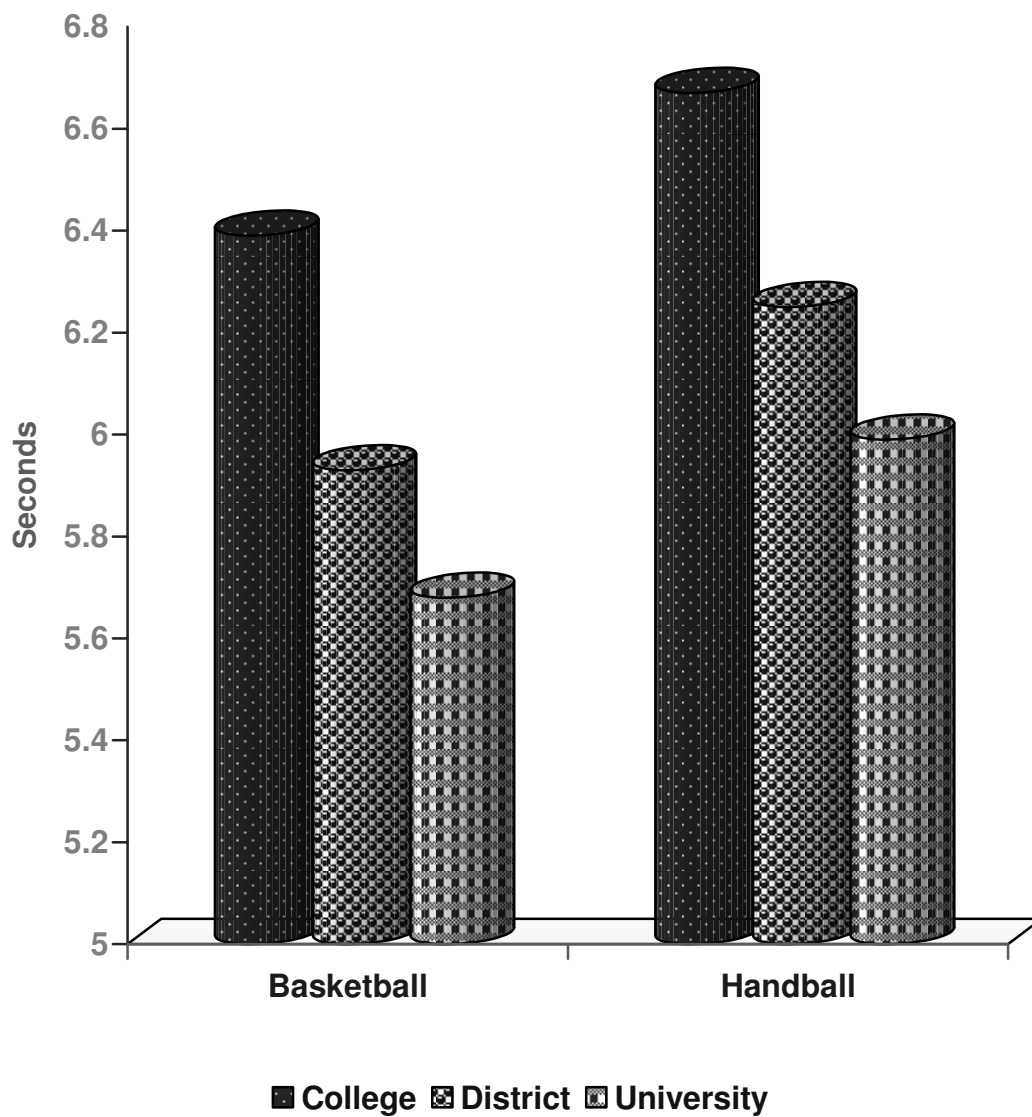


**FIGURE III: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON AGILITY.**

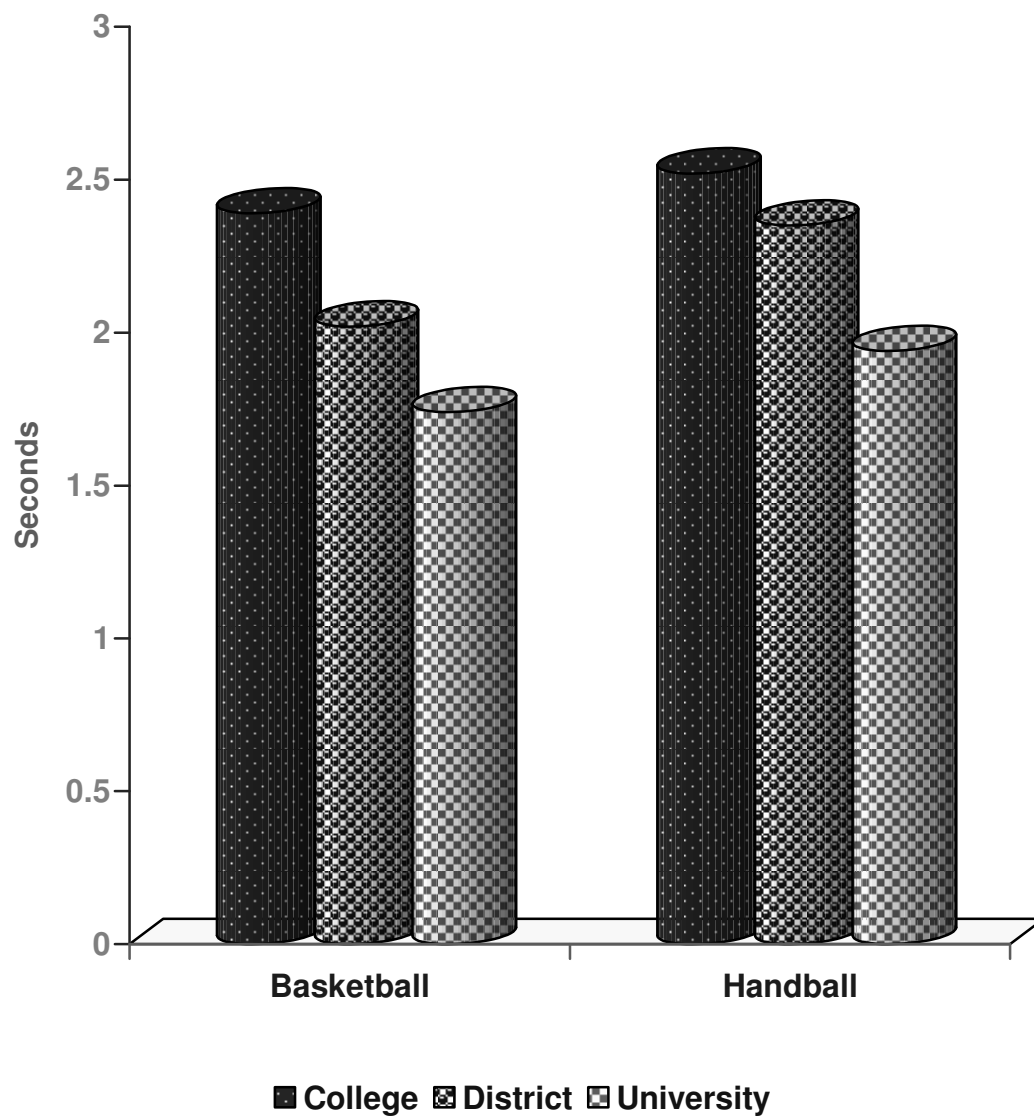


**FIGURE IV: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON EXPLOSIVE POWER.**





**FIGURE V: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON SPEED.**



**FIGURE VI: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON CARDIOVASCULAR ENDURANCE.**

#### 4.4.1.2 Basketball (Physical Fitness)

Table 4.2 presents the results of the univariate ANOVA tests of six physical fitness variables (strength, strength endurance, agility, explosive power, speed, cardio vascular endurance).

**TABLE 4.2**  
**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.

From the table 4.2, 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 4.3.

**TABLE 4.3**  
**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).

#### 4.4.1.3 Handball (Physical Fitness)

Table 4.4 presents the results of the univariate ANOVA tests of six physical fitness variables (strength, strength endurance, agility, explosive power, speed, cardiovascular endurance).

**TABLE 4.4**  
**ANALYSIS OF VARIANCE ON THE SELECTED PHYSICAL FITNESS OF**  
**HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY**

<b>Variables</b>	<b>Source of Variance</b>	<b>Sum of Squares</b>	<b>df</b>	<b>Mean Square</b>	<b>F</b>	<b>Sig.</b>
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 4.2, 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 4.5.

**TABLE 4.5**  
**THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF**  
**HANDBALL WITH DIFFERENT TOPOGRAPHY ON SELECTED PHYSICAL**  
**FITNESS**

<b>Variables</b>	<b>College Vs District</b>	<b>College Vs University</b>	<b>District Vs University</b>	<b>C.I. Value</b>
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).

#### **4.4.1.4..Summary of Testing Hypothesis 1 & 2**

The statistical results confirmed the hypothesis 1, showing that there was a significant difference among college, district and university Basketball players on selected physical fitness variables such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

The statistical results confirmed the hypothesis 2, showing that there would be significant difference among college, district and university Handball players on selected physical fitness variables such as strength, strength endurance, agility, explosive power, speed, cardio vascular endurance.

#### **4.4.2 Testing of Hypothesis 3 & 4**

**Hypothesis 3:** There would be significant difference among college, district and university Basketball players on selected personality traits such as sixteen personality factor.

**Hypothesis 4:** There would be significant difference among college, district and university Handball players on selected personality traits such as sixteen personality factor.

Table 4.6 presents the means and standard deviations of each continuous variable by the three groups.

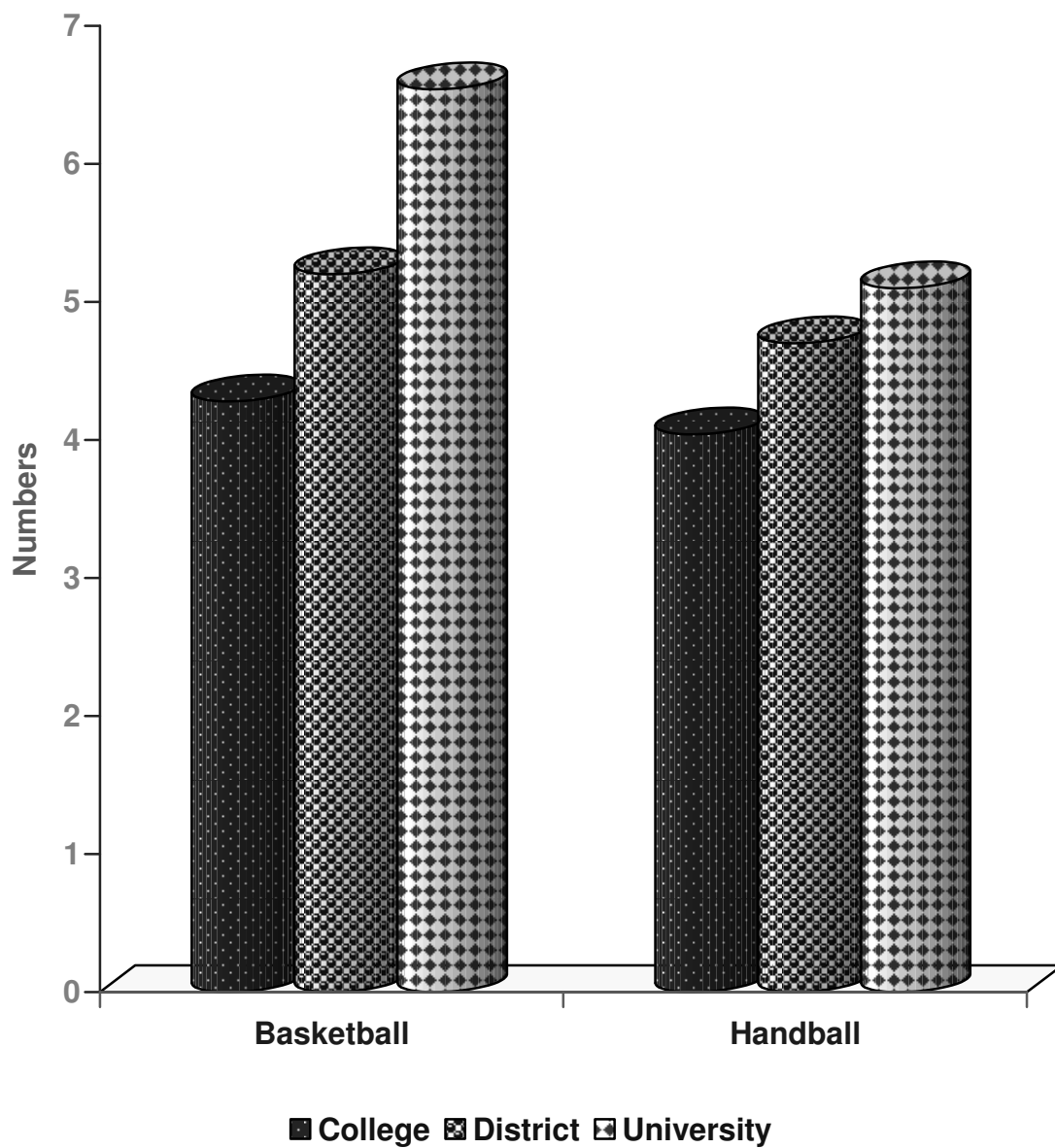
**Table-4.6**

**MEAN AND STANDARD DEVIATION OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON PERSONALITY TRAITS**

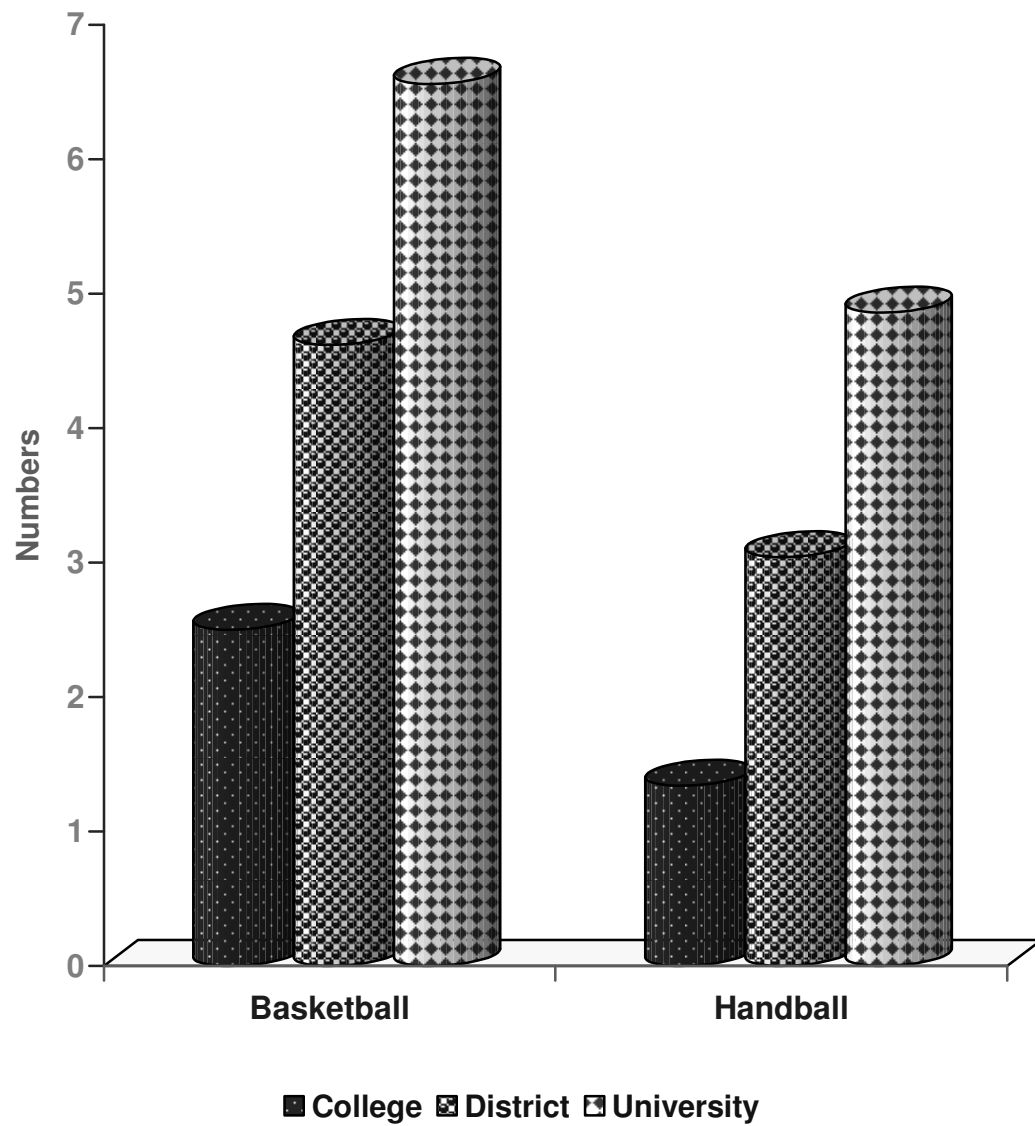
Variables	Level of Participation	Basketball		Handball	
		Mean	Std. Deviation	Mean	Std. Deviation
Factor A	College	4.28	1.18	4.04	1.48
	District	5.20	0.81	4.70	0.99
	University	6.54	0.71	5.10	0.86
Factor B	College	2.50	0.54	1.34	0.48
	District	4.62	0.70	3.04	0.67
	University	6.56	0.70	4.86	0.64
Factor C	College	4.10	0.71	2.26	0.83
	District	4.82	0.66	3.78	0.68
	University	6.64	0.83	4.86	0.78
Factor E	College	4.90	0.91	3.88	0.98
	District	5.42	0.64	4.64	0.85
	University	6.84	0.71	5.18	0.72
Factor F	College	3.44	0.61	1.82	0.72
	District	4.70	0.95	3.28	0.64
	University	6.78	0.91	4.52	0.74
Factor G	College	3.78	0.89	2.34	0.87
	District	5.10	0.71	3.68	0.79
	University	6.44	0.86	4.74	0.72
Factor H	College	3.70	0.68	1.96	0.70
	District	4.98	0.71	3.90	0.65
	University	6.90	0.79	4.88	0.82
Factor I	College	4.18	0.96	2.38	0.90
	District	5.42	0.76	3.88	0.63
	University	6.56	0.50	5.02	0.62
Factor L	College	4.10	1.02	2.10	0.74
	District	4.96	0.99	3.64	0.75

	University	6.22	1.04	4.16	0.93
Factor M	College	3.62	0.64	2.22	0.71
	District	5.50	0.58	3.72	0.70
	University	7.00	0.78	5.10	0.71
Factor N	College	3.78	0.74	2.16	0.65
	District	4.84	0.96	3.60	0.95
	University	6.92	0.72	4.80	0.67
Factor O	College	3.50	0.51	2.44	0.70
	District	5.24	0.69	4.06	1.11
	University	6.84	0.87	5.48	0.61
Factor Q1	College	4.30	0.79	1.96	0.73
	District	5.38	0.75	3.64	0.63
	University	7.06	0.91	4.82	0.66
Factor Q2	College	3.76	0.66	1.90	0.68
	District	5.10	0.84	3.74	0.88
	University	7.08	0.70	5.26	0.72
Factor Q3	College	4.34	0.63	1.78	0.58
	District	5.42	0.88	3.82	0.90
	University	6.94	0.74	5.20	0.64
Factor Q4	College	4.24	0.69	2.72	1.07
	District	5.44	0.64	4.10	0.99
	University	7.34	0.89	5.34	0.63

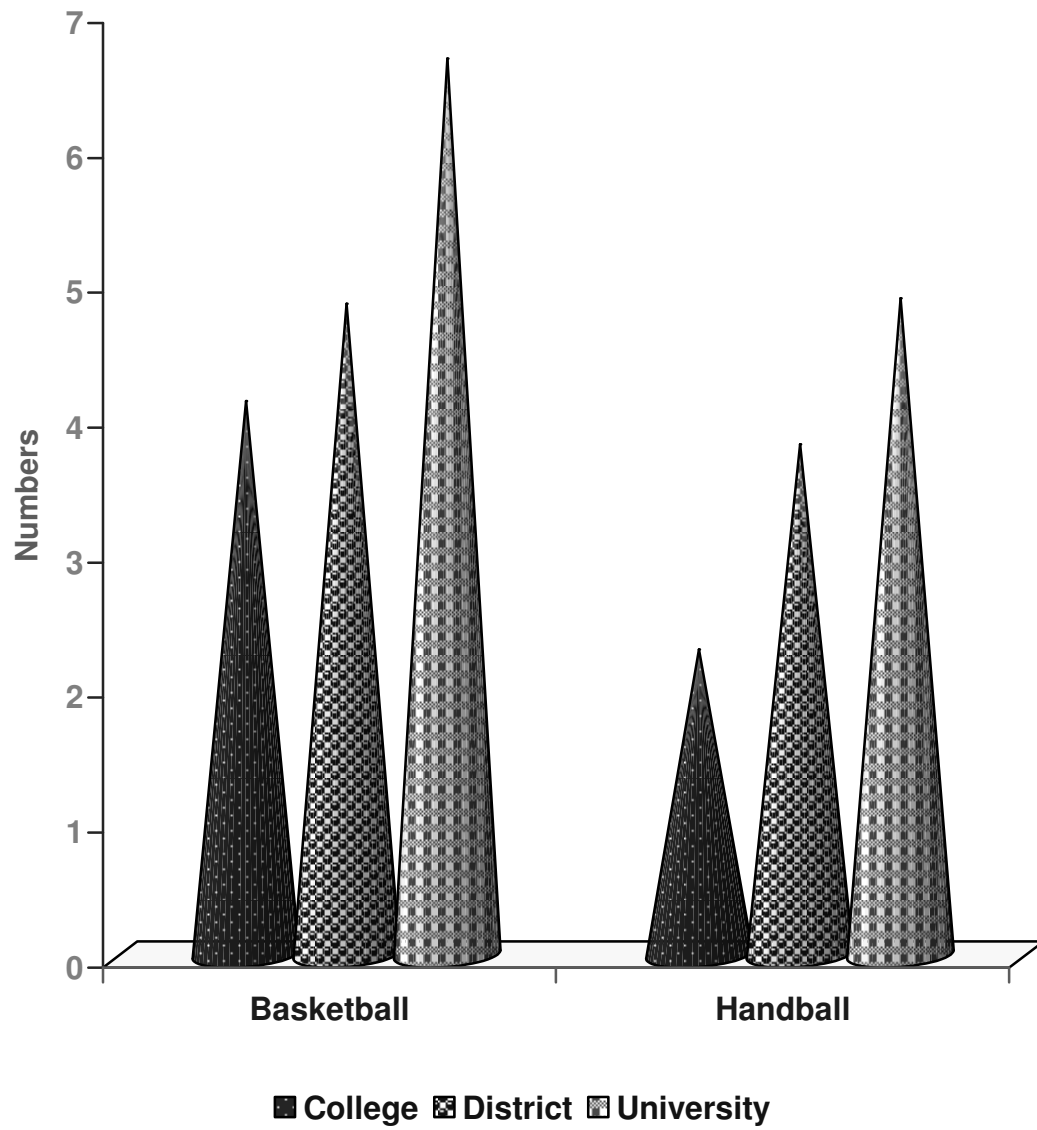
Figure VII-XXII presents the means of each continuous variable by the three groups.



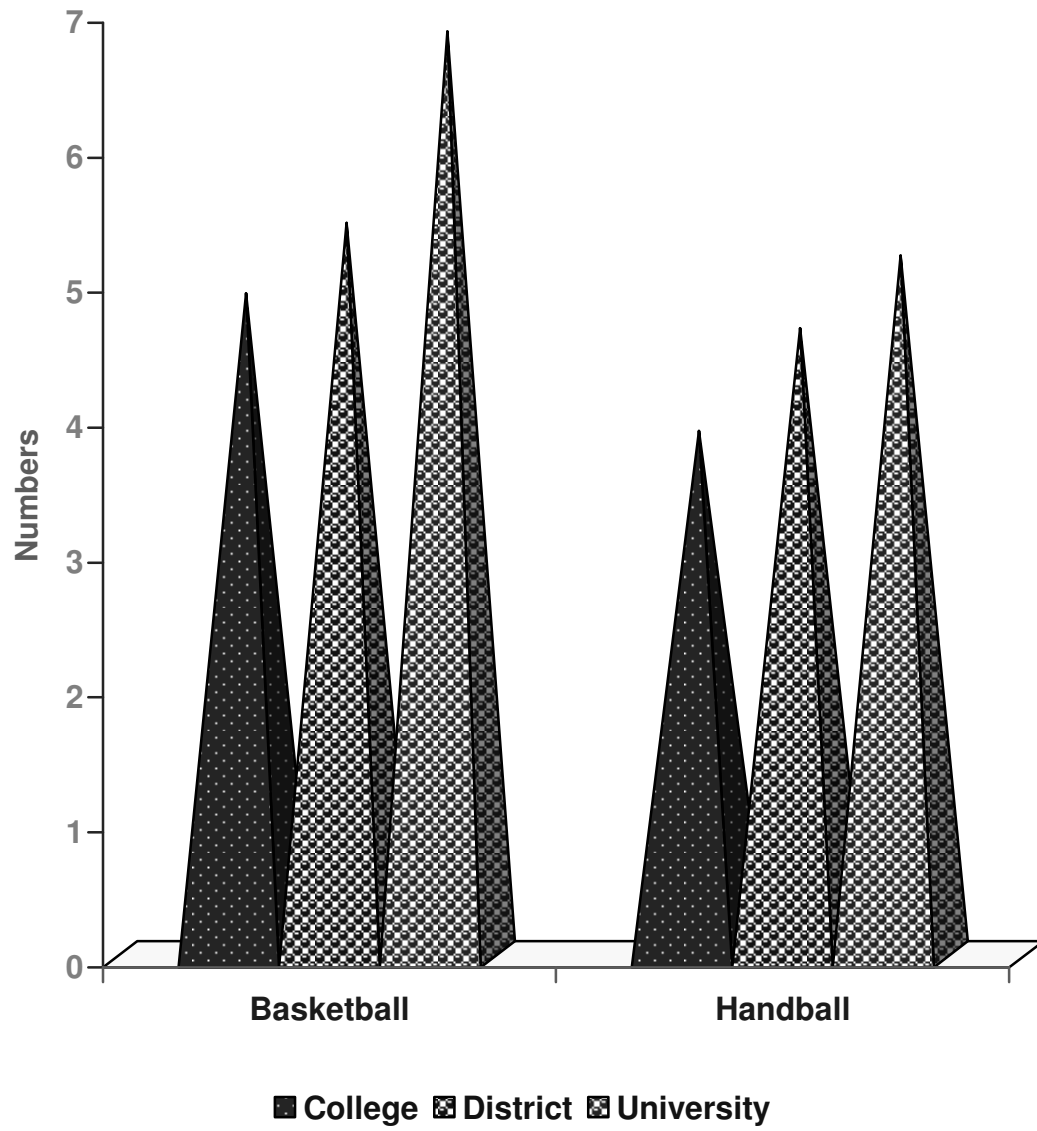
**FIGURE VII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR A.**



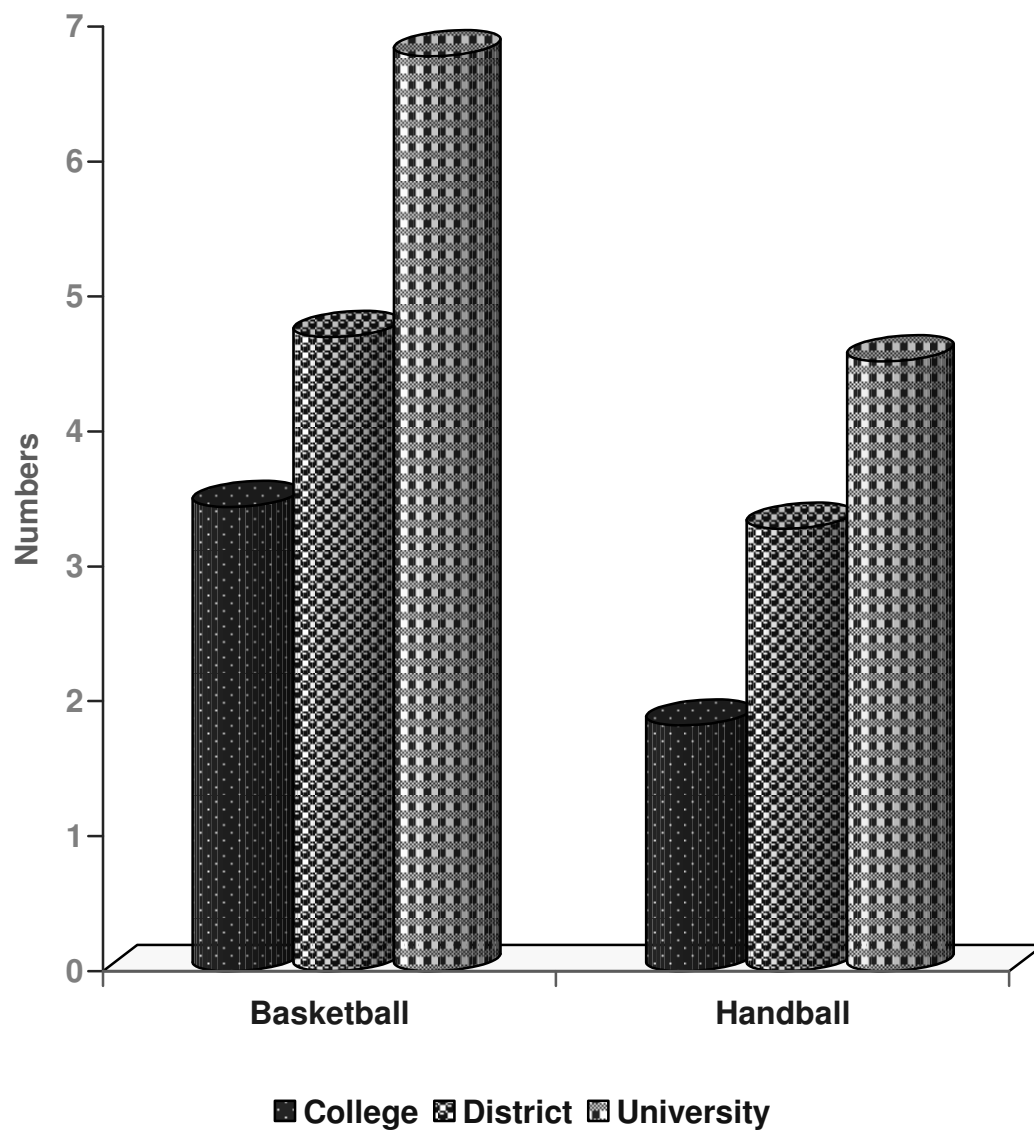
**FIGURE VIII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR B.**



**FIGURE IX: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR C.**

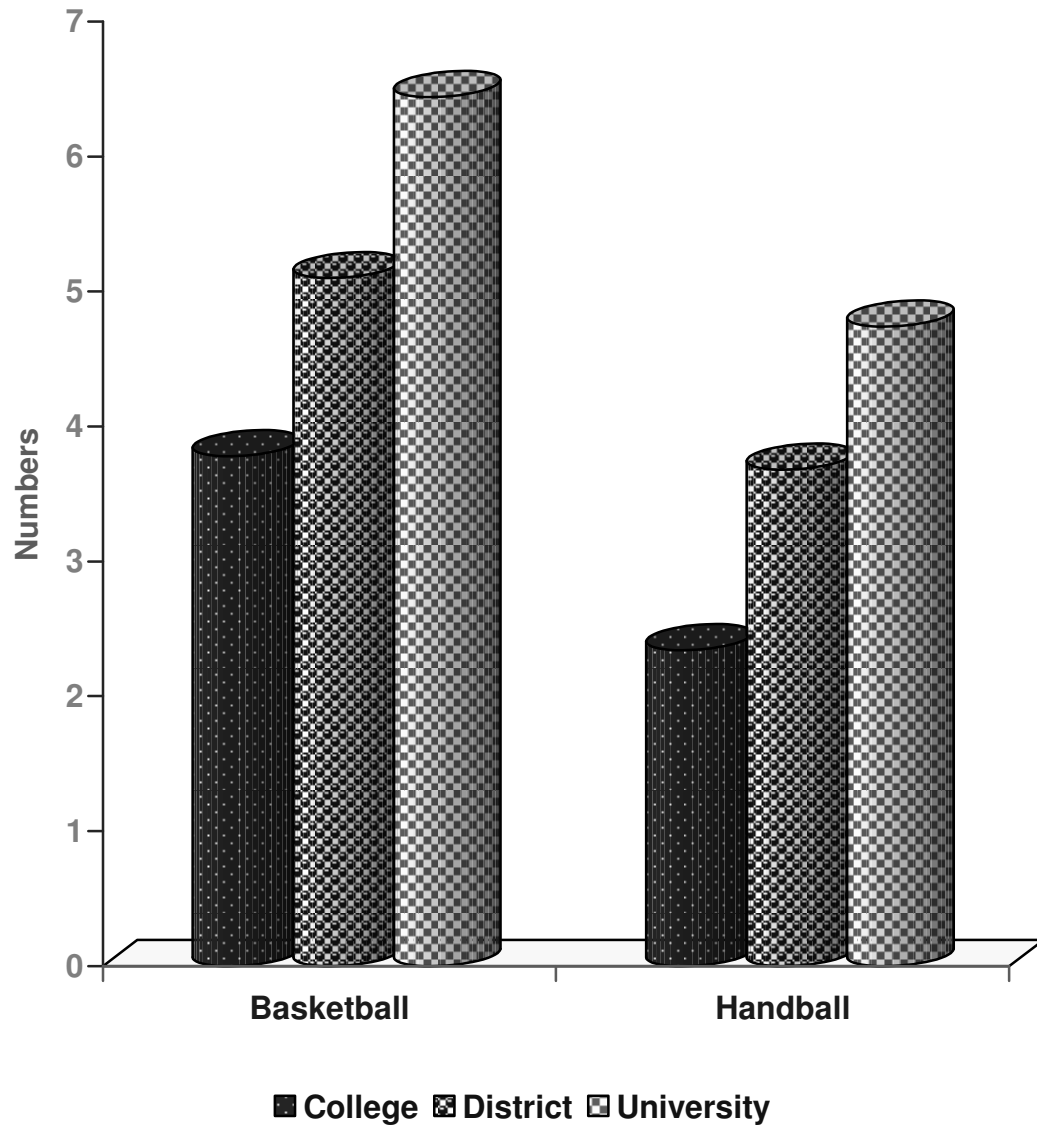


**FIGURE X: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR E.**

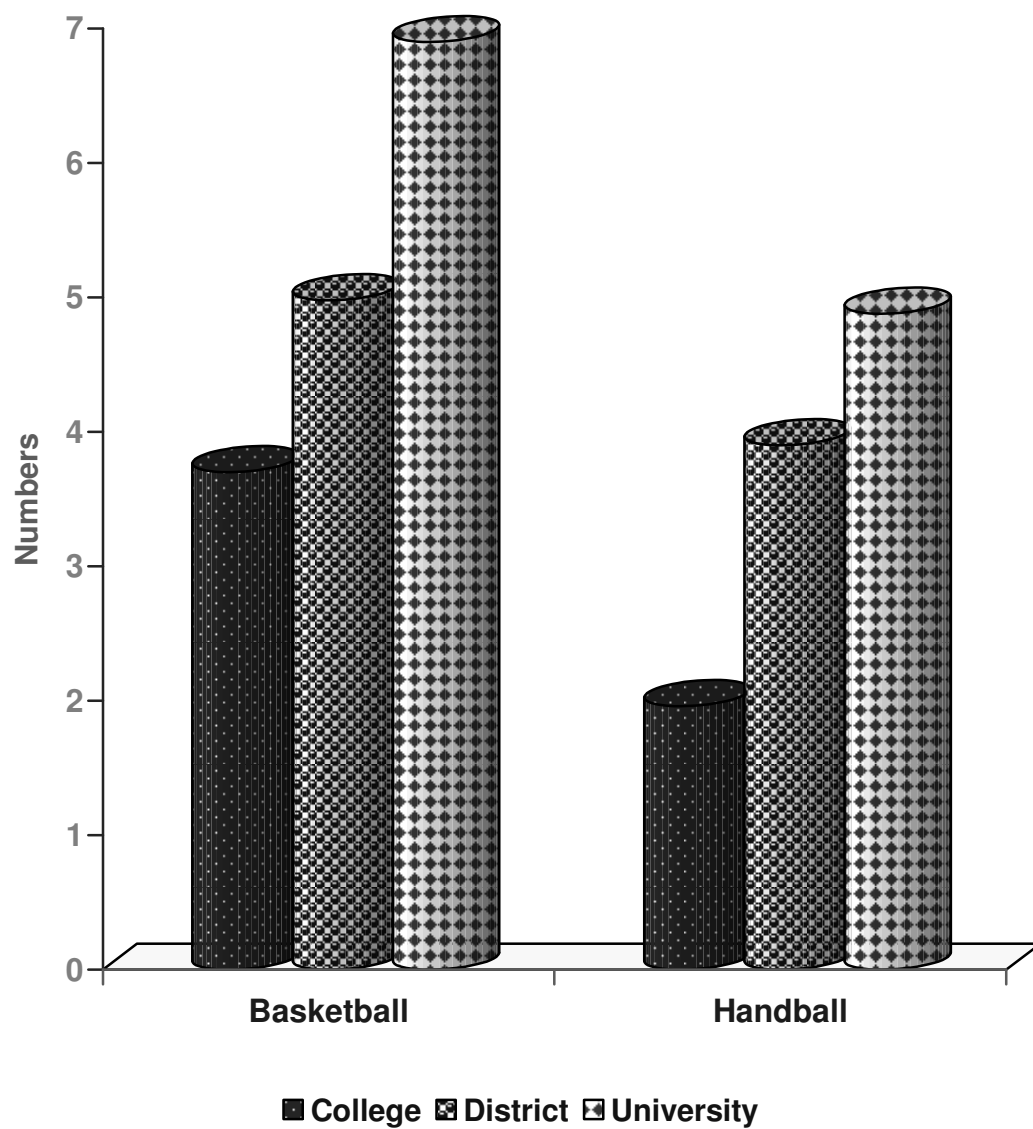


**FIGURE XI: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR F.**

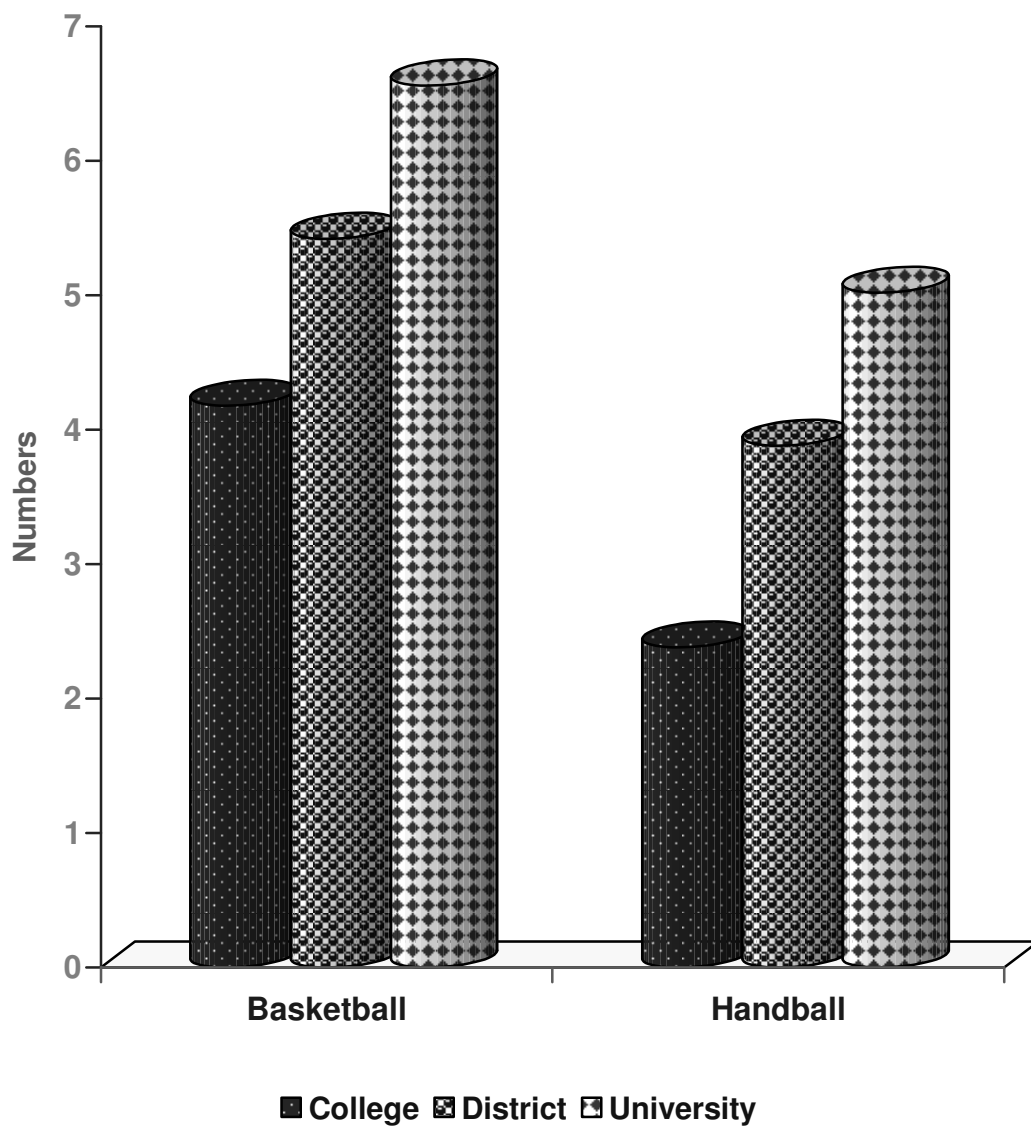




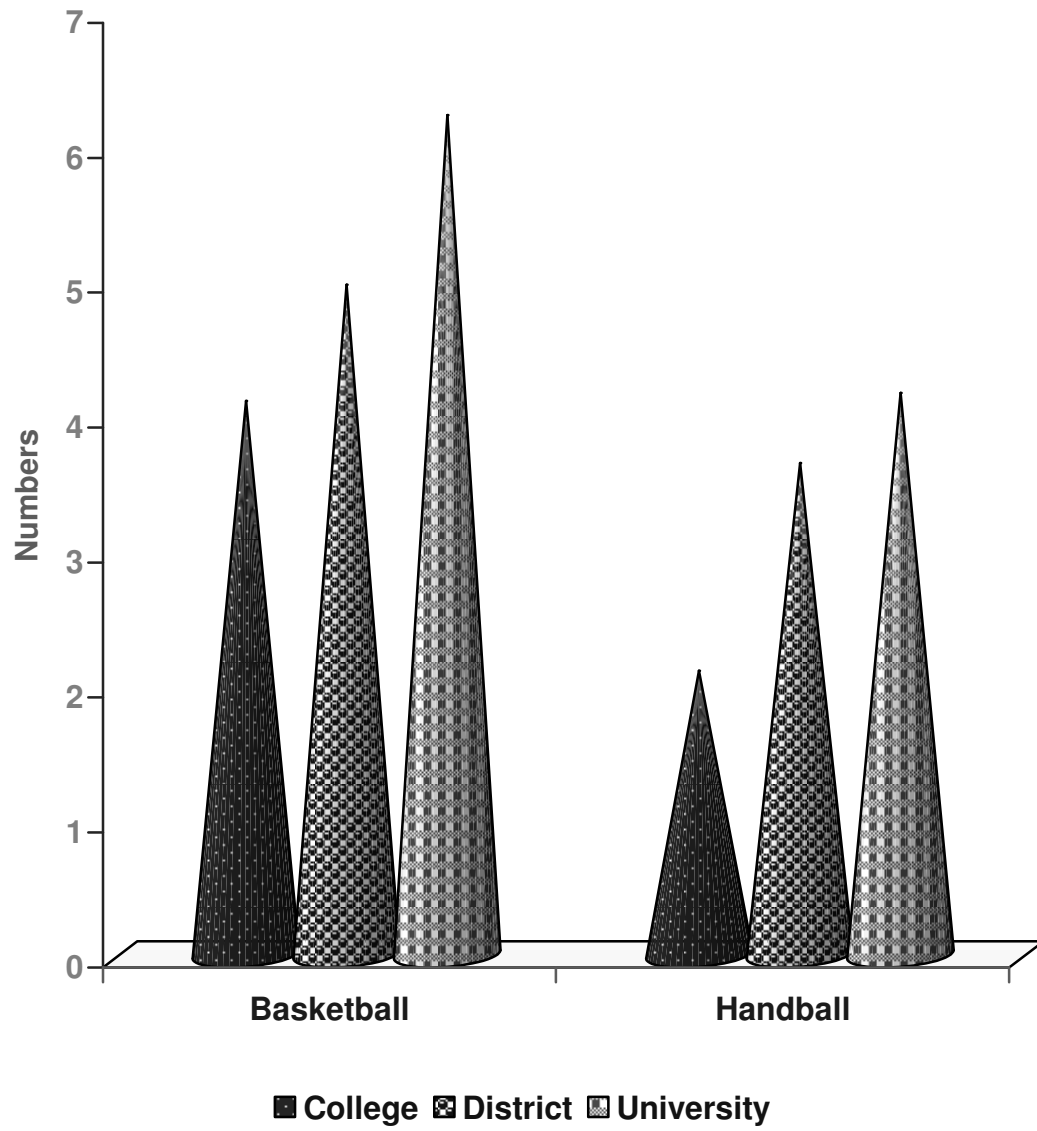
**FIGURE XII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR G.**



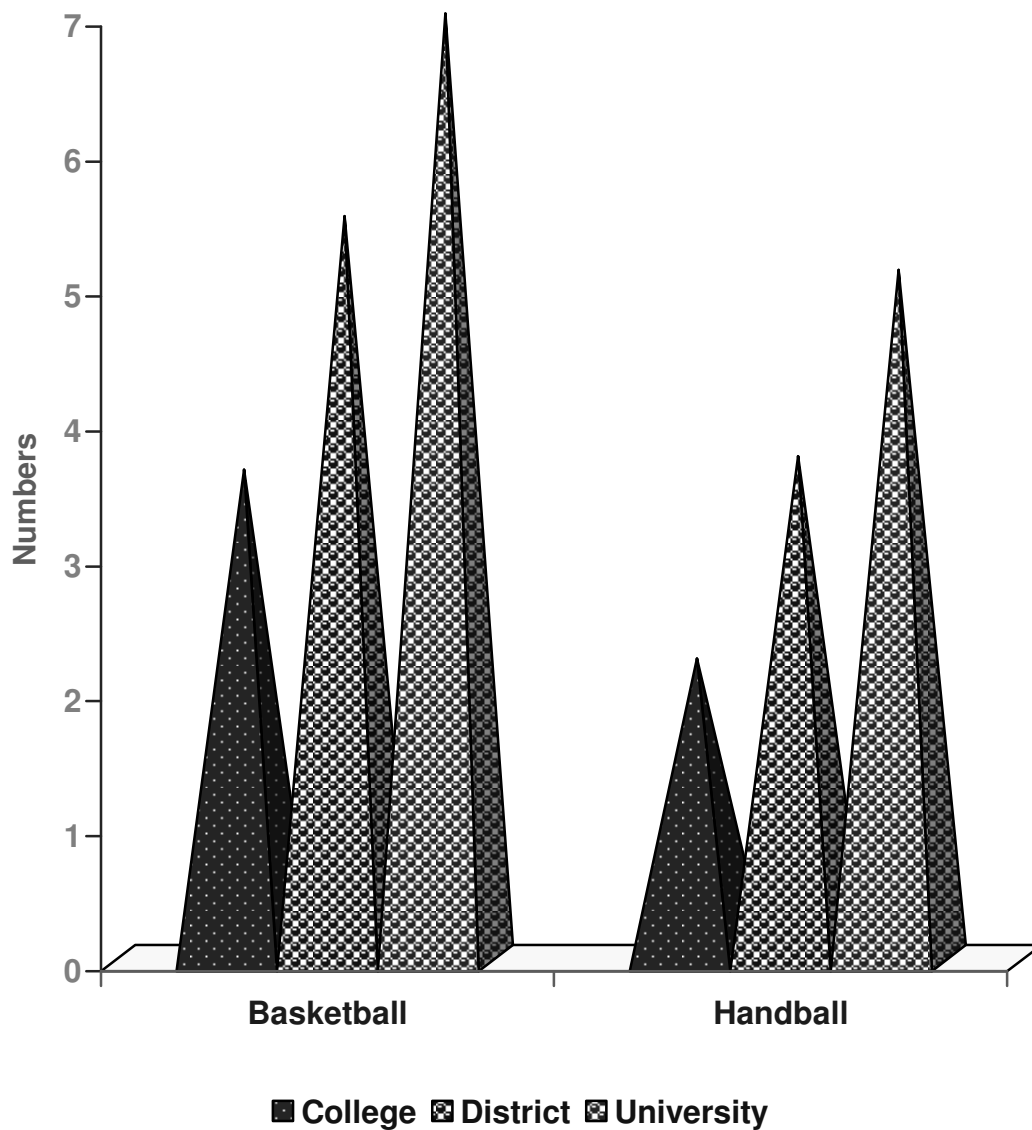
**FIGURE XIII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR H.**



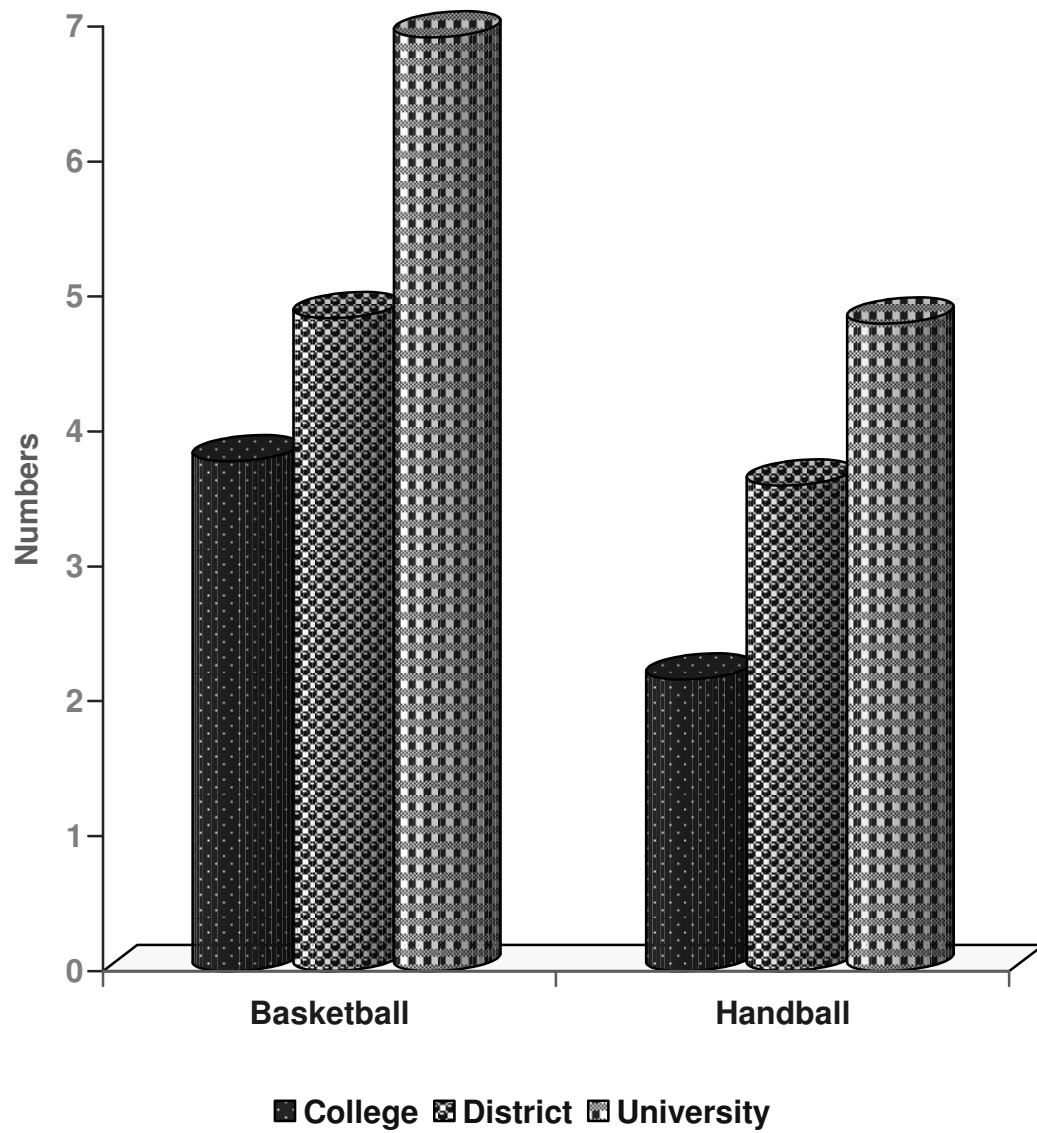
**FIGURE XIV: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR I.**



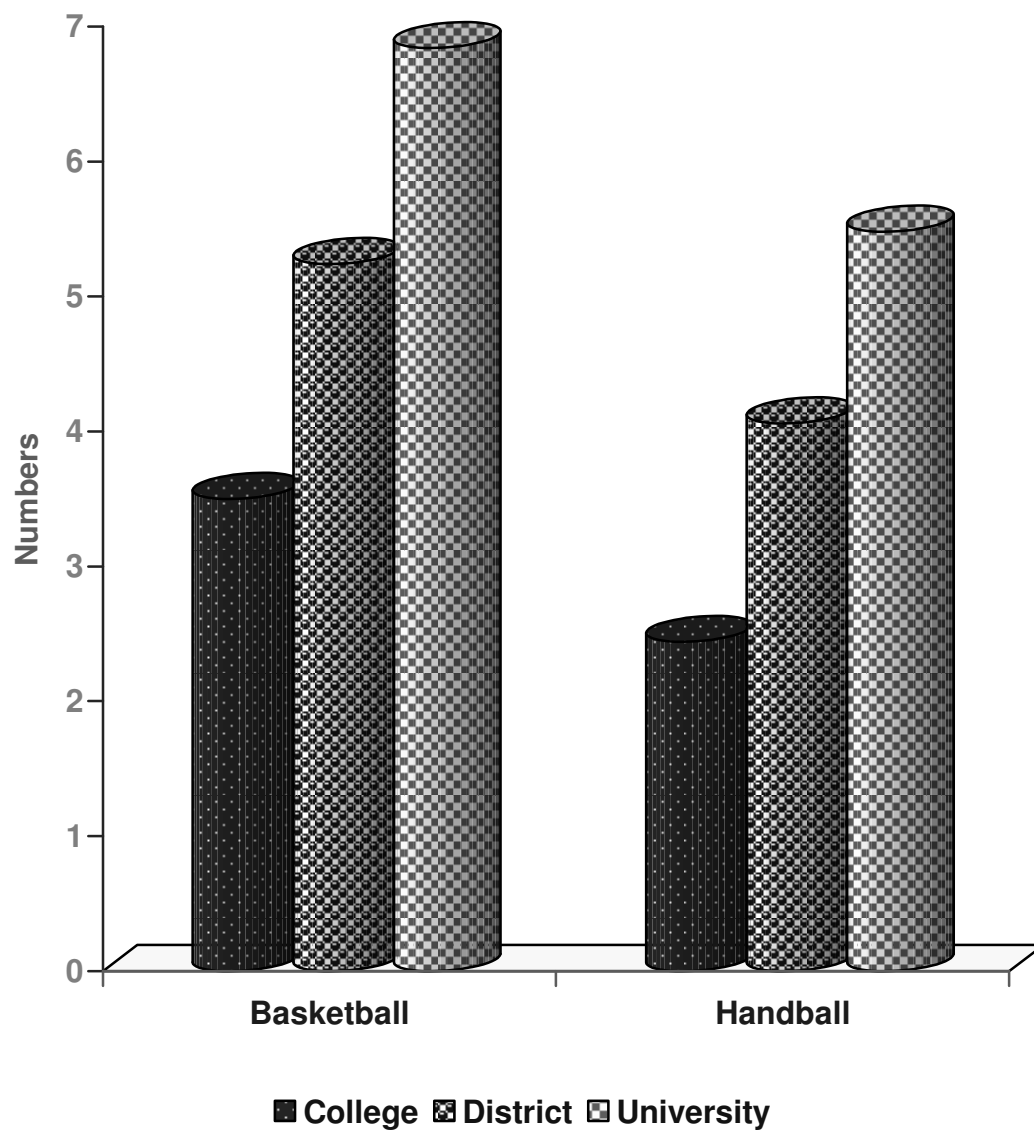
**FIGURE XV: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR L.**



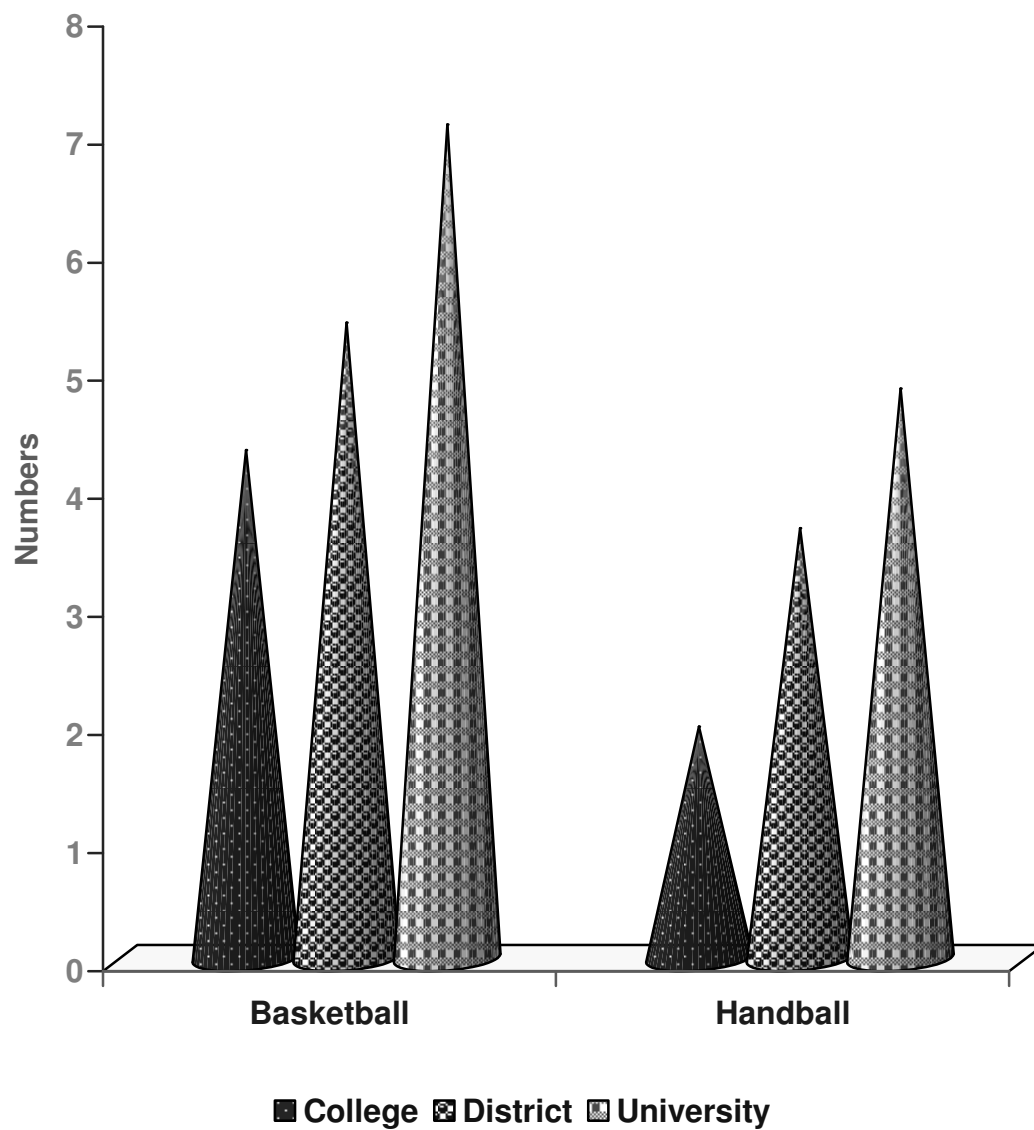
**FIGURE XVI: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR M.**



**FIGURE XVII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR N.**

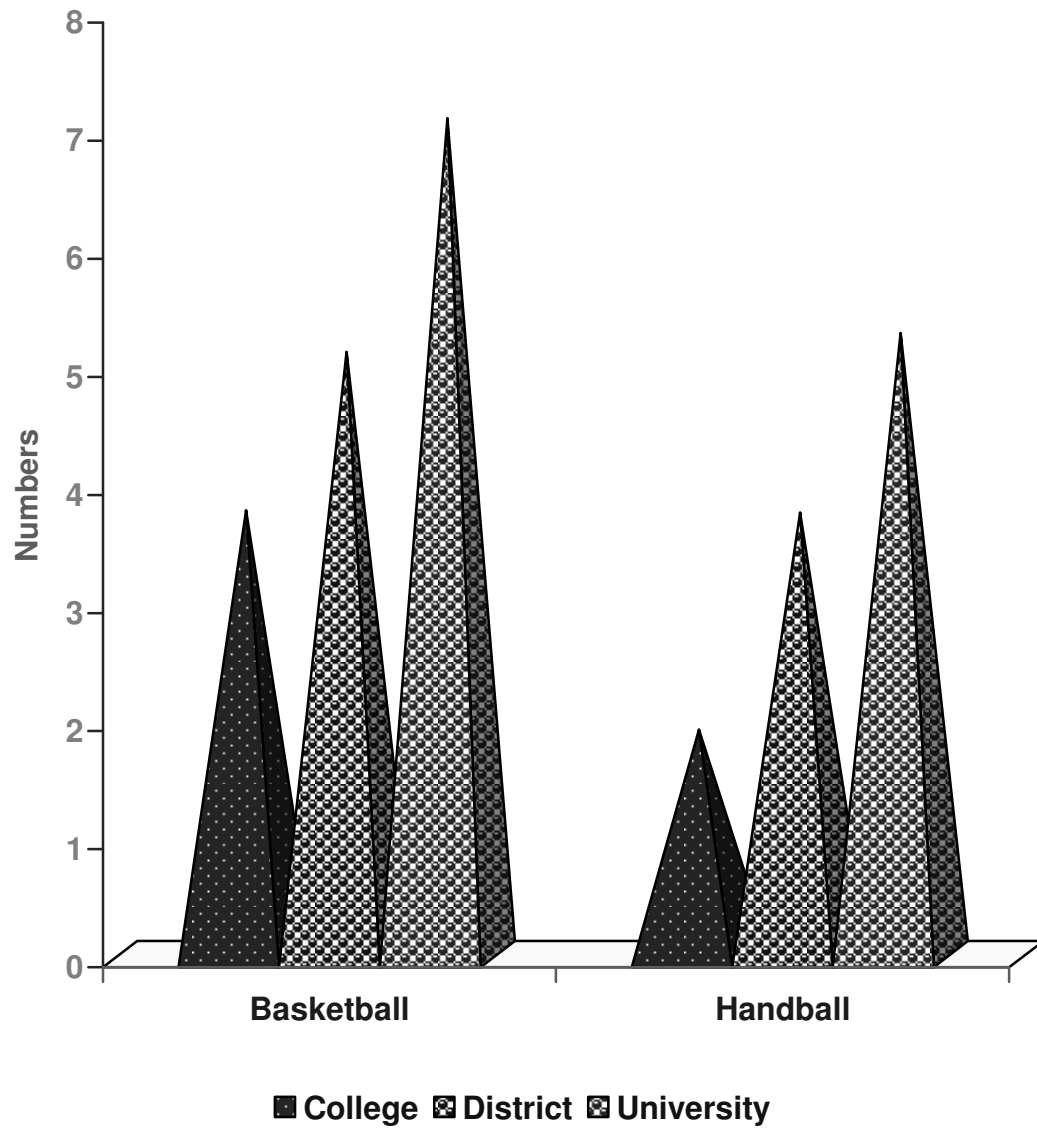


**FIGURE XVIII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR O.**

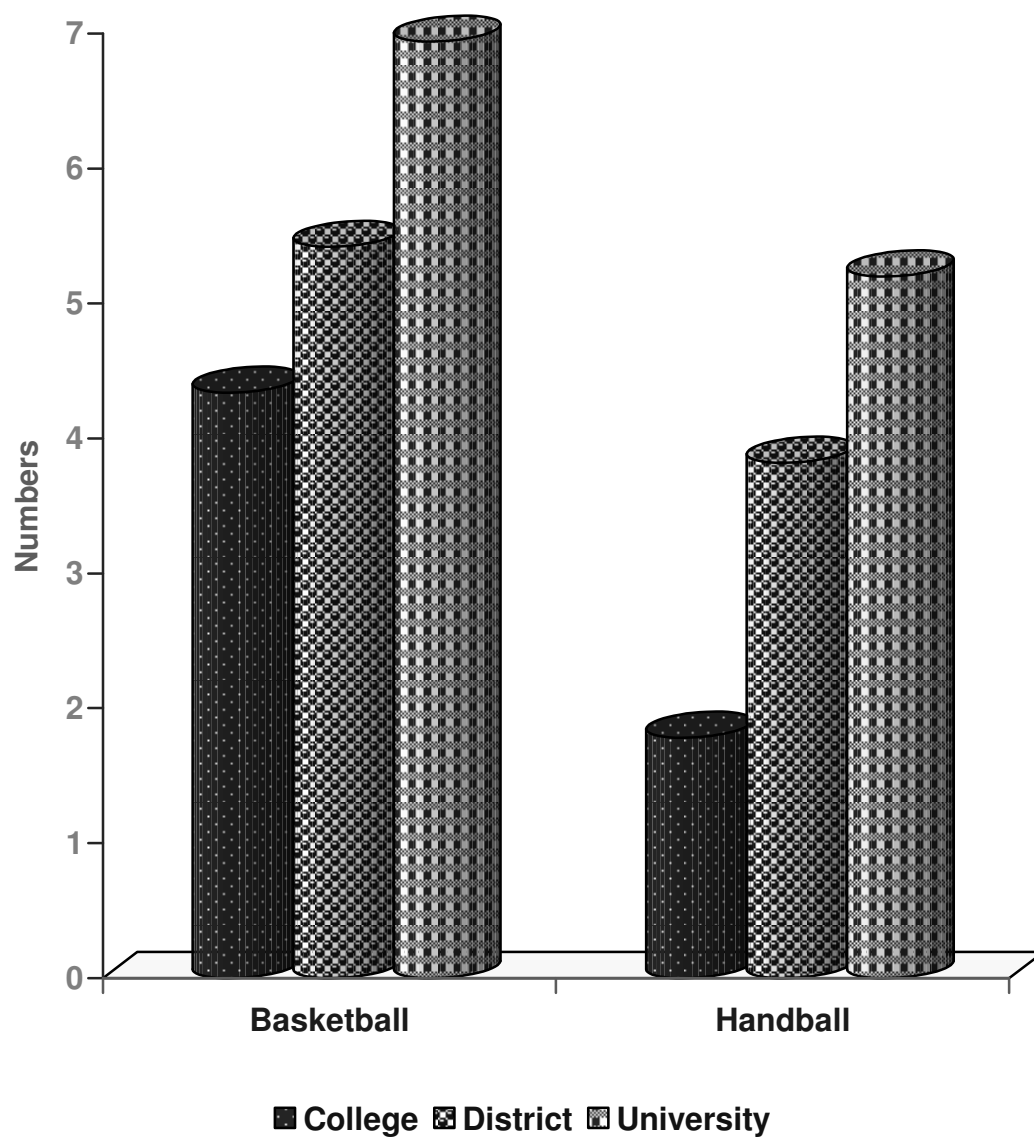


**FIGURE XIX: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR Q1.**

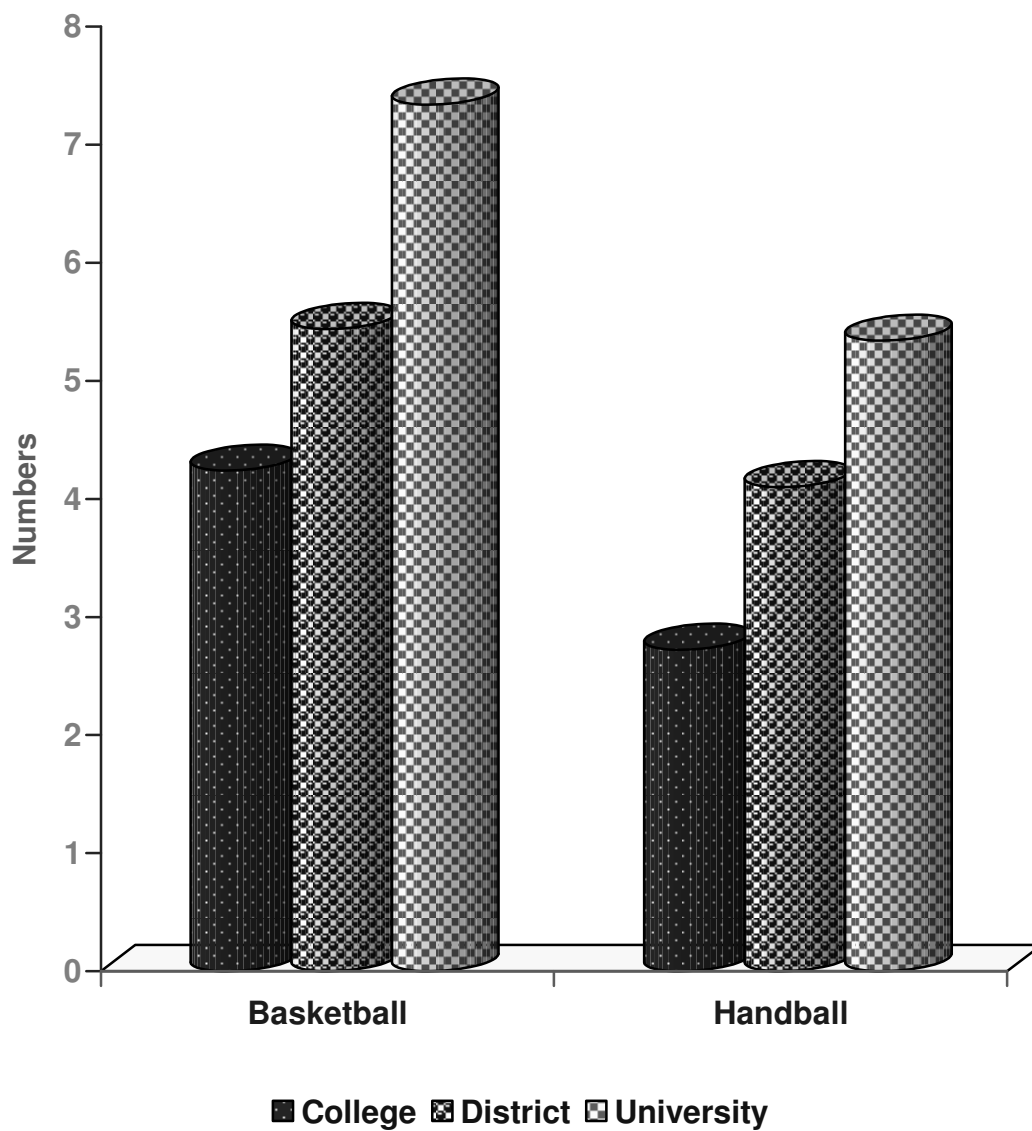




**FIGURE XX: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR Q2.**



**FIGURE XXI: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR Q3.**



**FIGURE XXII: MEAN VALUES OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY ON FACTOR Q4.**

#### 4.4.2.1 Basketball (Personality Traits)

Table 4.7 presents the results of the univariate ANOVA tests of sixteen personality traits variables (Personality Trait Factors-A, B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3, and Q4).

**TABLE 4.7**  
**ANALYSIS OF VARIANCE ON THE SELECTED PERSONALITY TRAITS OF BASKETBALL PLAYERS AT DIFFERENT TOPOGRAPHY**

Variables	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Factor A	Between	129.160	2	64.580	76.251*	.000
	Within	124.500	147	.847		
	Total	253.660	149			
Factor B	Between	412.360	2	206.180	484.161*	.000
	Within	62.600	147	.426		
	Total	474.960	149			
Factor C	Between	171.373	2	85.687	158.639*	.000
	Within	79.400	147	.540		
	Total	250.773	149			
Factor E	Between	100.840	2	50.420	86.789*	.000
	Within	85.400	147	.581		
	Total	186.240	149			
Factor F	Between	284.493	2	142.247	202.227*	.000
	Within	103.400	147	.703		
	Total	387.893	149			
Factor G	Between	176.893	2	88.447	130.801*	.000
	Within	99.400	147	.676		
	Total	276.293	149			
Factor H	Between	259.413	2	129.707	244.510*	.000
	Within	77.980	147	.530		
	Total	337.393	149			
Factor I	Between	141.693	2	70.847	121.268*	.000
	Within	85.880	147	.584		
	Total	227.573	149			
Factor L	Between	113.693	2	56.847	55.341*	.000
	Within	151.000	147	1.027		
Factor M	Between	286.813	2	143.407	318.056*	.000
	Within	66.280	147	.451		
	Total	353.093	149			

Factor N	Between	255.160	2	127.580	193.383*	.000
	Within	96.980	147	.660		
	Total	352.140	149			
Factor O	Between	279.053	2	139.527	283.528*	.000
	Within	72.340	147	.492		
	Total	351.393	149			
Factor Q1	Between	193.440	2	96.720	143.470*	.000
	Within	99.100	147	.674		
	Total	292.540	149			
Factor Q2	Between	278.973	2	139.487	258.569*	.000
	Within	79.300	147	.539		
	Total	358.273	149			
Factor Q3	Between	170.613	2	85.307	148.897*	.000
	Within	84.220	147	.573		
	Total	254.833	149			
Factor Q4	Between	244.333	2	122.167	217.257*	.000
	Within	82.660	147	.562		
	Total	326.993	149			

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

From the table 4.7, the obtained F-ratio values among college, district and university Basketball players on 16 personality factors 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 16 personality factors.

The results of the study indicated that there was a significant difference on 16 personality factors. 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 4.8.

**TABLE 4.8**  
**THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF**  
**BASKETBALL WITH DIFFERENT TOPOGRAPHY ON SIXTEEN**  
**PERSONALITY TRAITS**

<b>Variables</b>	<b>College Vs District</b>	<b>College Vs University</b>	<b>District Vs University</b>	<b>C.I. Value</b>
Factor A	0.92*	2.26*	1.34*	<b>0.45</b>
Factor B	2.12*	4.06*	1.94*	<b>0.32</b>
Factor C	0.72*	2.54*	1.82*	<b>0.36</b>
Factor E	0.52*	1.94*	1.42*	<b>0.38</b>
Factor F	1.26*	3.34*	2.08*	<b>0.41</b>
Factor G	1.32*	2.66*	1.34*	<b>0.41</b>
Factor H	1.28*	3.20*	1.92*	<b>0.36</b>
Factor I	1.24*	2.38*	1.14*	<b>0.38</b>
Factor L	0.86*	2.12*	1.26*	<b>0.50</b>
Factor M	1.88*	3.38*	1.50*	<b>0.33</b>
Factor N	1.06*	3.14*	2.08*	<b>0.40</b>
Factor O	1.74*	3.34*	1.60*	<b>0.35</b>
Factor Q1	1.08*	2.76*	1.68*	<b>0.40</b>
Factor Q2	1.34*	3.32*	1.98*	<b>0.36</b>
Factor Q3	1.08*	2.60*	1.52*	<b>0.37</b>
Factor Q4	1.20*	3.10*	1.90*	<b>0.37</b>

\*Significant at .05 level.

From the table 4.8, The University Basketball players significantly scored higher than the District Basketball player and College Basketball player in sixteen personality factors and also District Basketball players scored higher than the college Basketball players in sixteen personality factors.

Factor A - University Basketball players working with teammates and are comfortable in situations where contact with others is required.

Factor B – University Basketball players tend to prefer to figure problems out for themselves.

Factor C – University Basketball players feel more in control of their life and surroundings.

Factor E – University Basketball players tend to be dominating and aggressive in imposing their will on the other players.

- Factor F – University Basketball players are enthusiastic, spontaneous, and attention seeking.
- Factor G – University Basketball players are compliant, strict, and rule-conscious.
- Factor H – University Basketball players are bold and adventurous in social groups and show little fear of social situations.
- Factor I – University Basketball players are empathic and sensitive to the rights, feelings, and needs of other players.
- Factor L – University Basketball players are vigilant and may have a hard time moderating their vigilance when it might be advantageous to do so.
- Factor M – University Basketball players are more oriented to internal processes and ideas.
- Factor N – University Basketball players are non-disclosing and private about themselves.
- Factor O – University Basketball players worry and feel apprehensive about things.
- Factor Q1 – University Basketball players tend to think of ways to improve things and they enjoy experimenting with the status quo.
- Factor Q2 - University Basketball players tend to be more self-reliant and enjoy time alone.
- Factor Q3 – University Basketball players tend to be organized, neat, and keep things in their proper places.
- Factor Q4 – University Basketball players tend to be, restless, fidgety, and impatient.

#### 4.4.2.2 Handball (Personality Traits)

Table 4.9 presents the results of the univariate ANOVA tests of sixteen personality traits (Personality Trait Factors-A, B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3, and Q4).

**TABLE 4.9**  
**ANALYSIS OF VARIANCE ON THE SELECTED PERSONALITY TRAITS OF**  
**HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY**

Variables	Source of Variance	Sum of Squares	df	Mean Square	F	Sig.
Factor A	Between	28.653	2	14.327	10.917*	.000
	Within	192.920	147	1.312		
	Total	221.573	149			
Factor B	Between	309.880	2	154.940	428.446*	.000
	Within	53.160	147	.362		
	Total	363.040	149			
Factor C	Between	170.613	2	85.307	145.443*	.000
	Within	86.220	147	.587		
	Total	256.833	149			
Factor E	Between	42.653	2	21.327	28.980*	.000
	Within	108.180	147	.736		
	Total	150.833	149			
Factor F	Between	182.653	2	91.327	186.614*	.000
	Within	71.940	147	.489		
	Total	254.593	149			
Factor G	Between	144.653	2	72.327	113.445*	.000
	Within	93.720	147	.638		
	Total	238.373	149			
Factor H	Between	220.840	2	110.420	208.903*	.000
	Within	77.700	147	.529		
	Total	298.540	149			
Factor I	Between	175.320	2	87.660	165.121*	.000
	Within	78.040	147	.531		
	Total	253.360	149			
Factor L	Between	114.760	2	57.380	87.191*	.000
	Within	96.740	147	.658		
Factor M	Between	207.480	2	103.740	208.444*	.000
	Within	73.160	147	.498		
	Total	280.640	149			



Factor N	Between	174.720	2	87.360	148.085*	.000
	Within	86.720	147	.590		
	Total	261.440	149			
Factor O	Between	231.373	2	115.687	164.118*	.000
	Within	103.620	147	.705		
	Total	334.993	149			
Factor Q1	Between	206.573	2	103.287	227.224*	.000
	Within	66.820	147	.455		
	Total	273.393	149			
Factor Q2	Between	283.093	2	141.547	242.680*	.000
	Within	85.740	147	.583		
	Total	368.833	149			
Factor Q3	Between	296.040	2	148.020	286.453*	.000
	Within	75.960	147	.517		
	Total	372.000	149			
Factor Q4	Between	171.773	2	85.887	101.982*	.000
	Within	123.800	147	.842		
	Total	295.573	149			

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

From the table 4.9, the obtained F-ratio values among college, district and university Handball players on 16 personality factors 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 16 personality factors.

The results of the study indicated that there was a significant difference on 16 personality factors. 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 4.10.

**TABLE 4.10**  
**THE SCHEFFE'S TEST FOR THE DIFFERENCES BETWEEN PAIRED MEANS OF**  
**HANDBALL WITH DIFFERENT TOPOGRAPHY ON SIXTEEN**  
**PERSONALITY TRAITS**

<b>Variables</b>	<b>College Vs District</b>	<b>College Vs University</b>	<b>District Vs University</b>	<b>C.I. Value</b>
Factor A	0.66*	1.06*	0.40	<b>0.56</b>
Factor B	1.70*	3.52*	1.82*	<b>0.30</b>
Factor C	1.52*	2.60*	1.08*	<b>0.38</b>
Factor E	0.76*	1.30*	0.54*	<b>0.42</b>
Factor F	1.46*	2.70*	1.24*	<b>0.34</b>
Factor G	1.34*	2.40*	1.06*	<b>0.39</b>
Factor H	1.94*	2.92*	0.98*	<b>0.36</b>
Factor I	1.50*	2.64*	1.14*	<b>0.36</b>
Factor L	1.54*	2.06*	0.52*	<b>0.40</b>
Factor M	1.50*	2.88*	1.38*	<b>0.35</b>
Factor N	1.44*	2.64*	1.20*	<b>0.38</b>
Factor O	1.62*	3.04*	1.42*	<b>0.41</b>
Factor Q1	1.68*	2.86*	1.18*	<b>0.33</b>
Factor Q2	1.84*	3.36*	1.52*	<b>0.38</b>
Factor Q3	2.04*	3.42*	1.38*	<b>0.35</b>
Factor Q4	1.38*	2.62*	1.24*	<b>0.45</b>

\*Significant at .05 level.

From the table 4.10, The University Handball players significantly scored higher than the District Handball player and College Handball player in sixteen personality factors and also District Handball players scored higher than the college Handball players in sixteen personality factors. However, there was no significant difference between District and University Handball players on personality traits Factor A.

University handball players are participating and outgoing, intellectual and analytic, stable and secure feeling, dominant and stubborn, enthusiastic and spontaneous, conscientious, socially uninhibited, sensitive and humanistic, opinionated, imaginative, shrewed and deliberative, apprehensive, free-thinking, self-

organizing, perfectionistic and tense on their personality traits when compare with lower level of players.

#### **4.4.2.3 Summary of Testing Hypothesis 3 & 4**

The statistical results confirmed the hypothesis 3, showing that there was a significant difference among college, district and university Basketball players on selected personality traits such as sixteen personality factor.

The statistical results confirmed the hypothesis 4, showing that there would be significant difference among college, district and university Handball players on selected personality traits such as sixteen personality factor.

#### **4.4.3 Testing of Hypothesis 5, 6 & 7**

**Hypothesis 5:** There would be significant difference between College Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor).

**Hypothesis 6:** There would be significant difference between District Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor).

**Hypothesis 7:** There would be significant difference between University Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor).

#### 4.4.3.1 Independent T-Test (Comparing basketball and handball players at different topography)

Table 4.11 presents the results of the independent T-tests of physical fitness variables (strength, strength endurance, agility, explosive power, speed, cardio vascular endurance, Personality Trait Factors-A, B, C, E, F, G, H, I, L, M, N, O, Q1, Q2, Q3, and Q4) between Basketball and Handball players.

**TABLE 4.11**  
**INDEPENDENT T-TEST ON THE SELECTED PHYSICAL FITNESS AND PERSONALITY TRAITS OF BASKETBALL AND HANDBALL PLAYERS AT DIFFERENT TOPOGRAPHY**

Variables	University	District	College
Strength	8.825*	5.230*	4.819*
Strength Endurance	2.765*	<b>1.761</b>	<b>0.439</b>
Agility	8.701*	7.328*	3.703*
Explosive Power	10.462*	7.187*	3.939*
Speed	7.331*	9.606*	4.406*
Cardiovascular Endurance	4.282*	9.447*	3.630*
Factor A	9.132*	2.758*	<b>0.895</b>
Factor B	12.637*	11.569*	11.322*
Factor C	11.053*	7.764*	11.946*
Factor E	11.608*	5.173*	5.389*
Factor F	13.660*	8.746*	12.130*
Factor G	10.692*	9.445*	8.187*
Factor H	12.520*	7.927*	12.641*
Factor I	13.625*	11.065*	9.655*
Factor L	10.445*	7.522*	11.282*
Factor M	12.739*	13.831*	10.404*
Factor N	15.197*	6.516*	11.659*
Factor O	9.061*	6.375*	8.647*

Factor Q1	14.058*	12.523*	15.420*
Factor Q2	12.830*	7.927*	13.940*
Factor Q3	12.587*	8.993*	21.178*
Factor Q4	12.950*	7.995*	8.454*

\*Significant at .05 level. The table value required for .05 level of significance with df 98 is 1.98.

**University:** From the table 4.11, the obtained independent T-tests values between University Basketball and Handball players on selected physical fitness and 16 personality factors are greater than the tabulated F-value of 1.98 with df 98 required for significance at .05 level of confidence. The result of the study shows that there was significant difference exists between University Basketball and Handball players on selected physical fitness and 16 personality factors. University Basketball players scored higher than the University Handball players on selected physical fitness and 16 personality factors.

**District:** From the table 4.11, the obtained independent T-tests values between District Basketball and Handball players on selected physical fitness and 16 personality factors are greater than the tabulated F-value of 1.98 with df 98 required for significance at .05 level of confidence. The result of the study shows that there was significant difference exists between District Basketball and Handball players on selected physical fitness and 16 personality factors. District Basketball players scored higher than the college Handball players on selected physical fitness and 16 personality factors except in strength endurance.

**College:** From the table 4.11, the obtained independent T-tests values between college Basketball and Handball players on selected physical fitness and 16 personality factors are greater than the tabulated F-value of 1.98 with df 98 required

for significance at .05 level of confidence. The result of the study shows that there was significant difference exists between College Basketball and Handball players on selected physical fitness and 16 personality factors. College Basketball players scored higher than the college Handball players on selected physical fitness and 16 personality factors except in strength endurance and factor A.

Basketball players are warmth, abstracted, emotionally stable, dominant, lively, rule-conscious, socially bold, sensitive, vigilant, practical, private, anxious, open to change, self-reliant, perfection and tense than the Handball players. The table given below shows the personality traits of the players in respect to the low and high scores. Low scores means less than 5 and high scores means more than 5.

Variable	Low scores	High scores
1 A	Reserved and critical	Participating and outgoing
2 B	Concrete-thinking	Intellectual and analytic
3 C	Easily annoyed or upset	Stable and secure-feeling
4 E	Mild, conforming, submissive	Dominant and stubborn
5 F	Prudent and serious	Enthusiastic and spontaneous
6 G	Unreliable and self-indulgent	Conscientious
7 H	Restrained and shy	Socially uninhibited
8 I	Self-reliant and tough	Sensitive and humanistic
9 L	Trusting and accepting	Suspicious, critical, opinionated
10 M	"Proper", conventional	Imaginative, unconcerned
11 N	Natural, forthright	Shrewd and deliberate
12 O	Self-confident	Guilt-prone
13 Q1	Overly cautious, traditional	Free-thinking, tolerant of ideas
14 Q2	Emotionally group dependent	Resourceful, self-organizing
15 Q3	Casual and non-integrated	Precise and orderly
16 Q4	Satisfied, emotionally relaxed	Fretful, tense

Basketball is the game which gained popularity among the audience. Hence, the player has more expectation to fulfill the need of the audience in turn it increases their personality traits during competition than handball players because Handball is the developing game.

#### **4.4.3.2 Summary of Testing Hypothesis 5, 6 & 7**

The statistical results confirmed the hypothesis 5, showing that there would be significant difference between College Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor) except in strength endurance and Factor A. The statistical results confirmed the hypothesis 6, showing that there would be significant difference between District Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor) except in strength endurance.

The statistical results confirmed the hypothesis 7, showing that there would be significant difference between University Basketball and Handball players on selected physical fitness and personality traits (sixteen personality factor). The following documents also add support for the present findings as University players are scored higher in physical fitness and personality traits than the district and college level players.

Compared with the results of the population of top athletes, differences in particular variables can be explained by basketball play characteristics. Basketball, compared to other sport and sports games, is more loaded with the so called psychological factor; it is full of emotions, tense, changeable, full of turnovers and uncertainties. "Dense", uncertain game ends are very frequent and in these cases, as a rule, better psychological fitness is decisive, i.e. composure and emotional stability. Therefore it is understandable that top basketball players are: sports achievement-oriented, exceptionally conscious and responsible, brave and adventurous, light-hearted and full of enthusiasm, prone to anxious behavioral forms, emotional inhibition and instability, practical, independent and realistic, anxious and resistant.

The results of the factor analysis show seven factors of conative dimensions of both senior and junior basketball players. Senior players are oriented to achievement, extrovert, susceptible to formation. They show emotional stability, self-reliance, imaginativeness and rationality. These results are expected because there are professional basketball players and they want to "do" their job in the best possible way. Junior players are characterized by factors whose presence could be explained by psychological features of that age: emotional reactions, orientation to competition, sentimentality, self-reliance and openness to change. They are not yet professional players, they "do not work at basketball, only play it" (**Jakovljević, S., Karalejić, M, & Lazarević, Lj., 2010**).

The results on the 16 PF test show that wheelchair basketball players are significantly different from people with disability who do not take part in sports (**Kasum Goran, Ljubica Bačanac & Saša Jakovljevic., 2011**).

In the case of professional basketball players, mean values of particular variables are almost equal when compared to the results of top Serbian athletes (Bačanac, 2001). Results of Cattell questionnaire showed partial differences in personality between wheelchair basketball players and professional basketball players. These differences were notable in the expression of certain forms of behavioral patterns within certain dimensions of personality (**Kasum Goran, Ljubiša Lazarević, Saša Jakovljević, Ljubica Bačanac, & Fadilj Eminović., 2012**).

Results of the 16 PF test show that the elite wrestlers are significantly different from elite basketball players. These differences are basically consequence of characteristics of wrestling, as individual sport, and basketball as team sport. Although the psychological profiles of wrestlers and basketball players show normal



levels of development of all 16 factors of personality that is very similar to the results of other elite athletes, they are still statistically significantly differ on 8 of 16 personality factors (B, E, F, G, H, I, N, Q3). Wrestlers achieve average, but compared to basketball players slightly lower values of factors: B, E, F, G, H, N, Q3. This means that they: prefer concrete thinking, are less assertive, intrusive, aggressive; they are more restrained and less ready for team work; they are more sensitive, sentimental, refined, and more anxious; they are more socially naive, natural, open, spontaneous, less subtle and less calculated; they less take into account their social image, they are not primarily directed to confirmation and recognition of social environment, but follow their needs and interests (**Kasum Goran, Ljubica Bacanac & Saša Jakovljevic., 2011**).

Basketball is characterized by tendency of emphasized abstract thinking, higher level of verbal skills, a stronger need for dominance, managing and organizing others, greater respect and appreciation of social rules and norms of teamwork, and no-sentimental utilitarian approach, more pronounced integration with the social standards, a stronger sentiment of self-esteem and emphasized the need for social recognition (**Kasum Goran, Ljubica Bacanac & Saša Jakovljevic., 2011**).

The results of the present study (as per the data obtained from the subjects) confirm that the psychological profiles of Handball and Basketball players are not uniformed, but to possess significant characteristics which are at the very beginning that individuals with certain psychological characteristics opt for one or the other. Therefore, in the process of sport coaching, selection of teams at various level, as well as educational and psychological work with players, one should bear in mind the compatibility of their psychological traits with specific requirements for successful achievement in a chosen sport.