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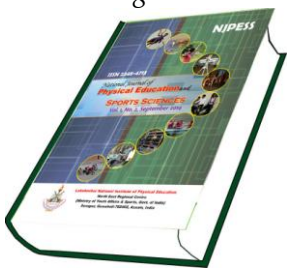

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Editorial

Epicenter Voyage of a Myth Institute-Lakshmibai National Institute of Physical Education
North East Regional Center

Lakshmibai National Institute of Physical Education, NERCis amongst the most admired centers of world-class education to foster academic excellence, physical fitness and research in sports committed to helping scholars, researchers and sports scientist leap into the 21st century. The present endeavor is a tribute to the holy symbol of Lakshmibai National Institute of Physical Education, NERC as the same was long precious aspiration. The journal shall symbolically signify the essence of quality research thereby appropriate in the ambition of the institute. The journal shall offer a much desired platform to publish quality research being undertaken in the whole world on the area in question. The journal shall bring the academicians and researchers from all over the globe to share their accumulated experiences and perceptions in order to realize new scientific and original innovation focused on aspects of the sports sciences and sports performance.

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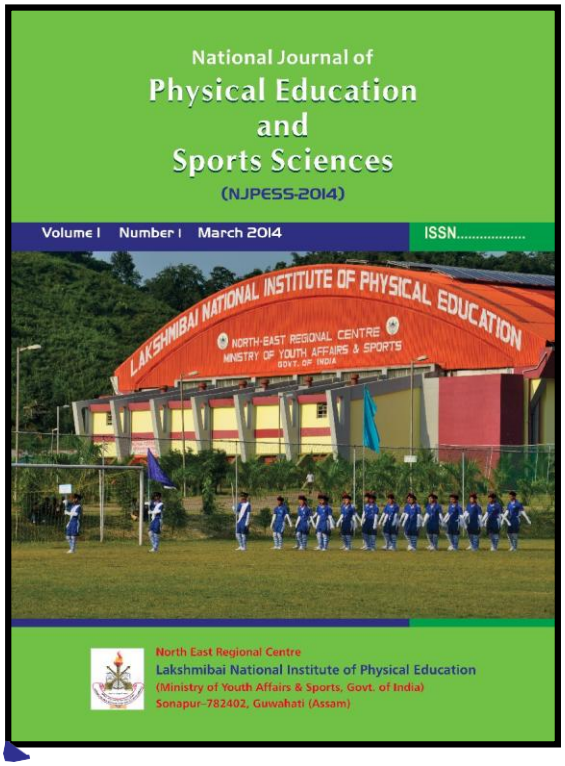

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N J P E S S

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Effect of Carbohydrate Consumption on the Performance of Selected Motor Ability on University Players

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ABSTRACT

The aim of this study is to find out the effect of carbohydrate consumption on the performance of motor ability of university players. To achieve the purpose of the study, twenty male university players were selected randomly from Lakshmibai national institute of physical education, Gwalior. The selected subjects were divided into two groups of ten each. Group I underwent 10 days carbohydrate consumption. The criterion variables selected for the present study are agility, medicine ball throw, standing broad jump, jump and reach test and cardio-respiratory endurance. The experimental group underwent carbohydrate consumption for 10 days with the gap of 24 hours. The study was evaluated on the basis of collected data assessed by "Paired t test" and T-ratio". The level of significance was fixed at 0.05. The result of the study showed that carbohydrate consumption for 10 days with the gap of 24 hours significantly improved agility (t = 6.622), medicine ball throw (t = 6.333*), standing broad jump (t = 11.19*), jump and reach test (t = 5.832*) and cardio-respiratory endurance (t = 4.265*) since the calculated value of t (2.00) for the selected degree of freedom and level of significant whereas no significant between-group differences were noted in control group. It is concluded that carbohydrate consumption for 10 days with the gap of 24 hours is effective enough to improve motor ability of university players.*

INTRODUCTION

The history of man to a large extent has been a struggle to obtain food. Until turn of the century science of nutrition had a limited range. **(Park K.; 2007)**. Carbohydrates are the main source of energy in all activities. They provide quick energy to the body and are not stored in the body for long. A carbohydrate is the most easily digested food. The primary function of carbohydrates is to provide energy for the body, especially the brain and nervous system. The body breaks down starches and sugars into substances called glucose that is used for energy by the body **(Dr. Anand S. 2005)**. Carbohydrates reserve (glycogen) of a human adult is about 500 grams. This reserve is rapidly exhausted when a man is fasting **(Park K.; 2007)**. Each teaspoon of sugar contains 17 calories, this amount to 2, 31,000 calories or 66 pounds of potential body fat if the energy is not used as fuel for daily living **(Dumphy M.; 2001)**. During muscular exercise, carbohydrates and lipids represent the major part of the substrates used for the production of energy. **(Glisenzinsk D. and *et al.*, 2008)**. Sprint performance is significantly improved when a carbohydrate/protein supplement is ingested during repeated bouts of short duration, high-intensity cycling. **(Harmon J.H. and *et al.*, 2007)**. Both muscle glycogen and plasma glucose are oxidised by skeletal muscles to supply energy during prolonged exercise. Although the underlying mechanism are uncertain. There appears to be a gradual shift from intramuscular glycogen towards blood borne glucose as the predominant carbohydrate energy source as exercise proceeds and as a muscle glycogen is depleted.
(Coyle E.F. and *et al.*, 1993).

SUBJECTS AND METHODS

Simple random sampling technique was used to select the sample. All the subjects are residing in the university hostel and although they belonged to difference classes, are habitual of fairly heavy work. It is reasonable to assume that they were seasonably well condition.

SAMPLING

20 male students of LNIPE were randomly selected as the subjects for this study. The age group was ranged from 17 to 25 years.

STUDY TOOLS

The research scholar has gone through all the scientific literature pertaining to the effect of carbohydrate

consumption on motor fitness components from books, journals, periodicals, available in the library of Lakshmibai National Institute of Physical Education, Gwalior keeping the feasibility in mind especially in case of availability of instruments.

The following variables are selected

1. Agility
2. Medicine Ball throw
3. Standing Broad Jump
4. Jump and reach Test
5. Cardio respiratory endurance

METHOD OF CARBOHYDRATE CONSUMPTION

20 gram carbohydrate powder intake in liquid form (as mixing in 200 ml. of water) and was given during evening session before normal daily sports activities for 10 days with the gap of 24 hours.

COLLECTION OF DATA

There were two groups of 10 subjects in each pre-test was taken on selected motor fitness components of both groups. Then carbohydrate consumption to the experimental group and on the other hand pacebo was given to the control group for the duration of 10 days. After that post-test of both the groups was conducted on the same components.

The testes used were explained to the subjects prior to their administration. The subjects were given chance to practice the tests and made them familiar to the test being used.

STATISTICAL ANALYSIS

The study was evaluated on the basis of collected data assessed by "Paired t test" and T-ratio". The level of significance was fixed at 0.05.

RESULTS

The study was conducted to determine the effect of carbohydrate consumption on the performance of agility, medicine ball throw, standing broad jump, jump and reach test and cardio respiratory endurance. The statistical analysis of data collected on twenty (N = 20) subjects. The results pertaining to the motor ability performance in experimental group and control (placebo group) are presented in Table 1. Significant between-group differences were found in agility (t = 6.622*), Medicine ball throw (t = 6.333*), Standing broad jump (t = 11.19*), Jump and reach test (t = 5.832*) and cardio-respiratory endurance (t = 4.265*) since the calculated value of t (2.00) for the selected degree of freedom and level of significant whereas no significant between-group differences were noted in control group, since the calculated value of t is smaller than tabulated value of t (2.00) for the selected degree of freedom and level of significance. The graphical representation of t-value of motor ability in experimental and control groups (n = 20 each) of carbohydrate consumption is exhibited in figure 1.

Table 1: Mean Values (±SD) of Motor Ability of Experimental and Control Groups (n = 10 each) Before (Pre) and after (Post) Carbohydrate Consumption (Experimental Group Only)

	Experimental Group			Control Group		
Variables	Pre	Post	t-value	Pre	Post	t-value
Agility (A)	6.540 ± 0.26	6.345 ± 0.22	6.622*	6.520 ± 0.13	6.525 ± 0.13	0.224
Medicine Ball Throw (MBT)	11.19 ± 0.96	11.88± 0.96	6.333*	11.54± 1.14	11.41± 1.15	0.691
Standing Broad Jump (SBJ)	2.589 ±0.10	2.682 ±0.10	11.19*	2.588± 0.11	2.591± 0.10	0.880
Jump and Reach Test (JRC)	75.50 ± 7.51	79.10± 7.16	5.832*	70.65± 4.39	71.45± 4.39	1.848
Cardio-respiratory Endurance (CRE)	1761.1 ± 137.4	1855.9 ± 159.5	4.265*	1597.5 ± 236.2	1647.3 ± 211.7	1.713

***Significantly ($p<0.005$) different from the respective 'Pre' value

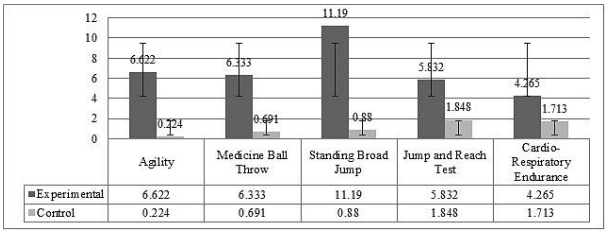

Fig. 1: Graphical Representation of t-value of Motor Ability in Experimental and Control Groups (n = 20 each) of Carbohydrate Consumption

DISCUSSION

Physical and physiological responses to nutrition component, including carbohydrate ingestion have been well studied by many researchers. It may be expected to positively improve many motor abilities. In a previous study of carbohydrate ingestion, the authors speculated that improvement in endurance performance (Caitlin C. and *et al.*, 2008). Carbohydrate ingestion shown to be one of the most effective methods for improvement sprint performance immediately following 90 minute of running at 70-80%

of maximal heart rate reserve on thirty young active men allocated randomly to 2 carbohydrate (CHO, N = 15) and placebo (PL, N = 15) groups. The results suggested that carbohydrate, protein, and fat metabolism during exercise after oral carnitine supplementation in humans on 20 non-vegetarian active meals and through data found that 2 weak of L-carnitine L-tartrate (LC) supplementation does not affect fat, carbohydrate and protein contribution to metabolism during prolonged moderate-intensity cycling exercise, it indicates that the oral LC supplementation might have the potential to reduce the metabolic stress of exercise or warrants further investigation (Broad E.M. and *et al.* 2008). Therefore, more studies are needed to determine the result of carbohydrate ingestion and how it affects motor ability. The experimental findings of this study indicate that the significant between-group differences were found in the carbohydrate ingestion on motor ability that is, agility (t = 6.622), medicine ball throw (t = 6.333), standing broad jump (t = 11.19), jump and reach test (t = 5.832) and cardio-respiratory endurance (t = 4.265) and non-significant between-group differences were found in control group on agility (t = 0.224), medicine ball throw (t = 0.691), standing broad jump (t = 0.88), jump and reach test (t = 1.848) and cardio-respiratory endurance (t = 1.713)whereas, no significant changes were noted in the control group. These finding are supported by Carlson, Green S and Schumm.

CONCLUSION

From the result of the study following conclusions may be drawn that there was a significant between-group differences were found in the carbohydrate ingestion on motor ability that is, agility (t = 6.622), medicine ball throw (t = 6.333), standing broad jump (t = 11.19), jump and reach test (t = 5.832) and cardio-respiratory endurance (t = 4.265) and non-significant between-group differences were found in control group on agility (t = 0.224), medicine ball throw (t = 0.691), standing broad jump (t = 0.88), jump and reach test (t = 1.848) and cardio-respiratory endurance (t = 1.713)whereas, no significant changes were noted in the control group.

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Comparison between Tactile and Visual Reaction Time

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ABSTRACT

In daily life activities as well as in performance sports reaction time is an important performance parameter and that is why reaction time considered as a decisive area of research in the field of sports science. So many research work have been completed in this psycho-physiological problem and indicated that reaction time of an individual depends on so many factors like age, gender, nature of stimulus, intensity of stimulus, exercise, fatigue, fasting, hunger, personality type etc. According to the findings the reaction time of an individual varies with change of nature of stimulus. Present study was planned as an extension of such effort to analyze the change in reaction time using two different types of stimulus–tactile and visual.

A total of 1600 male and female population from 05 to 70 years of age were selected as subjects with 16 equal sized age groups.The reaction time was measured by digital electronic reaction timer by using visual and tactile stimulus. The data were statistically analyzed for testing significance of difference between means. Exact location of the difference was identified using Post-hoc test.

Results showed that the mean values of tactile reaction time were lower than the visual reaction time for almost all age groups for both the sexes but the differences were statistically significant for five girl groups only. The trend of change in reaction time with age for both the stimulus was also similar for both the sections. The results have been supported by other research studies.

Keywords: *Reaction time, Visual stimulus, Tactile stimulus, Psycho-physiology*

INTRODUCTION

Reaction is purposeful voluntary response to different stimuli as visual or auditory or tactile stimuli. Reaction times, that is, the phenomenon involved in muscular activity in which there is a delay between response in a muscle and the stimulus for that response. By stimulus we include conscious intention not just, say, reacting away from a pin prick. The reaction times with which we are familiar are those involved in such stimulus response activities as, say, an athlete experiences when the sound of the starting gun acts as a stimulus for action. Reaction time is the elapsed time between the presentation of a sensory stimulus and the subsequent behavioural response. In psychometric psychology it is considered to be an index of speed of processing.

To react to an external stimulus is a basic property of life and living being. To react to a stimulus is of fundamental importance for adaptation with the environment. So, the ability to react is very important for all living beings. Reaction time influences the reaction ability. Reaction time has been defined as the time elapsing between the onset of a stimulus and the onset of a response to that stimulus. Reaction time has become an important area of research for experimental psychologists since middle of 19th Century. The researchers have identified different types of reaction time such as simple reaction time (Luce, 1986), recognition reaction time (Welford, 1980) and choice reaction time (Donders, 1868). For about 120 years the accepted mean values of reaction time for college population have been about 0.19s for light and 0.16s for sound respectively (Brebner and Welford, 1980). Research studies have been conducted to analyze the influence of different factors on reaction time of an individual like nature of stimulus (Galton, 1899; Woodworth and Schlosberg, 1954; Brebner and Welford, 1980); stimulus intensity (Froeberg, 1907; Wells, 1913; Pieron, 1920; Luce, 1986); age (Welford, 1977; Jevas and Yan, 2001; Luchies et al., 2002), sex (Bellis, 1933; Engel et al., 1972), and personality type (Nettelbeck, 1973, Brebner, 1980, Lenzenweger, 2001) . Physical education and sports also has special consideration for reaction time. In most of the situations the performance of games and sports is directly or indirectly influenced by reaction time of the individual. Accordingly, studies have been conducted

to analyze the effect of physical training on reaction time (Sander, 1998; Ando et al., 2002 and Rogers et al., 2003), effect of fatigue (Welford, 1968 and 1980); and physical fitness (Welford, 1980) on reaction ability of an individual.

Present project was planned to study the change of reaction time with (i) change of nature of stimulus, (ii) increase of age and iii) the nature of change. The results of the study would help to understand the nature of stimulus and the age that could produce quicker reaction for human subjects.

METHODOLOGY

In this project considering the basic nature of the problem 1600 subjects were selected from different age groups both for male and female sections. The selected age groups were 05 to 07 yrs, 08 to 10 yrs, 11 to 12 yrs, 13 to 15 yrs, 16 to 17 yrs, 18 to 20 yrs, 21 to 25 yrs, 26 to 30 yrs, 31 to 35 yrs, 36 to 40 yrs, 41 to 45 yrs, 46 to 50 yrs, 51 to 55 yrs, 56 to 60 yrs, 61 to 65 yrs and 66 to 70 yrs. The age range for groups was smaller in size for the early part of life i.e. from 05 yrs to 20 yrs. Thereafter the age range groups were of 05 yrs duration each. There were 16 age groups for male section and equal number of age groups for female section. In each age group there were 50 subjects. So, the total number of subjects for male section was 50 x 16 = 800 and same number of subjects was there for female section. Thus the total number of subjects for the study was 1600 (800+800).

To measure the reaction time of the subject two types of stimulus were used like tactile stimulus, and visual stimulus. Reaction time was measured by a multipurpose digital electronic reaction timer capable of measuring reaction time for one hundredth part of a second.

The subjects were tested for reaction time in the afternoon between 4-6 p.m. At first the subjects of a group were assembled in a place and clearly informed about the purpose of the study. Later on, the method to measure reaction time was explained. The visual stimulus was used at first to measure reaction ability. It was followed by the tactile stimulus.

The collected data were statistically analyzed using ASP software. For descriptive statistics Mean and Standard Deviation were computed. The data were also statistically analyzed for testing significance of difference between means. Exact location of the difference was identified using Post-hoc test.

RESULTS AND DISCUSSION

The mean values and standard deviation of reaction time for both the sections for different age groups of subjects for two types of stimulus have been presented in Table-1.

It is seen from the above table that the mean values of reaction time was different for different forms of stimulus. Results showed that the mean values of tactile reaction time were lower than the visual reaction time for almost all age groups for both the sexes. The trend of change in reaction time with age for both the stimulus was also similar for both the sections.

Table 1: Mean and SD of Reaction Time (Sec.) of Two Stimulus for Male and Female Subjects

Sl. No.	Age Group	Reaction Time of Male		Reaction Time of Female	
		Tactile	Visual	Tactile	Visual
1	05–07	0.260 ± 0.040	0.270 ± 0.044	0.274 ± 0.043	0.290 ± 0.040
2	08–10	0.253 ± 0.040	0.267 ± 0.041	0.270 ± 0.040	0.287 ± 0.044
3	11–12	0.248 ± 0.038	0.252 ± 0.037	0.252 ± 0.038	0.244 ± 0.039
4	13–15	0.236 ± 0.036	0.237 ± 0.034	0.234 ± 0.039	0.252 ± 0.031
5	16–17	0.230 ± 0.035	0.238 ± 0.032	0.236 ± 0.037	0.244 ± 0.040
6	18–20	0.227 ± 0.036	0.221 ± 0.050	0.235 ± 0.034	0.230 ± 0.032
7	21–25	0.207 ± 0.037	0.213 ± 0.033	0.210 ± 0.037	0.206 ± 0.031
8	26–30	0.213 ± 0.033	0.214 ± 0.032	0.219 ± 0.030	0.226 ± 0.033
9	31–35	0.234 ± 0.040	0.238 ± 0.040	0.243 ± 0.040	0.257 ± 0.036
10	36–40	0.260 ± 0.033	0.264 ± 0.033	0.262 ± 0.040	0.265 ± 0.040
11	41–45	0.263 ± 0.040	0.277 ± 0.038	0.275 ± 0.034	0.285 ± 0.036
12	46–50	0.285 ± 0.034	0.289 ± 0.037	0.290 ± 0.026	0.295 ± 0.029
13	51–55	0.300 ± 0.036	0.307 ± 0.029	0.292 ± 0.037	0.308 ± 0.031
14	56–60	0.305 ± 0.038	0.313 ± 0.036	0.298 ± 0.036	0.307 ± 0.034
15	61–65	0.309 ± 0.036	0.320 ± 0.036	0.310 ± 0.029	0.322 ± 0.030
16	66–70	0.328 ± 0.039	0.336 ± 0.037	0.341 ± 0.033	0.348 ± 0.036

Fig. 1 and Fig. 2 indicate the variation in reaction time with respect to the nature of stimulus and age for male and female subjects respectively.

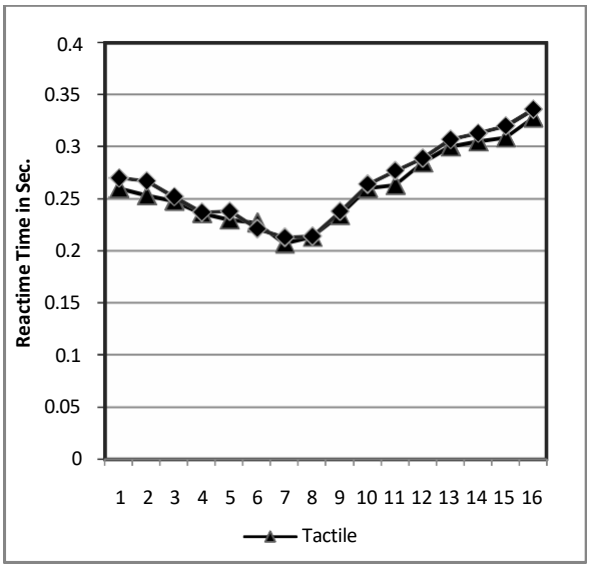

Fig. 1: Reactime Time with Tactile and Visual Stimulus for Male Subjects

It is clear from figure 1 that the tactile stimulus produced quicker reaction than the visual stimulus for different male age groups. But the differences were sometime more and sometime less.

Same trends were observed in female groups from figure 2. Of course, the difference was very small.

Difference between tactile and visual Reaction Time for both the sections:

Tactile and visual stimulus of all the sixteen age groups was compared in reaction time. Table–2 and 3 represent the results for male and female subjects respectively. The comparison was made by using t-test. It is seen from the table values that the tactile stimulus had lower reaction time than visual reaction time for almost in all the age groups of male subjects but the differences were not statistically significant. In case of female subjects same trends have been observed - tactile stimulus produced lower reaction time than visual stimulus. Here out of sixteen age groups five differences were statistically significant and for all other eleven age groups the differences were not statistically significant.

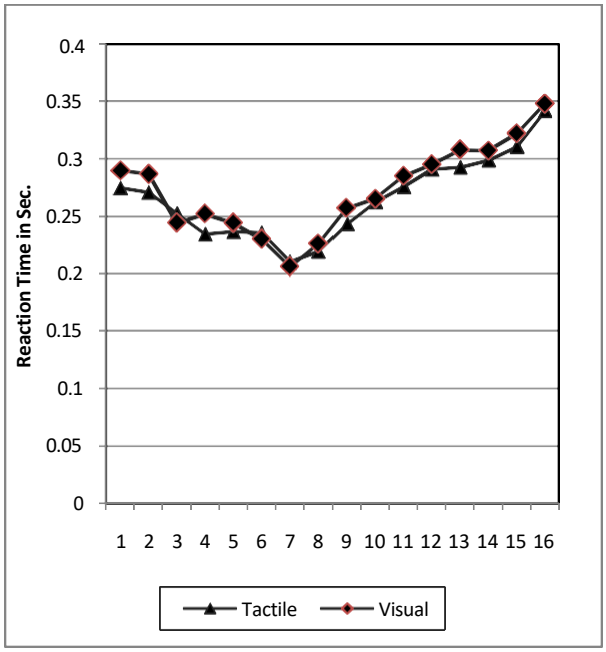

Fig. 2: Reactime Time with Tactile and Visual Stimulus for Female Subjects

Table 2: Reaction Time with Tactile and Visual Stimulus for Male Subjects

Groups	Tactile	Visual	Difference	T value	Probability
05–07	0.260 ± 0.040	0.270 ± 0.044	0.01	1.1891	0.2373
08–10	0.253 ± 0.040	0.267 ± 0.041	0.014	1.728	0.0871
11–12	0.248 ± 0.038	0.252 ± 0.037	0.004	0.5333	0.5950
13–15	0.236 ± 0.036	0.237 ± 0.034	0.001	0.1428	0.8867
16–17	0.230 ± 0.035	0.238 ± 0.032	0.008	1.1928	0.2358
18–20	0.227 ± 0.036	0.221 ± 0.050	- 0.006	0.6886	0.4927
21–25	0.207 ± 0.037	0.213 ± 0.033	0.006	0.8557	0.3942
26–30	0.213 ± 0.033	0.214 ± 0.032	0.001	1.1538	0.8781
31–35	0.234 ± 0.040	0.238 ± 0.040	0.004	0.5000	0.6182
36–40	0.260 ± 0.033	0.264 ± 0.033	0.004	0.6061	0.5459
41–45	0.263 ± 0.040	0.277 ± 0.038	0.014	1.7943	0.0759
46–50	0.285 ± 0.034	0.289 ± 0.037	0.004	0.5629	0.5748
51–55	0.300 ± 0.036	0.307 ± 0.029	0.007	1.0707	0.2869
56–60	0.305 ± 0.038	0.313 ± 0.036	0.008	1.0807	0.2825
61–65	0.309 ± 0.036	0.320 ± 0.036	0.011	1.5278	0.1298
66 - 70	0.328 ± 0.039	0.336 ± 0.037	0.008	1.0523	0.2953

Table 3: Reaction Time with Tactile and Visual Stimulus for Female Subjects

Groups	Tactile	Visual	Difference	T value	Probability
05–07	0.274 ± 0.043	0.290 ± 0.040	0.016	1.9265	**0.0569**
08–10	0.270 ± 0.040	0.287 ± 0.044	0.017	2.0215	**0.0460**
11–12	0.252 ± 0.038	0.244 ± 0.039	- 0.008	1.0389	0.3014
13–15	0.234 ± 0.039	0.252 ± 0.031	0.0180	2.5548	**0.0122**
16–17	0.236 ± 0.037	0.244 ± 0.040	0.008	1.0382	0.3017
18–20	0.235 ± 0.034	0.230 ± 0.032	- 0.005	0.7572	0.4507
21–25	0.210 ± 0.037	0.206 ± 0.031	- 0.004	0.5860	0.5593
26–30	0.219 ± 0.030	0.226 ± 0.033	0.007	1.1099	0.2698
31–35	0.243 ± 0.040	0.257 ± 0.036	0.014	1.8396	0.0689
36–40	0.262 ± 0.040	0.265 ± 0.040	0.003	0.3750	0.7085
41–45	0.275 ± 0.034	0.285 ± 0.036	0.010	1.428	0.1565
46–50	0.290 ± 0.026	0.295 ± 0.029	0.005	0.9077	0.3662
51–55	0.292 ± 0.037	0.308 ± 0.031	0.016	2.3438	**0.0211**
56–60	0.298 ± 0.036	0.307 ± 0.034	0.009	1.2852	0.2018
61–65	0.310 ± 0.029	0.322 ± 0.030	0.012	2.0336	**0.0447**
66 - 70	0.341 ± 0.033	0.348 ± 0.036	0.007	1.0135	0.3133

Similar results have been reported by so many researchers. They have confirmed that reaction to sound is faster than reaction to light, with mean auditory reaction times being 140-160 msec and visual reaction times being 180-200 msec (Galton, 1899; Woodworth and Schlosberg, 1954; Fieandt*et al.*, 1956; Welford, 1980; Brebner and Welford, 1980). Perhaps this is because an auditory stimulus only takes 8-10 msec to reach the brain (Kemp *et al.*, 1973), but a visual stimulus takes 20-40 msec (Marshall *et al.*, 1943). Reaction time to touch is intermediate, at 155 msec (Robinson, 1934). Differences in reaction time between these types of stimuli persist whether the subject is asked to make a simple response or a complex response (Sanders, 1998, p. 114). Calhoun et al. (2004) found that in situations when visual load was high, reaction times to tactile cues were faster than reaction times to visual alerts and as fast as those to auditory cues. Like auditory cues, tactile cues do not require the operator to look in any particular direction to receive the information. Research suggests that tactile cues can enable the performance of multiple tasks better than visual cues can. In one study, a tactile cue elicited faster reaction times in the detection of system faults than a visual cue and was less disruptive in the performance of concurrent tracking and visual monitoring tasks (Calhoun, Draper, Ruff, &Fontejon, 2002).

Vogels (2004) demonstrated that people were able to detect asynchrony between a visual and haptic

Stimulus at about 45ms.Adelstein et al., (2003) measured Just Noticeable Difference (JND) of 24ms. Haptic feedback can lower the demands for visual stimuli and lower the reaction time by 18ms as demonstrated in the work of Griffiths and Gillespie (2004).

CONCLUSION

Within the limitation of the present study following conclusions were drawn:

- The tactile stimulus produces quicker reaction than visual stimulus for almost in all the age groups.
- The reaction time decreases with the increase of age up to the age of 21-25 years for both the sexes.
- The reaction time becomes lowest showing quickest reaction ability of an individual during 21-25 years of age for both the sections.

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Effect of Resistance and Plyometric Training on the Performance of Jumpers

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ABSTRACT

Effect of resistant and plyometric training on the performance of Jumpers. For the purpose of the study 80 male jumpers (Mean +_SD: age 20.23+1.34 years, height 1.65+ 0.032m, body mass 61.50+ _ 2.50 kg) of district level players were randomly selected as the subjects for the study. The purpose of this study was to find out the effect of 3 different training protocols–Resistance training, plyometric training and their combination on standing broad jump, jump and reach test and long jump performance. Based on their training male jumpers were divided into 4 groups: A resistance training group (n=20), B plyometric training group (n=20), C resistance + plyometric training group (n=20) and D control group (n=20). The standing broad jump, jump and reach test and long jump performance were measured before and after the 12 weeks training period. Subjects in each of the training groups trained 3 days per week, whereas control group did their normal routine activities. The data was analyzed by analysis of co-variance. The results showed that all the training treatments elicited significant (P<0.05) improvement in all of the tested variables. However, the combination training groups showed signs of improvement in standing broad jump, jump and reach test and long jump performance that was significantly greater than the improvement in the other 2 training groups (resistance training and plyometric training). This study provides support for the use of a combination of resistance + plyometric training drills to improve the performance of standing broad jump, jump and reach test and long jump.

Keywords: *Stretch-shortening cycle, Resistance Training, Plyometric Training.*

INTRODUCTION

Success in many sports depends heavily upon the athlete's explosive leg power and muscular strength. In jumping, throwing, sprinting, track and field events and other activities, the athlete must be able to use strength as quickly and forcefully as possible. This display comes in the form of speed-strength or power represents the amount of work a muscle can produce per unit of time. An increase in power (YESSIS, & HATFIELD, 1986) gives the athlete the possibility of improved performance in sports, in which the improvement of speed-strength relationship is sought (PAUL, 2003).

In athletics, some amount of resistance has to be overcome and the greater the resistance, stronger should the sportsman. A high level of speed, endurance, technique and other coordinated abilities are impossible if the sportsman lacks the requisite amount of strength, which is regarded as the ability of the sportsman to overcome resistance or to act against it. The strength can be dynamic or static. The static (isometric) and dynamic (isotonic) strength are two principal types of strength while we come across in athletics. A more accurate measure of strength can be obtained by using dynamometers or densitometer instruments which measures force. The maximum strength which is the highest possible resistance, a sportsman can overcome through voluntary contractions of the muscles, the explosive strength which is the ability of the sportsman to overcome resistance with high speed and the strength endurance which is the ability to act against resistance under conditions of fatigue, can be developed through different weight training exercise.

To any sport that requires powerful, propulsive movements, such as football, volleyball, sprinting, high jump, long jump, and basketball, the application of plyometric or explosive jump training is applicable (MCARDLE, KATCH & KATCH, 2001). Plyometric has been a very popular training technique used by many coaches and training experts to improve speed, explosive power output, explosive reactivity and eccentric muscle control during dynamic movements (COETZEE, 2007). It is considered a high-intensity, physical training method, consisting of explosive exercises that require muscles to adapt rapidly from eccentric to concentric contractions (CHU, 1998).

Plyometric training (PT) has widely been used to enhance muscular power output, force production, velocity, and aid in injury prevention (ROBINSON, 2004; POTASH & CHU, 2008).

To assess the training state and physical preparedness for explosive power performance across all of the throwing events in athletics, it is useful to use a general field test of explosive power production. Selection of the appropriate test is key in generating an accurate profile of performance readiness. The vertical jump (VJ) is one such commonly-used test (CHURCH, WIGGINS, MOODE, & CRIST, 2001; GOURGOULIS ET AL., 2003; JENSEN & EBBEN, 2003; MAYHEW ET AL., 2005; STOCKBRUGGER & HAENNEL, 2001; STOCKBRUGGER & HAENNEL, 2003; YOUNG ET AL., 1998). However, this movement focuses primarily on hip and leg function and includes little trunk or arm contribution to total power production (MAYHEW, 2005; STOCKBRUGGER & HAENNEL, 2001; STOCKBRUGGER & HAENNEL, 2003). In addition, the vertical jump focuses on accelerating body mass only and ignores the element of momentum production and transfer to an implement (STOCKBRUGGER & HAENNEL, 2001; STOCKBRUGGER & HAENNEL, 2003).

The stretch-shortening cycle is described as the combination of eccentric (muscle lengthening) and concentric (muscle shortening) actions. An eccentric muscle action is performed when an athlete lowers a weight. A concentric muscle action is the upward motion of above exercise. When an eccentric action then the resulting force output of the concentric action is increased. The stretch shortening cycle works like a rubber bend that is stretched and then snaps back together. This is the essence of the stretch shortening cycle and speed, ability and quickness training.

It seems that researcher have not common agreement about the relative effectiveness of the plyometric training compared with resistance training or combination of both in the development of sprinting ability. It seems likely that different durations of training periods, different training statuses of the subjects, different training designs (i.e. training loads or volumes or exercises) might have caused that discrepancy in the results of previous studies. Therefore the purpose of the present study was to determine how selected variables of the jumpers performance, namely leg power, leg strength and explosiveness are affected by a typical 12 weeks plyometric training program, a typical 12 weeks resistance training program and 12 weeks training program that combines plyometric exercises and resistance training.

MATERIAL AND METHODS

Sample

For the purpose of the study 80 male jumpers (Mean ± SD: age 20.23±1.34 years, height 1.65± 0.032m, body mass 61.50± 2.50 kg) of district level players were randomly selected as the subjects for the study. The age of subjects ranged between 17-21 years. A medical examination of the subjects was carried out in order to check the fitness of the subjects. All the subjects were randomly assigned to four groups consisting of three experimental groups and the control group, each group consisting of 20 subjects. The group A trained with resistance training, group B with plyometric training, group C with a combination of resistance and plyometric training while group D served as Control group, which continued with regular programmed only.

METHODOLOGY

After the initial measurements, the subjects were divided into four groups; the resistance training group (N=20), the plyometric training group (N=20), the combination of plyometric + resistance training group (N=20), and the control group (N=20). The control group was continued with their regular routine work. The other three training groups were trained for 12 weeks, 3 days per week. The training programs were designed to overload the muscles involved in sprinting and explosive performance.

The subjects in resistance training group performed Split jerk, clean push press, Romanian dead lift. 10-15 repetitions in each of the 3 sets, with 40% weight of 1 repetition maximum and with 3 min recovery period in between each set. After the three weeks the weight was set at 50% of 1 R.M. and recovery period was same as it was in first three weeks. After the second three weeks the weight was raised to 60% of 1 R.M. and reducing the repetitions to 8-10 in each set for 3 sets with 2 min recovery period between the sets. Finally for last three weeks the exercises were performed with 70% weight of 1 R.M., 8-10 repetitions in each of the 3 sets with 2 min recovery period in between sets.

The subjects in plyometric training group performed hurdle jumps, slug and side medicine ball throws for 5 repetitions of each exercise in each set for 3 sets with a recovery period of 30 secs and 120 secs in between repetitions and sets respectively. After the first three weeks the number of repetitions of exercise in each set for second three weeks, third three weeks and finally last three weeks were 7, 8, 10 respectively. And numbers of sets for above period were 3, 4 and 4 respectively with a recovery period of 30 secs and 120 secs between repetitions and sets respectively throughout the training. The subjects performed Depth

jump, fast skipping, medicine ball chest pass for 6 repetitions in each set for 3 sets with a recovery period of 30 secs and 120 secs between repetitions and sets respectively. After the first three weeks, the number of repetitions of exercises in each set and number of sets for second three weeks, third three weeks and finally for last three weeks were 8, 7, 8 respectively and number of sets for above said period were 3, 4 and 4 respectively with a recovery period of 30 secs and 120 secs between repetitions and sets respectively throughout the training programme.

Fig. 1: (A) Split Jerk, (B) Clean Push Press, (C) Romanian Dead Lift (D) Hurdle Jumps, (E) Slug, (F) Side Medicine Ball Throws

The combination of plyometric training and resistance training group performed combination of two training programs, (plyometric and resistance training programs) but the volume and intensity of work was reduced. All training sessions were supervised by the researcher.

Each subject underwent measurements of his standing broad jump, jump and reach test and long jump performance. Pre-testing was conducted before the initiation of the training period. Identical measurements were performed in the same order on the completion of the complete training period.

Standing Broad Jump

The standing broad jump test is one of the tests for leg explosive power measurement. The subject (JOHNSON AND NELSON, 1988) stands behind a line marked on the ground with feet slightly apart. A two foot take-off and landing is used, with swinging of the arms and bending of the knees to provide forward drive. The subject attempts to jump as far as possible, landing on both feet without falling backwards. Three attempts were allowed. The measurement was taken from take-off line to the nearest point of contact on the landing (back of the heels). Record the longest distance jumped, the best of three attempts. The measurement was taken in meters and centimeters.

Jump and Reach Test

The Jump and reach test is one of the test for leg explosive power measurement in vertical direction. The subject stood side (KANSAL, 2008) on to a wall and reached up with the hand closest to the wall. Keeping the feet flat on the ground, the point of the fingertips was marked or recorded. This was called the standing reach height. The subject then stood away from the wall, and leaped vertically as high as possible using both arms and legs to assist in projecting the body upwards to touch the wall at the highest point of the jump. The difference in distance between the standing reach height and the jump height was the score. The best of three attempts was recorded. The jump height was recorded as a distance score. The measurement was taken in centimeters.

Long Jump

The long jump test is one of the tests for leg explosive power measurement in horizontal direction. The subject approached the take off from running on runway, take off from single leg while takeoff, swing the arms upward to lift the body up and thrust the trunk to provide forward drive, swing the arms downward and backward, subjects attempted to jump as per as possible, landed on both feet, three attempts were allowed. The maximum distance covered recorded in meters and centimeters between the takeoff line and to the nearest mark made on the pit by any part of the subject's body as the performance in long jump. Best of three trials was recorded as the final score of the subject.

STATISTICAL ANALYSIS

In order to find out the effect of resistance, plyometric and combination of resistance and plyometric training programmes on the performance of jumpers. The t-test was used to identify any significant differences between the groups at the pre and post-tests data. An

analysis of co-variance was used to determine significant differences for physical/performance variables within the three experimental and a control groups. The level of significance was set at 0.05.

RESULTS

All values of the criterion measures for the groups are presented in tables from 1 to 6.

As shown in table-1 that insignificant value of F-ratio's were obtained for the comparison of pre test means (0.449), the obtained value was lesser than the required value. The significant values of F-ratio's were obtained for the comparison of post test means (2.775) and adjusted post test means (13.650). The obtained values were greater than the required value for the selected degree of freedom and the significant level.

The results of the post hoc analysis and the differences between the means among the four groups are given in Table 2.

The results in Table 2 have shown that the mean differences of all experimental groups when compared with the control group have exhibited the significant values of critical difference at the selected level of 0.05.

The group C which trained with the combination of plyometric and resistance training yield greater value of critical difference when compared to group B

The results have shown the insignificant values of critical difference when the experimental group A was compared with group B and group C.

As shown in table-3 that significant value of F-ratio's were obtained for the comparison of pre test means (7.259), post test means (10.106) and adjusted post test means (10.568). The obtained values were higher than the required value for the selected degree of freedom and the significance level. The results of the Post hoc analysis and the difference between the means among the four groups are shown in Table 4.

The results in Table 4 have shown that the mean differences of all experimental groups when compared with the control group have exhibited the significant values of critical difference at the selected level of 0.05.

The group C trained with the combination of plyometric and resistance training yield significant value of critical difference when compared with Group B which trained with resistance training.

The results have shown the insignificant values of critical difference when the experimental group A was compared with group B and group C.

As shown in table-5 that significant value of F-ratio's were obtained for the comparison of pre test means, post test means and adjusted post test means.

The obtained values were higher than the required value for the selected degree of freedom and the significant level. The post hoc test was conducted and the results of the Post hoc analysis and the difference between the means among the four groups are shown in Table 6.

Table 1: Analysis of Co-variance for the Experimental Groups and the Control Group of Standing Broad Jump

	Group Means (m)								
Test	A	B	C	D	Source of variation	Sum of Squares	df	Mean sum of Squares	F-ratio
Pre-test Mean	2.61	2.63	2.59	2.59	Among Within	0.017 0.979	3 76	0.005 0.012	0.449
Post-test Mean	2.67	2.67	2.68	2.59	Among Within	0.101 0.929	3 76	0.033 0.012	2.775*
Adjusted Post-test Mean	2.67	2.65	2.69	2.61	Among Within	0.073 0.134	3 75	0.024 0.001	13.650*

*Significant at 0.05 level F.05 (3, 76) = 2.72 F.05 (3, 75) = 2.72 A–Plyometric, B–Resistance, C–Plyometric + Resistance, D–CONTROL

Table 2: Paired Adjusted Final Means and Differences between Means among the Experimental Groups and Control Group of Standing Broad Jump (Meters)

Groups				Mean Difference
A	B	C	D	
2.67	2.65			0.020
2.67		2.69		0.020
2.67			2.61	0.060*
	2.65	2.69		0.040*
	2.65		2.61	0.040*
		2.69	2.61	0.080*

*Significance at 0.05 level.
Required value of critical difference at 0.05 level is 0.026 A–Plyometric, B–Resistance, C–Plyometric + Resistance, D-Control

Table 3: Analysis of Co-variance for the Experimental Groups and the Control Group of Jump and Reach Test

	Group Means (cm)								
Test	A	B	C	D	Source of Variation	Sum of Squares	df	Mean sum of Squares	F-ratio
Pre-test Mean	76.1	80.8	75.45	70.6	Among Within	1044.6 3595.8	3 76	348.21 47.31	7.359*
Post-test Mean	78.9	82.7	79.20	71.4	Among Within	1344.5 3370.1	3 76	448.17 44.34	10.106*
Adjusted Post-test Mean	78.5	77.9	79.49	76.2	Among Within	108.77 257.29	3 75	36.26 3.43	10.568*

*Significant at 0.05 level F.05 (3, 76) = 2.72 F.05 (3, 75)= 2.72
A–Plyometric, B–Resistance, C–Plyometric + Resistance, D–Control

Table 4: Paired Adjusted Final Means and Differences between Means among the Experimental Groups and Control Group of Subjects of Jump and Reach Test (cm)

Groups				Mean Difference
A	B	C	D	
78.59	77.97			0.620
78.59		79.49		0.900
78.59			76.21	2.380*
	77.97	79.49		1.520*
	77.97		76.21	1.760*
		79.49	76.21	3.280*

*Significant at 0.05 level. Tab t .05 (19) = 1.159
A–Plyometric, B–Resistance, C–Plyometric + Resistance, D–Control

Table 5: Analysis of Co-variance for the Experimental Groups and the Control Group of Long Jump Test

	Group Means (m)								
Test	A	B	C	D	Source of Variation	Sum of Squares	df	Mean sum of Squares	F-ratio
Pre-test Mean	6.24	6.47	6.39	6.46	Among Within	0.669 2.644	3 76	0.223 0.034	6.418*
Post-test Mean	6.32	6.51	6.46	6.47	Among Within	0.428 2.257	3 76	0.142 0.029	4.805*
Adjusted Post-test Mean	6.45	6.44	6.46	6.41	Among Within	0.031 0.135	3 75	0.010 0.001	5.900*

*Significant at 0.05 level F.05 (3, 76) = 2.72 F.05 (3, 75)= 2.72 A–Plyometric, B–Resistance, C–Plyometric + Resistance, D–Control

Table 6: Paired Adjusted Final Means and Differences between Means among the Experimental Groups and Control Group of subjects of Long Jump Test (Meters)

Groups				Mean Difference
A	B	C	D	
6.45	6.44			0.010
6.45		6.46		0.010
6.45			6.41	0.040*
	6.44	6.46		0.020
	6.44		6.41	0.030*
		6.46	6.41	0.050*

*Significant at 0.05 level. Tab t .05 (19) = 0.026
A–Plyometric, B–Resistance, C–Plyometric + Resistance, D-Control

The results in table-6 have shown that the mean differences of all experimental groups when compared with the control group have exhibited the significant values of critical difference at the selected level of significance.

The group C which trained with the combination of plyometric and resistance training yield greater value of critical difference in comparison to other experimental groups (Group A and B).

The results have shown the insignificant values of critical difference when the experimental group A was compared with group B, group C and group B with group C.

DISCUSSION

All these significant changes have shown that the short term plyometric and resistance training alone are capable in improving the jump performance but the combination of both Plyometric and resistance training is even have greater effects. While performing the plyometric, resistance and combination of both training, the loads have been given in developing the particular muscles of body. It is based on the understanding that concentric (shortening) muscular contraction is much stronger if it immediately follows an eccentric (lengthening) contraction of the same muscle. It is bit lit stretching out a coiled spring to its fullest extent and then letting it go. Immense levels of energy are released in a split second as the spring recoils. Muscle fiber more elastic energy and transfer more quickly and powerfully from the concentric to the eccentric phase responsible for the development of explosiveness, speed, explosive power and muscle strength, mobility and flexibility of various joints, dynamic stability and coordination of various muscles, which are the key factors in generating the most powerful stimulus by increasing hip and thighs power production of the athletes but when we see the results of combined training, these were much better than the plyometric and resistance training alone. It may be due to the fact that the muscles are trained in two different patterns. Weight training programme are conductive to develop the upper and lower extremities muscle strength, while the simultaneous application of plyometric permits effective use of this strength to produce explosiveness in sports or events demanding speed, explosiveness and quickness. Therefore, better improvement in jumping performance ability, speed, explosive power and muscle strength can be seen.

It is therefore concluded that is a choice has to be made out of three training methods namely plyometric training, resistance training and combined training of both. The combined training may be preferred for improving the speed of the athletes. The findings of this study are in consonance with the results of the study done by (RAHIMI AND BEHPUR, 2005; SULTANA ET, AL. 2008; GERMER 1987; GEHRI ET.AL. 1998; KRITPET 1989 as well as FAIGENBAUM AND MCFARLAND 2007).

PRACTICAL APPLICATION

On the basis of the findings of the study, the following conclusions are drawn:

a. Twelve weeks of Plyometric and resistance training exercises are useful program to improve the performance of jumpers.

b. The combined plyometric and resistance training programs has greater effect in comparison to resistance and plyometric training.

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Efficacy of Smoking on Circulatory and Respiratory Indices of Smokers and Non-Smokers Sportsman

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ABSTRACT

The purpose of the study is to assess the effect of smoking on circulatory and respiratory indices of sportsman. A group of 40 University boys aged 21–24 years, who participated in All India Inter university level in the sports of Badminton, Basketball and football, volunteered to participate in this study. As per the requirement of the study the players were divided into two groups. i.e., smokers and non smokers. Each group comprised of 20 subjects. A smokers was a subjects who smoked more than ten cigarettes per day, and a non smokers was a subjects who had been not smoking at all. The circulatory indices was measured by using Stop watch, Stethoscope and Sphygmomanometer and respiratory indices was measured by Stop watch, Wet spirometer and Peak Flow Meter.

Results showed that there was a significant difference on that resting pulse rate, blood pressure (Systolic), blood pressure (Diastolic) between Smokers and non Smokers sportsman. Pulse pressure has been found insignificant difference between Smokers and non Smokers, since the computed value of t for all the dimensions were greater than the tabulated t.05 (19) =2.02 except pulse pressure (t=0.85). The Results also indicate that resting respiratory rate, peak flow rate, breath holding (positive) and breath holding (negative) has been found significant difference between Smokers and non Smokers sportsman. Vital capacity has been found insignificant difference between Smokers and non Smokers, since the computed value of t for all the indices were greater than the tabulated t.05 (19) =2.02 except vital capacity (t=0.01). Finding showed non smokers sportsmen were better than smokers sportsmen on circulatory and respiratory indices.

Keywords: *Smoking, Circulatory Indices, Respiratory Indices*

INTRODUCTION

Smoker says it is pleasant to smell and relaxes the mood and develops confidence towards life. A non-smoker says smoking is used as a custom, loathsome to the eyes, hateful to nose, harmful to brain and dangerous to lungs.So many scientific facts and evidences have been put forward to explain that smoking is harmful to health. Many smokers in spite of knowing this keep on smoking. Doctors who know all about it are found to be chain smokers. This shows that there exists some sort of psychological factor which plays the role when a person starts smoking and later on it develops physiological dependence due to which he is not able to leave the habit. Smoking in teenagers and adolescents indicates the psychology of this particular age group who want to break away from the bonds of adult authority as a reaction and experience the freedom by doing as they like. The glamor and to be foremost among fashionable also facilitates this habit among the affluents.

The effect of smoking evidently does not depend upon the number of cigarette smoked as much as it depends upon the amount of smoke inhaled. Moreover, man's physical performance has a range of fluctuation which may mask the exact effect of tobacco among the moderate smokers.

Nicotine which is one of the important constituent of tobacco has a transient stimulatory effect on the nervous system followed by depression. Nicotine causes release of epinephrine from the adrenal grands which in turn stimulates the nervous system and other endocrine glands and causes the release of glycogen from the liver. The result is the feeling of stimulation or "kick" and relief from fatigue. This is however transient and is followed by further fatigue and depression. This explains the physiological dependence and why person likes to smoke again.

Acute inhalation of cigarette smoke may increase airways resistance and elevate blood carboxyheamoglob in because of the high concentration of carbon-monoxide in cigarette smoke. After having considered it may be said that smoking would have some definite effects on sports achievement of the higher level sportsmen.

Present study was planned to assess the effect of smoking on circulatory and respiratory indices of sportsman. The result would help to identify among smokers and nonsmokers, which group gives better result in circulatory and respiratory indices of sportsman.

METHODS

A group of forty (N = 40) male All India Inter university level in the sports of Badminton, Basketball and football players were in this study. The subjects were divided into two groups. i.e., smokers and non smokers Each group comprised of 20 subjects. The average age of the students ranged from 21 to 24 years. A smoker was a subjects who smoked more than ten cigarettes per day, and a non smoker was a subjects who had been not smoking at all.

For measuring the breath holding time, resting respiratory rate and pulse rate, the stop watches were used. The suppliers, Krishna Watch Company, Mumbai, assured the accurate calibration of there watches. Blood pressure of the subjects was measured using Stethoscope and Sphygmomanometer. The Wet-Spiro meter used to measure Vital Capacity The peak Flow Meter was utilizes to measure Peak Flow Rate. The equipments were manufactured by a competent form, Biological concern, Kalkota. Thus the instrument reliability was assumed.

The subjects were clearly informed and well acquainted with the requirement of the study and the testing procedure. The testing on variables of resting pulse rate and resting respiratory rate was conducted in the morning in the respective rooms of the subjects, the tests on the rest of the variables was conducted at the human performance Laboratory of Lovely Professional University, Phagwara. The entire testing procedure took about 4 days.

The collected data were statistically analyzed using Medcalc software. Student's t-test was used to assess the between group differences. The level of $p \leq 0.05$ was considered significant.

RESULTS

The mean value of circulatory indices of smoker and non–smoker sportsmen is presented in Table–1.

It is seen from the Table 1 that the mean values of resting pulse rate and pulse pressure were lower for smokers and higher in non smokers. Blood pressure (Systolic), blood pressure (Diastolic) is lower for Smokers and higher in non Smokers. So it is understood that the resting pulse rate and pulse pressure is better in non Smokers than Smokers and blood pressure (Systolic) and blood pressure (Diastolic) is better in Smokers than non Smokers.

It is clear from the table value that resting pulse rate, blood pressure (Systolic), blood pressure (Diastolic) has been significant difference between Smokers and non Smokers. Pulse pressure has been found insignificant difference between Smokers and non Smokers, since the computed value of t for all the dimensions were greater than the tabulated $t_{.05}$ (19) =2.02 except pulse pressure (t=0.85). Thus it may be concluded that the all the circulatory índices except pulse pressure among Smokers and non Smokers sportsmen found to be statistically significant.

It is seen from the table 2 that the mean values of resting respiratory rate were higher for smokers than the non smokers. Peak flow rate, breath holding (positive) and breath holding (negative) is lower for Smokers and higher in non Smokers. In case of vital capacity the mean is equal for smokers and non smokers. So it is understood that the resting respiratory rate, breath holding (positive) and breath holding (negative) is better in non Smokers than Smokers and Peak flow rate found no difference in mean for Smokers than non Smokers.

It is clear from the table value that resting respiratory rate, peak flow rate, breath holding (positive) and breath holding (negative) has been found significant difference between Smokers and non Smokers sportsman. Vital capacity has been found insignificant difference between Smokers and non Smokers, since the computed value of t for all the dimensions were greater than the tabulated t.05 (19) =2.02 except vital capacity (t=0.01). Thus it may be concluded that the all the respiratory índices except vital capacity among Smokers and non Smokers sportsmen found to be statistically significant.

Table 1: The Significant of Mean Difference, Standard Error of the Mean and Test Statistic t of on Circulatory Variables of Smoker and Non–smoker Sportsmen

Group Variable	Mean		SD		SEM		t-value	p-value
	Smokers	Non-Smokers	Smokers	Non-Smokers	Smokers	Non-Smokers		
Resting Pulse Rate(RPR)	63.8	58	5.46	9.40	1.22	2.10	2.08*	0.05
Blood Pressure (Systolic)	115.1	118.7	8.49	4.68	1.89	1.04	2.44*	0.02
Blood Pressure (Diastolic)	72	76.25	8.03	6.52	1.79	1.45	2.92*	0.008
Pulse Pressure (PP)	43.2	41.95	6.22	5.08	1.39	1.13	0.85	0.40

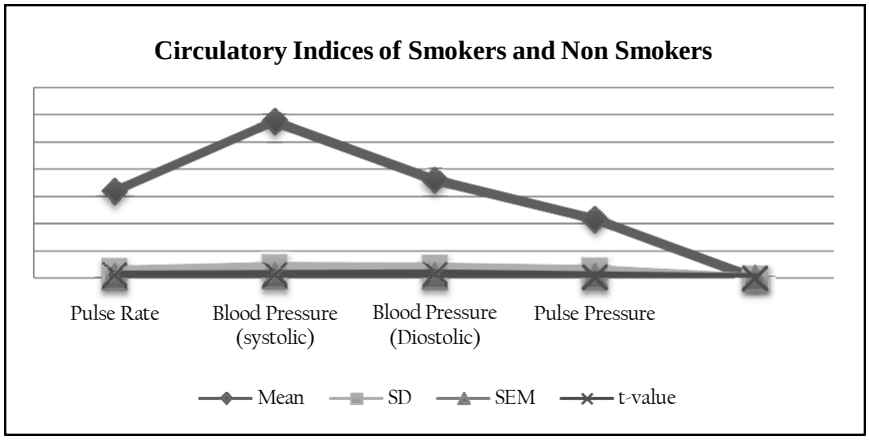

Fig. 1: Indicate the Mean Values (±SD), Standard error of the Mean and Test Statistic t of Pulse Rate, Blood Pressure (Systolic), Blood Pressure (Diastolic) and Pulse Pressure of Smokers and Non Smokers (N = 20) Sportsman

Table 2: The Significant of Mean Difference, Standard Error of the Mean and test STATISTIC t on Respiratory Índices of Smokers and Non Smokers Sportsmen

Group Variable	Mean		SD		SEM		t-value	p-value
	Smokers	Non-Smokers	Smokers	Non-Smokers	Smokers	Non-Smokers		
Resting Respiratory Rate(RPR)	18.50	16.60	4.04	2.68	0.90	0.60	3.06*	0.006
Vital Capacity (VC)	3.46	3.46	0.49	0.44	0.11	0.09	0.01	0.98
Peak Flow Rate(PFR)	566.5	590.0	56.5	60.7	12.6	13.5	2.22*	0.03
Breath Holding (Positive)	54.75	65.85	12.7	26.6	2.86	5.96	2.28*	0.03
Breath Holding(Negative)	24.90	34.55	6.90	12.9	1.54	2.89	2.84*	0.01

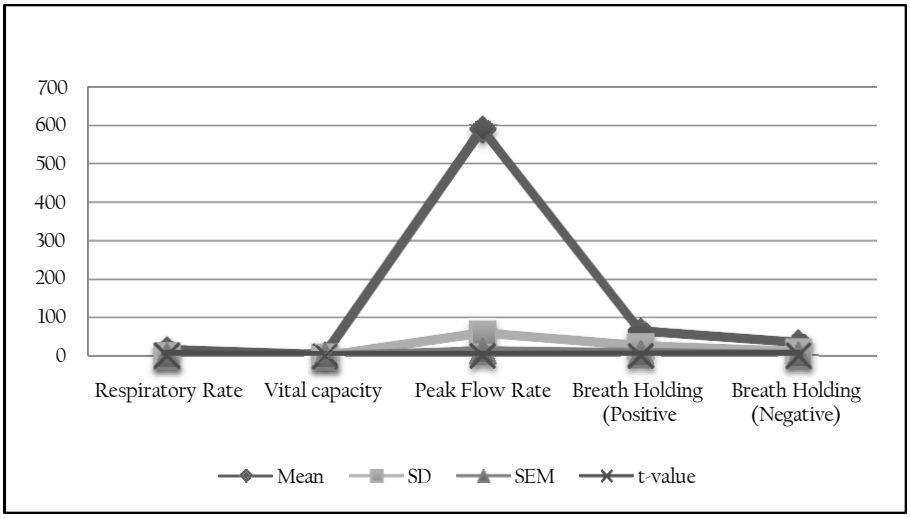

Fig. 2: Indicates the Mean Values (±SD), Standard Error of the Mean and Test Statistic t of Respiratory Rate, Vital Capacity, Peak Flow Rate Breath Holding (Positive) and Breath Holding (Negative) of Smokers and Non Smokers (N = 20) Sportsmen

DISCUSSION

The calculation of circulatory indices has shows that there was a significant difference on resting pulse rate, blood pressure (Systolic), blood pressure (Diastolic) between Smokers and non Smokers. Pulse pressure has been found insignificant difference between Smokers and non Smokers sportsman, since the computed value of t for all the indices were greater than the tabulated $t_{.05}$ (19) =2.02 except pulse pressure (t=0.85). Thus it may be concluded that all the circulatory índices except pulse pressure among Smokers and non Smokers sportsmen found to be statistically significant.

The calculation of respiratory indices that resting respiratory rate, peak flow rate, breath holding (positive) and breath holding (negative) has been found significant difference between Smokers and non Smokers sportsman. Vital capacity has been found insignificant difference between Smokers and non Smokers, since the computed value of t for all the indices were greater than the tabulated t.05 (19) =2.02 except vital capacity (t=0.01). Thus it may be concluded that all the respiratory índices except vital capacity among Smokers and non Smokers sportsmen found to be statistically significant.

As per the finding non smoker sportsmen were better than smoker sportsmen on resting pulse rate, blood pressure (Systolic), blood pressure (Diastolic), resting respiratory rate, peak flow rate, breath holding (positive) and breath holding (negative) the finding of this study is supported by the finding of Oring and Jamison.

The finding of Moutis are in disagreement with the Finding of this investigation that of having insignificant difference on pulse pressure and vital capacity. Moreover research scholar has an observation that the difference between the pulse pressure and vital capacity between the smoker and non-smoker groups has been larger although not statistically significant. Moreover the smokers were not heavy smokers, they were moderate smokers. These reasons could be attributed to not getting significant differences on the indices as mentioned above.

CONCLUSION

In the light of conclusion drawn and with in the limitations of the study, it can be revealed that our bodily system have been gifted by nature to accommodate themselves and change the functions accordingly within the physiological limits. Smoking effects respiratory function due to carbon monoxide(co present in its constituents) in the blood and reducing it's oxygen (O2) carrying capacity. So the lower vital capacity of the smokers was due to the lesser concentration of oxygen in the blood. This has been responded by cardio-vascular system by increasing the pulse rate which increases the amount of blood flow through lungs. Minutes to compensate the deficient oxygenation of blood.

No significant changes were found in pulse pressure and vital capacity of the smokers and non smokers. Hence, it can be concluded that the physical activity may help the moderate smokers by involving the adaptation power of there cardio-vascular and respiratory system.

After giving a deep view of all the tables, it can be observed that there is not much of difference in the blood pressure, but pulse rate is higher for smokers, which indicates that due to the physical activity. The individuals maintain certain physical values to the optimum level. They also compensate certain changed values, which were the Results of harmful effects of smoking. It may be said that the individuals who are involved in physical activity may adopt and tolerate the harmful effects of smoking in better way.

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The Effects of Dynamic Resistance Training on Upper and Lower Body Muscular Strength Performance of Inter-University Male Handball Players

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ABSTRACT

The purpose of this investigation was to examine the muscular strength performance in upper and lower body muscular strength when using the dynamic resistance exercise training methods. Thirty (n=30) male Inter- University Handball players volunteered to take part in this study. The subjects were randomly assigned to either a dynamic resistance exercise training group (DRETG) and control group (CG). Assessments for 1RM bench press and 1RM half squat were performed before and after 6 week in season dynamic training programme. The two groups kept up their regular Handball practice; additionally dynamic resistance exercise training group (DRETG) performed 3 sessions per week of a respective programme. Results: The univariate analysis of variance showed that training induced significant ($p<0.05$) improvement in muscular strength for the two groups: 22.48 % for DRETG, and 1.01% for CG. The DRETG had significantly higher averaged adjusted values than the control groups ($p<0.05$). Training also induced significant improvements in upper and lower body muscular strength for the two groups: 22.48 % for DRETG, and 1.01% for CG. The DRETG had significantly higher averaged adjusted values than the control groups ($p< 0.05$). **Conclusion:** *We conclude that Dynamic resistance training is a useful working tool for physical education teachers and coaches innovative in this muscular strength training domain, equally contributing to better time efficient training. The dynamic resistance exercise and traditional method of training groups significantly improved in the 1RM bench press and 1RM half squat values ($p<0.05$). The dynamic resistance exercise group significantly developed in two variables better than the traditional method training groups.*

Keywords: *Dynamic Resistance Exercise Training and Muscular Strength*

INTRODUCTION

The term resistance training refers to a specialized method of conditioning, which involves the progressive use of a wide range of resistive loads and a variety of training modalities designed to enhance health, fitness, and sports performance. Although the term resistance training, strength training, and weight training are sometimes used synonymously, the term resistance training encompasses a broader range of training modalities and a wider variety of training goals. The term weightlifting refers to a competitive sport that involves the performance of the snatch and clean and jerk lifts (1).

The primary adaptation of skeletal muscle to long–term resistance training is hypertrophy or increased cross sectional area of muscle fiber, resulting in increased force and power production capability (2).

Dynamic resistance training involves concentric and eccentric contractions of muscle group performed against a constant or variable resistance (3).

Success in sports depends heavily upon the player's muscular strength. Power training is commonly conducted using lighter resistances that are performed explosively. To achieve the greater benefits from power training it should be performed at the beginning of an exercise session or on a separate training day (4). The best results are attained when a combination of heavy and light loads are implemented within the workout.

By performing heavy loads before light power exercises there is greater activation and preparation for maximal effort in the lighter load (5). The heavy resistance work gets the nervous system into full action so that more Type IIb fibers are available for the explosive exercise (6). The use of heavy resistance exercises and lighter resistance exercises within a session has repeatedly been referred to as "weight

lifting exercise" The term "weight lifting exercise" refers to a workout that involves the use of exercises of contrasting loads that is, alternating heavy and light exercises set for set. Performing lighter resistance before the heavy resistances will be termed the "traditional training" method.

Verkhoshansky and Tatyan (7) examined if there was any significant difference in power development when manipulating the order in which exercises are conducted with in a single training session. Although intense exercise results in potentiation of power performance and this was because of increased neuromuscular activity (8), the effect of several sets of a heavy loaded exercise on power performance, as in a typical resistance session, has not been examined. The purpose of this investigation was to compare the effects of complex and contrast training methods in the improvement of power performance throughout an entire resistance session.

METHODS

Selection of Subjects

Thirty Inter- University male Handball players volunteered to take part in this study. The subjects were randomly assigned to the DRETG (n = 15: age 19.2 ± 0.6 years old; weight 65.4 ± 10.2 kg ; height 174.3 ± 6.4 cm ; and Handball training experience 3 ± 1.3 years) and CG (n = 15 : age 19.6 ± 0.6 years old ; weight 65.4 ± 10.8 kg ; height 176.4 ± 6.2 cm ; Handball training experience 3.2 ± 1.2 years. The subjects received all the necessary information about the study's procedure in oral and written form.

Experimental Design

ThirtyInter-University Handball players were randomly divided into the experimental group I (DRETG), and the control Group II (CG). The experimental group I under went a resistance exercise training programme, and the control group II underwent traditional method of training. The experimental lasted for 6 weeks during which 18 training sessions were conducted 3 times per 6 week.

Testing Procedures

Subjects were assessed before and after a 6 week training programme for upper and lower body muscular strength. The assessment was done in the following variables: a) upper body muscular strength, and b) lower body muscular strength. Tests followed a general warm–up that consisted of running, calisthenics, and stretching. All the tests were performed with 3 trials and all the correspondent mean values were considered for statistical analysis. There was a 30 second and a 20 second rest between trials respectively.

Training Protocol

After the initial measurements, Experimental Group I (DRETG) practiced dynamic resistance exercises training programme and control group II (CG) practiced traditional method of Handball training. The two groups trained for 6 weeks, 5 days per week. Before the initiation of the training periods, the subjects of all groups were instructed about the proper execution of all the exercises to be used during the training period for all training regimens.

Dynamic Resistance Exercise Training Group

The exercise training workout comprised of 3 sets of resistance exercises. e.g.: Squats. All the subjects performed twelve repetition maximum (12RM) of the exercise before they were fatigued. The subjects in the exercise training group performed five resistance exercises: clean & jerk, squats, , barbell lunge, lat pull down and abdominal crunches. In this training programme the players completed 3 sets with 12 repetitions of weights exercise with a recovery of 60 second/set. This was followed by a 45 second rest. The resistance exercise training programme is described in the Table 1.

Statistical Analysis

Statistical analysis followed the most important descriptive statistics, such as mean and SD. A repeated measure't' test was used to determine the presence or absence of gains in each group. Because of the slight differences in the initial groups, analysis of covariance with the pre–test values as the covariate was used to determine significant differences between the posts–test adjusted means in the groups. The results are presented as means (SD). A significance level of 0.05 was used. All statistical analyses were conducted using SPSSv11.

Table 1: Dynamic Resistance Exercise Training Programme (DRETG)

Dynamic Resistance Exercise Training	1-2 Weeks	3-4 Weeks	5-6 Weeks
Power Clean	‡ 3 x10 (50%) 60	3 x10 (60%) 60	3 x 8 (70%) 50
Dead lift	‡ 3 x10 (50%) 60	3 x10 (60%) 60	3 x 8 (70%) 50
Back Squat	‡ 3 x10 (50%) 60	3 x10 (60%) 60	3 x 8 (70%) 50
Shoulder Press	‡ 3 x10 (50%) 60	3 x10 (60%) 60	3 x 8 (70%) 50
Bench Press	‡ 3 x10 (50%) 60	3 x10 (60%) 60	3 x 8 (70%) 50

‡ Sets x reps at (percentage of 1RM) rest time between sets
RM = Repetition Maximum; Reps = Repetition
Note: 12 RM–a weight which only allows you to complete a maximum of 12 repetitions of the exercise before you are fatigued.

RESULTS

The results between the pre - and post - test for muscular strength performance scores in the two groups and the results between groups at baseline and after the dynamic resistance training programme are presented in Table 1.

Six weeks of dynamic resistance exercise training elicited significant increases in upper body muscular strength 29.43 ± 1.5 vs 32.97 ± .90, and lower body muscular strength 39.73 ± 1.5 vs 43.90 ±1.7 from pre to post test. The control group did not show any significant increase in the two variables. The dynamic resistance exercise training group elicited significantly greater increases in upper body muscular strength 11.99 vs 0.58 % and lower body muscular strength 10.49 vs 0.43%. The dynamic resistance exercise training group significantly increased in upper body muscular strength 11.99 vs 0.58 % and lower body muscular strength 10.49 vs 0.43 % better than the control group.

Table I: Comparison of Explosive Power Test Results Mean (± SD) between the 2 Groups in Pre– and Post Test Conditions

Test		Pre	Post	Gains		Value	
				Absolute	%	't'*	F†
UBMS(kg)	DRETG CG	29.43 ± 1.5 29.17 ± 1.4	32.97 ± .90 29.33 ± 1.5	3.53 .17	11.99 0.58	13.12* Δ 2.09	212.81
LBMS(kg)	DRETG CG	39.73 ± 1.5 39.60 ± 1.3	43.90 ± 1.7 39.78 ± 1.2	4.17 .17	10.49 0.43	13.23* Δ 1.78	144.84

DRETG= Dynamic Resistance Exercise Training Group, CG= Control Group.
* Significant difference from pre to post ($p < 0.05$)
† Significant difference between groups post training ($p < 0.05$)
Δ Significantly better than control group

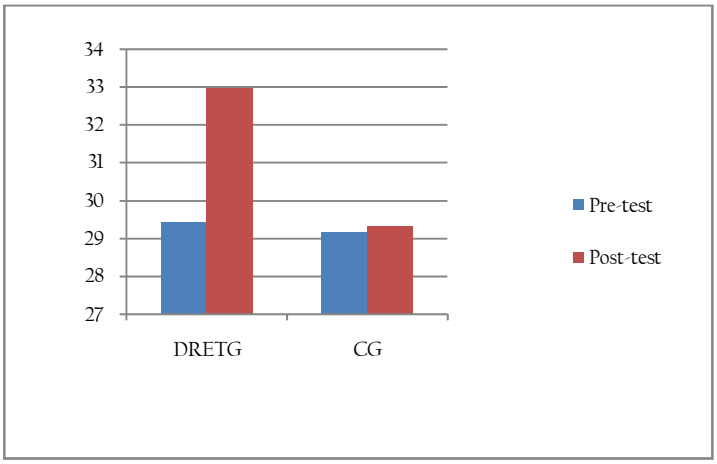

Fig. 1: Diagram Showing the Pre and Post Test of Mean Values of Upper Body Muscular Strength

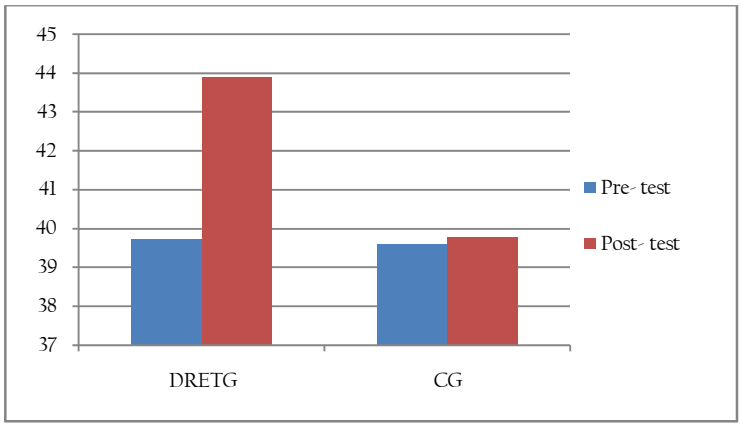

Fig. 2: Diagram Showing the Pre and Post Test of Mean Values of Lower Body Muscular Strength

DISCUSSION

The purpose of this study was to determine dynamic resistance exercise training (Power Clean, Dead Lift, Back Squat, Shoulder press and bench Press) can enhance muscular strength performance, the results indicate that short term dynamic resistance exercise training is capable of improving the muscular strength.

The result of the present study are in line with previous study [Perez-Gomez J, 2008] they found that the Effects of resistance training combined with plyometric exercises on physical fitness, body composition and knee extension velocity during kicking in football and Increased 1 repetition maximum (1 RM) of half squat (HQ) (+45.1%). In the present investigation, subjects who participated in the combined plyometric and resistance training program made significantly greater improvements in upper body power, lower body power and speed and agility than subjects who performance static stretching and resistance training. Plyometric and resistance training enhanced upper body power (as measured by the seated medicine ball toss) by 14.4% as compared to a 5.6% gain by the group that performance static stretching and resistance training. While both groups performed upper body resistance training, this difference is likely due to the upper body plyometric exercises with medicine balls that were incorporated into the combined training program. These data concur with findings from Vossen and colleagues (2000) who noted that the addition of upper body plyometrics may increase an athlete's ability to improve upper body performance.

CONCLUSION

It can be concluded that the dynamic resistance exercise training methods for strength development may lead to greater improvements in strength performance than the traditional method of training and in Handball strength plays a dominating factor for getting higher performance. Among the resistance exercise training methods the resistance exercises training method may be better than the control group method in improving the upper and lower extremity strength performance.

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Comparative Study on Pre-Competition Anxiety between Team Games and Individual Games

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ABSTRACT

The purpose of the study was to find out pre-competition anxiety between Team game and individual game male players. Due to the fact that during competition athletes mental state greatly affects their stamina explosion, which finally influence the result of final competition. Anxiety in sports is considered as an important issue for many athletes. It refers to a sort of nervous and fear emotion formed by frustration of self-esteem and self- confidence, or increasing of the sense of failure and guilty, which is resulted by the threat from being unable to achieve goals or to overcome obstacles at the right time. For the purpose of the study the subjects were selected randomly from 63rd State Athletic Championships of West Bengal and East Zone Universities which participated in interuniversity tournaments during 2012-13to measure the pre-competition anxiety by a questionnaire Sport Competition Anxiety Test (SCAT) developed by Rainer Marten. 25 University level football players and 25 state level male athletes selected randomly from East Zoneinteruniversity tournaments during 2012-13 and 63rd State Athletic Championships of West Bengal. To find out pre-competition anxiety between Team game and individual game 't' test was applied. The result showed that there was significant difference on pre-competition anxiety between team game male players and individual game male athletes. The team game male players had less pre-competition anxiety than the individual game mail athletes.

Keywords: *Pre-competition anxiety, Individual game male athletes, team game male athletes*

INTRODUCTION

Sports is littered with broken dreams of those whose performance collapsed when they are most needed to be in control of themselves and focus on the task at hand. It is not uncommon to see athletes "freeze" in big games or moments or commit unexplainable error in the course of their performance. When athletes do not perform well in relation to their abilities, nervousness in anticipation of the sporting challenges could be the root cause of anxiety.

Anxiety refers to a sort of nervous and fear emotion formed by frustration of self-esteem and self-confidence, or increasing of the sense of failure and guilty, which is resulted by the threat from being unable to achieve goals or to overcome obstacles (Akbar et al., 2011). Anxiety can have a devastating effect on the performance of an athlete. No matter how much talent or skill one may have, he will never perform at his or her best if he or she lives in fear before every event.

The problem of pre-competitive anxiety is one of the most pressing problems in modern sports psychology. It has been recognized for many years that psychological factors, in particular anxiety, play an important role in competition and in competitive sports, every athlete experience fear before, during and after events (Lizuka, 2005). Anxiety could make even the world most successful athlete feel nervous. According to Moran (2004), factors such as fear of failure and lack of confidence induce feeling of anxiety in athletes. Anxiety is like worry; it is an unpleasant emotion that most athletes feel at sometimes when they are faced with challenges.

Competitive anxiety is one of the factors to decrease athletes'performance (Esfahani & Soflu., 2010). Feelings of tension, thinking of upcoming events in their mind, nervousness, worry and involved in physiological changes such as increased in heart rate response are common response for the athletes prior to the competition (Hackfort & Spielberger, 1989). Some athletes also involved with the feelings of fear, unhappiness, guilt, discouragement, and focus distraction (Cerin, 2003; Kais &Raudsepp, 2005). All of these conditions are a common conditions which is known as anxiety (Cerin, 2003; Hackfort & Spielberger, 1989; Jarvis, 2006; Kais & Raudsepp, 2005; Martens, Vealey, & Burton, 1990; Wiggins, 1998). However, Hanton et al., (2008). Generally, there are

two types of anxiety that are state anxiety and trait anxiety (Cox, 2002). State anxiety involved feeling of apprehension, tension, fear, and increase in physiological arousal (Cox, 2002).

Researcher took up this study to compare the Pre Competitive anxiety between the Players who participated in the West Bengal Athletics competition, and the Players who represented their respective University in East Zone interuniversity tournaments during 2012-13.The purpose of the study was to compare the differences on pre-competition Anxiety between team game and individual game male players. Trevadi et.al also found significance differences between Male and Female Weight Lifters of Gujarat.

Esfahani (Alzahra University) and H. Gheze Soflu (Gonbade Kavoos University) also found significant differences while comparing Pre-Competition Anxiety and State Anger between Female and Male Volleyball Players.

The fact is also supported by the study of Amit K. Gamit. (Research Scholar CMJ University) while comparing Sports Competition Anxiety. Between Male and Female CricketPlayers of Gujarat.

METHODOLOGY

For the purpose of the study 25 male football players, who participated at East Zoneinteruniversity tournaments during 2012-13 and 25 male state level athletes, who participated in West Bengal state Athletic competition were selected randomly for the purpose of this study. The age of the subjects were ranged between 21 to 24 years.

To compare the pre competition anxiety between them, the players and the athletes, data were collected by using Sport Competition Anxiety Test (SCAT) questionnaire, developed by Rainer Marten.

Student's 't'test at 0.05 level of significance was applied to calculate the significance of difference between Team game and individual game male players.

FINDING

Table 1: Significance of Differences of Mean, Standard Deviation and t-test on Pre-competition Anxiety between Women National and State Level Athletes

Groups	Mean	Std- deviation	t-ratio
Team game	16.6	2.62	4.00*
Individual game	19.60	2.78	

* = significance, $t_{0.05}(48) = 2.00$

DISCUSSION OF FINDING

Anxiety plays a paramount role in sports. It is the challenge in sports participation which produces anxiety. How an athlete handles the anxiety determines how successful he would be. Anxiety may be a positive motivating force or it may interfere with successful performance in sports events. The degree of anxiety also varies with a number of different conditions. Anxiety is likely to be greater in higher competitive sports than in relatively non competitive sports, because in the competitive sports, participants are expected to win a great demands are made up on them to succeed.

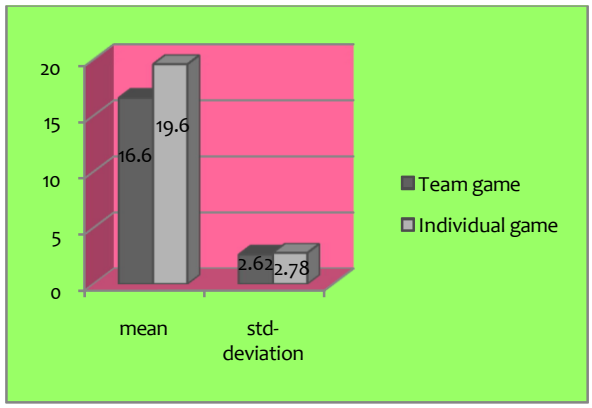

Fig. 1

It is revealed from the above findings that the Individual game mail players are more prone to pre-competition Anxiety than Team game players.

Douglas et al (2006) stated that the major sources of pre-competitive anxiety include: fear of failure, thinking too much on what people may say about the performance, and lack of confidence. They concluded however, that pre- competitive anxiety is dependent upon factors such as: skill level, experience and general level of arousal in daily activities.

The final result of team game basically depends upon the team members it not only depend upon the success or flair on one player. They are able to control their emotion and anxiety. Their nutritional status, blended demand with training for skill development in their training schedule and previous record in competition increase their confident level before competition and experience. These have been reflected in the result of the present study, but in case of individual game the final result totally depend upon the individual of their success and failure. So the anxiety level of individual player is higher than team game player. In individual game basically in athletics a player has done any mistake he or she does not get any chance to overcome this mistake but in team game basically football if a player done any mistake he have sufficient time to overcome it where the Athletes do not have such opportunity. Therefore the higher mean indicates that the pre competition anxiety in athletes are higher than the team players.

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Relationship of the Selected Biomechanical and Physical Variables on the Performance of Kicking for Distance in Soccer

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ABSTRACT

The purpose of the study is to analyze and examine the relationship of selected biomechanical and physical variables on the performance of kicking for distance in soccer. Five male intervarsity soccer players of LNIPE, Gwalior were taken as the sample for the study with mean age = 22 years. Leg strength, Back strength and leg length were taken as physical variable whereas angular displacement, angular velocity, angular acceleration, joint angle of elbow, shoulder, knee, ankle and hip are considered as biomechanical variables. Dynamometer was used to measure all physical variables and the distance of kick was recorded in meters with the help of a measuring tape. A standard motion driven Sony camera with frequency of 50frame/second was used to collect its biomechanical data and Biokin-2D V4_5.wmv was used for analysis. Pearson's product moment correlation was used as a statistical tool and the hypothesis was tested at 0.05 level of significance. The tabulated value at 3 degree of freedom was 0.87 and the calculated value of angle of knee joint at 0.98, hip joint at 0.89 and leg strength at 0.91 are found to be significant.

Keyword: *Leg strength, Back strength, leg length, angle of joints (elbow, shoulder, knee, ankle, hip) and angular velocity, angular acceleration, & angular displacement*

INTRODUCTION

Soccer is reputedly one of the most important sports with 40 million registered players and many more hundreds of millions of people purported to play. The biomechanical factors relevant to success in the game of soccer are those, which relates to the technical performance of skills, to the equipment used and to thecausative mechanisms of injury (*Lees and Nolan 1998*). Performance can therefore be best trained or improved through the analysis of its biomechanical and physical variable related issues. Success of any soccer kick merely depends on various factors including the distance of the kick from the ball, the type of kick used, area of ball contact, the air resistance and the technique/skill of the kick can best be described with biomechanical principles. Kicking in soccer is the main focus for goal scoring, ball passing and for clearance in defense and so with more kicks on the target have better chances in achieving an individual and teams goal. For the efficiency or the improvement of any sports movement, the essence of focus should be skills and it must be mastered thereof. So the study has been taken with keen interest to analyze specifically for soccer players in distance kicking so as to know the motor variables of the techniques which must be given due attention for improving that particular skill. Since it is very difficult for the naked human eye to analyze all the movement of various body segments and joints correctly at a one 'go' various instruments like still camera, video camera, measuring tape were used and the collected data's were analyzed through the Biokin-2D V4_5.wmv software analysis.

METHODOLOGY

The aim of the study was to find out the relationship of the selected physical and biomechanical variables on the performance of kicking for distance in soccer. To achieve these, five male intervarsity players of 18 to 25 years of age who represented LNIPE soccer team were selected as subject for the study as they may possess good level of physical fitness and techniques. Research scholar had thoroughly explained and made them understand the test for which it was conducted, they were also told to give best performance in kicking to their possibility.

The criterion measures for the study are:

1. For distance ball kicking, the starting point was marked in which the subject kicked the ball from it. They performed a long kick and the distance was measured from the starting point to the point of the first drop. Three trials were given and the best performance was taken as the research data and it distance covered was recorded in meters.

2. Both Back & Leg strength were measure with the help of dynamometer and the score was recorded in terms of kilogram.
3. Leg length was taken with the help of a flexible steel tape and its unit of measurement was taken in centimeters.

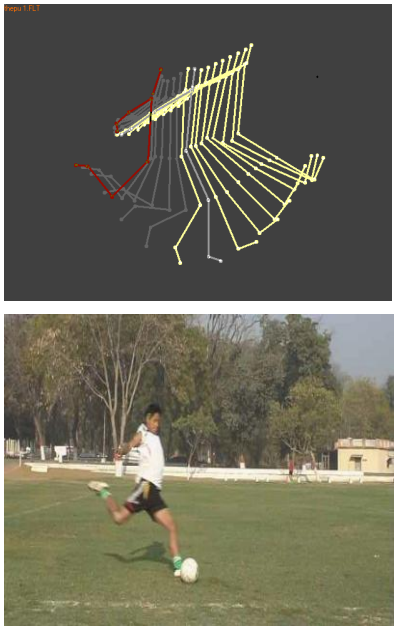
Filming Protocol

Biokin motion analysis was used for biomechanical analysis of kicking for distance in soccer. A standard motion driven camera i.e. handy camera of Sony Company with frequency of 50 frame/second was implied. At the moment of stance, at the moment of execution and at the moment of follow-through was selected for the purpose of biomechanical analysis. The photographic sequence was taken under controlled condition and the distance of the camera from the subjects was 10 meters away and affixed at one-meter height. The kicking distances were measured manually for each subject in meters.

Analysis of Film

The photographs as obtained by the use of digital camera were analyzed (the best trial) by standard analysis method. With the help of Biokin2D V4_5 motion analysis computer software the dimension of each angle photograph were measured and calculated accordingly.

The relationship of selected biomechanical and physical variables with the performance of kicking for distance in soccer was calculated by using Pearson's product moment correlation and for testing the hypothesis the level of significance was set at 0.05.



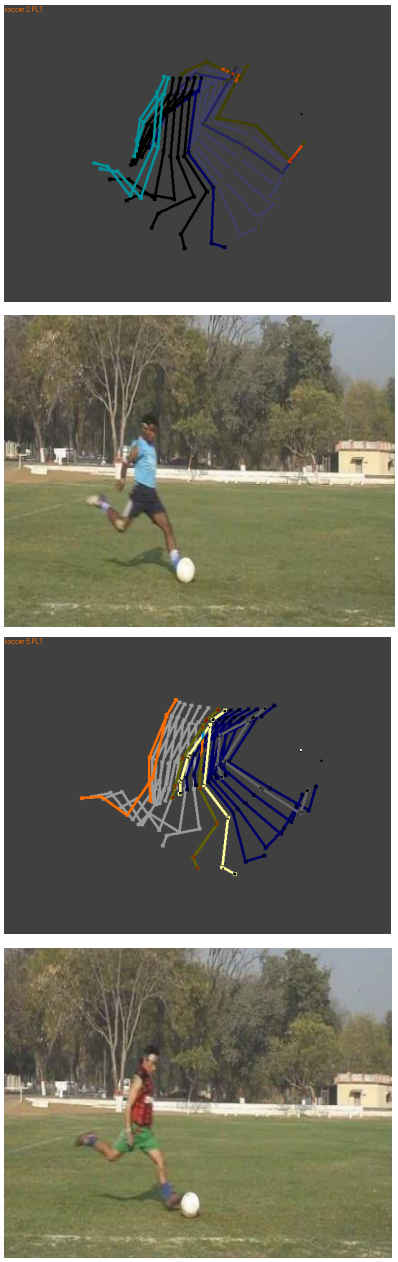


Fig. 1: Statistical Technique

OBSERVATION AND DISCUSSION

Pearson's product moment correlation was used to find out the relationship of selected biomechanical and physical variables on the performance of kicking for distance in soccer players. The level of significance to check the relationship was set at .05.

The score of each independent biomechanical and physical variable were correlated with performance of subjects in kicking for distance in soccer. In order to ascertain the relationship of selected biomechanical variables namely Angular displacement, Angular velocities, Angular acceleration, Angle of elbow joint,

Angle of shoulder joint, Angle of knee joint, Angle of angle joint and Angle of hip joint with the performance kicking for distance, the Pearson's product moment correlation was calculated and co-efficient of correlations are presented in Table 1.

Table 1 revealed that during the stance the angle of knee joint and hip joint have significant relationships with the performance as obtained 'r' value is greater than the tabulated value. However, the obtained value of coefficient of correlation in other all kinematics variables were less than the required value at the selected level of significance, these selected angular kinematics variables at selected moment have shown insignificant relationship with the performance of subjects.

In order to find out the relationship of selected physical variables namely: Leg strength, Back strength and Leg length. With the performance, Pearson's product moment correlation was calculated and co-efficient of correlations are presented in Table 2.

Table 2 revealed that the leg length has significant relationship with the performance and the leg strength and back strength have a close relationship with performance.

The value of co-efficient of correlation, at the moment of stance of the knee joint and hip joint of the kicking leg has significant relationship with the performance as to make a greater contribution to execute a long back swing or a greater range of movement.

The hip joint of kicking leg also has a higher relationship with the performance and helpful to maintain the upper body position and if the body lean backward the ball will definitely cover a distance in air. The arm also helps to maintain the upper body balance.

At the moment of execution and follow-through none of the angular measurement has shown significant relationship with the performance.

In physical variables, the leg length has a highly significant relationship with the performance of kicking distance. It is well known that the length of body segment is because the greater range of movement and for maximum force. The leg strength and back strength also have close relationship with the performance as strength is contributing factors.

As a whole the variables, which have shown high relationship with the performance, may have maximum contribution towards the performance of kicking for the distance. Along with these variables, other motor component also might have contributed to the performance. The low value of coefficient of correlation shown by other variable doesn't mean that, those variables are not contributing to the performance. They do contributing the performance, but the insignificant value of coefficient of correlation of such variables with the performance might have been due to the small size of sample and other factors.

Table 1: Relationship of Selected Linear and Angular Measurements with Performance of Kicking for Distance in Soccer

S. No.	Variable Stance Execution	Coefficient of Correlation Follow-through		
1	Angular displacement	-0.18	0.39	0.02
2	Angular velocities	0.41	0.05	0.50
3	Angular acceleration	-0.02	0.64	0.09
4	Angle of elbow joint	-0.65	-0.19	0.85
5	Angle of shoulder joint	-.76	-0.90	-0.55
6	Angle of knee joint	0.98*	0.40	0.70
7	Angle of ankle joint	-0.18	0.13	0.10
8	Angle of hip joint	0.89*	0.40	0.70

*Significant at .05 level Required value of 'r' at 3 degree of freedom is 0.87

Table 2: Relationship of Selected Physical Variables Measurements with Performance of Kicking for Distance in Soccer

S. No.	Variables	Coefficient of Correlation
1	Leg strength	0.68
2	Back strength	0.70
3	Leg length	0.91*

*Significant at.05 level Required value of 'r' for 3 degree of freedom is 0.87.

CONCLUSION

Based on the analysis and within the limitations of the present study, the following conclusion can be drawn:

The knee joint and hip joint of kicking leg has shown positive effect at the moment of stance.

The leg length has shown positive relationship with the performance of kicking for distance.

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Effects of Selected Biomechanical Variables on a Coordinated Human Movement: Instep Kicking with Dominant and non Dominant Feet. Doc-toral Dissertation, Auburn University, Auburn, AL

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A Study on Physiological and Biochemical Responses of Long Distance Runners

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ABSTRACT

Understanding the biochemical demands put on athletes during long distance running and impact on Blood Glucose, Lactate Dehydrogenase (LDH) and Blood Lactate in competitions like 5000m and 10000m races is vital; analysis of the recovery pattern, its rate and mechanism in distance runners would be beneficial for designing training schedules. The prime aim was to assess recovery pattern of long distance runners at different time intervals, in relation to biochemical parameters. The subjects were 20 male junior national level athletes, 16-20 yrs old, categorized into two groups of 10 each (5000m and 10000m runners). The recovery pattern for Blood Glucose and Lactate of subjects was observed post-test, then after 15, 30, 45 minute intervals. F-values show that Blood Glucose levels in 5000m and 10000m runners differ significantly, while Blood Lactate levels do not. Interaction between group and time intervals shows both factors differ significantly in each group at different time intervals. t-values for LDH of both groups indicate significant difference in pre and post-test levels. t-value of pre and post-test of LDH between the groups show no significant difference. Increase in glucose level in 5000m and 10000m runners may have been due to increased gluconeogenesis. Long distance running involves significant contribution of anaerobic glycolysis resulting in lactic acid accumulation. Though the events are predominantly aerobic, the anaerobic portion of the events is so intense that it caused lactate accumulation exceeding the anaerobic lactate threshold, signifying intense enzymatic activity or stimulation of lactate removal. LDH enzyme is an intermediary in both lactate accumulation and removal. Increase in LDH immediately during 5000m and 10000m running results in faster lactate removal. Lactate response in terms of recovery is directly proportional to duration of rest and recovery period.

INTRODUCTION

It is very important to understand the physiological demands put on athletes during long distance running and to be aware of the physiological responses in competitions like 5, 000m and 10, 000m races; and also, to analyze the recovery pattern, its rate and its mechanism in the distance runners, which would be beneficial for designing the training schedule.Based on the views of Lamb (1983), Fox *et al.* (1989), and Powers and Howley (2007), the need to explore the physiological and biochemical responses concerned with long distance running was recognized.

METHODOLOGY

The study was conducted on 20 male junior national level athletes, aged 16-20 years, of Tata Athletic Academy, Jamshedpur, India. The subjects were categorized into two groups comprising 10 athletes each, i.e., 5000m and 10000 meter runners. Physiological variables, namely Heart Rate, Respiratory Rate and VO_2 max, and Biochemical variables, namely Blood Glucose, Blood Lactate and Lactate Dehydrogenase, were investigated.

RESULTS AND DISCUSSION

The responses observed and their recovery patterns are summarized in the Table.

Two-way ANOVA of mean scores for Heart Rate of long distance runners revealed that the adjusted F-value for the group is 24.93, which is significant at 0.05 level. It means that the adjusted mean scores for Heart Rate of 5000m and 10000m runners differ significantly. Further, the adjusted F-value for time intervals is 410.07, which is significant at 0.05 level. Evidently, the adjusted mean scores of Heart Rate at various time intervals differ significantly.

Table 1: Physiological and Biochemical Responses in 5000 m and 10000 m runners

Variables		Pre-test	Post-test	Post-race-After Rest-mean & S.D.		
		Mean & S.D.	Mean & S.D.	15 min.	30 min.	45 min.
Heart Rate (per minute)	5000 m	64.60±8.28	175.80±11.68	105.00±7.62	86.20±7.86	76.20±4.05
	10000 m	70.80±5.90	177.50±11.97	128.00±9.98	96.40±13.85	82.80±10.12
Respiratory Rate (per minute)	5000 m	15.10±2.38	35.30±4.69	24.30±2.36	18.70±1.83	16.90±2.18
	10000 m	15.80±2.10	38.10±3.35	26.10±1.60	20.00±1.73	18.10±1.60
Blood Glucose (Mg./dl.)	5000 m	99.40±9.38	196.00±44.46	132.00±26.18	100.80±18.15	95.60±14.76
	10000 m	106.00±9.67	229±7.00	164.60±12.83	109.60±9.82	89.40±7.12
Blood Lactate (m.mol./liter)	5000 m	6.07±2.51	15.05±2.97	10.27±1.28	8.34±3.60	7.44±1.66
	10000 m	3.62±1.077	12.87±3.16	10.51±2.01	9.55±2.19	9.54±1.53
Lactate Dehydrogenase (Units/liter)	5000 m	383.00±20.74	432.00±41.80	—	—	—
	10000 m	371.10±13.05	407.20±24.79	—	—	—
VO_2 max (ml . min^{-1}. Kg^{-1})	5000 m	74.22±2.04	—	—	—	—
	10000 m	75.56±2.47	—	—	—	—

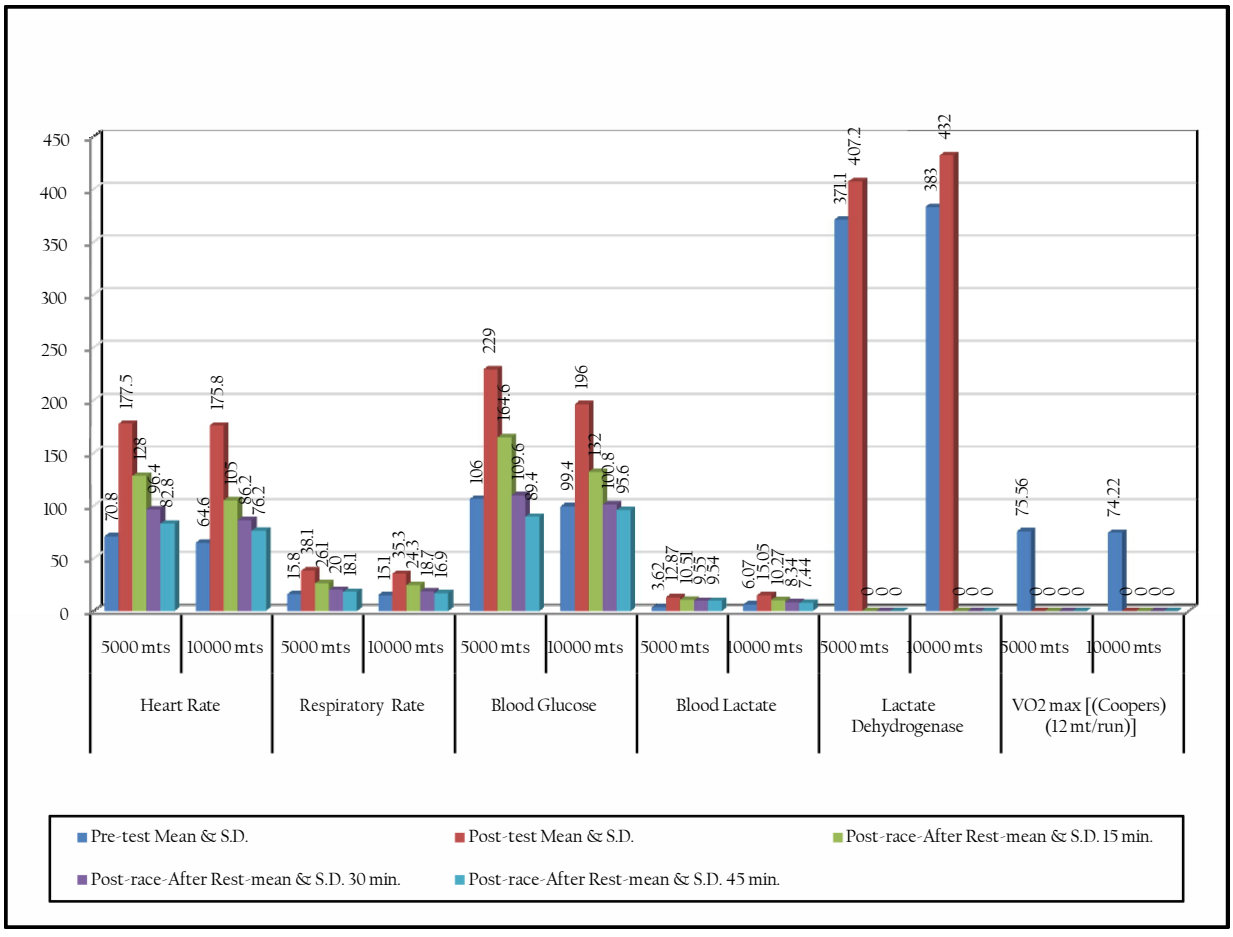

Fig. 1: Physiological and Biochemical Responses in 5000 and 10000mts Runners

The F-value for interaction between group and time interval is 3.6, which is significant at 0.05 level, and shows that the adjusted mean scores of Heart Rate of 5000m and 10000m runners during different time intervals differ significantly.

Two-way ANOVA of mean scores for Respiratory Rate of long distance runners revealed that the F-value for the sample group is 11.64, which is significant at 0.05 level. It indicates that the adjusted mean scores for Respiratory Rate of 5000m and 10000m runners differ significantly. The adjusted F-value for time intervals is 222.96, which is significant at 0.05 level, indicating that the adjusted mean scores at various time intervals differ significantly. The adjusted F-value for interaction between group and time interval is 0.521, which is not significant at 0.05 level. It means that the adjusted mean scores for Respiratory Rate of 5000m and 10000m runners at different time intervals do not differ significantly.

Two-way ANOVA of mean scores for Blood Glucose of the subjects revealed that the adjusted F-value for the group is 12.41, which is significant at 0.05 level. This implies that the adjusted mean scores for Blood Glucose of 5000m and 10000m runners differ significantly. The adjusted F-value for time intervals is 108.184, which is also significant at 0.05 level. This suggests that the adjusted mean scores for Blood Glucose at different time intervals differ significantly. The adjusted F-value for interaction between group and time intervals is 3.31, which is significant at 0.05 level. It indicates that the adjusted mean scores for Blood Glucose of 5000m and 10000m runners at different time intervals differ significantly.

Two-way ANOVA of mean scores for Blood Lactate of long distance runners revealed that the adjusted F-value for the sample group is 0.11, which is not significant at 0.05 level. It indicates that the adjusted mean scores of Blood lactate of 5000m and 10000m runners do not differ significantly. The adjusted F-value for time intervals is 39.64, which is significant at 0.05 level. This means that there is a significant difference between the adjusted mean scores for Blood Lactate at different time intervals. The adjusted F-value for interaction between the group and time intervals is 3.97, which is also significant at 0.05 level. It indicates that the adjusted mean scores for Blood Lactate of 5000m and 10000m runners at different time intervals differ significantly.

Boileau *et al.* (1982) studied the physiological characteristics of elite middle and long distance runners. The oxygen uptake (VO_2) of 74 elite runners (42 MD and 32 LD) was measured during treadmill running at several speeds (201, 241, 282, and 322 m/min) and at maximal effort. The mean VO_2 max (ml . min^{-1}. Kg^{-1}) of the LD runners (76.9) was significantly higher (p less than 0.01) than the value for the MD group (68.9).

Davies and Thompson (1986) conducted a study on physiological responses of 10 ultramarathon athletes to prolonged exercise at the highest intensity level. Energy expenditure for the 4 hrs.of exercise was 14, 146 +/-1, 789 kJ, of which 63% was provided by the oxidation of fat.

Comparison between the maximum oxygen consumption (VO_2 max) of 5000m runners and that of 10, 000m runners revealed that the t-value is 1.32, which is not significant at 0.05 level with degree of freedom 18. It indicates that the mean scores of VO_2 max of 5000m and 10, 000m runners do not differ significantly.

Comparison between the pre-test and the post-test means of lactate dehydrogenase of 5000m runners showed that the t-value is 5.025, which is significant at 0.05 level with degree of freedom 9. Likewise, in the case of 10, 000m runners the t-value is 6.75, which is significant at 0.05 level with degree of freedom18. These results indicate that the pre-test and the post-test means of lactate dehydrogenase differ significantly in both groups of runners.

Comparison of difference of pre-test and post-test of lactate dehydrogenase between 5000m runners and 10, 000m runners gave a t-value of 1.18, which is not significant at 0.05 level with degree of freedom 18. Hence, no significant difference was found between the 5, 000m and 10, 000m runners.

Billat *et al.* (1996) examined the use of blood lactate measurements for prediction of exercise performance and for control of training. Recommendations for long-distance running time over a distance, i.e. speed, is the reference for performance for all events whose rules are based on locomotion in different mechanical constraints. However, despite the complexity of the regulation of lactate metabolism, blood lactate measurements can be used by coaches for prediction of exercise performance. The anaerobic threshold, commonly defined as the exercise intensity, speed or fraction of maximal oxygen uptake (VO_2 max) at a fixed blood lactate level or at a maximal lactate steady-state (MLSS), has been accepted as a measure of endurance. Baldari *et al.* (2005) examined blood lactate removal during recovery at various intensities below the individual anaerobic threshold in athletes. Optimal lactate removal was reported to occur at work-rate between 30% and 70% VO_2 max. However, it has been recently recommended to quantify exercise intensity not in percentage of VO_2 max but in relation to validated metabolic reference points, such as the individual anaerobic threshold (IAT) and the individual ventilatory threshold (IVT).

CONCLUSION

On the basis of analyses performed following conclusions were drawn:

1. Long distance running involves significant contribution of anaerobic glycolysis resulting in lactic acid accumulation.
2. Lactate response in terms of recovery from the effect of 5000m and 10, 000m event is directly proportional to the duration of rest and recovery period.
3. This signifies that the longer the rest period, the better will be the lactate recovery.
4. A 15 minutes period of rest after the event provides significant recovery from fatigue in terms of blood lactate, respiratory rate and heart rate.
5. It could be considered important in training format for long distance runners, from the point of planning interval training, extensively or intensively.
6. On similar lines, repetition training schedule can also be decided on the basis of fatigue recovery rate during 15, 30 and 45 minutes recovery period.
7. Heart rate assessment is an effective and simple method of examining load intensity, load factor or fatigue evaluation.
8. Enzymatic and hormonal activity significantly raises blood glucose level during 5000m and 10, 000 m events to meet the intense energy demands.
9. Increase in lactate dehydrogenase immediately during 5000m and 10, 000m running activity results in faster lactate removal process, which may be improved through training.

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Effect of Asanas and Pranayama on Height of Males School Going Children

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ABSTRACT

Background: *Yoga, an ancient culture of Indian heritage, regular practice leads to ideal physical, mental, intellectual, and spiritual health. Asana and Pranayama are the yogic practices. These have a number of beneficial physiological effects on various systems in our body. The present work was taken up as data reported on the effect of Asanas and Pranayama on height of males school going children.*

Aim: *To know whether there is any change in height in the subjects practicing Asanas, Pranayama & combination of Asana Pranayama and with that of subjects not practicing any type of yoga.*

Materials and Methods: *120 male student volunteers from Muni International School, A-2/16-18, Mohan Garden, Uttam Nagar New Delhi-110059, India, of age between 8 to 10 years were selected. Subjects were equally assigned to the four groups by using random sampling procedure i.e. three experimental groups and one control group. The experimental Group A was administered Asanas (30 subjects), Group B was administered Pranayama (30 subjects) and Group C was administered combination of Asana Pranayama (30 subjects), and Group D control group (30 subjects) was given no training of an experimental period of twelve weeks. They practiced Asanas and pranayama for 45 minutes, six days a week and Sunday has been observed as weekly off. The control group consisted of age and sex matched 30 students. Pick flow rate was recorded to litter per minute with the help of peak flow meter.*

Results: *Significant improvement was not found in Height as a result of the experimental treatment in all the three experimental groups.*

Conclusion: *Increase heights of children are a natural process and depending on heredity and some of other factor. May be due to this reason, there is no Significant improvement was not found in height.*

Keywords: *Asana, Pranayama, Heights*

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INTRODUCTION

"Yoga is not an ancient myth buried in oblivion. It is the most valuable inheritance of the present. It is the essential need of today and the culture tomorrow."

—Swami Satyananda Saraswati

The world yoga means 'unity' or 'oneness' and is derived from the Sanskrit word Yuj which means 'to join'. This unity or joining is described in spiritual terms as the union of the individual consciousness with the universal consciousness. On a more practical level, yoga is a means of balancing and harmonizing the body, mind and emotions. This is done through the practice of Asana, Pranayama, Mudra, Bandha, Shatkarma and Meditation, and must be achieved before union can take place with the higher reality (Swami SatyanandaSaraswati, 2004). The restraint of the mind-stuff from taking various forms is yoga (Swami Vivekananda's translation) or Yoga is the control of thought-waves in the mind (as translated by Swami Prabhavananda of Sri Ramkrsana Math). The Maharsi further observes:-"thereafter the soul abides in it's real self". In other words, yoga lies in being one's real self.

Yogic practices, an ancient culture of Indian heritage, have led to ideal physical, mental, intellectual, and spiritual health. Yoga has a number of beneficial

physiological effects on various systems in our body. Regular yogic practices have been shown to cause profound improvement (Subbalakshmi NK, Saxena SK, Urmimala, D'Souza UJA, 2005) in cardiorespiratory, thermoregulatory (Madanmohan, Sivasubramaniyan KM, Balakrishnan S, Gopalakrishnan M, Prakash ES, 2008) and psychologic functions in healthy individuals (Ray US, Mukhopadhyaya S, Purkayastha SS, Asnani V, Tomer OS, Prashad R, 2001). Yogic practices have been also found to be most useful in alleviating hypertension (Murugesan R, Govindarajulu N, Bera TK, 2000), bronchial asthma (Sathyaprabha TN, Murthy H, Murthy BT, 2001), diabetes mellitus (Telles S, Naveen KV, 1997) and coronary artery disease (Manchanda SC, Narang R, Reddy KS, Sachdeva U, Prabhakaran D, Dharmanand S, 2000). A previous study has shown that there is significant increase in PEFR in pranayama practicing school children (Sivapriya DV, Subamalani S, Shyamala T., 2010). Combination of various type of Asanas, pranayama has also led to significant increase in hand grip strength, hand grip endurance, maximum expiratory pressure, maximum inspiratory pressure, forced expiratory volume, forced expiratory volume in first second and peak flow rat (Madanmohan, Lakshmi J, Kaviraja U, Ananda BB, 2003). Fifteen days regular practice of different types of pranayama (Ankad RB, Balachandra AS, Herur A, Patil S, Chinagudi S, Shashikala GV, 2011) and practice of asanas, pranayamas & suryanamaskara (Makwana K, Khirwadkar N, Gupta HC, 1988) has led to increase in the mean breath holding time significantly alone with other parameters. There is a need to know the effect of Asanas and Pranayama training alone on height, so that benefits, if any, could be obtained by its practice.

OBJECTIVES OF THE STUDY

- To study the effect of Asanas on Height.
- To study the effect of Pranayama on Height.
- To study the combination effect of Asana Pranayama on Height
- To compare the effect of Asanas and Pranayama and their combination on Height.
- To compare the three treatments and its effect on the Height.

HYPOTHESES

H_1 : There will be significant effect of Asanas Practice on Height of school going children.

H_2 : There will be significant effect of Pranayama Practice on Height of school going children.

H_3 : There will be significant effect of Asana Pranayama Practice on Height of school going children.

H_4 : There will not be any significant different between three treatment groups.

SELECTION OF SUBJECTS

One hundred twenty (120) school going boys were selected randomly as subjects in the age group of 8-10 years from Muni International School, A-2/16-18, Mohan Garden, Uttam Nagar New Delhi-110059, India. The subjects were divided into three treatment groups and one control group using random method. Group A was allotted Asanas treatment group consisted of 30 subjects, Group B was allotted Pranayama treatment group consisted of 30 subjects, Group C was allotted combination of Asana Pranayama treatment group consisted of 30 subjects and Group D control group consisted of 30 subjects. The study was confined to 12 weeks of training programme.

EXPERIMENTAL PROTOCOL

A period of twelve weeks in the month of August to November 2012, the climate condition was rainy and atmospheric temperature was varying from 25^0 C to 38^0 C.Experimental population of 90 subjects were assembled in Activity Hall at Muni International School, A-2/16-18, Mohan Garden, Uttam Nagar, New Delhi-110059, India. Experimental training was executed from 9:00 AM onwards for 45 minutes, for six days a week and Sunday has been observed as weekly off. Each subjects of the experimental group was ready to learn Asanas and Pranayamas. Group 'A' acts as Asanas Group, 'B' acts as Pranayama group, Group 'C' acts as Combination of Asana and Pranayama group and Group 'D' acts as control group which did not participate in the training programme. The subjects of experimental group 'A' practiced Asana (Surya Namaskar, Sarvangasana, Matsyasana, Halasana, Bhujangasana, Shalvhasana, Dhanurasana, Chakrasana, ArdhaMatsyendrasana, Paschimottanasana, Vajrasana, Yogamudra, Standing katichakrasana, Tadasana and Shavasana) and group 'B' practiced Pranayama (AnulomaVilom and Bhastrika) and group 'C' practiced combination of Asana and Pranayama (Surya Namaskar, Sarvangasana, Matsyasana, Halasana, Bhujangasana, Shalvhasana, Dhanurasana, Chakrasana, ArdhaMatsyendrasana, Paschimottanasana, Vajrasana, Yogamudra, Standing katichakrasana, Tadasana, Shavasana, AnulomaVilompranayama and Bhastrika pranayama).

PREPARATION OF TREATMENT PROGRAMME

For the purpose of the study "Effect of Asanas and Pranayama on Selected Anthropometric and Psycho-

Physiological Variables of School Going Children" the training programme consisted of three experimental groups (one control group).Keeping in mind the basic philosophy behind practicing Yoga that is "*Sthira Sukham Asanam*" (Patanjali), the deep rooted meaning that has been taken as a guide line while execution of a training no body has been forced to do on an above his capacity on the contrary it has been observed by research scholar improvement has taken place like students could able to attend better posture and sustain it. Even in case of pranayama the magnitude has been increased like retention and frequency of stroke.

Three experts Yoga trainer were involved to administer the training simultaneously to all three experimental groups. All the training groups were supervised by the scholar.

TOOL USED

Height was recorded on centimeter (Cm) with the help of Gulick Tape.

RESULTS

Table 1 indicates the values of descriptive statistics of the experimental Groups (Asanas Group, Pranayama Group, Asana Pranayama Group) & Control Group for anthropometric variable of height, which shows that the mean and S.D. values of Asanas Group, Pranayama Group, Asana Pranayama Group and the Control Group were found to be 127.19±7.16, 125.85±8.76, 124.30±6.70 and 125.32±6.97 respectively. For the total subject the mean and S.D. was 125.66 ±7.42.

Table 1: Descriptive Statistics of the Data Measured in the Post Testing Height

Treatment Group	Mean	Std. Deviation	N
AsanasGroup	127.19	7.16	30
PranayamaGroup	125.85	8.76	30
Asana PranayamaGroup	124.30	6.70	30
ControlGroup	125.32	6.97	30
Total	125.66	7.42	120

Table 2: Descriptive Statistics of the Data Measured in the Post-Testing after Adjustment with the Initial Difference Height

Treatment Group	Mean	Std. Error	95% Confidence Interval	
			Lower Bound	Upper Bound
AsanasGroup	125.7[a]	0.004	125.66	125.68
Pranayama Group	125.7[a]	0.004	125.65	125.67
Asana Pranayama Group	125.7[a]	0.004	125.65	125.67
Control Group	125.7[a]	0.004	125.66	125.67

(a) Covariates appearing in the model are evaluated at the following values: general height scale for children pre test = 125.66.

The mean and standard error of different post-testing Groups after adjustment have been shown in table 2.Which is for Asanas Group 125.7& 0.004, Pranayama Group 125.7 & 0.004, Asana Pranayama Group 125.7 & 0.004 and Control Group 125.7 & 0.004.

Table 3: Ancova Table for the Post-Test Data on Height

Source	Sum of Squares	DF	Mean Square	F	Sig. (p-value)
PreHeight Scale for Children	6559.22	1	6559.22	1.364E7	0.00
Treatment Group	0.002	3	0.001	1.17	0.32
Error	0.05	115	0.00		
Corrected Total	6559.28	119			

Table 3 indicates the values test of difference between the subject effects, which shows that there was a significant difference in pre test values of anthropometric variable of height for the four selected Groups, as the value was found to be1.364E7 (E7 means that the numerical error which represent the point after 7digits), which proves to be the base of Analysis of Co-Variance. Also, a significant difference was found between the post test values of the experimental and ControlGroup as the value was found to be 1.17, which was insignificant at 0.05 level.

Table 4: Post Hoc Comparison for the Group Means in Post-Measurement Adjusted with the Initial Differences Height

(I) Treatment Group	(J) Treatment Group	Mean Difference (I-J)	Sig.[a] (p-value)
Asanas Group	Pranayama Group	0.01	0.07
	Asana Pranayama Group	0.007	0.23
	Control Group	0.003	0.54
Pranayama Group	Asana Pranayama Group	-0.003	0.57
	Control Group	-0.007	0.24
Asana Pranayama Group	Control Group	-0.003	0.54

Based on estimated marginal means
a. Adjustment for multiple comparisons: Least Significant Difference (equivalent to no adjustments).
*The mean difference is significant at the 0.05 level.

Table 4 indicates the values of post hoc test for the selected Groups for anthropometric variable of height, which shows that a significant difference was not found betweenthe post test values of Asanas Group and the ControlGroup as the value was found to be 0.003which was not significant at 0.05 level, the post test values of PranayamaGroup and the Control Group as the value was found to be 0.007which was not significant at 0.05 level, Asana PranayamaGroup and the Control Group as the value was found to be 0.003which was not significant at 0.05 level.

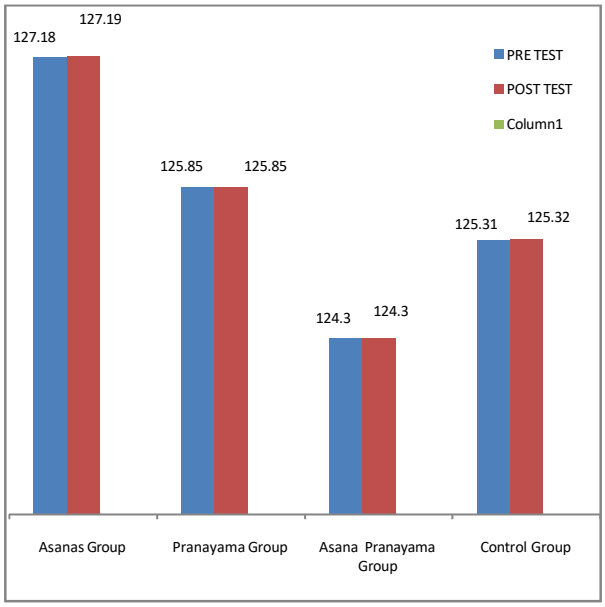

Fig. 1: Comparison of the Means on Height of the Control Group and Three Experimental Groups

INTERPRETATION OF FINDINGS

The values of the means and standard deviations for the data on height in the different Groups during the post testing is shown in the table 1. Further, adjusted means and standard deviation for the data on height of different Groups during post testing have been shown in table 2. This may be noted that these values are different from that of the unadjusted values shown in table 1. The advantage of using the ANCOVA is that the differences in the post-testing means are compensated for the initial difference in the scores. In other words, it may be said that the effect of covariate is eliminated in comparing the effectiveness of the treatment Groups during post-test. Table 3 shows the F –value for comparing the adjusted means of the four treatment Groups (Asanas Group, Pranayama Group, Asana Parnayama Group and Control Group) during post-testing. Since p-value for the F- statistic is 0.32 which is higher than 0.05, so of it is not significant. Thus, the null hypothesis of no difference among the adjusted post-means for the data on height in four treatment Groups may be accepted at 5%level. Since F-statistic is significant, post hoc comparison has been made for the adjusted means of the four treatment Groups which is shown in table 4. It may be noted here that p-value for the mean difference between Asanas Group and ControlGroup is 0.54, PranayamaGroup and ControlGroup is 0.24, Asana PranayamaGroup and ControlGroup is 0.54, all these p-values are higher than 0.05 and hence they are not significant at 5% level. Thus, the following conclusions can be drawn:

- There is no significant difference between the adjusted means of the Asanas Group and Control Group on the data of anthropometric variable height during post-test.
- There is no significant difference between the adjusted means of the PranayamaGroup and Control Group on the data of anthropometric variable height during post-test.
- There is no significant difference between the adjusted means of the Asana PranayamaGroup and Control Group on the data of anthropometric variable height during post-test.

Hence, it may be inferred that Asanas, Pranayama and Asana Pranayama are not effective in increasing the height among the subjects in comparison to that of the Control Group.

DISCUSSION

In the present study (Table 3) no significant difference was found in case of height after administrating the different training programme namely Asanas, Pranayama and combination of Asana Pranayama. The post hoc test (Table 4) revealed that height was not significantly improved in Asanas, Pranayama and combination of Asana Pranayama programme separately.Increase heights of children are a natural process and depending on heredity and some of other factor and all the four Groups (Asanas Group, PranayamaGroup, Asana PranayamaGroup and Control Group) subjects are increase in height naturally. May be due to this reason, there is no significant difference was found between the adjusted means of the Asanas Group and Control Group, PranayamaGroup and Control Group, Asana PranayamaGroup and Control Group on the data of anthropometric variable height during post-test.Therefore, proposed hypothesis has been rejected in case of height.

CONCLUSION

Significant improvement was not found in Height as a result of the experimental treatment in all the three experimental group.

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A Study on Relationship of Femoral Length Calf Circumference Foot Length and Foot Breadth with Sprinting Ability

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ABSTRACT

The study was delimited to randomly selected 30 male B.P.Ed students of P.G.G.I.P.E Banipur age ranging from 21-30 years. The variables undertaken was Sprinting ability, measured by 50 meters in second, Femoral Length, measured by Anthropometric rod in centimeters, Calf circumference measured by steel tape in centimeters, Foot Length and foot Breadth was measured by Sliding Calliper in centimeters. To analyse all the results of the subjects, Product Moment Co-relation statistics was employed at 0.05 level of significance. The present study revealed that speed was inversely related with femoral length calf circumference foot length and foot breadth. It was also found that accept foot length others were significantly related with speed. Volume of calf muscles determines the thrust to be obtained forms the ground which determines the speed of movement of the legs. Heavier the calf muscles lesser will be the drive of the length. Femoral length of the athletes' partially determines the strides length. Width of the foot is responsible for frictional resistance. Greater, the width of the foot more will be frictional resistance and vice versa. Those were the reasons for getting significant relationship between speed and above three variables.

Keywords: *Sprinting Ability, Anthropometric Measurements*

INTRODUCTION

The technological knowledge is incorporated in sports science and sports persons are being trained accordingly based on the need of the movement. The physique and also physiological aspect support the athlete to reach to the top level sports performance. Besides this psychological domains and a suitable social and family are also integral factors to achieve the high level performance. It is the understanding of interaction of all these factors that can help us designing the way in selecting the children for appropriate game and training. The kinanthropometry or physical characteristics are known to be of fundamental importance individual development to achieve high level performance in sports. The physique which includes the evaluation of the size, shape and form of an individual is of prime importance as to know how far and individual can succeeds in becoming a top athlete.

Anthropometric investigation have the basic importance in establishing the prerequisite characteristics of athletes for their maximum performance (Norton and Olds, 2001).

The term anthropometry invented by a German physician, in seventeenth century refers to measurement of human body and its various proportion. It encompasses a wide variety of measurement procedure determining endless number of body dimension

Hammes conducted a study to determine the relationship of selected anthropometric measures to the Vertical Jump of high school girls. She concluded that the total weight, sitting height, foot height, metatarsal, phalangeal calcaneus and medical malleouls to calcaneus length had no relationship tovertical jumping ability. There was a relationship but no predictive value of weight, total leg length to vertical jumping ability

It is well established that anthropometric analysis of different sports have shown that optimum performance appears to have definite physical requirements (Tanner, 1964; Alexander, 1976)

Therefore, The athletes in a particular sports must possess such specific characteristics which are advantage to them during the game (Sodhi and Sidhu, 1984).

The most essential factors of speed are strength, power, endurance flexibility, co-ordination, reaction time, movement time, locomotor ability, femoral length, calf circumference, foot length, foot breadth etc. The femoral length, calf circumference, foot length, foot breadth is one of the measure factors of the speed. The information have inspired the researcher to investigate the relationship of Femoral Length, Calf Circumference, Foot Length and Foot Breadth with Sprinting Ability.

MATERIALS AND METHOD

The study was delimited to randomly selected 30 male B.P.Ed students of P.G.G.I.P.E Banipur age ranging from 21-30 years. The variables undertaken was Sprinting ability, measured by 50 meters in second, Femoral Length, measured by Anthropometric rod in centimeters, Calf circumference measured by steel tape in centimeters, Foot Length and foot Breadth was measured by Sliding Calliper in centimeters. Toanalyse all the results of the subjects, Product Moment Co-relation statistics was employed at 0.05 level of significance.

RESULTS AND DISCUSSION

Form the Table – I, it was evident that speed was inversely related with femoral length, calf circumference, and foot length and foot breadth.

Table I: Relationship of Femoral Length Calf Circumference Foot Length Foot Breadth with Sprinting Ability

Variables	Mean	SD	'r'
Speed	Mean- 7.34	SD - 1.30	-0.396*
Femoral length.	Mean-3.43	SD - 0.61	
Speed	Mean- 7.34	SD - 1.30	-0.411*
Calf Circumference	Mean-33.78	SD- 6.06	
Speed	Mean- 7.34	SD - 1.30	-0.159
Foot length.	Mean- 26.05	SD- 4.68	
Speed	Mean- 7.34	SD - 1.30	-0.275*
Foot breadth	Mean-10.01	SD- 1.80	

*Significant at .05 level of confidence.

'r' value required to be significant at 0.05 level of confidence with 58 degree of freedom was 0.250

The present study revealed that speed was inversely related with femoral length calf circumference foot length and foot breadth. It was also found that accept foot length others were significantly related with speed.

Volume of calf muscles determines the thrust to be obtained forms the ground which determines the speed of movement of the legs. Heavier the calf muscles lesser will be the drive of the length. Femoral length of the athletes' partially determines the strides length. Width of the foot is responsible for frictional resistance. Greater, the width of the foot more will be frictional resistance and vice versa. Those were the reasons for getting significant relationship between speed and above three variables.

The subjects chosen were all male B.P.Ed students of P.G.G.I.P.E Banipur who were randomly selected irrespectively of any events. The subjects followed usual routines of the teaching learning process of the institutions, In between the class a short break was provided and the subjects were tested on speed performances. They were a bit tired, not optimumly motivated, somewhat unwilling to participate in test that probably the reason of getting inverse relationship between the variables.

CONCLUSION

Form the statistical calculation it was concluded that

1. Femoral length, Calf circumference, Foot length and Foot breadth was inversely related with speed.
2. Femoral length, Calf circumference, Foot breadth was significantly related with speed.
3. There was in significant relationship between speed and foot length.

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Comparative Effect of Ageing on Physical and Physiological Ability of Healthy Citizens

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ABSTRACT

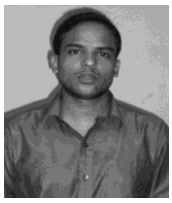
Objective: *The purpose of the study was to find out effect of ageing on physical and physiological ability of healthy citizens.*

Design: *The researcher one hundred eight (108) subjects were randomly selected of which thirty six school going male adolescence (age ranging students (13-19), thirty six college going adult male (age ranging (20-40) and thirty six old male citizens (age ranging 40-65) from Banipur village of North 24 parganas, West Bengal respectively.*

Methods: *In order to investigate aging effect on physical and physiological ability of adolescence, adulthood and old aged peoples, the low back flexibility was measured by 'Sit and Reach Test' by using a 'Sit & Reach box' into nearest inches and maximum strength of grip of each hand is measured by using 'Grip Dynamometer Machine' to secure strength scores in K.G. of the grip of each hand and Systolic Pressure, Diastolic Pressure and Pulse rate were measured by using a 'Blood pressure Monitor'. The gathered data were duly analyzed through one way analysis of variance (ANOVA) statistics and post hoc test (L.S.D) was used in order to investigate significant difference between the pair group means. The level of significance was set at 0.05 level.*

Result: *The obtained results indicate existence of statistically significant differences in low back flexibility and hands grip strength (physical variables) among the three age groups and adults were found better in this case. On the other hand significant differences were found on systolic blood pressure, diastolic blood pressure & pulse rate (physiological variables) among the three age groups, where adolescence were found better in systolic pressure and adult were found better in diastolic pressure & pulse rate.*

Keynote: *Ageing, Physical and Physiological ability, Healthy citizens*



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INTRODUCTION

Ageing is irreversible since biological changes that occur in all living beings with the passage of time, eventually result in death. Nobody can stop this process; we can only delay the process by following certain measures. Getting older brings abundance of new physical, mental, emotional and social challenges which the aged people invariably need to meet *[Bhattacharya 2007]*. The aim of research into ageing is to get better the health of older humans. Only that time we can improve older health when we come to known the lacuna of physical, physiological & psychological ability with increasing age of a person [*Linda Partridge et al 2002]*. The scientific theory of aging said that, human cells have the limit of fifty times cell division before they stop and there after the cells start to aging or senesce (i.e., deteriorate with age). Another theory of aging factor states that structural damage to cell leads not only to age but also to diseases that frequently occur to human. One Cause of this damage may be the role of free radical; and human life span depends largely on the prevention of this free radical damage *[Bhattacharya 2007]*.

Human life begins with the parental stage followed by other postnatal stage, babyhood, childhood, adolescence, adult hood and old age. Human being never static. From the conception to death due to passes of time changing in constantly takes place in his physical and physiological abilities. The two words growth & development are often used to describe these constant changes. Such physical and physiological changes i.e.-muscular strength, flexibility, systolic, diastolic, pulse rate, neuromuscular function, cardiovascular function, body composition etc are varies from one stage to other stages of life *[Ajmer Singh 2004]*.

Thus, these consistencies changing of growth & development of human beings encouraged the investigator to compare the effect of aging on physical and physiological ability of healthy citizens. In order to investigated aging effect of growth & development stages (i.e.-adolescence, adulthood and old age) on physical & physiological ability, the researcher was compare two health's related physical fitness components that is maximum strength & flexibility, and three physiological components that is systolic, diastolic & pulse rate which is known as a blood pressure profile. The entire components were separately measure among all three growth & development stages of life.

OBJECTIVES

The research was believed that present study would be significantly useful in Physical Education and Sports Sciences in various way. Such as study might be divulge in detail how aging affects the physical & physiological ability of human being. It could be find out the significant differences of physical & physiological ability among growth & development stages of healthy peoples. The study might provide a public-access information base to engage all stakeholders, including national policy makers and health systems planners, in planning and decision-making processes about the health and well-being of older, adults & child. This study could be help to obtain reliable, valid and comparable health, health-related and well-being data over a range of key domains for adolescence, adult and older adult populations in nationally representative samples.

DESIGNS AND METHODS

In order to inspect aging effect on physical & physiological ability researcher had taken three growth & development stage of life for comparison (such as - adolescence, adulthood and older age). For this reason one hundred eight subjects were randomly selected of which thirty six school going male adolescence (age ranging (13-19) students from KMR institution, kharo, thirty six college going male adult (age ranging (20-30), and thirty six older aged male citizens (age ranging 31-60) from Banipur village of North 24pargana district of West Bengal respectively. The mean of all age groups were fifteen, twenty five & fifty five accordingly in respect to adolescence, adulthood and old age. As a criterion measure of physical ability to measure Low back flexibility of a person 'Sit and Reach Test' was used by using a 'Sit & Reach box' into nearest inches and to measure Maximum strength of grip of each hand 'Grip dynamometer machine' (manufactured by Anand Agency) was used to secure strength scores in K.G. of the grip of each hand. As a criterion measure of physiological ability to measure the systolic pressure, diastolic pressure & pulse rate as a blood pressure profile, digital 'Blood pressure" Monitor was used. The instrument is manufactured by Omron Corporation, model no-IA_2 HEM 7001-c-1. The gathered data were duly analyzed through one way analysis of variance (ANOVA) statistics and post hoc test (L.S.D) was used in order to investigate significant difference between the pair group means. The level of significance was set at 0.05 level. In the present study random group design was use

ANALYSIS OF DATA & RESULTS OF THE STUDY

Table 1: Analysis of Variance (ANOVA) of Low Back Flexibility among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	751.48	375.74	36.729*
Within	105	1074.56	10.23	

*Significant at 0.05, Tab. F_{05} (2,105) = {4.82}

Table 2: Paired Adjusted Final Means Differences of Low Back Flexibility among Adolescence, Adult and Old Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
15.05	11.13	---	3.92*	1.49
15.05	---	8.64	6.41*	
	11.13	8.64	2.49*	

*Significant at 0.05 level

Table 3: Analysis of Variance (ANOVA) on Maximum Strength of Right Hand Grip among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	2855.11	1412.56	38.49*
Within	105	3853.81	36.70	
Within	105	1074.56	10.23	

*Significant at 0.05, Tab. F_{05} (2,105) = {4.82}

Table 4: Paired Adjusted Final Means Differences of Maximum Strength of Right Hand Grip among Adolescence Adult and Old Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
34.44	22		12.44*	2.83
34.44		26.97	7.47	
	22	26.97	4.97	

*Significant at 0.05level

Table 5: Analysis of Variance (ANOVA) on Maximum Strength of Left Hand Grip among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	3283.12	1651.56	41.224*
Within	105	4181.51	39.82	

*Significant at 0.05 level, Tab. F_{05} (2,105) = {4.82}

Table 6: Paired Adjusted Final Means Differences of Maximum Strength of Left Hand Grip among Adolescence, Adult and Old Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
34.46	20.8	---	13.56*	2.83
34.46	---	26.81	7.55*	
---	20.8	26.81	6.01*	

*Significant at 0.05 level

Table 7: Analysis of Variance (ANOVA) of Systolic Blood Pressure among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	13520.05	6760.03	39.72*
Within	105	17868.87	170.18	

*Significant at 0.05, Tab. F_{05} (2,105) = {4.82}

Table 8: Paired Adjusted Final Means Differences of Systolic Blood Pressure among Adolescence, Adult and Old Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
125.78	117.8	---	7.98*	6.08
125.78	---	144.5	26.7*	
---	117.8	144.5	18.72*	

*Significant at 0.05 level

Table 9: Analysis of Variance (ANOVA) of Diastolic Blood Pressure among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	7468.79	3734.39	48.30*
Within	105	7468.79	3734.39	

*Significant at 0.05, Tab. F_{05} (2,105) = {4.82}

Table 10: Paired Adjusted Final Means Differences of Diastolic Blood Pressure among Adolescence, Adult and Old Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
79.63	63.08	---	16.55*	4.10
79.63	---	81.63	1.94	
---	63.08	81.63	18.55*	

*Significant at 0.05 level

Table 11: Analysis of Variance (ANOVA) of Pulse Rate among Adolescence, Adult and Old Aged Peoples

Sources of Variance	df	SS	MSS	'F' value
Between	2	4233.68	2116.84	14.39*
Within	105	15448.39	147.13	

*Significant at 0.05, Tab. F_{05} (2,105) = {4.82}

Table 12: Paired Adjusted Final Mean Differences of Pulse Rate among Adolescence, Adult and Aged Peoples

Adult	Adolescence	Aged	Mean Differences	Critical Differences
75.25	90.33	---	15.08*	5.66
75.25	---	85.19	9.94*	
---	90.33	85.19	5.14*	

*Significant at 0.05 level

CONCLUSION

The obtained results indicate existence of statistically significant differences in low back flexibility [tab F_{05} (2,105) = (4.82)‹cal 'F'$_{05}$ 36.729], maximum strength of both hands grip [tab F_{05} (2,105) = (4.82)‹cal 'F'$_{05\ RH}$= 38.49/$_{LH}$=41.224] as physical variables where adults were found better in all respect, such as means of L.B.F [$_{Ad}$=15.05›$_{ADO}$=11.13›$_{OA}$= 8.64], & M.S. R.H [$_{Ad}$=34.44›$_{ADO}$=22‹$_{OA}$= 26.97] & L.H [$_{Ad}$=34.46›$_{ADO}$=20.8‹$_{OA}$= 26.81] and systolic blood pressure diastolic blood pressure & pulse rate [tab $_{5}$ (2,105) = (4.82)›cal 'F'$_{05\ SBP}$=39.72/$_{DBP}$=48.30/ $_{PR}$=14.39] as physiological variables among adult, adolescence and older aged groups. In this time adolescence were found better in systolic pressure [$_{Ad}$=125.78‹$_{ADO}$=117.8‹$_{OA}$= 144.5], and adult were found better in diastolic pressure [$_{Ad}$=79.63›$_{ADO}$=63.08‹$_{OA}$= 81.63], & pulse rate [$_{Ad}$=75.25‹$_{ADO}$=90.33›$_{OA}$= 85.19].

As per low back flexibility is concern due to regular participations in the games and sports and physical activity in their daily life's mobility of the joints, stretching ability of the skeletal muscles & stretching ability of the connective tissues are become more, therefore causing the more flexibility in the adult peoples in the present study *[Fox and Foss 1993]*. Loss of grip strength as a result of normal aging and general weakness is reported to impair functional ability various communities *[Jackson, A.S., et al., 2002; Hurley, M., 1998; Bohannon, R., 1997]*. In this study adult were found better, might be due to use of more muscle and muscular hypertrophy in dominant hand which leads to increased strength *[G.A &T.D 1971]*.

Normal systolic blood pressure of the adolescence is of their lifestyle and physiological structure. Due to losses of surplus energy with various Exercises, low-salt and low-fat diets, and no family stress have a

dramatic and positive impact on their blood pressure as does quitting smoking and reducing alcohol intake etc*[www.medterms.com/script/main/art.asp]*. Diastolic and pulse rate were found better in case of adult people.It has also been observed that these subjects were used to do regular activity and games & sports. So their hearts can begin to work more efficiently, needing to beat less to transport blood throughout the body.. In adult subjects, the pulse wave velocity is slower and the time for the pulse wave to travel the aorta and the wave reflection to return back toward the heart is longer *[www.everydayhealth.com/formus/hear)]*. So they have been found as better subjects in both cases.

1. There was a significant difference on low back flexibility, maximum strength of both hands, systolic, diastolic & pulse rate among adult, adolescence & older aged peoples.
2. The adult subjects were better in low back flexibility, grip strength of each hand; diastolic blood pressure & pulse rate whereas adolescences were found better in systolic blood pressure among adult, adolescence & older aged peoples.

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Effect of Intensity Manipulation of Olympic Lift Training on Reaction Time of Elite Athletes

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ABSTRACT

The purpose of the present study was to determine effect of intensity manipulation of Olympic lift training on the performance of elite athletes. The subjects were 30 male elite athletes of 18 to 25 years of age group from Lakshmibai National Institute of Physical Education. The subjects were randomly selected and were assigned to the one experimental groups (Intensity manipulation of Olympic lift training) and one control group with 15 subjects in each group. The training was given for a period of 6 weeks. The experimental groups were trained thrice a week, while the control group continued with their daily routine work. The performances of reaction time of the subjects were taken by the Nelson foot reaction test. The Pre and Post test were conducted to collect the data. After the collection of data, the t- test was used to identify any significant differences between the groups. The level of significance was 0.05. The finding have shown the significant value of F-ratio's for selected variable in the experimental group i.e. Intensity manipulation of Olympic lift training programs as compared with the control group. The hypothesis was rejected because of significant differences were observed in the reaction time.

Keywords: *Intensity Manipulation, Olympic Lift Training, Reaction Time, Elite Athletes*

INTRODUCTION

Today the sports persons are trained scientifically with the latest training methods and sophisticated instruments for higher performance improvement in different sphere of sports. The modern trends in preparation of sportsman are to proceed in a scientific manner and to take the help of allied sciences to achieve the top level of performance. (William, 1980). Sports performance is indeed an aspect of complex human performance, which has several dimensions. Hence, several disciplines of sports sciences are required to work in a coordinated manner to explore the nature and the process of improving performance In the last few decades several disciplines of sports sciences have established e.g. sports medicine, sports physiology, sports training, sports bio-mechanics, sports psychology, sports pedagogy, sports nutrition and so on. These sports sciences work as one integrated unit to give super sports performance. (Rachna, 2001). Training is not a recent discovery. In ancient times, people systematically trained for military and Olympic endeavors. Today athletes prepare themselves for a goal through training.(Tudor, 1999). In the recent years greater stress has been laid on the quality rather than the quantity of training. The sports scientists and experts of sports want their sportsman to extract maximum achievement from their training procedure without causing too much strain on them. This is possible only if coaches and teachers of physical education apply the most economical manner for enhancing the performance of athletes.(Asha, 1980). Over the years this form of training has been employed extensively to improve many power oriented movements in a variety of sports. There are many variations on the theme of power training. Some of these training principles include plyometrics, assisted and resisted training and speed and acceleration drills. A popular method used to increase athletic power is Olympic lifting (ie power cleans, push presses, snatches, jump jerks and their variations) conducted in the weight room. This has traditionally been seen as an effective way of producing general explosive ability. However, considering motor skill and neurological aspects of movement, the logic of employing Olympic Lifts in power training becomes unclear. Therefore, the interpretation and application of Olympic lifting to the development of power will be considered (Takano, 1992).

MATERIALS AND METHODS

Subjects

The present study had been undertaken to compare the effect of intensity manupulation of olympic lift training on reaction time of elite athletes. Thirty male elite athletes between the age group of 18 to 25 years of age

had been selected for this study. All of the subjects played at Inter university in athletics and none had been trained by means of a six weeks of training programme and not to alter their normal daily exercise routine throughout the duration of the study. Further the subjects was equally divided in two groups i.e. Group A (N=15) for experimental group, Group B (N=15) control group to give six weeks training.

METHODOLOGY

The Nelson Foot Reaction Test

Objective: To measure the speed of reaction with the foot in response to a visual stimulus.

Test Equipment and Materials: Nelson Reaction Timer, table or bench, well space.

Direction: The subject sits on a table (or bench) which is about 1 inch from the wall. With his shoe off, the subject positions his foot so that the ball of the heel resting on the table about 2 inches from the edge. The tester holds the reaction timer next to the wall and the subject foot with the base line opposite the end of the big toe. The subject looks at the timer is dropped, by pressing the stick against the wall the ball of his foot, Twenty trials are given.

Scoring: The reaction time for each trial is the line just above the end of the big toe. When the foot is pressing the stick to the wall. The slowest five trails and the fastest five trials are discarded, and the average of the middle ten trials is recorded.

Six Week of Olympic Lift Training Programme

Subjects were trained thrice a week i.e. on Monday, Wednesday and Friday. The subjects performed Power Clean, Snatch, Push Press, Push jerk and Split jerk. 10-15 repetitions in each of the 3 sets, with 50% weight of 1 repetition maximum and with 3 min recovery period in between each set. After the two weeks 10-12 repetitions in each of the 3 sets, with 60% of 1 R.M. and recovery period was same as it was in first two weeks. Finally for last two weeks the exercises were performed with 70% weight of 1 R.M., 6-8 repetitions in each of the 3 sets with 2 min recovery period in between sets. The detailed weekly Olympic lift training schedule.

RESULTS

The study was conducted to determine the effects of intensity manipulation of olympic lift training on reaction time of elite athletes. The statistical analysis of data collected on thirty (N=30) subjects. The finding have shown the significant value of F- ratio's for selected variables in the experimental group i.e. Intensity manipulation of Olympic lift training programs as compared with the control group. The hypothesis was rejected because of significant differences were observed in the reaction time. The results pertaining to significant difference, if any, between experimental and control groups were assessed by "t" test and are presented in following tables:

The Table 1. represent the number of students in experiment group to be 15. The means of reaction time of pre-test and post-test scores of experiment group were 0.22 and 0.21 respectively. The calculated 't' value in case of experimental group is 6.259. The calculated t value was more than the table t value at 0.05 level of significance. Cal. T (=6.259) › tab t.05 (14) (= 2.14), Hence it may be concluded that six week intensity manipulation of Olympic lift training programme showed significant improvement in reaction time. Thus the post-test scores of experimental group were significantly higher than the pre-test scores.

Table 1: Mean, Standard Deviation (SD), Standard Error of Mean (SEM) of Reaction Time of Experimental Group

	Pre-test	Post-test
Sample size	15	15
Arithmetic mean	0.2212	0.2156
95% CI for the mean	0.2094 to 0.2330	0.2045 to 0.2266
Variance	0.0004525	0.0003985
Standard deviation	0.02127	0.01996
Standard error of the mean	0.005492	0.005154
Mean difference		-0.005653
Standard deviation		0.003498
95% CI		-0.007591 to -0.003716
Test statistic t		6.259
Degrees of Freedom (DF)		14
Two-tailed probability		P < 0.0001

Table 2: Mean, Standard Deviation (SD), Standard Error of Mean (SEM) of Reaction Time of Control Group

	Pre-test	Post-Test
Sample size	15	15
Arithmetic mean	0.1833	0.1859
95% CI for the mean	0.1640 to 0.2026	0.1663 to 0.2056
Variance	0.001215	0.001255
Standard deviation	0.03486	0.03542
Standard error of the mean	0.0090	0.009146
Mean difference		0.002633
Standard deviation		0.005863
95% CI		-0.0006136 to 0.00588
Test statistic t		1.739
Degrees of Freedom (DF)		14
Two-tailed probability		P = 0.1039

The Table 2 shows the number of student in control group to be 15. The mean of reaction time of pre-test and post-test score of control group were 0.183

and 0.185 respectively. The calculated t value in case of control group is 1.739. The calculated t value was less than the table t value at 0.05 level of significance. Cal t (= 0.414) ‹ tab t.05 (14) (= 2.14). Therefore the calculated t value was not significant. It was interpreted that the mean difference of Reaction time in pre-test and post-test were not significant. Thus there was no effect of intensity manupulation of Olympic lift training on reaction time of control group.

The table 3 shows the result was accomplished that intensity manipulation of Olympic lift training had significant impact in increasing the reaction time of the experimental group. Therefore the hypothesis was rejected. Since there was significant effect of intensity manipulation of Olympic lift training on reaction time.

Table 3: Mean, Standard Deviation (SD), Standard Error of Mean (SEM) of Reaction Time of Experimental and Control Group

Group	Number	Mean	S.D.	SEM	't' Value
Experimental (Pre-test)	15	0.2212	0.02127	0.0054	6.259 *
Experimental (Post-test)	15	0.2156	0.01996	0.0051	
Control (Pre-test)	15	0.1833	0.03486	0.009	1.739
Control (Post-test)	15	0.1859	0.03542	0.0091	

*Significant at 0.05 level of confidence.
"t".05 (14) = 2.14

SUMMARY, CONCLUSION AND PRACTICAL APPLICATIONS

Today the sports persons are trained scientifically with the latest training methods and sophisticated instruments for higher performance improvement in different sphere of sports. The findings pertaining to the study resolved significant improvement in reaction time the six weeks intensity manupulation of Olympic lift training programme for the elite athletes. The experimental groups were effective in improving the reaction time of the subjects. The intensity manupulation of Olympic lift training programme improving the reaction time of the subjects. In reaction time t' test analysis showed an equal improvement due to the intensity manupulation of Olympic lift training programme which reveals that Olympic lift training is for improving reaction time. The 't' test analysis on reaction time demonstrated significant differences between experimental group. While the control group were not found significantly different on this variable. This indicates that's the regular practice of Olympic lift improve the reaction time which was required for players in elite athletes. However, there have been improvements of reaction time although in varying degrees as a result of the intensity manupulation of Olympic lift training. This finding of present investigation is in line with the finding ofSingh Shamsher (2006).In conclusion, the present study suggests that the intensity manipulation of Olympic lift training of six week training duration leads to a significant effect on the reaction time of elite athletes. So, in case of reaction time, Olympic lift training was found to effective. The world of training methodology has crossed many milestones. In modern time athletes are being trained by highly sophisticated means for better achievements in their concerned sports, and greater stress has been laid on the quality rather than the quantity of training. Six weeks of intensity manipulation of olympiclift training are useful program to improve the reaction time of elite athletes.

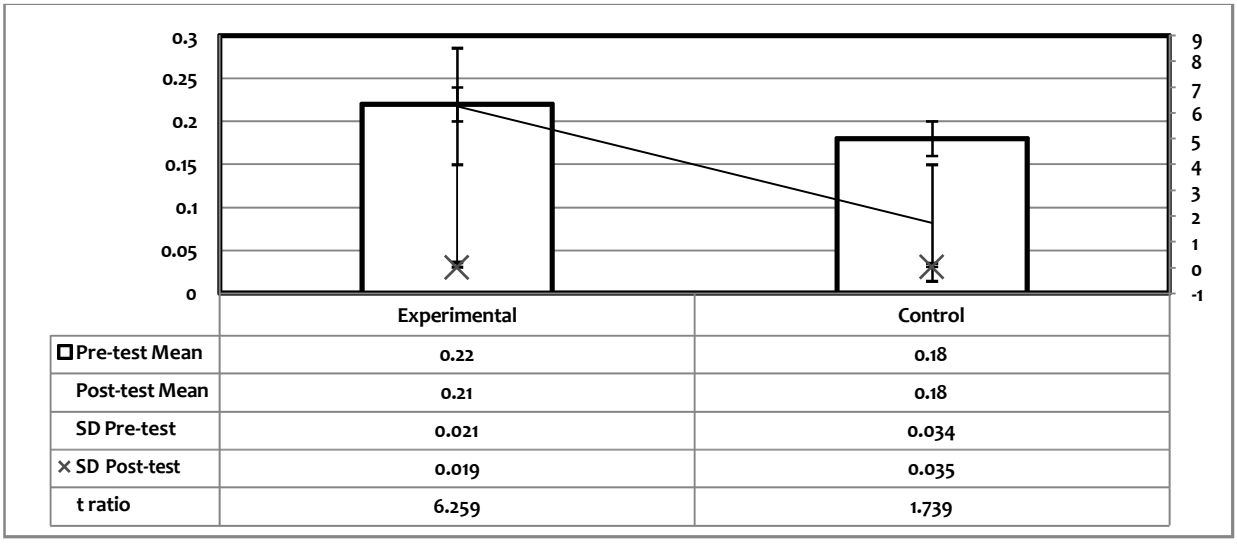

Fig. 1: Mean, Standard Deviation (SD), Standard Error of Mean (SEM) of Reaction Time of Experimental and Control Group

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Analysis of Emotional Intelligence among Men Handball Players

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ABSTRACT

Emotion as the process by which motivational potential is realized on 'read' our, other activated by challenging stimuli. In other words, emotion is seen as a 'read out' mechanism carrying information about motivations systems. The purpose of the study was to analyze the level of emotional intelligence among men handball players.48 men handball players were selected as the subjects for the study (four universities i.e. Nagarjuna University, L.N.U.P.E., Kerela University and Osmania University and 12 subjects for each University). The psychological characteristics of emotional intelligence were relevant and contributing factor for performance efficiency of athletes. The emotional intelligence scale for sports person (eiss) was develop and standardized by Rajita Menon.A and Dr.Jayashree Acharya was selected for this study. For the statistical analysis of data, analysis of one way ANOVA was used to compare the best four teams. The level of significance was set at 0.05.The result of the study revealed that there was significance difference was found among men handball players.

Keywords: *Emotional Intelligence, Handball Players.*

INTRODUCTION

Emotional intelligence is an individual ability to adapt, acquire knowledge, solve problem under the stress and duress of emotional influences and challenging situation. It reflects an individual ability to act purposefully, think rationally and to deals effectively to adapt with its environment under demanding situation which induces arousal of emotions. An innate ability which gives us owns emotional sensitivity and our potential for learning healthy emotional management skills. Emotions has long been considered to be of such depth and power that in Latin, for example, they were described as 'motusanima' meaning literally the spirit that moves us. Contrary to most conventional thinking, emotions are inherently neither positive nor negative; rather, they serve as the single most powerful source of human energy. In fact each feeling provide us with vital and potentially profitable information on every minute of the day. This feedback ignites creative genius, improves and shapes trusting relationships, provides on inmate campus for one's life and career, guides to unexpected possibilities and even saves organization from disaster. To exhibit emotions in very easy but dong it at the right time, at the right place, with right person and to the right degree in difficult. The management of emotions has given rise to the most talked about term "Emotional intelligence." Emotional intelligence motivates employees to pursue their unique potential and purpose, and active innermost potential values and aspirations, transforming them from things they thing about, to what they do. Emotional intelligence enables one to learn to acknowledge and understand feeling in ourselves and in others and that we appropriately respond to them, effectively applying the information and energy of emotions on our daily life and work.

OBJECTIVES OF THE STUDY

- To find out the analysis of emotional intelligence among men handball players.

HYPOTHESIS

- It was hypothesized that there was significant analysis difference of emotional intelligence of among interuniversity south west zone Handball players.

SELECTION OF SUBJECTS

48 men handball players of intervarsity level were selected as subjects for this study. Subjects were members of the best four teams of west zone intervarsity handball tournament (four universities i.e. Nagarjuna University, L.N.U.P.E., Kerela University and Osmania University and 12 subjects for each University.) from the academic year in 2009-10 held at Acharya Nagarzuna University, Guntur (Andhra

Pradesh). They were from undergraduate and post-graduate courses. Their age ranged between 18-25 years.

SELECTION OF VARIABLE

The following variable was used for this study:

- Emotional intelligence (self awareness, self regulation, motivation, empathy and social skills)

SELECTION OF QUESTIONNAIRE

A standard test of emotional intelligence scale for sports person, by Menon and Acharya (2005) was selected for this study. It was selected because it is sports specific test.

RESULTS

Table-1 shows that mean and standard deviation of self awareness of Nagarjuna University handball team was 20+/-3.27, L.N.U.P.E. handball team was 20.33+/-2.01, Kerela University handball team was 23.41+/-2.99,Osmania University handball team was 21.66+/-3.55.Mean and standard deviation of self regulation of Nagarjuna University handball team was 17.33+/-2.57, L.N.U.P.E. handball team was 18.41+/-2.46,Kerla University handball team was 17.75+/-1.6,Osmania University handball team was 21.08+/-2.6.Mean and standard deviation of motivation of Nagarjuna University handball team was 16.25+/-3.07, L.N.U.P.E. handball team was 16.08+/-2.7,Kerela University handball team was 14.41+/-2.15,Osmania University handball team was 22.33+/-6.18.Mean and standard deviation of empathy of Nagarjuna handball team was 21.08+/-2.57, L.N.U.P.E. Gwalior handball team was 23.75+/-3.04, Kerela University handball team was 23.00+/-3.16,Osmania University handball team was 23.16+/-3.24. Mean and standard deviation of overall emotional intelligence of Nagarjuna handball team was 94.58+/-7.70, L.N.U.P.E. handball team was 98.00+/-5.95,Kerla University handball team was 97.83+/-6.80,Osmania University handball team was 111.41+/-14.50.

Table 1: Descriptive Statistic of Selected Handball University on Emotional Intelligence

		N	Mean	S.d	Minimum	Maximum
Self Awareness	Nagarjunauniv	12	20.00	3.27	13.00	24.00
	Lnupe	12	20.33	2.01	17.00	24.00
	Kerala univ	12	23.41	2.99	17.00	27.00
	Osmania univ	12	21.66	3.55	14.00	27.00
	Total	48	21.35	3.21	13.00	27.00
Self Reg.	Nagarjunauniv	12	17.33	2.57	15.00	22.00
	Lnupe	12	18.41	2.46	15.00	23.00
	Kerala univ	12	17.75	1.65	16.00	21.00
	Osmania univ	12	21.08	2.60	15.00	24.00
	Total	48	18.64	2.71	15.00	24.00
Motivation	Nagarjunauniv	12	16.25	3.07	12.00	22.00
	Lnupe	12	16.08	2.74	12.00	21.00
	Kerala univ	12	14.41	2.15	11.00	18.00
	Osmania univ	12	22.33	6.18	16.00	30.00
	Total	48	17.27	4.82	11.00	30.00
Empathy	Nagarjunauniv	12	21.08	2.57	17.00	25.00
	Lnupe	12	23.75	3.04	18.00	28.00
	Kerala univ	12	23.00	3.16	17.00	28.00
	Osmania univ	12	23.16	3.24	18.00	28.00
	Total	48	22.75	3.09	17.00	28.00
Social Skills	Nagarjunauniv	12	19.91	2.19	16.00	23.00
	Lnupe	12	19.41	2.93	14.00	24.00
	Kerala univ	12	19.25	3.74	14.00	25.00
	Osmania univ	12	23.16	3.24	18.00	28.00
	Total	48	20.43	3.38	14.00	28.00
EmoInt	Nagarjunauniv	12	94.58	7.70	82.00	109.00
	Lnupe	12	98.00	5.95	89.00	109.00
	Kerala univ	12	97.83	6.80	88.00	110.00
	Osmania univ	12	111.41	14.50	82.00	127.00
	Total	48	100.45	11.18	82.00	127.00

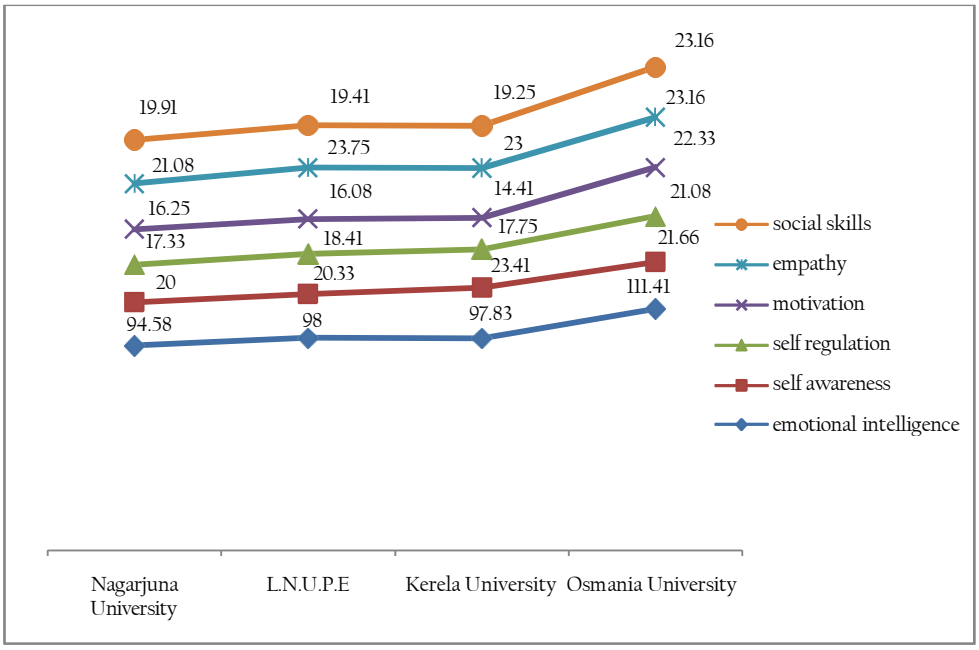

Fig. 1: A Mean Value of Selected Handball University of Emotional Intelligence (Self Awareness, Self Regulation, Motivation, Empathy and Social Skills)

Table 2: Analysis of Variance (ANOVA) of Mean Difference of Emotional Intelligence of Four Teams of West Zone Intervarsity Level Men Handball Players

		Sum of Squares	Df	Mean Square	F	Sig.
Self Awareness	Between groups	86.729	3	28.910	3.18*	.033
	Within groups	400.250	44	9.097		
Self Reg.	Between groups	102.229	3	34.076	6.13*	.001
	Within groups	244.750	44	5.563		
Motivation	Between groups	434.729	3	144.910	9.68*	.000
	Within groups	658.750	44	14.972		
Empathy	Between groups	48.167	3	16.056	1.762	.168
	Within groups	400.833	44	9.110		
Social Skills	Between groups	122.063	3	40.688	4.29*	.010
	Within groups	417.750	44	9.494		
EmoInt	Between groups	2010.417	3	670.139	7.63*	.000
	Within groups	3865.500	44	87.852		

Table 2 reveals that calculated f value of self awareness (3.18) was higher than tabulated value (2.82) required to be significant at 0.05 level. This indicates that there was significant difference was found in case of self awareness among selected handball university teams.It is also reveals that calculated f value of self Regulation (6.13) was higher than tabulated value (2.82) required to be significant at 0.05 level. This indicated that there was significant difference was found in case of self regulations among selected handball university teams.It is also shows that calculated f value of motivation (9.68) was higher than tabulated value (2.82) required to be significant at 0.05 level. This indicated that there was significant difference was found in case of motivation among selected handball university teams.It is also shows that calculated f value of empathy (1.762) was lower than tabulated value (2.82) required to be significant at 0.05 level. This indicated that there was no significant difference was found in case of empathy among selected handball university teams.It is also reveals that calculated f value of social skill (4.29) as higher than tabulated value (2.82) required to be significant at 0.05 level. This indicated that there was significant difference was found in case of social skill among selected handball university team.It is also shows that calculated f value of emotional intelligence (7.63) as higher than tabulated value (2.82) required to be significant at 0.05 level. This indicated that there was no significant difference was found in case of emotional intelligence among selected handball university teams.

Table 3: Post HOC Test of Selected Handball University on Emotional Intelligence

Dependent Variables	(I) Teams	(J) Teams	Mean Diffrence (I-J)	Critical Diffrence (C.D.)	Std. Error	Sig.
Self-Awareness	Kerla University	Nagarjuna University	3.41667*	2.48	1.23130	.08
		L.N.U.P.E.	3.08333*	2.48	1.23130	.016
Self-Regulation	Osmania University	Nagarjuna University	3.75000*	1.94	.96285	.000
		L.N.U.P.E.	2.66667*	1.94	.96285	.008
		Kerela University	3.33333*	1.94	.96285	.001
Motivation	Osmania University	Nagarjuna University	6.08333*	3.19	1.57964	.000
		L.N.P.U.E.	6.25000*	3.19	1.57964	.000
		Kerela University	7.91667*	3.19	1.57964	.000
Social Skills	Osmania University	Nagarjuna University	3.25000*	2.55	1.25793	.013
		LNUPE	3.75000*	2.55	1.25793	.005
		Kerela University	3.91667*	2.55	1.25793	.003
Emotional intelligence	Osmania university	Nagarjuna University	16.83333*	7.72	3.82649	.000
		LNUPE	13.41667*	7.72	3.82649	.001
		Kerela University	13.58333*	7.72	3.82649	.001

The mean difference is significant at the 0.05 level Post hoc test was applied to find out the mean difference among the selected handball university in term of emotional intelligence which was presents in table no-03. From table-3 it is evident that there was mean difference was found in self awareness in case of L.N.U.P.E.and Kerela University, Nagarzuna University and Kerela University. To be significant at 0.5 level the value require C.D.(Critical Difference) is 2.48.Where as the calculated values (mean difference) are 3.41, 3.08.From self awareness it was shown that the Kerela University had better self awareness than the L.N.U.P.E. and Nagarjuna University.It is also shows that there was mean difference were found in self regulation in case of Osmania University and Nagarjuna, Osmania University and Kerala University, Osmania University and L.N.U.P.E.To be significant at 0.5 level the value require C.D.(Critical Difference) is 1.94.Where as the calculated values (mean difference) are 3.75, 3.33 and 2.67.From self regulation it was shown that the Osmania University had better self regulation than the L.N.U.P.E., Kerela University and Nagarjuna University.It is also evident that there was mean difference were found in motivation in case of Osmania University and Kerela University,Osmania University and L.N.U.P.E., Osmania University and Nagarjuna.To be significant at 0.5 level the value require C.D.(Critical Difference) is 3.19. Whereas the calculated values (mean difference) are 7.92, 6.25, 6.08. it was shown that Osmania University had better motivation than the Nagrjuna University, L.N.U.P.E., and Kerela University. It is evident that significant mean differences were found in social skills in case of Osmania University and Kerela University, Osmania and L.N.U.P.E., Osmania University and Nagarjuna University. To be significant at 0.5 level the value require C.D.(Critical Difference) is 2.55. Whereas the calculated values (mean difference) are 3.92, 3.75, 3.25. From social skills it was shown that Osmania University had better social skills than the Nagarjuna University, L.N.U.P.E., and Kerela University.It is also evident that there was mean differences were found in emotional intelligence in case of Osmania University and Nagarjuna University, Osmania University and Kerela University,Osmania and L.N.U.P.E.To be significant at 0.5 level the value require C.D.(Critical Diffrence) is 7.72. Whereas the calculated values (mean difference) are 16.83, 13.58, 13.41.From emotional intelligence it was shown that Osmania University had better emotional intelligence than the L.N.U.P.E. Kerela University and Nagarjuna University.

DISCUSSION

The result of the study revealed that there was significance difference was found among the best four teams of Handball University namely Nagarjuna University, L.N.U.P.E., Kerela University and Osmania University in terms of emotional intelligence accept in empathy factors of emotional intelligence there was no significant difference among of four teams. Overall in all the factors of emotional intelligence, Osmania University team had distinctively different with higher level of emotional intelligence when compare to Nagarjuna University, L.N.U.P.E. and Kerela University but in case of factors of emotional intelligence of self awareness Osmania University had no significant difference was found with all the four teams. It is also evident that all these best four teams require more emotional stability and intelligence due to the nature of demands on the sports man.

CONCLUSION

- The Osmania University team had better and distinctively different in term of emotional intelligence when compare to Nagarjuna University, L.N.U.P.E. and Kerela University.
- In the factors of emotional intelligence in self awareness Osmania University had no significant difference among the all four teams but Kerela University had better significant difference than L.N.U.P.E. and Nagarjuna University.
- All the best four teams had significant difference in the factors of emotional intelligence accept in empathy there is no significant difference among of all the best four teams.
- In the factors of emotional intelligence in self regulation L.N.U.P.E. and Kerela University, L.N.U.P.E. and Nagarjuna University, and Kerela University and Nagarjuna University had no significant difference.
- In the factors of emotional intelligence in motivation Nagarjuna and L.N.U.P.E., Nagarjuna University and Kerela University and L.N.U.P.E. and Kerela University had no significant difference.
- In the factors of emotional intelligence in social skills Nagarjuna University and L.N.U.P.E.,Nagarjuna University and Kerela University and L.N.U.P. and Kerela University had no significant difference
- It was also evident that in overall emotional intelligence L.N.U.P.E. and Kerela University,L.N.U.P.E. and Nagarjuna University and Kerela University and Nagarjuna University had no significant difference.

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Influence of Natural and Artificial Surface Running on Speed Agility and Flexibility of Non-Athlete College Boyes

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ABSTRACT

The purpose of the study was to measure influence of natural and artificial surface running onspeed, agility and flexibilityof non athlete's college boys. In this purpose researcher wasselectedthirty six (36) non athlete's college boy's(age ranging 16-22 years) from Nalbari district of Assam. The subjects were divided in to three equal groups (Group A, Group B, Group C) having twelve subjects in each group.There were ten weeks running programs three days in a week on different surfaces such as Tread Mill & Natural grass track. Ten weeks Tread mill running were assigned to "Group A" and Natural grass surface were assigned to "Group B" whereas no experimental treatment were administered to "Group C" which is named and studied as control group. A pre test was taken before the treatment period and immediate after the completion of the ten weeks training programmes the post test was held on a day on all three groups at the club premises.The selected test were demonstrated and explained to the subject by the researcher himself. After that, subjects were asked to give the test and the data were recorded.As a criterion measures "50 yards dash" was used to measure Speed in nearest sec, "10x4" yards shuttle run was used to measure Agility in nearest sec, and "Sit & Reach test" was used to measured Hamstring muscles flexibility in nearest inc. respectively (Nelson & Johnson 2007). To compare the best possible effects of natural & artificial surface running on speed, agility & flexibility of non athlete's analysis of covariance (ANCOVA) statistic and post hoc test (L.S.D) was used in order to investigate significant difference between the pair group means at 0.05 level of confidence. Result of the study revealed that speed was not significant in pre test phase (1.86<3.30), however post & adjusted post test phases (78.11& 13.76>3.30 at 0.05 level) were found significant differences and mean of the artificial surface was found better thannatural surface. Again agility was not significant in pre test phase (1.70<3.30), however post & adjusted post test phases (36.46 & 18.36>3.30 at 0.05 level) were found significant differences and mean of the natural surface was found better than artificial surface. Flexibility of hamstring muscle was not significant in pre test & post test phase (0.085 & 2.82<3.30) respectively, however adjusted post test phase (4.09>3.30 at 0.05 level) was found significant differences and mean of the natural surface was found better than artificial surface. The study may be concluded that artificial surface running are good in case of speed & agility development of non athletes college boys whereas Natural surface running is more effective for hamstring muscles flexibility.

Keyword: *Artificial & Natural Surface, Speed, Agility & Flexibility, Athlete*

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INTRODUCTION

Running is a pawing movement. The body is propelled forward by the force of the push backward of the feet against the ground. The surfaces on which athletes run on can play a large role in determining how well they perform-and how likely they are to get injured. To understand why this is so, it's important to realize that running is essentially a series of collisions between our body and the ground (Uppal, *et al.* 2004). As our right foot makes impact with the surface on which we are running, the muscles in our right leg contract and reverse the downward velocity of our body, accelerating us upward and forward. Less than a half-second later, as our left foot hits pay dirt, the muscles in our left leg contract and turn the tables on our descending acceleration again. These collisions and velocity reversals occur at a high rate-about 180 times per minute for the average runner, or over 37,000 times in all during a three and a-half hour marathon (Hawley 1978).

Most runners believe that running on natural surfaces (grass, sand) is easier on the body and protects them from jarring and impact injuries. However research evidence that natural surfaces such as grass, sand, gravel or dirt tracks are beneficial to runners, but some timenatural surfaces may lead to more injuries

such as twisted ankles, knees and pulled muscles especially if the surfaces are uneven rather than smooth (Janderson99). The reviews of the literature show that there are definitive comparative studies tracking the relative injury rates for large numbers of people running on natural or artificial surfaces. Most people assume the obvious that the forces and impacts on our feet, knees, hips and legs will be much less on dirt or grass than on hard concrete or synthetic surface. The limited studies that have been done suggest that the body adjusts to different surfaces automatically to even out the impact. Researchers found that when runners were faced with various running surfaces with different stiffness, they responded by changing the stiffness and flexibility in their legs to compensate for the differences (Babar et. al. 1994).

In the present study the subjects were running on manicured grass track (as natural surface) and tread mill (as artificial surface). A treadmill is a device for walking or running while staying in the same place. Treadmills were introduced before the development of powered machines, rather than the user powering the mill, the machine provides a moving platform with a wide conveyor belt driven by an electric motor or a flywheel. The belt moves to the rear requiring the user to walk or run at a speed matching that of the belt. The rate at which the belt moves is the rate of walking or running. Thus, the speed of running may be controlled and measured (www.runnersworld.com/beginners/). When running on a treadmill, "the belt pulls our leg through, resulting in a relatively passive extension of the hip. Passive [hip] extension would then minimize the contribution of the primary hip extensors. Running overground, on the other hand, requires that we pull your leg through, therefore involving active hip extension (Paul M. Juris 1996).

Present study is done on speed agility and flexibility. Speed is the quickest movement of the limb, agility is the ability which enables an individual to rapidly change body position and flexibility refers to range of motion available in a joint (Nelson & Johnson 2007).these are also considered parameter of physical fitness and so many techniques of development these parameters (D.k.kansal 2007).Therefore it would be interesting to see how artificial and natural surface influence on lower extremities after given ten weeks running programs of non athletes college boys.

METHOD AND MATERIALS

In order to measure influence of natural and artificial surface running onspeed, agility and flexibilityof non athlete's college boys, researcher wasselectedthirty six (36) non athlete's college boy's(age ranging 16-22 years) from Nalbari district of Assam. The subjects were divided in to three equal groups (Group A, Group B, Group C) having twelve subjects in each group.There were ten weeks running programs three days in a week on different surfaces such as Tread Mill & Natural grass track. Ten weeks Tread mill running were assigned to "Group A" and Natural grass surface were assigned to "Group B" whereas no experimental treatment were administered to "Group C" which is named and studied as control group. A pre test was taken before the treatment period and immediate after the completion of the ten weeks training programmes the post test was held on a day on all three groups at the club premises.The selected test were demonstrated and explained to the subject by the researcher himself. After that, subjects were asked to give the test and the data were recorded.As a criterion measures "50 yards dash" was used to measure Speed in nearest sec, "10x4" yards shuttle run was used to measure Agility in nearest sec, and "Sit & Reach test" was used to measured Hamstring muscles flexibility in nearest inc. respectively (Nelson & Johnson 2007).

STATISTICAL PROCEDURE

For the purpose of measuring influence of artificial & natural surface running on speed, agility and flexibility of non athlete's college boys, pre & post data were analyzed through analysis of Covariance (ANCOVA) statistic was used. Beside this post hoc test (L.S.D) was used in order to investigate significant difference between the pair group means. The level of significance was set at 0.05 level of confidence.

TRAINING PROGRAM

Following training were given separately to the artificial & natural surface running groups up to ten weeks Artificial surface training (Tread mill running) was given in a multi gym complex and Natural surface running (Grass track running) was given in the High School sports field complex.

Artificial Surface (Treadmill Running)		Natural Surface (Grass Track)	
Monday (Morning)	10 min. running without grade of sloping & with 7km.p/h	Monday (Morning)	10 min. running with 70% intensity
Wednesday (Morning)	12 min running without grade of sloping & with 7k.m p/h	Wednesday (Morning)	12 min running with 70% intensity
Friday Morning	15 min running without grade of sloping & with 7k.m p/h	Friday (Morning)	15 min running with 70% intensity

RESULT OF THE STUDY

The table 01& figure 01 clearly revealed no significant difference in Speed ('F'=1.86<3.30 at 33 degree of freedom at 0.05 level) in pre test phase. However the 'F' value in post test & adjusted post test phases revealed significant difference in Speed among two experimental group and one control group of non athletes college boys, because cal 'F' value in post test & adjusted post test Phases (78.11 & 13.76 respectively) were found to be higher than that of required 'F' ratio value 3.30 to be significant at 0.05 level of confidence.

Table 02 reveled that significant difference exist between Group-A & control group, Group-B & control group but no significant difference exist between Group-A & Group–B. It is therefore concluded that both Artificial & Natural surface running are quite effective.

The Table 03 & Figure 02 clearly revealed no significant difference in Agility ('F'=1.70<3.30 at 33 degree of freedom at 0.05 level) in pre test phase. However the 'F' value in post test & adjusted post test phases revealed significant difference in Speed among two experimental group and one control group of non athletes college boys, because cal 'F' value in post test & adjusted post test Phases (36.46& 18.36 respectively) were found to be higher than that of required 'F' ratio value 3.30 to be significant at 0.05 level of confidence.

Table I: Analysis of Co-Variance of the Means of Speed among Two Experimental Groups and One Control Group

Mean	Artificial	Natural	Control	Source of Variance	df	SS	MSS	'F' Ratio
Pre-test	7.5	7.28	7.64	Among	2	0.78	0.39	1.86
				Within	33	6.87	0.21	
Post-test	6.43	6.18	7.58	Among	2	14.05	7.03	78.11*
				Within	33	2.96	0.09	
Adjusted Post-test	6.39	6.41	7.37	Among	2	6.33	3.17	13.76*
				Within	32	7.33	0.23	

$F_{.05}(2, 33) = 3.30$, $F_{.05}(2, 32) = 3.30$ A = among means variance. W = within group variance

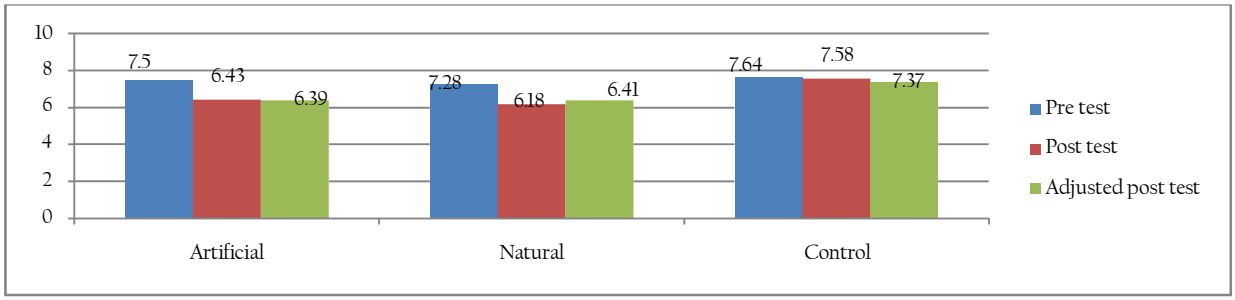

Fig. 1

Table II: Paired Group Mean Differences (As Per Adjusted Post-Test Means) of Speed

Artificial surface Group A (Ex.)	Natural surface Group B(Ex.)	Control group	Mean Difference	Critical value At 5% level
6.39	6.41		0.02	
				0.34
6.39		7.37	0.98*	
				0.34
	6.41	7.37	0.98*	0.34

*The mean difference is significant at the 0.05 level

Table III: Analysis of Co-Variance of the Means of Agility among Two Experimental Groups and One Control Group

Mean	Artificial	Natural	Control	Source of Variance	df	SS	MSS	'F' Ratio
Pre-test	19.49	18.76	18.32	Among	2	8.29	40.15	1.70
				Within	33	80.19	2.43	
Post-test	17.35	16.50	18.1	Among	2	28.43	14.22	36.46*
				Within	33	12.94	0.39	
Adjusted Post-test	17.24	16.52	18.19	Among	2	11.75	5.88	18.36*
				Within	32	10.51	0.32	

$F_{.05}(2, 33) = 3.30$, $F_{.05}(2, 32) = 3.30$) A = among means variance. W = within group variance.

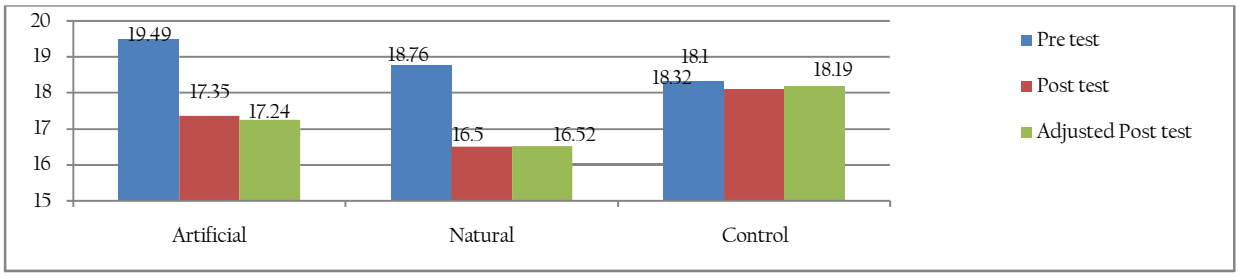

Fig. 2

Table 04 reveled that significant difference exist between Group-A & Group-B, Group-A & control group, Group-B & control group. It is therefore concluded that both Artificial & Natural surface running are quite effective but if a choice has to be made out of two treatments A & B, treatment 'B' should be preferred because mean of natural surface is reasonably better than artificial surface

The table 05& figure 03 clearly revealed no significant difference in Flexibility {'F'= (0.085<3.30) (2.82<3.30) at 33 degree of freedom at 0.05 level} in pre test & post test phases respectively. However the 'F' value in adjusted post test phase revealed significant difference in hamstring muscle flexibility among two experimental group and one control group of non athletes college boys, because cal 'F' value in adjusted post test Phases (4.09) was found to be higher than that of required 'F' ratio value 3.30 to be significant at 0.05 level of confidence.

Table 06 reveled that significant difference exist between Group-A & control group, Group-B & control group but no significant difference exist between Group-A & Group–B. It is therefore concluded that both Artificial & Natural surface running are quite effective.

Table IV: Paired Group Mean Differences (As Per Adjusted Post-Test Means) of Agility

Artificial Surface Group A (Ex.)		Natural Surface Group B (Ex.)	Control Group	Mean Difference	Critical Value At 5% Level
	17.24	16.52		0.72*	0.47
	17.24		18.19	0.95*	0.47
				1.67*	0.47
		16.52	18.19		

*The mean difference is significant at the 0.05 level

Table V: Analysis of Co-Variance of the Means of Hamstring Muscle Flexibility among Two Experimental Groups and One Control Group

Mean	Artificial	Natural	Control	Source of Variance	df	SS	MSS	'F' Ratio
Pre-test	15.17	15.42	14.97	Among	2	1.22	0.61	0.085
				Within	33	234.75	7.11	
Post-test	16.69	17.77	15.12	Among	2	41.24	20.62	2.82
				Within	33	241.3	7.31	
Adjusted Post-test	16.71	17.56	15.32	Among	2	11.62	5.81	4.09*
				Within	32	45.61	1.42	

$F_{.05}(2, 33) = 3.30$, $F_{.05}(2, 32) = 3.30$) A = among means variance. W = within group variance.

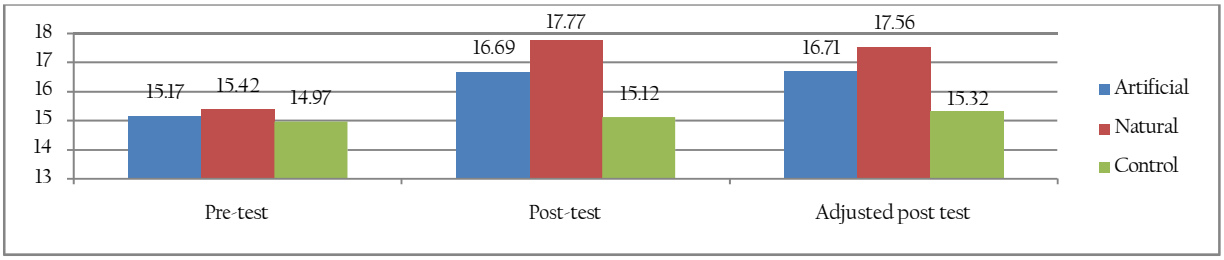

Fig. 3

Table VI: Paired Group Mean Differences (As Per Adjusted Post-Test Means) of Hamstring Muscle Flexibility

Artificial Surface Group A (Ex.)	Natural Surface Group B (Ex.)	Control Group	Mean Difference	Critical Value At 5% Level
16.71	17.56		0.85	0.99
16.71			1.39*	0.99
		15.32		
	17.56	15.32	2.24*	0.99

*The mean difference is significant at the 0.05 level

DISCUSSION OF FINDINGS

The outcomes of this study revealed that the application of artificial & natural surface running programs resulted in significant improvement in speed, agility and flexibility of both treatment groups. The implication of this finding is that an individual with less speed, agility and flexibility would be benefited from both running programs, but natural surface is greater benefited than artificial surface in case of agility development otherwise both treatments are equally effective for improvement of speed and flexibility.

Speed can be improved by both artificial and natural surface running and they are equally effective. Research said that speed can be develop by fast running practice (Paradisis & Cooke 2006). In the present study the subjects were running with 70% intensity on the ground and 7 K.m/h on tread mill which is also considered fast speed running so that speed of the subjects are equally develop by both training. Research said that speed can be improved by improving mechanism of running pattern (Gosztyla AE 2006). In the study after running ten weeks the subject were find best running position and able to reduce unwanted body movement as a result due to correct technique of running they gained their maximum speed. Research does believe that running can develop leg strength (Young *et al.* 2002) and leg strength has significant impact on development of speed of an athlete (Baker & Newton 2006). In this study continuous ten weeks running may develop leg strength of the subjects which is developed speed of the subjects.

This study revealed that agility can be improved by natural surface running than artificial surface running. Agility is the ability which enables an individual to rapidly change body position (Nelson & Johnson 2007). In natural surface or ground track running the runner has to run in different direction (such as straight direction, Bend direction, and circulatory direction) (Sheppard, Young 2006). Therefore according to situation body has to change their position rapidly in ground track running as a result significant improvement of agility was found in case of natural surface running group and on the other hand in the treadmill running doesn't have chance to run in difference direction because in tread mill the persons has to run in forward direction on same place (Elliott *et al.*1974). Therefore improvement of agility was less than natural surface running group.

The artificial and natural surface running was equally effective for flexibility development of both groups. Research said that hamstring muscle flexibility is develop by rhythmical running and maintaining stride length (Elizabeth Quinn 2010). In the ground running the subject had run with well stride length and frequency which may develop their hamstring muscle flexibility on the other hand in treadmill running the subjects had been running rhythmically that is why flexibility was develop.

CONCLUSION

1. There was significant improvement of Agility of both training groups but natural surface running are quite better than artificial surface.
2. Both artificial and natural running are equally effective for speed and flexibility for both artificial and natural surface running groups.

ACKNOWLEDGEMENT

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Comparative Study of Selected Physiological Variables of Special Needed School Going-Children

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ABSTRACT

Special needed children are slightly different from the normal child. They need some special, additional assist to maintain their normal childhood. Most of the time, it has been observed that the people with special need, are under estimated with their capabilities by forgetting that they are also the part of our society. Physiological variables are one of the main factors which affect the capabilities of human being. Comparisons of selected physiological variables were made between 22 deaf and same number of blind school going children. Blood pressure, Vital Capacity and Cardio Vascular Endurance were measured for the study. The age of the subjects was ranged between 9-13 years. Blood pressure was measured by Mercury sphygmomanometer and stethoscope; Vital Capacity and Cardio Vascular Endurance were measured by Dry Spirometer and Modified Harvard Step Test respectively. Verbal help and support was given by mediator as and when required by them. To determine the significant difference the data were analyzed by 't' test and level of significance was set at 0.05 level. The result illustrated that there was significant difference in Blood Pressure and Cardio Vascular Endurance whereas Vital Capacity showed insignificant difference between Deaf and Blind school going children. It may be concluded that Blind children had higher Blood Pressure where as Deaf showed nearer to normal value and Blind school going children had lower mean value of Cardio Vascular Endurance than Deaf children.

Keywords: *Special Needed Children, Blind, Deaf, Blood Pressure, Vital Capacity, Cardio Vascular Endurance*

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INTRODUCTION

Special needed school going children means that who are regular in school curriculum but somehow their learning process is barricaded, remedial instruction or means are needed for revealing the innate qualities and improving the abilities. Special need allow the various approaches like Communication and interaction, cognition and learning, behavior-emotional and social approach, sensory and physical impairment approach.[1] Sensory impairment like hearing impairment, visual impairment are affected by nervous system and other physiological functions which also comes under the neurodevelopmental disability.[2] The category of Sensory impairment of special needed children are suffered from neurodevelopmental disorder but their other physiological variables may be in good state which can be assisted the special needed children to achieve the peak form of their abilities. So it is very important to know the physiological conditions of special needed children which help the expert to build up the appropriate school curriculum and remedial program for them. The knowledge of Physiological status of special needed children also help in identifying the need of a particular group while extending a special program in relation to strengthen their weak areas and proper utilization and further improvement of their strong areas. One of the physiological variables, Arterial Blood Pressure denotes the measurement of the force applied to the walls of arteries as the heart pumps blood through the body which has two sub-sequent stages i.e. Systolic Blood Pressure and Diastolic Blood Pressure.[3] The Systolic Pressure is the maximum pressure in an artery at the moment when the heart is beating and pumping blood through the body. The Diastolic Pressure is the lowest pressure in an artery in the moments between beats when the heart is resting. Vital Capacity and Cardio Vascular Endurance are also the indicators of level of physical fitness.[4] Vital Capacity is the total amount of air that one can forcefully breath out after completely filling his/her lungs. Cardio Vascular Endurance denotes the ability of heart and lungs to deliver blood and oxygen to the working muscles for longer duration.

STATEMENT OF THE PROBLEM

The purpose of the study was to compare the selected Physiological variables i.e. Blood Pressure, Vital

Capacity and Cardio Vascular Endurance of special needed children, where only Deaf and Blind male school going children categories were selected for comparison.

METHODOLOGY

Total forty four (N = 44) special needed male school going children whose percentage of impairment was above 80% acted as subjects for the study. Among them twenty two were male Blind schools going children and rests of twenty two were male Deaf schools going children. The chronological ages of the subjects were in between 9–13 years as per their school records. The data were collected from different special needed schools of different district of West Bengal. Among the physiological variables Blood Pressure was measured by Sphygmomanometer and Stethoscope and recorded to the unit mmHg. After half an hour complete-rest Systolic and Diastolic pressure was measured. Vital Capacity was measured with the help of Dry Spirometer and recorded in liter. Cardio Vascular Endurance was measured through Modified Harvard Step Test proposed by Lucien Brouha and M.V. Ball. Help and verbal support for Blind and signal support for deaf was given by mediator as and when required by special needed children.

STATISTICAL PROCEDURE

To investigate the mean difference between Blind and Deaf groups, student 't' ratio was employed at 0.05 level of significance which was considered appropriate, keeping in view the limitation of the subjects.

FINDINGS

The result of the study has been presented in tabular form as given hereunder.

Table points out that the obtained 't' ratio of 3.3 lfor systolic Blood Pressure, 3.19 for diastolic Blood Pressure and 2.25 for Cardio Vascular Endurance were significant at 0.05 level as obtained 't' values were lower than the tabulated 't' value of 2.02 required for significance. However the 't' value of 0.99 for Vital Capacity was not significant at 0.05 level as obtained value was lesser than tabulated 't' value of 2.02 required for significance.

Diagram 1 represent the mean value of Systolic Blood Pressure of Special Needed Children, where checked bar stands for Blind and Red bar stands for Deaf Children.

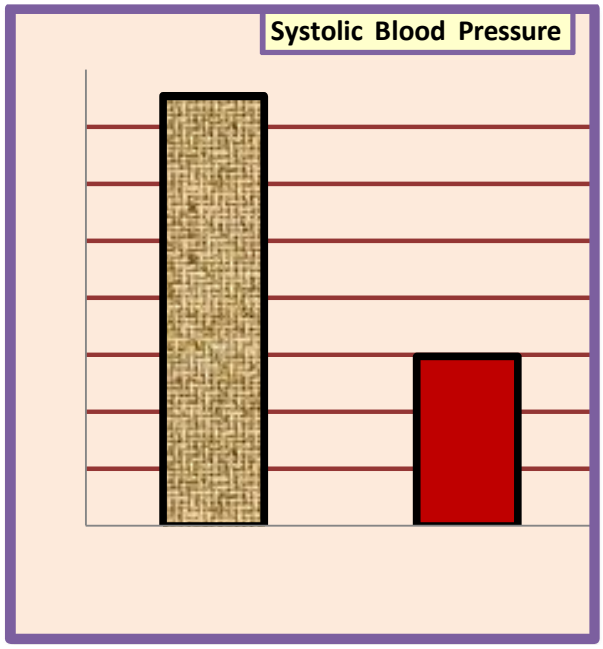

Diagram 1

Table 1: Mean, Standard Deviation and Standard Error of Physiological Variables of Special Needed School Going Children

Variables	Group	Mean	Mean Difference	Standard Deviation	Standard Error	't' value
Blood Pressure (Systolic)	Blind	107.09	9.13	8.83	1.88	3.31*
	Deaf	97.96		9.49	2.02	
Blood Pressure (Diastolic)	Blind	70.18	7.32	8.59	1.83	3.19*
	Deaf	62.86		6.45	1.38	
Vital Capacity	Blind	1.85	0.1	0.41	0.09	0.99
	Deaf	1.95		0.25	0.05	
Cardio Vascular Endurance	Blind	62.75	4.63	8.53	1.82	2.25*
	Deaf	67.38		4.50	0.96	

Significant at 0.05 level

Diagram 2 shows the Mean Value of Diastolic Blood Pressure of Special Needed Children, where checked bar stands for Blind and Red bar stands for Deaf Children.

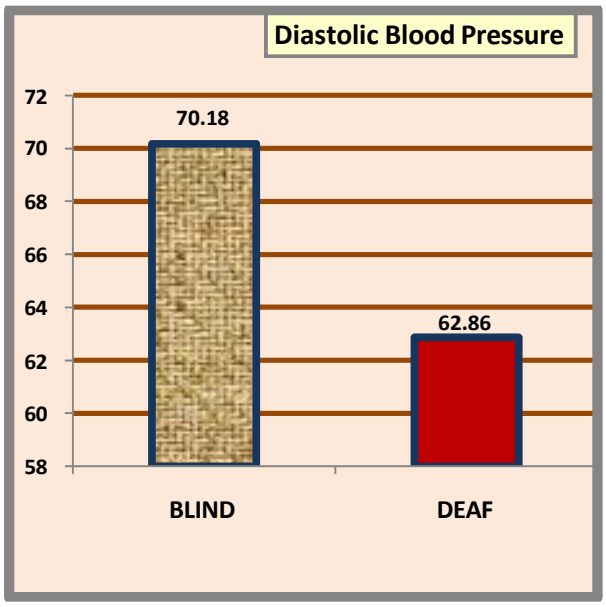

Diagram 2

Diagram 3 represent the mean value of Vital Capacity of Special Needed Children, where doted bar stands for Blind and Red bar stands for Deaf Children.

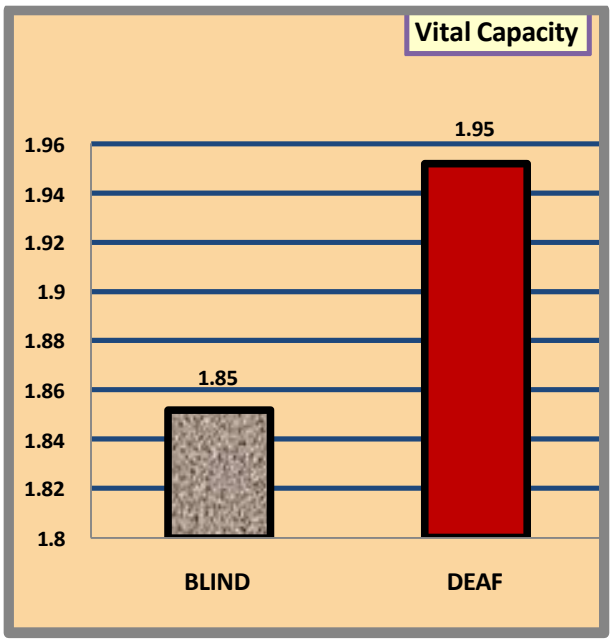

Diagram 3

Diagram 4 shows the Mean Value of Cardio Vascular Endurance of Special Needed Children, where doted bar stands for Blind and Green bar stands for Deaf Children.

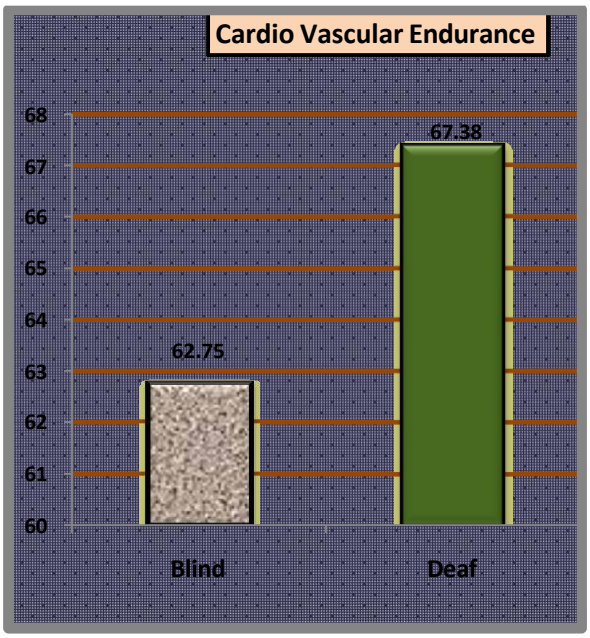

Diagram 4

DISCUSSION OF FINDINGS

Above Table depicts that Blind children had higher Blood Pressure where as Deaf showed nearer to normal value. According to researcher the reasons for high Blood Pressure in Blind school going children may be attributed to the following grounds. Blind children have limited scope for variation in movement in supported games due to their impairment. So they start feeling monotonous within short period of play. Short duration activities with frequent interruption are considered as anaerobic activity which failed to improve the complete efficiency of heart. In case of Blind children for their non-continuous activity elasticity of blood vessels, cardiac hypertrophy is not ensured[5]. Blind school children hardly take part in vigorous activities and because of that there is no variation in blood flow rate. The stereo type flow of blood help to accumulate extra amount of cholesterol and other debris on the wall of blood vessels and it restrict the normal blood flow by narrowing the channel of blood vessels. Due to these reasons extra pressure is put on the wall of the blood vessels and result into abnormal Blood Pressure in case of Blind school going children. Whereas Deaf children can enjoy the free play, uninterrupted play and variation in play as normal children. They can obtain normal physiological benefits of exercise as there is variation in the tempo and rhythm of play, which lead to enjoy normal Blood Pressure.

From above table it is clear that there was no significant difference in Vital Capacity between Blind and Deaf school going children. Vital Capacity (VC) of

an individual is determined by Inspiratory Reserve Volume (IRV), Tidal Volume (TV) and Expiratory Reserve Volume (ERV).[6] The insignificant result of VC may be attributed to the fact that the value of IRV, TV and ERV of Blind and Deaf children might have not been influenced by the nature of their abnormalities. VC of an individual also depends upon the synchronized movement of respiratory muscles, elastic properties of chest wall, efficiency of lungs etc[7]. In case of Blind and Deaf children these factors might have played dominating role in determining their Vital Capacity. Nature of their disabilities and their participation in games and sports might have not played any significant role in this.

Above Table also illustrates that Blind school going children had lower mean value of Cardio Vascular Endurance than Deaf school going children. Researcher predicted that the findings may be attributed for the following reasons. Cognitive disability of Blind restricts them from participating in long enduring activities. The restriction in variation, duration and continuity of exercises do not improve their Cardio Vascular Endurance, whereas Deaf children could participate in both aerobic and anaerobic type of exercises. As they can freely participate in aerobic activities their diaphragm and inter costal muscles became stronger and working capacity also increased.

CONCLUSION

It is concluded from the obtained result that Visual impairment of the children may lead to higher Blood Pressure whereas normal Blood Pressure is not affected by hearing impairment. On other hand, type of disabilities like visual and hearing impairment do not influence the Vital Capacity of special needed children. Movement limitation of Blind children makes them inferior in Cardio Vascular Endurance when compared to Deaf school going children.

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Physical Education Lesson and Academic Learning Time

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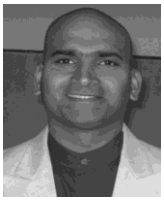

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ABSTRACT

The purpose of this study was to examine the type and frequency of student teacher behaviours during physical education lessons. The amount of time student teacher were actually engaged in practicing physical education skills during the lessons was examined subjects in this study were ten Physical Education student teachers and children in their classes. To collect data on student teacher behaviour, the researchers observed student teachers during their normal Physical Education lessons. The results of the study show there is a lot of time utilised in Physical Education lessons, for example, student teachers utilise 31.9% of lesson time on explanation, 18.2% of lesson time on class management and 11.9% on organizing activities. The study also shows the average time spent by children practicing physical activity was approximately 9.5% of the entire lesson. The study recommends the need to decrease time utilised on explanation and class management behaviours by implementing more efficient class routines and combine explanations with practice.

Keywords: *Academic Learning Time; Physical Education; Teacher Behaviour, Student Teacher, Children*

INTRODUCTION

Physical education (PE) is an integral part of educational programs for nearly all school children. The importance of PE can be emphasised in two main ways, one possibility is to focus on the physical side, and the other principle option is to emphasize the educational potential. Thus, many factors affect students' achievements in physical education. One of the most important factors is the amount of time that students are motor engaged in physical activities appropriate for their abilities resulting in high success rates. This factor has been identified as academic learning time–physical education (ALT-PE). Few researchers have emphasised on few factors related to the study they are as:

1. Brandl-Bredenbeck (2005), Physical education (PE) is an integral part of educational programs for nearly all school children. The importance of PE can be emphasised in two main ways, one possibility is to focus on the physical side, and the other principle option is to emphasize the educational potential.
2. Colvin and Johnson (1998), asserted the need for active participation where classes should be organized so that all children are actively involved in performing the skills that are being taught.
3. Rink (1998), Instructional opportunities are lost if children must wait in lines. Students' learning time ultimately determined the performance of learning tasks and therefore is a critical factor that may influence learning.
4. Godbout, Brunelle, & Tousignant (1983), agreed that one of the most important factors is the amount of time that students are motor engaged in physical activities appropriate for their abilities resulting in high success rates. This factor has been identified as academic learning time–physical education (ALT-PE).

STATEMENT OF PROBLEM

The academic learning time is important as an indicator for the quality and accountability of physical education. The researchers, according to their field experience and interest noted that the physical fitness and general physical condition of students in schools was poor. This was emphasized by Al-Bayyat and Mismar (1996) in their study, which revealed that the majority of students had a low level of physical activity and therefore, a low level of physical fitness. Moreover, Cale and Almond (1992), Centers for Disease Control and Prevention (1997) and Welk (1999) reported that physical activity levels of adults and children remain low in many countries of the world. This situation could be attributed to lack of time available for students to practice physical education activities. In this context, Al-Bataineh and Al-Dari (1987) noted that the teacher effectiveness in PE relies on increasing the

time spent on practicing the activity. Based on the above, and in the lack of studies related to analyse the relationship between teacher behaviour and academic learning time of students at middle school class, when students are taught by specialist physical education teachers.

This study was designed to analyse student teachers' behaviour and the amount of time students practice actual activities. This will provide valuable data on where time is being spent in order to increase activity time which could help to secure improvement of physical education.

AIMS OF THE STUDY

This study aims to achieve the following:

1. Determine the percentage of academic learning time where students are engaged in practicing physical education skills during the lessons.
2. Determine the percentage of teacher behaviour i.e. (explanation, watching student practice the skills, organize the activities and lesson skills, class management, management behaviour, and uncodable) during the physical education lessons for students grade 5-7 in Irbid First Directorate.
3. Examine the level of relationships between teacher behaviour and students ALT-PE.

RESEARCH QUESTIONS

The following research questions were posed to provide a framework for studying the relationship between teacher behaviours and student academic learning time in physical education grades 5-7:

1. What is the mean ALT-PE of students, observed in grades 5-7 classes?
2. What teacher behaviours, as defined by Andersons' observation categories, that occur the most in the grade 5-7 settings?
3. Are there significant relationships at the 0.05 level of significance between student teacher behaviours as defined by the Anderson observation categories and student ALT-PE?

METHODOLOGY

Participants

The subjects of this study were ten physical education Student Teachers and their middle school classes in Bolpur, Santiniketan. The subjects were randomlyselected to participate in the study during the first academic semester 2013 with all classes being coeducational. Attempts were made to include subjects from different schools within the area. Data was collected from ten different schools.

Teachers

Ten physical education student teachers i.e. six males and four females, participated in the study. The ten student teachers were randomly selected from the Bachelor of Physical Education class of Visva-Bharati, Santiniketan. All student teachers who were selected to participate in the study then met with the researchers during the preparation period. The student teachers were given an explanation about the nature and the purpose of the study, as well as the sampling procedures which were to be used. In order to minimize the effects of the investigator's behaviours, the subjects were not pre informed about the specific target behaviour, (explanation, watching student practice the skills, organize the activities and lesson skills, class management, management behaviour, and uncodable) to be observed.

Students: All participating students were from the middle school classes of selected schools in Bolpur, Santiniketan. For each lesson the researcher selected three target students for observation (one high, one medium, and one low in their skills). In order to obtain the student teacher's views of the three students' high, medium, and low skill levels, he/she was asked to list the names of six students (two high, two medium, and two low skilled) the lesson before the observation took place. The criteria used to determine the skill levels were based upon the level of attendance of lessons, students marks in Physical Education and the level of participation in activities during school time and outside the school timetable. From each of these three groups the researchers randomly selected one student from each level for each case of study. The student teachers were not informed which students were chosen nor the specific behaviours or events being observed during the observation.

Instrumentation

The Anderson Observation Instrument (Anderson, 1980) which included 6 categories of teacher behaviour was used for the study.

1. *Explanations:* this refers to the verbal statements instructing the pupils on which physical skills to carry out and how to do them, giving examples using teachers or students where appropriate to demonstrate the correct manner of performing the skill. Also, using any educational technology available to facilitate students' learning and correct any mistakes.

2. Teacher watching student practice the skills: refers to the amount of time the teacher spends on watching students without comment while they perform the skills being taught in class.
3. Organize the activities and lesson skills this refers to any responsibility or duties for the teacher. For example, time distribution, giving instructions to the student to commence or stop the activities in which they are involved, recording and refereeing any competition between students.
4. *Class Management:* refers to the time the teacher is using behaviours that are related to the class. The students may or may not be involved in activity during this time. For example, the teacher may be repairing equipment, or apparatus that has broken during the course of the class, sweeping water off a court that is to be used during the class, dividing students into different groups to perform a range of activities.
5. *Management behaviour:* refers to the interaction process between teacher and student to facilitate the social domain in the class such as Praise: refers to positive or supportive statements or gestures of a general nature made by the teacher during or following a behavioural episode, an example of "this is good everyone is quiet and listening", Scold: refers to the times a teacher verbally or non-verbally scolds a student or students in a low or high intensity manner for an undesirable social behaviour. Examples: "I told you to get in line", or "you are making too much noise".
6. Uncodable refers to any behaviour not included under any of the previous categories. Also any behaviour which happened without interaction, for example talking with another person outside of the class, inking water, take off the jacket, sitting and reading newspapers.

DATA COLLECTION

The following procedures were used:

1. A letter from the Head, Department of Physical Education of Visva-Bharati, Santiniketan, was sent to the selected schools asking for permission for the BPEd, course Internship for the departmental student teachers lessons and data collection for the research.
2. The student teachers and their classes were videotaped during the study. The mean size of the 10 classes was 36.6. An Analysis of Teachers' Behaviour and Students' Academic Learning Time in Physical Education at the Middle school Classes ranged in length from 30-38 minutes. There were a variety of units taught including football (n= 6), basketball (n = 5), gymnastics (n = 4), volleyball (n=1), and handball (n = 4).
3. Each videotape was coded once using the Anderson observation categories to obtain student teachers behaviour and then a second time to collect data on student time in ALT.

DATA ANALYSIS

The data was analysed by 2 methods. The first was calculated by the researchers themselves and utilized descriptive statistics and included frequencies, means and percentages for each category of teacher behaviours (as in Anderson Observation system):

1. The number of times each of the specific 6 categories was coded per lesson was determined.
2. The total number of behaviours occurring in each lesson was then calculated.
3. The following equation was then applied and results were calculated in the following manner for all 10 teachers.

$$\text{\% of Behaviour Occurrence} = \frac{\text{Number of times 1 category is coded during one lesson}}{\text{Total number of all behavior coded during one lesson}} \times 100\%$$

4. The percentages were then submitted to the SPSS computer programme for statistical analysis.
5. To determine the amount of time students (one medium, one high and one low skill) spent in actual movement, the observer recorded the time the lesson started using a stop watch, then the total amount of time the students spent actually practicing activities, the time of the lesson end was noted, the following equation was used:

$$\text{ALTPE} = \frac{\text{Student Total Practice Time}}{\text{Total lesson time}} \times 100\%$$

The time on the stopwatch was compared with that on the video tape to ensure accuracy and validity.

STUDENT TEACHERS BEHAVIOUR

In order to provide an answer to the second research question: Which student teacher behaviours, as defined by Andersons' observation categories, occur the most in

the middle school class settings? The results are shown in Table 1

Table 1: The mean of Behaviours as Found in the Anderson Observation System Behaviour Tool (N = 10)

Behaviour Categories	Mean	Std. Deviation
Explanation	31.9	7.3
Watching students practicing the PE skills	30.3	5.7
Class management	18.2	3.0
Organize the activities and lesson skills	11.9	2.0
Management behaviour	4.3	1.1
Uncodable	3.4	1.6

Table 1 shows that the highest percentage of student teachers behaviour occurred was in the category of explanations accounting for 31.9% of all observed lessons. This was followed by the student teacher watching the students' practicing their skills (30.3%). The second highest percentage was observed for class management (18.2 %). The Organization of activities and lesson skills accounted for 11.9% of the lesson time. Whereas, the management behaviour was 4.3% and the last behaviour was uncodable with 3.4%.

STUDENT ACADEMIC LEARNING TIME

In order to provide an answer to the research question: What is the mean ALT-PE of students with excellent, medium, and weak skill levels, observed in middle school classes? ALT-PE in this study is the time students are engaged in physical education activities from beginning to end of a physical education lesson. The results are shown in table 2 below.

Table 2: The Mean of the ALT-PE According to the Skill Level of Students

Type of Students	N	Mean	Std. Deviation
Excellent	10	11.5	1.6
Medium	10	9.3	1.5
Weak	10	7.7	1.2
Total	30	9.5	1.4

The table 2 shows the average ALTP E time for students in each of the different skill levels. It may be noted that the students with an excellent level of skills had a higher ALT PE time than those of a weak or a medium skill level.

CORRELATION OF STUDENT TEACHER BEHAVIOUR TO ALT

In order to provide an answer to the third research question: Are there significant relationships at the .05 level of significance between student teacher behaviours as defined by the Anderson observation categories and student ALT-PE? The following results were shown in Table 3.

Table 3: Pearson Product Moment Correlation Coefficients for Anderson Observation Instruments Behavior Categories with Student ALT-PE

Pearson Correlation	Behaviour with Excellent Students	Behaviour with Medium Students	Behaviour with Weak Student
Explanation	0.05	-0.10	0.17
Watching in silence	0.09	0.13	-0.01
Organize the activities & lesson skills	0.10	-0.11	0.02
Class management	-0.3 *	-0.22 *	-0.58
Management behaviour	-0.03	0.31	0.07
Uncodable	0.08	0.24	0.19

The Pearson Product Moment Correlation indicated that there was no significant relationships between student teacher behaviour in the physical education lessons and academic learning time for students of all skill levels (excellent, medium and weak). Correlation analysis indicated that class management behaviour had a significant negative relationship with ALT-PE for weak and medium students.

DISCUSSION

The first question examined in this study was the type and frequencies of student teacher behaviour during the physical education session. The Anderson Observation instrument data indicated that the top behaviour was explanation. The 31.9% of the lesson used for explanation seems exceedingly high, where only 22.6% of the lesson time was spent on presentation. This indicates a high level of explanation was needed for the students to attempt the skills being taught. In this respect, Baily (2001) stated that one of the main difficulties that occur during PE lessons which affect the time available for students to practice the activities is teacher behaviour such as talking for a long time, especially in the beginning of the lesson instead of moving quickly to actual practice. Maowth (1978) said that the time taken by teacher explaining what the class should be doing reduces the 45 minute session by 10 minutes while the students are required to stand and listen. Class size and the teaching style used by teachers could affect the Academic learning time-E. Command style which was used in all the lessons observed is, where the teacher is totally dominant, and he or she dictates the activity to be performed, when the pupils should begin and when they should stop. This does not suit the number of the students per class, the average of which was (36.6 students). Williams (1993) mentioned that command style could achieve improvements in physical

performance when used in a small group situation and certain activities such as vaulting, or trampoline.

This shows the need for student teachers to understand and select the most effective teaching styles and methods for physical education settings. Examples of this are the effectiveness of station work when limited equipment is available, the use of task cards to focus student attention and learning and to minimize time students spend receiving instructions.

The results of the study also indicated the time taken by class management (18.2%) i.e students setting out equipment or moving from station to station or choosing teams could affect the amount of time left for practicing activities. This varies on class size, classes with larger numbers of students needing more time for class management. The finding of the study showed that participants in the smaller class spent an average of 11 minutes 17 seconds (38% of lesson time) on practicing skills compared to only 6 minutes 25 seconds 21% of lesson time) in large class sessions. This agreed with Hastie and Saunders (1991) who reported that significantly more students were engaged in off-task behavior during physical education soccer lessons in large classes (n= 44) compared to smaller classes (n = 12-24). Not surprisingly, class management had the strongest relationship with ALT with a negative correlation for weak and medium students. It was found that class management used up time that would otherwise have been used for skill practice especially if the class size was large. Physical education lessons with a large class involved approximately 30% more time on organization i.e more time spent in transition between activities. Also, Hendry (2000) said that in large classes, children could escape teacher scrutiny and time was wasted organizing participations into groups. This research indicates there is a lot of time wasted in physical education lessons, where students spent an average of 9.5 % of the lesson practicing Physical Education skills. It may be noted that higher skilled students spent a longer time (11.5%) practicing the physical activities than medium (9.3%) and lower (7.7%) skilled students. This agreed with the results of Metcalf (1986) who noted that highly skilled students spent more time practicing physical activities than lower skilled students who spent more time waiting for instructions from the student teacher. The reasons for the low percentage may be attributed to the type of activities taught. In individual activities more opportunities are provided for students to practice skills whilst team activities demand more explanation and class management time from the student teacher resulting in less practice time being available. In this respect, Siedentop and Tannehill (2000) pointed out the relationships between certain types of activities and the affects they have on the amount of Allocated activity time PE accumulated by students. Fitness and dance are highest, individual sports come next, and team sports and gymnastics were lowest.

RECOMMENDATIONS

From these results, it seems fair to suggest that student teachers should decrease explanation and class management behaviours by implementing more efficient class routines, decreasing student teacher talk prior to activity, and combine explanations with practice. As research has shown that practicing allocated activity time in school physical education needs to be increased, it may be suggested that reducing the time to get changed, providing more equipment, organization of after school activities by physical education student teachers would provide more opportunities for higher achieving students to spend more time in structured learning activities. Weekends, and summer months could also provide opportunities for additional learning to take place. Future studies should be completed examining the relationships between teacher and student behaviours. The results of this study can only be generalized to the ten student teachers and their students in the observed classes. Additional studies in other settings would be helpful to expand the database in this area. Studies focusing on the effects of such things as class size, structure, and other types of teaching methods and their relationships with student Allocated activity time could also aid teachers and researchers to better understand what constitutes an effective teaching-learning environment.

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Role of Competitive State Anxiety in Softball Players Performance

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ABSTRACT

This study examined the role of competitive state anxiety in performance of softball Players. To obtain required data, the investigators had selected seventy five (N=75) male district, state and national level softball players were selected. They were further divided into three groups N = 25 each (i.e., N1=25; District, N2=25; State and N3=25 National). To measure the level of State Anxiety of the subjects, the Competitive State Anxiety Inventory-2 (CSAI-2) scale constructed by Rainer Marten was administered. One Way Analysis of Variance (ANOVA) was employed to compare the different level of performance. Where 'F' values were found significant, LSD (Least Significant Difference) Post-hoc test was applied to find out the direction and degree of difference. For testing the hypotheses, the level of significance was set at 0.05. The results revealed significant differences have been noticed in the variable cognitive anxiety, somatic anxiety, self-confidence and competitive state anxiety with regards to district, state and national level softball players. The findings of these studies also reveal that the psychological factors are highly related with the performance of team game players.

Keywords: *Competitive State Anxiety, Cognitive Anxiety, Somatic Anxiety, Self-Confidence, Softball Players.*

INTRODUCTION

Sports psychologists can teach skills to help athletes enhance their learning process and motor skills, cope with competitive pressures, fine-tune the level of awareness needed for optimal performance, and stay focused amid the many distractions of team travel and in the competitive environment. Psychological training should be an integral part of an athlete's holistic training process, carried out in conjunction with other training elements. This is best accomplished by a collaborative effort among the coach, the sport psychologist, and the athlete; however, a knowledgeable and interested coach can learn basic psychological skills and impart them to the athlete, especially during actual practice. In order for us to determine whether psychology plays a significant role in the mind of a young athlete, we must look at the uses and techniques of sport psychology. Sport psychologists over the years have maintained a keen interest in psychological profiling and have been naturally drawn to the quantification of personality variables. As sport itself revolves around the measurement and reward of individual differences in performances, it is no surprise that scientists quantify psychological differences rather than sporting differences.

Each psychological variable has its unique contribution towards sports performance but some of the variables are preferably and specifically suitable for few games. The psychological parameters such as personality traits, anxiety, self-esteem and mental toughness are among the factors that can be considered to determine psychological predictors (Anizu et al., 2003).

The ability to cope with pressure and anxiety is an integral part of sports, particularly among elite athletes (Hardy, Jones, & Gould, 1996; Orlick & Partington, 1988). Researchers have reported that over 50 of consultations among athletes at an Olympic festival were related to stress or anxiety related problems (Murphy, 1988). Research has demonstrated that the ability to cope with intense anxiety is integral to success in competitive sport, particularly at the highest levels (Gould, Eklund, & Jackson, 1992a, b; Scanlan, Stein, & Ravizza, 1991). Accordingly, a great deal of research has been directed towards the study of anxiety in sport, much of it utilizing the Competitive State Anxiety Inventory-2 (CSAI-2) (Martens, Burton, Vealey, Bump, & Smith, 1990). The CSAI-2 assesses the intensity of cognitive anxiety (characterized by negative expectancies and self-doubts), and somatic anxiety (typified by symptoms such as increased heart rate and muscular tension), along with a third component, self-confidence.

Anxiety is made up of a mental (cognitive) component and a physiological (somatic) component.

Prior research has indicated that the relationship between somatic anxiety and performance is curvilinear (i.e., as anxiety increases, performance increases to a point then begins to decrease as anxiety continues to increase). However, prior research has also indicated that the relationship between cognitive anxiety and performance is negatively linear (i.e., as anxiety increases, performance decreases). Terry and Youngs (1996) indicated that the ability to predict performance from the multidimensional approach was stronger for "open" sports, which deal with greater interaction between opponents and less environmental control (e.g., softball, basketball), than it is for "closed" sports which are more individualized (e.g., golf, archery). Findings have also shown that the less experienced and non elite performers will experience a steady increase in anxiety right up to and even during performance, whereas, experienced and elite performers demonstrate a similar prevent increase, but then a reduction just prior to and during performance. Competition can cause athletes to react both physically (somatic) and mentally (cognitive) in a manner which can negatively affect their performance abilities. Stress, arousal and anxiety are terms used to describe this condition.

There is always a pre-defined 'region of anxiety' in a sportsperson, before the start of any game, bout or a race. When this anxiety is at the optimum level, it can lead to a significantly better performance. If the level exceeds or falls below this 'region of anxiety', it can adversely affect the performance. Research has also proved that performances influenced by anxiety have more impact in a team game than in a solo sport. A swimmer has higher levels of performance anxiety than a baseball player. The dominant and top players of a game convert their performance anxiety into excitement, which stimulates the positive hormones, resulting in winning performances. They take the anxiety arousal as a facilitator to come up with a better performance. A sportsperson whose mind interprets anxiety as a debacle often end up losing. Performing to the best of abilities has become more relevant in today's sport, because of the extensive media exposure. Sports are at the peak of their popularity all throughout the world, cutting across the barriers of richness or poverty, nationality, race or religion. In order to sustain the tremendous expectations of the fans and also to maintain a high ranking in the international arena, it is important to perform well. Self-confidence, strong resolve, humility to accept defeat and experience are the best tools to counter the effects of anxiety. Anxiety is not a disease that a sportsperson can get rid of, once and for all. It has to be used as a booster to improve performance, to achieve sporting glory. This study investigates the significant difference of competitive state anxiety" among district, state and national softball players.

SELECTION OF SUBJECTS

To obtain required data, the investigators had selected seventy five (N=75) male district, state and national level softball players were selected. The purposive sampling technique was used to select the subjects. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study. They were further divided into three groups N = 25 each (i.e., N_1=25; District, N_2=25; State and N_3=25 National)

- District Level Softball Players.
- State Level Softball Players.
- National Level Softball Players.

INSTRUMENTATION

To measure the level of State Anxiety of the subjects, the Competitive State Anxiety Inventory-2 (CSAI-2) scale constructed by Rainer Marten was administered. Further it assesses competitive anxiety on the basis of three dimension anxiety i.e.

- Cognitive anxiety.
- Somatic anxiety.
- Self-confidence.

STATISTICAL TECHNIQUES

One Way Analysis of Variance (ANOVA) was employed to compare the different level of performance. Where 'F' values were found significant, LSD (Least Significant Difference) Post-hoc test was applied to find out the direction and degree of difference. For testing the hypotheses, the level of significance was set at 0.05.

It is evident from table 1 that there is significant difference in cognitive anxiety among district, state and national level softball players, since f value observed 11.003 is much greater than the tabulated value 3.12 at 0.05 level of significance. Above finding clearly indicates that softball players of three performance level-district, state and national level are different in

cognitive anxiety. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups. The post hoc mean comparison on cognitive anxiety presented in Table 2.

Table 1: Analysis of Variance (ANOVA) Results among District, State and National Level Softball Players with Regard to the Sub-parameter Cognitive Anxiety

Source of Variance	Sum of Squares	df	Mean Square	F-ratio	P-value (Sig.)
Between Groups	174.427	2	87.213	11.003	.000
Within Groups	570.720	72	7.927		
Total	745.147	74			

Significant at.05 level of significance
$F_{.05}$ (2, 72) =3.12

Table 2: Analysis of Least Significant Difference (LSD) Post Hoc-test among District, State and National Level Softball Players with Regard to the Sub-parameter Cognitive Anxiety

Group (A)	Group (B)	Mean Difference (A-B)	P-value (Sig.)
District (Mean=27.32)	State	3.56000	.000
	National	.80000	.606
State (Mean=30.88)	District	3.56000	.000
	National	2.76000	.004
National (Mean=28.12)	District	.80000	.606
	State	2.76000	.004

A glance at depicted to Table-2 results showed that while comparing the mean values of all the three groups i.e. district, state and national level softball players with the help of Least Significant Difference (LSD) post hoc test then it is showed that state level softball players had higher cognitive anxiety than their counterparts; district and national level softball players.

Table 3: Analysis of Variance (ANOVA) Results among District, State and National Level Softball Players with Regard to the Sub-parameter Somatic Anxiety

Source of Variance	Sum of Squares	df	Mean Square	F	P-value (Sig.)
Between Groups	304.027	2	152.013	19.453	.000
Within Groups	562.640	72	7.814		
Total	866.667	74			

Significant at.05 level of significance
$F_{.05}$ (2, 72) =3.12

It is evident from table 3 that there is significant difference in somatic anxiety among district, state and national level softball players, since f value observed 19.453 is much greater than the tabulated value 3.12 at 0.05 level of significance. Above finding clearly indicates that softball players of three performance level-district, state and national level are different in somatic anxiety. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups. The post hoc mean comparison on somatic anxiety presented in Table 4.

Table 4: Analysis of Least Significant Difference (LSD) Post hoc-test among District, State and National Level Softball Players with Regard to the Sub-parameter Somatic Anxiety

Group (A)	Group (B)	Mean Difference (A-B)	P-value (Sig.)
District (Mean= 25.88)	State	3.84000*	.000
	National	4.60000*	.000
State (Mean=22.04)	District	-3.84000*	.000
	National	.76000	.632
National (Mean=21.28)	District	-4.60000*	.000
	State	-.76000	.632

A glance at depicted to Table-4 results showed that while comparing the mean values of all the three groups i.e. district, state and national level softball players with the help of Least Significant Difference(LSD) post hoc test then it is showed that district level softball players had higher somatic anxiety than their counterparts; district and national level softball players.

Table 5: Analysis of Variance (ANOVA) Results among District, State and National Level Softball Players with Regard to the Sub-parameter Self-confidence

Source of Variance	Sum of Squares	df	Mean Square	F	P-value (Sig.)
Between Groups	52.560	2	26.280	5.922	.004
Within Groups	319.520	72	4.438		
Total	372.080	74			

Significant at.05 level of significance
$F_{.05}$ (2, 72) =3.12

It is evident from table 5 that there is significant difference in self-confidence among district, state and national level softball players, since f value observed 5.922 is much greater than the tabulated value 3.12 at 0.05 level of significance. Above finding clearly indicates that softball players of three performance level-district, state and national level are different in self-confidence. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups. The post hoc mean comparison on self-confidence presented in Table 6.

Table 6: Analysis of Least Significant Difference (LSD) Post hoc-test among District, State and National Level Softball Players with Regard to the Sub-parameter Self-confidence

Group (A)	Group (B)	Mean Difference (A-B)	P-value (Sig.)
District (Mean= 18.72)	State	1.20000	.139
	National	.84000	.375
State (Mean=19.92)	District	1.20000	.139
	National	2.04000	.004
National (Mean=17.88)	District	.84000	.375
	State	2.04000	.004

A glance at depicted to Table-6 results showed that while comparing the mean values of all the three groups i.e. district, state and national level softball players with the help of Least Significant Difference(LSD) post hoc test then it is showed that state level softball players had higher self-confidence than their counterparts; district and national level softball players.

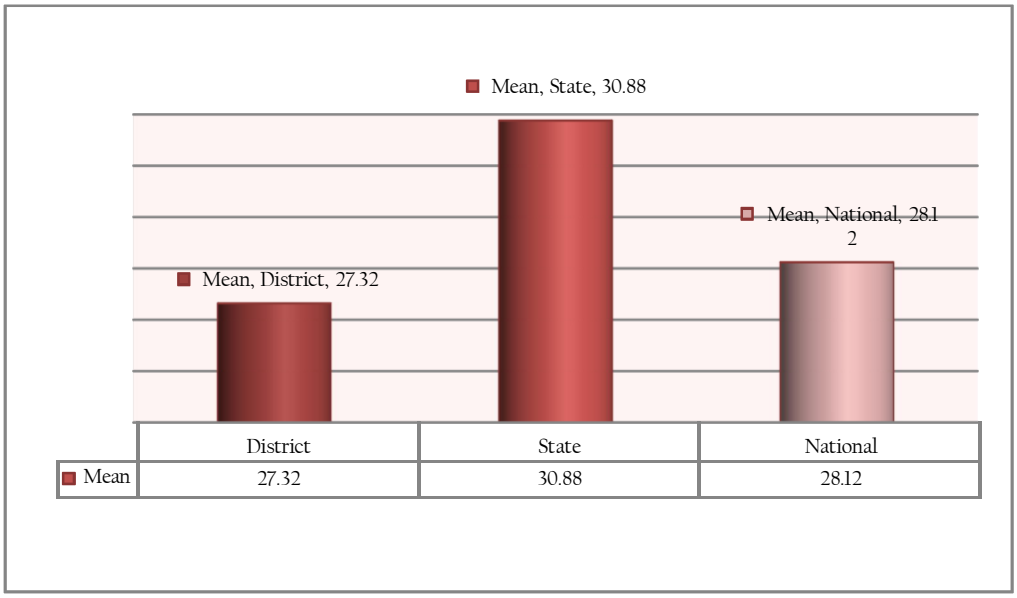

Fig. 1: Graphical Representation of Mean Scores with Regard to District, State and National Level Softball Players on the Sub-parameter Cognitive Anxiety

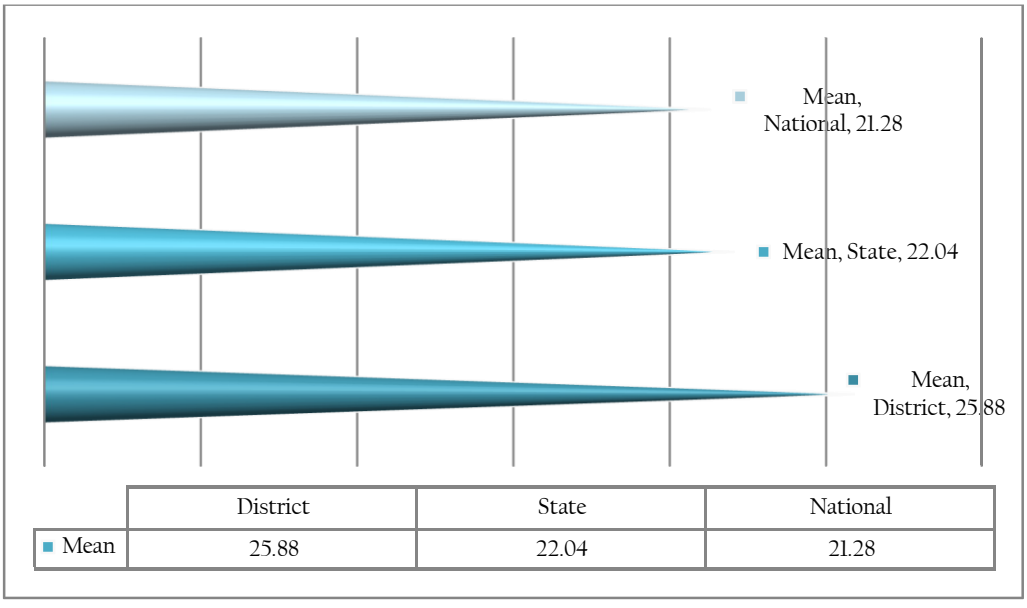

Fig. 2: Graphical Representation of Mean Scores with Regard to District, State and National Level Softball Players on the Sub-parameter Somatic Anxiety

Table 7: Analysis of Variance (ANOVA) Results among District, State and National Level Softball Players with Regard to the Parameter Competitive State Anxiety

Source of Variance	Sum of Squares	df	Mean Square	F	P-value (Sig.)
Between Groups	444.080	2	222.040	10.003	.000
Within Groups	1598.240	72	22.198		
Total	2042.320	74			

Significant at.05 level of significance
$F_{.05}$ (2, 72) =3.12

It is evident from table 7 that there is significant difference in competitive state anxiety among district, state and national level softball players, since f value observed 10.003 is much greater than the tabulated value 3.12 at 0.05 level of significance. Above finding clearly indicates that softball players of three performance level-district, state and national level are different in competitive state anxiety. As f value was found significant post hoc mean comparison was used to exactly find the difference as well as level of difference between the groups. The post hoc mean comparison on competitive state anxiety presented in Table 8.

Table 8: Analysis of Least Significant Difference (LSD) Post Hoc-test among District, State and National Level Softball Players with Regard to the Sub-parameter Competitive State Anxiety

Group (A)	Group (B)	Mean Difference (A-B)	P-value (Sig.)
District (Mean= 71.92)	State	.92000	.789
	National	4.64000	.004
State (Mean=72.84)	District	.92000	.789
	National	5.56000	.000
National (Mean=67.28)	District	4.64000	.004
	State	5.56000	.000

A glance at depicted to Table-8 results showed that while comparing the mean values of all the three groups i.e. district, state and national level softball players with the help of Least Significant Difference(LSD) post hoc test then it is showed that state level softball players had higher competitive state anxiety than their counterparts; district and national level softball players.

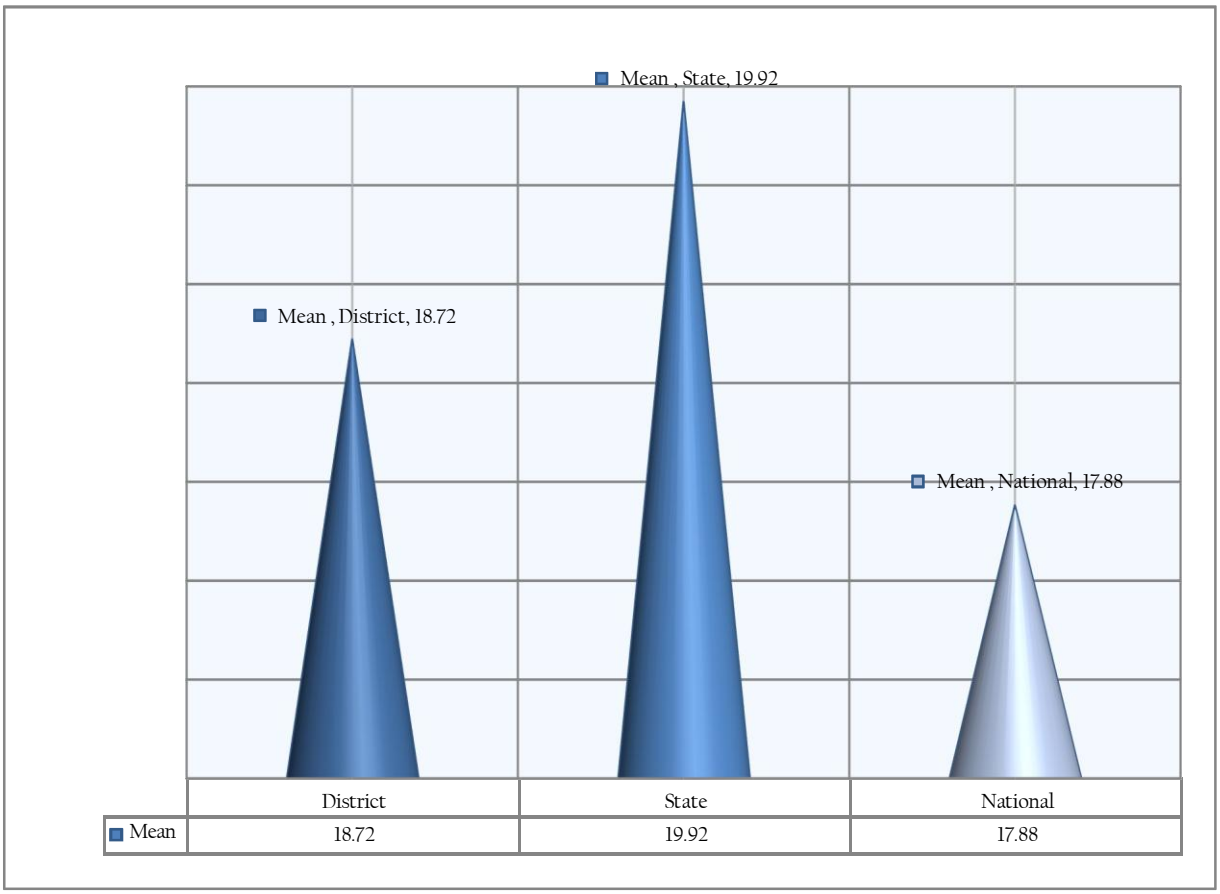

Table 3: Graphical Representation of Mean Scores with Regard to District, State and

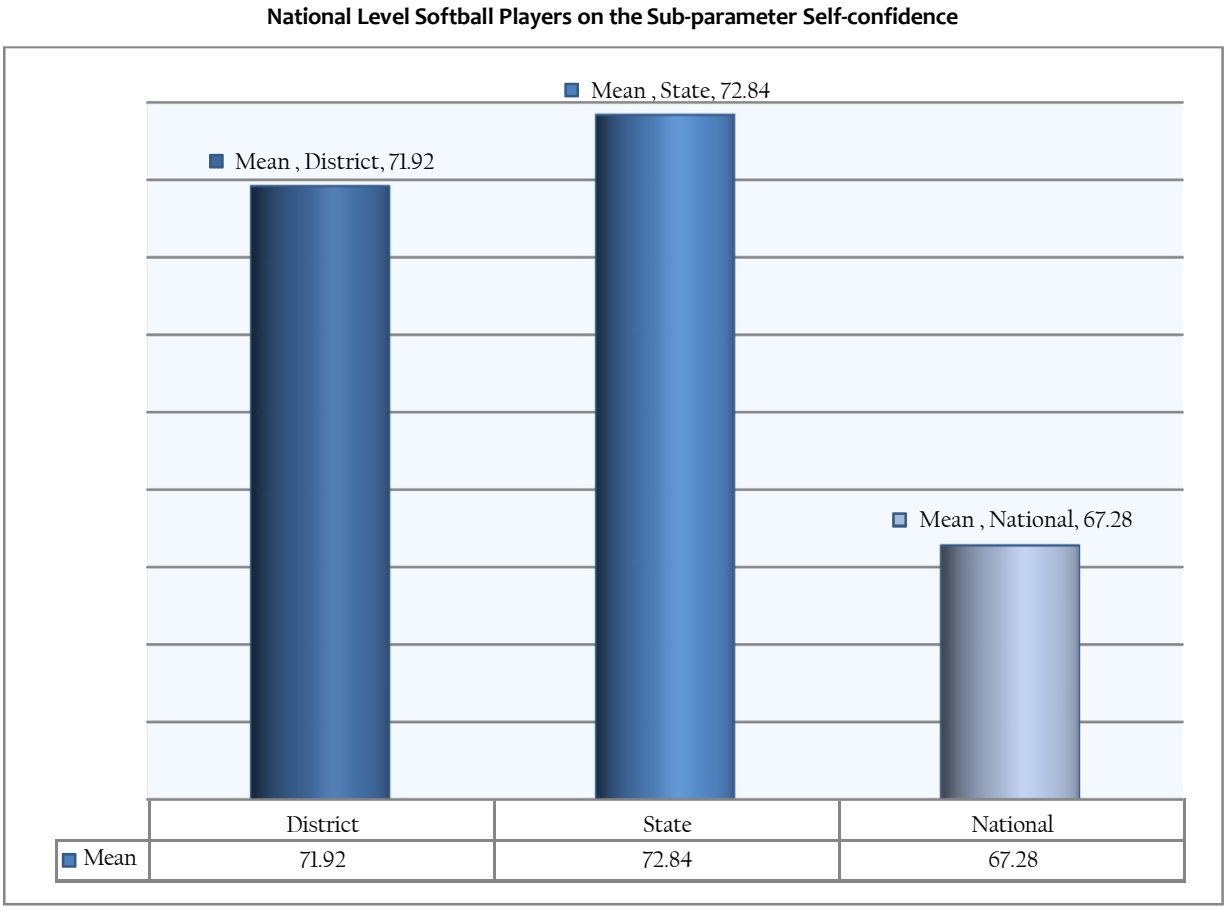

Fig. 4: Graphical Representation of Mean Scores with Regard to District, State and National Level Softball Players on the Sub-parameter Competitive State Anxiety

DISCUSSION OF FINDINGS

Sport psychology has emerged as a field with a research tradition that provides a foundation for direct application with athletes. As the role played by psychological factors in the performance and over well-being of athletes has become better understood, intervention have been designed to favorably affect athlete behavior throughout their involvement in sport and beyond. Sport psychology researchers have been interested in how athletes' psychological and characteristics influence performance. From this point, it is clear that psychological characteristics differ between more and less effective athletes and teams. Moreover, the ability to mentally prepare is considered a key component of such differences (Brewer, B.W., 2009). Psychological issues with respect to a variety of sports have also been addressed in a large number of scientific studies which have examined many of the mental characteristics during competition. Anxiety attracted the attention of many researchers because they could have negative and destructive effects on athletes' performance. One of the most important issues which have attracted the attention of sport specialists and psychologists is to identify effective factors influencing anxiety and aggression control before a competition so that athletes' performance can be facilitated. The relationship between anxieties upon sport performance has attracted much research attention over the past 20 years, and researchers have tried to clarify this relationship by advancing several models and theories. These include multidimensional anxiety theory (Martens et al., 1990), catastrophe models (Hardy, 1990, 1996a), reversal theory (Apter, 1982; Kerr, 1990) and zones of optimal functioning models (Hanin, 1980 & 1986). In multidimensional anxiety theory, (Martens et al., 1990) proposed a series of two-dimensional relationships between cognitive anxiety, somatic anxiety, self-confidence and performance. Consequently, the purpose of the current investigation was to compare the competitive state anxiety among softball players. The statistical analysis of the data were collected on seventy five subjects (N=75). The subjects were further divided into three

groups: Group-A (N_1=25; district Level), Group-B (N_2=25; State Level) and Group-C (N_3=25; National Level). The purposive sampling technique was used to attain the objectives of the study. All the subjects, after having been informed about the objective and protocol of the study, gave their consent and volunteered to participate in this study. The Competitive State Anxiety Inventory-2 (CSAI-2) by Rainer Marten was selected for the study because it is a sports specific anxiety test.

The findings of the present study have been duly endorsed by (Gualberto, 2008) believes that those athletes who experience higher levels of competitive anxiety would experience early burnout in their sport field and this factor causes stress due to expressing bad performance by the athlete. He believes that as the athletes have the ability to control the conditions causing anger and anxiety, they could use this additional energy to delay exhaustion, to attempts more to achieve those goals considered by the coach, to increase their awareness level and correct concentration. Different research results imply that competitive anxiety is the source of decrease in performance especially in amateur athletes. Elite athletes by controlling their competitive anxiety through mental skills (such as imagination, feeling control) have higher motivation and self-confidence, but amateur ones experience weak performance through an increase in anxiety during competitions (Shinke & Costa 2001). The above given findings and quoted studies clearly support the result of present study. The result of these studies also reveals that the psychological factors are highly related with the performance of team game players.

CONCLUSION

It is concluded from the results that significant differences have been noticed among district, state and national level softball players on the sub-parameters cognitive anxiety, somatic anxiety, self-confidence and competitive state anxiety. The findings of these studies also reveal that the psychological factors are highly related with the performance of team game players.

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