

Analysis of the Maximal Voluntary Ventilation and Hemoglobin oxygen saturation ratio between playing and non playing women students

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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. It needs to be emphasized that different games activities due to their inherent differences in the intensity and density of physical activities, it is certain that every different games activity induces differences in the physical fitness components differently.

Cardiorespiratory fitness helps to improve lung and heart condition, hence increases the feeling of wellbeing. Among the several functional and dynamic variables of cardiorespiratory function, Maximal voluntary ventilation and hemoglobin o₂ saturation ratio measure the physical functional efficiency. 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 above said cardio respiratory functional variables and also to compare the non playing to playing women engineering college students on these two variables.

METHODS: fifty women players and ten women non players of engineering college were randomly selected in the age group of 18 to 22 years. The minimum criteria for the women players should be the university level participation in either of basketball, badminton, Tabletennis, Throwball, and Volleyball. Computerized PFT kit and Digital Pulse Oxymeter was used to measure the MVV and o₂ saturation ratio respectively. Analysis of Variance (ANOVA) was applied to understand whether there was any significant difference between the women players and non players for the two variables (MVV, o₂ saturation ratio) and descriptive mean analysis was also used to arrive to conclusion. Scheffe's Post Hoc comparison test was used to find out the source of significant difference among the playing group and to explain more vividly, which group is significantly differs from other groups in different combinations on each criterion variable. The level of significance used was 0.05.

RESULTS AND DISCUSSION:

ANOVA for MVV:

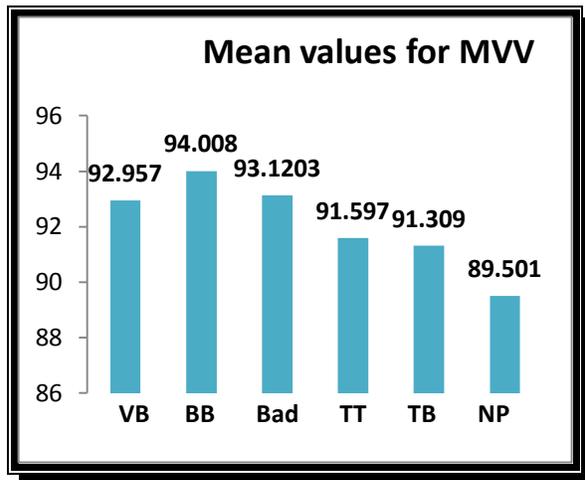
Analysis of variance as depicted in table I indicates that the different sports groups of the study differ significantly with respect to their MVV values as the derived F value i.e. 3.0266 is higher than the F critical value i.e. 2.26 at the significant p value of 0.01204 (Level of significance for the present study is 0.05). Since, this will not illustrate each group status with respect to the different other groups of the study, further analysis was conducted.

Table I: Analysis of Variance

Source of Variation	SS	df	MS	F	P-value	F crit
Between Groups	391.4715	5	78.29431	3.02668	0.012042	2.266062
Within Groups	4501.041	174	25.86805			
Total	4892.512	179				

Figure I

Table II: Summary table



Groups	n	Sum	Average	Variance
VB	30	2788.73	92.95767	22.35733
BB	30	2820.26	94.00867	16.65994
BAD	30	2793.61	93.12033	32.46188
TT	30	2747.91	91.597	26.83341
TB	30	2739.28	91.30933	33.92488
NP	30	2685.04	89.50133	22.97087

Table III: Scheffe's Post hoc test

$$(CD = \sqrt{(a-1)F\sqrt{2(MSerror)/n}} = 4.42)$$

Group /Value	Bad 93.12	VB 92.96	TT 91.59	TB 91.31	NON 89.5
BB 94.01	0.89 N.Sig	1.05 N.Sig	2.42 N.Sig	2.7 N.Sig	4.51 Sig
Bad 93.12		0.16 N.Sig	1.53 N.Sig	1.81 N.Sig	3.62 N.Sig
VB 92.96			1.37 N.Sig	1.65 N.Sig	3.46 N.Sig
TT 91.59				0.28	2.09

				N.Sig	N.Sig
TB 91.31					1.81 N.Sig

Descriptive analysis as conducted in table II indicates that Basket ball activity group showed higher MVV value with 94.008 followed by Badminton activity group (93.12) and all. The same is also clearly depicted in the Figure I.

Since, the one way analysis of variance clearly indicated that the selected six groups of individuals significantly differ in their MVV values, Scheffe's Post Hoc comparison test was used as depicted in table III to find out the source of the significant difference. Comparing with the obtained CD value of 4.42, the Scheffe's individual comparison indicated that only Basket ball activity group of the study alone showed significantly higher MVV value, when compared to the Non player group of the study (4.51, higher than the obtained Comparison difference = 4.42) and no other group showed such significantly higher MVV value than the Non player group of the study. Among the sports activity groups of the study, there was no significant difference in comparison in any combination across all the groups of the study.

ANOVA for O₂ saturation:

Analysis of variance as depicted in table IV indicates that the different sports groups of the study differ significantly with respect to their O₂ saturation values. 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 V indicates that Basket ball activity group showed higher O₂ saturation value with 95.179, followed by Badminton activity group (94.99) and all. The same is also clearly depicted in the Figure II.

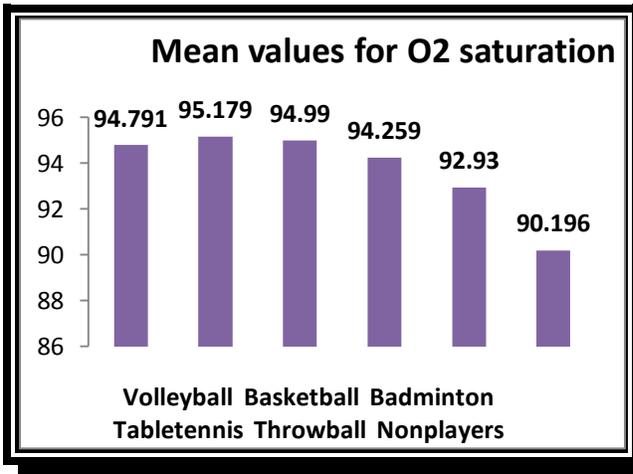
Table IV: Analysis of Variance

<i>Source of Variation</i>	<i>SS</i>	<i>df</i>	<i>MS</i>	<i>F</i>	<i>P-value</i>	<i>F crit</i>
Between Groups	546.3673	5	109.2735	5.385872	0.000125	2.266062
Within Groups	3530.27	174	20.28891			
Total	4076.637	179				

Since, the one way analysis of variance clearly indicated that the selected six groups of individuals significantly differ in their O₂ saturation values, Scheffe's Post Hoc comparison test was used as depicted in table VI to find out the source of the significant. Comparing with the obtained CD value of 4.79, the Scheffe's individual comparison indicated that only Basket ball (4.99, was higher when compared to the CD = 4.79) and Badminton activity groups of the study showed significantly higher O₂ saturation 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.

Figure II

Table V: Summary table



Groups	n	Sum	Average	Variance
VB	30	2843.73	94.791	12.45102
BB	30	2855.38	95.179	12.41536
BAD	30	2849.72	94.990	8.488682
TT	30	2827.77	94.259	17.3628
TB	30	2788.13	92.937	28.04178
NP	30	2705.88	90.196	42.9738

Table VI: Scheffe’s Post hoc test

$(CD = \sqrt{(a-1)F\sqrt{2(MSerror)/n}} = 4.79)$

Group /Value	Bad 94.99	VB 94.79	TT 94.26	TB 92.94	NON 90.19
BB 95.18	0.19 N.Sig	0.39 N.Sig	0.92 N.Sig	2.24 N.Sig	4.99 Sig
Bad 94.99		0.2 N.Sig	0.73 N.Sig	2.05 N.Sig	4.8 Sig
VB 94.79			0.53 N.Sig	1.85 N.Sig	4.6 N.Sig
TT 94.26				1.32 N.Sig	4.07 N.Sig
TB 92.94					2.75 N.Sig

Among the sports activity groups, both Basket ball and Badminton groups did not differ significantly (0.19) indicating both groups O₂ saturation values are similar though there was slight difference in terms of absolute mean values. Also all the sports activity groups of the study did not show any significant difference in the post hoc comparison among themselves.

CONCLUSIONS: 1. Only Basket ball sports group of the study showed significantly higher MVV value when compared to the Non playing group of the study and the other four groups of the study (Badminton, Table tennis, Volley ball and Throw ball groups) did not show significantly higher MVV value than the non playing group of the study.

2. Only Basket ball and Badminton sports groups of the study showed significantly higher haemoglobin O₂ saturation 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 than the non playing group of the study.

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