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A STUDY OF TRAINING LOAD ON SELECTED PHYSICAL AND PHYSIOLOGICAL VARIABLES OF SOCCER PLAYERS OF MANIPUR STATE

Dr. L. Santosh Singh[1] and Chandu G. Lamani[2]

[1]MPEd, MPhil, PhD ,Assistant Professor, Department of Physical Education and Sports Science Manipur University, Canchipur.

[2]MPEd, SLET, (PhD) ,Physical Education Instructor, In Charge SAC & Sports Birla Institute of Technology & Science Pilani – K.K.Birla Goa Campus Deemed University Research Scholar, Department of Physical Education, Karnatak University Dharwad.

ABSTRACT

The purpose of the study was to compare the effect of training loads on selected physical and physiological variables of soccer players. For this study, one hundred twenty (120) male soccer players are selected as subject. The average age of the subjects was 18 to 24 years. Random group experimental design was employed in this study. The subjects were classified into three groups viz. speed dominated (ED) group, endurance dominated (SD) group and control (C) group; each group consisting 40 subjects. The groups were administered initial tests on physical and physiological variables. After the initial tests, the training loads were administered to the two experimental groups, where no special training was given to the control group. The training was given for the period of ten weeks, five days a week in progressive manner. To find out the significance of difference between pre and post –test mean't' test was employed. The level of significant was set at 0.05 levels. To find out the significance of mean difference among pre – test, post- test and adjusted means, analysis of variance and co –variance techniques were employed. The result showed that there were found the significant effects of training loads on the selected physical and physiological variables after ten weeks speed dominated and endurance dominated training programme and accepted the hypothesis stated earlier.

KEYWORDS:*Soccer players, Physical variable, Physiological variable, strength, endurance.*

INTRODUCTION:

The word of training methodology has crossed many milestones as a result of different types of researchers in general and their application to the sports development in particular. In the modern scientific age, athletes are being trained by highly sophisticated means for better achievement in their concerned sports. They are being exposed to the exercises and training methods which have proved beneficial for achieving higher standards. Much progress has been made in the recent years in the acquisition of knowledge about training means and techniques of sports skills.

With the constant demand for "high sports perfor mance" the concept of soccer, to date, has been

changed. The concept of "Total Soccer" applies skill development, tactical development, development of all important motor components and physiological parameters which are closely associated and contributes to performance in soccer. Not only the technical, physiological and physical development, the sports scientists are also making efforts to develop the intellectual ability of the soccer players. The existing literature in the field of soccer shows that endurance, speed, agility, maximum leg strength, upper body strength, leg power, muscular endurance, flexibility, coordination and reaction time are important pre requisites for efficient soccer performance.

STATEMENT OF THE PROBLEM

The purpose of the study was to compare the effect of training loads on selected physical and physiological variables of soccer players

SIGNIFICANCE OF THE STUDY

It is hoped that the data generated and interpreted in this study will one day help the football fraternity. It is evident that the examination physiological and motor fitness level among football players is very essential. The information collected can be used for monitoring the training programme as well as counselling, providing information about the choice between football players. The author also assumes that this study will help the Manipur Football to improve the standard of football in the state.

METHODOLOGY - SELECTION OF SUBJECTS

One hundred twenty (120) male soccer players belonging to the different clubs under the affiliated to the All Manipur Football Association in Manipur and who had participated in the national and state level competitions were selected as subjects for this study. The average age of the subjects was ranging between from 18- 24 years of age.

SELECTION OF TEST ITEMS

The selection test items were done by using the following selected items:

Selected Physical Test Items: The specific motor ability test items were selected on the basis of their relevance to the game of soccer. These test items are presented below:

I. Flexibility: Sit and Reach
ii. Speed: Sprint with Flying Start
iii. Agility: Illinois Agility Run

Selected Physiological Test Items: The following physiological test items were selected in relation to standard of soccer players.

i.Aerobic capacity: Cooper's 12 Minutes Run-Walk Test.
ii.Anaerobic capacity: Sargent Jump-Lewis Nomogram.

DESIGN OF THE STUDY

Random group experimental design was employed in this study. The subjects were classified into three groups viz. speed dominated (ED) group, endurance dominated (SD) group and control (C) group; each group consisting 40 subjects. The groups were administered initial tests on physical and physiological variables. After the initial tests, the training loads were administered to the two experimental groups, where no special training is was administered to the control group. The training was administered for the period of ten weeks, five days a week in progressive manner. Detailed procedure adopted in this regard is described under the heading "Administration of Training."The final tests were re – administered on selected physical and physiological variables under similar conditions by the same testers after ten weeks.

ADMINISTRATION OF TRAINING

The training for both the experimental groups was administered at the Khuman lampak Sports Complex. The experimental groups met 5 days per week for the period of ten weeks (April 20, 2008 to June 26, 2008). Each experimental session was of 60 – minute's duration with additional 30 minutes was made available for all the groups for soccer skill practice. The training commenced with first two weeks of General Physical Condition for both the experimental groups, so that; physiological and physical systems of subjects were ready to undertake specific load administered to them for the purpose of the study. After the conditioning the training was administered separately for the two experimental groups and details of which are as follows:

Speed Dominated Group (SD): The strength dominated group also met 5 days per week. The training schedule includes three days of strength training whereas other two days were utilized for the development of other motor components. A weeks schedule was repeated for the proceeding week and thereafter the loads were adjusted progressively for the next proceeding block of two weeks.

Endurance Dominated Group (ED): For endurance dominated group the training schedules included three days of endurance training and two days were spent for the development of other components. A week's schedule was repeated for the proceeding week and there after the loads were adjusted progressive for the next proceeding block of two weeks.

Control Group (C): The control group was not allowed to take part in the specific experimental training programme except they had a daily 30 minute of soccer skill practices for 5-days a week for the period of 10 weeks.

STATISTICAL ANALYSIS

To find out the effect of training, following statistical techniques were employed.

1. To find out the significance of difference between pre and post –test mean't' test was employed.
2. To find out the significance of mean difference among pre – test, post- test and adjusted means, analysis of variance and co –variance techniques were employed.

Analysis and finding of the study

Its deals with the comparison of Speed dominated group, endurance dominated group and control group respectively. To observe the difference among different workload before and after the treatments on specific test items of physical and physiological variables, the analysis of co-variance (ANCOVA) was adopted and data pertaining to these have been presented in Table- 1,

Table -1: Analysis of Co-Variance of the Means of Two Experimental Groups and the Control Groups in SRT

Experiment	Groups			Sum of Squares		df	Means sum of squares	F-ratio
	Speed dominated	Endurance dominated	Control Group					
Pre-test Means	3.518	3.500	3.556	A	.067	2	.033	1.023
				W	3.805	117	.033	
Post-test Means	3.813	3.652	3.598	A	1.002	2	.501	19.750*
				W	2.967	117	.025	
Adjusted post test means	3.817	3.665	3.583	A	1.123	2	.561	32.117*
				W	2.028	116	.017	

* Significant at 0.05 level of confidence.

N=120, A= Among Means variance, W= Within Group variance,

F= Ratio needed for significance at 0.05 level of confidence: (2,117) = 3.09, (2,116) = 3.09

- The analysis of co-variance for SRT indicated that the resultant F-ratio of 2.974 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the two experimental groups was quite successful.
- The post-test means of all the three groups yielded an F-ratio of 10.014, which was also significant at 0.05 level

of confidence.

• The difference between the adjusted posts means was found significant as the obtained F-ratio was 17.498.

• The F-ratio needed for significance at 0.05 level of confidence was 3.09. Differences between the paired adjusted final means are shown in Table 2.

Table 2: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and Control Groups in SRT

Means			Difference between Means	Critical difference for adjusted means
Speed dominated group	Endurance dominated group	Control Group		
12.459	11.939		0.52*	0.506
	11.939	10.977	0.962*	
12.459		10.977	1.482*	

* Significant at 0.05 level of confidence.

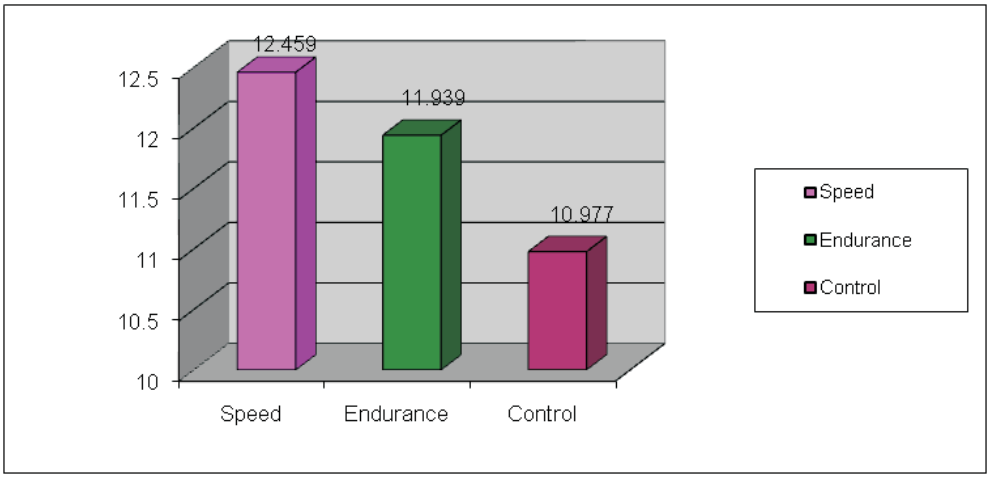

Fig. No.1. Graphical representation of SRT of adjusted means

Table -3: Analysis of Co-Variance of the Means of Two Experimental Groups and the Control Groups in SFS

Experiment	Groups			Sum of Squares		df	Means sum of squares	F-ratio
	Speed dominated	Endurance dominated	Control Group					
Pre-test Means	2.1730	2.1777	2.1848	A	.003	2	.001	.072
				W	2.265	117	.019	
Post-test Means	2.6430	2.3260	2.2230	A	3.833	2	1.917	62.332*
				W	3.598	117	.031	
Adjusted post test means	2.645	2.326	2.220	A	3.916	2	1.958	72.407*

* Significant at 0.05 level of confidence.

N=120, A= Among Means variance, W= Within Group variance,

F= Ratio needed for significance at 0.05 level of confidence: (2,117) = 3.09, (2,116) = 3.09

• The analysis of co-variance for SFS indicated that the resultant F-ratio of 1.023 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the two experimental groups was quite successful.
• The post-test means of all the three groups yielded an F-ratio of 19.750, which was also significant at 0.05 level of confidence. The difference between the adjusted posts means was found significant as the obtained F-ratio was 32.117.
• The F-ratio needed for significance at 0.05 level of confidence was 3.09. Differences between the paired adjusted final means are shown in Table 4.

Table 4: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and Control Groups in SFS

Means			Difference between Means	Critical difference for adjusted means
Speed dominated group	Endurance dominated group	Control Group		
3.817	3.665		0.152*	
	3.665	3.583	0.082*	
3.817		3.583	0.234*	0.058

* Significant at 0.05 level of confidence.

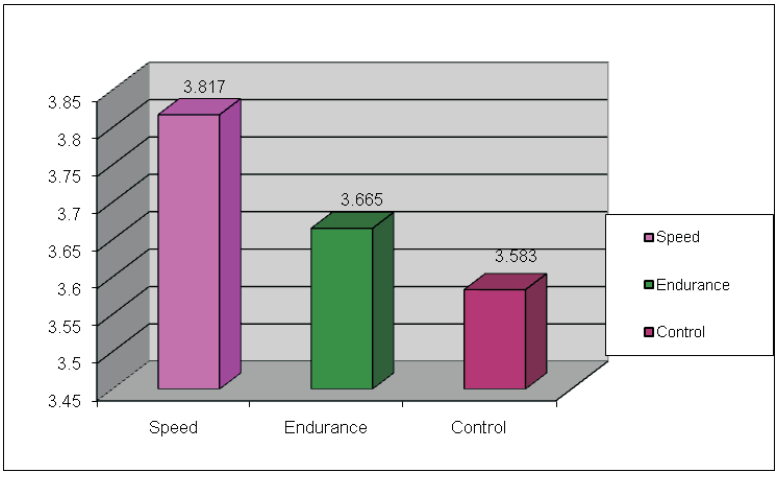

Fig.No.2 Graphical representation of SFS of adjusted means

Table -5: Analysis of Co-Variance of the Means of Two Experimental Groups and the Control Groups in IAR

Experiment	Groups			Sum of Squares		df	Means sum of squares	F-ratio
	Speed dominated	Endurance dominated	Control Group					
Pre-test Means	13.180	13.317	13.029	A	1.666	2	.833	.571
				W	170.788	117	1.460	
Post-test Means	14.168	13.731	13.550	A	8.058	2	4.029	6.015*
				W	78.373	117	.670	
Adjusted post test means	14.167	13.710	13.573	A	7.747	2	3.873	6.030*
				W	74.508	116	.642	

* Significant at 0.05 level of confidence.

N=120, A= Among Means variance, W= Within Group variance,
F=Ratio needed for significance at 0.05 level of confidence: (2,117) = 3.09, (2,116) = 3.09

• The analysis of co-variance for IAR indicated that the resultant F-ratio of .571 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the two experimental groups was quite successful.
• The post-test means of all the three groups yielded an F-ratio of 6.015, which was also significant at 0.05 level of confidence.
• The difference between the adjusted posts means was found significant as the obtained F-ratio was 6.030. The F-ratio needed for significance at 0.05 level of confidence was 3.09.Differences between the paired adjusted final means are shown in Table 6.

Table 6: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and Control Groups in IAR

Means			Difference between Means	Critical difference for adjusted means
Speed dominated group	Endurance dominated group	Control Group		
14.167	13.710		0.457*	
	13.710	13.573	0.137	
14.167		13.573	0.594*	0.358

* Significant at 0.05 level

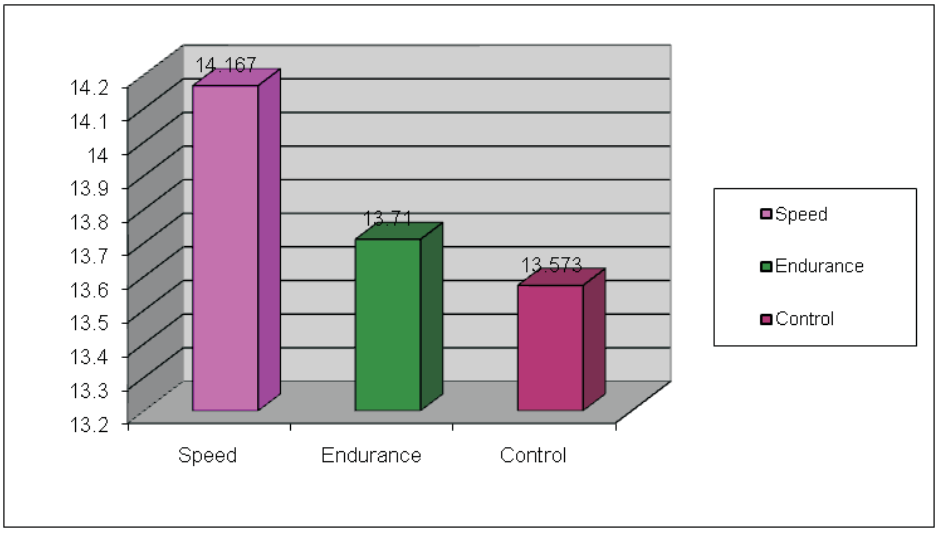

Fig.No.3. Graphical representation of IAR of adjusted means

Table-7: Analysis of Co-Variance of the Means of Two Experimental Groups and the Control Groups in AC

Experiment	Groups			Sum of Squares		df	Means sum of squares	F-ratio
	Speed dominated	Endurance dominated	Control Group					
Pre-test Means	57.215	57.275	56.407	A	18.776	2	9.388	.804
				W	1366.214	117	11.677	
Post-test Means	58.455	59.952	56.937	A	181.807	2	90.904	8.452*
				W	1258.353	117	10.755	
Adjusted post test means	58.231	59.674	57.440	A	101.788	2	50.894	38.726*
				W	152.447	116	1.314	

* Significant at 0.05 level of confidence.

N=120, A= Among Means variance, W= Within Group variance,
F=Ratio needed for significance at 0.05 level of confidence: (2,117) = 3.09, (2,116) = 3.09

- The analysis of co-variance for indicated that the resultant F-ratio of .804 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the two experimental groups was quite successful.
- The post-test means of all the three groups yielded an F-ratio of 8.452, which was also significant at 0.05 level of confidence.
- The difference between the adjusted posts means was found significant as the obtained F-ratio was 38.726.
- The F-ratio needed for significance at 0.05 level of confidence was 3.09. Differences between the paired adjusted final means are shown in Table 8.

Table – 8: Paired Adjusted Final Means and Differences between Means for the Two Experimental Groups and Control Groups in AC

Means			Difference between Means	Critical difference for adjusted means
Speed dominated groups	Endurance dominated groups	Control Groups		
58.231	59.674		1.443*	0.512
	59.674	57.440	2.234*	
58.231		57.440	0.791*	

* Significant at 0.05 level of confidence.

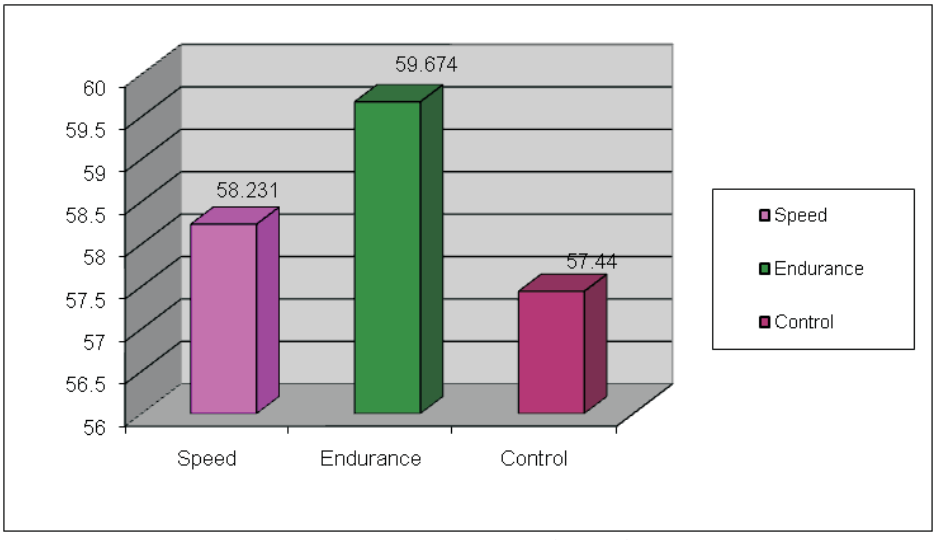

Fig.No.4. Graphical representation of AC of adjusted means

Table -9Analysis of Co-Variance of the Means of Two Experimental Groups And The Control Groups in ANC

Experiment	Groups			Sum of Squares		df	Means sum of squares	F-ratio
	Speed dominated	Endurance dominated	Control Group					
Pre-test Means	72.600	71.675	72.175	A	17.150	2	8.575	.188
				W	5326.150	117	45.523	
Post-test Means	73.975	73.525	72.250	A	64.050	2	32.025	.874
				W	4288.450	117	36.653	
Adjusted post test means	73.637	73.882	72.231	A	63.469	2	31.734	2.872
				W	1281.888	116	11.051	

* Significant at 0.05 level of confidence.

N=120, A= Among Means variance, W= Within Group variance,

F= Ratio needed for significance at 0.05 level of confidence: (2,117) = 3.09, (2,116) = 3.09

• The analysis of co-variance for ANC indicated that the resultant F-ratio of .188 was insignificant in case of pre-test means from which it is clear that the pre-test mean does not differ significantly and that the random assignment of subjects to the two experimental groups was quite successful.

• The post-test means of all the three groups yielded an F-ratio of .874 which was also insignificant at 0.05 level of confidence.

• The difference between the adjusted post means was also further found insignificant as the obtained F-ratio was 2.872. The F-ratio needed for significance at 0.05 level of confidence was 3.09.

DISCUSSION AND CONCLUSION

In this Section, with the comparison of pre-test and post-test of Strength dominated (SD) group, Endurance dominated (ED) group, and control (C) group by the analysis of covariance (ANCOVA) for selected test items of different physical and physiological variables are discussed.

Physical test items: In case of Sit and Reach Test (SRT), it was evident from the result that there were found significant difference as the yielded F-ratio of post-test means and the adjusted post means were 10.014 and 17.498 respectively at 0.05 level of confidence (3.09). However, in Sit and Reach Test (SRT), there were found insignificant differences in case of pre-test means of the groups. Further, this test items, it was evident that there were significant difference between adjusted final means of Speed dominated group and Endurance dominated group, Speed dominated group and Control group, Endurance dominated group and control group. Therefore, the Speed dominated (SD) and Endurance Dominated (ED) training loads were effective for the improvement of physical component "Flexibility."

Speed: In case of Sprint with Flying Start (SFS), it was evident from the result that there were found significant difference as the yielded F-ratio of post-test means and the adjusted post means were 19.750 and 32.117 respectively at 0.05 level of confidence (3.09). However, in Sprint with Flying Start (SFS), there were found insignificant differences in case of pre-test means of the groups. Further, in this test items, it was evident that there were significant difference between adjusted final means of Speed dominated group and Endurance dominated group, Speed dominated group and Control group, Endurance dominated group and control group. Therefore, the Speed dominated (SD) and Endurance Dominated (ED) training loads have similar contributions for the improvement of physical component "Speed."

Physiological Test Items: In the Aerobic Capacity (AC) also, there were found significant difference as the yielded F-ratio of post-test means and the adjusted post means were 8.452 and 38.726 respectively. The significant difference was compared at 0.05 level of confidence (3.09). Further, in these test items, it was evident that there were significant difference between adjusted final means of Speed dominated group and Control group, Endurance dominated group and Control group, Speed dominated group and Endurance dominated group. On the other hand, in case of Anaerobic Capacity (ANC), it was evident from the result that there were found insignificant difference as the yielded F-ratio of post-test means and the adjusted post means were .874 and 2.872 respectively. Therefore, there was no application of critical difference for adjusted means to find out the paired adjusted final means. Therefore, the selected Speed dominated (SD) and Endurance Dominated (ED) training loads might have differential contributions for the improvement of physiological components except Anaerobic Capacity (ANC).

PRACTICAL APPLICATION

It was found that the significant effects of training loads on the selected physical and physiological variables after ten weeks speed dominated and endurance dominated training programme and accepted the hypothesis stated earlier.

RECOMMENDATION FOR FUTURE RESEARCH WORK

Extensive research have been undertaken in several sports disciplines to identify Physiological and Motor fitness characteristics of young sports children which enables coaches to identify promising talent in their respective sports disciplines. However, no research is traceable which identify physiological and other characteristics of young football players.

- Therefore it is recommended to undertake research which might identify the, physiological, Motor Fitness profiles of young football from normal population or other sporting population.
- In the present study sample size of young football was very small. Therefore, it is recommended to replicate such an investigation with larger sample size.
- Within each sports disciplines the demands placed on various specialists differs. Therefore Investigation of physiological and motor fitness profiles of football specializing in striker, defender, and goal keeper is recommended.
- The present investigation involved football players at state level. The physiological and motor fitness profile at national and international level may be accentuated for various reasons. Therefore an investigation involving football of national and international repute may be undertaken.

Recommendation for Coaches and Administrators

• It is recommended that either training regime be made demanding or select candidates with suitable physiological and motor fitness.

• Based on the research findings involving young children in sports, identify talented cricketers at early age and coach them right.

• It is recommended that coaches based on their knowledge of physiological and motor fitness profile required for various departments of the game of football.

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Dr. L. Santosh Singh
MPEd, MPhil, PhD ,Assistant Professor, Department of Physical Education and Sports Science Manipur University, Canchipur.

Chandu G. Lamani
MPEd, SLET, (PhD) ,Physical Education Instructor, In Charge SAC & Sports Birla Institute of Technology & Science Pilani – K.K.Birla Goa Campus Deemed University Research Scholar, Department of Physical Education, Karnatak University Dharwad.