



A COMPARATIVE STUDY BETWEEN PLAYERS AND NON PLAYERS CARDIO RESPIRATORY FUNCTION OF TECHNOLOGICAL COLLEGES

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Introduction

Physical exercise in any form is viewed as a good intervention for the improvement of general health of individuals. The derivative of involvement in physical exercise is enhanced physical fitness and this enhanced physical fitness is the specific cause for the enhanced physical and biodynamic functioning of the different systems of the body. Enhanced functioning of the different systems elevates the molecular energetic environment leading to enhanced anti-inflammatory capacity, enhanced immune function, and enhanced overall metabolic function of the body. Enhanced metabolic status of the individual, further causes for the optimal anabolic processes than the catabolic process with respect to the creation of several enzymes, hormones and other cytokines for the better functioning of the body. Hence, physical activity is very apt intervention for enhancement of health through the improvement in the functional aspects of the human body. Whereas, decreased functional efficiency of one or many systems of the body

leads to the degeneration of the system or systems leading to the diseased state of the particular system or systems. Degeneration is mainly due to the inactivity or insufficient physical activity of individuals.

Different sports with inherent nature of their mixture of aerobic and anaerobic combination of efforts could provide different functional effects on the cardio respiratory system and thereby on the functional variables of the cardio vascular system. Hence, the present study was envisaged to understand the effect of regular involvement in selected games activities by the Women engineering college students on the selected cardio respiratory functional variables.

Statement of the Problem:

The study was to conduct comparative analysis between the selected sports activities participating women students of the technology colleges and non playing women students of the technology colleges with respect to the selected cardio respiratory health function variables.

A total of hundred and eighty women

technology students belonging to Chaitanya Bharathi Institute of Technology, Sridevi College of Engineering and G Narayanamma Institute of Technology and Science of Hyderabad city volunteered for this study. Since, the research was aimed to study and analyse the selected cardio vascular functional variables between the sports persons and non sports persons of technology colleges, the researcher included only those sports activity groups, which are more intensively involved by the women students of such colleges. The identified sports activities were Basketball, Volleyball, Badminton, Throw ball, Table tennis. Hence, thirty women student volunteers for each activity were included into each activity group.

Criterion variables:

The criterion variables selected for the study were FVC (Forced Vital Capacity) : Amount of air exhaled in one single powerful exhalation after a deep inhalation, FEV₁ (Forced Expiratory Volume during first second): Amount of air exhaled during the first second of the FVC manoeuvre and FEV₁/FVC ratio : the ratio of FEV₁ to FVC X 100 (expressed as a percent); an important value because a reduction of this ratio from expected values is specific for obstructive rather than restrictive diseases. These three pulmonary functional variables were measured by using the Digital Spirometry by using Spirowin Digital PC based spirometry Version 2.01 supplied by General Medical Systems, Hyderabad and installed in the Centre for Physical Fitness and Sports

Sciences of University of Hyderabad..

Hypotheses:

The following hypotheses were formed at the initiation of the research study:

1. All the five sports activity groups of the study would show significantly higher values for all the selected criterion variables of the study when compared to the non playing group of the study.
2. Both Basket ball sports activity group and badminton sports activity groups of the study would show significantly higher values for all the selected criterion variables of the study when compared to the Volley ball, Throw ball and Table Tennis activity sports groups of the study.
3. Basket ball sports activity group of the study would show significantly higher values for all the selected criterion variables of the study when compared to even the badminton activity sports group of the study.

Delimitations of the study:

1. Women students of three technology colleges only.
2. Age between 18 and 22 years.
3. One hundred and fifty players and thirty non players.
4. Players included for the study are Basketball, Volleyball, Badminton, Table Tennis and Throw Ball only.

Limitations of the study:

1. No discrimination in the status of players like university level, state level etc.
2. After preliminary training, the PFT will be

done by the investigator herself.

3. There was no intervention of sports activity by the researcher, but only those who were regular in participation of the related sports activities were only included.

Significance of the study:

1. The result of the study will provide more accurate and in depth understanding of the relationship between the cardio respiratory health and the type of physical activity.
2. The results of the study also contribute for vivid understanding and marked differentiation each different type of selected sports activities and their effect on the cardio vascular health fitness variables and would give specific direction about the selection of the type of the physical activity and sport keeping in view of the feasibility to the individuals.
3. The study would contribute for creating scope to undertake similar kind of studies with different health fitness functional variables relating to the different systems of the body and would cause for specific knowledge in this regard.

Statistical Technique:

One way Analysis of Variance (ANOVA) was used to compare the six groups of the study (five sports groups and one non player group) on each criterion variable separately. Hence, seven ANOVAs were conducted to find out whether the study groups differ significantly in each of the criterion variable included for the

study. Whenever, the ANOVA results indicated that there was significant difference among the group of study on the criterion variable, Scheffe's Post Hoc comparison test was used to find out the source of significant difference among the groups and to explain more vividly, which group is significantly differs from other groups in different combinations on each criterion variable of the study.

Level of significance:

0.05 level of significance was used to test the statistical derivatives.

The data pertaining to the selected criterion variables was statistically analysed to draw results and for further discussion on hypotheses. The data was statistically analysed through Excel Analysis Tool Park soft ware.

ANOVA for FVC:

Analysis of variance as depicted in table I indicates that the different sports groups of the study differ significantly with respect to their FVC values as the derived F value i.e. 14.104 is higher than the F critical value i.e. 2.26 at the significant p value of 0.00014. Since, this will not illustrate each group status with respect to the different other groups of the study, further analysis was conducted. Descriptive analysis as conducted in table II indicates that Basket ball activity group showed higher FVC value followed by other groups and the same is also clearly depicted in the Figure I.

Table I: Analysis of Variance

Source of Variation	SS	Df	MS	F	P value	F crit
Between Groups	5.686797	5	1.137359	14.10439	1.4E-11	2.266062
Within Groups	14.03113	174	0.080639			
Total	19.71793	179				

Figure

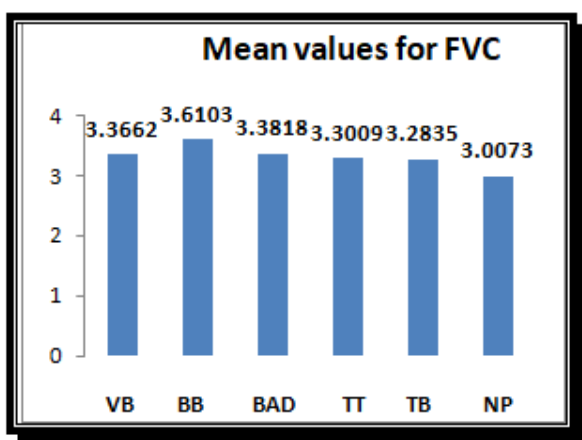


Table II: Summary table

Groups	N	Sum	Average	Variance
VB	30	100.986	3.3662	0.075
BB	30	108.309	3.6103	0.108
BAD	30	101.455	3.3818	0.086
TT	30	99.027	3.3009	0.084
TB	30	98.505	3.2835	0.096
NP	30	90.219	3.0073	0.033

Since, the one way analysis of variance clearly indicated that the selected six groups of individuals significantly differ in their FVC values, it is essential to find out the activity source of the significant difference and to know which group of the study showed significant difference in comparison to other groups in terms of the FVC value. For this Scheffe's Post Hoc comparison test was used as depicted in table III. Comparing with the obtained CD value of 0.24, the Scheffe's individual comparison indicated that all the sports activity

groups of the study showed significantly higher FVC value when compared to the Non player group. Basket ball group showed 0.6 (higher when compared to the CD of 0.24), Badminton group showed 0.373, Volley ball group showed 0.353, Table tennis group showed 0.293 and Throw ball group showed 0.273. Among the sports activity groups, both Basket ball and Badminton groups did not differ significantly (0.23) indicating both groups FVC values are similar though there was slight difference in terms of absolute mean values.

Table III: Scheffe's Post hoc test ($CD = \sqrt{(a-1)F\sqrt{2(MS_{error})/n}} = 0.24$)

Group/Value	Bad 3.38	VB 3.36	TT 3.30	TB 3.28	NON 3.007
BB 3.61	0.23 N.Sig	0.25 Sig	0.31 Sig	0.33 Sig	0.6 Sig
Bad 3.38		0.02 N.Sig	0.08 N.Sig	0.1N.Sig	0.373 Sig
VB 3.36			0.06 N.Sig	0.08 N.Sig	0.353 Sig
TT 3.30				0.02 N.Sig	0.293 Sig
TB 3.28					0.273 Sig

But, the Scheffe's post hoc comparison table indicates clearly that the Basket ball group showed significantly higher FVC value when compared to the Volleyball group (0.25), Table tennis group (0.31) and Throw ball group (0.33) and all these three groups did not differ significantly in their FVC values indicating that these three activity groups' FVC values are similar, though slight variation appears in terms of absolute mean values.

ANOVA for FEV₁

Analysis of variance as depicted in table IV indicates that the different sports groups of the study differ significantly with respect to their FEV₁ values as the derived F value i.e. 14.999 is higher than the F critical value i.e. 2.26 at the significant p value of 0.0000308. Since, this will not illustrate each group status with respect to the different other groups of the study, further analysis was conducted.

Table IV: Analysis of Variance

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	6.210934	5	1.242187	14.99946	3.08E-12	2.266062
Within Groups	14.40989	174	0.082815			
Total	20.62082	179				

Descriptive analysis as conducted in table V indicates that Basket ball activity group showed higher FVC₁ value with 3.367 followed by other groups. The same is also clearly depicted in the Figure II.

Figure II

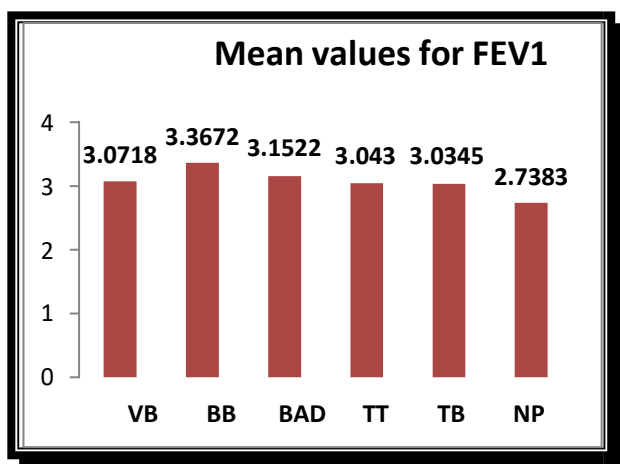


Table V: Summary table

Groups	N	Sum	Average	Variance
VB	30	92.154	3.0718	0.083
BB	30	101.01	3.3672	0.113
BAD	30	94.567	3.1523	0.085
TT	30	91.29	3.043	0.071
TB	30	91.037	3.0345	0.103
NP	30	82.151	2.7383	0.038

Since, the one way analysis of variance clearly indicated that the selected six groups of individuals significantly differ in their FEV₁ values, it is essential to find out the source of the significant difference and to know which group of the study showed significant difference in comparison to other groups in terms of the FEV₁ value. For this Scheffe's Post Hoc comparison test was used as depicted in table VI. Comparing with the obtained CD value of 0.25, the Scheffe's individual comparison indicated that all the sports activity

groups of the study showed significantly higher FEV₁ value when compared to the Non player group. Basket ball group showed 0.62 (higher when compared to the CD of 0.24), Badminton group showed 0.41, Volley ball group showed 0.33, Table tennis group showed 0.3 and Throw ball group showed 0.29. Among the sports activity groups, both Basket ball and Badminton groups did not differ significantly (0.21) indicating both groups FEV₁ values are similar though there was slight difference in terms of absolute mean values.

Table VI: Scheffe's Post hoc test ($CD = \sqrt{(a-1)F\sqrt{2(MSerror)/n}} = 0.25$)

Group/Value	Bad 3.15	VB 3.07	TT 3.04	TB 3.03	NON 2.74
BB 3.36	0.21 N.Sig	0.29 Sig	0.32 Sig	0.33 Sig	0.62 Sig
Bad 3.15		0.08 N.Sig	0.11 N.sig	0.12 N.sig	0.41Sig
VB 3.07			0.03 N.sig	0.04 N.sig	0.33 Sig
TT 3.04				0.01 N.Sig	0.3 Sig
TB 3.03					0.29 Sig

But, the Scheffe's post hoc comparison table indicates clearly that the Basket ball group showed significantly higher FEV₁ value when compared to the Volleyball group (0.29), Table tennis group (0.32) and Throw ball group (0.33) and all these three groups did not differ significantly in their FEV₁ values indicating that these three activity groups FEV₁ values are similar, though slight variation appears in terms of absolute mean values.

ANOVA for FEV₁/FVC:

Analysis of variance as depicted in table VII indicates that the different sports groups of the

study differ significantly with respect to their FEV₁/FVC ratio values as the derived F value i.e. 4.569 is higher than the F critical value i.e.

2.26 at the significant p value of 0.00061. Since, this will not illustrate each group status with respect to the different other groups of the study, further analysis was conducted. Descriptive analysis as conducted in table VIII indicates that Basket ball activity group showed higher FEV₁/FVC ratio value with 93.204 followed by other groups and the same is also clearly depicted in the Figure II.

Table VII: Analysis of Variance

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	129.9717	5	25.99435	4.569737	0.00061	2.266062
Within Groups	989.7762	174	5.688369			
Total	1119.748	179				

Since, the one way analysis of variance clearly indicated that the selected six groups of individuals significantly differ in their FEV₁/FVC ratio values, it is essential to find out the source of the significant difference and to know which group of the study showed significant difference in comparison to other groups in terms of the FEV₁/FVC ratio value. For this Scheffe's Post Hoc comparison test was used as depicted in table IX. Comparing with the obtained CD value of 2.07, the Scheffe's individual comparison indicated that

only Basket ball (2.17 was higher when compared to the CD = 2.07) and Badminton (2.13 was higher when compared to the CD = 2.07) activity groups of the study showed significantly higher FEV₁/FVC ratio value when compared to the Non player group. The other three groups of study showed no significant difference when compared to the non player group of the study. Throw ball group showed a difference of 1.31 (less when compared to the CD = 2.07), Table tennis group showed a difference of 1.17

Figure III

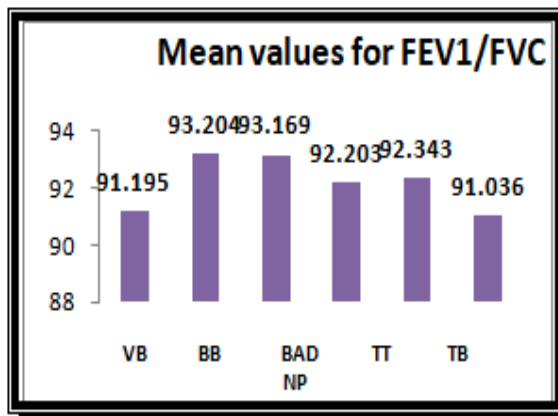


Table VIII: Summary table

Gro ups	N	Sum	Average	Varian ce
VB	30	2735.853	91.195	7.583
BB	30	2796.12	93.204	5.094
BAD	30	2795.093	93.169	2.638
TT	30	2766.117	92.203	3.822
TB	30	2770.306	92.343	6.684
NP	30	2731.094	91.036	8.307

(less when compared to the CD = 2.07) and Volley ball group showed a difference of 0.16 (less when compared to the CD = 2.07). Among the sports activity groups, both Basket ball and Badminton groups did not differ significantly (0.04) indicating both groups FEV₁/FVC ratio values are similar though there was slight difference in terms of absolute mean

values. Also the table clearly indicates that all the sports activity groups of the study did not show any significant difference in the post hoc comparison among themselves (all the combinations of the groups) reflecting that the FEV₁/FVC ratio values of all the groups of the study are similar, though their absolute mean values reflected slight variations.

Table IX: Scheffe's Post hoc test ($CD = \sqrt{(a-1)F\sqrt{2(MSerror)/n}} = 2.07$)

Group/Value	Bad 93.16	TB 92.34	TT 92.2	VB 91.19	NON 91.03
BB 93.2	0.04 N.Sig	0.86 N.Sig	1 N.Sig	2.01 N.Sig	2.17 Sig
Bad 93.16		0.82 N.Sig	0.96 N.Sig	1.97 N.Sig	2.13 Sig
TB 92.34			0.14 N.Sig	1.15 N.Sig	1.31 N.Sig
TT 92.2				1.01 N.Sig	1.17 N.sig
VB 91.19					0.16 N.Sig

Results Of The Study

The following results were obtained from the study:

1. Forced Vital Capacity (FVC) of all the five study sports groups of women engineering colleges (Basket ball, Badminton, Volley ball, Table Tennis and Throw Ball) are

- significantly higher when compared to the Non player women group of the women technology colleges of the study.
2. Forced Vital Capacity (FVC) of the Basket Ball women group of the study is significantly higher when compared to Volley ball group, Table tennis group and Throw ball group of the study, but not when compared to the Badminton sports women group of the study.
 3. Forced Vital Capacity (FVC) of the Badminton sport group, Volleyball group, Table tennis group and Throw ball groups is similar and are not significantly different among them.
 4. Forced Expiratory Volume in first second (FEV₁) of all the five study sports groups of women technology colleges (Basket ball, Badminton, Volley ball, Table Tennis and Throw Ball) are significantly higher when compared to the Non player women group of the women technology colleges of the study.
 5. Forced Expiratory Volume in first second (FEV₁) of the Basket Ball women group of the study is significantly higher when compared to Volley ball group, Table tennis group and Throw ball group of the study, but not when compared to the Badminton sports women group of the study.
 6. Forced Expiratory Volume in first second (FEV₁) of the Badminton sport group, Volleyball group, Table tennis group and Throw ball groups is similar and are not significantly different among them.
 7. Only Basket ball and Badminton sports groups of the study showed significantly higher FEV₁/FVC ratio when compared to the Non playing group of the study and the other three groups of the study (Table tennis, Volley ball and Throw ball groups) did not show significantly higher ratio.
 8. All the five sports groups of the study did not show any significant difference among themselves in any combination in terms of their FEV₁/FVC value indicating that all the groups of the study have similar FEV₁/FVC values.

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