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Effects of 6-week of Yoga Asana on Biochemical Variables in Adolescent Girls

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Abstract:
The purpose of this study was to investigate the effects of 6 week Yoga Asana training on biochemical variables in Adolescent Girls. A group of 20 adolescent girls (mean + SD: age 17.03 + 1.62 years, height 1.53 + 0.03 m, body mass 44.5 + 5.3 kg), who participated in interschool yoga competition volunteered to participate in study. The study was approved by the Ethics Committee of Lakshmibai National Institute of Physical Education, India. All participants were informed about the study aim and methodology. All the subjects agreed to the above conditions in writing. They were randomly assigned into yoga asana training (Y) and control (C) groups, n = 10 each. Yoga group (Y) was subjected to 6 week Yoga Asana training program of 30 min a day and the control group did not perform any Yoga Asana training techniques. The following biochemical parameters were determined: Haemoglobin, Uric acid, Total cholesterol, Testosterone, Triglycerides, Blood sugar, Red blood corpuscles and White blood corpuscles.

Keywords:
Yoga Asana, Biochemical Variables, Adolescent Girls

1. INTRODUCTION

In this present, fast growing world of science and technology, the human element is treated as ever before. Its goals are indistinct and unsatisfying the mechanism of modern living, the forced restriction of physical activity leading to a sedentary life, an increases amount of leisure time. Yoga exercise can help a person to develop his health along with control of various emotions like lust, love, affection, anger, greediness and provides firm control over body and mind specially to overcome most of the dangerous diseases. For this reason at present the importance of yoga is felt by the large number of person as in mast of nations.

It is now being realized in all parts of the globe that yoga is not only for better development of mind, socio-control, and spiritual, moral but also a therapy (Joshu,1995). Recent research trends have shown that it can serve as an applied science in a number of fields such as education, physical education and sports. Yogic practices are generally looked upon as exercise and many time interpreted in the light of exercise physiology the physiology of yogic practices differs from that of exercise physiology. This needs basic understanding of the concept of yoga and its relation with the technique. The nature of every yogic practices is psycho physiological and if this conceptual background is not clearly understood, the whole outlook on yogic practice will be distributed the relation of yogic exercise in terms of anatomy and physiology would remove many misconception about them (Gore, 1984). Yoga exercise are scientific means for strengthen of all living or atrophying muscle fibers and tissues. It develops the will power long with bodily strength. This aspect of yoga is technically known as a Asana which was developed

by the Latin hatha yogic into a well-organized system of physical culture (Yogendra, 1971). Yoga is also a method of self-realization which begins with the perfection of one's physical self and aspires to achieve a state of self-consciousness (Joshi, 1967). Pranayama is a science of Respiration. It consists of three phases Purak, Khumbhak, Rechak. Pranayama improve the circulation of blood and capable of producing very high pressures in the lungs and in the thorax.

2. MATERIALS AND METHODS

A group of 20 adolescent girls (mean ± SD: age 17.03 ± 1.62 years, height 1.53 ± 0.03 m, body mass 44.5 ± 5.3 kg), who participated in interschool yoga competition volunteered to participate in study. The study was approved by the Ethics Committee of Lakshmibai National Institute of Physical Education, India. All participants were informed about the study aim and methodology. All the subjects agreed to the above conditions in writing. They were randomly assigned into yoga asana training (Y) and control (C) groups, n= 10 each. Yoga group (Y) was subjected to 6 week Yoga Asana training program of 30 min a day and the control group did not perform any Yoga Asana training techniques.

3. MEASUREMENT OF BIOCHEMICAL PARAMETERS

To measure the biochemical parameters of the adolescent girls, 5 ml of venous blood was drawn from an antecubital vein after a 12 h fast and 24 h after the last session of exercise. Haemoglobin, Uric acid, Total cholesterol, Testosterone, Triglycerides, Blood sugar, Red blood corpuscles and White blood corpuscles were determined by enzymatic method using Boehringer Mannhein kit (Mukharjee, 1997).

4. YOGASANAS 6-WEEK TRAINING PROGRAMME

The aim of asanas is to strengthen the body, clearing the impurities of nadis and to make the body fit for sitting comfortably in meditation for long hours. The present study had been undertaken to examine the effect of 6-week of Yoga Asana on Biochemical Variables in Adolescent Girls. The experimental group received training in physical postures (asanas, 30 minutes).

The asanas which were practiced every day included:

1. Matyasana (Fish pose)
2. Hal asana (Plough pose)
3. Noukasana (Boat pose)
4. Ardhachakrasana and
5. Bhujangasana (Cobra poses)




Figure 1

6. RESULTS

To determine whether experimental treatment was effective in bringing about a significant change in count of biochemical variables or not, 't' test was used and analysis of data pertaining to this study are presented in Table 1.

Table 1

Variables	Yoga Group			Control Group		
	Pre	Post	't' Value	Pre	Post	't' Value
Haemoglobin Hb ($g.dl^{-1}$)	14.36	14.74	0.045	14.61	14.77	.002
Uric acid ($mg·dl^{-1}$)	3.73	3.94	1.10	3.73	3.80	.80
Total Cholesterol ($mg·dl^{-1}$)	86.3	92.1	2.47*	89.6	90.1	1.16
Testosterone	21.03	25.15	2.76*	22.03	24.16	1.27
Triglycerides	12.6	13.2	3.17*	11.4	11.9	1.75
Blood Sugar	83.6	92.45	2.56*	84.5	90.89	1.85
Red Blood Carpuscles	5.28	5.48	.0004	5.22	5.37	.071
White Blood Carpuscles	7460	7420	0.494	7530	7540	.811

"t" value to be significant at (9) degree of freedom is 2.262.

The results of biochemical parameters in 6-week yoga asana (Y) and control (C) groups are presented in Tables 1. Significant between-group differences were found in total cholesterol (t = 2.47*), testosterone (t = 2.76*), triglycerides (t = 3.17) and blood sugar (t = 2.56*) since the calculated value of t is greater than tabulated value of t (2.262) for the selected degree of freedom and level of significance whereas no significant between-group differences were noted in haemoglobin (t = 0.045), uric acid (t = 1.10), red blood corpuscles (t = .0004) and white blood corpuscles (t = 0.494) since the calculated value of t is smaller than tabulated value of t (2.262) for the selected degree of freedom and level of significance. No significant changes were noted in the control group. The graphical representation of t-value of biomechanical parameters in the yoga training (Y) and control (C) groups (n = 10 each) of 6 week Yoga Asana training exhibited in Fig. 1, respectively.

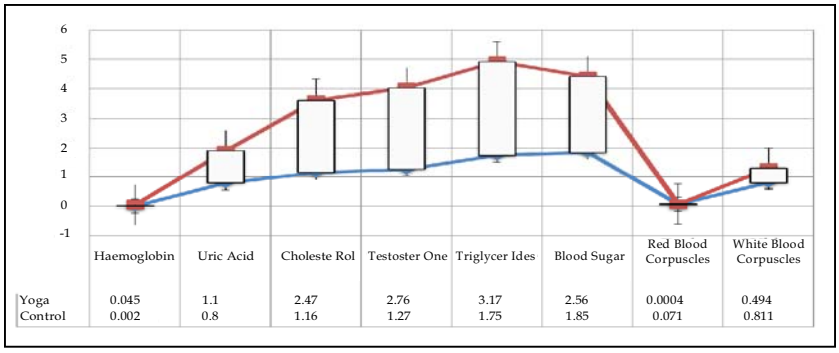

Figure 2

7. DISCUSSION

Physiological responses to physical training, including yoga have been studies by many investigators. It may be expected to positively influence many biochemical functions. In a previous study of Yoga, a method of learning that aims to attain the unity of mind, body, and spirit through exercise, breathing and meditation [Garfinkel , Hadi and Murugesan], that employs means like rope *mallakhamb* training, may be expected to positively influence many physiological functions including respiration. The results of this study showed that yoga training lasting 6 week significantly between-group differences were found in Total cholesterol (t = 2.47*), testosterone (t = 2.76*), Triglycerides (t = 3.17) and blood sugar (t = 2.56*) since the calculated value of t is greater than tabulated value of t (2.262) for the selected degree of freedom and level of significance whereas no significant between-group differences were noted in Haemoglobin (t=0.045), Uric acid (t=1.10), red blood corpuscles (t = .0004) and white blood corpuscles (t = 0.494) since the calculated value of t is smaller than tabulated value of t (2.262) for the selected degree of freedom and level of significance. No significant changes were noted in the control group.

8. INFERENCE

Since calculated "t" is greater than tab t.05, Ho (null hypothesis) may be rejected at .05 level of significance. Thus it may be concluded that 6-week of Yogic practice training programme have a significant effect on total cholesterol (t= 2.47*), testosterone (t=2.76*), triglycerides (t=3.17) and blood sugar (t=2.56*). As per the study the above remark can be given at 95% confidence.

9. CONCLUSION

Findings of this exploratory study suggest that the treatment of 6-week of yogic practices training programme showed significant improvement in total cholesterol, testosterone, triglycerides and blood sugar and not produce improvement in haemoglobin, uric acid, red blood corpuscles and white blood corpuscles.

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Muscle Strength and Size Gains in Older Women after Four and Eight Weeks of High-Intensity Resistance Training

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Abstract:
The purpose of this study was to examine skeletal muscle strength and size gains that may occur during 4 and 8wk of high-intensity resistance training in physically-active older women. Fifteen regularly aerobic-exercising women (age 63–77 y) were randomly placed into a weight-training group (WTG) (n = 8) or control group (CG) (n = 7). Weight training consisted of bilateral knee extension (BLE), knee flexion (BKF) and leg press (BLP) (3 d•wk-1, 3 sets, 80% 1-RM). Subjects exercised to full-range failure (6–10 repetitions) and then attempted 2 additional partial reps on each set. When 10 full reps were completed, resistance was increased to allow for only 6 full reps on the subsequent set. Assessments of skeletal muscle strength and size were made in WTG and CG at 0, 4 and 8wk. All measures of strength (1-RM) increased ($p < 0.001$) in WTG after 4wk and 8wk of training. BLE increased 78 and 125%, BKF increased 99 and 156% and BLP increased 42% and 60% after 4wk and 8wk, respectively. Thigh muscle volume (cm3) was measured by obtaining 10 contiguous 10mm thick images of both thighs using T1 weighted magnetic resonance imaging. Muscle volume increased 2.4% ($p = 0.01$) after 4wk and 6.7% ($p < 0.001$) after 8wk in WTG. Muscle strength and size of CG did not change. This study confirms that older women can increase strength dramatically with training. This study also demonstrates that physically-active older muscles are capable of significant hypertrophy after as few as 4wk of high-intensity training.

Deterioration of physiological systems is an unavoidable consequence of the aging process (Rogers *et al*., 2013). However, declines in muscle size and function may not be due primarily to the aging process. Other factors including physical inactivity may contribute to this phenomenon.

In young adults, muscle strength has been shown to increase in response to training between 60 and 100% of the 1RM (MacDougall, 1986). Early studies concluded that weight training did not induce strength gains in older adults (Muller, 1957; Rodriguez *et al*., 1965). However, low exercise intensities similar to those used in early studies promote only modest increases in strength in older subjects (Aniansson & Gustavsson, 1981; Larsson, 1982). Several studies have since demonstrated that, given an adequate training stimulus, resistance training provides similar or greater strength gains in older men and women compared to younger individuals (Rogers *et al*., 2002; Takeshima *et al*., 2004; Lee *et al*., 2011).

Few studies have focused on the adaptive responses of women to strength training. On average men are stronger than women and strength deficits in older women are very common. Data from the Framingham Disability Study indicate that 40% of women aged 55 to 64, 45% of women 65 to 74, and 65% of women aged 75 to 84 were unable to lift 4.5 kg (Jette & Branch, 1981). Given that muscle mass is related to falling and that older women have higher incidences of osteoporosis and risk of fracture from falling (Rogers *et al.*, 2003), the paucity of data in this area is unfortunate.

In many studies, the significant increases in strength could be expected because most researchers recruited previously sedentary subjects. Morgan *et al.* (1995) investigated the effect of strength training on muscle size in active 61–71-year-old women. Unlike sedentary older persons used in previous studies, these women had been participating in an aerobic exercise program for the previous several months. During the study, normal exercise activity was supplemented with heavy resistance training. Training intensity was set at 80% of maximal strength for three sets of 8 to 12 repetitions. Results showed that physically active post-menopausal women can significantly increase the strength of the knee extensors by 42% and the knee flexors by 89% after eight weeks of training. Although strength increased, significant differences were not observed in muscle mass as measured by limb volume water displacement.

Volume displacement and anthropometric measures of limb musculature are gross estimates of muscle size area that are subject to considerable variability. Changes in subcutaneous or intramuscular fat and water content which may occur in conjunction with muscle alterations may affect these measures of muscle size. As a result, changes in muscle size may occur but remain undetected. Techniques used to assess muscle mass in older individuals must be capable of differentiating tissue within the anatomical compartment because the intra- and intermuscular fat stores of older adults are significant (Borkan *et al.*, 1983; Imamura *et al.*, 1983). Techniques such as computed tomography (CT) provide accurate measurements of skeletal muscle mass *in vivo* by providing high resolution cross-sectional images of muscle that differentiate adipose and bone as distinct components (Heymsfield *et al.*, 1995). In a study performed by Frontera *et al.* (1988), sedentary older men responded to a 12-week progressive resistance exercise program that more than doubled knee-extensor strength and more than tripled knee-flexor strength with total muscle area estimated by CT increasing by 11.4%. In addition, measurements made at the six-week point also revealed significant increases in muscle size. Also using CT, Brown *et al.* (1990) showed statistically significant cross-sectional increases for 60–70-year-old males in the knee flexors (4%) and knee extensors (10%) after 12 weeks of weight training.

Detailed, serial investigations of body structures in healthy subjects have not been performed with CT due to significant X-ray exposure. Unlike CT, magnetic resonance (MR) imaging can be performed without exposing the subject to ionizing radiation. With CT, the use of a single CSA introduces the potential for greater test-retest error and therefore the accuracy of repeated CT scans depends on the precise localization of the measures. However, MR minimizes this potential error by using imaged bony landmarks as references. Additionally, with MR, a series of images can be taken at specific sites and a computerized integration procedure used to measure CSA and calculate total muscle volume from the images.

As in young adults (MacDougall, 1986), heavy-resistance training can be used to increase muscle size in older adults. Previously it was thought that muscle strength improvements in this population were solely the result of neurological factors (i.e., motor unit recruitment patterns) because hypertrophy was not detectable using anthropomorphic measures (Moritani & deVries, 1980). Recently, studies using more sensitive techniques (CT and/or muscle biopsies) have demonstrated significant increases in muscle mass accompany strength improvements, even in nonagenarians. The purpose of this study was to utilize MR to determine if and when any changes in skeletal muscle size occur in active, older women who participate in an 8-week heavy resistance training program.

1. METHODS

1.1. SUBJECTS

Seventeen healthy women between the ages of 63 and 77 years volunteered to participate in the study. All women had been post-menopausal (i.e., no menstrual bleeding) for at least 5 years. Subjects were recruited from the community and a university-based exercise program for older adults, as well as from advertisements in local newspapers. No one was currently involved in any type of resistance training. Subjects had no history, signs or symptoms of any disabilities or neuromuscular illness that could preclude participation in a strength training program. Approval was given by both the university's Institutional Review Board. All subjects, as well as their physicians, signed informed consent documents.

All subjects were physically active having participated in an aerobic exercise program for $\geq$ 2 months (at least 15 minutes on three days each week). Ten of the subjects were enrolled in the university-based exercise program. This program was conducted three times per week and consisted of stretching and calisthenics (10 minutes), walking/jogging/bicycling/rowing (20–30 minutes), and relaxation/recovery (5 minutes). Four others participated in swimming programs that consisted of approximately 30 minutes of swimming surrounded by 15-minute warm-up and cool-down sessions. Three others participated in walking programs of their own.

2. DESIGN OF STUDY

The study was a randomized 8-week controlled investigation. After acceptance into the study, subjects were randomly assigned to strength training (n = 9) or control (n = 8) groups. All subjects continued to participate in their aerobic exercise programs during the study. Unless otherwise stated, all evaluations were made at baseline and four and eight weeks thereafter.

Body mass was measured to the nearest 0.1 kg using a balance beam scale and stature was measured to the nearest 1.0 mm using a stadiometer. Although subjects were asked to maintain their normal dietary patterns, food records were not obtained.

3. STRENGTH TESTING

All strength testing was performed at each of the evaluations times. The one repetition maximum (1RM) was recorded as the measure of dynamic concentric strength for bilateral knee extension (BKE), bilateral knee flexion (BKF), and bilateral leg press (BLP). All measurements were made with identical equipment positioning and technique at each time point. The same weight machines used in the strength training program were used to determine 1RM. The best of two 1RM measurements (obtained 2–3 days apart for the strength trainers and 2–8 days apart for the control subjects) was used as the baseline, mid-study, and final measurement of strength for the strength trainers and controls.

The BKE strength was assessed on a weight bench (Task Ind., Chino, CA) utilizing weight plates for the resistance. Subjects were seated upright with both ankles resting behind a padded ankle bar. Each subject was instructed to slowly extend the knees from the resting position (90°–100° of flexion) to full extension over 3 s and then returned to the starting position over 2 s.

Bilateral knee flexion was performed on a custom-made weight bench that also used weight plates. Subjects were placed in a prone position with the knees in an extended position just overhanging the end of the bench. A padded ankle bar that held the weights was placed behind the ankles. From the fully extended position, subjects flexed the knees to 90° of flexion over 3 s and then returned to the starting position.

Bilateral leg press strength was measured using a standard weight-and-pulley system (Pacific Fitness, Santa Fe Springs, CA). Subjects were seated erect with both feet resting against a foot-plate directly in front of them. The seat was adjusted to place the hip in approximately 45° of flexion. The knees were placed at 90° of flexion and subjects placed the heels of the feet 6–8 inches apart on the foot-plate. Subjects were instructed to focus on pushing with the heels and not the toes during lifting. The hips and knees were extended over 3 s until the knees were approximately 5° short of full extension (to prevent knee joint locking) and then returned to the starting position in over a 3 s period.

to each strength testing session, subjects performed a general warm-up for 5–10 minutes that included walking and stretching. After instruction in the use of weight-training equipment, subjects performed each exercise several times at a low resistance to ensure proper warm-up and familiarization. The order of testing was: 1) BKE, 2) BKF, and 3) BLP. All exercises were repeated with weight increments of 0.25 to 25.00 pounds until failure occurred despite verbal encouragement. All weight plates had been previously weighed for accuracy. Failure was reached when the subject failed to lift the weight through the entire range of motion on at least two attempts spaced 45–60 seconds apart. Lifts were discounted if the subject utilized momentum or changed body position in a manner not directly related to the movement of the weight during the exercise motion. To stabilize the body, subjects were allowed to grasp handles that were attached to each machine. To minimize fatigue resulting from repetition, each test began at a weight near a predicted maximum. Most subjects required fewer than six repetitions to determine the 1RM. The highest successfully lifted weight was used as the 1RM for that muscle group. There was 45–60 seconds between repetitions with five minutes of rest between the three exercises.

3.1. EXERCISE TRAINING

Subjects in the strength-training group participated in a high-intensity resistance training program of dynamic exercise that included both concentric and eccentric work. Training took place 3 $d \cdot wk^{-1}$ for 8 weeks. Each subject participated in a total of 24 training sessions during the study. Subjects were forced to miss an occasional exercise session (e.g., holidays, bad weather, family care) so 100% compliance was set at 24 training sessions within 9 weeks. Sessions were carried out in groups of 2–3 subjects under the constant supervision by the study investigators.

Three exercises were used to specifically increase the strength and mass of the thigh muscles: BKE, BKF, and BLP. The same machines and subject positioning as described above were used during training. Initial starting weights were determined using 80% of the individual's initial 1RM. To maintain intensity, subjects were asked to repeatedly lift the weight until they failed to complete a full repetition and then to attempt two more partial repetitions. When a subject could complete 10 full repetitions the weight was increased (0.25–5.0 pounds) to allow for only 6 full repetitions to be completed on the subsequent set. If less than 10 repetitions were completed during the third set, the final weight lifted was used to begin the following session. Resistances were evaluated daily and attempts were made to increase the resistance each session. All weights were placed on the machines by study investigators.

Each training session included 3 sets of 6–10 full repetitions for each exercise with 3–5 minutes of rest between sets. Subjects were allowed to stand and walk about the room between sets. Concentric and eccentric phases lasted 2–3 seconds each without rest between repetitions. Subjects completed all sets for a given exercise before moving to the next exercise. The order in which exercises were performed was rotated for each subject on a daily basis. Strength training sessions lasted approximately 45 minutes and were completed on alternate days to allow for adequate rest and recovery.

Subjects in both groups were instructed to continue their current aerobic fitness programs. Half of the strength group performed their aerobic program before strength training and half performed their aerobic exercise later in the day. Concurrent strength and endurance training does not interfere with the development of strength or endurance when compared to either type of training completed alone (Gettman *et al.*, 1982; Sale *et al.*, 1990). Controls were instructed to not initiate any resistance training during the 8-week study and were offered the opportunity to participate in a

strength training program after the completion of the study. While making, confirming, and performing follow-up evaluations, frequent contact was maintained with controls that sustained their level of interest.

3.2. MAGNETIC RESONANCE IMAGING

Magnetic resonance (MR) images of the thighs were obtained at baseline and after four and eight weeks of training. The subject was positioned on the imaging table and the feet secured with adhesive tape. All subjects entered the magnet feet-first with the arms placed along the body. Subject placement was standardized by the technician.

Images were generated on a General Electric Signa MRI system (Milwaukee, WI) equipped with a 1.5 Tesla superconducting magnet, cooled to liquid helium temperatures. Shielded gradient coils allowed spatial localization of the MR signal. To obtain reasonable tissue contrast, T1 images were obtained using a spin-echo sequence with a 500 ms repetition time and 12 ms echo time. Data sets were obtained with a 400x480 mm field of view that consisted of a two-dimensional array of 256 x 256 pixels.

Initially, a series of coronal images were taken to identify the femur. A series 27–30 transaxial, 10-mm-thick slices of both thighs were then acquired beginning at the femoral head for each subject. Images were taken with a 100% gap to eliminate inter-image interference and then sequentially arranged to form a continuous muscle volume. Data were stored on 9-mm reel-to-reel tape using a Data General 7800 computer. The total acquisition time was approximately 10 minutes.

Images were transferred using a UNIX workstation to a stand-alone personal Indigo computer (Silicon Graphics) for analysis. Processing was performed using an image analysis package that allows for the separation and quantitation of muscle and non-muscle tissue. All identifications of tissue were performed by a single operator blinded to the identity of the subject.

Ten sequential images from the right and left thighs of each subject were analyzed. Quantitation of thigh muscle mass without anatomical interference (i.e., buttocks and patella) was possible using this method. Using the femoral head as the anatomical landmark from which the leg images were measured, analysis of images began 120 mm distal to the femoral head. At each slice level, images of both thighs were treated together and data combined during analysis.

Subcutaneous and interstitial adipose tissue (AT), muscle, and bone were differentiated based on MR image pixel intensity within the gray level histograms. Each tissue was assigned a different color code (subcutaneous AT, beige; interstitial AT, green; muscle, blue; bone, red). Each slice was reviewed using an interactive slice editor program that allowed the operator to identify, verify, and edit the classification of individual pixels. Identification of tissue was facilitated by superimposing the original gray level image on the segmented image using a transparency mode controlled by a toggle switch.

The areas of respective tissues in each slice were computed automatically by summing respective pixels and multiplying by the pixel surface area (2.93 mm^2). Volumes (mm^3) of respective tissues within each image were calculated by multiplying the tissue area (mm^2) by the slice thickness (10 mm). Total muscle volume for individual tissues within 10 slices was calculated by adding individual slice volumes. Intra-observer and inter-observer reliability coefficients were 0.99. Previous work has verified that the error in the spatial dimensions of images using this system ranges from 0.1 to 1.5% (Ross *et al.*, 1991). Total analysis time for each image was approximately 3 minutes.

4. DATA ANALYSIS

Data analysis was completed using the statistical software program SPSS for Windows V.18.0 (SPSS Inc., Chicago, IL). Data were screened for outliers, and assumptions of normality and homoscedasticity. To reduce the potential influence of outliers on the statistical analysis, boxandwhiskers plots were used to identify outliers, which were

subsequently eliminated prior to analysis. Each variable was examined for normality using the Kolomogorov-Smirnov test. Assumptions of homogeneity of variance and sphericity were evaluated. Baseline group mean comparisons were performed using a oneway ANOVA. Repeated measures ANOVA procedures were conducted to evaluate the effects of the interventions and posthoc analysis was performed to identify the nature of any differences. A probability value of less than 0.05 will be considered statistically significant.

5. RESULTS

Of the original sample of 17 women, 15 successfully completed the study. Two declined further participation following initial testing. For the remaining women, protocol compliance was excellent. All weight-trainers completed 24 training sessions within 9 weeks. Subjects in both groups completed all strength testing sessions. No training-related injuries were reported. No significant differences were found in age, body stature, or mass between weight-training and control groups (Table 1).

Table 1. Subject Characteristics

Group	n	Age (yr)	Stature (m)	Mass (kg)
Strength Training	8	67.9 ± 5.4	1.63 ± 0.06	78.2 ± 15.5
Control	7	68.9 ± 3.7	1.60 ± 0.10	75.7 ± 19.2

Values are means ± standard deviation; n: number of subjects.

5.1. MUSCLE STRENGTH

Absolute values of 1RM measures were corrected for total body mass at each time-point for BKE (Figure 1), BKF (Figure 2), and BLP (Figure 3). Strength did not differ between groups at baseline. Relative strength increased ($p<0.001$) in the weight-training group after only 4 wk of training. Gains of 78% (± 6.4) in BKE, 99% (±12.1) in BKF, and 42% (±6.9) in BLP were observed in the weight-training group (Table 6). After 8 wk of training there were further increases ($p<0.001$) in muscular strength for the weight-training group as indicated by increases of 125% (±12.6) in BKE, 156% (±21.3) in BKF, and 60% (±8.7) in BLP as compared to baseline measures. Significant changes in 1RM strength in the control group were not observed during any 4 wk period of the study but BLP did increase after eight weeks ($p=0.02$).

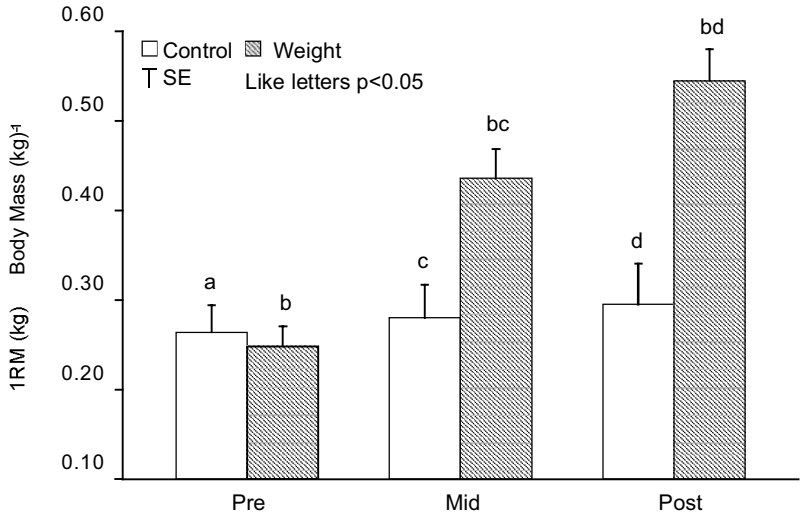

Figure 1: Bilateral Knee Extension 1RM (kg) Body Mass (kg)$^{-1}$

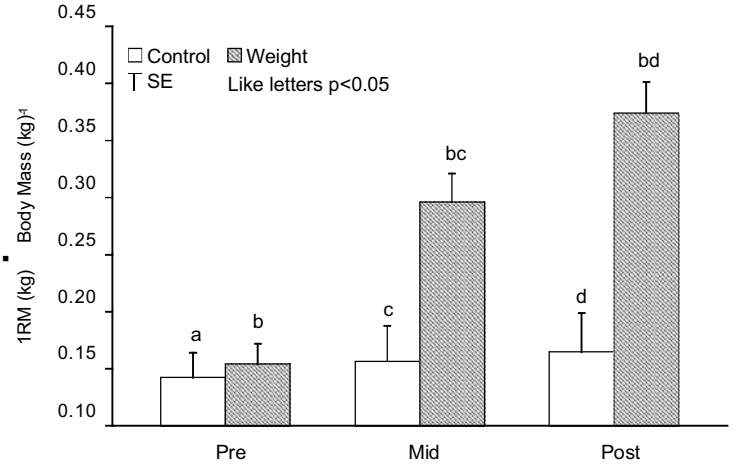

Figure 2: Bilateral Knee Flexion 1RM (kg) • Body Mass (kg)$^{-1}$

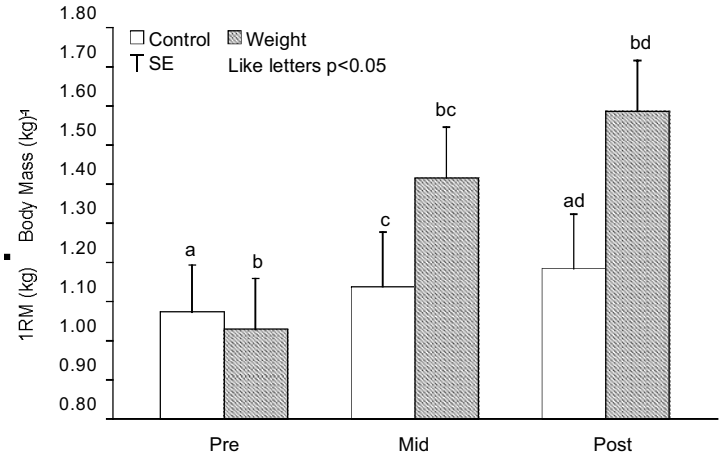

Figure 3: Bilateral Leg Press 1RM (kg) • Body Mass (kg)$^{-1}$

5.2. MUSCLE VOLUME

Due to technical errors, the baseline magnetic resonance (MR) images of one weight-training subject and the 4-wk MR images of one control subject were lost. During baseline measures, an additional weight-training subject had to be removed from the MR unit after becoming claustrophobic before imaging was completed. However, this subject was able to successfully complete the final two MR analyses. In the analysis of tissue volume, images obtained at four-weeks were also used at baseline for the two training subjects with missing baseline data. Images obtained at eight-weeks were used for the missing four-week measure of the control subject. This conservative approach was used for the missing data as it decreased the probability of observing any significant differences over time.

Muscle volumes were significantly different ($p<0.001$) between the groups throughout the study. Strength training resulted in significant increases in mid-thigh muscle volume after 4 wk ($p=0.01$) and 8 wk ($p<0.001$) (Figure 4). The increase in muscle volume after 4 wk of training was 2.4% (±0.9) and 6.7% (±0.8) after 8 wk. Mid-thigh muscle volume in the control group did not change significantly over the course of the study.

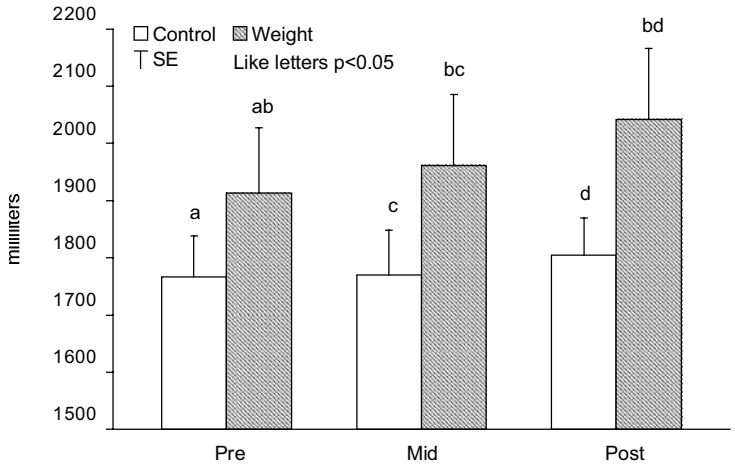

Figure 4: Muscle Volume (ml)

6. DISCUSSION

The major finding of this study is that significant increases in muscle volume are possible after as little as 4 weeks of progressive, heavy resistance training in women aged 63–77 years. These results suggest that neurological adjustments within older muscle are not solely responsible for the strength gains observed during the early phases of a weight training program. The data of this study support the findings of other studies that indicate weight-training is capable of producing rapid and dramatic increases of muscle strength in older women. Furthermore, the present investigation indicates that the muscles of older individuals who have remained physically active retain the capacity to undergo rapid strength accretion along with significant changes in hypertrophy.

Earlier studies had concluded that weight training did not induce strength gains in older adults (Muller, 1957; Rodriguez *et al.*, 1965). However, low exercise intensities similar to those used in such studies promote only modest increases in strength in elderly subjects (Aniansson & Gustavsson, 1981; Larsson, 1982). More recent studies have utilized higher workloads that have demonstrated rapid strength gains as a consequence of weight training, even at very advanced ages.

The results of the current study are in agreement with the findings of Frontera *et al.* (1988) who conducted a slightly longer training protocol in older males. They used a dynamic weight training program to train a group of 12 previously sedentary men aged 60–72 years. Subjects trained the knee extensors and flexors with weights three times per week performing three sets of eight repetitions, using 80% of the 1RM throughout the 12-week program. Subjects significantly increased the strength of the knee flexors (227%) and extensors (107%).

Strength gains in the present investigation were greater than those reported by Charette *et al.* (1991) in women, aged 64 to 86 years, after 12 weeks of moderate- to high-intensity isotonic resistance training. In that study, subjects exercised at 65% of 1RM during the first five weeks, 70% for four weeks, and 75% for the final 3 weeks. Training sessions were conducted three days a week and three sets of six repetitions of each exercise were performed during each training session. Strength increased 93% for knee extension, 115% for knee flexion, and 28% for leg press. The control group did not demonstrate significant strength changes. Although the current study was of shorter duration, the higher training intensity may explain the greater gains in strength.

In many studies the significant increases in strength could be expected as previously sedentary subjects were recruited. However, the aging process may not be the sole cause of the decline in muscle function. Other factors,

including physical inactivity, likely contribute to this phenomenon. Morgan *et al.* (1995) have shown that physically active post-menopausal women can significantly increase the strength of the knee extensors by 42% and the knee flexors by 89% after eight weeks of training in a study designed similarly to the current study. However, the results of the present investigation show strength gains of almost twice the magnitude of the previous study (Morgan *et al.*, 1995).

Research has suggested that strength gains are approximately 5% per training session (Frontera *et al.*, 1988) during a twelve-week program. In the present study, gains of 6% per session were observed in BKE and BKF and 3% for BLP. It is apparent that improvements in strength can be rapid for older persons, occurring within two months. Although older people continue to gain strength with prolonged programs, it appears that as with young individuals the greatest gains for older adults are made during the initial stages of a strength training program. The strength training group continued to gain strength during the final four weeks, however the increase was less than that of the preceding 4 weeks. This possibly reflects a trend for the gains to level off as reported by Hakkinen and Pakarinen (1994). They observed a plateau in strength gains in older men and women at eight weeks during a 12-week strength training program. Similarly, the strength gains recorded by Moritani and deVries (1980) appeared to level off after 6 weeks. In addition, Pyka *et al.* (1994) strength trained three older men and five older women for 52 wk and demonstrated that three quarters of the strength gains over baseline were obtained in the first eight weeks with the remaining gains seen over the remaining year. In contrast, the present investigation was only eight weeks in duration and therefore, the effects of this training protocol on older muscle after eight weeks remains undetermined.

Few studies have utilized a control group when investigating the effects of training on strength and muscle mass. The control group is of value to separate factors such as strength declines over time, neural learning, psychological motivation, and changes in activity patterns. Although the strength of control subjects in the study of Morgan *et al.* (1995) did not change during the study, other control groups in strength studies have shown increases of approximately 5% (Agre *et al.*, 1988; Brown & Holloszy, 1991; Charette, *et al.*, 1991). These changes may be attributed to learning effects. In an attempt to minimize these effects, two baseline measures of strength were conducted in this study.

In the control group of this study, there was an approximate 6% improvement in the three bilateral strength measures after 4 wk. However, these changes were not significant. After 8 wk, this increase was approximately 10% for each of the three exercises and did reach statistical significance ($p=0.02$) for BLP. These results are similar to those of Morganti *et al.* (1995) in which a control group demonstrated small improvements in knee extension (13%; not significant) and leg press (4%; $p = 0.04$) strength during a study. However, it must be remembered that the control group of the current study was not sedentary. Instead, they were participating in regular aerobic exercise. The significant gain in leg press strength after eight weeks is not surprising because it is an activity often used in daily living (e.g., raising from a chair). In addition, the leg press is a more complex motion than either of the other two exercises (i.e., knee extension/flexion) and may have involved more motor learning that resulted in gains over time. General activity questionnaires indicated that activity did increase for the control group. This change in general activity may have caused the subjects to derive some training effect from simply performing this motion more often throughout the day.

The finding in the present investigation that hypertrophy of older muscles can occur following heavy-resistance training contradicts the early conclusions of Moritani and deVries (1980) who failed to observe muscle hypertrophy in old muscle following moderate-intensity resistance training. Groups of young (aged 18 to 26 years) and old (aged 67–72 years) men in the study of Moritani and deVries (1980) both had similar and significant relative increases in strength, however only the young group demonstrated any changes in muscle mass. The investigators concluded that neural factors were responsible for the initial strength gains in young people and hypertrophy became the

dominant factor after three to five weeks of training. The investigators also concluded that the effects of strength training in older adults were entirely due to neurological factors as hypertrophy was not observed using indirect anthropometric measures.

The increase in muscle tissue due to strength training in this study was within the range of results from other studies using older people. Frontera *et al.* (1988) found an 11% increase in the total muscle area of the thigh in elderly men after12 wk. Fiatarone *et al.* (1990) found an increase of 9% in a group of 86– to 96-year-old men and women after eight weeks of strength training.

Again our results are similar to those of Frontera *et al.* (1988) in which older men more than doubled knee extension strength and more than tripled knee flexor strength. After 12 weeks of training, total muscle area estimated by CT increased 11.4%. In addition, measurements conducted at the six-week point also revealed significant increases in muscle size. Also using CT, Brown *et al.* (1990) showed statistically significant cross-sectional increases for 60–70-year-old males in the knee flexors (4%) and knee extensors (10%) after 12 weeks of weight training.

It is widely believed that differences in the measurement technique used to assess muscle mass may explain the disparity in research results. Several methods have been utilized to document changes in muscle mass following resistance training in the elderly. Observed differences in muscle mass are largely dependent on the method utilized (Mazariegos *et al.*, 1994). The one study (Morgan *et al.*, 1995) that examined strength training in active older women measured muscle volume using water-displacement procedures that are subject to large errors. The 8-week strength gains in that study are similar to those observed after 4 weeks in the present study. The change in muscle mass at that time-point was 2.5%. The sensitive MR imaging techniques utilized in the present investigation are capable of detecting such a small change. In addition, changes in subcutaneous or intramuscular fat and water content that may have occurred in conjunction with muscle alterations could have affected the estimates of muscle size in the study of Morgan *et al.* (1995). Only techniques capable of separating muscle from fat (e.g., MR imaging) would provide information concerning volume changes independent of intramuscular and subcutaneous fat. Therefore, while hypertrophy may have occurred during the previous study performed by Morgan *et al.* (1995), the technique used to measure muscle mass did not detect any changes. This could explain the failure of those investigators to observe muscle hypertrophy after 8-weeks of strength training in older women although significant strength changes occurred.

The increases in strength and muscle mass found in the current study are larger than previously reported for older women. The differences may be explained by the training intensity and the sensitivity of the technique used to measure small changes in muscle mass. Two main factors may account for the differences in the results of this study compared to others. First, in this study the training stimulus was greater than that used in other studies of strength in older subjects. Other studies have utilized high workloads but have not overloaded the subjects as rapidly nor included partial repetitions at the end of each set. Second, all subjects in this study were cooperative and highly motivated as evidenced by the low absenteeism.

Many studies have used moderately-high intensities (60–70% of 1RM) during the initial weeks of a study and increased the intensity as the study progressed. In contrast, this study attempted to begin strength-training at a high-intensity and maintain that intensity throughout the entire program. While most studies have adjusted the training-weights on a weekly or bi-weekly basis, the present study adjusted the training load on a session-to-session basis. Prior to the first week of the strength program, strength trainers were given the opportunity to do a "familiarization session" or "practice workout" in which they completed three sets of each exercise at approximately 50% of their 1RM. Starting weights for the first training session were determined using 80% of the individual's initial 1RM. To maintain intensity, subjects were asked to repeatedly lift the weight until they failed to complete a full repetition and then to attempt two more partial repetitions. When a subject could complete 10 full repetitions the weight was increased to allow for only 6 full repetitions to be completed on the subsequent set. The final weight lifted was

used to begin the following session. To maintain a constant level of intensity, resistances were evaluated daily, and attempts were made to increase the resistance each session.

In addition, adequate rest (3–5 minutes) was given following each set to allow sufficient recovery before the performance of the subsequent set. These rest periods were used to avoid additional fatigue that would decrease the subjects' ability to lift maximal amounts of weight during each set. The training intensity was also augmented by having the subjects attempt two repetitions after they were unable to lift the weight through the full range-of-motion. The resulting partial repetitions enhanced the challenge to which the muscle was subjected and provided more assurance that each set was sufficiently fatiguing the muscle. This is a technique often used by competitive body-builders to increase workout intensity and the current study is the first to apply this "forced-repetitions" technique to strength-training in older women. It appears that older women are capable of handling training intensities and techniques that are typically used by much younger athletes of competition caliber. This study clearly demonstrates that given an adequate training stimulus, resistance training can provide greater strength gains in older women than once believed.

7. CONCLUSION

This study confirms that a progressive heavy-resistance training program can produce dramatic improvements in muscle strength for physically-active older women, aged 63–77 years. Muscle strength increased significantly after four and eight weeks of heavy-resistance training compared to a small increase that occurred in the controls who remained physically active but did not participate in resistance training. Strength increases during the first four weeks accounted for approximately two-thirds of the total strength gain. Significant increases in muscle mass were also observed after four and eight weeks of training. Muscle volume increases during the final four weeks accounted for approximately two-thirds of the total gain in muscle mass. Significant changes in muscle size were not observed in the control group. Thus, this study indicates that the muscles of older women, who have remained physically active, retain the capacity to undergo rapid strength accretion along with significant changes in hypertrophy. This study also supports the safety of strength training performed at very high intensity for older women.

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Relationship of Selected Biomechanical Variables with the Performance of Cricket Players in Cover Drive Shot

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Abstract:
The purpose of this study was to measure the relationship of selected biomechanical variables to the performance of cricket player in cover drive shot. The subjects for this study were 48 male cricket players who had represented their respective states in Under-19 in Cricket tournaments (12 subjects from each team). Their age ranged from fifteen to nineteen years. All the subjects were right handed batsman. The data was analyzed by use of Pearson's Product Moment Correlation. The level of significance chosen to test the hypothesis was .05. None of the selected angular biomechanical (kinematic) variables that is Ankle Joint (Right and Left), Knee Joint (Right and Left), Shoulder Joint (Right and Left), Elbow Joint (Right and Left) and Wrist (Right and Left), and Hip Joint (Left and Right) has significant relationship with the performance of Cricket players in cover drive shot. In case of Linear A biomechanical (kinematic) variable that is height of center of gravity at moment contact does not have significant relationship with the performance of Cricket players in cover drive shot.

Keywords:
Biomechanical, Kinematics, Cover Drive

1. INTRODUCTION

Cricket is one of the most popular and richest in history of all ball games. There is no record available which shows when and by whom cricket was started in England. It is essentially an English game. Old work shows that it is as old as 13th Century. The game eventually developed in the 17th century with underarm bowling, curved bat and a wicket of two feet wide and one foot high with a whole in the ground between the stumps. Cricket is a game of intricate movements combined with great speed and accuracy. Great teams are developed by the meshing of fundamentally sound players weaving clever patterns of attack and defense tactics.

There is a wide variety of shots played in cricket. The batsman's repertoire includes strokes named according to the style of swing and the direction aimed: e.g., "Cut", "Drive", and "Hook", "Pull". It is universally accepted that success of a team in cricket depends upon a greater extent on the hitting ability of the players.

Thus in cricket driving (or to use the pace of the ball) is a primary skill of the game and requires a great deal of practice assisted by good models, scientifically based. Since players were expected to drive often in order to score, they developed a variety of drives, which include the straight drive, the cover drive, the square drive, and the on drive. Now the sportsman has been able to give outstanding performance because of involvement of new scientifically substantiated training methods and means of execution of sport exercises such as sports techniques

and tactics, improvement of sportswear and equipments as well as other components and conditions of the system of training.

The role that sports biomechanics can play is becoming more widely understood in sports community and the demand for service increasing, researchers in sports biomechanics will have to consider carefully how much time they can devote to the provision of scientific services without impairing their performance as scholar researchers. To develop programmers of study for the training of techniques in sports biomechanics, technicians who can provide the kind of services sought by sporting bodies.

In order to analyze the techniques o sports and games, photographic methods is probably the most popular methods. Although this is not a recent development, photography was formally limited to the filming of few sports only. It is now being applied to many sports at an increasing rate.

Recently videotapes have begun to replace conventional motion pictures for teaching and coaching purpose. Since videotape is erasable reusable and does not require any developing. It is more economical than film. The relatively inexpensive recorders are simple to operate and permit immediate play back.

Biomechanics and Cricket players in cover drive shot practices described by some of the authors are as follows:

1.1. BIOMECHANICS

A branch of physics concerns with the description of the motion of objects without considering the forces that causes or result from the motions. It is a study of motion that aims to provide a description of the spatial position of points in moving bodies. For the purpose of this study Biomechanical variables were represented by the selected angles of the various joints of human body and height of center of gravity at moment contact.

1.2. KINEMATICS

Kinematics will be represented by the selected angles of the various joints of human body and height of center of gravity at selected moment.

1.3. COVER DRIVE

Cover Drive also called off drive; this is a batting stroke in which slightly over pitch ball is struck with full downward swing off perpendicular bat. Cover drive is usually played to a length ball pitching just outside off stump by which the ball is sent pass cover point the bats taken back with a good back lift and the front foot moved across to place it just near to the spot where the ball is likely to pitch. The bat is brought forward with a straight swing close to the front leg, and the weight of the body transferred to the front foot. The ball played powerfully to the mid-off or extra-cover region.

2. METHODOLOGY

The subjects for this study were 48 male cricket players who had represented their respective states Uttar Pradesh, Delhi, Uttaranchal and Haryana (12 subjects from each team) Under-19 in Cricket tournaments. Four teams were selected for this study namely: Uttar Pradesh, Delhi, Uttaranchal and Haryana (12 subjects from each team). Their age ranged from fifteen to nineteen years. All the subjects were right handed batsman. The research scholar familiarized subjects with the testing equipments and procedures. Following were the Kinematic variables which were constituted in the study: The selected kinematical variables were divided in two parts i.e.

1. Linear Kinematic Variable were: Height of Center of Gravity at moment release.
2. Angular Kinematic Variables were represented by the angles at selected joints i.e.

a. Ankle joints
b. Knee joints
c. Hip joints
d. Shoulder joints
e. Elbow joints
f. Wrist joints

The scholar developed stick figures on the photographs, from which selected kinematical variables were calculated. The stick figures were developed by using Joint-point method. The center of gravity of each subject, at one selected moment.

2.1. PROCEDURE FOR LOCATION OF CENTER OF GRAVITY

The center of gravity of the body at moment release was determined by use of segmentation method.

2.2. ANALYSIS OF DATA AND RESULTS OF THE STUDY

The data was analyzed by use of Pearson's Product Moment Correlation. The level of significance chosen to test the hypothesis was .05 and are presented in Table 1, Table 2, Table 3, Table 4, Table 5.

Table 1: Relationship of Selected Angular Kinematical Variables at Moment Contact with the Performance of Uttar Pradesh Under-19 Cricket Team in Cover Drive (N = 12)

S. No.	Variables	Coefficient of Correlation "r"
1.	Ankle Joint (Left)	0.189
2.	Ankle Joint (Right)	0.144
3.	Knee Joint (Left)	0.175
4.	Knee Joint (Right)	-0.123
5.	Hip Joint (Left)	0.118
6.	Hip Joint (Right)	0.305
7.	Shoulder Joint (Left)	0.420
8.	Shoulder Joint (Right)	-0.162
9.	Elbow Joint (Left)	0.137
10.	Elbow Joint (Right)	-0.036
11.	Wrist Joint (Left)	0.00
12.	Wrist Joint (Right)	-0.007

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 2: Relationship of Selected Angular Kinematical Variables at Moment Contact with the Performance of Delhi Under-19 Team in Cover Drive (N = 12)

S. No.	Variables	Coefficient of Correlation "r"
1.	Ankle Joint (Left)	-0.151
2.	Ankle Joint (Right)	-0.127
3.	Knee Joint (Left)	0.070
4.	Knee Joint (Right)	-0.069
5.	Hip Joint (Left)	0.195
6.	Hip Joint (Right)	0.287
7.	Shoulder Joint (Left)	-0.206
8.	Shoulder Joint (Right)	-0.126
9.	Elbow Joint (Left)	-0.100
10.	Elbow Joint (Right)	-0.053
11.	Wrist Joint (Left)	------
12.	Wrist Joint (Right)	-0.407

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 3: Relationship of Selected Angular Kinematical Variables at Moment Contact with the Performance of Uttaranchal Under-19 Team in Cover Drive (N = 12)

S. No.	Variables	Coefficient of Correlation "r"
1.	Ankle Joint (Left)	-0.208
2.	Ankle Joint (Right)	-0.274
3.	Knee Joint (Left)	-0.384
4.	Knee Joint (Right)	-0.267
5.	Hip Joint (Left)	-0.323
6.	Hip Joint (Right)	-0.402
7.	Shoulder Joint (Left)	0.553
8.	Shoulder Joint (Right)	-0.318
9.	Elbow Joint (Left)	-0.437
10.	Elbow Joint (Right)	-0.551
11.	Wrist Joint (Left)	-----
12.	Wrist Joint (Right)	0.033

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 4: Relationship of Selected Angular Kinematical Variables at Moment Release with the Performance of Haryana Under-19 Team in Cover Drive (N = 12)

S. No.	Variables	Coefficient of Correlation "r"
1.	Ankle Joint (Left)	-0.542
2.	Ankle Joint (Right)	0.384
3.	Knee Joint (Left)	0.046
4.	Knee Joint (Right)	-0.284
5.	Hip Joint (Left)	0.113
6.	Hip Joint (Right)	-0.034
7.	Shoulder Joint (Left)	-0.847*
8.	Shoulder Joint (Right)	0.605*
9.	Elbow Joint (Left)	0.065
10.	Elbow Joint (Right)	0.555
11.	Wrist Joint (Left)	-----
12.	Wrist Joint (Right)	0.056

*Significant at 0.05 Level

r .05 (10) = 0.576

As shown in Table 1, 2, 3, that the values of coefficient of correlation in case of all the selected Kinematic variables with the (Uttar Pradesh Under, Delhi , Uttaranchal) Under-19 teams were found insignificant at the selected level of significance of 0.05. Since the required value of coefficient of correlation for 10 degree of freedom is 0.576 and the obtained values of coefficient of correlation of selected variables less than the required value. The correlation could not be calculated with the left wrist joint because the variable was constant in case of every subject. The correlations might have been insignificant because of the independent calculation but they must have a cumulative effect on the performance.

As shown in Table IV that the values of Coefficient of Correlation in case of all the selected Kinematic variables with the Haryana Under-19 team were found insignificant at the selected level of significance of 0.05. Since the required value of Coefficient of Correlation for 10 degree of freedom is 0.576 and the obtained values of coefficient of correlation of selected variables less than the required value, except in case of the both the shoulder joints of the subjects which showed significant relationship. As the Cricket player uses both his hands while executing the Cover Drive and full extension of hands is required and the right hand is the bottom hand so as the angle would increase the shot would be better and vice versa the left shoulder joint angle is bound to decrease, so combination of both would produce a good Cover Drive. The correlation could not be calculated with the Left Wrist Joint because the variable was constant in case of every subject. The correlations might have been insignificant because of the independent calculation but they must have a cumulative effect on the performance.

The relationship of selected Linear Kinematic variables at the moment contact with the performance in Cover Drive as presented in Table 5, 6, 7 and 8.

Table 5: Relationship of Selected Linear Kinematic Variables at Moment Contact with the Performance of Uttar Pradesh Under-19 Team in Cover Drive

S. No.	Variables	Coefficient of Correlation "r"
1.	Height of Centre of Gravity (Moment Contact)	-0.172

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 6: Relationship of Selected Linear Kinematic Variables at Moment Contact with the Performance of Delhi Under-19 Team in Cover Drive

S. No.	Variables	Coefficient of Correlation "r"
1.	Height of Centre of Gravity (Moment Contact)	0.304

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 7: Relationship of Selected Linear Kinematic Variables at Moment Contact with the Performance of Uttaranchal Under-19 Team in Cover Drive

S. No.	Variables	Coefficient of Correlation "r"
1.	Height of Centre of Gravity (Moment Contact)	-0.161

*Significant at 0.05 Level
r .05 (10) = 0.576

Table 8: Relationship of Selected Linear Kinematical Variables at Moment Contact with the Performance of Haryana Under-19 Team in Cover Drive

S.No.	Variables	Coefficient of Correlation "r"
1.	Height of Centre of Gravity (Moment contact)	0.019

*Significant at 0.05 Level
r .05 (10) = 0.576

As shown in Table 5, 7, 6, 8, that the values of coefficient of correlation in case of the selected Linear Kinematic variable (Height of Center of Gravity) with the (Uttar Pradesh, Delhi, Uttaranchal, Haryana) Under-19 Cricket teams was found insignificant at the selected level of significance of 0.05. Since the required value of coefficient of correlation for 10 degree of freedom is 0.576 and the obtained values of coefficient of correlation of selected variables less than the required value. This trend does not mean that Height of Centre of Gravity does not play any important role in executing the Cover Drive but the low value of correlation must have been because of the small sample size and the low value of the Height of Center of Gravity at moment contact.

Table 9: Analysis of Variance of the Mean Difference of the Four Groups for Height of Centre of Gravity at Moment Contact

Source of Variance	df	Sum of Square	Mean Sum of Square	'F' Ratio
Between Groups	3	3731	1243.06	9.48*
Within Groups	44	6295.92	131.66	

*Significant at .05 level.
F.05 (3, 44) = 2.82

It is evident from Table 1.9 that variability exists among the four groups with respect to criterion variable namely Height of Centre of Gravity at moment contact. As each player has his own reach as per the flexibility of the groin muscle and leg length so the difference in the Centre of Gravity at moment contact must have been there.

Since there is significant difference in the result of 'One Way Analysis of Variance' therefore Post Hoc (LSD) test was applied to find out which of the mean difference amongst the group were statistically significant. The data relating to this is presented in Table 1.10.

Table 1.10: Least Significant Difference Post Hoc Test for Mean of the Four Groups for Height of Centre of Gravity at Moment Contact

Uttar Pradesh	Delhi	Uttaranchal	Haryana	M. D.	C. D.
	188.72		185.20	-3.52*	
		183.15	185.20	-2.05*	
166			185.20	-19.2*	0.2282
	188.72	183.15		-5.57*	
166		183.15		-17.15*	

*Significant at .05 level.

The above Table 1.10 shows that there was significant difference between the means of Delhi and Haryana Under-19 teams in which as per the terms of means Delhi Under-19 team was found to be superior.

Significant difference was also found between the means of Uttaranchal and Haryana Under-19 teams in which as per the terms of means Haryana Under-19 team was found to be superior. Significant difference was also found between the means of Uttar Pradesh and Haryana Under-19 teams in which as per the terms of means Haryana Under-19 team was found to be superior. Table 4.26 also reveals that difference was found between the means of Delhi and Uttaranchal Under-19 team as per the means the Delhi Under-19 team was found to be superior. Significant difference was also found between the means of Uttar Pradesh and Uttaranchal Under-19 teams in which as per the terms of means Uttaranchal Under-19 team was found to be superior. Difference between the means of four groups is shown in Fig. 1.

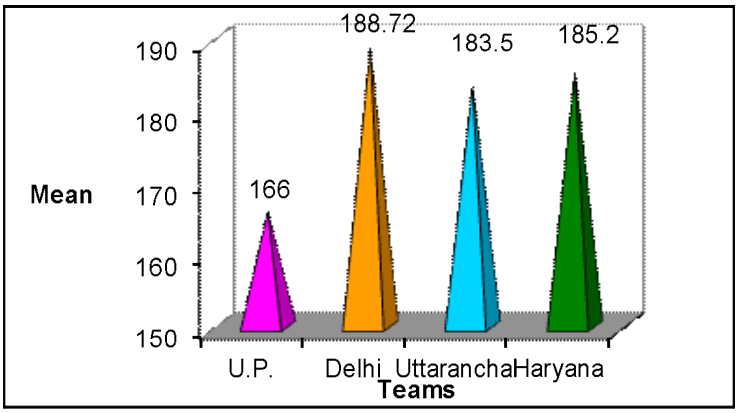

Figure 1: Bar Diagram Representing Means for Four Under-19 Teams for Height of Centre of Gravity at Moment Contact

3. DISCUSSION OF FINDINGS

- None of the selected Angular Kinematic variables that are Ankle Joint (Right and Left), Knee Joint (Right and Left), Shoulder Joint (Right and Left), Elbow Joint (Right and Left) and Wrist (Right and Left), and Hip Joint (Left and Right) showed relationship with the performance of Uttar Pradesh, Delhi, Uttaranchal, Haryana Under-19 team in Cover drive. This trend does not mean that these variables do not have any effect on the performance of the players but these variables' relationship was calculated independently but the variables must have a cumulative effect on the performance.
- In case of Linear Kinematic variable Height of Center of Gravity at moment contact none of the teams showed relationship with the performance of the subjects in Cover Drive. As the study was about the moment contact of the Cover Drive and the higher the subject is elevated from the ground which is Height of Centre of Gravity the better would be his performance. So it can be concluded that better performance is achieved by higher elevation.

- No variation was found between the groups in case of all the Under-19 teams in terms of their performance in Cover Drive but the mean of the performance of Haryana was a little high than the other teams. As the performance of the Under-19 teams is more or less the same but in this age of cut throat competition even a little difference can win or lose matches but the skill tested was under controlled conditions and was also one in number so if a detailed study on each and every skill (Hook Shot, Pool Shot, Drive Shot etc.) may be done difference can found.
- No variation was found between the Under-19 teams in terms of their Angular Kinematic Variables Ankle Joint (Right and Left), Knee Joint (Right and Left), Shoulder Joint (Right and Left), Elbow Joint (Right and Left) and Wrist (Left), and Hip Joint (Left and Right) apart from right wrist joint and Height of Centre of Gravity at moment contact which was the highest in case of Uttar Pradesh Under-19 state team. No significant difference was found between the means of Uttar Pradesh and Haryana, Delhi and Haryana, Uttaranchal and Haryana but the means of the Uttar Pradesh and Delhi, Delhi and Uttaranchal were found to be statistically significant as per the LSD test implemented which showed the mean difference 13.91 in case of Uttar Pradesh and Haryana,8.08 in case of Delhi and Haryana and 8.41 in case of the means of Uttar Pradesh and Haryana , Delhi and Haryana, Uttaranchal which was higher than the tabulated value of 3.59.The analysis of data clearly reveals that the Uttar Pradesh and the Uttaranchal Under-19 State team are better in terms of right Wrist Angle. In case of Height of The Center of Gravity the following state teams differed Uttar Pradesh and the Delhi State team as the mean difference was 22.49, Uttar Pradesh and Uttaranchal Under-19 State team which was 15.34, Uttar Pradesh and Haryana was 16.62 which was higher than the tabulated value of 3.59 hence it could be said that Delhi and Uttaranchal Under-19 State team was better in terms of Height of Center of Gravity at moment contact.

4. CONCLUSION

1. None of the selected Angular Kinematic variables that are Ankle Joint (Right and Left), Knee Joint (Right and Left), Shoulder Joint (Right and Left), Elbow Joint (Right and Left) and Wrist (Right and Left), and Hip Joint (Left and Right) showed relationship with the performance of Uttar Pradesh, Delhi, Uttaranchal, Haryana Under-19 team in Cover Drive.
2. In case of Linear Kinematic Variable Height of Center of Gravity at moment contact none of the teams showed relationship with the performance of the subjects in Cover Drive.
3. No variation was found between the groups in case of all the National Teams in terms of their performance in Cover Drive but the mean of the performance of Haryana was a little high than the other Under-19 teams.
4. No variation was found between the Under-19 teams in terms of their Angular Kinematic variables Ankle Joint (Right and Left), Knee Joint (Right and Left), Shoulder Joint (Right and Left), Elbow Joint (Right and Left) and Wrist (Left), and Hip Joint (Left and Right) apart from right wrist joint and Height of Centre of Gravity at moment contact which was the highest in case of Uttar Pradesh Under-19 state team. No significant difference was found between the means of Uttar Pradesh and Haryana , Delhi and Haryana, Uttaranchal and Haryana but the means of the Uttar Pradesh and Delhi, Delhi and Uttaranchal were found to be statistically significant as per the LSD test implemented which showed the mean difference 13.91 in case of Uttar Pradesh and Haryana,8.08 in case of Delhi and Haryana and 8.41 in case of the means of Uttar Pradesh and Haryana, Delhi and Haryana, Uttaranchal which was higher than the tabulated value of 3.59.The analysis of data clearly reveals that the Uttar Pradesh and the Uttaranchal Under-19 State team are better in terms of Right

Wrist angle. In case of Height of the Center of Gravity the following state teams differed Uttar Pradesh and the Delhi Under-19 State team as the mean difference was 22.49, Uttar Pradesh and Uttaranchal State team which was 15.34, Uttar Pradesh and Haryana was 16.62 which was higher than the tabulated value of 3.59 hence it could be said that Delhi and Uttaranchal Under-19 State team was better in terms of Height of Center of Gravity at moment contact.

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Effect of Selected Warm Up Protocols on Explosive Strength Performance in Atheletes

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Abstract:
The aim of present study was to investigate that which type of warm-up protocol was most suitable for explosive leg strength performance. Fifteen male sprinters, 18–23 years of age, were randomly selected from lakshmibai national university Gwalior. All the subjects underwent three different warm up conditions i.e. static stretching warm up (SSW), dynamic stretching warm up after jogging (DSWJ) and dynamic stretching warm up after ABC exercises (DSWABC). The intensity of warm-up was 38% to 45% of maximum heart rate except in static stretching group. The subjects were assigned to different warm up conditions in counterbalancing manner. The standing broad jump performance was recorded 3 to 4 minutes after the warming up protocol was recorded. One way repeated measure ANOVA was applied to find out significance of the mean differences. The results of the study revealed that there is a significant difference between the.

1. INTRODUCTION

Generally Athletes engage in warming up before participating in any vigorous physical activity. Mostly several minutes of low intensity of warm-up followed by static stretching is generally recommended for young athletes. There are many kinds of warm up protocols which are recommended for this purpose. Basic elements in any kind of warming up protocol remains performing mild aerobic activity involving large muscles, stretching and specific movements related to activity to be performed.

The warm up increases muscle efficiency and reduces potential for muscle pulls and also improves reaction time as well as the speed. Movement of the muscles or ligaments in this case is very important part. Another important factor during warm up is with which intensity and duration it is performed. Warm up should be adjusted according to the environmental temperature and the amount of clothing worn in any case no more than fifteen minutes should elapse. Competitive and recreational athletes typically perform warm up and stretching activities to prepare for strenuous exercise. This type of warm up to prevent sports related injuries and enhance physical performance in cold days. Warm up should not end more than ten minutes before the kick off or actively and extremely cold days the warm up could be performed in change room. A good indicator of optimal muscles temperature is when the athlete begins to sweat. The most important thing of warm up increase core temperature, blood flow, and prepared the body for exercise and also the specific muscles get ready and can get high performance. There is no doubt that time spent on warming up and cooling down will improve its athletes and level of performance and increase the recovery process that is needed before training or competing again.

However, there is some evidence that static stretching can be detrimental to the power component of athlete's performance. Stretching has shown to inhibit drop jump performance (young.WB and Behm.D.G 2003) vertical jump performance power part as measured by maximum voluntary contraction force and leg extension power.

Most of the athletes for the purpose of warm up perform jogging followed by stretching of specific muscle before participating in main activity. In an extensive review, Behm and Chauachi, reported that dynamic routines are more helpful than static stretching to improve leg explosive performance.

The present investigation was undertaken to find out the most effective warm up protocol in terms of explosive strength performance.

2. METHODOLOGY

For the purpose of study 11 sprinters were selected randomly from track and field match practice group at Lakshmibai national institute of physical education, Gwalior. The participants were selected using random sampling technique. The age of selected subject range from 18-23 years and the height of subjects was 171 ± 7 cm. The body weight was 52–72 kg . All the participants underwent each warm up protocol in counter balancing manner. The temperature range from 330 to 430 celcius for all experimental conditions. Each experiment was conducted 2 hours after the meal. The intensity of warming up was 38 % to 45% of maximum heart rate was except in static stretching group. The heart rate monitor was used to measure the heart rate and also control the intensity. The data on standing broad jump was collected 4 to 5 minutes after warm up on long jump Pit. Three trials were given to each subject and the best performance was considered as score of the subjects. The maximum heart rate was calculated by this given formula:

HRmax = 208(0.7* age)

This formula was given by Tanaka.

3. RESULTS

Table 1: Descriptive Statistics

	Mean	Std. Deviation	N
SSW	2.6100	.12829	15
DSWJ	2.6167	.11690	15
DSWABC	2.6367	.11387	15

Table 1 shows the descriptive statistics i.e. mean and standard deviation of the broad jump performance under different warming up conditions.

Table 2: Mauchly's Test of Sphericity[a]

Within Subjects Effect	Mauchly's W	Approx. Chi-Square	df	Sig.	Epsilon[b]
					Greenhouse-Geisser
Warm_up	.276	16.719	2	.000	.580

Mauchley's statistic tests the assumption of sphericity.. as the mauchley's value is significant at 0.05 level of significance, greenhouse geisser correction will be used for purpose of further analysis.

Table 3: Test of Within Subject Effect

Source		Type III Sum of Squares	df	Mean Square	F	Sig.
Warm_up	Sphericity Assumed	.006	2	.003	21.538	.000
	Greenhouse-Geisser	.006	1.160	.005	21.538	.000
	Huynh-Feldt	.006	1.200	.005	21.538	.000
	Lower-bound	.006	1.000	.006	21.538	.000
Error(Warm_up)	Sphericity Assumed	.004	28	.000		
	Greenhouse-Geisser	.004	16.245	.000		
	Huynh-Feldt	.004	16.797	.000		
	Lower-bound	.004	14.000	.000		

Test of within subject effects reveal that there is a significant difference between different warm up conditions in terms of standing broad jump performance as the p - value is less than 0.05 level of significance.

Table 4: Pairwise Comparisons

(I) Warm_up	(J) Warm_up	Mean Difference (I-J)	Std. Error	Sig.[b]	95% Confidence Interval for Difference[b]	95% Confidence Interval for Difference
					Lower Bound	Upper Bound
SSW	2	-.007	.004	.409	-.018	.005
	3	-.027*	.006	.001	-.042	-.012*
2	SSW	.007	.004	.409	-.005	.018
	3	-.020*	.002	.000	-.026	-.014*
3	SSW	.027*	.006	.001	.012	.042*
	2	.020*	.002	.000	.014	.026*

Pair wise comparison shows there is significant difference between SSW and DSWABC as the p value is less than 0.05 level of significance. Whereas no significant difference was found between SSW and DSWABC.

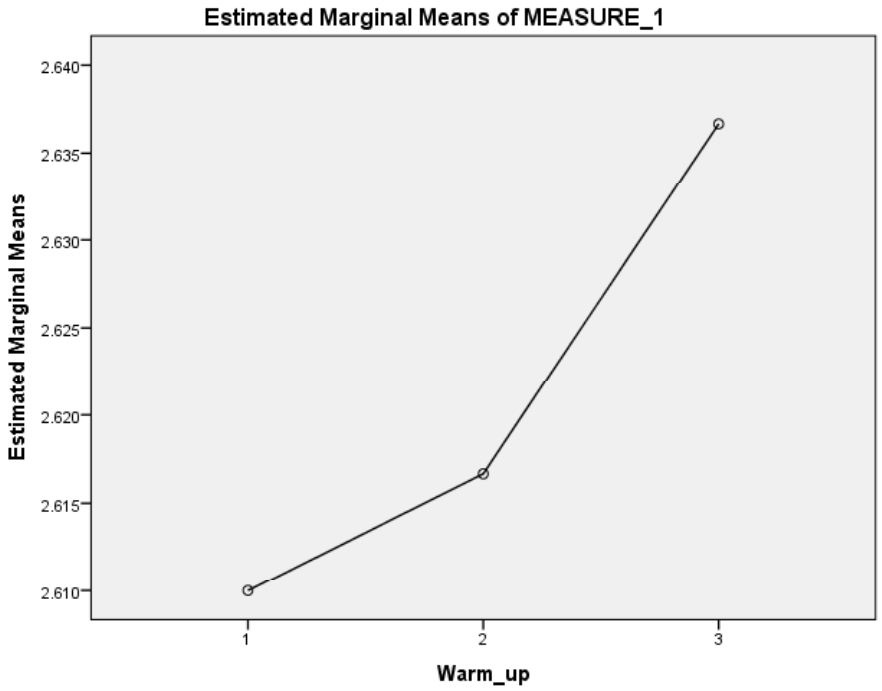

Figure 1: Profile Plot

4. DISCUSSION OF FINDINGS

The present investigation was conducted to investigate, the most suitable warmup protocol for the performance of explosive leg strength. Out of there selected protocol that is static stretching warm-up (SSW) , dynamic stretching warm up after JOGGING (DSWJ), dynamic stretching warm up after abc exercises. (DSWABC).

The result of the study reveal that there is significance difference between SSW and DSWJ and SSW or DSWABC as well but no significant exist between DSWJ and DSWABC . These results are consistent with Bishop's review of the literature, vindicating that an active warm up of moderate intensity is likely to significantly improve short-term performance on a range of tasks as long as fatigue is not induced. (BISHOP, 2003)

As a result show the worst performance of standing broad jump was observed in SSW as compare to the DSWJ and DSWABC as in static stretching it can has been observed that it leads to over elasticity in the tendon (attachment between muscle and bone). Avery D. Faigenbaum (2005) suggested that it may be desirable for children to perform moderate- to high intensity dynamic exercises prior to the performance of activities that require a high power output.

SSW may also lead to in significant increase to temperature of the involved muscles although DSWJ has resulted in better performance as compared to SSW, but still performance in explosive strength. Where recorded in much better in DSWABC. ABC exercise include in warm up protocol where mostly such nature that they lack to the rapid contraction and relaxation .As there leads to recruitment of greater number of muscles fibres . Investigations by Shellock, F.G, 1985 have shown high intensity dynamic warm up to improve knee joint position sense, to increase oxygen uptake, to lower lactate concentration and raise blood pH, to improve efficiency of thermoregulation, and to improve performance for bicycle sprints and vertical jumps. It also leads to better stimulation of motor unit during all out effort. Stimulation of muscles in this manner may have all resulted in the broad jump performance. Although DSW after jogging may have enhance the broad jump performance due to increases in temperature and involvement of muscles. But the inability of this kind of warm up to stimulate muscles fibre at rapid pace may have lead to lesser performance as compared to dynamic stretching warm up after ABC.

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Analysis of the Shot Put Performance for University Athletes from the Year 2013–2014

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Abstract:

Background: The purpose of the study was to analyze the shot put performance for university athletes from the year 2013–2014.

Method: For the purposes of the study, five male athletes from MATS University, Raipur, INDIA, were selected as subjects, there age ranged from 18 to 25 years. The shot put performance of the athletes in the year 2014 was analyzed through trend analysis and manipulates all the result through graphical representation across the year of 2013–2014. The level of significance set at 0.05 level & data was analyzed by Statistical Package of social sciences (SPSS version 17.0).

Result: The finding of the present study clearly indicated that the performance of shot put in men category, statistically significant liner trend here graph is peaked in November, it means the performance is in peaked in comparison to other selected months as well as graph is much more downfall in April is comparison to other months it means the performance of shot put men category is down in comparison to other months. On the other hand the graph uniformed in December, February and March, it is also described from trend analysis that from July, August, September and November, the performances were change in all selected months simultaneously. This change in performance from the Months July, August, September, November, December, January, February, March and April described whether the performance of shot put men category are statistically different it is based as analysis of variance.

Conclusion: The data was collected from the official's records in the form of reports of competition & being maintained at department of games & sports of MATS University, between the months of 2013–2014. The data collected from the records of the university, was analyzed by using descriptive statistics and trend analysis including one analysis of variance (ANOVA). The findings of the study indicates the statistically significant liner trend, here graph is peaked in the month of November, as well as graph is much more downfall in April. On the other hand the graph uniformed in December, February and March, it is also described from trend analysis that from July, August, September and November, the performances were change in all selected months simultaneously.

Keywords:
Trend Analysis

1. INTRODUCTION

Search and selection of potential athletes in specific based on specification, is a matter of routine in many development countries. Unfortunately in India, this aspect has not been given serious, consideration consequently; athletes are selected from the "available pool" mainly on the basis of their performances in various sports meets.

It is often forgotten that such "talents "have already reached their peek performance with little scope for further spectacular improvement inspire of intense grooming schedules. Therefore, a fresh look needs to be taken to improve upon the method of selection of Indian athletes. They need to be identified at a very young age. Today all over the world, physical educators and coaches are facing their greatest challenge in handling problems in scientific way i.e. to give their sportsmen proper and progressive guidelines based on scientific approach which leads to desired results. Science, both physical and physiological has been recognized as one of the best mean of underlying sportsman, performance and of helping in producing better performance. In the competition of athletics, there can be manifold factors which may affect the performance of the athletes. Lacking in any of the above mentioned factors may bring disaster to the athlete performance. By its nature , the compaction demand from the athletes- a high level of physical and mental fitness, mastery of skills, tactical efficiency, will power, devotion, killer instinct, common sense understanding and cooperation among the athlete and so on. Without these essential ingredients no magical organization of players can ensure the success. Athletics is a season less game and it required to be played in various conditions of play field, regardless of climate. To a large extent, the environmental factors and field conditions affect the performance of players. The team that best adapt to them, therefore, can increase the chances of winning.

2. OBJECTIVES OF THE STUDY

The purpose of the study was to analyze the shot put performance of university athletes in the year 2013- 2014.

3. METHODOLOGY

For the purposes of the study, five male athletes from MATS University, Raipur, INDIA, were selected as subjects, there age ranged from 18 to 25 years. The shot put performance of the athletes in the year 2014 was analyzed through trend analysis and manipulates all the result through graphical representation across the year of 2014. The level of significance set at 0.05 level & data was analyzed by Statistical Package of social science s (SPSS version 17.0).

4. STATISTICAL ANALYSIS

To analyze the shot put performance of university athletes in the year 2014, trend analysis statistical technique was used with SPSS version 17.0. The hypothesis was tested at 0.05 level of significance.

Table 1: Descriptive Statistics of Shot Put Performance from the Year 2013–2014

Months	N	Mean	Std. Deviation	Std. Error	Min	Max
July	5	12.1100	.65341	.29222	11.61	12.84
August	5	12.0420	.42204	.18874	11.30	12.35
September	5	12.3940	.58423	.26128	11.60	13.10
October	5	13.1960	.36018	.16108	12.89	13.80
November	5	13.4000	.49107	.21961	12.85	13.97
December	5	12.8780	.81328	.36371	11.91	14.08
January	5	12.6600	.66487	.29734	11.69	13.50
February	5	13.1160	.48252	.21579	12.70	13.92
March	5	13.0540	.51747	.23142	12.58	13.70
April	5	11.6640	.75699	.33854	10.83	12.78
Total	50	12.6514	.76848	.10868	10.83	14.08

Table 2: Analysis of Variance to the Shot Put Performance of Male Athlete from 2013–2014 ANOVA

Shot Put Performance							
			Sum of Squares	df	Mean Square	F	Sig.
Between Groups	(Combined)		14.960	9	1.662	4.757	.000
	Linear Term	Contrast	.314	1	.314	.898	.349
		Deviation	14.647	8	1.831	5.239	.000
Within Groups			13.978	40	.349		
Total			28.938	49			

The analysis of variance table shows that F (9, 40) = 4.757, P<0.05 is significant. This table concludes that performance of shot put performance differ significantly across the years from 2013-2014. Moreover, the linear terms in the above table shows insignificance (P<0.05). This means that, shot put performance of athletes for consistently non uniform.

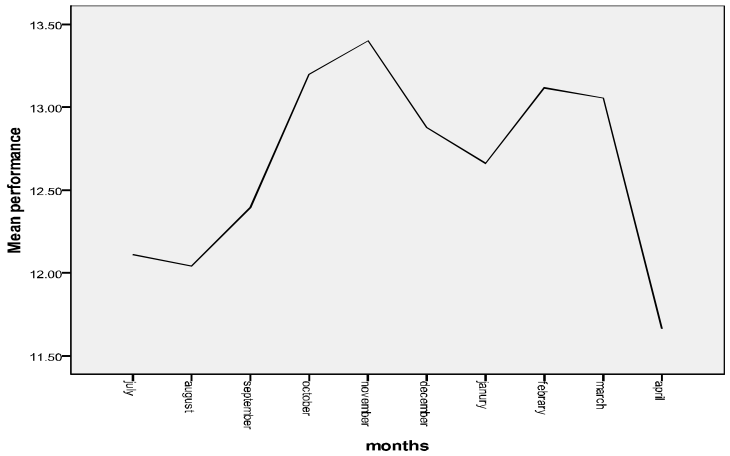

Figure 1: Graphical Representation of the Shot Put Performance of the Male Athlete from the Year 2013–2014

5. RESULTS OF THE STUDY

The finding of the present study clearly indicated that the performance of shot put in men category, statistically significant liner trend here graph is peaked in November, it means the performance is in peaked in comparison to other selected months as well as graph is much more downfall in April is comparison to other months it means the performance of shot put men category is down in comparison to other months. On the other hand the graph uniformed in December, February and March, it is also described from trend analysis that from July, August, September and November, the performances were change in all selected months simultaneously. This change in performance from the Months July, August, September, November, December, January, February, March and April described whether the performance of shot put men category are statistically different it is based as analysis of variance.

6. CONCLUSION

The data was collected from the official's records in the form of reports of competition & being maintained at department of games & sports of MATS University, between the months of 2013 - 2014. The data collected from the records of the university was analyzed by using descriptive statistics and trend analysis including one analysis of variance (ANOVA). The findings of the study indicates the statistically significant liner trend, here graph is peaked in the month of November, as well as graph is much more downfall in April. On the other hand the graph uniformed in December, February and March, it is also described from trend analysis that from July, August, September and November, the performances were change in all selected months simultaneously.

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Construction of Knowledge Test for Football Players

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Abstract:
The purpose of the study was the construction of knowledge test for football players. The hundred Football players were randomly selected to serve as a subjects from L.N.I.P.E., Gwalior. The age of subjects was ranged between 18 to 30 years. All the subjects had regular theoretically classes during which different aspects of the game of football was theoretically explained. The test contents comprised of various aspects of tennis game with the rules and their interpretations, history , tactics and techniques as adopted by Federation International de Football. The knowledge test was consisted of objective type questions on rules of football with its interpretation, history, tactics and techniques in relation to the game of football. Objective knowledge test was first administered to ten subjects to determine the clarity of question items were refined. Then a trial run of the test was administered to all the subjects, which they answered in the allotted time period. These response sheet were then evaluated. This was ussd to make decisions about individual test item within the test as well as the worthiness of the test as a whole. For analyzing this difficulty rating and index of discrimination were employed. Using split half method, a correlation between the odd and even numbered item was established . the spearman – Brown prophecy formula was used. Findings of the study revealed that twenty five items were eliminated on the basis of difficulty rating which contained items answered correctly by the students above 80% and below 20%, fifteen items were discarded on the basis of index of discrimination in which poor students did well or better than upper group. A total of 35 questions were deleted depending upon the results of item analysis and the revised test contained 65 objective type questions in football knowledge test.

1. INTRODUCTION

If you want to test the knowledge of any individual in a particular field, knowledge test is the best tool for that. Evaluation in physical education cannot be completed without the use of knowledge test. A football player should also be aware about the different aspects of football. It may be rules, tactics, history etc. It helps him to take advantage over the opponent and to think creatively. Knowledge test involves various statistical techniques to finalized the questions.[1]

2. METHODOLOGY

For this purpose hundred football players were selected to serve as subjects from the Match practice group of football L.N.I.P.E. Gwalior.the age of subjects were 18 to 30. All the subjects had regular theoretically classes during which different aspect of the game of football was theoretically explained. Keeping in view the learning level of

[1]Dewey, Langston F. (1955), "Standardization of a Football Knowledge Test for College Men Physical Education Major's", *Research Quarterly American Association for Health, Physical Education and Recreation,* Vol. 26, Issue 1.

the objects and utility of the test, following objectives were set : to develop an understanding of the rules and their interpretation, history , tactics and techniques in relation to game of football. The knowledge test was consisted of objective types of questions on rules of football with interpretation. History, tactics and techniques in relation to the game of football. The preliminary form of the test was circulated to the experts and test items were refined,

Before administering the test intensive instructional classes were conducted for the subjects to be well acquainted with the subject matter. Each explanation was taught with due explanation of diagrams (wherever necessary)

Objective knowledge test was first administerd to ten subjects to determine the clarity of question items and on that basis questions items were refined. Then a trial run of the test was administered to all the subjects which they answered in the allotted time period. These responses sheets were then evaluated.

On the basis of the response scores , the questions items were further subjected to careful item analysis. The items which were found unsatisfactory after analysis either rejected or modified.

3. STATISTICAL PROCEDURE

3.1. ITEM ANALYSIS

This was used to make decision about individual test within the test as well as the worthiness of the test as a whole. For analyzing this difficulty rating and index of discrimination were employed.

3.2. DIFFICULTY RATING

It was determined by the percentage of student who have chosen the correct responses for a particular test item. This formula was used.[2]

DR = Number Answering correctly/ Total number in Group

3.3. INDEX OF DISCRIMINATION

It was used to provide information about the high and low performance. For index of discrimination the scores from the top and bottom 27% of the students who were appeared in the test. The formula used was[3]:

ID = (No. of correct response in Upper Group–No. of Correct response in Lower Group)/ No. in each group

3.4. RELIABILITY OF DATA

Using split half method, a correlation between the odd and even numbered item was established by using Spearman –Brown formula.[4]

Table 1: Difficulty Rating for Fifty Students on Knowledge Test of Football

S. No.	Question No.	No of Students Answered Correctly	Difficulty Rating= No. of Students Answered an Item Correctly/ No of Students Appeared for the Test
1	1	54	0.54
2	2	67	0.67
3	3	78	0.78
4	**4**	**86**	0.86
5	**5**	**69**	**0.69**
6	**6**	**56**	**0.56**

Table 1 (Contd.)...

[2]Miler, David K. (2006), *Measurement by the Physical Educator Why and How*, 5th Edition, p. 78.
[3]*Ibid*, p. 79.
[4]*Ibid*, p. 69.

...Table 1 (Contd.)

7	7	64	0.64
8	8	66	0.66
9	9	87	0.87
10	10	92	0.92
11	11	59	0.59
12	12	54	0.54
13	13	57	0.57
14	14	56	0.56
15	15	68	0.68
16	16	52	0.52
17	17	69	0.69
18	18	81	0.81
19	19	72	0.72
20	20	58	0.58
21	21	59	0.59
22	22	95	0.95
23	23	67	0.67
24	24	61	0.61
25	25	49	0.49
26	26	90	0.9
27	27	46	0.46
28	28	62	0.62
29	29	64	0.64
30	30	16	0.16
31	31	57	0.57
32	32	57	0.57
33	33	84	0.84
34	34	55	0.55
35	35	53	0.53
36	36	48	0.81
37	37	63	0.63
38	38	56	0.56
39	39	69	0.69
40	40	89	0.89
41	41	66	0.66
42	42	94	0.94
43	43	59	0.59
44	44	68	0.68
45	45	46	0.46
46	46	92	0.92
47	47	48	0.48
48	48	63	0.63
49	49	45	0.45
50	50	18	0.18
51	51	55	0.55
52	52	64	0.64
53	53	3	0.03
54	54	49	0.49
55	55	10	0.1
56	56	58	0.58
57	57	59	0.59
58	58	88	0.88
59	59	76	0.76
60	60	77	0.77
61	61	83	0.83
62	62	63	0.63

Table 1 (Contd.)...

...Table 1 (Contd.)

63	63	64	0.64
64	64	68	0.68
65	65	74	0.74
66	66	87	0.87
67	67	61	0.61
68	68	84	0.84
69	69	94	0.94
70	70	48	0.48
71	71	54	0.54
72	72	18	0.18
73	73	74	0.74
74	74	62	0.62
75	75	63	0.63
76	76	85	0.85
77	77	66	0.66
78	78	58	0.58
79	79	39	0.39
80	80	12	0.12
81	81	74	0.74
82	82	78	0.78
83	83	42	0.42
84	84	87	0.87
85	85	64	0.64
86	86	87	0.87
87	87	57	0.57
88	88	51	0.51
89	89	61	0.61
90	90	69	0.69
91	91	64	0.64
92	92	46	0.46
93	93	73	0.73
94	94	56	0.56
95	95	76	0.75
96	96	53	0.53
97	97	58	0.58
98	98	54	0.54
99	99	64	0.64
100	100	62	0.62

Table 2: Index of Discrimination for Fifty students on Knowledge Test of Football

S. No.	No. of Correct Response in the Upper 27%	No of Correct Responses in the lower 27%	Index of Discrimnation
1	25	12	0.48
2	22		0.30
3	24	6	0.67
4	20	12	0.30
5	18	11	0.26
6	19	6	0.48
7	26	11	0.56
8	20	8	0.44
9	17	14	0.11
10	19	7	0.44
11	18	8	0.37
12	21	4	0.63

Table 2 (Contd.)...

...Table 2 (Contd.)

13	16	10	0.22
14	18	6	0.44
15	15	4	0.41
16	20	6	0.52
17	27	8	0.70
18	23	4	0.70
19	22	9	0.48
20	24	2	0.81
21	21	14	0.26
22	21	11	0.37
23	24	8	0.59
24	25	9	0.59
25	26	7	0.70
26	21	9	0.44
27	24	7	0.63
28	21	6	0.56
29	22	6	0.59
30	26	8	0.67
31	13	12	0.04
32	23	4	0.70
33	18	5	0.48
34	19	7	0.44
35	20	6	0.52
36	18	6	0.44
37	19	7	0.44
38	18	5	0.48
39	17	4	0.48
40	25	21	0.15
41	22	7	0.56
42	22	10	0.44
43	24	12	0.44
44	22	11	0.41
45	27	12	0.56
46	22	6	0.59
47	15	3	0.44
48	14	2	0.44
49	23	6	0.63
50	25	25	0.00
51	24	12	0.44
52	21	10	0.41
53	16	6	0.37
54	23	6	0.63
55	20	5	0.56
56	24	13	0.41
57	25	11	0.52
58	20	8	0.44
59	26	9	0.63
60	23	7	0.59
61	21	9	0.44
62	22	10	0.44
63	16	3	0.48
64	17	7	0.37
65	24	9	0.56
66	16	4	0.44
67	17	5	0.44
68	23	4	0.70

Table 2 (Contd.)...

...Table 2 (Contd.)

69	17	3	0.52
70	22	9	0.48
71	19	7	0.44
72	18	5	0.48
73	24	9	0.56
74	20	8	0.44
75	26	11	0.56
76	21	10	0.41
77	26	6	0.74
78	22	8	0.52
79	15	9	0.22
80	27	25	0.07
81	13	5	0.30
82	26	10	0.59
83	18	3	0.56
84	19	5	0.52
85	21	8	0.48
86	21	9	0.44
87	25	14	0.41
88	27	6	0.78
89	20	20	0.00
90	20	6	0.52
91	22	7	0.56
92	17	6	0.41
93	19	5	0.52
94	18	4	0.52
95	17	5	0.44
96	19	6	0.48
97	20	16	0.15
98	21	9	0.44
99	22	7	0.56
100	20	4	0.59

4. DISCUSSIONS AND CONCLUSION

From the findings of the study it was concluded that:

1. 25 items were eliminated on the basis of difficulty rating which contained item answered correctly by the students above 80 percent and below 20 percent.
2. Fifteen items were discarded on the basis of index of discrimination in which poor students did well or better than upper group.
3. A total of 35 questions were deleted depending upon the result of item analysis.
4. The revised test contained 65 objective type questions in football knowledge test.

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A Study on Blood Glucose Response and Recovery Pattern of Long Distance Runners

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Abstract:

The purpose of the study was to investigate the recovery pattern of Long distance runners i.e. 5,000mts and 10,000mts in relation to Blood glucose. The study was delimited to long distance runners. viz. 5,000mts and 10,000mts of Junior National level (10 athletes each of 5,000mts and 10,000mts) from Tata Athletics Academy, Jamshedpur (Jharkhand). The age of the subjects ranged between 16–20 years. The Physiological variables chosen for the study was Blood Glucose. It was hypothesized that there will be significant recovery in blood glucose as a result of different duration of recovery among 5,000 mts and 10,000 mts runners. The data for the physiological responses and recovery pattern of long distance runners were obtained with the help of instrument of Blood glucose was taken prior to the actual event. The subjects were then asked to run exact distance of their event like a competiton in a trial run. Immediately after the finish of the respective races their data were collected on all the variables. Then the athletes were subjected to active recovery for 15 minutes and the data were again collected on the same variables. The data on blood glucose was taken in similar fashion subsequently at recovery of 30 minutes and 45 minutes from the finish of the race. In order to analyze and compare the physiological responses and recovery pattern of long distance runners of 5,000mts and 10,000 mts , Two way Analysis of variance was used. LSD Post Hoc Mean comparison was applied for the significant F-values. The level of significance was set at 0.05.It may therefore be concluded on the basis of the findings that the long distance running events like 5000 mts and 10,000mts are not absolutely aerobic event.The anaerobic proportion of Long distance running 5000 mts and 10,000mts is of significant level and fatigue caused in these events are due to anaerobic glycolysis . Since 15 minutes recovery provides significant level of fatigue elimination it could be considered important in training implication for long distance runners, from the point of planning interval training, extensively or intensively. Enzymatic and hormonal activity significantly raises Blood glucose level during 5000mts and 10,000 mts event to meet the intense energy demands.

1. INTRODUCTION

The field of exercise physiology has become increasingly sophisticated. New research procedure and measurements techniques coupled with advances in equipment, computer technology, and other related disciplines such as biochemistry have contributed to the rapid advancement of the knowledge base. Exercise biochemistry involves examination of the effects of exercise at the cellular level, specifically within the muscle. Although the field of exercise physiology is becoming increasingly specialized, many professionals in this field recognize that to fully investigate and understand human performance an interdisciplinary approach is necessary. (Deborah A.Wuest, 1992).During heightened energy demands of exercise, muscles use glucose rapidly. Hence, muscle is required to be supplied with glucose and this is achieved by rising plasma glucose in blood through a process of gluconeogenesis.

During intense exercise the plasma glucose concentration in blood mainly increases due to four hormones i.e. Glucagon; Epinephrine; Norepinephrine; and Cortisol. The plasma glucose concentration during exercise depends on a balance between glucose uptake by the muscles and its release by the liver. (Wilmore & Costill, 2008).

At rest, glucose release from the liver is facilitated by glucagon, which promotes liver glycogen breakdown and glucose formation from amino acids. During exercise, glucagon secretion increases. Muscular activity also increases the rate of catecholamine release from the adrenal medulla, and the hormones epinephrine and norepinephrine work with glucagon to further increase glycogenolysis. Evidence suggests that cortisol levels also increases protein catabolism, freeing amino acids to be used within the liver for gluconeogenesis. These hormones can increase the amount of plasma glucose by enhancing the processes of glycogenolysis and gluconeogenesis. (Wilmore and Costill, 2008). The purpose of the study was to investigate the recovery pattern of Long distance runners i.e. 5,000mts and 10,000mts in relation to Blood glucose.

2. METHODOLOGY

The study was delimited to long distance runners. viz. 5,000 mts and 10,000mts of Junior National level (10 athletes each of 5,000 mts and 10,000mts) from Tata Athletics Academy, Jamshedpur (Jharkhand). The age of the subjects ranged between 16–20 years. The Physiological variables chosen for the study was Blood Glucose. It was hypothesized that there will be significant recovery in blood glucose as a result of different duration of recovery among 5,000 mts and 10,000 mts runners. The recovery pattern in physiological responses due to different duration of recovery will be significantly different for 5,000 mts and 10,000 mts runners. Blood Glucose was measured by Accu-Check Analyzer and it was recorded in mg/dl. The purposive sampling technique was employed as the study was based on Long distance runners of Junior National level belonging to 5,000 mts and 10,000 mts events.

The data for the physiological responses and recovery pattern of long distance runners were obtained with the help of instrument of Blood glucose was taken prior to the actual event i.e. 5,000mts and 10,000mts at resting condition. The subjects were then asked to run exact distance of their event like a competiton in a trial run. Immediately after the finish of the respective races their data were collected on all the variables. Then the athletes were subjected to active recovery for 15 minutes and the data were again collected on the same variables. The data on blood glucose was taken in similar fashion subsequently at recovery of 30 minutes and 45 minutes from the finish of the race. The mode of the recovery followed by the athletes was active. In order to analyze and compare the physiological responses and recovery pattern of long distance runners of 5,000mts and 10,000 mts , Two way Analysis of variance was used. LSD Post Hoc Mean comparison was applied for the significant F-values. The level of significance was set at 0.05.

Table 1: Two-Way ANOVA of Mean Scores for Blood Glucose during Recovery Pattern of Long Distance Runners

Source of Variances	df	S.S.	M.S.S.	F-ratio
Group	1	5700.25	5700.25	12.41*
Time	4	198778.24	49694.56	108.18*
Group* Time (Interaction)	4	6089.20	1522.30	3.31*
Error	90	41341.70	459.35	
Total	100	2002503.00		

*Significant at 0.05 level, $F_{.05}$ (1, 90) = 3.94, $F_{.05}$ (4, 90) = 2.46

From the Table 1, it is evident that adjusted F-value of groups for Blood glucose is 12.41, which is significant at 0.05 level. It indicates that the adjusted mean scores of Blood glucose of 5,000mts and 10,000mts runners differ significantly. It is further evident that adjusted F-value of time intervals for Blood glucose is 108.184 which is also significant at 0.05 level. This means that the adjusted mean scores of Blood glucose at different time intervals differ

significantly. It is also evident that adjusted F-value of interaction between group and time interval is 3.31 which is significant at 0.05 level. It indicates that the adjusted mean scores of Blood glucose belonging to 5,000 mts and 10,000 mts runners at different time intervals differ significantly.

Table 2: Row wise LSD Post Hoc Comparison for Blood Glucose among 5000m and 10000m Runners

5,000 Mts Runners	10,000 Mts Runners	Mean Difference
124.76	139.86	15.1*

*Significant at 0.05 level.

$C.D_{.05}$ (4, 90) = 8.57

It is observed from Table 2 that there is a significant difference between 5,000 m and 10,000m runners on their Blood glucose concentration as the mean difference of Blood glucose 15.1 is greater than the critical difference 8.57.

Table 3: Column wise LSD Post Hoc comparison of Blood Glucose among Different Time Intervals

Pre-Test	Post-Test	After 15 Minutes	After 30 Minutes	After 45 Minutes	Mean Difference
102.7	212.85				110.15*
102.7		148.30			45.6*
102.7			105.20		2.5
102.7				92.50	10.2
	212.85	148.30			64.55*
	212.85		105.20		107.65*
	212.85			92.50	120.35*
	212.85	148.30	105.20		43.1*
		148.30		92.50	55.8*
			105.20	92.50	12.7

* Significant at 0.05 level.

$C.D_{.05}$ (4, 90) = 13.55

It is evident from Table-3, that obtained mean differences on Blood glucose among Pre-test–Post-test, Pre-test-After 15 minutes, Post-test-After 15 minutes, Post-test-After 30 minutes, Post-test-After 45 minutes, After 15 minutes-30 minutes, After 15 minutes-45 minutes are 110.15, 45.6, 64.55, 107.65, 120.35, 43.1, 55.8 respectively is significant at 0.05 level as the values were greater than critical difference 13.55. It is also evident that obtained mean difference among Pre-test-After 30 minutes, Pre test-After 45 minutes and After 30 minutes–45 minutes are 2.5, 10.2 and 12.7, which is not significant as the values are lesser than critical difference 13.55.

Table 4: LSD Post Hoc Interaction Analysis for Blood Glucose between Groups and Time Internal

Exp. Condition/ Time Interval	5,000 mts Runners	10,000 mts Runners	Mean Difference
Pre-Test	99.4	106.0	6.6
Post-Test	196.0	229.7	33.7*
After 15 minutes	132.0	164.6	32.6*
After 30 minutes	100.8	109.6	8.8
After 45 minutes	95.6	89.4	6.2

*Significant at 0.05 level.

$C.D_{.05}$ (4, 90) = 19.17

It is evident from Table-4 that significant difference exist between 5,000 mts and 10,000 mts runner at Post-test & after 15 minutes of recovery of Blood glucose as obtained values 33.7 and 32.6 were greater than critical difference 19.17. However, insignificant difference were found in the other time intervals i.e. Pre-test, after 30 minutes and after 45 minutes of recovery as the obtained mean difference values of 6.6, 8.8 and 6.2 were lesser than critical difference 19.17.

Table 5: Post Hoc mean Comparison for Blood Glucose at Different Time Intervals of 5,000m Runners

Pre-Test	Post-Test	After 15 minutes	After 30 minutes	After 45 minutes	Mean Difference
99.4	196.0				96.6*
99.4		132.0			32.6*
99.4			100.8		1.4
99.4				95.6	3.8
	196.0	132.0			64.0*
	196.0		100.8		95.2*
	196.0			95.6	100.4*
		132.0	100.8	95.6	31.2*
		132.0		95.6	36.4*
			100.8		5.2

*Significant at 0.05 level.

C. $D_{.05}$ (4, 90) = 19.17

In Table 5 when mean Blood glucose level at Pre-test, Post-test and after 15 minutes were compared statistical significant differences were observed. The mean difference values were statistically significant with mean difference value of 96.6 and 32.6, when mean Blood glucose of Post-test and after 15 minutes was compared with pre-test mean Blood glucose. Since all above mean difference values were higher than critical difference 19.17.The mean difference between Pre-test-after 30 minutes and Pre-test–after 45 minutes were 1.4 and 3.8 respectively, which was not statistically significant as values were lesser than critical difference value 19.17. The mean Blood glucose level recorded at five phases Pre-test, Post-test , after 15 minutes, after 30 minutes and after 45 minutes with mean values of 99.4, 196.0, 132.0, 100.8 and 95.6 respectively were statistically significant when mean differences were compared for analyzing recovery rates.Similarly 45 minutes post test Blood glucose showed recovery of 100.40 Blood Glucose which is statistically significant, but, if time duration is taken into account the first phase of recovery of 15 minutes is the most effective recovery from fatigue in terms of Blood glucose normalization. The graphical representation of Mean of Blood glucose at different time intervals of 5000mts runners is shown in Figure 1.

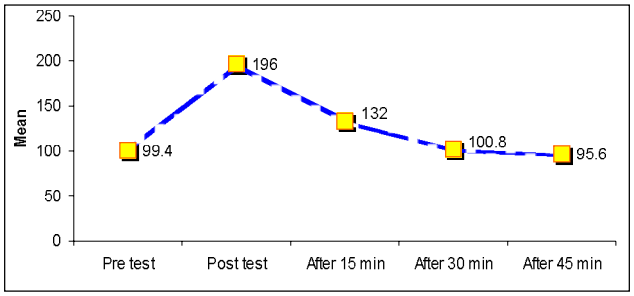

Figure 1: Mean of Blood Glucose at Different Time Intervals of 5,000mts Runners

Table 6: Post Hoc Mean Comparison for Blood Glucose at Different Time Intervals of 10,000m Runners

Pre-Test	Post-Test	After 15 minutes	After 30 minutes	After 45 minutes	Mean Difference
106.0	229.7				123.7*
106.0		164.6			58.6*
106.0			109.6		3.6
106.0				89.4	16.6
	229.7	164.6			65.1*
	229.7		109.6		120.1*
	229.7			89.4	140.3*
		164.6	109.6	89.4	55.0*
		164.6		89.4	75.2*
			109.6		20.2*

*Significant at 0.05 level.

C.$D_{.05}$ (4, 90) = 19.17

In the case of 10,000mts runners a similar trend was observed. The mean Blood glucose value recorded at five stages namely Pre-test, Post test, after 15 minutes, after 30 minutes and after 45 minutes were 106.0, 229.7, 164.6, 109.6 and 89.4 respectively. The difference between mean Blood glucose value recorded at different stages were statistically significant when compared between the stages except between Pre-test–after 30 minutes and Pre test–after 45 minutes. Since the mean Blood glucose difference 3.6 and 16.6 respectively were lesser than critical difference 19.17. Which was not statistically significant. From physiological response point of view the after 15 minutes recovery duration showed Blood Glucose level is 65%. This amounts to approx. 30 % fatigue recovery rate in 15 minute time, whereas at after 30 minutes Blood glucose though showed 120% mean difference but 52% of fatigue recovery in 30 minutes. Hence, in terms of better recovery rate the time duration of 15 minutes showed greater rate of recovery than any other recovery period. The graphical representation of Mean of Blood glucose at different time intervals of 10,000mts runners is shown in Figure 2.

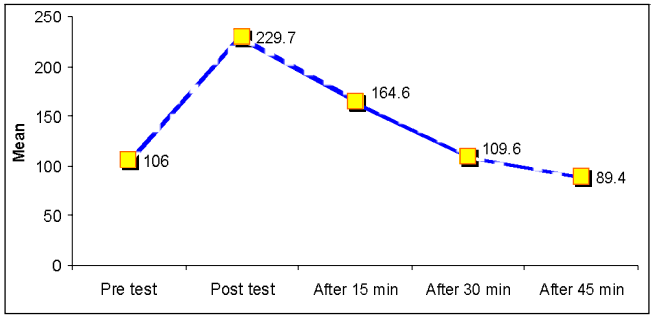

Figure 2: Mean of Blood Glucose at Different Time Intervals of 10,000mts Runners

3. DISCUSSION

Blood glucose response during event and three post event rest duration assessment showed contrasting level of glucose accumulation and depletion for both 5000mts and 10,000mts runners. Glucose response immediately after 5000m event shows rise of more than double or 100% rise i.e. 99.4 mg/dl at Pre-test to 196 mg/dl immediately at the end of the event. In Post event recovery 15 minutes, 30 minutes and 45 minutes the glucose normalization resulted with significant differences in blood glucose level. When glucose normalization in blood level was compared from post test level and between the three recovery duration phases, the first 15 minutes duration immediately after competition shows most significant decrease with 64 mg/100ml which amounts to 27% decrease in the glucose level. The recovery phase from 15 minutes duration to 30 minutes duration glucose level decreases to 31.2 mg/dl which amounts to 23% reduction in glucose level. Further in the 2nd phase recovery from 30 minutes duration to 45 minutes duration glucose level decrease resulted with 5.2 % approx. reduction in glucose level.

The findings clearly show that a post event recovery of 45 minutes duration glucose level came down from 196 mg/dl to 95.6 mg/dl. The normal standard of glucose level is 95.6 mg/dl for a healthy person in clinical terms. Hence, this finding can be interpreted that 45 minutes duration of recovery brings down glucose demand created by 5000mts event work load to normal level. Similar trend of glucose response was observed in 10,000 mts runners, but the glucose response measured immediately after the event showed blood glucose level raised to almost 126% i.e. 229.7 mg/dl from 106 mg/dl. which was higher than the 5000mts runners. The glucose response at three phases of post event recovery showed highest normalization in glucose level in first 15 minutes with decrease of 65 mg/dl and between 15 to 30 minutes with 55 mg/dl. The last 15 minutes showed decrease in Blood glucose to 20.2 mg/dl. All these mean differences were significant statistically, though, 45 minutes post event recovery also showed Blood glucose from 229.7 mg/dl post event response to normalized with glucose level 89.4 mg/dl.

During heightened energy demands of exercise, muscles use glucose rapidly. Hence, muscle is required to be supplied with glucose and this is achieved by rising plasma glucose in blood through a process of gluconeogenesis. During intense exercise the plasma glucose concentration in blood mainly increases due to four hormones i.e Glucagon; Epinephrine; Norepinephrine; and Cortisol. The plasma glucose concentration during exercise depends on a balance between glucose uptake by the muscles and its release by the liver. (Wilmore &Costill, 2008).The immediate effect of this process during recovery, start reducing blood glucose level and in the first 15 minutes duration this reversible process is in faster rate due to presence of high amount of enzymes and hormones. During recovery period, pancreatic hormone insulin plays an important role in blood glucose conversion to muscle glycogen and glycogen storage in liver. With rise in recovery duration, the blood glucose level comes to normal standard i.e. 90-100mg/dl depending on health and fitness status of the individual.

4. CONCLUSION

5. The long distance running events like 5000mts and 10,000mts are not absolutely aerobic event.
6. The anaerobic proportion of Long distance running 5000mts and 10,000mts is of significant level and fatigue caused in these events are due to anaerobic glycolysis .
7. Since 15 minutes recovery provides significant level of fatigue elimination it could be considered important in training implication for long distance runners, from the point of planning interval training, extensively or intensively.
8. Enzymatic and hormonal activity significantly raises Blood glucose level during 5000mts and 10,000 mts event to meet the intense energy demands.
9. The blood glucose level could raise to 120% immediately after the completion of the event from the normal stage.

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Analysis of Anxiety of Male Handball Players at Three Different Levels of Participation

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Abstract:
Purpose of the Study: The purpose of present study to analysis of Anxiety of Male Handball player at Three Different Levels of Participation.
Selection of the Subjects: One eighty (180) Handball Players were selected on the basis of their performance and skill. Further the thirty (30)All India University Handball Players were selected as subjects from different universities during the All India University Handball tournament-2014 at Jammu University, sixty (60) West Zone University Handball Players were selected as subjects from different universities during the West Zone Inter University tournament–2014 held at Rashtrasant Tukdoji Maharaj Nagpur University and also ninety (90) State players were selected as subject from Guwahati, Assam, volunteered to participated in the study. The selection of subjects was on based on the desired standard in terms of skill, technique and playing ability of Handball player at different level of participation. The age of the subjects ranged between 17 to 28 years.
Instrumentation: Anxiety (trait and state anxiety) of different level of Handball Players was assessed by Self Evaluation Questionnaire (STAI) made by Spielberger C.D., R.L. Gorsuch and R.E. Lushare, (1970).
Statistical Technique: To Analyze the Anxiety (State and Trait) at different level of Handball Players ANOVA was applied and also scheffe's Post Hoc tests were used for significant F value and level of significance was set at 0.05 level.
Conclusions: In the present study significant difference was found among All India University, West Zone Inter-University and State level Handball Players in relation to trait and state anxiety

Keywords:
Trait Anxiety, State Anxiety

1. INTRODUCTION

Anxiety is an emotional state consists of subjective, consciously experienced feeling of tension, apprehension, nervousness and worry and heightened arousal or activation of automatic nervous system. Since perceived that mediates the relationship between stressor and the intensity of an anxiety reaction, anxiety states vary in intensity and fluctuate over time as a function of the amount of perceived threat (**Hackfort Dieter., & Splieberger D. Charles**).

Handball is a game in which the aim to score goals. To attain this team must gain and retain session by skillful passing, intelligent, positioning, movement and leadership for all this balance psychological state is required and anxiety is an essential component of any Handball competitive situations and without certain level of anxiety, there cannot be performance in competition (**Pennycook, L. & Sykes R**).

Anxiety plays an important role in sports basically anxiety is a combination of state and trait anxiety. State anxiety is situational specific anxiety however trait anxiety is in born qualities which a person possesses by birth.

The physiological changes associated with increased state anxiety include: elevated heart rate and blood pressure; faster, shallower, more intense breathing; dryness of the mouth; dilation of the pupils; erection of the hair; and increased perspiration. In addition, many muscles tense and contacts to prepare the body for rapid and vigorous action; more white corpuscles are produced to help fight infection; and low priority functions, like eating and digestion of food, are suspended(**Martens, R., Vealey, S.R. Burton, D**).

2. PURPOSE OF THE STUDY

The purpose of present study to analysis of Anxiety of Male Handball player at Three Different Levels of Participation.

3. SELECTION OF SUBJECTS

One hundred and eighty (180) Handball Players were selected on the basis of their performance and skill. Further the thirty (30)All India University Handball Players were selected as subjects from different universities during the All India University Handball tournament-2014 at Jammu University, sixty (60) West Zone University Handball Players were selected as subjects from different universities during the West Zone Inter University tournament-2014 held at Rashtrasant Tukdoji Maharaj Nagpur University and also ninety (90) State players were selected as subject from Guwahati, Assam, volunteered to participated in the study. The selection of subjects was on based on the desired standard in terms of skill, technique and playing ability of Handball player at different level of participation. The age of the subjects ranged between 17 to 28 years.

The subject came from different parts of the country and belonged to different socio-economic status. All the players had fairly well developed physique because all of had been playing regularly for a number of years.

4. INSTRUMENTATION

Anxiety (trait and state anxiety) of different level of Handball Players was assessed by Self Evaluation Questionnaire (STAI) made by Spielberger C.D., R.L. Gorsuch and R.E. Lushare, (1970).

5. SCORING PATTERN

Speilberger along with Gorsuch and Lushane developed a test of State-Trait Anxiety to measure a person's anxiety in specific situation, which might fluctuate from one moment to the next and a test of a person's level of anxiety on a more permanent basis as indicated by personality trait.

The questionnaire contains a number of statements from 1to 20 which are related to state anxiety and indicate how one feels right now, that is, at this moment. The statements from 21 to 40 assess the level of trait anxiety and indicate how a person generally feels.

Each STAT item is given a weighted score of 1 to 4.

1. "Not at all" and "Almost never" score one,(2)"Some what" and "Sometimes" score two,(3)"Moderately so" and "Often" score three and(4)"Very much so" and "Almost always" score four.

The scoring weights for the anxiety absent items are reversed that is responses marked 1,2,3 or 4 are scored 4,3,2 or 1 respectively. The anxieties absent items for which the scoring weights are reversed on the state and trait anxiety scales are:

State Anxiety: 1,2,5,8,10,11,15,16,19 and 20

Trait Anxiety: 21,23,26,27,30,33,34,36 and 39.

To obtain scores for the state anxiety and trait anxiety scales, simply add the weighted scores for the inventory items that make up each scale, taking into account the fact that the scores are reversed for the above items. Scores for both the state anxiety and trait anxiety scales vary from a minimum of 20 to a maximum of 80.

2. STATISTICAL TECHNIQUE

Analyze the Anxiety (State and Trait) at different level of Handball Players ANOVA was applied and also scheffe's Post Hoc tests were used for significant F value and level of significance was set at 0.05 level.

3. ANALYSIS OF DATA AND RESULTS OF THE STUDY

The psychological variables namely state and trait anxiety were collected on 180 male Handball Players of different levels. Ages of the subjects were ranging between 17 to 28 years. To analyze the anxiety level of Handball Players belonging to three levels of participation (All India University, West zone Inter-university and State), one-way analysis of variance (ANOVA) was used. The level of significance was set at.05 level which was considered appropriate for the purpose of the study.

4. FINDINGS OF THE STUDY

The mean comparison of three different level of participation of Handball Players with respected to selected psychological variable namely Anxiety (state and trait anxiety). Since the present investigation deals with comparison of mean of more than two groups, one way analysis of variance was applied and the significant variable was subjected to pair wise comparison of mean using scheffe's Post hoc test. Further the inferential analysis was presented in Table 1 to 2. Further graphical representation was made in figure: 1 to 2.

Table 1: Analysis of Variance of State Anxiety of Three Different Levels of Participation of Handball Players

	Sum of Squares	Df	Mean Square	F
Between Groups	445.217	2	222.608	3.285*
Within Groups	11993.069	177	67.75	
Total	12438.286	179		

*Significant at 0.05 level

F.05 (2, 177) = 3.04

It appears from the Table-1 reveals that there was a significant difference of state anxiety among three different levels of Handball Players as calculated F value (3.285) was greater than the tabulated F value (3.04) at.05 level of significance with 2,177 degree of freedom.

Since the F-value was found to be significant, the scheffe's Post hoc test was applied for further comparison.

Table 1.1: Pair Wise Comparison of State Anxiety Means of Different Level of Handball Players

Levels			Mean Difference	CD at 5% level
State	West Zone Inter-University	All India University		
38.8122	39.2667		0.4545	3.3815
38.8122		34.4121	3.9909	4.2762
	39.2667	34.4121	4.8546*	4.5334

*Significant at 0.05 level.

The Table 1.1 reveals that there was no significant difference between State and West zone Inter-University Level; State and All India University level Handball Players, on the other hand there was significant difference between; West zone Inter-University and All India University level of Handball Players in relation to State Anxiety.

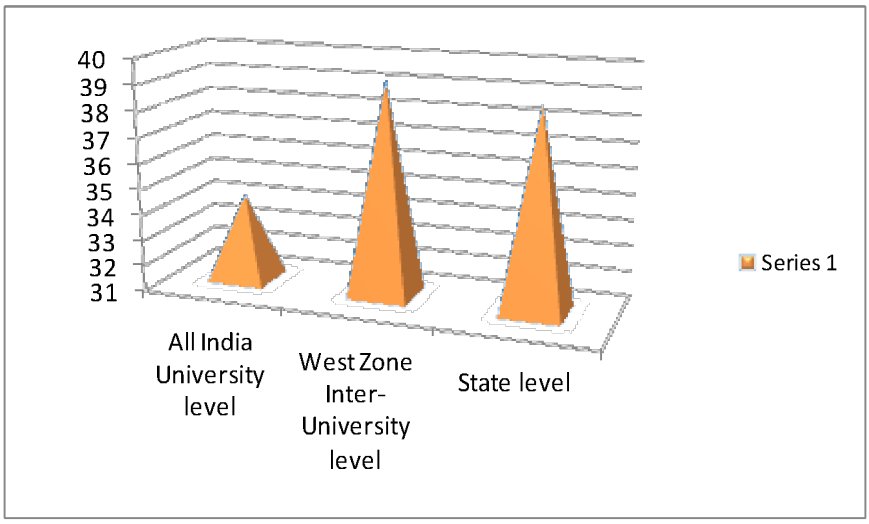

Figure 1: Graphical Representation of Handball Players of Different Levels in Relation to State Anxiety

Table 2: Analysis of Variance of Trait Anxiety of Three Different Levels of Participation of Handball Players

	Sum of Squares	df	Mean Square	F
Between Groups	1411.151	2	705.575	12.295*
Within Groups	10157.210	177	57.385	
Total	11568.361	179		

*Significant at 0.05level

$F_{.05}$ (2, 177) = 3.04

It appears from the Table-2 that there was a significant difference of trait anxiety among three different levels of Handball Players as calculated F value (12.295) was greater than the tabulated F value (3.04) at.05 level of significance with 2,177 degree of freedom.

Since the F-value was found to be significant, the scheffe's Post hoc test was applied for further comparison.

Table 2.1: Pair wise comparison of Trait Anxiety Means of different level of Handball Players

Levels			Mean Difference	CD at 5% level
State	West Zone Inter-University	All India University		
40.1	41.5436		1.4436	3.1087
40.1		33.5436	6.5564*	3.9357
	41.5436	33.5436	8.0*	4.1724

*Significant at 0.05 level

The Table 2.1 reveals that there was no significant difference between State level and West zone Inter-University level Handball Players; on the other hand there was significant difference between State and All India University level; West Zone Inter University level and All India University level of Handball Players in relation to Trait Anxiety.

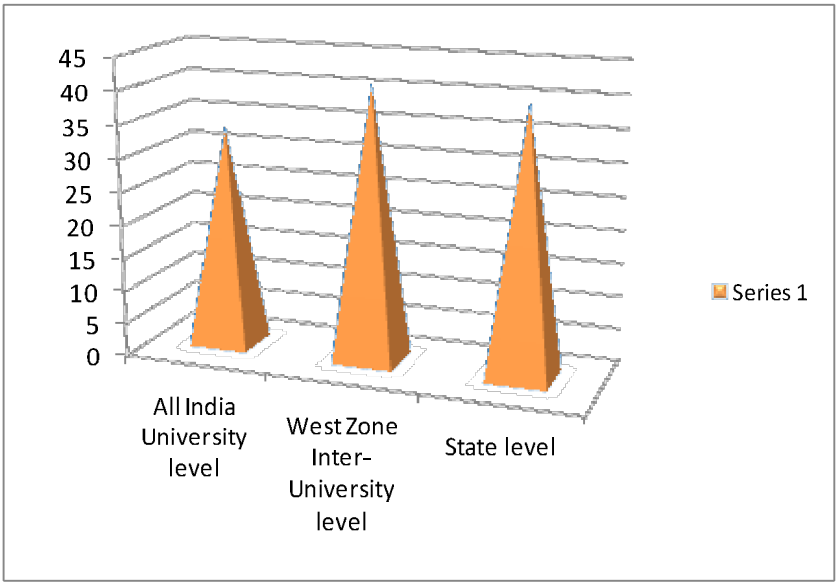

Figure 2: Graphical Representation of Handball Players of different level in relation to Trait Anxiety

5. DISCUSSION OF FINDINGS

The winners had less somatic anxiety than losers and draw. Likewise, the direction of somatic anxiety for winners had a facilitative effect compared with the losers and draw (**Papastergiou, L. et.al**). In the present study significant difference was found among All India University, West Zone Inter-University and State level Handball Players in relation to trait and state anxiety, this might be due to the reason that All India University players have more experience and they have better knowledge about the environment in addition All India University players are tougher in relation to skill in comparison to West Zone Inter-University and state level Handball players. Another reason might be that All India University players are mentally satisfied because they already qualified for the All India University tournament so they possess very less anxiety in comparison to West zone Inter-University where teams have to play in Knock-out format and the State level player are always under pressure to give a better performance and there possesses more anxiety level. These results are supported by the survey of **(Filaire, Alix, Ferrand and Verger)**, who examined the physiopsychologic profile of 16 tennis players (8 men, 8 women) during their first tournament. CSAI-2 was used as a measuring instrument, including the intensity and the direction of their abilities. The results showed a statistically significant difference between women who had higher somatic anxiety scores and men who had higher scores in self-confidence. The winners were found to have statistically lower levels of cognitive anxiety and higher self-confidence scores than losers, who had statistically higher somatic anxiety which impeded their performance.

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Effects of 10 Weeks Step Aerobics on Selected Motor Components of Deaf and Dumb Children

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Abstract:
The present study was investigated the effects of 10 weeks step aerobics on selected motor ability components of deaf and dumb children. Randomly 40 (fourty) deaf and dumb school going students aged 12–16 years were selected and divided into equal groups consists of twenty subjects each. Group A underwent Step aerobics and group B without any activities as control group. Step aerobics training of one hour per day thrice a week for 10 weeks was given. Pretest and post test were tested for Motor components (Explosive leg strength, agility and speed). Statistical analysis ANCOVA was used to find out the effects of step aerobics on deaf and dumb children. The level of significance of the study was at 0.05 level of confidence. It was concluded that a significant difference was found in experimental and control groups on standing broad jump and shuttle run.

Keywords:
Step Aerobics, Deaf and Dumb Children, Motor Components

1. INTRODUCTION

Hearing disability with their different degrees is one of common types of disabilities among people from childhood. Alqoraity (2001) the deafness disability has a particular importance, because of the importance of the sense of hearing to the individuals and the problems caused by losing it, as a result of losing the basic means of communication between them and members of the community. Rateb (2007), said that the proportion of people who suffer from weak to full hearing loss reached between 4 to 5% of individuals worldwide, this deficit does not mean that disabled hearing person has lost his ability to work and satisfy his psychological and physical needs.

Alkrioti (1995), insist that the hearing-disabled are capable of performing most if not all activities that suit other ordinary people with the same orientation and mental level. It also stresses by both Canon (2002) and Mahroos (2000), that the hearing-disabled have super power in game play and physical achievement of some motor skills more than their ordinary peers, as they are distinguished form all other disabilities, that their organs are sound and their senses are correct, and will enjoy high fitness with the regular training, if they were guided correctly to reach a level similar to the level of ordinary peers with similar orientation and mental level.

Aerobic exercise is physical exercise of relatively low intensity that depends primarily on the aerobic energy generating process with intensity between 60 and 85% of maximum heart rate without rest in between. Step aerobics is performed on an elevated platform or the step for the aerobic outcomes distinguished from other forms of aerobic exercise by its use of an elevated platform (the step).

Physiological capabilities and development process of an individual differ in motor skill and rebuilt. The physical skill required for lifelong are of an extremely high order. Perhaps more important, however, the skills required to achieve physical, social, economic or political access vary enormously across the range of physical, social, residential and employment context. The present study has been conducted to find out the significant mean difference if any exist between experimental and control group.

2. OBJECTIVE OF THE STUDY

The objective of the study was to find out the "Effects of 10 Weeks Step Aerobics on Selected Motor Ability Components of Deaf and Dumb Children".

3. METHODOLOGY

A total of Fourty subjects were randomly selected age ranging from 12-16 years studying at St. Mary School for deaf, Kalimpong,West Bengal, India. Subjects were divided into two groups of Tweenty each as Group A and Group B (control group). Step aerobic activity was given to Group A and no special training was given to Group B (Control group).

The experimental Group A, 3 days per week for an hour of Step aerobics programme for 10 weeks under the supervision of the investigator. The control group did not have any special training programme or strenuous physical activities apart from their daily activities. Data were collected on selected motor component, were measured and tested by using Standing broad Jump, 4 x 10 Shuttle run before and after ten weeks of training.

3.1. VARIABLE

Step Aerobics was selected as a Dependent Variable and Motor Ability Components was considered as Independent Variable. Criterion Measure to test the motor ability components of deaf and dumb children, standing broad jump, and 4 x 10 shuttle run was used.

3.2. EXPERIMENTAL DESIGN

For the present study pre test–post test randomized group design which consists of control group (n=20) and experimental group (n=20). Equal numbers of subjects were assigned randomly to both the groups. One group served as experimental group on which treatment was assigned. The other group served as the control group.

3.3. ADMINISTRATION OF TEST

The treatment was administered on experimental group for the period of ten weeks while the control group underwent selected motor components of Deaf And Dumb Children of experimental and control group Before the administration of motor components, the selected test was administered on both the experimental and control groups to collect pre test data. After the completion of Ten weeks of selected motor components of Deaf And Dumb Children of experimental and control group again the same test was conducted to collect the post training data.

3.4. STATISTICAL ANALYSIS

The statistical treatment of data comprised of analysis of covariance (ANCOVA) was used to determine the overall significance of the difference between the effects of 10 weeks Step Aerobics on selected motor components of Deaf

And Dumb Children of experimental and control group were tested for significance at 0.05 level of confidence. Analysis was performed using SPSS 16.0 (SPSS Inc., Chicago, IL, USA).

4. RESULTS AND DISCUSSION

Table I: Analysis of Covariance for Standing Broad Jump, and 4 X 10 Shuttles Run for Step Aerobic Group and Control Group

Variable Name	Group Name	Step Aerobics Group	Control Group	'F' Ratio
Standing Broad Jump	Pre-test Mean ± S.D	55.67 ± 1.35	55.93 ± 1.45	0.265
	Post-test Mean ± S.D.	58.13 ± 1.41	55.87 ± 1.51	18.14*
	Adj. Post-test Mean ± S.D.	58.23	55.77	38.12*
4 x 10 shuttle run	Pre-test Mean ± S.D	11.67 ± 0.035	11.90 ± 0.013	0.54
	Post-test Mean ± S.D.	11.07 ± 0.022	11.93 ± 0.091	4.66*
	Adj. Post-test Mean ± S.D.	11.01	11.901	5.01*

*Significant at 0.05 level of confidence.

(The table values required for significance at 0.05 level of confidence for 1 and 38 & 1 and 37 are 4.10 and 4.11 respectively).

5. RESULT

Table I showed that the results of the study there was a significant difference between experimental and control group on standing broad jump, and shuttle run. Further the results of the study showed that there was a significant improvement in the performances of standing broad jump and shuttle run due to Ten weeks of step aerobic programme. However the improvement was in favour of experimental group.

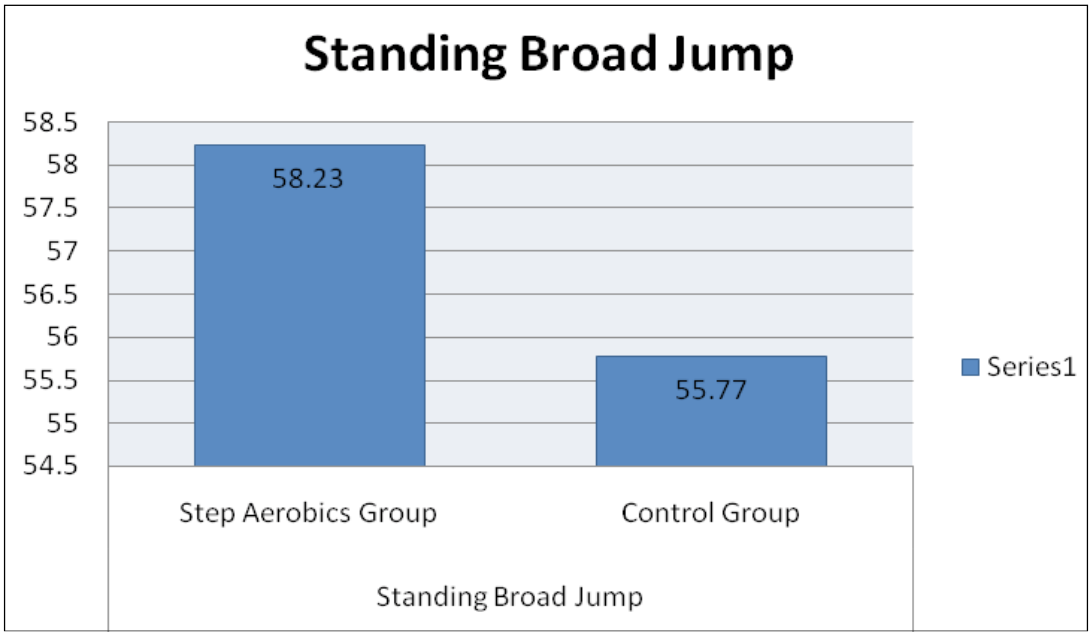

Figure 1: Graphical Representation of Adjustment Means of Step Aerobic Group, and Control Groups in Relation to Standing Broad Jump

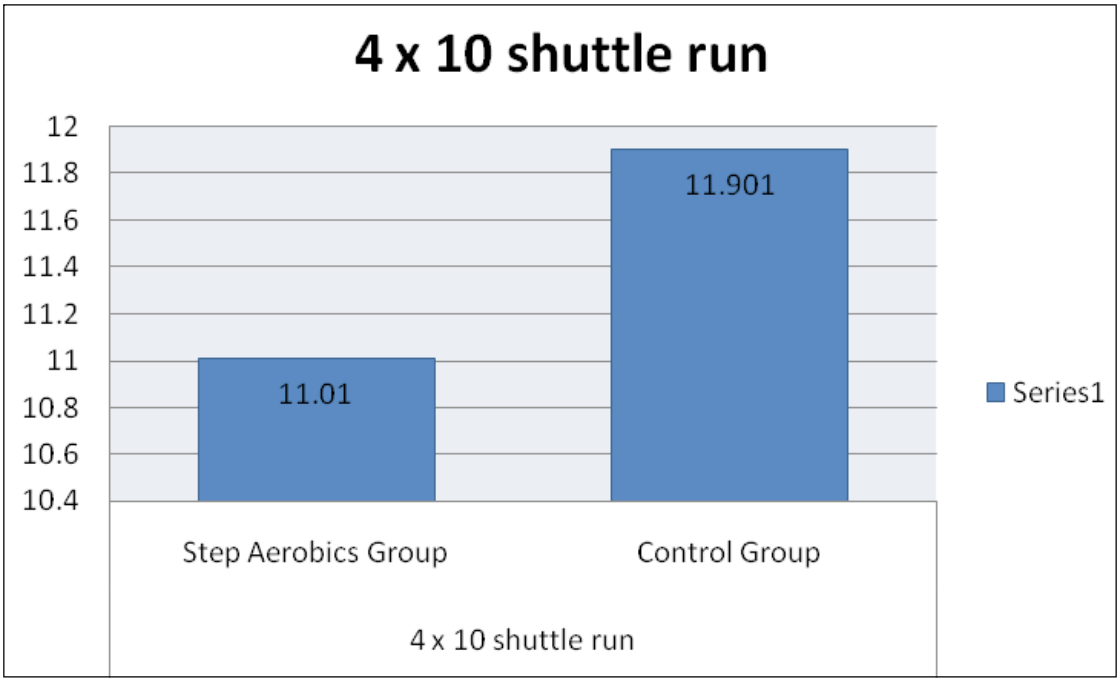

Figure 2: Graphical Representation of Adjustment Means of Step Aerobic Group, and Control Groups in Relation 4 x 10 Shuttle Run

6. CONCLUSION

1. There was a significant improvement in the performances of standing broad jump and shuttle run. However this improvement was in favour of experimental group due to ten weeks of step aerobic programme.
2. There was a significant difference between experimental and control groups on standing broad jump and shuttle run.

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Effect of Aerobic Training and Nutritional Supplementary on Selected Bio-Chemical among Type-II Diabetic Men

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1. INTRODUCTION

Exercise is the structural well planned physical activity its gives acute and chronic metabolic responses on human body. Regular exercise provides adaptations including biochemical, physical and physiological changes in the heart and skeletal muscles as well as health and well being.

2. AEROBIC TRAINING

The word aerobic meaning "with oxygen" to represent idea. Even so the dynamics of the idea are more complicated than implied by the definition. Aerobic can be viewed as an intricate system of bodily supply and demand. That is the body needs energy for any kind of activity and the need is filled by burning off the foods that eat oxygen is to spank the fuel needs to burn regardless aerobics is the world in general use. The majority opinion is that aerobic programs strengthen heart, muscle, increase the efficiency of lungs and offer other wonderful benefits

3. DIABETES MELLITUS

Diabetes mellitus is chronic metabolic disorder that prevents the body to utilize glucose completely or partially. It is characterized by raised glucose concentration in blood and alterations in carbohydrate, protein and fat metabolism (Srilashmi, 2007). The disease was known to the Greeks as diabetes, a word derived from the verb diabainein, made up of the prefix dia-,"across, apart,'' and the word derived from the berb diabainein, made up of the prefix dia-,"across, apart," and the word bainein, "to walk, stand."

3.1. TYPE OF DIABETES

Diabetes is classified into many types they are:

1. Type–I Diabetes (Insulin dependent mellitus).
2. Type–II Diabetes (Non-Insulin dependent mellitus).
3. Gestational diabetes.
4. Malnutrition related diabetes mellitus.

3.2. NUTRITION IN DIABETES

A good diabetic diet is a healthy diet. It's a low glycemic diet that's high in fiber, moderately low in fat-25% to 30% of calories, with a focus on good fats-and high in diabetes nutrition.

3.2.1. SUPPLEMENTATION

The definition of a supplement is a product, which helps to fulfill certain needs of the body, which cannot be completed or provided by the body. Usually these supplements are available in the forms of capsules or powders and various other forms too. It has been seen that there are various kinds of supplements available in the market today and these cater to fulfilling various needs of the users. These supplements provide the users with the nutrition or the nutrient, which they lack, the most(Cassandra Bagley 06/03/2009). The following supplementation was Fenugreek, Garlic and Ginger.

3.2.2. FENUGREEK

Fenugreek (Trigonella foenum-greacum) is a plant is the family Fabaceae. Fenugreek is used both as a herb (the leaves) and as a spice (the seed, often called methi in Urbu/Hindi/Nepali). The leaves and sprouts are also eaten as vegetables. The plant is cultivated worldwide as a semi-arid crop and is a common ingredient in many curries. Fenugreek is available ground from the roasted seeds, as whole and dried fenugreek seed, or as a dully yellow powder. Its value comes from its contents: lysine and L-tryptophan, alkaloids steroidal saponins (diosgenin, tigogenin, yamogenin and neotigogenin) and musilaginous fiber. Fenugreek is a natural source of silicon, iron, sodium, selenium and thiamine. Fenugreek is great aid to digestion because it contains a non-dissolving fiber. The fiber swells in the presence of liquid, making it a great natural laxative. Fenugreek also lowers a person's blood pressure. Fenugreek is able to lower levels of harmful cholesterol and to regulate blood sugar level. When taken with meals, fenugreek can slow how quickly the body absorbs sugars. One amino acid that is found in fenugreek has been reported to increase the production of insulin when blood sugar rises. This is not saying a diabetic can take fenugreek may sooth irritated skin, relieve the pain of boils and cysts and decreases surface aches and pains, it is also used for boils, cysts and other complaints.Fenugreek reduces coughing, stimulates perspiration that reduces fevers (this was even known in Ancient Egypt) and is beneficial for treating bronchitis, allergies and congestion. Fenugreek fights infection, reduces inflammation and relieves congestion. Fenugreek contains ideal qualities for treating lung congestion and sinus problems. It's also loosens and removes excessive amounts of mucus and phlegm (Alexis Roger, 2009).

Table I: Nutritive Value of Fenugreek Seed

(Serving size-1 teaspoon-20grams)

Nutrients	Amount Per Serving
Calories	36 kcal
Total fat	1gram
Saturated fat	0 gram
Cholesterol	0 gram
Sodium	2milligram
Total carbohydrates	6gram
Dietary fiber	3gram
Saturated fat	0gram
Cholesterol	0gram
Sodium	2milligram
Total carbohydrates	6gram
Dietary fiber	3gram
Sugar	4.7gram
Protein	4gram
Vitamin A	0%
Vitamin C	1%
Calcium	2%
Iron	20%

5. STATEMENT OF THE PROBLEM

The purpose of the study was to examine was influence of aerobic training and nutritional supplementation selected on bio-chemical among type-II diabetic men.

6. SIGNIFICANCE OF THE STUDY

1. This study would help to identify the training method for maintain the glucose level and reduce the cholesterol for type-II diabetic people.
2. This study would help to identify the supplement for maintain the glucose level and reduce the cholesterol for type-II diabetic people.
3. This study would helpful for the people to make awareness of the selected variable for to maintain their body health and it helps to improve the general physical fitness.
4. This study also helpful for people to adapt the training programme and supplement for maintain the glucose level and reduce the cholesterol for type-II diabetic people.

5. METHODOLOGY

5.1. SELECTION OF VARIABLES

To achieve the purpose of the Study 60 type II diabetic men were selected as subject were selected from Pondicherry region. They were randomly divided into three equal groups and each group consists of twenty subjects. Experimental group I underwent aerobic training with , Experimental group II underwent nutrients supplement and control group III no training for a period of eight weeks.

5.2. SELECTION OF VARIABLES

This study was to find out the influence of aerobic training and with nutritional supplementation selected on bio-chemical among type-II diabetic men were selected as subject.

5.3. DEPENDENT VARIABLES

Biochemical Variables:

1. Fasting Blood sugar
2. Post partial Blood sugar
3. Total Cholesterol

5.4. INDEPENDENT VARIABLES

Experimental Group I: Aerobic training.

Experimental Group II: Nutrition supplementation.

Control Group III: No training.

5.5. TRAINING SCHEDULE

Table 2: Experimental Group–II Nutritional Supplementation

Sl. No.	Number of Weeks	Training
1	First week	Fenugreek and Ginger, Garlic past-20gm.
2	Second week	Fenugreek and Ginger, Garlic past-20gm.
3	Third week	Fenugreek and Ginger, Garlic past-20gm.
4	Fourth week	Fenugreek and Ginger, Garlic past-20gm.
5	Fifth week	Fenugreek and Ginger, Garlic past-20gm.
6	Sixth week	Fenugreek and Ginger, Garlic past-20gm.
7	Seventh week	Fenugreek and Ginger, Garlic past-20gm.
8	Eighth week	Fenugreek and Ginger, Garlic past-20gm.

Table 3: Experimental Group–I Aerobic Training

Sl. No.	Number of Weeks	Training	Duration
1	First week	Brisk walking	30 minutes
2	Second week	Brisk walking	35 minutes
3	Third week	Brisk walking	40 minutes
4	Fourth week	Brisk walking	45 minutes
5	Fifth week	Brisk walking	50 minutes
6	Sixth week	Brisk walking	55 minutes
7	Seventh week	Brisk walking	60 minutes
8	Eighth week	Brisk walking	One hours

4. DATA COLLECTION

The data was collected on related test items as per the methods described above. The pre test was conducted before the experimental period and post test was conducted and data was collected after the experimental study.

1. Blood sample was collected from individuals forearm in the morning with empty stomach to check the value of an individual's selected bio-chemical among men type-II diabetic people in the period of pre and post test training session.
2. The blood sample was analyzed in the bio-chemistry lab.

3. RESULTS AND DISCUSSION

3.1. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR FASTING BLOOD SUGAR

The following table illustrates that statistical result of influence of aerobic training and nutritional supplementation on Biochemical parameters of Fasting blood sugar among type-II diabetic Men.

Table 4: Computation on Analysis of Covariance on Fasting Blood Sugar

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	125.850	124.700	123.850	B	40.30	2	20.15	0.61
SD	1.29	1.29	1.29	W	1885.30	57	33.08	
Post-test Mean	116.400	122.000	122.950	B	501.10	2	250.55	6.96*
SD	1.342	1.342	1.342	W	2051.75	57	35.99	
Adjusted Post-test Mean	115.5	122.1	123.8	B	751.59	2	375.79	33.21*
				W	633.73	56	11.32	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 =3.165and 3 and 56=3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 125.85, 124.70 and 123.85 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 0.61. Hence, it proved that there was no significant difference between the group in the initial score at 0.05 level.

The post test mean of experimental group I, experimental group II and control group were 116.4, 122.0 and 122.95 respectively. The obtained 'F' ratio of 6.96 was greater than the required table 'F' ratio of 3.165 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 115.5, 122.1 and 123.8 respectively. The obtained 'F' ratio of 33.21 was greater than the required table 'F' ratio of 3.16. Hence, significant differences were observed among the groups on fasting blood sugar due to aerobic training and nutrition supplementation.

Since significant differences were recorded, the scores were further subjected to statistical treatment using the Scheffe's test and the result were presented in Table.

3.2. COMPUTATION OF SCHEFFE'S POST HOC TEST ORDERED, ADJUSTED, FINAL MEAN DIFFERENCE OF FASTING BLOODSUGAR

Table 5: Scheffe's Post Hoc Test

(Scores in mg/dl)

Con. Group	Exp. Group–II	Exp. Group-I	Mean Difference	Required CI
123.8	-	115.5	8.3*	3.63
123.8	122.1		1.7	3.63
-	122.1	115.5	6.6*	3.63

**Significant*

The mean difference between the control group and experimental group I was 8.3 which was lesser then the confidence interval value 3.63. However, the difference between control group and experimental group II was 1.7 which was lesser than the confidence interval value 3.63. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.63.

3.3. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR POST PRANDIAL BLOOD SUGAR

The following table illustrates that statistical result of influence of aerobic training and nutritional supplementation on Biochemical parameters of post prandial blood sugar among type-II diabetic Men.

Table 6: Computation of Analysis of Covariance on Post Prandial Blood Sugar

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	221.15	229.4	228.6	B	849.10	2	424.55	3.64
SD	2.41	2.41	2.41	W	6640.55	57	116.501	
Post-test Mean	212.65	226.50	227.10	B	501.10	2	250.55	6.96*
SD	2.42	2.42	2.42	W	2051.75	57	35.99	
Adjusted Post-test Mean	217.9	224.5	224.9	B	492.675	2	246.338	62.62*
				W	220.286	56	3.934	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 =3.165 and 3 and 56=3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 221.15, 22.9 and 228.6 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 3.64. Hence, it proved that there was no significant difference between the group in the initial score at 0.05 level.

The post test mean of experimental group I, experimental group II and control group were 212.65, 226.50 and 227.10 respectively. The obtained 'F' ratio of 6.96 was greater than the required table 'F' ratio of 3.16 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 217.9, 224.5 and 224.9 respectively. The obtained 'F' ratio of 62.62 was greater than the required table 'F' ratio of 3.44. Hence, significant differences were observed among the groups on prandial blood sugar due to aerobic training and nutrition supplementation.

Table 7: Computation of Scheffe's Post Hoc Test Ordered Adjusted Final Mean Difference of Prandial Blood Sugar

(Scores in mg/dl)

Con. Group	Exp. Group–II	Exp. Group-I	Mean Difference	Required CI
224.9	-	217.9	7*	3.63
224.9	224.5		0.4	3.63
-	224.5	217.9	6.6*	3.63

*Significant

The mean difference between the control group and experimental group I was 7 which was lesser then the confidence interval value 3.42. However, the difference between control group and experimental group II was 0.4 which was lesser than the confidence interval value 3.42. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.62.

3.4. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR TOTAL CHOLESTEROL

The following table illustrates that statistical result of influence of aerobic training and nutritional supplementation on Biochemical parameters of total cholesterol among type-II diabetic Men.

Table 8: Computation on Analysis of Covariance on Total Cholesterol

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	166.85	166.20	165.75	B	12.233	2	6.117	.014
SD	4.72	4.72	4.72	W	25387.500	57	445.395	
Post-test Mean	154.90	158.75	172.00	B	3218.633	2	1609.317	3.91
SD	4.54	4.54	4.54	W	23473.550	57	411.817	
Adjusted Post-test Mean	154.3	158.8	172.5	B	3574.393	2	1787.197	21.1*
				W	472.753	56	8.442	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 = 3.165 and 3 and 56 = 3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 166.85, 166.20 and 165.75 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 0.014. Hence, it proved that there was no significant difference between the groups in the initial score at 0.05 levels.

The post test mean of experimental group I, experimental group II and control group were 154.90, 158.75 and 172.00 respectively. The obtained 'F' ratio of 3.91 was greater than the required table 'F' ratio of 3.165 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 154.3, 158.8 and 172.5 respectively. The obtained 'F' ratio of 21.1 was greater than the required table 'F' ratio of 2.72. Hence, significant differences were observed among the groups on total cholesterol due to aerobic training and nutrition supplementation.

Since significant differences were recorded, the scores were further subjected to statistical treatment using the Scheffe's test and the result were presented in Table.

Table 9: Computation of Scheffe's Post Hoc Test Orderedadjusted Final Mean Difference of Total Cholesterol

(Scores in mg/dl)

Con. Group	Exp. Group–II	Exp. Group-I	Mean Difference	Required CI
123.8	-	115.5	8.3*	3.63
123.8	122.1		1.7	3.63
-	122.1	115.5	6.6*	3.63

*Significant

The mean difference between the control group and experimental group I was 8.3 which was lesser then the confidence interval value 3.63. However, the difference between control group and experimental group II was 1.7 which was lesser than the confidence interval value 3.63. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.63.

3.5. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR FASTING BLOOD SUGAR

Table illustrates that statistical result of influence of aerobic training and nutritional The following supplementation on Biochemical parameters of Fasting blood sugar among type-II diabetic Men.

Table 10: Computation on Analysis of Covariance on Fasting Blood Sugar

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	125.850	124.700	123.850	B	40.30	2	20.15	0.61
SD	1.29	1.29	1.29	W	1885.30	57	33.08	
Post-test Mean	116.400	122.000	122.950	B	501.10	2	250.55	6.96*
SD	1.342	1.342	1.342	W	2051.75	57	35.99	
Adjusted Post-test Mean	115.5	122.1	123.8	B	751.59	2	375.79	33.21*
				W	633.73	56	11.32	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 = 3.165 and 3 and 56 = 3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 125.85, 124.70 and 123.85 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 0.61. Hence, it proved that there was no significant difference between the group in the initial score at 0.05 level.

The post test mean of experimental group I, experimental group II and control group were 116.4, 122.0 and 122.95 respectively. The obtained 'F' ratio of 6.96 was greater than the required table 'F' ratio of 3.165 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 115.5, 122.1 and 123.8 respectively. The obtained 'F' ratio of 33.21 was greater than the required table 'F' ratio of 3.16. Hence, significant differences were observed among the groups on fasting blood sugar due to aerobic training and nutrition supplementation.

Table 11: Computation of Scheffe's Post Hoc Test Ordered Adjusted Final Mean Difference of Fasting Blood Sugar

(Scores in mg/dl)

Con. Group	Exp. Group–II	Exp. Group-I	Mean Difference	Required CI
123.8	-	115.5	8.3*	3.63
123.8	122.1		1.7	3.63
-	122.1	115.5	6.6*	3.63

*Significant

The mean difference between the control group and experimental group I was 8.3 which was lesser then the confidence interval value 3.63. However, the difference between control group and experimental group II was 1.7

which was lesser than the confidence interval value 3.63. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.63.

3.6. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR POST PRANDIAL BLOOD SUGAR

The following table illustrates that statistical result of influence of aerobic training and nutritional supplementation on Biochemical parameters of post prandial blood sugar among type-II diabetic Men.

Table 12: Computation on Analysis of Covariance on Post Prandial Blood Sugar

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	221.15	229.4	228.6	B	849.10	2	424.55	3.64
SD	2.41	2.41	2.41	W	6640.55	57	116.501	
Post-test Mean	212.65	226.50	227.10	B	501.10	2	250.55	6.96*
SD	2.42	2.42	2.42	W	2051.75	57	35.99	
Adjusted Post-test Mean	217.9	224.5	224.9	B	492.675	2	246.338	62.62*
				W	220.286	56	3.934	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 =3.165 and 3 and 56=3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 221.15, 22.9 and 228.6 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 3.64. Hence, it proved that there was no significant difference between the group in the initial score at 0.05 level.

The post test mean of experimental group I, experimental group II and control group were 212.65, 226.50 and 227.10 respectively. The obtained 'F' ratio of 6.96 was greater than the required table 'F' ratio of 3.16 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 217.9, 224.5 and 224.9 respectively. The obtained 'F' ratio of 62.62 was greater than the required table 'F' ratio of 3.44. Hence, significant differences were observed among the groups on prandial blood sugar due to aerobic training and nutrition supplementation.

Table 13: Computation of Scheffe's Post Hoc Test Ordered Adjusted Final Mean Difference of Prandial Blood Sugar

(Scores in mg/dl)

Con. Group	Exp. Group-II	Exp. Group-I	Mean Difference	Required CI
224.9	-	217.9	7*	3.63
224.9	224.5		0.4	3.63
-	224.5	217.9	6.6*	3.63

*Significant

The mean difference between the control group and experimental group I was 7 which was lesser then the confidence interval value 3.42. However, the difference between control group and experimental group II was 0.4 which was lesser than the confidence interval value 3.42. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.62.

3.7. COMPUTATION OF ANALYSIS OF COVARIANCE AND SCHEFFE'S POST HOC TEST FOR TOTAL CHOLESTEROL

The following table illustrates that statistical result of influence of aerobic training and nutritional supplementation on Biochemical parameters of total cholesterol among type-II diabetic Men.

Table 14: Computation on Analysis of Covariance on Total Cholesterol

(Scores in mg/dl)

Means	Exp. Group-I	Exp. Group-II	Control Group	SV	SS	Df	MS	Obtained F
Pre-test Mean	166.85	166.20	165.75	B	12.233	2	6.117	.014
SD	4.72	4.72	4.72	W	25387.500	57	445.395	
Post-test Mean	154.90	158.75	172.00	B	3218.633	2	1609.317	3.91
SD	4.54	4.54	4.54	W	23473.550	57	411.817	
Adjusted Post-test Mean	154.3	158.8	172.5	B	3574.393	2	1787.197	21.1*
				W	472.753	56	8.442	

*significant at 0.05 level F ratio (0.05) Level of confidence for 2 and 57 =3.165 and 3 and 56=3.16.

Table shows that the pre test mean of experimental group I, experimental group II and control group were 166.85, 166.20 and 165.75 respectively. The obtained 'F' was lesser than the required table 'F' ratio of 0.014. Hence, it proved that there was no significant difference between the groups in the initial score at 0.05 levels.

The post test mean of experimental group I, experimental group II and control group were 154.90, 158.75 and 172.00 respectively. The obtained 'F' ratio of 3.91 was greater than the required table 'F' ratio of 3.165 which indicated that there was significant difference between post test means at 0.05 level of confidence for the degrees of freedom 2 and 57.

The adjusted post test means of experimental group I and experimental group II and control group were 154.3, 158.8 and 172.5 respectively. The obtained 'F' ratio of 21.1 was greater than the required table 'F' ratio of 2.72. Hence, significant differences were observed among the groups on total cholesterol due to aerobic training and nutrition supplementation.

Table 14: Computation of Scheffe's Post Hoc Test Ordered Adjusted Final Mean Difference of Total Cholesterol

(Scores in mg/dl)

Con. Group	Exp. Group–II	Exp. Group-I	Mean Difference	Required CI
123.8	-	115.5	8.3*	3.63
123.8	122.1		1.7	3.63
-	122.1	115.5	6.6*	3.63

*Significant

The mean difference between the control group and experimental group I was 8.3 which was lesser then the confidence interval value 3.63. However, the difference between control group and experimental group II was 1.7 which was lesser than the confidence interval value 3.63. The mean difference between experimental group II and experimental group I was 6.6 which was greater than the confidence interval value 3.63.

4. CONCLUSION

From the analysis of the data, the following conclusions were drawn

1. There was a significant difference among Aerobic training, nutrition supplementation and control groups on selected biochemical variable such as fasting blood sugar among men type–II diabetic.
2. There was a significant difference among Aerobic training, nutrition supplementation and control groups on selected biochemical variable such as Post partial Blood sugar among men type–II diabetic.
3. There was a significant difference among Aerobic training, nutrition supplementation and control groups on selected biochemical variable such as Total Cholesterol among men type–II diabetic.
4. There was a significant difference among Aerobic training, nutrition supplementation and control groups on selected Anthropometric variable such as Weight among men type–II diabetic.
5. There was significant difference among Aerobic training, Aerobic training without nutrition supplementation and control groups on selected Anthropometric variable such as Body Mass Index among men type–II diabetic.

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Comparison of Selected Physiological Variables between Football and Basketball Male Players

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Abstract:
The purpose of the present study was to compare the selected Physiological variables between Football and Basketball male Players of University of Delhi, Delhi. Total 60 male intercollegiate, 30 each Football and Basketball Players were randomly selected as subjects. The age of the subjects were ranged from 18 to 25 years. The variables selected for the present study were: Blood Pressure (Systolic Blood Pressure and Diastolic Blood Pressure), Vital Capacity, Resting Heart Rate, Breath Holding Capacity (Positive Breath Holding Capacity and Negative Breath Holding Capacity), and Body Fat Percentage.
To analyzed the data't' test was used. The level of significance was set at 0.05 levels.
Results showed significant difference of Fat percentage between intercollegiate Basketball and Football male players. But insignificant differences were found in Systolic Blood Pressure, Diastolic Blood Pressure, vital capacity, Resting Heart Rate, Positive Breath Holding Capacity, Negative Breath Holding Capacity, and Negative Breath hold capacity.

Keywords:
Vital Capacity, Resting Heart Rate, Breath Holding Capacity, Breath Holding Capacity, and Body Fat Percentage

1. INTRODUCTION

The history of human civilization witness to the fact that as man was always been busy in their day to day routine work probably in absence of modern means of life which has been developed with the passage of time. Moreover, the development in the field of technology has provided numerous comforts to the modern men compared to their ancient one. Sports are not exception to it. Science applied to sports has enabled modern youth to develop physical capacities beyond anything earlier imagined.

One of the most important, remarkable, beautiful, valuable and priceless thing that god has created particularly on the earth is human life. Therefore it is necessary to protect and maintain human life in order to achieve higher goals and objectives in regards to the sports performance and also live a happy and meaningful life. To develop adequate health and fitness for excellence sports performance and considering in general to lengthen life, the Sports Scientists and Researchers have devoted their extreme valuable lives to invent various drugs that protect life from various diseases and also health related equipment that measure the physical, physiological and psychological parameters of individual which farther have become the new additions which are highly remarkable and admirable in the history of men and civilization.

2. OBJECTIVE OF THE STUDY

The purpose of study was to Compared on selected physiological variables between Football and Basketball male intercollegiate players.

3. MATERIAL AND METHOD

The purpose of the present study was to compare on selected Physiological variables between Football and Basketball male intercollegiate players of University of Delhi. Total 60 male intercollegiate 30 each Football and Basketball Players were randomly selected to act as subjects with age ranging from 18 to 25 years. The physiological variables selected were:

a. Blood Pressure
   i. Systolic Blood Pressure
   ii. Diastolic Blood Pressure
b. Vital Capacity
c. Resting Heart Rate.
d. Breath Holding Capacity.
   i. Positive Breath Holding Capacity.
   ii. Negative Breath Holding Capacity.
e. Body Fat Percentage.

The data collected were analyzed with "t" test in order to compare on selected physiological variables between Football and Basketball male players. The level of significance was set at 0.05 levels.

4. RESULTS AND DISCUSSION

Statistical findings pertaining to the comparison of selected physiological variables between Basketball and Football intercollegiate players have been presented below from Table 1 to 7.

A graphical comparison was also made and represented in Figure 1.

Table 1: Mean Comparison of Systolic Blood Pressure between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	119.9333	120.5000	.950
SD	2.47656	1.77626	

Significant t 0.05 (58) = 2.021

The above Table 1 reveals that no significant difference was found in Systolic Blood Pressure between Football and Basketball players, as the calculated mean value i.e. 0.950 was less than the tabulated $t_{.05}$ (58) = 2.021.

Table 2: Mean Comparison of Diastolic Blood Pressure between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	**80.4333**	**80.8667**	**.596**
SD	**2.59553**	**2.68756**	

Significant t 0.05 (58) = 2.021

The above Table 2 reveals that there no significant difference was found in Diastolic Blood Pressure between Football and Basketball players, as the calculated "t" value 0.596 was less than the tabulated $t_{.05}(58) = 2.021$.

Table 3: Mean Comparison of Vital Capacity between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	1.5300	1.2200	.849
SD	1.98827	.21877	

Significant t 0.05 (58) = 2.021

The above Table 3 shows that no significant difference was found in Vital Capacity between Football and Basketball players, as the calculated "t" value 0.849 was less than the tabulated $t_{.05}(58) = 2.021$ required to be insignificant.

Table 4: Mean Comparison of Resting Heart Rate between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	73.6333	73.6333	0.701
SD	2.43088	2.18905	

Significant t 0.05 (58) = 2.021

The above Table 4 reveals that there was no significant difference of Resting Heart Rate between Football and Basketball players, as the calculated "t" value was 0.701 was less than the tabulated $t_{.05}(58) = 2.021$ which is required to be insignificant.

Table 5: Mean Comparison of Positive Breath Holding Capacity between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	20.8667	20.4667	0.338
SD	5.58158	4.02349	

Significant t 0.05 (58) = 2.021

The above Table 5 reveals that no significant difference was found in Positive Breath Holding Capacity between Football and Basketball players as the calculated "t" value 0.338 was less than the tabulated $t_{.05}(58) = 2.021$ therefore required to be insignificant.

Table 6: Mean Comparison of Negative Breath Holding Capacity between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	11.1667	11.0333	0.335
SD	1.48750	1.42595	

Significant t 0.05 (58) = 2.02

The above Table 6 reveals insignificant difference of Negative Breath Holding Capacity between Football and Basketball players as the calculated "t" value 0.335 was less than the tabulated $t_{.05}(58) = 2.021$.

Table 7: Mean Comparison of Fat Percentage between Football and Basketball Players

	Football Players	Basketball Players	"t" Ratio
Mean	15.7990	17.1500	4.938*
SD	0.90406	1.08397	

Significant t 0.05 (58) = 2.02

It is apparent from the Table 7 that was a difference of mean value of Fat Percentage between Football and Basketball players as the observed calculated "t" value 4.938* much higher than the tabulated $t_{.05}(58) = 2.02$ and hence required to be significant.

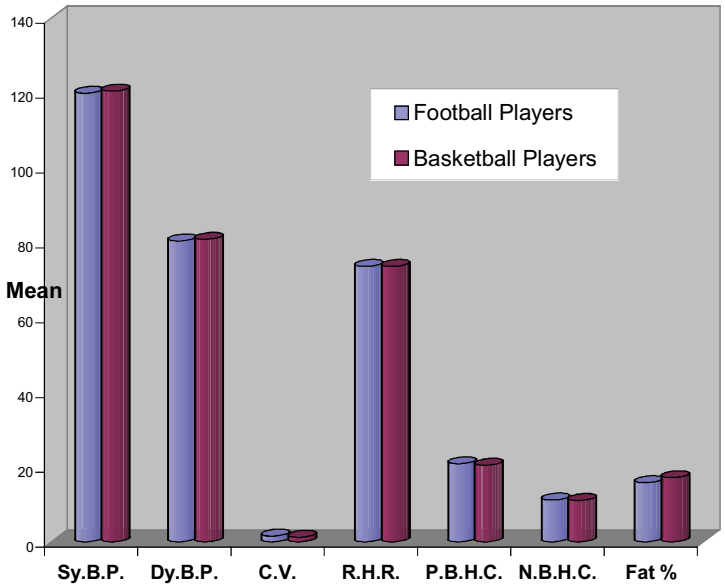

Figure 1: Graphical Representation of selected Physiological Variables Between Football and Basketball Players

5. CONCLUSION

Within the limitations identified and on the basis of present study the following conclusions have been drowned:

1. Systolic Blood Pressure, Diastolic Blood Pressure, vital capacity, Resting Heart Rate, Positive Breath Holding Capacity, Negative Breath Holding Capacity, and Positive Breath Holding Capacity have shown insignificant relationship between Football and Basketball players.
2. The Fat percentage has shown significant relationship betwen Football and Basketball players.

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Effect of Resistance and Plyometric Training and their Combination on the Performance of Jumpers

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Abstract:
The purpose of present study was to trace out the effect of three different training protocols viz. Plyometric training, Resistance training and their combination on standing broad jump, jump and reach test and long jump performance. Based on their training, eighty male jumpers were divided into four 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 training period of twelve weeks. The subjects in each of the training groups trained three days per week, whereas control group did their normal routine activities. The data was analyzed through 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, thus, 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:
Resistance Training, Stretch-Shortening Cycle, Plyometric Training

1. INTRODUCTION

The overall aim of success in Athletics depends primarily upon the explosive leg power and muscular strength of athlete. In the activities of 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 gives the athlete the possibility of improved performance in sports, in which the improvement of speed-strength relationship is usually sought.

In athletics, some amount of resistance has to be overcome and the greater the resistance, the stronger would the sportsman be. 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 that we come across in athletics. A more accurate measure of strength can be obtained by using dynamometers or densitometer instruments which measure force. The maximum strength that 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.

Plyometric training is an excellent method of developing body power and it is proved to be a very effective method for improving explosive strength. It offers rich variation in exercises and load structure. Any activity that activates the stretch reflex mechanism is plyometric exercise. Plyometric exercise based upon the belief that a rapid lengthening of a muscle just prior to the contraction will result in much stronger contraction. Plyometric training may be viewed as an extension of the "shock" method of strengthening muscle for athletic performance recommended by Verhoshanki of Russia. The shock method advocated by Verhoshauki consisted of rebound jump from a height to develop the "reactive" neuromuscular apparatus of the athlete. Plyometirc training involves simultaneously voluntary and involuntary muscle contractions. Therefore more motor units are called open during a single contractions of this type than would be used in either contraction alone. In Plyometric exercises eccentric contraction is followed immediately by a concentric contraction.

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, 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.

Several studies, used resistance and plyometric training have shown that it improves our power output, potential power, explosiveness and running speed (Chui, 1950; Impellizzeri FM.et.al, 2007) by training the muscle to do more work in shorter amount of time (Don, 1965; Mckethan James F., 1973; Bluker, 1976). This is accomplished by optimizing the muscle strength and stretch shortening cycle, which occurs when the active muscle switches from rapid eccentric muscle action to rapid concentric muscle action (Stuart and Larry, 1979; Germer, 1987). The rapid eccentric movement creates a stretch reflex that produces a more forceful concentric muscle action (Stone et.al.2000; Bompa, 1999) then could otherwise be generated from a resting position. The faster the muscle stretched, the greater force produces, and the more powerful the muscle movement. Plyometric exercises that exploit the stretch-shortening cycle have been shown to enhance the performance of the concentric phase of movement (Gehri et.al., 1998 Maffiuletti N.A. et.al., 2002) and increase power output (Adams et.al, 1992). The combination of plyometric and resistance increased (Rahimi & Behpur, 2005; Sultana et.al., 2008; Abe et.al. 2005) vertical jumping, speed and sprint performance. Adams *et al.*, Rahimi and Behpur, Sultana et. Al and Abe et.al. suggested that this combination may provide a more training stimulus for vertical jumping and speed performance than either resistance and plyometric training.

It is discernible that researcher have no common agreement of opinion on the relative effectiveness of the plyometirc 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.

2. PROCEDURE

For the purpose of the present study, 80 male jumpers of district level players were randomly selected as the subjects for the study. The age of subjects were ranged between 17-21 years. Then a medical examination of the subjects was

carried out in order to check the fitness of the subjects and 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 programme only.

2.1. DATA ACQUISITION

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.

2.2. STANDING BROAD JUMP

The standing broad jump test is one of the test 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 metres and centimeters.

2.3. 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.

2.4. LONG JUMP

The long jump test is one of the test 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 metres 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.

3. TRAINING PROTOCOLS

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 ploymetric + 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. Before the initiation of the training periods, the subjects of all groups were instructed about proper execution of all the exercises to be used during the training periods for all

training regimes. The training protocols included upper and lower extremities exercises. The training programs were designed to overload the muscles involved in sprinting and explosive performance.

The subjects in resistance training group performed Half Squat, Bench press, Knee extension, knee flexion, Heel raise, lunges and overhead press. 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 single leg speed hop, alternate leg bound, double leg hop progression and single leg stair 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 number 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.

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.

4. 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.

5. RESULTS OF THE STUDY

All values of the criterion measures for the groups are presented in Tables from 1 to 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

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.

Table 2: Paired Adjusted Final Meansand 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

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.

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	76.10	80.85	75.45	70.65	Among	1044.63	3	348.21	7.359*
					Within	3595.85	76	47.31	
Post-test Mean	78.90	82.70	79.20	71.45	Among	1344.53	3	448.17	
					Within	3370.15	76	44.34	10.106*
Adjusted Post-test Mean	78.59	77.97	79.49	76.21	Among	108.77	3	36.26	
					Within	257.29	75	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

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.

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

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

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 which 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.

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	0.669	3	0.223	
					Within	2.644	76	0.034	6.418*
Post-test Mean	6.32	6.51	6.46	6.47	Among	0.428	3	0.142	
					Within	2.257	76	0.029	4.805*
Adjusted Post-test Mean	6.45	6.44	6.46	6.41	Among	0.031	3	0.010	
					Within	0.135	75	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

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 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 .

6. DISCUSSION

All these significant changes have mirrored that the short-term plyometric and resistance training alone are capable of 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 load has been given on 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 level 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 in nutshell 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 earlier studies 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).

7. CONCLUSION

Based on the findings of the above study, the following conclusions can be laid down:

- The Twelve weeks of Plyometric and resistance training exercises are useful program to improve the performance of jumpers.
- The combined plyometric and resistance training programes have greater effect in comparison to resistance and plyometric training.

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INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

A Comparitive Study of Self-Concept between Archers and Shooters

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Abstract:
The objective of this study is to determine the difference self-concept between archers and shooters. For this purpose, Forty (N = 40) Male inter-college level archers and shooters players were selected. They were further divided into two groups N = 20 each (i.e., N1 = 2 0; inter-college, N2 = 20). The purposive sampling technique was used to attain the objectives of the study. Students't–test for independent date was used to determine the significant differences between inter-college male archers and shooters, unpaired t-test was employed for date analyses. To test the hypothesis, the level of significance was set 0.05. The Mean and SD values of archers on the variable self-concept as 72.95 and 14.24 respectively. However, shooters had Mean and SD values as 75.25 and 14.81 respectively. The 't'-value 0.50 as shown in the table above was found statistically significant ($P < 0.05$). It has been observed from the above results that inter-college shooters have demonstrated significantly better on self-concept than the inter-college archers.

Keywords:
Self-Concept, Archers, Shooters

1. INTRODUCTION

Psychology is the science of mind and behavior. Its immediate goal is to understand behavior and mental processes by researching and establishing both general principles and specific cases. For many practitioners, one goal of applied psychology is to benefit society. In this field, a professional practitioner or researcher is called a psychologist, and can be classified as a social scientist, behavioral scientist, or cognitive scientist. Psychologists attempt to understand the role of mental functions in individual and social behavior, while also exploring the physiological and neurobiological processes that underlie certain functions and behaviors. Sports Psychology is the study of the psychological factors that affect participation and performance in sports. It is also a specialization within the brain psychology and kinesiology that seeks to understand psychological/mental factors that affect performance in sports, physical activity, and exercise and apply these to enhance individual and team performance. Self-concept means what an individual thinks about himself. It is his own conception of his health and physique, intellectual abilities, academic status, behaviour, temperamental qualities, mental health, emotional tendencies and socio-economic status. Lee, L. & Kartika (2014) put forth a comprehensive definition wherein they say that self concept is the person's total appraisal of his appearance, back ground and origins, abilities , and resources, attitudes and feelings which culminate as a directing force in behaviour. Self concept has been defined by several authors. Prins *et al.* (2014) holds it to be all that a person is tempted to call by the name me or mine. Mohammadi (2011) defines it as the individual as known to the individual. According to Simons (2012), it is the way or manner in which

the individual reacts to himself. He spells out four aspects of self: (i). how a person perceives himself; (ii). what he thinks of himself; (iii). how he values himself; and (iv). how he attempts through various actions to enhance or defend himself.

2. MATERIALS AND METHODS

2.1. SELECTION OF SUBJECTS

For this purpose, Forty (N = 40) Male inter-college level archers and shooters players were selected. They were further divided into two groups N = 20 each (i.e., N_1 = 20; inter-college, N_2 = 20). 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.

2.2. SELECTION OF VARIABLES

A feasibility analysis as to which of the variables could be taken up for the investigation, keeping in view the availability of tools, adequacy to the subjects and the legitimate time that could be devoted for tests and to keep the entire study unitary and integrated was made in consultation with experts. With the above criteria's in mind, the psychological variable namely self-concept and adjustment were taken up for the present study:

2.2.1. SELF-CONCEPT

Tools Used

Self-Concept Inventory

Purpose: Designed to study self concept

Author: Dr. J.K. Virk and Dr. B.R. Chauhan

Publisher: Azad Publications opp. IIIrd Gate of K.U., Kurukshetra.

Description

For the construction of this inventory a set of 90 questions was selected. After analysis the inventory Consist a set 24 questions, which includes emotional, constructive and aspect of an individual. In these 24 questions first 12 questions have measured the positive and 12 questions the negative aspect. Each question has 5 options. First options have lowest value increasing order the last option have highest value of rating scale i.e. 1,2,3,4 and 5. This inventory was not developed for the "internal consistency" but for the "Inter-Sample consistency analysis."

Scoring

In this inventory each question has option:

- First option has: 1 point
- Second option has: 2 point
- Third option has: 3 point
- Fourth option has: 4 point
- Fifth option has: 5 point

The sum of the entire 24 question was the final score of an individual.

Reliability

- Split half reliability = 0.79
- Test retest reliability = 0.76

Validity

With Mohsin self-concept Inventory r = 0.68

Norms and Standard

- 96-120–High Self concept
- 49-95-Medium Self Concept
- 48–Below–Low self Concept

3. ADMINISTRATION OF TESTS AND DATA COLLECTION

For obtaining the data and fact based information for the present study, the researcher had sought permission and cooperation from many quarters. Researcher had approached team managers and coaches appointed with the various schools and colleges of Delhi University, Delhi for enabling him to administer the tests. With their consent and cooperation, the investigator decided the time and venue so that their daily schedule was not disturbed. The tests were administered one after the other. The test instructions were clearly read out and explained to them and they were permitted to ask queries and their doubts were cleared before administering the tests. The subjects were asked to record their first response and hand over their test response sheets as soon as they filled it up. The researcher tried his level best that there was no distraction or minimum distraction to the subjects who were attempting the tests.

4. STATISTICAL TECHNIQUES EMPLOYED

Students't–test for independent date was used to determine the significant differences between inter-college male archers and shooters, unpaired t-test was employed for date analyses. To test the hypothesis, the level of significance was set 0.05.

5. RESULTS

Table 1: Significant Differences in the Mean Scores of Inter-College Archers and Shooters on the Variable Self-Concept

	Archers=20		Shooters =20			
Variables	**Mean**	**SD**	**Mean**	**SD**	**t-value**	**Sig.**
Self-concept	72.95	14.24	75.25	14.81	0.50	0.61

A glance at Table 1 shows the results of inter-college archers and shooters players with regard to the variable adjustment. The descriptive statistics shows the Mean and SD values of archers on the variable self-concept as 72.95 and 14.24 respectively. However, shooters had Mean and SD values as 75.25 and 14.81 respectively. The 't'-value 0.50 as shown in the Table above was found statistically significant ($P<0.05$). It has been observed from the above results that inter-college shooters have demonstrated significantly better on self-concept than the inter-college archers.

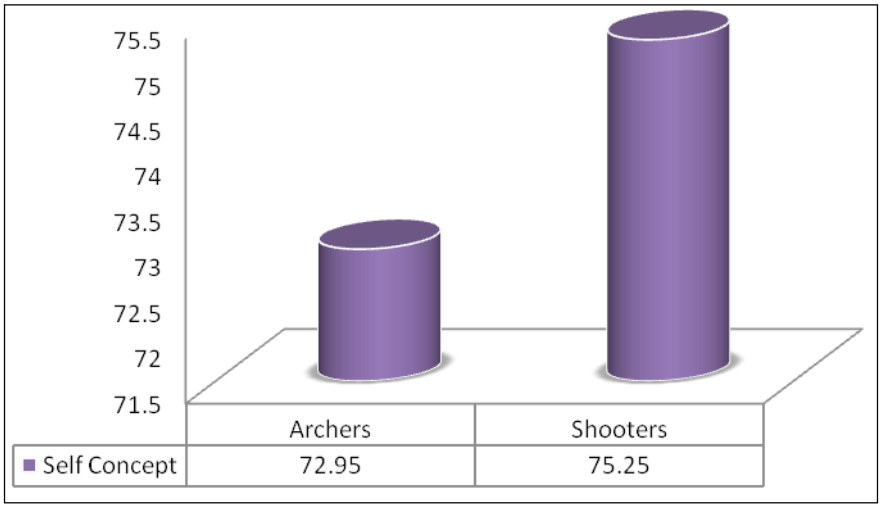

Figure 1: The Comparison of Mean Scores of Both the Groups has been Presented Graphically

6. CONCLUSION

The Mean and SD values of archers on the variable self-concept as 72.95 and 14.24 respectively. However, shooters had Mean and SD values as 75.25 and 14.81 respectively. The 't'-value 0.50 as shown in the Table above was found statistically significant ($P<0.05$). It has been observed from the above results that inter-college shooters have demonstrated significantly better on self-concept than the inter-college archers.

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INTERNATIONAL JOURNAL OF PHYSICAL EDUCATION AND APPLIED EXERCISE SCIENCES

Computation of Physical Fitness Norms of Inter College Male Athletes of Delhi University

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Abstract:
The purpose of this study was computation of Physical Fitness Norms (i.e., Muscular Strength, Muscular Power and Muscular Endurance) among intercollege male athletes. A group of thirty randomly selected male intercollege athletes of Delhi University, Delhi between the age group of 17–24 years (Mean ± SD: age 19.966 ± 2.399 years, height 5.793 ± 2.258 ft, body mass 71.203 ± 3.576 kg) volunteered to participate in this study. The Handgrip Strength Test was used to measure, "Muscular Strength", Vertical Jump Test was used to measure, "Muscular Power", and Pull-Up/ Chin up Test was used to measure, "Muscular Endurance". In Muscular Strength, the scores below 36.199 are considered very poor, from about 39.677–43.155 is considered poor, 43.155–50.111is considered average, 50.111–53.589 is considered good and the scores above 57.067 are considered very good. In Muscular Power, the scores below 36.915 are considered very poor, from about 39.599–42.283 is considered poor, 42.283–47.651is considered average, 47.651–50.335 is considered good and the scores above 53.019 are considered very good. In Muscular Endurance, the scores below 0.908 are considered very poor, from about 2.272–3.636 is considered poor, 3.636–6.364 is considered average, 6.364–7.728 is considered good and the scores above 9.092 are considered very good.

Keywords:
Norms, Athletes, Muscular Strength, Muscular Power, Muscular Endurance

1. INTRODUCTION

In competitive athletes, developing an athletic performance profile requires a detailed battery of testing that thoroughly analyzes all the components comprising athletic performance (i.e., strength, anaerobic power, speed, agility, maximal aerobic capacity, and endurance, flexibility, and body composition). Test results can determine the relevance of a fitness component to a particular sport and can direct the appropriate emphasis on that variable in the athlete's training program. In addition, a sport-specific athletic profile can help establish standards for predicting potential success in that sport. Although resistance training has long been accepted as a means for developing and maintaining muscular strength, endurance, power, and muscle mass (hypertrophy), [1, 2] its beneficial relationship to health factors and chronic disease has been recognized only recently [3, 4, 5]. Prior to 1990, resistance training was not a part of the recommended guidelines for exercise training and rehabilitation for either the American Heart Association or the American College of Sports Medicine (ACSM). In 1990, the ACSM first recognized resistance training as a significant component of a comprehensive fitness program for healthy adults of all ages [6]. Resistance training offers greater development of muscular strength, endurance, and mass. It also assists in the maintenance of basal metabolic rate (to complement aerobic training for weight control), promotes independence, and helps to prevent falls in the elderly [5, 7]. Resistance training is particularly beneficial for improving the function of most cardiac, frail, and elderly patients, who benefit substantially from both upper-and lower-body exercise [3, 4]. Norms for fitness, performance, and health

presents data for numerous fitness components, including strength, endurance, anaerobic and aerobic capacity and power, body composition, flexibility, , speed, and agility, as well as data for various health norms such as cardiovascular capacity, blood lipids, bone density, energy expenditure, and caloric values. Professionals will be able to use the information to provide a basis of comparison to others in the same category as their clients.

2. MATERIAL AND METHODS

2.1. SELECTION OF SUBJECTS

A group of thirty randomly selected male intercollege athletes of Delhi University, Delhi between the age group of 17–24 years (Mean ± SD: age 19.966 ± 2.399 years, height 5.793 ± 2.258 ft, body mass 71.203 ± 3.576 kg) volunteered to participate in this study. Their characteristics are presented in figure 1.

2.2. METHODOLOGY

The handgrip strength test was used to measure, "muscular strength", vertical jump test was used to measure, "muscular power", and pull-up test was used to measure, "muscular endurance".

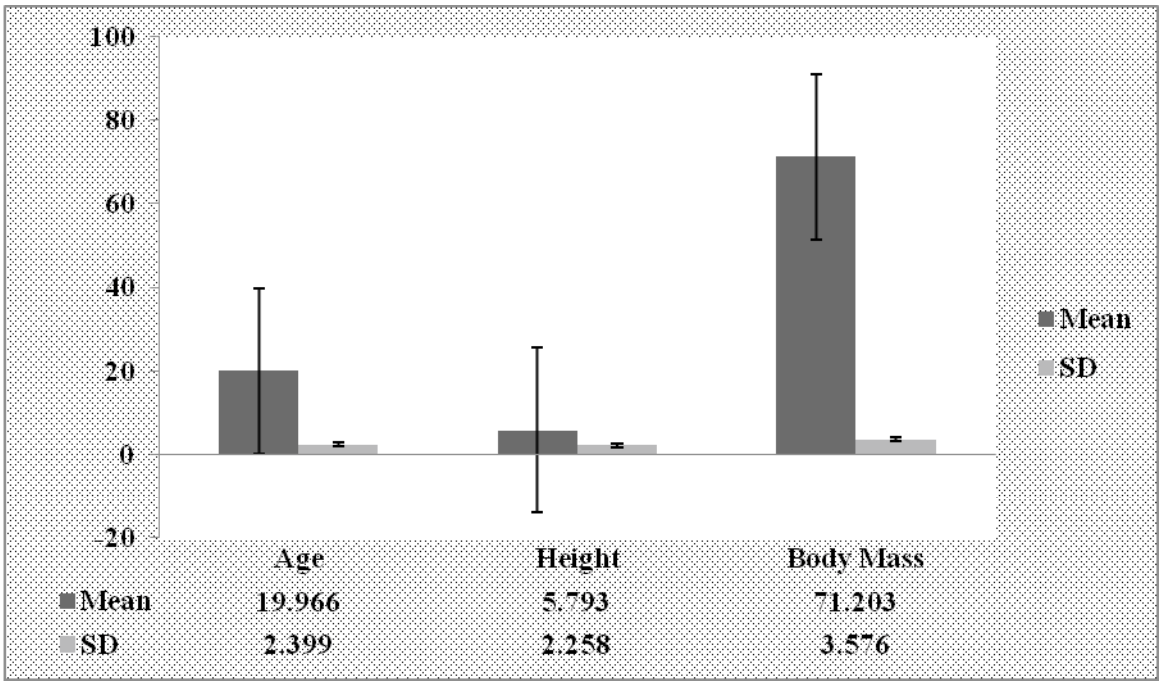

Figure 1: Features of Intercollege Male Athletes of Delhi University, Delhi

3. STATISTICAL ANALYSIS

The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e. very good, good, average, poor and very poor.

4. RESULTS

Table 1: Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of Strength, Power and Endurance Abilities of Inter College Male Athletes (N=30) of Delhi University, Delhi for the Academic Session 2014–2015

Sr. No.	Variables	Mean ± Standard Deviation		Hi	Low
1	Muscular Strength	Mean	46.633	52	41
		SD	3.478		
2	Muscular Power	Mean	44.9666	49	41
		SD	2.684		
3	Muscular Endurance	Mean	5	7	3
		SD	1.364		

Table 1 shows that in Muscular Strength, the mean score was 46.633 and standard deviation score was 3.478. In Muscular Power, the mean score was 44.9666 and standard deviation score was 2.684. In Muscular Endurance, the mean score was 5 and standard deviation score was 1.364, of Strength, Power and Endurance Abilities of Intercollege Male Athletes (N=30) of Delhi University, Delhi for the academic session 2014–2015.

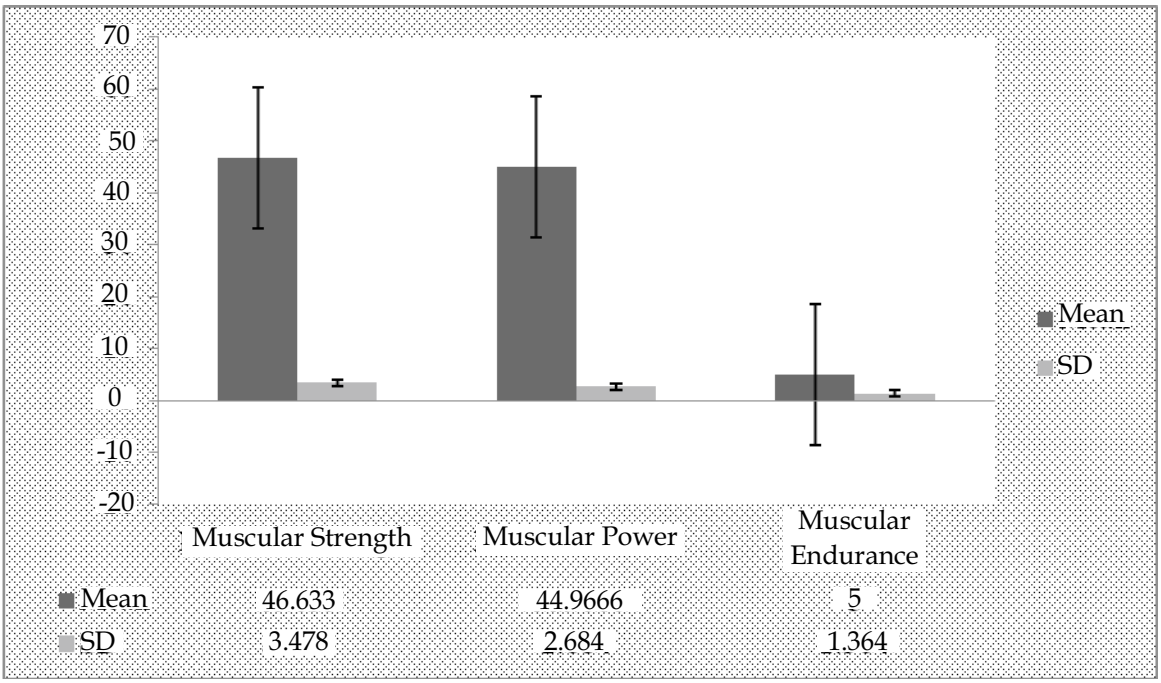

Figure 2: Descriptive Statistics (Mean & Standard Deviation) and of Strength, Power and Endurance Abilities of Inter College Male Athletes (N=30) of Delhi University, Delhi for the Academic Session 2014–2015

Table 2: Grading of Strength, Power and Endurance Abilities of Inter College Male Athletes (N = 30) of Delhi University, Delhi for the Academic Session 2014–2015

Variables	Very Poor	Poor	Average	Good	Very Good
Muscular Strength	Less than (<) 36.199	39.677–43.155	43.155–50.111	50.111–53.589	Greater than **(>)** 57.067
Muscular Power	Less than (<) 36.915	39.599–42.283	42.283–47.651	47.651–50.335	Greater than **(>)** 53.019
Muscular Endurance	Less than (<) 0.908	2.272–3.636	3.636–6.364	6.364–7.728	Greater than **(>)** 9.092

The values listed in Table 2 gives a guide to expected scores for Strength, Power and Endurance Abilities of Inter College Male Athletes (N = 30) of Delhi University, Delhi for the academic session 2014–2015. for Muscular Strength,

Muscular Power, and Muscular Endurance. In Muscular Strength, the scores below 36.199 are considered very poor, from about 39.677–43.155 is considered poor, 43.155–50.111 is considered average, 50.111–53.589 is considered good and the scores above 57.067 are considered very good. In Muscular Power, the scores below 36.915 are considered very poor, from about 39.599–42.283 is considered poor, 42.283–47.651 is considered average, 47.651–50.335 is considered good and the scores above 53.019 are considered very good. In Muscular Endurance, the scores below 0.908 are considered very poor, from about 2.272–3.636 is considered poor, 3.636–6.364 is considered average, 6.364–7.728 is considered good and the scores above 9.092 are considered very good.

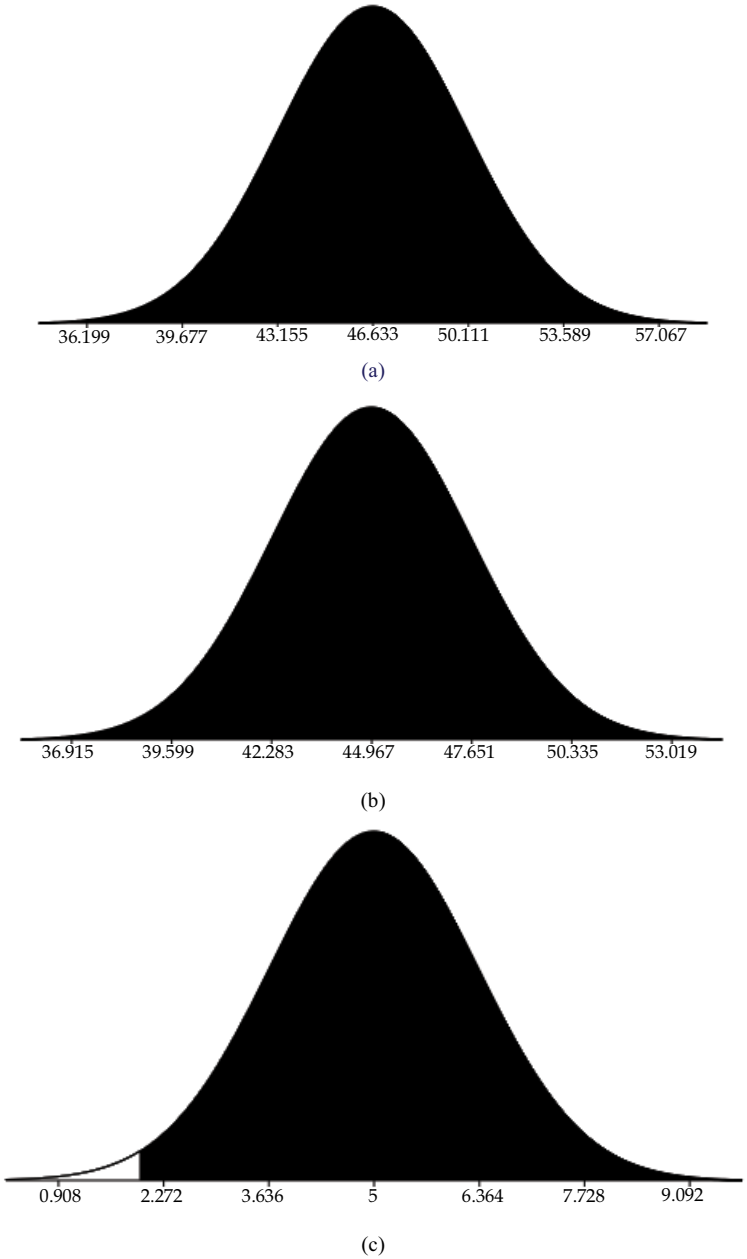

Figure 2: Normal Distribution of Strength, Power and Endurance Abilities i.e., (a) Muscular Strength, (b) Muscular Power, and (c) Muscular Endurance of Inter College Male Athletes (N = 30) of Delhi University, Delhi for the Academic Session 2014–2015

5. CONCLUSION

1. In Muscular Strength, the scores below 36.199 are considered very poor, from about 39.677–43.155 is considered poor, 43.155–50.111is considered average, 50.111–53.589 is considered good and the scores above 57.067 are considered very good.
2. In Muscular Power, the scores below 36.915 are considered very poor, from about 39.599–42.283 is considered poor, 42.283–47.651is considered average, 47.651–50.335 is considered good and the scores above 53.019 are considered very good.
3. In Muscular Endurance, the scores below 0.908 are considered very poor, from about 2.272–3.636 is considered poor, 3.636–6.364 is considered average, 6.364–7.728 is considered good and the scores above 9.092 are considered very good.

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Comparative Study on Selected Motor Fitness Components of National and State Level Junior Athletes

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Abstract:
The purpose of the study was to compare selected motor fitness components of national and state level junior athletes. Forty (40) National level and State level junior athletes of which twenty of each level (age ranging-14-19 y.) was selected from North East region of India especially from SAI complex of Guwahati. Players were selected from sprint, Long jump, shot put, javelin and long distance running events where four athletes of each event. J.C.R. test battery such as vertical jump, 10x10 yards shuttle run and chin up performance (D.K. Mathews 1958) were conducted to measure motor fitness of the subjects. Date were collected in a day shift with the help of Govt. employ PE teachers on the SAI sports ground. To find out the significant differences of collecting data were calculated by applying students "t" test at 0.05 level of confidence. Result of the study showed that significant difference has been noticed on JCR test battery Shuttle run and Chin up performances were found to be significant but there was no significant difference in vertical jump performance between national and state level junior athletes.

Keyword:
Motor Fitness, JCR Test Battery

1. INTRODUCTION

The term motor fitness is a broader concept which subsume both physical fitness and motor ability factor. Motor fitness is regarded as the preparedness for performance with special regard for big muscle activity, is a more general phase of physical fitness judge by performance and it common are strength, endurance, power, speed, agility, balance, flexibility and stamina (Barrow 1979). Motor fitness includes these physical fitness components plus for additional factors. India is vast country with unique cultural, social, geographical and climatic differences. The motor fitness of national and state level athletes varies according to regional variation of the country. The anthropometric characteristic also varies from one region to another which ultimately affects the physical growth and development and performance of the athletes. In the present study athletes were selected from north east region and some of them from hilly areas so their bodily structure is different from those plain areas but without measuring we can't say about their motor fitness. Motor abilities will provide more accurate information on the developmental process of children or junior athletes. However, it is not well known whether a relationship actually exists on motor abilities parameters in athletes or between different motor ability evaluation tests (Milanese 2010).

The aim of this investigation was to find out motor fitness of national and state level junior athletes. The forty athletics players sprint, Long jump, shot put, javelin and long distance running events where four athletes of each event were selected from North East region that used to practice at SAI complex of Guwahati.

2. METHOD AND METARIALS

In order to compare selected motor fitness components of national and state level junior athletes, Forty (40) National level and State level junior athletes of which twenty of each level (age ranging-14-19 y.) were selected from North East region of India Specially from SAI complex of Guwahati. Players were selected from sprint, Long jump, shot put, javelin and long distance running events where four athletes of each event. J.C.R. test battery such as vertical jump, 10x10 yards shuttle run and chin up performance (D.K. Mathews 1958) were conducted to measure motor fitness of the subjects. Data were collected in a day shift with the help of Govt. employ PE teachers on the SAI sports ground.

3. STATISTICAL PROCEDURE

The gathered data were duly analyzed through statistical procedure. **"t"** test was applied to find out significant differences between selected motor fitness components of national and state level athletes, The level of significant was set at 0.05 level of confidence.

4. RESULT OF THE STUDY

Table I: Mean, SD and "t" Test on Shuttle Run Performance of National and State Level Junior Athletes

Level	Mean	SD	Mean Difference	Standard Error	"t"
National	19.55	0.35	0.7	0.135	5.18*
State	20.25	0.49			

*Significance at 0.05 level, Tabulated $t_{0.05}$ (38) =2.024

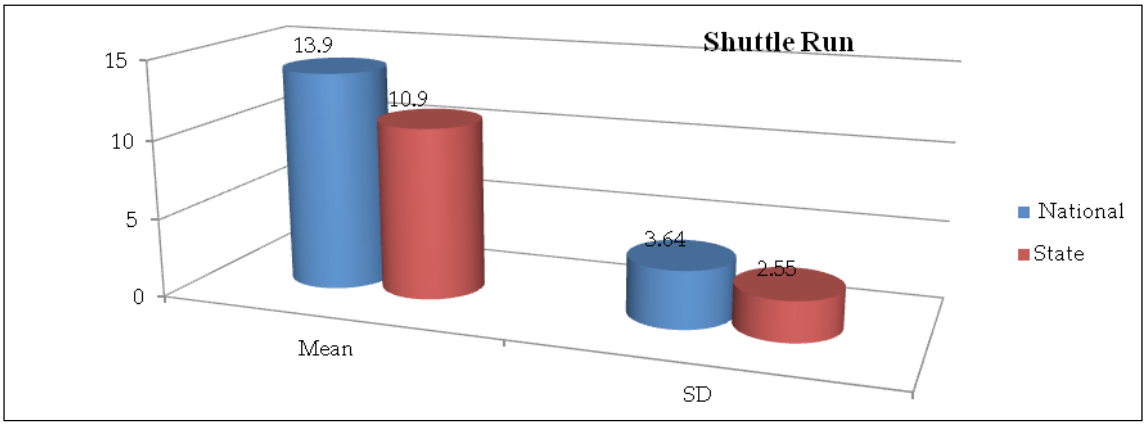

Figure 1: Shuttle Run

4.1. FINDINGS

In the table 01 & Figure 1, it is clearly reveled that, highly significant difference exist on shuttle run performance between national and state level athletes as because Cal "t" value (5.18*) is greater than Tab $t_{0.05}$ (38) value (2.024*). Mean of performance of state athletes were better than national athletes.

Table 2: Mean, SD and "t" Test on Vertical Jump Performance of National and State Level Junior Athletes

Level	Mean	SD	Mean Difference	Standard Error	"t"
National	65.9	10.37	5.5	3.49	1.57
State	60.4	11.69			

*Significance at 0.05 level, Tabulated $t_{0.05}$ (38) =2.024

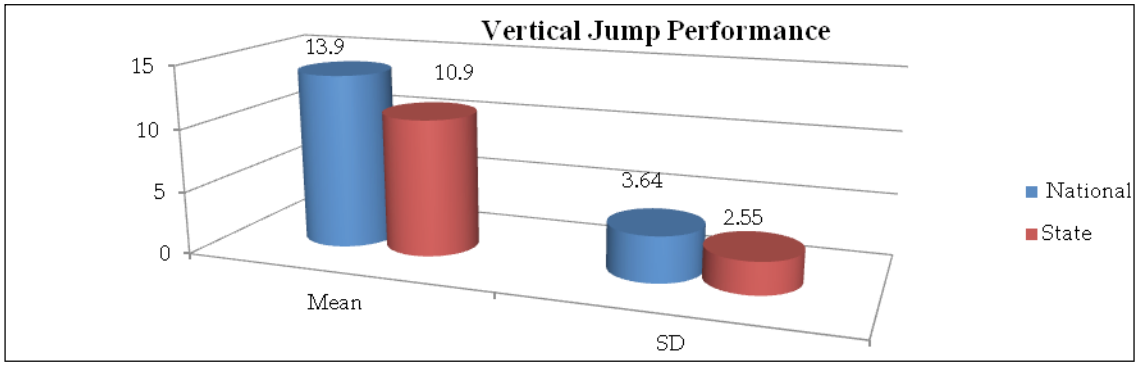

Figure 2: Vertical Jump Performance

4.2. FINDINGS

In the table 02 & figure 02, it is clearly reveled that, no significant difference exist on vertical jump performance between national and state level athletes as because Cal "t" value 1.57) is lower than Tab $t_{0.05}$ (38) value (2.024*). Mean of performance of national athletes were better than state athletes

Table VIII: Mean, SD and "t" Test on Chin Ups Performance of National and State Level Junior Athletes

Level	Mean	SD	Mean Difference	Standard Error	"t"
National	13.9	3.64	3.00	0.99	3.03*
State	10.9	2.55			

*Significance at 0.05 level, Tabulated $t_{0.05}$ (38) =2.024

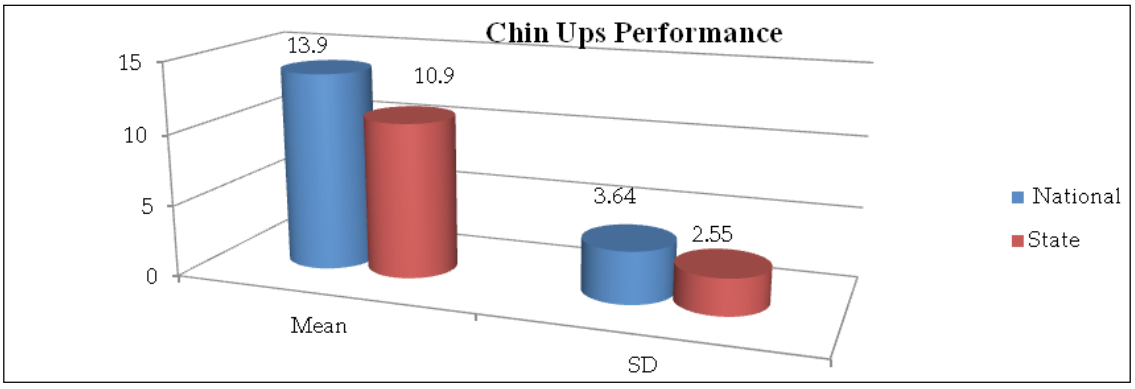

Figure 2: Chain Ups Performance

4.3. FINDINGS

In the table 03, it is clearly reveled that, highly significant difference exist on Chin ups performance between national and state level athletes as because Cal "t" value (3.03*) is higher than Tab $t_{0.05}$ (38) value (2.024*). Mean of performance of national athletes were better than state athletes.

5. DISCUSSION AND CONCLUSION

The main results of the present study, conducted in 40 junior National and State athletes aged 14-19 years from North east region of India, SAI complex of Guwahati, are the following:--

Result of the study showed that motor fitness parameter such as-Shuttle run and Chin up performance were found to be significant but there was no significant difference in vertical jump performance between national and state level junior athletes.

In the motor fitness performance there was significant difference on Shuttle run and Chin ups performance whereas no significant difference was found in vertical jump. It should be remember that four athletes were selected from each selected events of Track & Field. Thomas (1951) reported that high level performer such as national, international athletes are more agile, energetic and flexible than state athletes because strenuous undergoing training, conditioning, participating high pressure games and sports and experience. National athletes are practiced & participated under different climatic condition all over the country which gives them more physical, physiological, psychological stamina to perform better in the games & sports. The sports researcher use to give shuttle run & Chin ups to measure agility & shoulder strength of the athletes (D.K.Mathews 2007). Research shows that sprinters are more agile, energetic and flexible on the other hand shot put, Discus thrower & javelin throwers have more shoulder strength in comparison to other athletes (Nelson & Johnson 2007). So it could be said that due to physical maturity, national athletes were found better in shuttle run and chin ups performance than state athletes. In this study selected track and field events were no such vertical movements which can develop vertical jump performance of the present athletes. So that there was no significant difference of vertical jump performance of national and state level athletes.

6. CONCLUSION

In the motor fitness parameter such as-Shuttle run and Chin up performance were found to be significant but there was no significant difference in vertical jump performance between national and state level junior athletes.

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Impact of Multi Gym Fitness Training Programme on Body Fat Percentage among Adipose People

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Abstract:
The aim of this study was to observe the Impact of multi gym fitness training programme on Body Fat Percentage of subjects with the age range 28 to 55 years. For this 30 male subjects were drawn from Gwalior inssssw Madhya Pradesh, India by using simple random sampling. Pre post data were collected before and after intervention of training programme for 90 days. They fallow the training programme for 60 minutes, six days a week and Sunday has been observed as weekly off. It is concluded that significant improvement was found in Body fat percentage (%) as a result of the experimental treatment. The significant difference that could be observed among the overweight subjects could be due to the exercise programme designed for them with the help of different equipment inside the multi gym.

Keywords:
Body Fat Percentage, Multi Gym Fitness Training Programme

1. INTRODUCTION

Man had built machines for the purpose of adding comforts to his life but now he cannot exist bethought it. It has become part a parcel of one's lives. Modern man in comparison to his primitive counterpart is poorer and inferior with regards to physical process and skill. No doubt machines have done and can do much more of human work yet the assumption that the basis of man's existence physically continues to be true. For man there is nothing more beautiful and valuable than his physique and the proper use of this body is necessary if human being wish to grow and develop to their optimum. In the area of health and fitness also machines have become a very important part for man's development both physically and skilfully. Few of the machines used in this study are the treadmill, Elliptical trainer, Water-Based Rowing Machine, Upright Bike, EXT Dual Cable Cross etc.

2. MATERIAL AND METHODS

30 people were selected for the study from the Gwalior in Madhya Pradesh, India. Their age ranged from 28-55 years. The training session of the subjects were conducted during morning session of the day. Training programme for 90 days. They fallow the training programme for 60 minutes, six days a week and Sunday has been observed as weekly off. Each session was of about 1 hour, which consisted of 45 minutes of combination of these machines followed by proper cooling down and relaxation session. The variable selected for the study was Body Fat Percentage. Body fat was measured by the lenge skin fold calipers and the sum of the skin fold thickness of all the four sites of the body was converted in to percentage by body fat as suggested by Durnin & Womersley, Firstly, by using the lenge skin fold calipers fat % of each subject was measured and post measurement of fat % for the same subjects were taken after training programme for 90 days.

3. SAMPLING

This study was conducted in 30 samples from Gwalior, M.P, India. Samples were selected by applying the simple random sampling using lottery method. 30 were males of age range 28-55 yrs.

Research design: pre-post single group

Symbolically, A Q_1 X Q_2

Where,

A =Single group

Q =Pre-test

X = Multi gym training programme (60 min. for each morning per day)

Q2 = Post-test

4. RESULTS

Table 1: Paired Sample Statistics

		Mean	N	S.D	S.E(Mean)
Pair 1	Pre Fat %.	31.00	30	2.69	0.49
	Post Fat %.	27.62	30	2.09	0.38

Table 2: Paired T-Test Table

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	S.D	SE (Mean)	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 Pre Fat %. Post Fat %.	3.37	1.30	0.23	2.88	3.86	14.14	29	0.00

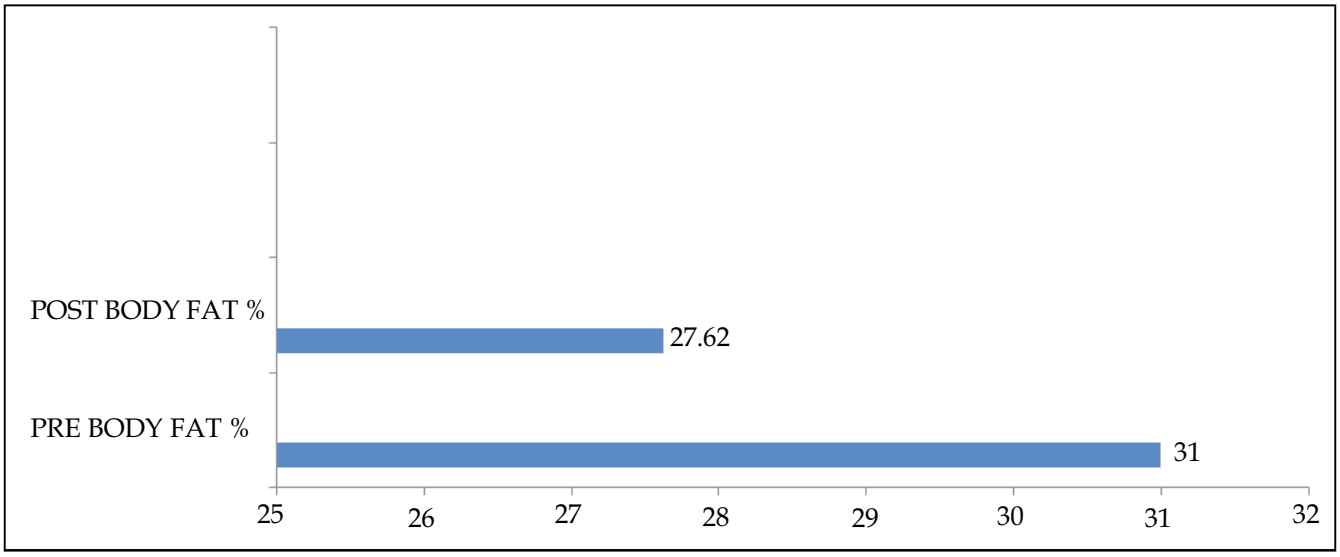

Figure 1: Graph for Total Subjects (Mean)

5. INTERPRETATION OF FINDINGS

The following interpretation can be made on the basis of the results shown in the above output.
The values of the mean, standard deviation and standard error of the mean for the data on Positive breath holding Capacity in the pre and post testing are shown in the Table-1. These values can be used for further analysis.

2. It can be seen from Table 2 that the value of t statistic is 14.14. This t value is significant as the p value is 0.00 which is less than 0.05.

For one -tail test, the value of tabulated t at 0.05 level of significance and 29 (N -1 = 29) df which is 2.045. Since calculated value of t (14.14) is higher than tabulated $t_{0.05}$ (29) (= 2.045). so significant result was found. It is concluded that significant improvement was found in body fat percentage as a result of the experimental treatment.

6. DISCUSSION

The results of the study shows that there is significant difference in the fat % of pre and post test means of the subjects when they went through the training on the various exercise machines mentioned earlier. The reason for having such a significant effect on the set variables may be attributed to the fat that due to training on treadmill, Elliptical trainer, Water-Based Rowing Machine, Upright Bike, EXT Dual Cable Cross etc. The study clearly showed that there is a significant difference on the pre and post means of the body fat percentage the reason for having such a significant effect on the set variables that is body fat percentage may be attributed again because of the workout session of the obese subjects on the treadmill, Elliptical trainer, Water-Based Rowing Machine, Upright Bike, EXT Dual Cable Cross etc used in this study.

7. CONCLUSION

The effect of training and the programmed designed for the obese subjects helped in the reduction of abdominal and others skin fold measurement. It also reduced the bicep and triceps skin fold measurement. This clearly indicates that how important exercise is for the survival of human beings in the modern age. Support and help of machines during exercise and for performing exercise makes the schedule much more scientific, systematic and efficient.

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Impact of Pranayamas on Positive Breath Holding Capacity of School Going Children

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Abstract:
The aim of this study was to observe the impact of Pranayamas on positive breath holding capacity of subjects with the age range 8 to 10 years. For this 30 male subjects were drawn from Muni International School, A-2/16-18, Mohan Garden, Uttam Nagar New Delhi-110059, India by using simple random sampling. Pre post data were collected before and after intervention of Pranayama for 90 days. Positive breath holding capacity was recorded to nearest second by using stop watch. Since calculated value of t (= 7.374) is higher than tabulated t0.05 (29) (= 2.045) so significant result was found. It is concluded that significant improvement was found in positive breath holding capacity as a result of the experimental treatment.

Keywords:
Pranayama, Positive Breath Holding Capacit

1. INTRODUCTION

Pranayama is appreciated and enjoyed by children of all ages, however a children's Pranayama session is vastly different to an adult's class. The key to being successful when introducing Yoga to children is in the way it is presented to them. Child care professionals have discovered a new tool in helping calm a roomful of excited children. Introducing Pranayama benefits children's physical co-ordination, makes them stronger and helps concentration. Pranayama is an ancient practice that helps create sense of union in body, mind and spirit. Pranayama is a system of physical and mental exercise which has since spread throughout the world breathing and meditation. Regular daily practice of these structures of Pranayama produces a clear, bright mind and a strong, capable body. Children can safely practice meditation and simple breathing exercises as long as the breath is never held. These techniques can greatly help children learn to relax, concentrate, and reduce impulsiveness. Children trained in these techniques are better able to manage emotional upsets and cope with stressful events.

2. OBJECTIVES

This study has aimed to study the impact of Pranayamas positive breath holding capacity of the male school going children.

3. HYPOTHESIS

Practice of Pranayamas causes significant increase in positive breath holding capacity of the all subjects.

4. METHODOLOGY

4.1. SAMPLING

This study was conducted in 30 samples from Muni International School, A-2/16–18, Mohan Garden, Uttam Nagar New Delhi-110059, India. Samples were selected by applying the simple random sampling using lottery method. 30 were males of age range 8-10 yrs.

Research design: pre-post single group

Symbolically, A Q_1 X Q_2

Where,

A = single group

Q = pre-test

X = Pranayama (45 min. for each morning per day)

Q2 = Post-test

4.2. PROCEDURES

To measure the positive breath holding capacity tie the subjects were instructed to place the nose clip tightly. They were asked to inhale through the mouth to maximum capacity. As soon as the Subjects had taken a deep breath to the fullest capacity of their lungs and close the lips, the stopwatch was started. As soon as the subjects opened their lips to exhale, the stop watch was stopped. The time given by the stop watch was recorded as the score of maximum Positive breath holding Capacity. Firstly, by using the stop watch positive breath holding capacity of each subject was measured and post measurement of positive breath holding time for the same subjects were taken after allowing practice of Pranayama for 12 weeks. The following Pranayama were perform Anuloma Vilom and Bhastrika.

4.3. RESULTS

Table 1: Paired Sample Statistics

		Mean	N	S.D	S.E(Mean)
Pair 1	Pre Positive breath holding Capacity	25.40	30	6.11	1.11
	Post Positive breath holding Capacity	28.26	30	6.07	1.10

Table 2: Paired T-Test Table

	Paired Differences					t	df	Sig. (2-tailed)
				95% Confidence Interval of the Difference				
	Mean	S.D	SE (Mean)	Lower	Upper			
Pair 1 Pre Positive breath holding Capacity Post Positive breath holding Capacity	-2.86	2.12	0.38	-3.66	-2.07	-7.37	29	0.00

Figure 1: Graph for Total Subjects (Mean)

5. INTERPRETATION OF FINDINGS

The following interpretation can be made on the basis of the results shown in the above output.

The values of the mean, standard deviation and standard error of the mean for the data on Positive breath holding Capacity in the pre and post testing are shown in the Table-1. These values can be used for further analysis.

2. It can be seen from Table-2 that the value of t statistic is **7.37**. This t value is significant as the p value is 0.00 which is less than 0.05.

For one -tail test, the value of tabulated t at 0.05 level of significance and 29 (N -1 = 29) df which is 2.045. Since calculated value of t (7.37) is higher than tabulated $t_{0.05}$ (29) (=2.045). so significant result was found. It is concluded that significant improvement was found in positive breath holding capacity as a result of the experimental treatment.

6. DISCUSSION

In the present study significant difference was found in case of Positive breath holding Capacity after administrating the Pranayama training programme. Pranayama may allow bronchodilatation by correcting the abnormal breathing patterns and reducing the muscle tone of inspiratory and expiratory muscles which leads to better oxygenation of alveoli. Due to improved breathing patterns, respiratory bronchioles may be widened and perfusion of large number of alveoli can be carried significantly. Pranayama is an ideal tool to improve the Positive breath holding Capacity in children. The effectiveness of Pranayama may be due to the reason that Pranayama increase the aerobic and anaerobic potentiality of an individual. Therefore, proposed hypothesis has been accepted in case of Positive breath holding Capacity.

7. CONCLUSION

Significant improvement was found in Positive breath holding Capacity performance as a result of the experimental treatment.

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Comparative Study of Anaerobic and Aerobic Capacity of Sprinters & Long Distance Runners of LNUPE

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Abstract:
The aim of this study was to compare anaerobic and aerobic capacity of sprinters & long distance runners of Lakshmibai National Institute of Physical Education, Gwalior, M.P., India. For this study subjects were randomly selected from track and field match practice group of sprinters and long distance runners of Lakshmibai National University of Physical Education, Gwalior . The total number of 20 male athletes, 10 each from sprinter and 10 long were selected . The age of the subjects ranged from 18–25 years. The selected variables for the study were aerobic capacity and anaerobic capacity. The statistical finding of the present study revealed that there were significant difference in sprinters and long distance runners in relation to aerobic and anaerobic capacity.

Keywords:
Anaerobic Capacity and Aerobic Capacity

1. INTRODUCTION

Man has reached the space age from the primitive stone age because of continuous change .As a result of exercise and work many physiological function and structural changes take place at various tissues, organs and systems.

During prolonged heavy physical work, the individual's performance capacity depends largely upon his ability to take up, transport, and deliver oxygen to working muscles . subsequently, the maximum oxygen uptake is probably one of the best measures of a person' s physical fitness, provided the definition of physical fitness is restricted to the capacity of the individual for pronged heavy work .

Aerobic capacity refers to the maximum amount of oxygen that body can utilize in an exercise session, usually measured as a brief of high intensity exercise. It is possible to improve aerobic capacity over time, and it is also possible to see a decline in aerobic capacity in response to a variety of factors, for athletes, aerobic capacity, sometimes known as vo2 max, is an important aspect of their physical health .

Anaerobic capacity is the ability to mobilize energy during activities of intensive nature i.e. executing intensive work with explosive action is short duration of time, such as, kicking the football faster and for explosive take off in jumps, maximum rate for about two or three minutes under water swimming. The anaerobic energy system produced energy without oxygen the purpose of anaerobic conditioning is two progressive improving in the body's ability to tolerate oxygen dept, increases store of ATP and muscle oxygen .

The lactate threshold (LT) is the exercise intensity at witch lactate (more specifically, lactic acid) starts to accumulate in the blood stream . The reason for the acidification of the blood at high exercise intensities is two –fold : the high

rates of ATP hydrolysis in the muscle release hydrogen ions, as they are co-transported out of the muscle in to the blood via the MCT-mono carboxyl ate transporter, and also bicarbonate stores in the blood begin to be used up .

2. METHODOLOGY

The subject selected for this study were randomly selected from track and field match practice group of sprinters and long distance runners of Lakshmibai National University of Physical Education, Gwalior . The total number of 20 male athletes, 10 each from sprinter and 10 long were selected . The age of the subjects ranged from 18-25 years .

The selected variables for the study were:

- Aerobic capacity
- Anaerobic capacity

The following tests were selected and considered as criterion measures for this study .

Aerobic capacity was measured by 12 minute cooper run and walk test. The scoring was in meters and nearest to 20 meters .

Anaerobic capacity was measured by 50 meters dash. The score was the time in the nearest $1/10^{th}$ of a second. The instruments reliability, tester competency and test reliability ensured the reliability of data. The stopwatches used for measuring the performances of subjects for aerobic and anaerobic capacity was obtained from the research laboratory of L.N.U.P.E, Gwalior. The researcher had sufficient practice to measure aerobic capacity, distance for 12 minute run/walk and to measure anaerobic capacity, timing for 50 meters under the supervision of an expert. To ensure that the researcher is well versed with techniques of conducting the tests, numbers of practice trials were conducted.

To measure the aerobic capacity 12 minute cooper run-walk test was conducted. The equipments used were Track or marked area and stopwatch (one for each time keeper), wooden clapper, measuring tape, finishing posts, pen and pencil. The score of each runner was recorded in meters to the nearest 25 meters covered by him in 12 minutes. 50-meter dash was used to test the anaerobic capacity of each subject. On the signal "on your marks " and "go" the subject run 50 meters distance as fast as possible. To compare aerobic and anaerobic capacity of sprinters and long distance runner. The analysis of variance (ANOVA) and t-test were used at 0.05 level of significance .

3. RESULTS AND FINDING

Table 1: Description of Aerobic Capacity of Sprinters and Long Distance Runners

Athletes	N	Mean	Std. Deviation	Minimum	Maximum
Sprinters	10	2291.0000	154.93	2020.00	2560.00
Long distance runner	10	3051.000	123.05	2920.00	3310.00
Total	20				

Table 1 shows descriptive analysis of aerobic capacity of athletes of track and field. Mean of sprinters and long distance runner were 2291, 3051 and standard deviations are 154.93, 123.50 respectively. Comparison between sprinters and long distance runner has been presented in Table 2.

Table 2: One–way Analysis of Variance of Aerobic Capacity of Sprinters and Long Distance Runners

Groups	Sum of Squares	df	Mean Square	F
Between groups	2898935.000	2	1449467.500	55.317*
Within group	707482.5000	27	26203.056	
Total	3606417.500	29		

*significant at 0.05, F 0.05 (2, 27) = 3.54

The Table 2 indicates aerobic comparison between sprinters and long distance runners, which is significant as calculated f-ratio 55.317 is greater than tabulated "f" value 3.54 .

Table 3: Paired Mean Differences and Significance of Difference between Sprinters and Long Distance Runners in Aerobic Capacity

Sprinters (Mean)	Long Distance Runner(Mean)	Mean Difference
2291.00	3051.00	420.50*
2291.00	3051.00	339.50*

CD.05(27)=148.54, * significant at 0.05 level

Table 3 reveals that a significant differences are obtained between sprinters and long distance runner (760.00) as mean differences value in all these two cases are more than the critical value which is 148.54 . The level of significance was set at .05 .

Table 4: Description of Anaerobic Capacity of Sprinters and Long Distance Runner

Athletes	N	Mean	Std. Deviation	Minimum	Maximum
Sprinters	10	6.8180	.24724	6.40	7.08
Long distance runner	10	8.0020	.42153	7.48	8.69
total	20				

Table 4 shows descriptive analysis of anaerobic capacity athletes of track and field. Mean of sprinters and long distance runners was 6.8180 and 8.0020 standard deviation are .24724 and .42153 respectively. Comparison between sprinters and long distance runner or anaerobic capacity in has been presented in Table 4.

Table 6: Paired mean values and Significance of Difference between Sprinters and Long Runners in Anaerobic Capacity

Sprinters (Mean)	Long Distance Runners (Mean)	Mean Difference
6.8180	8.0020	0.525*
6.8181	8.0020	.65900*

CD.05(27)=0.33, * significant

Table 6 reveals that a significant differences are obtained between sprinters and long distance runner (1.18400) as mean differences value in all these two cases are more than the critical value which is 0.33 . The level of significance was set at .05

4. DISCUSSION

The statistical finding of the present study revealed that there were significant difference in sprinters and long distance runners in relation to aerobic and anaerobic capacity. The differences may be attributed to the nature of the activity done by these groups. The sprinters perform activities which are highly anaerobic as they need to train with anaerobic energy system involved in activity. Motor ability requirement of sprinters dominated by speed and strength component and endurance training is given importance in the initial phase of preparatory phase. In case of long distance runners require more endurance than speed endurance. Sheer (1975) investigated to predict maximal aerobic power and anaerobic work capacity. His conclusion support the present study as he concluded that distance beyond half mile are significantly related to aerobic work capacity and distance up to including quarter mile are significantly related to anaerobic work capacity.

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Comparison of Motor Fitness Components among Selected Sport Groups

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Abstract:

Background: The purpose of this study was to compare the motor fitness components among different groups of Selected Match Practice groups.

Method: For achieve the purpose fifty male students from MATS University Raipur, CG, were selected as the subject. All subjects were practicing regularly and related from different team games like Hockey, Football, volleyball, basketball and handball, who had participated in Inter-university and as well as in state championship were selected as the subject for this study. Their age ranged from 23 to 27 year old, the study was confined to the selected motor fitness components namely Muscular Endurance, Speed, and Agility. The data of selected subject for motor fitness components (muscular endurance, speed, and Agility) were recorded by different measures, for muscular endurance, speed and Agility, data were observed by performing the 600 meter run/walk, 50 meter dash and Shuttle Run.

Result: The analysis of data reveals that there is insignificant difference in speed between different match practice groups were obtained. The insignificant difference may be due to the type of test selected. Usually hockey players, football players, volleyball players, basketball players and handball players are employ same type of speed of movement while taking part in a game. A significant difference in muscular endurance between hockey and football, hockey and volleyball, hockey and basketball, hockey and handball, football and volleyball, football and basketball, football and handball, volleyball and basketball, volleyball and handball and basketball and handball were obtained. A significant difference in agility between hockey and football, hockey and volleyball, hockey and basketball, football and volleyball, football and basketball, football and handball, volleyball and basketball, volleyball and handball and basketball and handball were obtained.

An insignificant difference in agility between hockey and handball was also obtained.

Conclusion: With the limitations of the study it may be concluded that, there was no significant difference found between the different match practice groups i.e. Hockey, Football, Basketball, Volleyball, and Handball in relation to their motor fitness component (speed) and there was also no significant difference found between the hockey and handball in relation to their motor fitness component (agility). On the other hand there was significant difference found between the different match group i.e. Hockey, Football, Basketball, Volleyball, and Handball in relation to their muscular endurance and agility (accept hockey and handball), when the subjects were involved in similar type of daily routine.

Keywords:
Speed, Muscular Endurance, Agility

1. INTRODUCTION

Sports is one of the avenues of mankind's never ceasing strive for excellence. Its uniqueness lies in the intimacy between the physical happenings of our bodies and their repercussions on our minds, as well as in the general recognoscibility of the social and aesthetic value. Sports evoke experience that is exclusively human and independent of the changing forms, patterns customs of a civilization, which involves profoundly modifying concepts of our environment. From its very simple form, a sport has emerged into highly organized form of play and play is a general innate tendency. Play is very important for preservation, growth and development of organism.

Over the years physical fitness has become the well-built foundation of a structure that supports many concrete blocks on it which represents all the activities that make life worth living: intellectual life, spiritual life, family life and social life.

Fitness tests, often referred to as fitness evaluations or fitness assessments, includes a series of measurements that help determine the health status and physical fitness of an individual. These tests are often the starting point for designing an appropriate exercise program. The specific tests used in an assessment depend on the health and fitness goals of the individual, the trainer's experience and the type of workout routines being performed. Performance of an athlete in the sports is not only depend upon the motor fitness components but other factors also contribute to the success of an athlete in the sports arena such as scientific good quality equipments, clothing, training schedule competition frequency & psychological preparation and the most important balanced diet. All these factors together make the athletes prepared for the competition and the only the fruitful result can be expected from the athlete in the competition. An individual to succeed in the competition must develop the motor fitness factor that is speed, agility, flexibility, strength and power. Motor fitness is the final criterion through which all other elements of physical fitness are seen and measured in man. How continuously and efficiently he performs his daily work in industry, on the farm, in the armed forces, or in athletic performance was at one time the only criterion that man had of physical fitness. He might know little or nothing about scientific facts of body structure, physiology or functioning the organs, strength test on dynamometer, or organic efficiency tests. But he could understand an outstanding performance displaying power, speed and endurance.

2. OBJECTIVES

The purpose of the study was to compare the motor fitness components among Selected Sport Groups.

3. METHODOLOGY

The purpose of the study was to compare the motor fitness components among different match practice group, for achieve this purpose fifty male students from MATS University Raipur, CG, who had participated in Inter-university and as well as in state championship were selected as the subject for this study. All subjects were practicing regularly and related from different team games like Hockey, Football, volleyball, basketball and handball. Their age ranged from 23 to 27 year old., Their age ranged from 23 to 27 year old, the study was confined to the selected motor fitness components namely Muscular Endurance, Speed, and Agility. The data of selected subject for motor fitness components (muscular endurance, speed, and Agility) were recorded by different measures, for muscular endurance, speed and Agility, data were observed by performing the 600 meter run/walk, 50 meter dash and Shuttle Run.

4. STATISTICAL METHOD

The Descriptive statistics and one-way analysis of variance (ANOVA) were applied to finding out the difference in selected motor fitness components at 0.05 level of significance among different Match Practice Group of different Team Games.

5. FINDINGS

After collecting the data of selected motor fitness components of different match practice group players, score of each category of subjects were subjected of F analysis of variance (ANOVA) and LSD test applied for finding out the critical difference in mean performance of selected motor fitness components among different match practice groups. The findings are presented in Tables.

Table 1: Descriptive and One Way Analysis of Varience of Motor Fitness Component (Muscular Endurance) among Selected Sport Groups

Descriptive Analysis

Variables	Groups	N	Mean	Standard Deviation
Muscular endurance	Hockey	10	1.46	0.034
	Football	10	2.49	0.124
	Volleyball	10	2.40	0.234
	Basketball	10	2.10	0.231
	Handball	10	2.25	0.091
	Total	50	2.14	0.401

ANOVA

Variable	Sources of Variance	Sum of Squares	Degree of Freedom	Mean Square	F
Muscular Endurance	Between Groups	6.694	4	1.674	62.665
	Within Groups	1.202	45	0.027	
	Total	7.896	49		

*Significant at 0.05 level.

Tab $F_{.05}(4,45)= 2.58$

Here Cal F>Tab $F_{.05}$

The table shows that there is significant difference found between the mean value of motor fitness components (Muscular Endurance) among selected sport groups.

Table 2: Least Significant Difference (Post Hoc Test) for Mean of Motor Fitness Component (Muscular Endurance) Among Selected Sport Groups

Hockey	Football	Volleyball	Basketball	Handball	Mean Difference	CD at 0.05 level
1.46	2.49				-1.034*	0.066
1.46		2.39			-0.939*	
1.46			2.10		-0.645*	
1.46				2.25	-0.796*	
	2.49	2.39			0.095*	
	2.49		2.10		0.389*	
	2.49			2.25	0.238*	
		2.39	2.10		0.294*	
		2.39		2.25	0.143*	
			2.10	2.25	-0.151*	

*Significant at 0.05 level of confidence.

The table shows that there is significant difference found between the mean value of motor fitness components (muscular endurance) among selected sport groups.

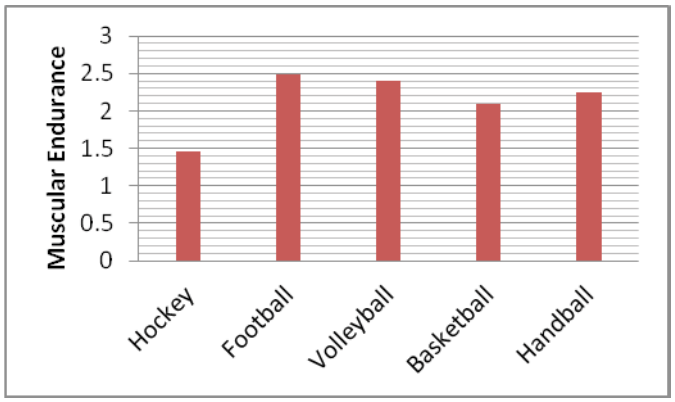

Figure 1: Motor Fitness Component (Muscular Endurance) among Selected Sport Groups

Table 3: Descriptive and One Way Analysis of Varience of Motor Fitness Component (Speed) among Selected Sport Groups Descriptive Analysis

Variables Groups		N	Mean	Standard Deviation
Speed	Hockey	10	5.46	0.295
	Football	10	5.62	0.456
	Volleyball	10	5.50	0.374
	Basketball	10	5.22	0.187
	Handball	10	5.65	0.427
	Total	50	5.49	0.379

ANOVA

Variable	Sources of Variance	Sum of Squares	Degree of Freedom	Mean Square	F
Speed	Between Groups	1.164	4	0.291	2.227
	Within Groups	5.881	45	0.131	
	Total	7.045	49		

*Significant at 0.05 level.

Tab $F_{.05}(4,45)= 2.58$

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The table shows that there is insignificant difference found between the mean value of motor fitness components (Speed) among selected sport groups.

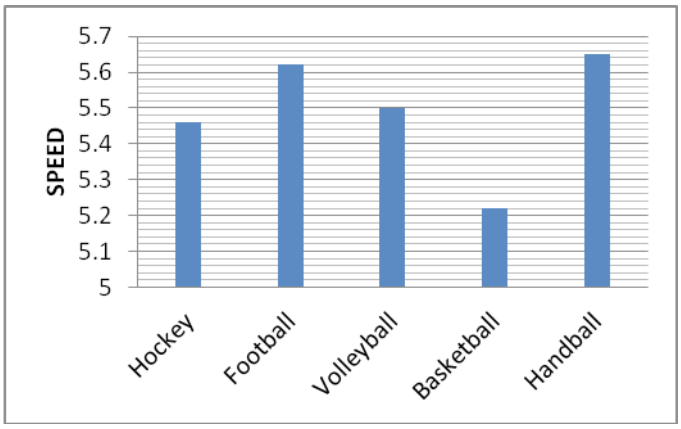

Figure 2: Motor Fitness Component (Speed) among Selected Sport Groups

Table 4: Descriptive and One Way Analysis of Varience of Motor Fitness Component (Agility) among Selected Sport Groups

Descriptive Analysis

Variable Groups		N	Mean	Standard Deviation
Agility	Hockey	10	6.96	0.607
	Football	10	6.81	0.570
	Volleyball	10	6.45	0.287
	Basketball	10	7.20	0.371
	Handball	10	6.89	0.530
	Total	50	6.86	0.529

ANOVA

Variable	Sources of Variance	Sum of Squares	Degree of Freedom	Mean Square	F
Agility	Between Groups	2.971	4	0.743	3.104
	Within Groups	10.767	45	0.239	
	Total	13.738	49		

*Significant at 0.05 level.

Tab $F_{.05}(4,45)= 2.58$

Here Cal F>Tab $F_{.05}$

The table shows that there is insignificant difference found between the mean value of motor fitness components (Agility) among different match practice group.

Table 5: Least Significant Difference (Post Hoc Test) for Mean of Motor Fitness Component (Agility) among Selected Sport Groups

Hockey	Football	Volleyball	Basketball	Handball	Mean Difference	CD at 0.05 level
6.96	6.81				0.150*	
6.96		6.45			0.510*	
6.96			7.20		-0.240*	
6.96				6.89	0.070	
	6.81	6.45			0.360*	**0.195**
	6.81		7.20		-0.390*	
	6.81			6.89	-0.080	
		6.45	7.20		-0.750*	
		6.4		6.89	-0.440*	
			7.20	6.89	0.310*	

*Significant at 0.05 level

The table shows that there is significant difference found between the mean value of motor fitness components (Agility) among different match practice group.

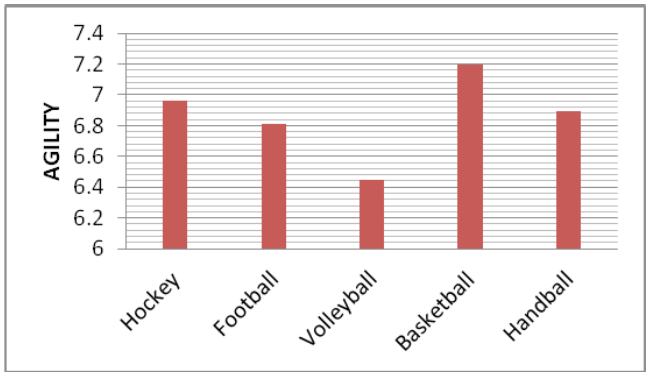

Figure 3: Motor Fitness Component (Agility) among Selected Sport Groups

6. DISCUSSION

The analysis of data reveals that there is insignificant difference in speed between different match practice groups were obtained. The insignificant difference may be due to the type of test selected. Usually hockey players, football players, volleyball players, basketball players and handball players are employ same type of speed of movement while taking part in a game.

A significant difference in muscular endurance between hockey and football, hockey and volleyball, hockey and basketball, hockey and handball, football and volleyball, football and basketball, football and handball, volleyball and basketball, volleyball and handball and basketball and handball were obtained.

A significant difference in agility between hockey and football, hockey and volleyball, hockey and basketball, football and volleyball, football and basketball, football and handball, volleyball and basketball, volleyball and handball and basketball and handball were obtained.

An insignificant difference in agility between hockey and handball was also obtained.

7. CONCLUSION

With the limitations of the study it may be concluded that, there was no significant difference found between the different match practice groups i.e. Hockey, Football, Basketball, Volleyball, and Handball in relation to their motor fitness component (speed) and there was also no significant difference found between the hockey and handball in relation to their motor fitness component (agility).

On the other hand there was significant difference found between the different match group i.e. Hockey, Football, Basketball, Volleyball, and Handball in relation to their muscular endurance and agility (accept hockey and handball), when the subjects were involved in similar type of daily routine.

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The Effects of Zumba Fitness Program on Changes of Body Mass Index and Weight

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Abstract:
The aim of this research was to determine the effects of Zumba fitness program on changes of Body Mass Index and Weight of 30 sedentary people aged 20 to 45 years, participated in the conducted Research. The effect of Zumba fitness program was analysed after two weeks of Zumba fitness Training. There were ten experimental training sessions. Body Weight, Height were measured at the beginning and at the end of the Zumba fitness training. The effects of experimental training were analyzed by using Paired sample 't' test. The obtained result showed that Zumba fitness program achieved statistically significant improvement in total Body Mass index and Body Weight loss (P>0.05). The results of the study clearly reveals that the Zumba fitness exercise can be used as effective group fitness exercise for the change in Body Mass Index and Weight of sedentary people.

Keywords:
Zumba, Body Mass Index, Weight

1. INTRODUCTION

Zumba fitness has quickly grown to one of the most popular group exercise classes on the planet. In fact, the Latin-dance inspired workout is reportedly performed by more than 12 million people at 110,000 sites, in 125 countries around the world.

"Ditch the Workout–Join the Party!" That's the marketing slogan for Zumba fitness, which attracts exercisers with a fun fusion of dance moves from styles like Salsa, Merengue, Reggaeton and Flamenco, and the sort of choreography you might see in a nightclub.

The craze now known as Zumba fitness is said to have started as a mistake by Colombian trainer Alberto "Beto" Perez.(Perez, B., & Greenwood-Robinson, M.; 2009). One day in the mid-90s, Beto reportedly forgot to bring his regular aerobics-style music tape to the group exercise class he was leading. With no music and a class to teach, he raced back to his car and scrounged up a cassette tape of Latin dance music. As the lively beats of Merengue and Rumba rang out, Beto drew upon his experience dancing in Salsa clubs and choreographing for local artists. Soon he was leading his pupils through a fun series of dance steps—and Rumbacize was born. It was an instant hit, and quickly became the most popular class at his gym. In 1999, Beto brought Rumbacize with him when he moved to Miami. It immediately caught on there as well and, with the help of a pair of entrepreneurs, Beto rebranded his class and transformed it into the global franchise that is Zumba fitness today.

Just because Zumba fitness is fun, however, doesn't necessarily mean it's an effective workout. Despite its immense popularity, to date very little research has been done to document the potential benefits of this form of aerobic dance. So the American Council on Exercise, the nation's Workout Watchdog, commissioned Dr. Porcari and his team of exercise scientists to determine whether Zumba fitness provides a workout, a party or both.

This modern approach of fitness exercising satisfies goals such as harmony of the body, improving posture and strengthening bone-joint segments of the locomotors apparatus (Furjan-Mandic, Kosalec, & Vlasic, 2011). The researches confirm that the implementation of various forms of group fitness program contributed to statistically significant effects in improving functional and motoric abilities of a woman (Mandaric, Sibinovic, Mikalacki, & Stojiljkovic, 2011; Oreb, Matkovic, Vlasic, & Kostic, 2007; Park, Park, Kwon, Yoon, & Kim, 2003; Sebic, Sahat, Zukovc, & Lukic, 2012), and changes in women body composition,

as well (Donges, Duffield, & Drinkwater, 2010; Stasiulis, Mockiene, Vizbaraite, & Mockus, 2010; Wong et al., 2002). Also, the latest researches separate dance aerobic as the most effective group fitness program (Hiznayova, 2013; Oreb, Matkovic, Vlasic, & Kostic, 2007; Kostic, Đuraskovic, Miletic, & Makalcki, 2006; Kostic & Zagorc, 2005; Luettgen, Foster, Doberstein, Mikat, & Porcari, 2012; Stoiljkovic, Mandaric, Todorovic, & Mitic, 2010; Viskic-Stalec, Stalec, Katic, Podvorac, & Katovic, 2007) which through motivating music implement creative choreography primarily aimed to entertain the trainees. This was the prime reason for the researcher to undertake this study

2. SUBJECTS

The subjects in this study were 30 sedentary individuals, age ranging from 20 to 45 years old. They did not have any cardio vascular disease, orthopedic injuries or back injuries that would prevent them from participating safely in any fitness program.

3. METHODS

The study was conducted on a sample of 30 aged 20 to 45, who participated in all training sessions during Two weeks of implementation of Zumba fitness program. During this research they did not practice any other kind of physical exercises. They were measured before and after the implementation of Zumba fitness program. Testing was performed in a Fitness Centre where the temperature was about 20°C. All 10 zumba training sessions were performed by a certified Zumba instructor. The basic descriptive statistic parameters were calculated for body weight and BMI (ht and wt).

4. ZUMBA FITNESS PROGRAM

Zumba fitness exercise was perfomed five times per week in the evening. Each Zumba training (60 minutes) contained basic principles of Zumba excercise: warm-up, main part of the workout (Zumba party section), cool down and stretching (Perez & Greenwood-Robinson, 2009). Exercise intensity is determined by the tempo of the music that changed during training sections. Warm up contained basic dance steps (march, step touch, side to side etc.) with gradually accelerating tempo of music (120-135 bpm), without leaps and jumps. In the second part of the warm-up the muscle toning exercises were performed with soft intensity through dance variations, slightly squats were allowed (tempo 125-140 bpm). The goal of warming up was to increase body temperature, muscle blood flow, joint mobilization and the psychological preparation, as well. Total warm-up time was 8-10 minutes (tempo 120-140 bpm). The main part of the Zumba training was performed with 8-10 original Zumba fitness songs. The dance choreographies and movements intensity was created in accordance with tempo changing of music (tempo between 140-160 bpm). All Latin American dance choreographies (merengue, salsa, samba, belly dance, cha cha cha, tango etc.) with their differences in character and dynamics of movement (Lukic, 2006) provide

dosing of exercise intensity. Each dance lasts 3-5 minutes, with pause of 15-30 sec. The aim of the main part of the training is that trainees enjoy the music and dance, and practice at the same time. Cool down as the final part of the training contained easy dance movement with soft music with mental and physical relaxing purpose. Stretching was performed for muscle relaxation, as also to prevent muscle soreness and increase body flexibility. There were not any jumps or squats allowed, and all the movements could be performed in standing, sitting or lying position (tempo of music-100 bpm). When program was constructed it was considered that intensity of exercising can be changed according to previous adaptability. The intensity of exercise is dosed by using toning sticks (Zumba toning program) as well as by changing character of the dance moves in presented choreographies.

5. DATA ANALYSIS

Data gathered during this research were analyzed using statistic programs for personal computers IBM SPSS 20.0. for Windows. For analysis of basic statistic data and distribution of results on initial and final measurement, basic descriptive parameters were calculated: arithmetic mean, minimal value, maximal value, standard error mean, standard deviation. The effects of applied training were analyzed using Paired sample 't' test. The level of statistical significance was set at $p<.05$.

6. RESULTS

Descriptive statistics in Table 1 indicates changes of values in all tested parameters after two weeks of training Zumba fitness program. On average, the body weight was reduced by 1.82 kg. The results indicate that there are statistically significant differences between initial and final measurements in parameters: body mass index and weight

Table 1

GROUPS	MEAN	S.D.	MEAN DIFF.	S.E. DIFF	'T' RATIO
Weight (Pre)	70.1933	15.26883	1.8233	.19296	9.449*
Weight (Post)	68.3700	15.23083			
BMI (Pre)	26.2273	4.68685	0.6743	.08239	8.185*
BMI (Post)	25.5530	4.61332			

*Significant at 0.05 level

*'t' value required to be significant at 0.05 level of confidence with 29 degree of freedom was 2.045.

7. DISCUSSION

Obviously, applied zumba fitness program has caused statistically significant changes in body mass index of the sedentary individuals. The changes are reflected primarily on reduction of body mass index ($p<0.05$), Body weight was decreased on average for 1.82 kg. Similar results were obtained in the studies of Barene, Krustrup, Jackman, Brekke, and Holtermann (2013) who investigated the effects of twelve-week Zumba fitness program at the percentage of fat mass and the total amount of fat mass, in a sample of women employed in the health sector. They practised 2 to 3 hours a week. The results showed that the group that exercised Zumba fitness reduced total body fat mass (-0.6kg; $p<.05$) in comparison to the control group. In generally, Zumba fitness training program outside of working hours can lead to certain health benefits for women employed in health care. The Zumba fitness exercise, among other things, is based on the variety of Zumba programs (Zumba classic, Zumba gold, Zumba toning, Zumba sentao, Zumba kids, etc.) in which the complexity of dance choreographies and intensity of exercise are adapted to age and the goals that want to be achieved by practicing.

The research showed high efficiency of Zumba fitness training program on the reduction of body mass index, which is very important since it is the common motive for joining group fitness programs. The uniqueness of Zumba

fitness exercising is in the variety of Latin dance choreographies and dynamic music that create an atmosphere of fun (zumba party) in which trainees forget they are practicing.

This approach to exercise enables long-lasting interest and continuous exercising. It would be interesting to examine the effects of Zumba fitness program on the reduction of body fat of individual body segments observed over the long period and continuous exercise (at least 3x per week), or to compare the effectiveness of applying Zumba fitness program compared to the other group fitness programs. It should be noted that researches about the effects of Zumba fitness exercise are rare compared to studies of other aerobic exercise. This is because the Zumba fitness is the latest "hit" that appeared in the domain of aerobic exercise and that its actual effects on different populations and for different purposes are yet to be examined. This paper is a contribution to the clarification of its actual effectiveness on sedentary individuals who are either obese or at the verge of getting obesed.

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Comparative Study of Cardio-Pulmonary Index of Basketball and Handball Players

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Abstract:
The purpose of the study was to determine differences of the Cardio-pulmonary Index between Basketball and Handball players. Eighteen Basketball and Eighteen Handball players total (36) district level players of Guwahati District (Assam) age ranging from 16 to 18 years were selected as the subjects. The Cardio-pulmonary Index was measured by employing the Hyman's Cardio-pulmonary Index test. The collected data were analyzed statistically through T-test and the level of significant was observed at 0.05 level of confidence.

1. INTRODUCTION

Sports by their very nature are enjoyable, challenging all observing and require a certain amount of skill and physical conditions which are basically based on one's endurance.

Fitness is a prerequisite for exhibiting better performance in all games and sports. A fit player or athlete can delay onset of fatigue during a match or competition. The more tired a player is, the more prone he is to making errors, and a player who makes a lot of errors will often shape his confidence, which all player need to perform well.

The sports like Basketball and Handball require Cardio-respiratory endurance besides rest of the other components of physical fitness in general and the motor fitness in particular. The lack of such endurance causes the set of early fatigue, which is mainly responsible for the decrease in other performance traits such as strength, coordination, basic skills, power, and speed of movement besides to large extent cardio-respiratory endurance.

2. METHODOLOGY

To conduct the present study 18 basketball and 18 handball district level players age ranging from 16-18 years of Guwahati district were selected as the subjects. To measure the cardio-pulmonary index of both the group, Hyman's Cardio-pulmonary Index test was used. The collected raw data were converted in to standard t-score for statistical analysis. To determine the differences between two groups the t-test statistical technique was employed and the level of significance was observed at 0.05 level of confidence.

3. RESULT AND DISCUSSION

Table 1: Difference between the Means of Performance Scores of C.P.I. of Basketball and Handball Players

Groups	Mean	D.F.	Mean Diff.	S.E.	t-ratio
Basketball Players	15.036	34	2.439	0.955	2.55*
Handball Players	12.597				

*Significant at 0.05 level of confidence, Tabulated $t_{(0.05, 34)} = 2.03$

From Table 1 it is learned that there are significant difference of Cardio-pulmonary (C.P.I.) between Basketball and Handball players as the obtained t-value of 2.55 is greater than the tabulated $t_{(0.05, 34)}$ value of 2.03 at 0.05 level of confidence

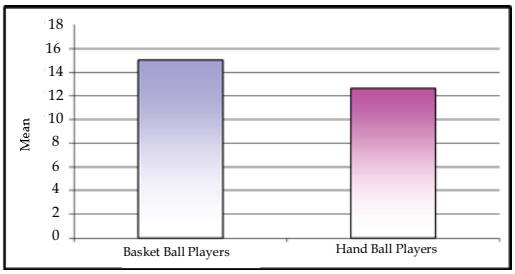

Figure 1: Difference between the Means of Performance Scores of C.P.I. of Basketball and Handball Players

4. DISCUSSION OF FINDINGS

From the above table it is revealed that there is significant difference in the Cardio-pulmonary Index of the Basketball and Handball players. Basketball players are found to be better as compared to Handball players. The probable reasons might be because of nature and characteristics of both the game. In both the game the players have to execute faster movements. While performing the movements there were rapid physiological changes. As the oxygen is the main fuel of performance the Cardio-pulmonary index may perhaps be affected.

5. CONCLUSION

On the basis of statistical findings it was conclude that there was a significant difference in Cardio-pulmonary Index (CPI) ($t_{(0.05, 34)} = 2.55 > 2.03$). It was also further concluded that the Basketball player have the better CPI than Handball player (m= 15.036> 12.597).

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Relationship of Achivement Motivation and Will to Win to the Performance of Jumpers

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1. INTRODUCTION

Motivation is the basic drive for all of our actions. Motivation refers to the dynamics of our behavior, which involves our needs, desires, and ambitions in life. Achievement motivation is based on reaching success and achieving all of our aspirations in life. Achievement goals can affect the way a person performs a task and represent a desire to show competence (Harackiewicz, Barron, Carter, Lehto, & Elliot, 1997).

Will to Win (WW; Pezer & Brown, 1980). The WW reflects the athlete's desire to reach some standard of excellence or to defeat an opponent. Winning is extremely important for those who are characterized by this trait. The objective outcome (i.e., score, time, distance, etc.) is less important than the win itself. The measurement concept was derived from the need to develop a sport specific tool that relies on the "person by situation" approach in psychology. To operationally define the desire to win, items consist of emotions associated with winning and losing.The purpose of the study was to find out the relationship of achievement motivation and will to win to the performance of Jumpers.

2. METHODOLOGY

For this Purpose 30 Male Inter-university level Jumpers were selected as the subject of the study. The variables under investigation were achievement, motivation, will to win and performance in their respective event that is Long Jump , High Jump and Triple Jump. It may hypothesize that there will be no significant relationship of achievement motivation, will to win and performance of sprinters. The questionnaire method was adopted for seeking the response on achievement motivation of Ray-Lynn "AO" scale (Ray, 1979) and will to win of Pezer, V., & Brown, M. (1980) and the performance was taken by the Time trial of their respective events. Pearsons product moment correlation was used to find out the correlation of achievement motivation, will to win to the performance of Jumpers.

3. RESULTS

Analysis of data revealed that correlation between Achievement motivation and performance is 0.53 Which is significant at 0.05 level with df= 29. As the value is greater than tabulated $r_{0.05}$ (29) = 0.36. Also, the correlation between will to win and performance is also significant at 0.05 level as the value 0.46 is also greater than the tabulated value.

Table 1: Correlation Co-efficient of Achievement Motivation and will to Win to the Performance of Jumpers

S. No.	Variables	Co-efficient of Correlation
1.	Achievement Motivation	0.53
2.	Will to win	0.46

Tab $r_{.05}(29)= 0.36$

4. CONCLUSION

The findings revealed that significant relationship exist between achievement motivation and performance. However significant relationship also exists between will to win and performance of Jumpers. It may further be concluded that achievement motivation and will to win has significant relationship to the performance of the Jumpers. This may be attributed to the fact that Achievement motivation and will to win are the Key Psychological variables responsible for better performance of Jumpers belonging to Long Jump, High Jump and Triple Jump.

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Effect of Maximal and Supramaximal Training on Anaerobic Ability of Sprinters

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Abstract:
The present study was to determine the effect of maximal and supramaximal training on the anaerobic ability. The subjects were sixty male sprinters of 18 to 25 years of age, from L.N.U.P.E., Gwalior. The subjects were randomly selected and were assigned to two experimental groups i.e. maximal and supramaximal groups and control group, with 20 subjects in each group. The training was given for a period of 12 weeks. The two experimental groups were trained upto six days in a week, while the control group continued with their daily routine work. The selected variables were the performance of subjects in to cover distance of 50 meters. The pre- and post-test were conducted. After the collection of data, analysis of covariance was used to identify significant difference between the groups. The LSD post hoc test was used to identify significant differences between the training programmes. The level of significance was set at 0.05.

Keywords:
Maximal , Supramaximal, Speed

1. INTRODUCTION

Training in games and sports is no longer a myth and does not have a casual approach; it provides opportunities for scientific process and verification. Training has been accepted as a highly specialized science.Training is not a recent discovery. In ancient times, people systematically trained for military and Olympic endeavours. Today athletes prepare themselves for a goal through training. Speed plays a vital role for sprinters to give performance. They must possess acceleration speed, speed of movement and reaction time. The contribution made by reaction time to performance is still not very certain. There is no doubt regarding the contribution of acceleration speed, sprinting speed and speed of movement to bring about better performance on the part of sprinters. Therefore, to optimum performance in activities, where the speed is the main factor, acceleration speed, sprinting speed, speed of movement and reaction time should move together

2. OBJECTIVES OF THE STUDY

1. To find out the effect of maximal training on speed.
2. To find out the effect of supramaximal training on speed.

3. METHODOLOGY

The subjects for this study were selected from the Lakshmibai National University of Physical Education, Gwalior. Sixty-seven male athletes, who had participated in inter-university and state level competitions ranged from 18–25

years of age, were selected for the experimental programme utilizing the purposive sampling technique. A medical examination of the subjects was carried out in order to check the fitness of the subjects. Four subjects from the supramaximal group, two from the maximal and one from the control group discontinued due to injury during the course of training. So out of sixty subjects, twenty each were selected on random basis for maximal training, supramaximal training and control group.Keeping in mind the feasibility criteria and specific purpose of the study. Speed was measured by the time taken to cover a distance of 50 meters.Pre-test and post-test randomized group design was employed in this study; both subjects as well as the experimental treatments were randomly assigned to the two experimental groups and one control group. The initial tests were conducted, followed by 12-weeks of selected training programmes. After completion of the experimental period, the final tests were conducted.In order to find out the effect of maximal and supramaximal training on speed, analysis of co-variance was used. The level of significance was 0.05.

4. RESULTS

In order to determine the significance difference between experimental groups and control group, the pre test and post test scores were collected. The initial and final test scores were analysed using ANCOVA. The results of the study are presented in tables and figure for each selected parameter of speed are shown.

Table 1: Descriptive Statistics Showing Mean And Standard Deviation Of 50 Meters Performance Of Different Groups

S. NO.	Group	N	Mean (sec.)	S.D.
1.	Control	20	6.40	0.06
2.	maximal	20	6.35	0.16
3.	Supramaximal	20	6.10	0.18

Table 1 reveals that the Mean and Standard Deviation of control, maximal and supramaximal were 6.40±0.06, 6.35±0.16 and 6.10±0.18 sec. respectively.

Table 2: Descriptive Statistics Showing the Adjusted Mean and Standard Deviation of 50 Meters Performance of Different Groups

S. No.	Group	Mean (Sec.)	S.D.	95% Confidence Interval	
				Lower Bound	Upper Bound
1.	Control	6.34	0.025	6.29	6.39
2.	maximal	6.33	0.023	6.29	6.38
3.	Supramaximal	6.17	0.026	6.12	6.23

Table 2 indicate the adjusted post mean and standard deviation of control, maximal and supramaximal groups are 6.34±0.025, 6.33±0.023, 6.17±0.026 sec. respectively.

Table 3: Analysis of Co-Variance of Comparison of Adjusted Post Test Means of Experimental Group and Control Group in 50 Meters

	Sum of Squares	*df*	Mean Square	*f*	Sig.
Between the groups	0.262	2	0.131	11.92*	0.00
Error	0.615	56	0.011		

* Significant at 0.05 level.

$f\ 0.05\ (2,56) = 2.39$

$p < 0.05$

Table 3 reveals that there was a significant difference among supramaximal, maximal and control group of 50 meters performance as calculated value (11.92) was more than the tabulated value (2.39) at 0.05 level of significance. Table has further shown that probability error is 0.000 which is $p<0.05$.

Table 4: Comparison of Adjusted Post Test Means of Three Experimental Groups and Control Group in 50 Meters Dash

Group	Group	Mean Difference	Sig.
Control	Supramaximal	0.161*	0.000
	maximal	0.004	0.910
Maximal	Control	-0.004	0.910
	Supramaximal	0.158*	0.000
Supramaximal	Control	-0.161*	0.000
	maximal	-0.158*	0.000

*Significant at 0.05 level.

Table 4 shows adjusted post test means of two experimental groups i.e. maximal , supramaximal and control groups. The adjusted means of maximal , supramaximal and control group were 6.174, 6.335 and 6.332 respectively. The mean difference between maximal and supramaximal group is 0.158 significant $p<0.05$. However, the insignificant difference is obtained between control group and maximal group. As the obtained mean difference is 0.004 where is probability of error $p>0.05$.Table further exhibited the significant difference between supramaximal group and control group as the obtained mean difference is -0.161 against the critical value of 0.049 at 0.05 level. Table has clearly shown that the supramaximal group is significantly superior than the maximal group and control group. However, the maximal and control group has not shown any significant difference.

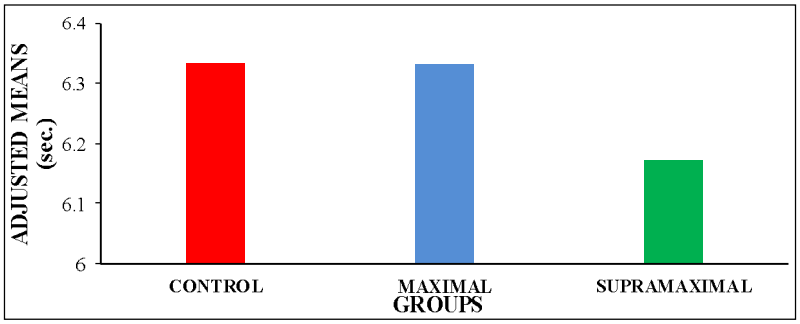

Figure 1: Bar Diagram Showing Descriptive Statistics of Adjusted Means of Different Groups of 50 Meters

5. DISCUSSION OF FINDING

The results, in general, show that maximal and supramaximal training improve speed. It was found that the experimental groups improved significantly. No significant differences were found in the control group. The results show, that the subjects who followed the treatment of maximal and supramaximal training improved their speed.

Billat (2001) also suggested that both the anaerobic pathways – lactic (glycolysis) and alactic (CP degradation) are activated instantaneously at the onset of maximal activity. The subjects having gone through supramaximal training, improves tolerance of blood lactate level by lowering down the pH values as compared to maximal training. It might be due to the fact that supramaximal training improves the body's capacity for acid-base regulation by enhancing chemical buffers (Mc Ardle, Catch and Catch, 1996).

6. CONCLUSION

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

1. Twelve-week maximal and supramaximal training programmes are useful to improve the speed.
2. The supramaximal training programme has a greater effect in comparison to maximal training programme on the speed.

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A Comparative Study of Bandhas on Selected Physiological Variables

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Abstract:
The purpose of the study was to compare the effect of Jalandhara Bandha & Uddiyana Bandha on selected physiological variables. For this study thirty female subject from Agra city, were randomly selected as subjects. Further the subjects were divided into three groups i.e. two experimental group was administered with Jalandhara bandha, second group was given Uddiyana Bandha and control group did not participate in training programme. The quantitative measurement of each subject were taken with the help of standard equipment, before and after the treatment period of twelve weeks.The selected physiological variables were vital capacity, peak Flow rate, Maximum Breath Holding Time and Resting blood Pressure were administered in the lab of B.V.R.I. Bichpuri, Agra. The respint Blood Pressure was measured to nearest 1.0 mm of Hg with the help of Sphygmomanometer. Wet spirometer was used to obtain the subjects Vital Capacity and the score was in litre. Peak Flow Rate was recorded to the nearest litre per minute with the help of Peak Flow Meter. Maximum Breath Holding Time was recorded to the nearest second by using stop watch. The random group design was adopted to the nearest second by using stop watch. The random group design was adopted for the purpose of the study. Analysis of co-variance was applied for the effect of Jalandhara Bandha & Uddiyana Bandha on physiological variables.The analysis of covariance revealed that practice of Jalandhara bandha & Uddiyana Bandha had differential effect on Vital Capacity (F=12.964, against required value of 3.37), Peak Flow Rate (F= 10.528, against required value of 3.37), Positive Breath Holding Time (F = 28.915, against required value of 3.37), Negative Breath Holding Time (F= 78.285, against required value of 3.37), Systolic Blood Pressure (F=19.990, against required vale of 3.37), diastolic Blood Pressure (F=65.324, againstrequired value of 3.37).

1. INTRODUCTION

Today yoga being a subject of varied interests, has gained worlds wide popularity. Recent research trends have shown that it can serve as an applied science in a number of field such as education, Physical education and sports. Health and family welfare, psychology and medicine and also one of the valuable means for the development of human resources for better performance and productivity. However, there exists controversy in accepting yoga as medicine and therapy because it has generally been believed that yoga is spiritual science having emancipation as it goal and hence can not be treated only as a therapy. It is now being realized in all parts of the globe that yoga is not only for better development of mind, socio-control, spiritual, moral but also a therapy. As per shiv samihita, shiva says, " I have studied all religious and given the best out of them as yoga and in relation to pranayam of the breath control, he says, if you control your, you control the mind and if you control the mind you control the breath."

Pranayama is a Science of Respiration. It Consists of there Phases Purack, Kumbhak, Rechak.It is an admitted physiology fact that the ordinary act of respiration involves, appreciable changes in the pressure condition, obtainable in the lungs, in the thorax and in the abdomen. If the respiration is made deepar, the pressure changes

become considerable and under particular circumstances these changes are observed to be remarkably great. Pranayama is a yogic exercise in respiration. It is therefore, desirable that a student of pranayama is acquainted with some important details of the respiratory system. Hence, we propose to describe in this chapter a few broad features of the anatomy and physiology of respiration.

The word bandha means 'to lock', 'to hold', 'to tighten'. There were only three bandhas and they are related to the three psychic knots, or granthis, in our personality.Brahma granthi is the first knot,or psychic block, where energy and consciousness interact and meanifest in a certain way. It is supposed to be the lowest knot, covering the areas of mooladhara and swadhisthana chakras. It is also known as the perineal knot and is awakened and stimuiated by the practice of moola bandha.Vishnu granthi is the second knot and covers the areas of manipura, anahata and vishuddhi chakras. It is also known as the navel knot and is activated by the practice of Uddiyana bandha. Rudra granthi is the third knot and covers the areas of ajna and sahasrara chakras. It is also known as the neck knot and is activated by the practice of jalandhara bandha.

1.1. STATEMENT OF THE PROBLEM

The Purpase of the study was to Investigate the comparative effect of jalandhara bandha and uddiyana bandha on selected physiological variables.

1.2. HYPOTHESIS

It was hypothesized that there will be significant defference between jalndhara bandha and uddiyana bandha practices of selected physiological variables.

1.3. SELECTION OF SUBJECTS

Thirty female subjects was selected randomly from Agra city. The age of the subjects ranges from 40-50 years.

Further there groups i.e. two experimental groups and one control group(each of students) was randomly selected from the selected subjects.

1.4. SELECTION OF VARIABLES

The following physiological variables was chosen for the study:

1. Vital capacity
2. Peak flow rate
3. Maximum Breath holding time
   a. Positive holding time
   b. Negative holding time
4. Resting blood pressure
   a Systolic blood pressure
   b Diastolic blood pressure

2. METHODOLOGY

2.1. COLLECTION OF DATA

The data for the purpose of the study was collected in the research Lab of B.V.R.I.Bichpuri, Agra. The data was collected before the start of the experiment (I .e pre test) and of training period (i. e . post test).

2.2. EXPERIMENTAL DESIGN

Random group design was utilized for the purpose of the study.

2.3. ADMINISTRATION OF TESTS

The test was administered in the research research Lab of B.V.R.I.Bichpuri, Agra with the help of a team of tester and research assistant under the guidance and supervision of the experts. Different stations of testing was arranged in sequence so that the subjects move from one testing station to the other one by one. After taking rest for some time in a room by the side of the testing room.

2.4. STATISTICAL TECHNIQUE

In order to study the comparative effect of jalandhara and uddiyana bandha on selected physiological variables, analysis ofd covariance was applied at significance level of 0.05. further, to see the significance difference between group means and least significant difference post Hoc test of significance was applied.

3. ANALYSIS OF DATA & FINDINGS

Finding of the research study related to selected physiological variables and discussion of the findings have been presented below:

3.1. VITAL CAPACITY

The result pertaining to vital capacity are presented in Table 1 and 1.1.

Table 1: Analysis of Covariance for Vital Capacity

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	2.51	2.04	2.50	A.G.	2	1.442	0.721	3.248
				W.G	27	5.993	0.222	
Post test means	2.76	2.60	2.74	A.G	2	0.152	0.076	0.378
				W.G.	27	5.428	0.201	
Adjusted Post test means	2.614	2.884	2.603	A.G.	2	0.409	0.204	12.964
				W.G.	26	0.410	0.016	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 1 of analysis of covariance for vital capacity for jalandhara, Uddiyana and control groups indicates insignificant f-ratio of 3.248 and 0.378 for the pre test and post test means respectively . However, the f-ratio for the adjusted post test means reveals a value of 12.964 which was significant for being greater than required f-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test means of jalandhara, uddiyana and control groups in vital capacity.

Table 1.1: Paired Adjusted Final Means and Difference between Means of Three Different Group of Vital Capacity

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
2.614	2.603		0.011	0.116
2.614		2.884	-0.270	0.116
	2.603	2.884	-0.281	0.116

Table 1.1 indicates that the difference betbeen the paired adjusted final means of jalandhara, uddiyana and control group in vital capacity reveals significant value of-0.270 and-0.281 gain which emphasized mean value observed for jalandhara and uddiyana group as compared to the control group.

3.2. PEAK FLOW RATE

The result pertaining to peak flow rate are presented in Table 2 and 2.1.

Table 2: Analysis of Convariance for Peak Flow Rate

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	4.03	4.12	3.96	A.G.	2	0.129	0.064	0.122
				W.G	27	14.261	0.528	
Post test means	4.16	4.29	4.00	A.G	2	0.422	0.211	0.418
				W.G.	27	13.613	0.504	
Adjusted Post test means	4.166	4.209	4.075	A.G.	2	0.094	0.047	10.528
				W.G.	26	0.115	0.004	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 2 of analaysis of covariance for peak flow rate for jalandhara, uddiyana and control group indicates insignificant F-ratio of 0.122 and 0.418 for the pre test and post test mean respectively. However, the F-ratio for the adjusted post test means reveals a value of 10.528 which was significant for being greater than required F-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test mean of jalandhara, uddiyana and control group in peak flow rate.

Table 2.1: Paired Adjusted Final Means and Difference between Means of Three Different Groups of Peak Flow Rate

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
2.6144.209	4.166		0.042	0.0575
4.209		4.075	0.134	0.0575
	4.166	4.075	0.092	0.0575

Tabie 2.1 indcates that the difference betbeen the paired adjusted final means of jalandhara, uddiyana and control group in peak flow rate reveals significant value of 0.134 and 0.092 gain which emphasized means value observed for jalandhara and uddiyana group as compared to the control group.

Adjusted post test means of jalandhara, uddiyana and control group in resting respiratory rate.

3.3. MAXIMUM BREATH BOLDING TIME (POSITIVE AND NEGATIVE)

The result pertaining to breath holding time (positive and negative) are presented in table 3.0, 3.1, 4.0 and 4.1

Table 3: Analysis of Convariance for Positive Breath Holding Time

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	52.4	37.9	37.5	A.G.	2	1441.400	720.700	2.630
				W.G	27	7397.800	273.993	
Post test means	54.3	40.1	37.7	A.G	2	1609.867	804.933	2.911
				W.G.	27	7465.100	276.485	
Adjusted Post test means	44.462	44.818	42.820	A.G.	2	22.219	11.109	28.915
				W.G.	26	9.989	0.004	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 3 of analysis of covariance for positive breath holding time for jalandhara, uddiyana and control group indicates insignificant F-ratio of 2.630 and 2.911 for he pre test and post test means respectively. However, the F-ratio for the adjusted post test means reveals a value of 28.915 which was significant for being greater than required F-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test means of jalandhara, uddiyana and contrpl group in positive breath holding time.

Table 3.1: Paired Adjusted Final Means and Difference Between Means of Three Different Groups of Positive Breath Holding

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
44.818	44.462		0.356	0.569
44.818		42.820	1.998	0.569
	44.462	42.820	1.642	0.569

Table 3.1 indicates that thedifference betbeen the paired adjusted final means of Jal;andhara, Uddiyana and Control group in positive Breath Holding Time reveals significant value of 1.998 and 1,642 which emphasized greater means value observed for jalandhara and Uddiyana group as compared to the control group.

Table 4: Analysis of Covariance for Negative Breath Holding Time

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	34.6	29.2	27.3	A.G.	2	286.867	143.433	1.486
				W.G	27	2606.100	96.522	
Post test means	36.6	32.0	27.5	A.G	2	414.067	207.033	2.232
				W.G.	27	2504.900	92.774	
Adjusted Post test means	32.455	33.142	30.503q	A.G.	2	36.570	18.285	78.285q
				W.G.	26	6.073	0.234	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 4 of analysis of covariance for Negative Breath Holding Time for Jalandhara, Uddiyana and control group indicates insignificant F-ratio of 1.486 and 2.232 for the pre test and post test means respectively. However, the F-ratio for the adjusted post test means reveals a value of 78.285 which was significant for being grater than required F-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test means of Jalandhara, Uddiyana and Control group in Negative Breath Holding Time.

Table 4.1: Paired Adjusted Final Means and Difference Between Means of Three Different Groups of Negative Breath Holding

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
33.142	32.455		0.688	0.444
33.142		30.503	2.640	0.444
	32.455	30.503	1.952	0.444

Table 4.1 indicates that the difference between the period adjusted final means of Jalandhara, Uddiyana and control group in Negative Breath Holding Time reveals significant value of 0.688 and 0.444 of critical difference value. It is also indicated that the differences between the paired adjusted final scores of Jalandhara, Uddiyana and Control group in Negastive Breath Holding Time reveals the significant value of 2.640 and 1.952 compared to 0.444 and 0.444 of Critical difference respectively and observed greater mean value of Jalandhara and Uddiyana groups compared to the control group.

3.4. RESTING BLOOD PRESSYRE (SYSTOLIC AND DIASTOLIC)

The result pertaining to Resting Blood Pressure (Systolic and diastolic are presented in Table 5.0, 5.1,6.0 and 6.1

Table 5: Analysis of Covariance for Systolic Blood Pressure

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	112.4	114.2	112.1	A.G.	2	25.800	12.900	0.186
				W.G	27	1870.900	69.293	
Post test means	110.6	112.2	112.4	A.G	2	19.467	9.733	0.148
				W.G.	27	1776.400	65.793	
Adjusted Post test means	111.084	110.942	113.174	A.G.	2	31.065	15.533	16.990
				W.G.	26	23.769	0.914	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 5 of analysis of covariance for Systolic Blood Pressure for Jalandhara, Uddiyana and control group indicates insignificant F-ratio of 0.186 and 0.148 for the pre test and post test means respectively. However, the F-ratio for the adjusted post test means reveals a value of 16.990 which was significant for being grater than required F-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test means of Jalandhara, Uddiyana and Control group in Systolic Blood Pressure.

Table 5.1: Paired Adjusted Final Means and Difference between Means of Three Different Groups of Systolic Blood Pressure

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
111.084	110.942		0.142	0.879
111.084		113.174	-2.090	0.879
	110.942	113.174	-2.233	0.879

Table 5.1 indicates that the difference between the period adjusted final means of Jalandhara, Uddiyana and control group in Systolic Blood Pressure reveals significant value of-2.090 and-2.233 which emphasized greater means value observed for Jalandhara and Uddiyana group as compared to the control group.

Table 6: Analysis of Covariance for Diastolic Blood Pressure

	Jalandhara Group	Uddiyana Group	Control Group	S.V.	Df	SS	MSS	F-ratio
Pre test means	112.71.7	71.0	72.0	A.G.	2	5.267	2.633	0.072
				W.G	27	990.100	36.670	
Post test means	70.0	69.0	72.3	A.G	2	57.267	28.633	0.770
				W.G.	27	1004.100	37.189	
Adjusted Post test means	69.866	69.569	71.865	A.G.	2	31.078	15.539	65.324
				W.G.	26	6.185	0.238	

$F_{0.05}$ (2,27)=3.35, $F_{0.05}$ (2,26)= 3.37

Table 6 of analysis of covariance for Diastolic Blood Pressure for Jalandhara, Uddiyana and control group indicates insignificant F-ratio of 0.072 and 0.770 for the pre test and post test means respectively. However, the F-ratio for the adjusted post test means reveals a value of 65.324 which was significant for being grater than required F-value of 3.37 at 0.05 level of significance. This indicates there were significant differences from the adjusted post test means of Jalandhara, Uddiyana and Control group in Diastolic Blood Pressure.

Table 6.1: Paired Adjusted Final Means and Difference between Means of Three Different Groups of Diastolic Blood Pressure

Jalandhara	Uddiyana	Control	Mean Difference	Critical Difference
69.886	69.569		0.297	0.448
69.886		71.865	-1.999	0.448
	69.569	71.865	-2.296	0.448

Table 6.1 indicates that the difference between the period adjusted final means of Jalandhara, Uddiyana and control group in Diastolic Blood Pressure reveals significant value of-1.999 and-2.296 which emphasized greater means value observed for Jalandhara and Uddiyana group as compared to the control group.

4. DISCUSSION OF FINDINGS

The result of the study reveals that both Jalandhara Bandha & Uddiyana Bandha had significant effect on the certain selected physiological variables.

Vital capacity was improved by Jalandhara bandha & Uddiyana Bandha practices. This may be due to the reason that Jalandhara as well as Uddiyana Bandha related to the breathing exercise, so it will have significant effect on the lungs volume of an individual. Therefore proposed hypothesis has been accepted in case of Vital Capacity.

The study revealed that Jalandhara Bandha & Uddiyana Bandha resulted into significant improvement in peak Flow rate of the subjects. These practices produce physiological balance in different system of the body for their harmonious working. This provides the best organic vigour to the individual. Therefore proposed hypothesis has been accepted in case of Peal Flow Rate.

The term Positive and Negative Breath Holding Time generally represent to some extent the aerobic and anaerobic potentiality of an individual. The study revealed that Jalandhara bandha & Uddiyana Bandha resulted into significant improvement in positive and negative breath Holding Time. Therefore proposed hypothesis has been accepted in case of Maximum Breath Holding Tiome (Positive and negative)

Based on available evidence a prudent recommendation is to include exercise in most therapeutic program to manage hypertension. Both systolic and Diastolic Blood Pressure can be significantly lowered with a regular programme of exercise. The study so the changes in the Blood Pressure as a result of Jalandhara Bandha & Uddiyana Bandha practices. Effect on Blood Pressure due to training been performed more frequently and for longer duration of time.

Therefore proposed hypothesis has been accepted in case of Blood Pressure.

5. CONCLUSION

Within the limitations of the present study the following conclusions may be drawn:

1. Differential change was found on Vital capacity between Jalandhara & Uddiyana bandha and control groups.
2. Differential change was found on Peak Flow Rate between Jalandhara & Uddiyana Bandha and control groups.
3. Differential change was found on Positive and Negative Breath Bolding Time between Jalandhara & Uddiyana Bandha and control group.
4. Differential change was found on Resting Blood Pressure (Sstolic and Diastolic) between
5. Jalandhara & Uddiyana Bandha and control groups.

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Comparison of Selected Physical Fitness Components between Urban and Rural School Boys

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Abstract:
The purpose of the study was to compare the selected physical fitness components between urban and rural school going boys. For this study, a sample of one hundred (N=100) school going boys i.e. urban (N1 = 50, mean ± SD: age 15.34 ± 1.10 years, height 155.40 ± 1.70 cm, weight 48.25 ± 1.63 kg, BMI 19.97 ± 0.35) and rural (N2 = 50, mean ± SD: age 15.34 ± 1.10 years, height 155.64 ± 1.56 cm, weight 47.87 ± 1.31 kg, BMI 19.75 ± 0.21), was selected from different schools affiliated to Punjab School Education Board, Punjab, India. All the boys were assessed for height, weight and selected physical fitness components. The height of the subjects was measured with anthropometric rod to the nearest 0.5 cm. The weight of subjects was measured by using portable weighing machine to the nearest 0.5 kg. The vertical jump test was used to measure explosive power of the legs whereas 50 meters dash test was used to determine speed. Shuttle run test was used to measure agility while sit and reach test was used to determine the flexibility. The independent samples t-test was used to assess the differences between urban and rural boys. The results of present study clearly indicated that rural school boys had significantly greater power ($p<0.05$), speed ($p< 0.05$), agility ($p<0.05$) and flexibility ($p<0.05$) than urban school boys.

Keywords:
Physical Fitness, Urban, Rural, Power, Speed, Agility, Flexibility

1. INTRODUCTION

Physical fitness is, in a very broad sense, determined by the individual's capacity for optional work and motor and sport performance (Astrand & Rodahl, 1986). Physical fitness depends upon age, sex, height, weight, body size, and occupational habits (Andersen et al., 1984). Physical fitness is not only one of the most important keys to a healthy body; it is also the basis of dynamic and creative activity. Fitness is a condition in which an individual has sufficient energy to avoid fatigue and enjoy life. It is necessary for people to maintain and improve their physical fitness in order to satisfy healthy, high quality of daily life (Tanaka et al., 2004). Physical fitness is measured by functional tests that are specific and usually normative-based, rather than criterion-based, thereby leaving unanswered as to how much of a specific fitness factor is required for a good quality of life (Chia et al., 2007). Physical fitness developed at early age could help prevent some of the health problems of adult life as it is now established that many chronic diseases start early in life (Twisk et al., 2002). That sedentary lifestyle affects the increase of body weight and obesity in childhood, as well as the lack of adoption of habits of regular physical activity. Low levels of physical activity and cardio-respiratory fitness are both associated with higher risk of all cause and disease specific mortality (Thune et al. 1998). Mehtap and Nihal (2005) conducted a study on physical fitness in rural children compared with urban children in Turkey and found that children living in the urban areas were more inactive and obese than rural children. Environmental and societal alteration connected with urban dwelling, e.g., changing neighborhoods, crowding, concern for

protection, lack of sufficient space for play and physical activity, and others, may contribute to reduced levels of physical activity and physical fitness (Pena et al., 2003). Rural residence is commonly associated with a more dynamic, physically active lifestyle as compare to urban area, which is beneficial to physical fitness. Exercise and physical activity impact on wellness and fitness (Lee et al.1995). Physical activity is undoubtedly important factor in achieving optimal health status and also acts to reduce the risk of various diseases, as it is confirmed by many studies conducted around the world (Blair et al., 2004; Eyler et al., 2003; Lee & Paffenbarger, 2000; Pate et al., 1995; Pena et al., 2003). Therefore, the purpose of the study was to compare the selected physical fitness components between urban and rural school going boys.

2. MATERIALS AND METHODS

2.1. SUBJECTS

A sample of one hundred (N=100) school going boys i.e. urban (*N_1=50, mean ± SD: age 15.34 ± 1.10 years, height 155.40 ± 1.70 cm, weight 48.25 ± 1.63 kg, BMI 19.97 ± 0.35)* and rural **(***N_2=50, mean ± SD: age 15.34 ± 1.10 years, height 155.64 ± 1.56 cm, weight 47.87 ± 1.31 kg, BMI 19.75 ± 0.21),* was selected from different schools affiliated to Punjab School Education Board, Punjab, India The purposive sampling method was used to select the subjects for the present study. The age of each subject was calculated from the date of birth as recorded in his school.

2.2. VARIABLES

The study was conducted on selected physical fitness components i.e. explosive power, speed, agility and flexibility of school going urban and rural boys. The necessary data was collected by administering various tests. The height of subjects was measured by using the standard anthropometric rod to the nearest 0.5 cm. Weight was measured with portable weighing machine to the nearest 0.5 kg. BMI was calculated by the formula of; Body Mass Index = Weight/Height². The vertical jump test (Fleishman, 1964) was used to measure explosive power of the legs whereas 50 meters dash test (Johnson and Nelson, 1982) was used to determine speed. Shuttle run test (Johnson and Nelson, 1982) was used to measure agility where as sit and reach test (Mathews, 1973) was used to determine the flexibility.

2.3. STATISTICAL ANALYSES:

Values are presented as mean values and SD. Independent samples t tests were used to test if population means estimated by two independent samples differed significantly. Data was analyzed using SPSS Version 16.0 (Statistical Package for the Social Sciences, version 16.0, SPSS Inc, Chicago, IL, USA).

3. RESULTS

Table 1: Demographic Characteristics of Urban and Rural School Going Boys

Students Group	Age (yrs)		Height (cm)		Weight (Kg)		BMI	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Urban Boys	15.34	1.10	155.40	1.70	48.25	1.63	19.97	0.35
Rural Boys	15.34	1.10	155.64	1.56	47.87	1.31	19.75	0.21

Table 1, shows the demographic characteristics of urban and rural school going boys. The mean age of both the groups was 15.34 years. The mean height of urban boys was 155.40 cm and rural boys were 155.64 cm. The mean weight of urban boys was 48.25 kg and rural boys were 47.87 kg. The mean BMI value of urban boys was 19.97 and rural boys were 19.75 respectively.

Table 2: Physical Fitness Characteristics of Urban and Rural School going Boys

VARIABLES	Urban Boys (N_1 = 50)		Rural Boys (N_2 = 50)		Mean Difference	SEDM	t-value	Sig.
	Mean	SD	Mean	SD				
Power (cm)	27.58	1.06	31.49	0.82	3.91	0.19	**20.58***	0.00
Speed (sec)	8.12	0.67	7.57	0.22	0.55	0.10	**5.50***	0.00
Agility (sec)	10.29	0.28	8.99	0.38	1.30	0.07	**19.44***	0.00
Flexibility (cm)	9.86	0.42	7.92	0.68	1.94	0.11	**17.11***	0.00

*Significant at 0.05 level, $t_{.05}$ *(98) =1.658*

Table 2 presents the physical fitness characteristics of urban and rural school going boys. The rural boys were found to have significantly better power ($p<0.05$) when compared to urban boys. The rural boys also had significantly better speed ($p<0.05$) and agility ($p<0.05$) than urban boys. Similarly, flexibility ($p<0.05$) was significantly greater in rural boys as compared to urban boys.

4. DISCUSSION

In the present study physical fitness characteristics of urban and rural school going boys have been evaluated and compared with each other. This study indicates the existence of physical fitness characteristics differences between urban and rural school going boys. The demographic characteristics of urban and rural school going boys show that urban boys were heavier and as compared to the rural boys and the rural boys were taller than urban boys. In a study of Pena et al,(2003) conducted in Mexico, it was found that children living in urban parts were significantly taller and heavier than rural children. The results of present study clearly indicated that rural school boys had significantly greater physical fitness variable i.e. power, speed, agility and flexibility than urban school boys. Uppal and Sareen (2000) find out the differences between rural and urban students in relation to cardiovascular fitness and revealed that students with rural background have better cardiovascular fitness than urban area students. Similar findings were found in the different studies in the world that have been regularly indicating to a better and more quality motor potential of students of rural areas (Ozdirenc et al.,2005; Pena et al, 2003). The results of present study is in agreement with evidence from a study conducted in Poland in that it claims that rural children are fitter than their urban counterparts (Dollman et al.,2002). However, it is in disagreement with evidence from a study conducted by Krombholz, (1997) stated that there were no differences have been identified in a range of fitness and motor skill measures between children from urban and rural areas. The results of this study are also disagreement with the study of Pilicz & Sadowska (1973) they indicated that urban children from Poland favored the better performance in physical fitness parameters. The results of present study clearly indicated that rural school boys had significantly greater physical fitness than urban school boys.

5. CONCLUSION

Significant differences were found between urban and rural school going boys with regard to physical fitness characteristics. The rural school going boys had higher power, speed, agility and flexibility when compared to urban school going boys. From the study, it might be concluded that rural boys showed greater physical fitness comparing to their urban counterparts in spite of the fact that regular participation in physical activity may improve physical fitness.

6. ACKNOWLEDGEMENT

Sincere thanks to teachers who extended their enthusiastic co-operation in collecting the necessary data and to all those urban and rural boys without whom this research was not possible. We acknowledge the immense help received from the scholars whose articles are cited and included in references of this paper. We are also grateful to authors/editors/publishers of all those articles, journals and books from where the literature for this paper has been reviewed and discussed.

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Comparison of Agility and Flexibility between Kabaddi Players and Gymnasts

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Abstract:
The aim of this study was to compare the Agility and Flexibility between Kabaddi Players and Gymnasts of subjects with the age range 13 to 17 years. 30 Kabaddi players and 30 Gymnasts from Bankura district were selected randomly. The statistics of 't' ratio was employed to compare the mean differences of the variables. The level of significance was set at 0.05 level of confidence for all calculations. District level Kabaddi players were significantly superior to district level Gymnasts in relation to Agility tested by shuttle run. In respect of Modified sit and reach test there was no significant difference found in flexibility among the District level Kabaddi players and Gymnasts players.

Keywords:
Agility and Flexibility

1. INTRODUCTION

Kabaddi is a body contact game and players need physical fitness to participate efficiently in this game. Kabaddi is a game which demands high standard of physical fitness and mastery of techniques which are complicated. In addition to this, excellent co-ordination and anticipation is required. To achieve that it is necessary that the players are inducted into this game quite early and lot of work is to be put on for achieving goals by way of long term physical and technical plan. Gymnastic is a sport involving performance of exercises requiring physical strength, flexibility, agility, co-ordination, balance, grace and passion for the sport. Gymnastics as a sport has had a long dark history. Its history can be penning down from many ancient civilization those of the Chinese, Persians, Indians, Greeks and Romans. It was essentially Greeks & Romans in particular who followed a strict code of exercises and developed physical exercises to a level never known before or since. agility and flexibility is the most important overall physical requirement in gymnastics and kabaddi.

2. OBJECTIVES

This study has aimed to compare the Agility and Flexibility between Kabaddi Players and Gymnasts.

3. SAMPLING

For this study 60(sixty) subjects out of which 30 kabaddi players and 30 gymnasts were selected at randomly from different clubs who generally participate in various competitions and also studying in different school and their age ranges between 13-17 years according to school record. The clubs are located in various places at the Bankura District.

4. CRITERION MEASURE

Agility was measured by shuttle run in minimum nearest second and Flexibility was measured by modified sit and reach test in maximum centimeters of stretch.

5. STATISTICAL PROCEDURE

To determine the comparative study of physical fitness between kabaddi players and Gymnasts the statistical procedure't' ratio was used to find out the significance of difference at 0.05 level and also calculated the mean differences and standard deviation.

6. RESULTS

Table I: Mean and Standard Deviation of Shuttle Run Between Kabaddi Players and Gymnasts.

Subject	Mean	Standard Deviation	Standard Error Mean	't' Ratio
Kabaddi Players	11.18	.733	.13377	2.470*
Gymnast	11.85	1.285	.23471	

't '58=2.00 (.05 level of significance)

From Table 1, it was evident that the calculated value is more than tabulated value (2.470>2.00). So in case of Agility there is significant difference in respect of physical fitness between the district level Kabaddi players and Gymnasts.

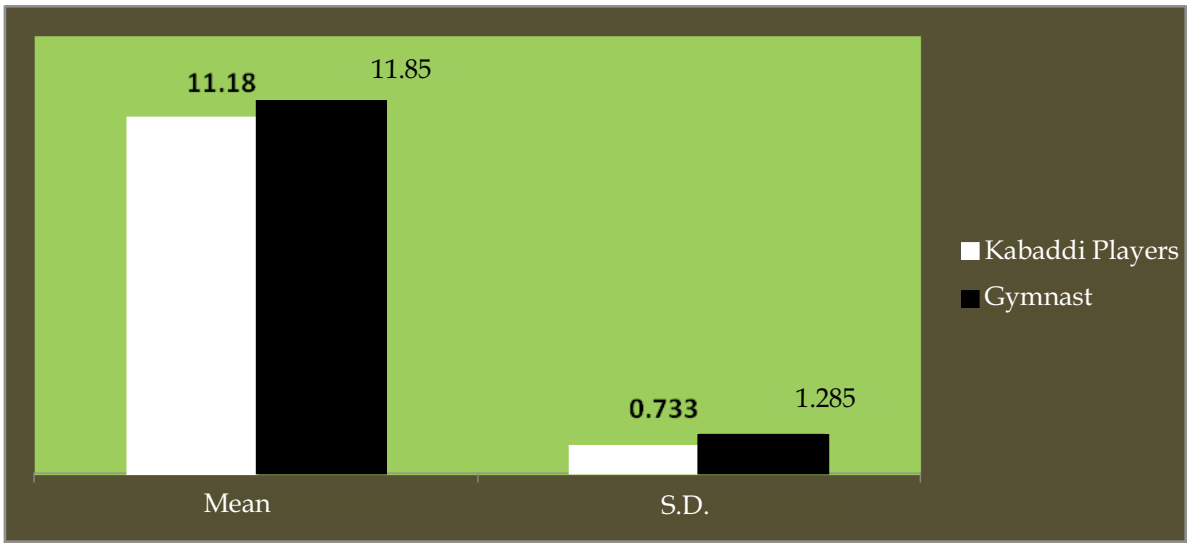

Figure 1: Comparison of Agility between the District Level Kabaddi Players and Gymnasts

Table 2: Mean and Standard Deviation of Modified Sit and Reach Test Between Kabaddi Players and Gymnasts

Subject	Mean	Standard Deviation	Standard Error Mean	't' Ratio
Kabaddi Players	18.80	2.295	.41908	1.893
Gymnast	19.866	2.063	.37672	

't '58=2.00 (0.05 level of significance)

From Table 2, it was evident that the calculated value is less than tabulated value (1.893< 2.00). So in case of Flexibility there is no significant difference in respect of physical fitness between the district level Kabaddi players and Gymnasts.

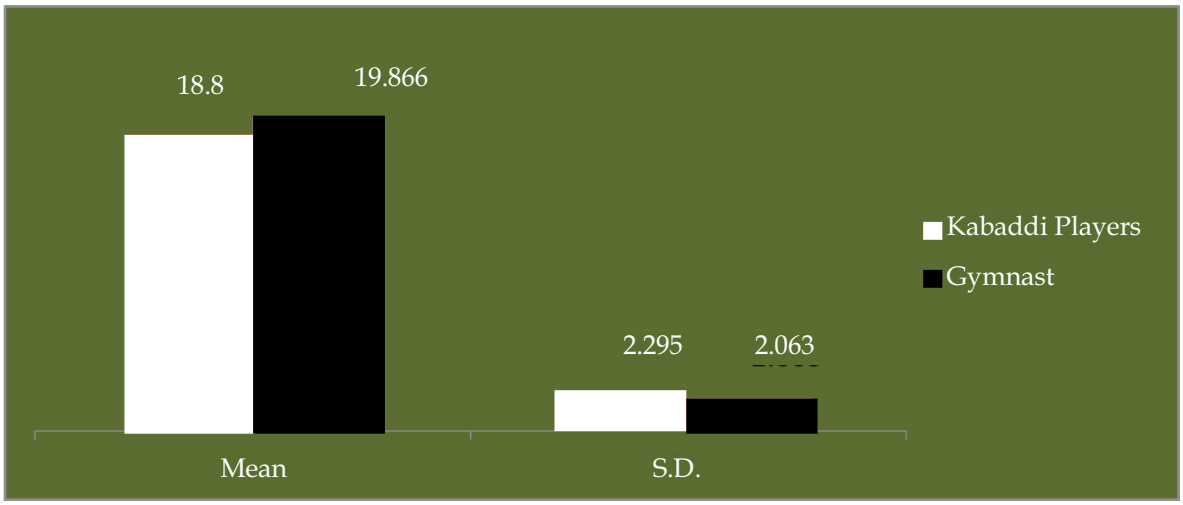

Figure 5: Comparison of Flexibility between the District Level Kabaddi Players and Gymnasts

7. DISCUSSION

In case of flexibility also no significant difference observed as in the two types of activities the component is very essential like any other sports. Again in the causes of agility(2.470>2.00) significant differences between two groups of players were observed through the practices of shuttle run may be that Kabaddi players need more strength in leg more agility compared to the Gymnasts. The reason for not significant differences between the Kabaddi players and Gymnasts in respect of flexibility may be that the emphasizes like modified sit and reach test have been developed the physical qualities which are equally needed for both Kabaddi game and Gymnastics activities. Again the causes of significant differences between two groups of players in respect of agility through the practices of shuttle run may be that Kabaddi players need more agility compared to the Gymnasts.

8. CONCLUSION

- District level Kabaddi players were significantly superior to district level Gymnasts in relation to Agility tested by shuttle run.
- In respect of Modified sit and reach test there was no significant difference found in flexibility among the District level Kabaddi players and Gymnasts.

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A Comparative Study of Fitness Variables among Age Groups of Different Professionals

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Abstract:
The study was cited as to expand the acceptance and for better inferences a total 1500 subjects were selected from five professional groups namely Doctors, Lawyers, Bureaucrats, IT Professionals and Engineers from three age group 25–35yrs, 36–45ys and 46-55yrs on Fitness Status. Fitness status was assessed for cardiovascular fitness, Body Mass Index and Fat Percentage. Data on fitness status obtained on BMI, 12 Minute Run and Walk and Fat Percentage were subjected to Analysis of Variance. The two way analysis of variance on three fitness items namely 12 Minute Run and Walk, Body Mass Index and Fat Percentage significance of variance was established for all the three age groups. Significant F Value of 9.668 and 4.069 were obtained for 12 Minute Run and Walk performance signifying in cardio vascular endurance the three age groups significantly different with each other. Further in Body Mass Index comparison also similar variational status was established with F Value of 11.798 and 12.242, it was observed in Body Mass Index comparison that in terms of age groups are significantly different. Fat Percentage analysis also revealed with F value of 20.414 and 15.972 that different significantly in terms of age groups.

1. INTRODUCTION

The fundamental right to health articulated by the World Health Organization (WHO) in 1946 remains integral to development today. This right is strongly reflected in the Millennium Development Goals (MDGs), the guiding international development framework adopted by the United Nations (UN) in 2000, and the Human Development Index used to measure the progress of all nations against universal human development goals (sport and health preventing disease and promoting health, 2007).

One of the primary goals of an exercise program is to develop and maintain cardio respiratory fitness. Many people engage in aerobic activities to improve their health status, reduce disease risk, modify body composition and improve all around physical fitness. It is important to select a mode of exercise that uses the large muscles of the body in a continuous, rhythmical fashion, and that is relatively easy to maintain at a consistent intensity. It is interesting to note that not all modes of exercise are comparable in terms of energy (caloric) expenditure. However, several factors, in addition to energy expenditure, should be considered when selecting an exercise mode (Len Kravitz, 2014).

The connections between regular exercise/ physical activity and health were not always as obvious as they are today. In fact, as recently as the early 1980s medical and public attitudes towards exercise were quite different. To run 5 min, swim 1 min in the ocean, or cycle 50 min along the coast and to do these several times each week were viewed to be characteristics of abnormal behavior. After all, the objectives of 'modern society' were to make life easier to live, not more laborious. Physicians were not demanding that their patients exercise more to combat

hypertension, excess body fat, or heart disease, and there was no media support to promote exercise and an active lifestyle. However, thanks to the continued research efforts of physical educators and exercise physiologists, and certain more enlightened physicians, the connections between an active lifestyle and overall health became more recognized. During the two and half decades from 1980 to the present, the evidence that exercise can not only prevent disease, but also reverse many disease processes has accumulated to such a degree that now almost all medical organizations have published statements on how important exercise is in the prevention and treatment of their diseases of interest.

Because physical inactivity is a primary risk factor driving the global increase in chronic disease, sport can play a critical role in slowing the spread of chronic diseases, reducing their social and economic burden, and saving lives. While physical activity includes a broader range of activities than sport alone (people can be physically active at work or engaged in domestic tasks at home), direct participation in sport is one of the most enjoyable, and therefore powerful, means of motivating and mobilizing people to become physically active. In addition to enhancing overall physical fitness, regular physical activity, active play and sports can have a positive impact on other major health risk factors, such as high blood pressure, high cholesterol, obesity, tobacco use and stress (sport and health preventing disease and promoting health, 2007). A powerful social connector, sport can bring people together, expand and strengthen social ties and networks, link people to resources and provide them with a sense of belonging. These social relationships are a fundamental determinant of health but are often lacking or people who are marginalized by poverty, disease, discrimination or conflict.

Sedentary lifestyles double the risk of heart disease. In terms of heart disease risk, physical inactivity is equivalent to smoking a pack of cigarettes each day. More people are at risk for developing heart disease because of physical inactivity, than are all people for smoking, high blood pressure, and high cholesterol (combined). Physical inactivity reduces your life span. Physical inactivity is associated with a higher incidence of chronic diseases such as diabetes, arthritis, osteoporosis and obesity. Physical activity declines dramatically with age and during adolescent years. The first step in developing your personal plan for change is to figure out how you are feeling about changing your habits. The stage of change diagram describes four stages that people may go through when changing a health behavior. Think about where you are in terms of eating better and/or moving more. What stage seems to best match where you are right now? Making the leap from thinking about change to taking action can be hard. Asking yourself about the pros (benefits) and cons (things that get in the way) of changing your habits may be helpful. Look at the lists below. Check off the items that you believe are true for you. Feel free to add others that you think are important. (Changing Your Habits: Steps to Better Health, 2014).

If jogging, swimming, cycling, aerobic dancing, and other strenuous activities aren't for you, *try* walking. Regular walking contributes many of the health benefits of other activities. And walking has advantages that other activities do not: other than appropriate shoes, no special clothing or equipment is required, and walking can be fit easily into a busy schedule. Walking contributes the most to health when it is done regularly (about four times a week) for a minimum of 20 minutes each day. How-strenuous the walk should be depends on the desires and physical abilities of the walker. Most of the benefits can be derived by walking between two and four miles per hour. Aerobic capacity can be increased by walking briskly enough to increase the heart rate.

2. STATEMENT OF THE PROBLEM

Physical fitness is also being now a day's seen in the context of wellness or health related fitness. This approach essentially takes into account the pattern of life style on follows rigorously due to professional demand, and it is growingly run in every profession.

The elite health club members are normally various professionals belonging to high income group of society. Because of their life style demand of profession, availability of time for recreational exercise, these group of people though aware about health hazards develops interrupted exercise schedule and hence benefits of exercise or health club visit are not derived.

3. OBJECTIVES OF THE STUDY

1. To Investigate Fitness Status of different age group among professionals such as Doctors, Bureaucrats, IT Professionals, Engineers and Lawyers.
2. To investigate about Fitness Status among all professionals namely Doctors, Bureaucrats, IT Professionals, Engineers and Lawyers visiting elite health clubs.

3. SIGNIFICANCE OF THE STUDY

This study was conceptualized with an idea to investigate Fitness status of different age group professionals visiting health club members:

1. Findings of the study may provide a premonition to the people about the consequences of fitness status towards personal and professional developments.
2. Proper circulation of the findings in different age groups may prompt them to be physically active, resulting in better output.
3. Findings of this research study will also add to the body of knowledge and literatures of Health, Fitness and Physical Education.

4. METHODOLOGY

The subjects from various professions were from the age group 25-35yr, 36-45yr and 46-55yr. Adapting purposive sampling method 100 subjects for each professional groups in each age group were selected from Elemention Health & Sport, Fitness Anthem, Ozone and Celebrity Fitness, thus a total of 1500 subjects were selected. The Research scholar personally contacted the Elite health clubs chains that are available in the Delhi, Gurgaon and Chandigarh. However, only Elemention Health & Sport, Fitness Anthem, Ozone and Celebrity Fitness chain of health club authorities consented to permit and provide access. The details of selected subjects are follows:

Table 1

Professionals	Age Groups		
	25 to 35	36 to 45	46 to 55
Bureaucrats	100	100	100
I.T. Professionals	100	100	100
Engineers	100	100	100
Doctors	100	100	100
Lawyers	100	100	100

5. SELECTION OF THE VARIABLE

In this study, care was taken to select the variables for fitness status which are not only relevant but also closely related to the purpose of this study.

Table 2

Variables	Tests	Criteria
Fitness Status		
(a) Body Mass Index	Weight/Height^2	Percentage
(b) Cardio Respiratory Endurance	12 Min. treadmill run and walk	Distance in km.
(c) Fat Percentage	Bioelectrical Impedance Analysis	Percentage

6. STATISTICAL TECHNIQUES

Parametric: In Parametric section fitness status was analyzed by using both descriptive and inferential statistics. Descriptive statistics was used to highlight the status of fitness status of different groups. In Inferential statistics two way analysis was used to compare health status and fitness status among different age groups and professionals. The level of significance of the entire test was tested at 0.05 levels.

Findings: The statistical analysis of data was done in accordance with the purpose of the study.

6.1. TWO WAY ANALYSIS OF DATA

Table 3: Two way ANOVA Table for the Data on BMI Scores Dependant Variable: Body Mass Index (BMI)

Source	Type III Sum of Squares	Df	Mean Square	F
Corrected Model	3670.092	14	262.149	15.495*
Intercept	1438643.217	1	1438643.217	85036.142*
Age Group	399.195	2	199.597	11.798*
Profession	1614.067	4	403.517	23.851*
Age Group * Profession	1656.831	8	207.104	12.242*
Error	251123.261	1485	16.918	
Total	1467436.570	1500		
Corrected Total	28793.353	1499		

*significant at 0.05 level of significance

In Table 1 analysis of variance on Body Mass Index, it is clearly evident that the three age group are significantly different on Body Mass Index. Since calculated value obtained are 11.798, 23.851and 12.242 are greater than tabulated value 3.00, 2.37 and 1.94.

Table 4: Post Hoc Mean Comparison on Body Mass Index (BMI) Among Different Professions of 25–35 yrs Age Group

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
29.04	28.43				0.61	0.26014	0.53
29.04		30.46			1.42*	0.26014	
29.04			32.64		3.6*	0.26014	
29.04				32.13	3.09*	0.26014	
	28.43	30.46			2.03*	0.26014	
	28.43		32.64		4.21*	0.26014	
	28.43			32.13	3.7*	0.26014	
		30.46	32.64		2.18*	0.26014	
		30.46		32.13	1.67*	0.26014	
			32.64	32.13	0.51	0.26014	

*significant at 0.05 level of significance

The statistical finding on BMI implies that Engineers are best with lowest BMI value followed by Doctors, Lawyers, IT Professional and Bureaucrats, in 25-35 yr age group of different profession.

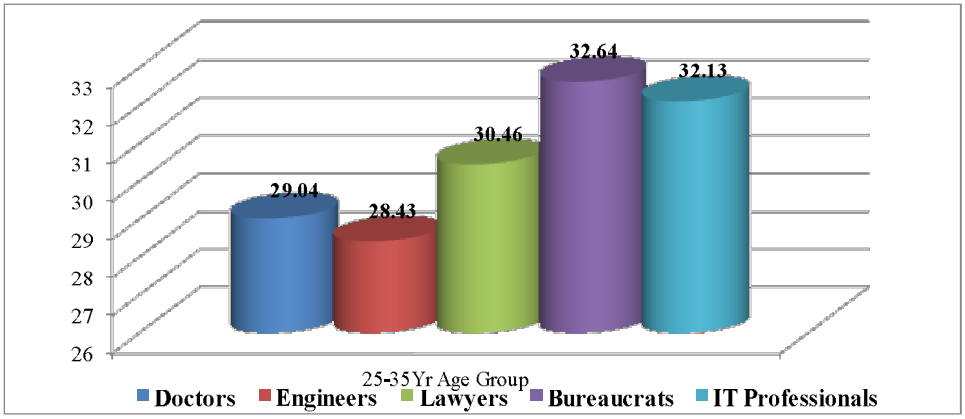

Figure 1: Post Hoc Mean Comparison on Body Mass Index (BMI) among Different Professions of 25–35 yrs Age Group

Table 5: Post Hoc Mean Comparison on Body Mass Index (BMI) among Different Professionals of 36–45 yrs Age Group

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
30.33	29.40				0.93	0.26014	0.53
30.33		29.89			0.44	0.26014	
30.33			30.46		0.13	0.26014	
30.33				33.27	0.06	0.26014	
	29.40	29.89			0.49	0.26014	
	29.40		30.46		1.06*	0.26014	
	29.40			33.27	3.87*	0.26014	
		29.89	30.46		0.57	0.26014	
		29.89		33.27	3.38*	0.26014	
			30.46	33.27	2.81*	0.26014	

*significant at 0.05 level of significance

The statistical finding on BMI implies that Engineers are best with lowest BMI value followed by Lawyers, Doctors, Bureaucrats and IT Professional in 36-45 yr age group of different profession.

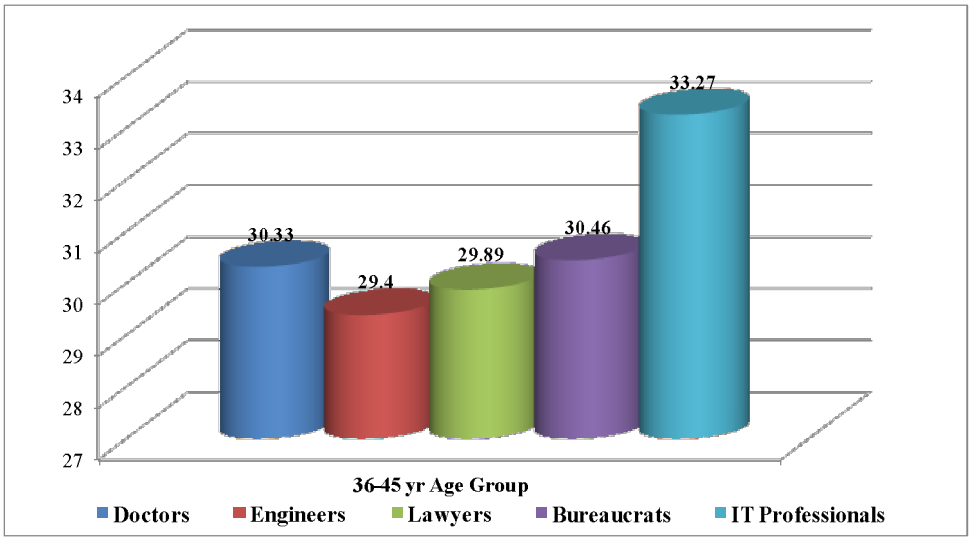

Figure 2: Post Hoc Mean Comparison on Body Mass Index (BMI) among Different Professionals of 36–45 yrs Age Group

Table 6: Post Hoc Mean Comparison on Body Mass Index (BMI) among different Professional of 46–55 yr

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
32.89	30.64				2.25*	0.26014	0.53
32.89		32.68			0.21	0.26014	
32.89			29.42		3.47*	0.26014	
32.89				32.82	0.07	0.26014	
	30.64	32.68			2.04*	0.26014	
	30.64		29.42		1.22*	0.26014	
	30.64			32.82	2.18*	0.26014	
		32.68	29.42		3.26*	0.26014	
		32.68		32.82	0.14	0.26014	
			29.42	32.82	3.4*	0.26014	

*significant at 0.05 level of significance

The statistical finding on BMI implies that Bureaucrats are best with lowest BMI value followed by Engineers, Lawyers, IT Professional and Doctors in 46-55 yrs age group of different profession.

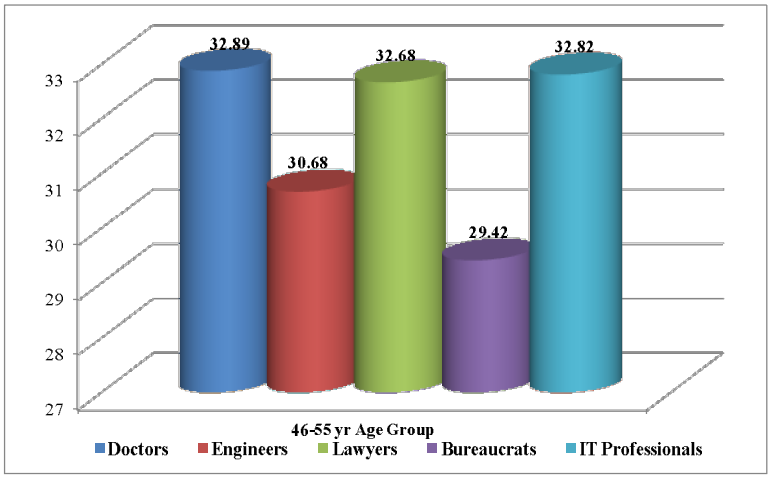

Figure 3: Post Hoc Mean Comparison on Body Mass Index (BMI) among Different Professional of 46–55 yrs

Table 7: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 25–35 yr

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
2288.69	2671.98				383.29*	0.26014	70.8
2288.69		2565.56			276.87*	0.26014	
2288.69			2273.26		15.43	0.26014	
2288.69				2587.33	298.64*	0.26014	
	2671.98	2565.56			106.42*	0.26014	
	2671.98		2273.26		398.72*	0.26014	
	2671.98			2587.33	84.65*	0.26014	
		2565.56	2273.26		292.23*	0.26014	
		2565.56		2587.33	21.77	0.26014	
			2273.26	2587.33	314.07*	0.26014	

*significant at 0.05 level of significance

The statistical finding on 12 minute run and walk performance implies that Engineers are best with highest performance score followed by IT Professional, Lawyers, Doctors, and Bureaucrats, in 25-35 yr age group of different profession.

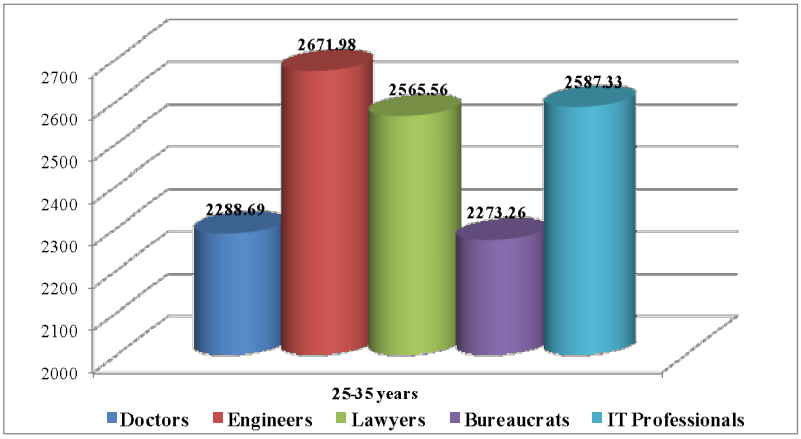

Figure 4: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 25–35 yr

Table 8: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 36–45 yr

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
2494.59	2563.90				69.31	0.26014	70.8
2494.59		2448.17			464.42*	0.26014	
2494.59			2390.38		104.21*	0.26014	
2494.59				2447.64	46.95	0.26014	
	2563.90	2448.17			115.73*	0.26014	
	2563.90		2390.38		173.52*	0.26014	
	2563.90			2447.64	116.26*	0.26014	
		2448.17	2390.38		57.79	0.26014	
		2448.17		2447.64	0.53	0.26014	
			2390.38	2447.64	57.26	0.26014	

*significant at 0.05 level of significance

The statistical finding on 12 minute run and walk performance implies that Engineers are best with highest 12 minute run and walk performance followed by, Doctors, Lawyer, IT Professional and Bureaucrats in 36-45 yr age group of different profession.

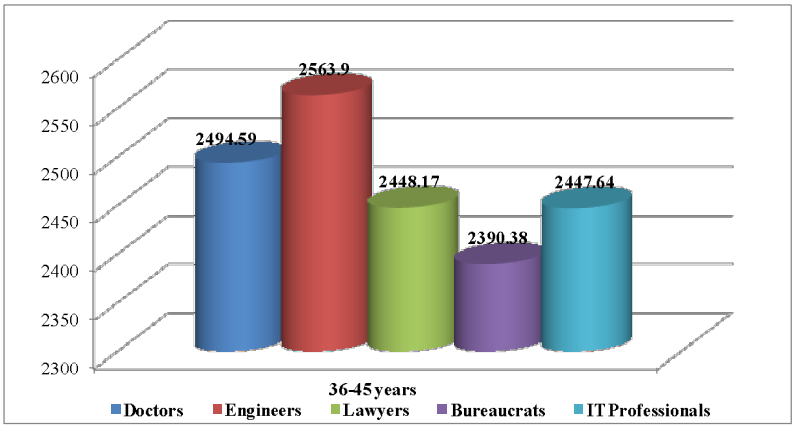

Figure 5: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 36–45 yr

Table 9: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 46–55 yr

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
2140.04	2490.90				350.86*	0.26014	70.8
2140.04		2522.14			382.1*	0.26014	
2140.04			2316.64		176.6*	0.26014	
2140.04				2233.01	92.97*	0.26014	
	2490.90	2522.14			31.24	0.26014	
	2490.90		2316.64		174.26*	0.26014	
	2490.90			2233.01	257.89*	0.26014	
		2522.14	2316.64		205.5*	0.26014	
		2522.14		2231.01	291.13*	0.26014	
			2316.64	2231.01	85.63*	0.26014	

*significant at 0.05 level of significance

The statistical finding on 12 minute run and walk performance implies that Lawyers are best with highest 12 minute run and walk performance followed by Engineers, Bureaucrats, IT Professional and Doctors in 46-55 yr age group of different professions.

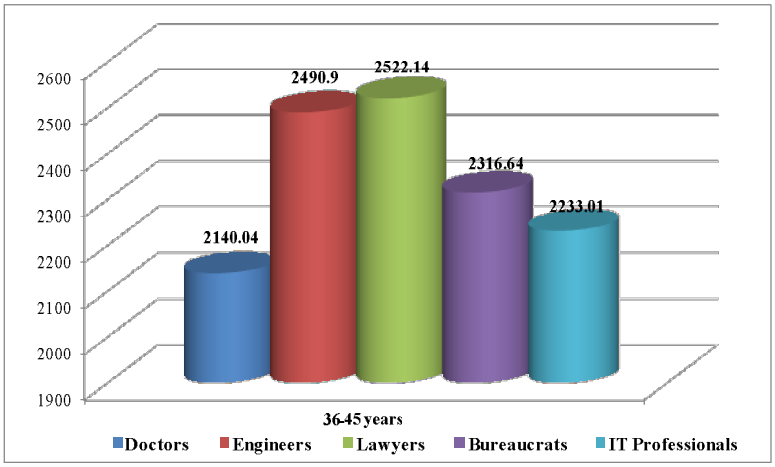

Figure 6: Post Hoc Mean Comparison on 12 Minute Run and Walk among Different Professional of 46–55 yr

Table 10: Post Hoc Mean Comparison on Fat Percentage between 25–35 Year Age Group (All Professional Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
24.26	24.51				0.25	0.36745	0.74
24.26		24.03			0.23	0.36745	
24.26			28.25		3.99*	0.36745	
24.26				25.46	1.2*	0.36745	
	24.51	24.03			0.48	0.36745	
	24.51		28.25		3.74*	0.36745	
	24.51			25.46	0.95*	0.36745	
		24.03	28.25		4.22*	0.36745	
		24.03		25.46	1.43*	0.36745	
			28.25	25.46	2.79*	0.36745	

*significant at 0.05 level of significance

The statistical finding on fat percentage implies that Lawyers are best with lowest fat percentage score followed by Doctors, Engineers, IT Professional and Bureaucrats in 25-35 yr age group of different profession.

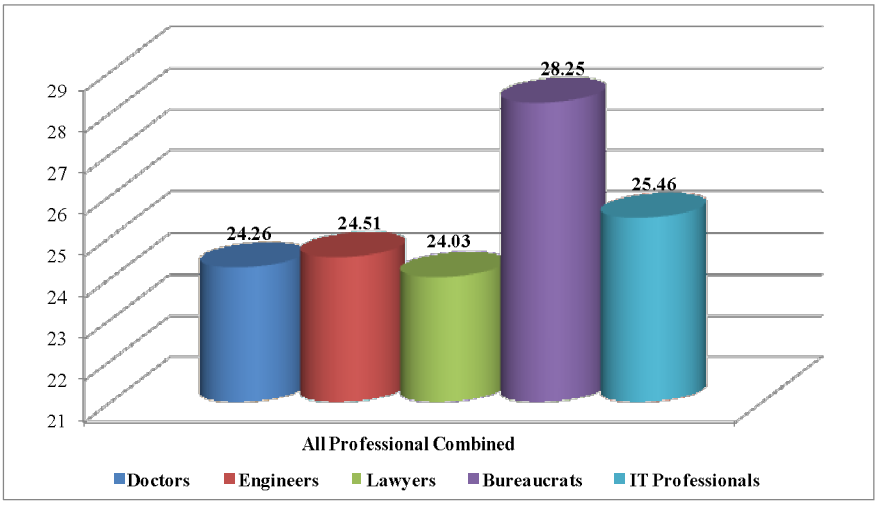

Figure 7: Post Hoc Mean Comparison on Fat Percentage between 25–35 Year Age Group (All Professional Combined)

Table 11: Post Hoc Mean Comparison on Fat Percentage between 36–45 Year Age Group (All Professional Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
25.29	24.88				0.41	0.36745	0.74
25.29		26.90			1.61*	0.36745	
25.29			25.89		0.6	0.36745	
25.29				29.24	3.95*	0.36745	
	24.88	26.90			2.02*	0.36745	
	24.88		25.89		1.01*	0.36745	
	24.88			29.24	4.36*	0.36745	
		26.90	25.89		1.01*	0.36745	
		26.90		29.24	2.34*	0.36745	
			25.89	29.24	3.35*	0.36745	

*significant at 0.05 level of significance

The statistical finding on fat percentage implies that Engineers are best with lowest fat percentage score value followed by Doctors, Bureaucrats, Lawyers, and IT Professional in 46-55 yr age group of different profession.

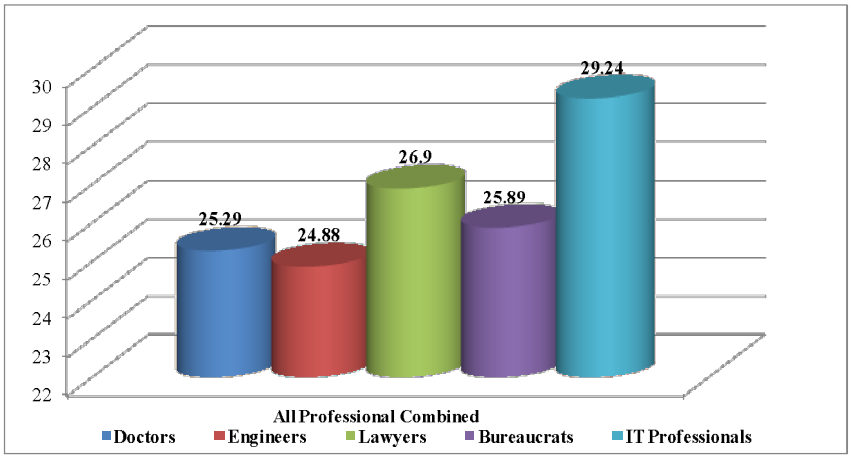

Figure 8: Post Hoc Mean Comparison on Fat Percentage between 36–45 Year Age Group (All Professionals Combined)

Table 12: Post Hoc Mean Comparison on Fat Percentage between 46–55 year Age Group (All Professional Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
24.82	26.34				1.52*	0.36745	0.74
24.82		30.31			5.49*	0.36745	
24.82			24.11		0.71	0.36745	
24.82				32.68	7.86*	0.36745	
	26.34	30.31			3.97*	0.36745	
	26.34		24.11		2.23*	0.36745	
	26.34			32.68	6.34*	0.36745	
		30.31	24.11		6.2*	0.36745	
		30.31		32.68	2.37*	0.36745	
			24.11	32.68	8.57*	0.36745	

*significant at 0.05 level of significance

The statistical finding on fat percentage implies that Bureaucrats are best with lowest fat percentage score followed by Doctors, Engineers, Lawyers and IT Professional in 25-35 yr age group of different profession.

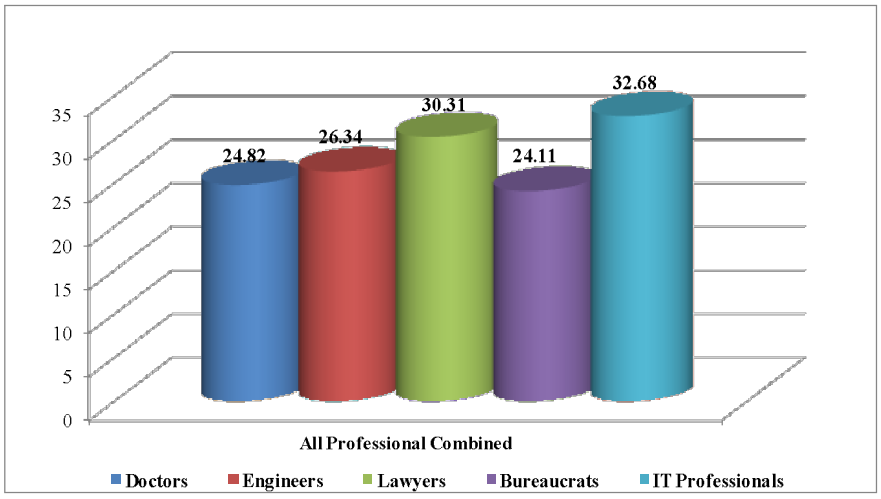

Figure 9: Post Hoc Mean Comparison on Fat Percentage between 46–55 year Age Group (All Professional Combined)

7. FINDINGS

In age group 25-35 yrs of different professions finding on BMI reveals that Engineers (28.43) are best with lowest BMI value followed by Doctors (29.04), Lawyers (30.46), IT Professionals (32.13) and Bureaucrats (32.64). Similarly, in age group 36-45 yrs of different professions finding on BMI implies that Engineers (29.40) are best with lowest BMI value followed by Lawyers (29.89), Doctors (30.33), Bureaucrats (30.46) and IT Professionals (33.27). Further, in 46-55 yrs age group of different professions finding on BMI implies that Bureaucrats (29.42) are best with lowest BMI value followed by Engineers (30.64), Lawyers (32.68), IT Professionals (32.82) and Doctors (32.89).

Further, in the age group 46–55 years Lawyers (2522.14) were found to be best on cardiovascular endurance followed by Engineers, Bureaucrats, IT Professionals and Doctors. It was also observed that among different professional groups the cardiovascular endurance status was best at different age group. Engineers were best at age group of 25–35 years (2671.98), Doctors at age group of 36–45 years (2494.59), Lawyers 25–35 years (2565.56), IT professionals at 25–35 years (2587.33) and Bureaucrats at the age of 36 – 45 years (2390.38).

However when compared among the professional's status in the age group 25–35 Lawyers (24.03) had the lowest Fat Percentage followed by Doctors, Engineers, IT Professionals and Bureaucrats. In the age group 36 – 45 years Engineers (24.88) were best followed by Doctors, Bureaucrats, Lawyers and IT professionals. Further in the age group 46–55 years Bureaucrats (24.11) were best with lowest Fat Percentage followed by Doctors, Engineers, Lawyers and IT professionals.

8. CONCLUSION

1. The five professional groups namely Doctors, Lawyers, Bureaucrats, IT Professionals and Engineers irrespective of their age have overweight and obesity problems.
2. The prevalence of overweight and obesity among all the professional groups is direct manifestations of low cardio vascular activities and sedentary lifestyle it is also failure of elite health clubs to either design appropriate exercise program and endorse complete engagement.
3. Professionals namely Doctors, Lawyers, Bureaucrats, IT professionals and Engineers are significantly having different levels of fitness status.
4. Among the five professional groups IT professionals are at extreme levels of sedentary life style.
5. All the five group of professionals have significant level of interrupted exercise program.

6. RECOMMENDATIONS

Elite health clubs needs to critically review their exercise programs and package offered to professionals and reprogram exercise schedule based on physiological and exercise principles completely. In addition health clubs need to consider that concept of fitness has to be based on one's working environment i.e. Occupational environment and such fitness program or work out plan ensures control of obesity and other occupational health problems. Professionals visiting elite health clubs need to ensure continuity of exercise programs to derive the health benefits.

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Assessment of Fitness Status of Different Age Group Professionals of Elite Health Club Members

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Abstract:
The study was cited as to expand the acceptance and for better inferences a total 1500 subjects were selected from five professionals groups namely Doctors, Lawyers, Bureaucrats, IT Professionals and Engineers from three age group young age (25-35yr), middle age (36-45yr) and old age (46-55yr) on Fitness Status. Fitness status was assessed for cardiovascular fitness, Body Mass Index and Fat Percentage. Data on fitness status obtained on BMI, 12 Minute Run and Walk and Fat Percentage were subjected to Analysis of Variance. To investigate existence of variance with respect to Age Groups among each age group, between the five professional groups. The two way analysis of variance on three fitness items namely 12 Minute Run and Walk, Body Mass Index and Fat Percentage significance of variance was established for all the three age groups. Significant F Value of 9.668 and 4.069 were obtained for 12 Minute Run and Walk performance signifying in cardio vascular endurance the three age groups are significantly different. Further in Body Mass Index comparison also similar variation status was established with F Value of 11.798 and 12.242, it was observed in Body Mass Index comparison in terms of age groups are significantly different. Fat Percentage analysis also revealed with F value of 20.414 and 15.972 in terms of age group as well among professionals.

1. INTRODUCTION

One of the primary goals of an exercise program is to develop and maintain cardio respiratory fitness. Many people engage in aerobic activities to improve their health status, reduce disease risk, modify body composition and improve all around physical fitness. It is important to select a mode of exercise that uses the large muscles of the body in a continuous, rhythmical fashion, and that is relatively easy to maintain at a consistent intensity. It is interesting to note that not all modes of exercise are comparable in terms of energy (caloric) expenditure. However, several factors, in addition to energy expenditure, should be considered when selecting an exercise mode (Len Kravitz, 2014)

The health club exercise equipment industries, the advertising and commercials that support them can easily lead people to think that exercising for health requires considerable time, energy, equipment special clothing, and money. Physical activity does not require special equipment or spending a lo of money. Physical activity is anything you do when you are not sitting or lying down. Besides jogging, swimming, cycling, and aerobic dancing, physical activity includes yoga, tai chi chuan, martial . its training, gardening, walking etc. For instance, regular walking strengthens muscles, increases aerobic capacity, clears and quiets the mind, reduces stress, expends calories, and causes few injuries, if any. Other than appropriate shoes, walking requires no special clothing, equipment, or money, and it can be worked into a busy schedule.

Sedentary lifestyles double the risk of heart disease. In terms of heart disease risk, physical inactivity is equivalent to smoking a pack of cigarettes each day. More people are at risk for developing heart disease because of physical inactivity, than are all people for smoking, high blood pressure, and high cholesterol (combined). Physical inactivity reduces your life span. Physical inactivity is associated with a higher incidence of chronic diseases such as diabetes, arthritis, osteoporosis and obesity. Physical activity declines dramatically with age and during adolescent years. The first step in developing your personal plan for change is to figure out how you are feeling about changing your habits. The stage of change diagram describes four stages that people may go through when changing a health behavior. Think about where you are in terms of eating better and/or moving more. What stage seems to best match where you are right now? Making the leap from thinking about change to taking action can be hard. Asking yourself about the pros (benefits) and cons (things that get in the way) of changing your habits may be helpful. Look at the lists below. Check off the items that you believe are true for you. Feel free to add others that you think are important. (Changing Your Habits: Steps to Better Health, 2014).

Research shows that only moderate, not necessarily extensive exercise is sufficient for good health. For example, for both women and men, the chance of dying from heart disease, cancer, and several other diseases is greater for individuals with sedentary life-styles that those who engage in a daily brisk walk of 30 to 60 minutes (Curf-man, 1993), Moderate regular exercise, lasting say 15 to 30 minutes, five times a week also has been found to improve health. Regular exercise may also lower your cholesterol and blood pressure, and reduce the risk of diabetes.

Exercise increases the size of coronary arteries and reduces clogging due to atherosclerosis. Exercise also increases the efficiency of blood's oxygen-carrying capacity and muscles' uptake of oxygen. Regular physical activity can result in periods of relaxed concentration, characterized by reduced physical and psychic tensions, regular breathing rhythms, and increased self-awareness.

2. STATEMENT OF THE PROBLEM

Having a membership of elite health clubs is not only a good healthy practice but also seen as matter of prestige. The elite health club members are normally various professionals belonging to high income group of society. Because of their life style demand of profession, availability of time for recreational exercise, these group of people though aware about health hazards develops interrupted exercise schedule and hence benefits of exercise or health club visit are not derived.

In addition to this research scholar felt that it is a matter of waste investigation about prevalence of health problems hazards, dietary practices, fitness status in relation to their health club visits and benefits they have derived there on. Hence with this consideration the study was titled as "Assessment of Fitness Status of Different Age Group Professionals of Elite Health Club Members".

3. OBJECTIVES OF THE STUDY

1. To Investigate the Fitness Status of all Professionals while combining different Age Groups visiting elite health clubs.
2. To Investigate the Fitness Status between three Age Groups Professionals visiting elite health clubs.

3. SIGNIFICANCE OF THE STUDY

This study was conceptualized with an idea to investigate Fitness status of high income group health club members of different age group.

1. By focusing of fitness status addition can be done in human capital of a particular nation.

2. Findings of the study may provide a premonition to the people about the consequences of fitness status.
3. Proper circulation of the findings in different age groups may prompt them to be physically active, resulting in better output.
4. Findings of this research study will also add to the body of knowledge and literatures of Health, Fitness and Physical Education.

5. METHODOLOGY

The subjects from various professions were from the age group 25-35yr, 36-45yr and 46-55yr. Adapting purposive sampling method 100 subjects for each professional groups in each age group were selected from Elemention Health & Sport, Fitness Anthem, Ozone and Celebrity Fitness, thus a total of 1500 subjects were selected. The Research scholar personally contacted the Elite health clubs chains that are available in the Delhi, Gurgaon and Chandigarh. However, only Elemention Health & Sport, Fitness Anthem, Ozone and Celebrity Fitness chain of health club authorities consented to permit and provide access. The details of selected subjects are follows:-

Table 1

Professionals	Age Groups		
	25 to 35	36 to 45	46 to 55
Bureaucrats	100	100	100
I.T. Professionals	100	100	100
Engineers	100	100	100
Doctors	100	100	100
Lawyers	100	100	100

6. SELECTION OF THE VARIABLE

In this study, care was taken to select the variables for fitness status which are not only relevant but also closely related to the purpose of this study.

Table 2

Variables	Tests	Criteria
Fitness Status		
(a) Body Mass Index	Weight/Height^2	Percentage
(b) Cardio Respiratory Endurance	12 Min. treadmill run and walk	Distance in km.
(c) Fat Percentage	Bioelectrical Impedance Analysis	Percentage

7. STATISTICAL TECHNIQUES

7.1. PARAMETRIC

In Parametric section fitness status was analyzed by using both descriptive and inferential statistics. Descriptive statistics was used to highlight the status of fitness status of different groups. In Inferential statistics two way analysis was used to compare health status and fitness status among different age groups and professionals. The level of significance of the entire test was tested at 0.05 levels.

7.2. FINDINGS

The statistical analysis of data was done in accordance with the purpose of the study.

7.3. TWO WAY ANALYSIS OF DATA

Table 1: Two way ANOVA table for the Data on BMI Scores Dependant Variable: Body Mass Index (BMI)

Source	Type III Sum of Squares	Df	Mean Square	F
Corrected Model	3670.092	14	262.149	15.495*
Intercept	1438643.217	1	1438643.217	85036.142*
Age Group	399.195	2	199.597	11.798*
Profession	1614.067	4	403.517	23.851*
Age Group * Profession	1656.831	8	207.104	12.242*
Error	251123.261	1485	16.918	
Total	1467436.570	1500		
Corrected Total	28793.353	1499		

*significant at 0.05 level of significance

In Table 1 analysis of variance on Body Mass Index, it is clearly evident that the three age group are significantly different on Body Mass Index. Since calculated value obtained are 11.798, 23.851and 12.242 are greater than tabulated value 3.00, 2.37 and 1.94.

Table 2: Post Hoc Mean Comparison of Body Mass Index Score among Different Professionals (All Age Group Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
24.79	25.24				0.45	.47437	0.53
24.79		27.08			2.29*	.47437	
24.79			26.08		1.29*	.47437	
24.79				29.12	4.33*	.47437	
	25.24	27.08			1.84*	.47437	
	25.24		26.08		0.84*	.47437	
	25.24			29.12	3.88*	.47437	
		27.08	26.08		1.0*	.47437	
		27.08		29.12	2.04*	.47437	
			26.08	29.12	3.04*	.47437	

*significant at 0.05 level of significance

The statistical finding on BMI implies that Doctors are best with lowest BMI followed by Bureaucrats, Lawyers, and IT Professional in all age group of different professions.

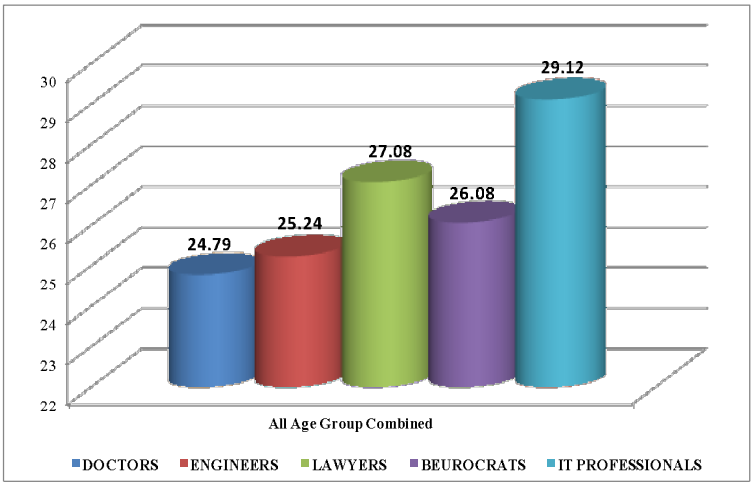

Figure 1: Post Hoc Mean Comparison of Body Mass Index Score among Different Professionals (All Age Group Combined)

Table 3: Post Hoc Mean Comparison on Body Mass Index (BMI) between Three Age Groups (All Profession Combined)

25-35 yrs Age Group	36-45 yrs Age Group	46-55 yrs Age Group	Mean Difference	CD
30.54	30.67		0.13	0.68
30.54		31.69	1.15*	
	30.67	31.69	1.02*	

*significant at 0.05 level of significance

The Finding shows among three age group of five professionals in terms of BMI values the age group 25-35yrs is best with lowest BMI value of 30.54 followed by age group 36-45yrs with 30.67. The 46-55 yrs age group showed highest mean value of 31.69. The finding shows a trend for BMI 25-35 yrs> 35-45 yrs age >46-55 yr age group.

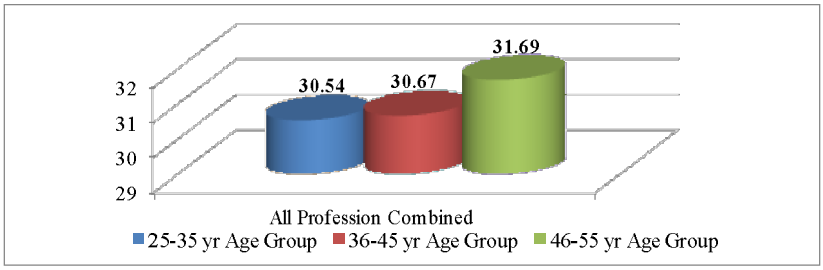

Figure 2: Post Hoc Mean Comparison on Body Mass Index (BMI) between Three Age Group (All Profession Combined)

Table 4: Two Way ANOVA Table for the Data on 12 Minutes Run and Walk Scores

Source	Type III Sum of Squares	Df	Mean Square	F
Corrected Model	31844600.89	14	2274614.350	7.4818*
Intercept	8849687437.953	1	8849687437.953	29106.419*
Age Group	5879031.401	2	2939515.701	9.668*
Profession	16068155.597	4	4017038.899	13.212*
Age Group * Profession	9897413.899	8	1237176.737	4.069*
Error	451508166.150	1485	304045.903	
Total	9333040205.00	1500		
Corrected Total	483352767.047	1499		

*significant at 0.05 level of significance

From this finding it is clearly evident that the three age groups and the five professional groups significantly differ on 12 minute run and walk performance. Since, the calculated values 9.668, 13.212 and 4.069 are more than the tabulated values i.e. 3.00, 2.37 and 1.94 respectively.

Table 5: Post Hoc Mean Comparison of 12 Minutes Run and Walk Performance among Different Professionals (All Age Group Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
2307.77	2575.59				267.82*	34.87	70.8
2307.77		2511.95			204.18*	34.87	
2307.77			2326.76		18.99	34.87	
2307.77				2422.66	114.89*	34.87	
	2575.59	2511.95			63.64	34.87	
	2575.59		2326.76		248.83*	34.87	
	2575.59			2422.66	152.93*	34.87	
		2511.95	2326.76		185.19*	34.87	
		2511.95		2422.66	89.29*	34.87	
			2326.76	2422.66	95.9*	34.87	

*significant at 0.05 level of significance

The statistical finding on 12 Minutes Run and Walk performance implies that Engineers are best with highest cardiovascular efficiency followed by Lawyers, IT Professional, Bureaucrats and Doctors in all age group of different profession.

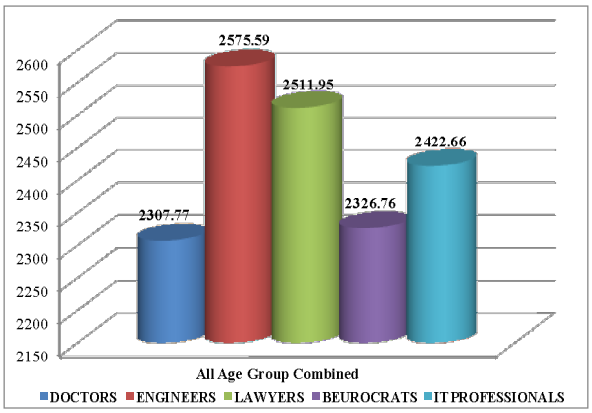

Figure 3: Post Hoc Mean Comparison of 12 Minutes Run and Walk Performance among Different Professionals (All Age Group Combined)

Table 6: Post Hoc Mean Comparison of 12 Minutes Run and Walk Performance among Different Age Group (All Profession Combined)

25-35 yr Age Group	36-45 yr Age Group	46-55 yr Age Group	Mean Difference	CD
2477.36	2468.93		8.43	91.39
2477.36		2340.55	136.81*	
	2468.93	2340.55	128.38*	

*significant at 0.05 level of significance

The finding shows among three age group of five professions in terms of 12 minute run and walk performance the age group 25-35yr is best with highest 12 minute run and walk performance of 2477.36 followed by age group 36-45yr with 2468.93. The 46-55 yr age group showed lowest mean performance of 2340.55. The finding shows a trend for 12 minute run and walk performance 25-35yr>36-45 yr< 46-55 yr age group.

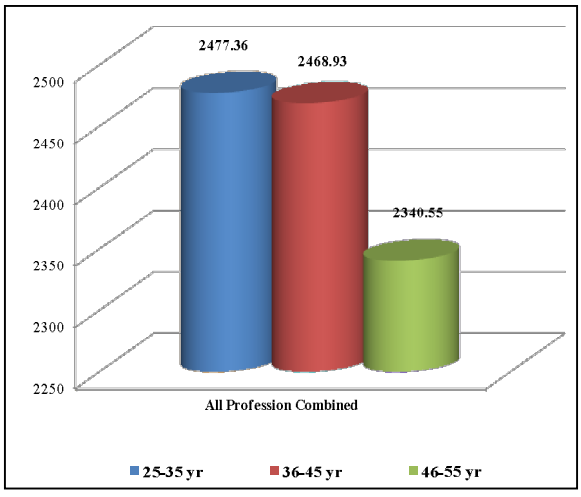

Figure 4 : Post Hoc Mean Comparison of 12 Minutes Run and Walk Performance among Different Age Group (All Profession Combined)

Table 7: Two Way ANOVA Table for the Data on Fat Percentage

Source	Type III Sum of Squares	Df	Mean Square	F
Corrected Model	9264.262	14	661.733	19.604*
Intercept	1050885.473	1	1050885.473	31133.313*
Age Group	1378.129	2	689.065	20.414*
Profession	3573.071	4	893.268	26.464*
Age Group * Profession	4313.062	8	539.133	15.972*
Error	50125.245	1485	33.754	
Total	1110274.980	1500		
Corrected Total	59389.507	1499		

*significant at 0.05 level of significance

From Table 23 of analysis of variance on fat Percentage it is clearly evident that the three age group and five professional groups are significantly different on fat percentage since calculated value obtained 20.414 and 26.464 are greater than tabulated value 3.00 and 2.37.

Table 8: Post Hoc Mean Comparison of Fat Percentage among Different Professionals (All Age Group Combined)

Doctors	Engineers	Lawyers	Bureaucrats	IT Professionals	Mean Difference	Standard Error	CD
24.79	25.24				0.45	0.36745	0.74
24.79		27.08			2.29*	0.36745	
24.79			26.08		1.29*	0.36745	
24.79				29.12	4.33*	0.36745	
	25.24	27.08			1.84*	0.36745	
	25.24		26.08		0.84*	0.36745	
	25.24			29.12	3.88*	0.36745	
		27.08	26.08		1.0*	0.36745	
		27.08		29.12	2.04*	0.36745	
			26.08	29.12	3.04*	0.36475	

*significant at 0.05 level of significance

The statistical finding on Fat Percentage mean value implies that Doctors are best with lean body mass followed by Engineers, Bureaucrats, Lawyers and IT Professional in all age group of different profession.

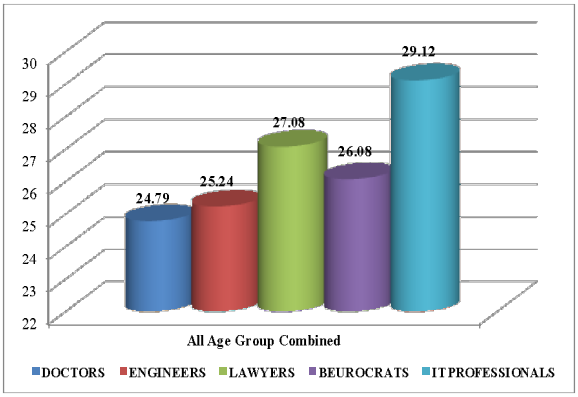

Figure 5 : Post Hoc Mean Comparison of Fat Percentage among Different Professionals (All Age Group Combined)

Table 9: Post Hoc Mean Comparison on Fat Percentage between Three Age Groups (All Profession Combined)

25-35 yrs Age Group	36-45 yrs Age Group	46-55 yrs Age Group	Mean Difference	CD
25.30	26.44		1.14*	0.96
25.30		27.55	2.25*	
	26.44	27.55	1.11*	

*significant at 0.05 level of significance

The Finding shows among three age group of five professions in terms of fat percentage score the age group 25-35yr is best with lowest BMI value of 25.30 followed by age group 36-45yr with 26.44. The 46-55 yr age group showed highest mean value of 27.55. The finding shows a trend for fat percentage score 25-35 yr <35-45 yr < 46-55 yr age group.

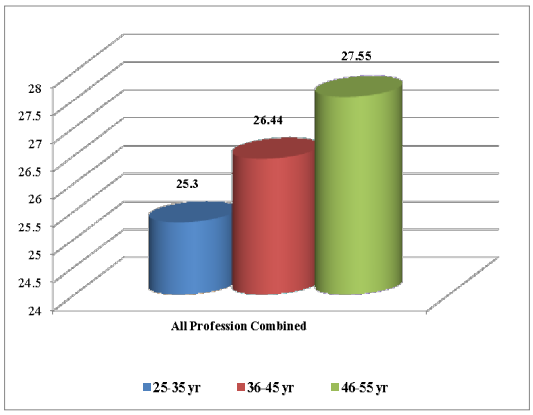

Figure 6 : Post Hoc Mean Comparison on Fat Percentage between Three Age Groups (All Profession Combined)

8. FINDINGS

The finding on finding on BMI shown that Doctors are best with lowest BMI followed by Engineers, Bureaucrats, Lawyers, and IT Professionals in all age groups. When BMI calculated by combining all professionals, the age group 25-35yrs is best with lowest BMI value of 30.54 followed by age group 36-45yrs with 30.67 and 46-55yrs 31.69.

The findings have shown fitness status assessed through 12 minutes run and walk test for cardiovascular endurance and Engineers were significantly better in the age group 25–35 yrs (2671.98) and 36–45yrs (2563.90). In the age group 25–35yrs Engineers were followed by IT Professionals, Lawyers, Doctors and Bureaucrats, but in the age group 36–45 yrs on cardiovascular endurance Engineers were followed in ranking by Doctors, Lawyers, IT Professionals and Bureaucrats.

Findings on fat percentage analysis showed significant variance among when compared among the professional's status in the age group 25–35 Lawyers (24.03) had the lowest Fat Percentage followed by Doctors, Engineers, IT Professionals and Bureaucrats.

9. CONCLUSION

Visit of health clubs for fitness have significantly helped and improved cardiovascular fitness status of all the professional groups. Professional namely Doctors, Lawyers, Bureaucrats, IT professionals and Engineers are significantly having different levels of health problems. Hence it has been observed that every group of professionals were near obese to completely obese there is significant difference even within obesity level in terms of actual values of BMI and Fat Percentage could be attributed to the inherent characteristic of the profession due to nature of task and associated stress demand etc.

Hence though findings that every group of professionals were near obese to completely obese there is significant difference even within obesity level in terms of actual values of BMI and Fat Percentage could be attributed to the inherent characteristic of the profession due to nature of task and associated stress demand etc.

10. RECOMMENDATIONS

Elite health clubs needs to critically review their exercise programs and package offered to professionals and reprogram exercise schedule based on physiological and exercise principles completely. In addition health clubs need to consider that concept of fitness has to be based on one's working environment i.e. Occupational environment and such fitness program or work out plan ensures control of obesity and other occupational health problems. Professionals visiting elite health clubs need to ensure continuity of exercise programs to derive the health benefits.

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A Comparative Study on Eye-Hand Coordination and Eye-Leg Coordination Ability between National Level Attackers and Blockers in Volleyball

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Abstract:
The present study was conducted for the comparison on eye-hand coordination and eye-leg coordination between ten national level central blockers and ten counter attackers in volleyball age ranged between 22 to 28 years. The subjects were taken from a renowned club BhabhaniSangha situated in Bhadreswar, Hooghly. eye-hand coordination was measured by the ball transfer test and eye-leg coordination was measured by the eye-foot coordination test. The means of the respective variables were compared between central blockers and counter attackers by applying t-test . Statistical significance was tested at 0.05 levels. The result of the present study shows that there was no significant difference in the mean value ofeye-hand coordination and eye-leg coordination between central blockers and counter attackers in volleyball.

Keywords:
Eye-hand Coordination, Eye-Leg Coordination, Central Blockers, Counter Attackers,Volleyball

1. INTRODUCTION

Volleyball is an extremely popular game which is played all over the world. FIVB is the world's largest sports organization with 220 affiliated member countries. It is a sport involving short and intensive physical efforts during training and competitions .volleyball players mainly relies on force, power, jumping ability with proper co-ordination of muscles and organs.

Along with the other component one of the most important component is co-ordination, which also plays a major role. A sportsman can compete effectively only by a coordinative mastery of the technique. Coordinative abilities enable the sportsman to do a group of movements with better quality and effect. Coordinative abilities are needed for maximal utilization of conditional abilities, technical skills, and tactical skills.

In volleyball game two very important positions are attackers and blockers.This study revolves around these two very important positions. Blocking in volleyball is a method of defending a spike in which the defensive team jumps up the net and stops the spike from crossing the net by contacting it with arms and hands. Blocking is the first line of defense against the attack of the opponent.Spiking is another very important skill in volleyball. Spiking is the act of driving the ball hard into an area of your opponent's court through cross court or diagonal hit or straight hit.

The present study is an effort for the path of investigation to seek the required amount of eye-hand coordination and eye-leg coordination among central blockers and attackers.

In case of spikers eye-hand coordination enables them to spike the ball with perfect technique and hit in the desired zone of the opponents court with full power and sometimes even with slow pace. And in case of central blockers

they resist the attackers from attacking the ball by use of proper blocking technique and placement of hands with the help of proper eye hand coordination.

The eye-leg coordination facilitates the spikers with better footwork and jump ability to hit as he wants to. And in case of central blockers the jumping and moving to the desired direction to complete a good block against the attack of a spiker eye-leg coordination is required.

2. STATEMENT OF THE PROBLEM

The purpose of the study was to compare the differences on eye-hand coordination and eye-leg coordination between national level attackers and blockers in volleyball.

3. METHODS

The objective of the study was to investigate the difference on eye-hand coordination and eye-leg coordination between national level attackers and blockers in volleyball. For this study 10 central blockers and 10 counter attackers from national level volleyball player were selected. The age of the subjects ranged between 22 to 28 year.

To compare the eye-hand coordination ability subjectswere asked to stand in the middle and 7.5 ft on left and right side of the subject box will be marked. With the command of the tester the subject will run and collect the balls from right side and place it on the left side marked box,5 balls are required to be transferred.

Tocompare the eye-legcoordination ability,the subjects wereasked to stand behind the marked area with one leg. With the start of the testers stopwatch and his command the subjects hops on the marked places as quickly as possible with acute perfection. One trial is permitted.

Table 1: Significance of Difference of Means and Standard Deviations of Eye-Hand Coordination and Eye-Leg Coordination between Central Blocker and Counter Attacker

Variables	Mean		Standard Deviation		t-Ratio
	Central Blocker	Counter Attacker	Central Blocker	Counter Attacker	
Eye-Hand Coordination	14.5150	13.3050	1.78999	1.78999	1.318 NS
Eye-Leg Coordination	6.8650	6.3980	1.58819	.99856	.720 NS

Table value-$t_{0.05}(18)$ = 2.101,*= Significant, NS=Not Significant.

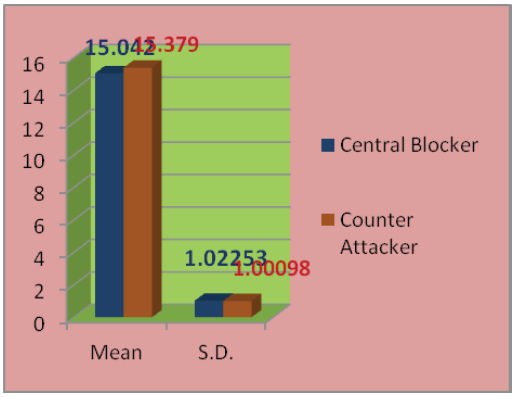

Figure 3: Comparison of Mean and Standard Deviation of Eye-Hand Coordination Ability between Central Blockers and Counter Attackers

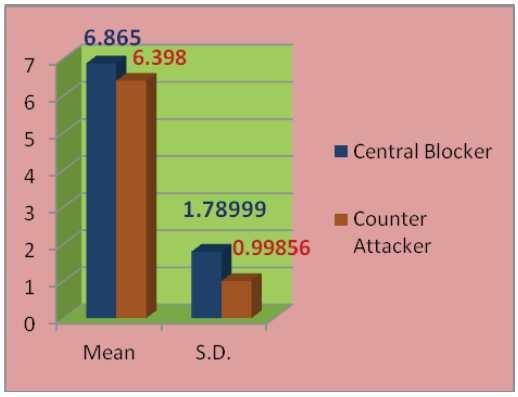

Figure 4: Comparison of Mean and Standard Deviationof Eye-Leg Coordination Ability between Central Blockers and Counter Attackers

4. DISCUSSION OF FINDINGS

The calculated t value of eye-hand coordination (1.318) and eye-leg coordination (.720) from the obtained data is less than the tabulated t value (2.101).The result explains that in case of eye-hand coordination and eye-leg coordination there was no significance difference in comparison to central blockers and counter attackers.

From the gathered data and the statistical calculation it was found that the central blocker does not differentiate much with the counter attackers in case of eye-hand coordination ability and also eye-leg coordination ability.

The central blockers need to have sheer perception and accurate time while completing a successful block. The eye-hand coordination and eye-leg coordination in this perspective plays a major role and the blockers required to develop this motor qualities.

In case of attackers the ability to spike the ball with great effect successfully will only be possible when they can jump and connect properly with the ball and can smash it in the desired zone of the opponent's court. For this purpose good eye-hand and eye-leg coordination ability is considered as a prime requisition.

The result found as non-significant in this present study may be due to the fact that both types of player need to possess similar qualities and their training module have been focused to develop such qualities. As the players considered in this study have specialize themselves in skill development and develop their fitness components blended with eye-hand and eye-leg coordination, required for playing Volleyball at the National Level with great efficiency, perhaps to be non-significance.

5. CONCLUSION

1. Significant difference was not found in case of eye-hand coordination between central blockers and attackers.
2. Significant difference was not found in case of eye-leg coordination between central blockers and attackers.

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Anxiety among Successful, Unsuccessful and Non-Sportsman Adolescents

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Abstract:
The present study was conducted to examine anxiety among successful, unsuccessful and non-sportsman adolescents. Total three hundred (N=300) male adolescents which include one hundred (n=100) successful sportsman, one hundred (n=100) unsuccessful sportsman and one hundred (n=100) non- sportsman adolescents were selected to act as subjects. The successful sportsman were those athletes who won medals in the inter-school tournaments whereas unsuccessful sportsman were those athletes who had just participated but failed to won medals in the inter-school tournaments and non- sportsman were those who did not participate in any inter-school tournaments. Random sampling technique was applied to select the subjects studying at various Government schools of Manipur. Anxiety was measured by applying the Anxiety Scale for Children constructed by Singh, A. K. and Gupta, A. Sen (2009). The One way Analysis of Variance (ANOVA) was applied to find out the significance of differences among successful, unsuccessful and non- sportsman adolescents. The level of significance was set at 0.05. The results of One way Analysis of Variance (ANOVA) among successful, unsuccessful and non- sportsman adolescents with regard to the variable anxiety was found statistically significant (P<.05). Since the obtained F-ratio 61.84 was found statistically significant, therefore, Post-hoc test was applied to see the degree and direction of differences among successful, unsuccessful and non- sportsman adolescents. The non-athlete adolescents had exhibited significantly higher anxiety followed by unsuccessful and successful sportsman adolescents.

Keywords:
Anxiety, Successful, Unsuccessful, Non- sportsman

1. INTRODUCTION

The root meaning of the word anxiety is 'to vex or trouble'; in either presence or absence of psychological stress, anxiety can create feelings of fear, worry, uneasiness, and dread (Bouras and Holt, 2007). Anxiety is generally regarded as having a set of component parts that include cognitive functioning, physiological, emotional, and behavioral facets. One cognitive component is the expectation of uncertain danger, of course. In literature terms such as stress, anxiety, arousal and fear have been used interchangeably with anxiety. Stress is a state that results from the demands that are placed on the individual which require that person to engage in some coping behavior (Jones, 1990). Arousal can be considered to be a signal to the individual that he or she has entered a stressful state and is characterized by physiological signs. Anxiety results when the individual doubts his or her ability to cope with the situation that causes him or her stress (Hardy et al., 1996). As such, anxiety is distinguished from fear, which is an appropriate cognitive and emotional response to a perceived threat. Additionally, fear is related to the specific behaviors of escape and avoidance, whereas anxiety is related to situations perceived as uncontrollable or unavoidable (Ohman, 2000).

The present situation is an era of competition in which every individual is trying to go ahead of others. The all-pervasive competitive atmosphere, its social or academic encourages adolescents to constantly compare themselves with their peers. Consequently their self-image is in a continual state of redefinition. Stress is partly created by parental pressure too when they expect the adolescents to perform and stand out among their peer groups. When they can't rise up to that expectation or are in process of meeting it, adolescents suffer from frustration, physical stress, aggression, undesirable complexes and depression (Bhansali and Trivedi, 2008). Anxiety has emerged as one of the most salient constructs in modern-day psychology and by far the most widely studied specific form of anxiety in the literature. Anxiety is a psychological condition in which a person experiences distress before, during, or after a test or other assessment to such an extent that this anxiety causes poor performance or interferes with normal learning. It deserves its notice due to its prevalence amongst the student's populations of the world (Mandler and Sarason, 1952). Anxiety is a kind of state of anxiety which relates to the impending danger from the environment of the academic institution. Anxiety is frequently used by other equivalent terms such as test anxiety, evaluation anxiety, performance anxiety and examination anxiety (Ottens, 1991). Anxiety is interchangeably used by term test and performance anxiety. Test anxiety is a ubiquitous phenomenon, with some degree of evaluative anxiety being experienced by most people in modern society. The test anxiety construct has matured within a large cocoon of attention ever since its inception in the early 1950s, with researchers making important strides toward understanding its nature, components, origins, determinants, effects, and treatments. The importance of test anxiety in understanding sources of student stress in evaluative situations and poor test performance is now readily apparent. The topic of test anxiety has prospered, in part, due to the increasing personal importance of test situations for people in modern society, making tests and their long-term consequences significant educational, social, and clinical problems for many. Since test results in most academic and occupational settings have important practical implications for a person's goals and future career, therefore, the present study was designed to investigate Anxiety among successful, unsuccessful and non- sportsman adolescents.

2. METHOD AND PROCEDURE

2.1. SAMPLE

For the present study, total three hundred (N=300) male adolescents which include hundred (n=100) successful sportsman, hundred (n=100) unsuccessful sportsman and hundred (n=100) non- sportsman adolescents were selected to act as subjects. The successful athletes were those who win medals in the inter-school tournaments whereas unsuccessful sportsman were those who had just participated but failed to win medals in the inter-school tournaments and non- sportsman were those who did not participate in any inter-school tournaments. Random sampling technique was applied to select the subjects studying at various schools of Manipur.

2.2. TOOL

For measuring Anxiety among successful, unsuccessful and non- sportsman adolescents, the Anxiety Scale for Manipur constructed by Singh, A. K. and Gupta, A. Sen (2009) was administrated.

3. STATISTICAL DESIGN

One way Analysis of Variance (ANOVA) was applied to find out the significance of differences among successful, unsuccessful and non- sportsman adolescents. Where 'F' ratio found significant, Scheffe's Post-hoc test was applied to find out the direction and significance of differences among successful, unsuccessful and non- sportsman adolescents. To test the hypothesis, the level of significance was set at 0.05.

4. RESULTS

The results with regard to variable of anxiety among successful, unsuccessful and non- sportsman adolescents have been presented below:

Table 1: Analysis of Variance (ANOVA) Results with Regard to Variable Anxiety among Successful, Unsuccessful and Non- Sportsman Adolescents

Variable	Source of Variance	Sum of Squares	D.F.	Mean Square	F-ratio	Sig.
Academic anxiety	Between group	843.287	2	421.643	61.844*	0.000
	Within group	2024.91	297	6.818		
	Total	2868.197	299			

*Significant at 0.05, $F_{0.05}$ (2,297)

It is evident from table-1 that results of Analysis of Variance (ANOVA) among successful, unsuccessful and non-sportsman adolescents with regard to variable anxiety were found statistically significant (P<0.05).

Since the obtained F-ratio 61.844 was found statistically significant, therefore, Scheffe's Post-hoc test was applied to find out the direction and significance of differences between paired means among successful, unsuccessful and non-sportsman adolescents with regard to variable anxiety. The results of Post-hoc test have been presented in Table 2 below.

Table 2: Comparison of Mean Values of Scheffe's Post-hoc Test among Successful, Unsuccessful and Non- Sportsman Adolescents with Regard to Variable Anxiety

Group (A)	Group (B)	Mean Difference (A-B)	Sig.
SUCCESSFUL (Mean- 6.57)	UNSUCCESSFUL	2.51000*	.000
	NON-SPORTSMAN	4.07000*	.000
SUCCESSFUL (Mean- 6.57)	UNSUCCESSFUL	2.51000*	.000
	NON- SPORTSMAN	4.07000*	.000
UNSUCCESSFUL (Mean- 9.08)	SUCCESSFUL	2.51000*	.000
	NON- SPORTSMAN	1.56000*	.000
NON- SPORTSMAN (Mean- 10.64)	SUCCESSFUL	4.07000*	.000
	UNSUCCESSFUL	1.56000*	.000

A glance at table-2 showed that the mean value of successful athletes was 6.57 whereas unsuccessful sportsman had mean value as 9.08 and the mean difference between both the groups was found 2.51000. The p-value sig .000 shows that the unsuccessful sportsman had demonstrated significantly higher anxiety than their counterpart's successful athletes.

The mean difference between successful athletes and non- sportsman adolescents was found 4.07000. The p-value sig .000 revealed that the non- sportsman adolescents had exhibited significantly higher anxiety than their counterpart's successful athletes.

The mean difference between unsuccessful sportsman and non- sportsman adolescents was found 1.56000. The p-value sig .000 showed that the non- sportsman adolescents had demonstrated significantly higher anxiety than their counterpart's unsuccessful sportsman.

The graphical representation of responses has been exhibited in (Figure 1).

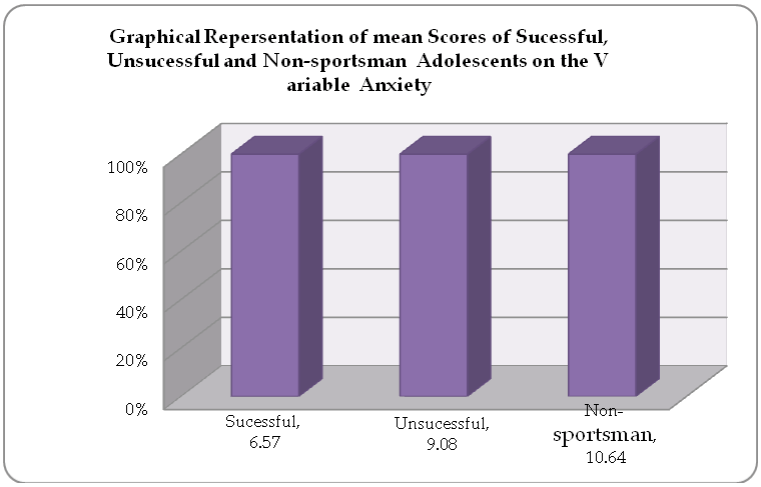

Figure 1: Graphical Repersentation of Mean Scores of Sucessful, Unsucessful and Non-Sportsman Adolescents on the Variable Anxiety

5. DISCUSSION

It is evident from the results presented in tables (1-2) that there was significant difference found among successful, unsuccessful and non - sportsman adolescents with regard to the variable Anxiety as the obtained F-ratio 61.844 was found statistically significant. The findings might be due to the fact that sports participation provides ample opportunities for emotional outlet to its participants and enable them to regulate the negative emotions associated with the environment as well as make them to do better on the task at hand. Singh (2004) carried out a study to explore the level of anxiety and emotional intelligence among the school students. While describing his results he revealed insignificant differences between sports and non-sports groups with regard to the variable Anxiety. However, while comparing the mean values of both the groups, it was observed that sports group had exhibited controlled anxiety than their counterpart's non-sports group. Similar findings were also reported by Beal (1998) while examining the academic achievement of student sportsman to non- sportsman at the University of North Dakota (UND), a NCAA Division II institution revealed that student- sportsman ' achievement surpassed non-sportsman. Initially, no significant difference was found between the cumulative colleges GPAs of student-athletes and non- sportsman. Furthermore, student- sportsmen were significantly less likely to have been placed on Academic Probation than their non sportsman counterparts. Similarly Yiannakis and Melnick (2001) explored that purported positive benefits attributable to the participation in high school sports by executing a longitudinal investigation from a nationally representative sample of 10th graders in order to assess the net effect of sportsman participation on student outcomes after a number of factors were controlled for. Specifically, the controls included student background and 8th-grade measures of the dependent variable of the study. They found that there were positive effects of sport participation on grades (lower academic trepidation), self-concept, locus of control, and educational aspirations in addition to a negative effect on discipline problems. Broh (2002) describes, the model supports the long held belief that sports participation socializes adolescents and prepares them for educational success. It is believed that teaching characteristics that are commonly found in sportsman and acquired through sports participation, including respect for authority, perseverance, dedication, and a strong work ethic, are constant with educational principles and that these characteristics that children acquire through sports help them achieve academically. According to him participation in sports significantly improves self-esteem, locus of control, and time spent on homework. These results offer empirical evidence that sports participation does help to build character, which, in turn, directly aids students' academic achievement. Another study conducted by Paul (2006) had examined academic anxiety, psycho-social conflicts and mental health among adolescents. He revealed significant difference ($P<0.05$) between sports and non-sports group with regard to academic anxiety. It was further found that

sports group had lower academic anxiety as compared to non-sports group. NHSAW (2001) found that the boys who had participated in sports demonstrated lower academic anxiety than their non- sportsman counterparts by a ratio of 2:1. Similarly, the study indicated that female sportsman exhibited controlled academic anxiety than their non- sportsman counterparts by a ratio of 3:1.

6. CONCLUSION

It is concluded from the above findings that significant differences were observed among successful, unsuccessful and non sportsman adolescents with regard to variable anxiety. Since the obtained F-ratio 61.84 was found statistically significant, therefore, it shows that non- sportsman adolescents had exhibited significantly higher anxiety than unsuccessful sportsman. Similarly, the unsuccessful sportsman demonstrated higher academic anxiety than successful sportsman. Finally, the successful sportsman adolescents showed controlled anxiety.

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Comparison of Anxiety, Aggression, Self-Concept and Morality among Individual, Combative and Team Game Players

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Abstract:

The purpose of the study was to characterize university level players by selected psychological responses and to compare selected psychological variables among individual, combative and team games. The study was conducted on selected psychological variables on 60 male interuniversity level players, twenty from each group i.e. individual, combative and team games. The age of the subjects was ranging between 20 to 25 years. The selected psychological variables were anxiety, aggression, self-concept and morality. To compare psychological variables among individual, combative and team games, analysis of variance (ANOVA) was employed at 0.05 level of significance. On the basis of results following conclusions were drawn:

No significant difference was found in individual sports, combative sports and team games in relation to anxiety (0.086) and aggression (0.259) whereas significant difference was found in self-concept (3.693) and morality (4.737) among individual, combative and team games

1. INTRODUCTION

Success and failure of an athlete depends on the blending of physical conditioning, training, mental preparation and ability to perform well in under pressure and cooperation of athlete with others, so all the aspects (physical, psychological and social) are needed for an athlete. If one is lacking in an aspect, it is very difficult to get success in competition. That's why the coaches must not only have the knowledge about the skills and strategies of the sports but also should be psychologically skillful. Anxiety is one of the greatest problems of modem trends in scientific knowledge, culture conflict, economic problem; industrialization all adds to the problem of men thus increasing the anxiety level. Sports may be arranged in a scale accordingly to the intensity and type of aggression inherent in each. Some sports require that a great deal of physical force be directed against one's opponent, whereas other requires forceful actions against the environment instead of direct aggression. Many sports however required that individual aggress with in structured rules and specific conditions stressful in the fact that in many sport all out aggression is alternated with periods of total absence of action. Thus, in sport as in life, one problem is to encourage an optimum amount of aggression. The self-concept is a highly complex component of behavior, composed of both cognitive and effective dimension and has at least four orientations: The real self, the perceived self, and the ideas self and the self as perceived by others. Not only from physical, physiological but also from moral point of view one has to be fit. Jawaharlal Nehru the first prime minister of India said about "PLAY THE GAME IN THE TRUE SPIRIT OF THE GAME" which reflects the moral values in games/sports.

Sports world is not separate from the real world. Just to get materialistic gains, people got to any extent. Today there are many who will readily bequeath their soul to the devil in exchange for pleasure and power. Modern

man is confronted with temptation at every step. In sports, the unfair measures of winning viz. cheating, lying, aggression, violation of rules, doping etc. has taken the place of morality.

Athlete thanks that morality is the obstacle in winning the games. It is the hindrance in their performance improvement. They use the unfair means, though may later realize the price. They had to pay for it in terms of losing their peace and happiness. It is because of the weakness of modern man/athlete that man has become a victim of their lust. The only way is the spiritual and moral regeneration through listening to their inner voice, the so-called conscience. That can never mislead man. The future of humankind is really in the hands of those who can bring about a reawakening of man's higher consciousness.

2. PURPOSE

The purpose of the study was to characterize university level players by anxiety, aggression, self-concept, and morality. Another purpose of the study was to compare anxiety, aggression, self-concept and morality among individual, combative and team games

3. MATERIAL AND METHODS

3.1. PARTICIPANTS

Sixty players at university level were selected as subjects for the study. The age of the subjects ranged between 20 to 25 years. The subjects were selected according to following sports groups.

Table 1: Participants

Individual Sports			Combative Sports		Team games		
Badminton	Athletics	Swimming	Wrestling	Judo	Football	Volleyball	Hockey
06	07	07	10	10	07	07	06

3.2. QUESTIONNAIRE USED

The following questionnaires were used to test the hypothesis:

1. The anxiety score of the subject was obtained by using Sports Competition Anxiety Questionnaire–A form developed by Rernier Marten.
2. The aggression score of the subject was obtained by using sports Aggression inventory developed by Anand Kumar and Prem Shankar Shukla.
3. The self-concept scores of the subjects were obtained by using Self-Concept Questionnaire (SCQ) by Dr. Raj Kumar Saraswat (r = 0.91)
4. Morality score of the subjects was obtained by using sports morality test by Dawn Slephae and David Layed Shield.

3.3. STATISTICAL ANALYSIS

To compare the Anxiety, Aggression, Self-concept and Morality among Individual, Combative and Team Game Players, one way analysis of variance (ANOVA) was applied at 0.05 level of significance.

5. RESULTS

To compare the Anxiety, Aggression, Self-concept and Morality among Individual, Combative and Team Game Players, one way analysis of variance (ANOVA) was applied and data pertaining to these has been presented in two sections.

Section one deals with the characteristics of Anxiety, Aggression, Self-Concept, and Morality belonging to Individual, Combative and Team Games.

Section two deals with the comparison of psychological variables namely Anxiety, Aggression, Self-Concept, and Morality among all the categories.

5.1. SECTION ONE

Table 2: Mean and Standard Deviation of Anxiety, Aggression, Self-concept and Morality Belonging to Individual, Combative and Team Game Players

Variables	Groups	Mean	Standard Deviation
Anxiety	Individual	19.75	2.77
	Combative	19.40	2.91
	Team	19.65	2.56
Aggression	Individual	70.15	4.18
	Combative	69.35	3.19
	Team	69.45	4.03
Self-Concept	Individual	13.55	2.01
	Combative	11.40	2.14
	Team	12.40	2.45
Morality	Individual	161.30	24.87
	Combative	175.70	15.79
	Team	160.25	18.51

5.2. SECTION TWO

Table 3: Analysis of Variance of Anxiety belonging to Individual, Combative and Team Games

Source of Variance	d.f.	Sum of Squares	Mean Sum of Squares	F-Raito
Between Groups	2	1.300	0.650	0.086
Within Groups	57	431.10	7.563	

Tab.-F 0.05 (2,57) = 3.17

It appears from Table 3 that the obtained value of F (0.086) among Individual, Combative and Team Games in relation to Anxiety was less than the tabulated value (3.17) at 0.05 level of significance, therefore null hypothesis among the Individual, Combative and Team Game Players was accepted.

Table 4: Analysis of Variance of Aggression belonging to Individual, Combative and Team Games

Source of Variance	d.f.	Sum of Squares	Mean Sum of Squares	F-Raito
Between Groups	2	7.600	3.800	0.259
Within Groups	57	836.050	14.668	

Tab.-F 0.05 (2,57) = 3.17

It appears from table-4 that the obtained value of F (0.259) among Individual, Combative, and Team Games in relation to Aggression was less than the tabulated value (3.17) at 0.05 level of significance, therefore null hypothesis among the Individual, Combative and Team Game Players was accepted.

Table 5: Analysis of Variance of Self-Concept Belonging to Individual, Combative and Team Games

Source of Variance	d.f.	Sum of Squares	Mean Sum of Squares	F-Raito
Between Groups	2	2981.100	1490.550	3.695*
Within Groups	57	23004.150	403.582	

*Significant at 0.05 level of significance

Tab.-F, 0.05 (2, 57) = 3.17

It appears from Table 5 that the computed value of F (3.695) among Individual, Combative, and Team Games in relation to Self-Concept was greater than the tabulated value (3.17), at 0.05 level of significance, therefore null hypothesis among the Individual, Combative, and Team Game Players was rejected.

Table 5.1: Least Significant Difference (LSD) Post-Hoc Test of Self-Concept in Relation to Individual, Combative and Team Games

Individual	Team	Combative	Mean Difference	Critical Difference
175.50	161.30		14.20*	12.70
175.50		160.25	15.25*	
	161.30	160.25	1.05	

*The Mean Difference was Significant at 0.05 level of significance

It is evident from table-5.1 that mean difference of Combative and Individual, Combative and Team was significant whereas mean difference of Individual and Combative was not significant at 0.05 level of significance.

Table 6: Analysis of Variance of Morality Belonging to Individual, Combative, and Team Games

Source of Variance	d.f.	Sum of Squares	Mean Sum of Squares	F-Raito
Between Groups	2	46.300	23.150	4.737*
Within Groups	57	278.550	4.887	

*Significant at 0.05 level of significance

Tab.-F, 0.05 (2, 57) = 3.17

It appears from Table 6 that the computed value of F (4.737) among Individual, Combative, and Team Games in relation to Morality was greater than the tabulated value (3.17), at 0.05 level of significance, therefore null hypothesis among the Individual, Combative, and Team Game Players was rejected.

Table 6.1: Least Significant Difference (LSD) Post-Hoc Test of Morality in Relation to Individual, Combative and Team Games

Individual	Team	Combative	Mean Difference	Critical Difference
13.55	12.40		1.150	1.398
13.55		11.40	2.150*	
	12.40	11.40	1.00	

*The Mean Difference was Significant at 0.05 level of significance

It is evident from table-6.1 that mean difference of Individual and Combative was significant, on the other hand mean difference of Individual and Team; Team and Combative was not significant at 0.05 level of significance.

6. CONCLUSION

1. The analysis of data revealed that the anxiety, aggression, of Individual, Combative and Team Game players did not differ significantly. This may be attributed to the fact that anxiety is more or less related with the experience of the player, since all the players were having more or less same experience.
2. Almost all the players in different games need a good level of controlled aggression and hence their nature of game has not brought any difference.

3. The analysis of data also showed that significant difference was found among Individual, Combative and Team Game players in relation to Morality and Self-Concept. This might be due to the reason that the sportsmen belonging to all the three categories of sports uses different types of tactics i.e. negative as well as positive. These tactics require different types of moral values and self-concept.

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Influence of Different Types Warming Up on Strength Performance of the Trained Athletes

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Abstract:

Introduction: Participating in some form of a warming up prior to engaging in physical activity is considered an acceptable and valid practice. Nonetheless, the topic has been debated among those in the sport and physical education field for a number of years. The present study was framed to find out the influence of various types active and passive of warming up methods on trained and untrained subjects.

Methodology:

Subjects: The active trained athletes participating in sports and games for more than 5 years and had participated at least one Inter-University or State Level games and sports of age group 20-25 years were taken as subjects (N = 26) for the study and they are called Trained athletes or TA. They were collected from 70 numbers of available subjects. All the boys were selected randomly from the respective population all over Murshidabad and Nadia district of West Bengal.

Group Design: First of all the investigator was interested in assessing the influence of different warming up procedure on strength performances of the trained athletes. Each of 26 randomly selected human subjects performed the task under each of five conditions. The five conditions were performance after No Warming Up (NWU), Active Unrelated Warming Up (AUR), Active Related Warming Up (AR), Sauna Bath (SB) and Massage (MAS) respectively. In all conditions, the subjects were performed pull-ups without any warming up or after a certain type of warming up.

Statistical Design: The performance of the subjects had been assessed under five separate conditions. At first basic data was presented, which was followed by Coefficient of correlation. Next step was calculation of percentage difference between No Warming Up and each of the five conditions. Finally analysis of variance had been made among five data of each test and that was followed by the Post Hoc Test for definite conclusion on effect of each conditions.

The data was analyzed by appropriate statistical method.

Results and Discussion: It was found that both active and passive warming-up had significant influence on speed performances of trained subjects, but the percentage of influence varied according to their performance status.

Conclusion: The analysis showed the relationship among performances as AR≥SB≥AUR>MAS>NWU, which meant that, performance at AR was best of all other performances and which might be higher or equal to the performance at SB as well as AUR. Performance at SB was highest among remaining three performances, but it may be higher or equal to the performance at AUR. Performance at AUR was higher than two remaining performances after MAS and NWU. Performance after NWU was found to be lowest of all other warming up performances.

Keywords:

Warming-up, Active and Passive WU, Strength Performance, Trained Athletes

1. INTRODUCTION

Participating in some form of a warming up prior to engaging in physical activity is considered an acceptable and valid practice. Nonetheless, the topic has been debated among those in the sport and physical education field for a number of years. Some professionals believe warming-up is essential to physical activity, while others believe warming-up is not necessary.

However, there are numerous physiological advantages associated with a warming-up that are difficult to refute. A warming-up is usually performed before participating in technical sports or exercising. A warming-up generally consists of a gradual increase in intensity in physical activity (pulse raiser), a joint mobility exercise, stretching and a sport related activity. For example, before running or playing an intense sport one might slowly jog to warm muscles and increase heart rate. It is important that warming ups should be specific to the exercise that will follow, which means that exercises (of warming up) should prepare the muscles to be used and to activate the energy systems that are required for that particular activity. The risks and benefits of combining stretching with warming up are mixed and in some cases disputed. Warming up prepares the body mentally and physically. Edington and Egerton state: `Warming-up is a technique to prepare the body for exercise at a competitive rate'.

There are some historical evidence regarding practice of warming-up in ancient times that ancient Greeks believed that training and music should be experienced together because they both pleased man's spirit and music was a key part of their warm up (Stefanovic *et al.*112). The athletic training of Greeks differed depending on whether it was held in indoors or outdoors, in hot or cold weather, on wet or dry days. In the ancient Greco-Roman tradition, wrestling warming-up drills were very important. Warming-up drills got one's body's systems going, his blood flowing, and his body was being ready for the upcoming challenges. Different researchers like **Asmussen and Boje (1945), Gregson, *et al.*(2002), Grose (1958), Bergh and Ekblom (1979)** and so on studied the performance of trained, moderately trained and untrained male under various WU conditions and they showed performance increment in sprint time, peak velocity, average speed at exercise, hot water shower, hot bath, diathermy etc in comparison to no WU. **Bishop, (2003)** concluded after reviewing different studies that active warming up tends to improve slightly larger improving in short-term performance (<10 seconds) than those achieved by passive heating alone. In another study they suggested that supra-maximal sprints were improved by including a judicious amount of specific supra-maximal sprinting in warm-up. **Curry, *et al.* (2009)** suggested that the variation in responses to warm-up conditions emphasizes the unique nature of individual reactions to different warm-ups; however, there was a tendency for warm-ups with an active component to have beneficial effects. The data suggests dynamic stretching has greater applicability to enhance performance on power outcomes compared to static stretching in trained only. **Close, 1995**; **Barany, 1967; Gray, *et al.*, 2006** suggested that muscles must be warmed up in order to contract as fast as possible. At the same time **Bishop (2003)** suggested that a warm muscle reduces the viscosity leading to more efficient contraction. Different researchers like **Asmussen and Boje (1945), Gregson, *et al.* (2002), Grose (1958), Bergh and Ekblom (1979), Binkhorst, *et al.* (1977), Clerk, et ai. (1958), Davies and Young (1983), Ranatunga, *et al.*(1980), Grose (1958)** and so on studied the performance of trained, moderately trained and untrained male under various WU conditions and they showed performance increment in isometric force, vertical jump height, hand grip strength, finger strength, knee extension etc at exercise, hot water shower, hot bath, diathermy etc in comparison to no WU. They also showed best performance increment for trained than moderately trained and untrained. **Holmstrom, *et al.*(2001)** suggested that short dose of warming up exercises could be beneficial for increasing and maintaining joint and muscle flexibility and muscle endurance for untrained male workers. **Barlow, *et al.* (2004)** suggested that a single massage of hamstring muscle group does not significantly alter Sit & Reach performance. However, their results also seem to indicate that percentage changes in Sit and Reach scores may be inversely proportional to pre-treatment values. The percentage changes in Sit & Reach scores were relatively small for those with pre-treatment values of 15 cm. and above –that is, those with relatively long reach to begin with.

2. METHODOLOGY

2.1 SELECTION OF SUBJECTS

The active trained athletes participating in sports and games for more than 5 years and had participated at least one Inter-University or State Level games and sports of age group 20-25 years were taken as subjects (N=26) for the study and they are called Trained athletes or TA. They were collected from 70 numbers of available subjects. All the boys were selected randomly from the respective population all over Murshidabad and Nadia district of West Bengal.

2.2. CRITERION MEASURE

Strength performance of the subjects was measured through Pull-ups test performance.

2.3. GROUP DESIGN

First of all the investigator was interested in assessing the influence of different warming up procedure on Pull-ups test performances of the trained athletes. The sample size for Trained athletes (TA) was 26 (twenty six) and they were selected randomly. Each of 26 randomly selected human subjects performed the task under each of five conditions. The five conditions were performance after No Warming Up (NWU), Active Unrelated Warming Up (AUR), Active Related Warming Up (AR), Sauna Bath (SB) and Massage (MAS) respectively. In all conditions, the subjects were performed Pull-ups without any warming up or after a certain type of warming up.

2.4. STATISTICAL DESIGN

The performance of the subjects had been assessed under five separate conditions. At first basic data was presented, which was followed by Coefficient of correlation. Next step was calculation of percentage difference between No Warming Up and each of the five conditions. Finally analysis of variance had been made among five data of each test and that was followed by the Post Hoc Test for definite conclusion on effect of each conditions.

3. RESULTS & DISCUSSION

Table 1 shows the means, variances, standard deviation and standard errors of the performances in of the subjects in pull up test under five conditions. The five conditions were performance after No Warming Up (NWU), Active Unrelated Warming Up (AUR), Active Related Warming Up (AR), Sauna Bath (SB) and Massage (MAS) respectively. The measurements were taken in respective units immediate after the performance of the 26 subjects under each of the **k**=5 conditions. The Mean and Variance of performance after no warming up and four warming up conditions were 10.0385 and 9.8785, 12.6923 and 15.5015, 13.1923 and 14.7215, 12.9231 and 13.8338, 11.8462 and 14.4554 respectively. The overall Mean and Variance was found 12.1385 and 14.5698. The mean performances at different conditions is shown in Fig.3.

Table 1: Mean, Variance, S.D. and S.E. of Pull-ups Data

	NWU	AUR	AR	SB	MAS	Total
N	26	26	26	26	26	130
∑X	261	330	343	336	308	1578
Mean	10.0385	12.6923	13.1923	12.9231	11.8462	12.1385
Var.	9.8785	15.5015	14.7215	13.8338	14.4554	14.5698
S.D.	3.143	3.9372	3.8369	3.7194	3.802	3.817
S.E.	0.6164	0.7721	0.7525	0.7294	0.7456	0.3348

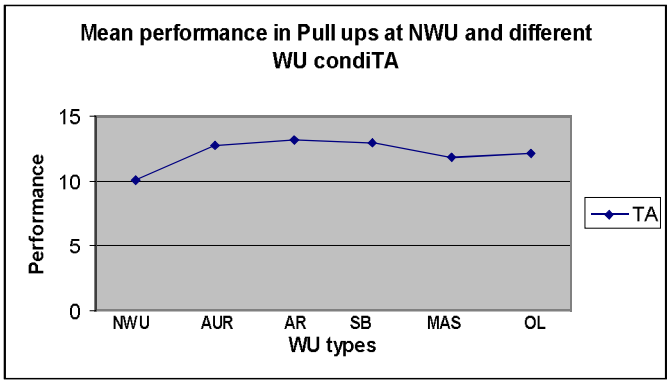

Figure 1: Pull ups Performance after NWU and Different WUs of TA

The all possible correlation coefficients (**r**) among the **5** groups had been also be measured. (The homogeneity of covariance assumption requires that all of these correlation coefficients be positive and of approximately the same magnitude). All the correlations were found positive and more all less high. Essentially, it is a requirement that the differential effects of the **5** conditions are consistent among the subjects in the repeated measures design, or among the matched sets of subjects in the randomized blocks design. The correlation coefficients of each performance with that of another performance were shown in Table No.-2.

Table 2: Correlation Coefficient between each Two Performances

Variables	NWU vs. AUR	NWU vs. AR	NWU vs. SB	NWU vs. MAS	AUR vs. AR	AUR vs. SB	AUR vs. MAS	AR vs. SB	AR vs. MAS	SB vs. MAS
Correlations	0.960	0.9214	0.9070	0.9411	0.9652	0.957	0.9773	0.9764	0.953	0.952

To find the magnitude of increment in performance in pull ups the percent increment of performance in respect of no warming up was calculated. That calculation was actually made to compare the increment of performance with different subjects groups after the influence of different warming ups. In Pull ups test that increment due to different warming ups is shown in Table No.-3 and Fig.-2. In respect of such increment it was found that. AR>SB>AUR>MAS.

Table 3: Percentage Increment of Performance in Pull-ups for Trained Athlete

	Warming Up Type				
Performance Variable	**AUR**	**AR**	**SB**	**MAS**	**Overa**
Pull-ups Test % Increment of Performance	26.43	31.41	28.73	18.00	20.91

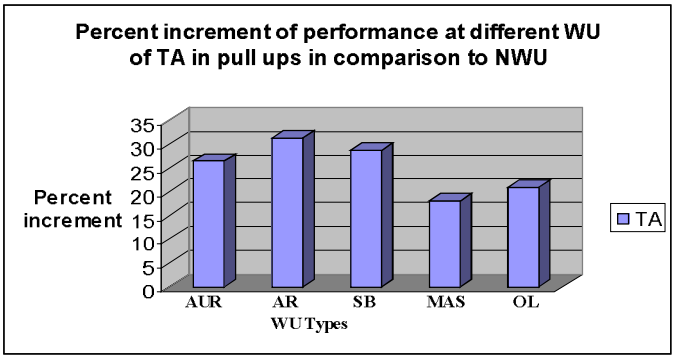

Figure 2: Per cent Increment of performance at Different WU of TA in Pull ups in Comparison to NWU

The data for the one way analysis problem consists of no warming up as well as different post warming up data of Trained Athletes. Let us now consider the ANOVA of correlated samples. It is the same structure with the correlated- samples ANOVA with two samples, except that now the number of conditions is three or more: NWU | AUR | AR | SB | MAS, and so forth. When the analysis involves each subject being measured under each of the **k** conditions, it is sometimes spoken of as a **repeated measures** or **within subjects** design. When it involves subjects matched in sets of three for **k**=3, four for **k**=4, and so on, with the subjects in each matched set randomly assigned to one or another of the **k** conditions, it is described as a **randomized blocks** design. (In this latter case, each set of **k** matched subjects constitutes a "block.") Thus, for **k**=5, the investigator had choosen the repeated measure design to analyse the data. Table No.-9 showed the analysis of variance.

Table 4: ANOVA Table for Pull ups test samples for Trained Athlete

Source	SS	df	MS	F	P
Treatment(Between groups)	169.7385	4	42.4346	57.45*	<0.0001
Error	73.8615	100	0.7386		
Ss/Bl	1635.9077	25			
Total	1879.5077	129			

*Significant, F (4,100) = 2.46 (5%), 3.51 (1%)

Consulting the tabulated value of F with degrees of freedom 4 and 100, the F ratios needed for significant differences between the means are 2.46 and 3.51 at 0.05 and 0.01 levels, respectively. As the observed value of **F**= 57.45 falls far to the right of **F**=3.51, the aggregate differences among the means of the five groups of measures, NWU | AUR | AR | SB | MAS, can be adjudged significant well beyond the .01 level. Our calculated F is much higher than the tabulated value. Therefore, F is significant. When F is significant then it is said that at least two means are significantly different.

In order to evaluate the magnitude differences among the various treatment means, additional post hoc test may be made. Let us test the difference between all possible pairs of means with the help of Tukey HSD test. Table No.-10 showed the post hoc test.

Tukey HSD Test

Critical Values: Q (.05) = 3.93 and Q (.01) = 4.74

Table 5: Post HOC Test for Pull ups test Samples of TA

M_1 vs. M_2	P< .01	M_1 = Mean of sample 1 or NWU. M_2 = Mean of sample 2 or AUR. M_3 = Mean of sample 3 or AR. M_4 = Mean of sample 4 or SB. M_5 = Mean of sample 5 or MAS.	HSD [.05] = 0.66; HSD [.01] = 0.8. HSD = absolute (unsigned) difference between any two sample means required for significant at the designated level. HSD [.05] for the .05 level; HSD [.01] for the .01 level;
M_1 vs. M_3	P< .01		
M_1 vs. M_4	P< .01		
M_1 vs. M_5	P< .01		
M_2 vs. M_3	NS		
M_2 vs. M_4	NS		
M_2 vs. M_5	P< .01		
M_3 vs. M_4	NS		
M_3 vs. M_5	P< .01		
M_4 vs. M_5	P< .01		

Computed F value for the differences between the means of several samples was found significant. Therefore, Tukey's honestly significant difference (HSD) method was followed for post hoc testing of differences between paired means. Table No.-10 showed the post hoc test results. The calculated HSD [.05] was 0.66 and HSD [0.01] was 0.8, which indicated that all differences between means except M_2 vs M_3, M_2 vs M_4, and M_3 vs M_4 were larger than both HSD values. When M_1 means mean of sample 1 or NWU, M_2 means mean of sample 2 or AUR, M_3 means mean of sample 3 or AR, M_4 means mean of sample 4 or SB and M_5 means mean of sample 5 or MAS. It may be noted that mean of NWU mean was significantly lower than all other four conditions. It means that performance at M_1 (NWU) was lowest in comparison to four other conditions. All the differences between means were found significant at 1% level. Differences between AUR and AR, AUR and SB as well as AR and SB were not significant at all.

4. CONCLUSION

- On the basis of the Statistical Analysis it might surely be concluded that performance without warming up was significantly lower than all other four conditions.
- Best performance was observed at AR and was significantly better than other two conditions except AUR and SB.(i.e. NWU and MAS).

The analysis showed the relationship among performances as AR≥SB≥AUR>MAS>NWU, which meant that, performance at AR was best of all other performances and which might be higher or equal to the performance at SB as well as AUR. Performance at SB was highest among remaining three performances, but it may be higher or equal to the performance at AUR. Performance at AUR was higher than two remaining performances after MAS and NWU. Performance after NWU was found to be lowest of all other warming up performances.

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A Comparative Study on Platelet Count among Three Different Physically Active Groups

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Abstract:
Introduction: The aim of this study was to compare and examine the platelet count among highly physically active, moderate physically active and low physically active groups in 16 weeks of observation.
Methods:
Thirteen (13) SAI football students as highly physically active group (SAI), twelve (12) professional physical education students as moderate physically active group (B.P.Ed) and ten (10) general college going students as very low physically active group (GEN) who has normal blood cell count at the beginning of the session with an average age of 21.16±1.85 have participated in this study voluntarily. SAI and B.P.Ed groups were involved in their respective training schedule under the supervision of experts. Researcher observed the all the groups for16 weeks and collected the data three times for every sample. After being informed, blood samples of subjects have been taken on an empty stomach at their respective ground between 7:00-8:00 in the morning. Platelets (PLT) count has been determined by using Syxmex auto-hemato analyzer.
Result: Measurement results were presented as average and standard deviation. Repeated measures ANOVA followed by Newman-Kuels post hoc test was used in order to make the comparison between three groups. P<-0.05 value was considered to be significant. The result of the study found statistically significant difference in Platelet count was evident between SAI vs B.P.Ed groups ($q=2.41$, $p<0.05$). However, statistical difference in Platelet level was evident between SAI vs General students ($q= 2.07$, $p<0.05$) and BPEd vs General students ($q= 3.03$, $p<0.05$); Thus, BPEd trainees maintained Platelet level at a better state than the trainees of SAI and general students.
Conclusion: Platelet level of SAI and BPEd students were although remained at normal level; the level of Platelet of the BPEd students was lying on the middle point of normal range, whereas Platelet level of the SAI remained at the lower side of the normal range. Thus, BPEd trainees maintained Platelet level at a better state than the trainees of SAI and general students.

Keywords:
Platelet, Physically Active, Blood, Training

1. INTRODUCTION

Platelet, also called thrombocyte, colorless, non nucleated blood component that is important in the formation of blood clots (coagulation). Platelets are found only in the blood of mammals. Although red blood cells had been known since van Leeuwenhoek (1632–1723), the German anatomist Max Schultze (1825–1874) was the first to describe platelets. He described "spherules" that were much smaller than red blood cells and that occasionally clumped and were found in collections of fibrous material. Platelets are formed when cytoplasmic fragments of megakaryocytes, which are very large cells in the bone marrow, pinch off into the circulation as they age.

Pathological and clinical studies have suggested that platelets play an important role in the pathogenesis and progression of cardiovascular diseases (Hirsh p. et al 1981, Fitzgerald et al 1986, Davies *et al.* 1986). It has also been postulated that regular exercise may reduce the risk of major vascular thrombotic events and protect us against cardiovascular diseases (Paffenbarger *et al.* 1975, Morris JN *et al.* 1980, Arraiz *et al.* 1992) However; Siscovick *et al.* (1984) reported that the risk of primary cardiac arrest was transiently increased during exercise. Therefore, physical exercise seems to be able to protect us against cardiovascular disease on the one hand and to provoke sudden cardiac death on the other hand. Accordingly, we hypothesize that different intensities of exercise may affect platelet function differently. Moreover, subjects who are physically active and those who are sedentary may respond differently to the same exercise protocol. Various studies, found an increase in platelet counts ranging from 18% to 80% immediately after treadmill or bicycle exercise (Warlow *et al.* 1974, Meheta J *et al.* 1982, Davis RB *et al.* 1990). Despite the increase in platelet number, most studies regarding the effects of exercise on platelet functional behavior, mainly aggregation and secretion, have been either controversial or incomplete (Bourey RE *et al.* 1988). In addition, studies of the effect of exercise on platelet adhesiveness are very few because of technical difficulties. This aspect was studied about 20 years ago, and the assays used in previous studies could not distinguish adhesion from aggregation (Pegrum *et al.* 1967, Bennett *et al.* 1972). Therefore, how the various intensities of exercise affect platelet function, is still unclear.

All studies express that exercises make positive contributions into human organism. Researchers have reported positive contribution of exercise in physical, physiological, psychological and motor features. It is stated that these differences depend on the severity, duration and frequency of exercise as well as physical and physiological conditions of subjects (Buyukyazı and Turgay, 2000).

So, in this study researcher wants to find out some fruitful findings about platelet changes with practicing of three different level of physical activity for 16 weeks

2. METHODOLOGY

2.1. SELECTION OF SUBJECTS

Thirty five (35) students were selected randomly as the subject for the study. Those 40 students were taken from three groups comprising of thirteen (13) students for highly, twelve (12) students for moderate physically active groups and ten (10) students for very low active sedentary group.

Subjects selected for the study were all male students of age group between 17 to 22 years.

2.3. DETAILS OF GROUPING OF SUBJECTS

2.3.1. GROUP I (HAG)

Thirteen (13) fresh male students of SAI training center (soccer), Burdwan will be selected as highly physically trained group. Subjects who are undergoing a coaching program in football under SAI have to follow a vigorous conditioning schedule to improve their general as well as specific fitness followed by a coaching schedule for the development of football skills.

2.3.2. GROUP II (MAG)

Twelve (12) fresh male Physical Education students of Department of Physical Education, Jadavpur University will be selected as moderate physically trained group. Student pursuing the one year program of Physical Education leading to the degree of Bachelor of Physical Education are required to maintain a moderate level of physical fitness in order to follow different practical classes round the year.

2.2.4. GROUP III (LAG)

Ten (10) first years (Arts) male students from Burdwan Raj College and Vivekananda College under Burdwan University will be selected as very low active sedentary group. They generally participate in sports program not in a regular basis and their objective of participation in such program is to have fun, enjoyment and recreation and as such it is voluntary.

2.2.5. SELECTION OF VARIABLE

Blood platelet.

Experimental design:

Table 1

Groups	Pre-test	Intermediate	Post-test
Highly physically trained (SAI) (N=13)	At the beginning of the session	After 8 week or 2 month of training	After 16 week or 4 month of training
Moderately physically trained (BPEd) (N=12)	At the beginning of the session	After 8 week or 2 month of training	After 16 week or 4 month of training
Low physically active (GEN) (N=10)	At the beginning of the session	After 8 week or 2 month of training	After 16 week or 4 month of training

2.2.6. COLLECTION OF BLOOD SAMPLE

The blood samples were taken in the morning between 6.30am to 7.30am. Blood samples from subjects were taken after 12 hour hungry and having refrained from vigorous exercise for at least 24 hours. The subjects were lay down or sat on arm chair. Examination of the superficial veins of the left forearm was made to select the vein for venous puncture. About 3ml of blood was collected from each subjects and captured in the anticoagulant (EDTA) tube.

2.2.7. ANALYZING BLOOD SAMPLE

All blood sample was analyzing by Sysmex XP-100 Automatic hematology analyzer (Sysmex corporation, Kobe, Japan). [*Code No. BB556095, Manufactured : July 2012, Software version: 00-05 and onwards*]

Figure 1

3. RESULT AND INTERPRETATION

Table 2: Status of Platelet Level (Lakhs/Cumm) among Three Different Physically Active Groups

	1st Test M (SD)	2nd Test M (SD)	3rd Test M (SD)
SAI	1, 85 (0.40)	1.60 (0.17)	1.65 (0.23)
BPEd	1.82 (0.18)	1.83 (0.39)	1.69 (0.27)
General	1.484 (0.17)	1.502 (0.15)	1.508 (0.17)
Normal value: 1.5 to 4.5 lakhs/cumm			

Table 3: Result of Repeated Measures ANOVA for Platelet (PLT) level (SAI, BPEd and General Students)

Source of Variation	SS	df	MS	F
TOTAL	1029.95	44	--	--
Between Subjects (A)	172.60	14	--	--
Within Subjects (B)	368.70	30	--	--
Treatments	144.53	2	72.26	5.88*
Residual	344.12	28	12.29	

* $p < 0.05$ ** $p < 0.01$

Overall result revealed that in SAI trainees, the Platelet level during 1st test, 2nd test and 3rd test were perhaps different, because statistically differences in Platelet level during 1st test, 2nd test and 3rd test were evident for SAI, B.P.Ed. and General students ($F=5.88$, $p<0.05$).

Depending upon the F-value, since there is need for a post hoc analysis, the researcher employed *Newman-Kuels post hoc test* to locate exact values of differences in Platelet between three physically active groups.

The comparative result of Newman-Kuels post hoc test indicates the following results (Table 4):

Table 4: Adjusted Ordered Means in Platelet during 1st Test, 2nd Test and 3rd Test Phases (SAI Group, B.P.Ed. Group & General Students Group)

	1st test (lakhs/cumm)	2nd test (lakhs/cumm)	3rd test(lakhs/cumm)
SAI	1.86	1.59	1.61
B.P.Ed.	1.83	1.86	1.78
General Stu.	1.50	1.52	1.51

1st test = base level test, 2nd test = after 2nd month of respective training, 3rd test = after 4th month of respective training.

- For SAI trainees, the Platelet level (lakhs/ cumm) during 1st test, 2nd test and 3rd were 1.86, 1.59 and 1.61 respectively. Here, the changes in Platelet level were found progressively decreased, but remained in the lower side normal range.
- For BPEd trainees, the Platelet level (lakhs/ cumm) during 1st test, 2nd test and 3rd test were 1.83, 1.86 and 1.78 respectively. Here, the changes in Platelet level were found progressively static, which remained in the average side of the normal range.
- For General students, the Platelet level (lakhs/ cumm) during 1st test, 2nd test and 3rd were 1.50, 1.52 and 1.51respectively, but remained at the lower side of the normal range.

Table 5: Newman-Kuels Post Hoc Test Difference In Platelet Level During 1st, 2nd And 3rd Test Phases

SAI Group	2nd test	1st test
3rd test	0.15	2.12*
2nd test	--	2.19*
B.P.Ed Group		
3rd test	0.85	0.81
2nd test	--	0.11
General Students Group		
3rd test	0.15	0.13
2nd test	--	0.16

* p<0.05, ** p<0.01

1st test = base level test, 2nd test = after 2nd month of respective training, 3rd test = after 4th month of respective training.

- For SAI group statistically significant decrease in Platelet was evident after 2nd month (q=2.19, p<0.05), but maintained the level on 4th month of training (q= 0.15, p>0.05).
- For B.P.Ed group no statistically significant difference was evident in Platelet level after 2nd month (q=0.11, p<0.05), but maintained the normal level on 4th month of training (q= 0.85, p>0.05).
- For general students group no significant change in Platelet was evident after 2nd month (q=0.16, p>0.05) and even on 4th month of training (q= 0.15, p>0.05).

Table 6: Newman-Kuels Post Hoc Test Indicating Difference In Platelet Level between Three Physically Active Groups

Group	B	A
C	3.03*	2.07*
B	--	2.41*

*p<0.05, ** p<0.01

A = SAI group, B = B.P.Ed. group, C = General students group

- Platelet level of SAI and BPEd students were although remained at normal level; the level of Platelet of the BPEd students was lying on the middle point of normal range, whereas Platelet level of the SAI remained at the lower side of the normal range.
- Statistically significant difference in Platelet was evident between SAI vs B.P.Ed groups (q=2.41, p<0.05). However, statistical difference in Platelet level was evident between SAI vs General students (q= 2.07, p<0.05) and BPEd vs General students (q= 3.03, p<0.05); Thus, BPEd trainees maintained Platelet level at a better state than the trainees of SAI and general students.

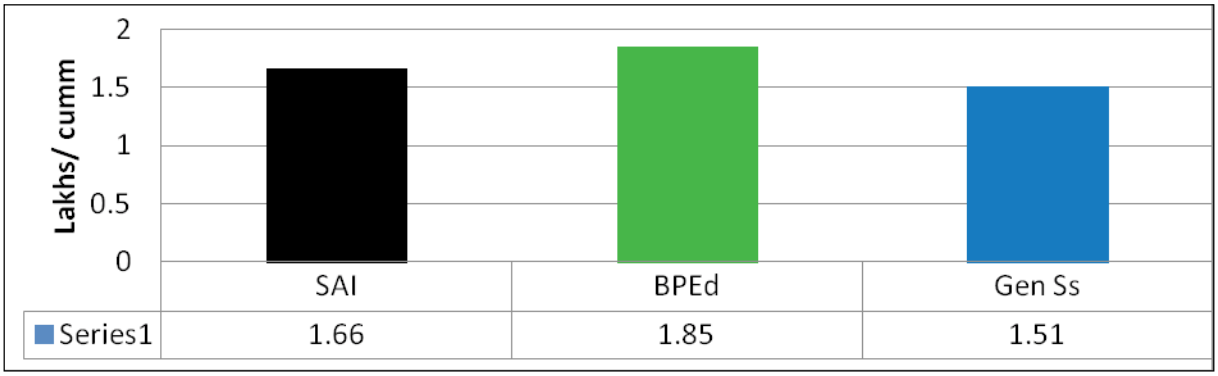

Figure 1: Platelet Status of the Trainees of SAI and B.P.Ed Compared to General Students

4. MAJOR FINDINGS

Platelets are necessary for normal blood clotting, and counts may be affected by several disease states. Interpretation: Low values seen in chemotherapy/ hemolytic anemia/ hepersplenism/ idiopathic thrombocytopenia purpura/ vitamin B12 or foliate deficiency/leukemia. High values in post splenectomy syndrome/primary thrombocytosis/ certain malignancies/ early chronic myelogenous leukemia/ polycythemia Vera/ rheumatoid arthritis. The findings of this variable are –

In case of SAI trainees, statistically significant decrease in Platelet was evident after 2nd month ($q=2.19$, $p<0.05$), but maintained the level on 4th month of training ($q= 0.15$, $p>0.05$). For BPEd students no reduction in Platelet level was evident not only after 2nd month ($q=0.11$, $p<0.05$), but maintained the normal level on 4th month of training ($q= 0.85$, $p>0.05$). Moreover, for General students no significant change in Platelet was evident after 2nd month ($q=0.16$, $p>0.05$) and even on 4th month of training ($q= 0.15$, $p>0.05$). Thus, the result revealed that during 2nd and 4th months of training, the SAI students could show significant decrease in Platelet level, although remained in the lower side of normal limit. However, the BPEd students group could maintain normal Platelet level, although remained in the middle point of the normal range even during 2nd and 4th months respectively. Such result infers a progressive trend in reduction of Platelet level exists in the SAI trainees, whereas BPEd students maintained the Platelet level at the middle point of the normal range. Amazingly, general students' Platelet level remained in the lower side of normal limit during 2nd and 4th months respectively.

Platelet level of SAI and BPEd students were although remained at normal level; the level of Platelet of the BPEd students was lying on the middle point of normal range, whereas Platelet level of the SAI remained at the lower side of the normal range. Thus, BPEd trainees maintained Platelet level at a better state than the trainees of SAI and general students.

5. DISCUSSION

Joksimovic *et al.* (2009) who found insignificantly increased of platelet count when he compare hematological profile between Sebrian youth national soccer players with non-athlete. While some studies report that exercise increases the number of thrombocytes (F. Ozdengul, 1998, Younesian, 2004), others state that exercise have no effects (M.Unal, 1998, S. Patlar *et al.*, 2007). In this study among the thrombocyte parameters we found slightly decrease of platelet count in highly physical training group (SAI). Ebrahim *et al.* (2012) noted a decrease but within the normal values (150.000-300.000) in the number of Platelets after exercise program, it might be caused due to several mechanism, but the bone marrow may be able to compensate as stated by Waterbury (2007), that thrombocytopenia (a mild decrease in platelets) is present in cases of disseminated intravascular coagulation, and platelets return to normal slowly, or due to immune thrombocytopenia caused by infections or due to drug administration of participants. Again this study found significant incensement in PLT count with moderately physical training group (BPEd). Although the increase can be explained as the hemoconcentration related to exercise, it can also be defined as the activation of neural system caused by the factors such as compelling body and stress and the increased number of blood platelets (M. Gunay, 2006).

6. CONCLUSION

During 2nd and 4th months of training, the SAI students could show significant decrease in Platelet level, although remained in the lower side of normal limit, whereas the BPEd students remained in the middle point of the normal range. Thus, BPEd trainees maintained Platelet level at a better state than the trainees of SAI and general students.

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Effect of Phyical Education Programme on Body Composition Variables of B.P.Ed. and M.P.Ed. Students

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1. INTRODUCTION

Before the industrial revolution, fitness was the capacity to carry out the day's activities without undue fatigue. However with automation and changes in lifestyles physical fitness is now considered a measure of the body's ability to function efficiently and effectively in work and leisure activities, to be healthy, to resist hypokinetic diseases, and to meet emergency situations. Physical fitness is a general state of health and well-being and, more specifically, the ability to perform aspects of sports or occupations. Physical fitness is generally achieved through correct nutrition, exercise, hygiene and rest. It is a set of attributes or characteristics seen in people and which relate to the ability to perform a given set of physical activities.

In physical fitness, body composition is used to describe the percentages of fat, bone, water and muscle in human bodies. Because muscular tissue takes up less space in our body than fat tissue, our body composition, as well as our weight, determines leanness. Two people of equal height and body weight may look completely different from each other because they have a different body composition. Physical education programme play a important role for improving physical fitness and body composition. In this study an attempt was made to find out the effects of physical education programme on body composition variables of B.P.Ed. and M.P.Ed. students of P.G.G.I.P.E., Banipur, West Bengal.

2. PURPOSE OF THE STUDY

The purpose of the study was to find out the effect of physical education programme on body composition variables of B.P.Ed. and M.P.Ed. students.

3. HYPOTHESIS

It was hypothesized that there will be no significant difference between the scores of pre and post test in the selected body composition variables of B.P.Ed. and M.P.Ed. male students.

4. METHODOLOGY

For the purpose of the study sixty male subjects (30 B.P.Ed. and 30 M.P.Ed) were selected randomly from from P.G.G.I.P.E., Banipur. West Bengal, and their age ranged from 21-28 years. Subjects ware underwent three months training programmes in the morning and evening consisting of various physical activity. Body composition was measured by total body weight i.e. with the help of weighing machine, skinfold measurement i.e. sum of triceps calf, lean body mass measured by total body weight minus weight of body's fat and fat weight were chosen as criterion variables. To find out the difference between the pre-test and post-test means t-ratio was applied.

5. RESULTS AND DISCUSSION

To find out the significant difference between the pre-test and post-test means of B.P.Ed. and M.P.Ed. male students following three months physical education programme t-ratio was applied. The level of significant was set at 0.05.

Table 1: Pre and Post Scores of B.P.Ed. and M.P.Ed Subjects in Total Body Weight

Group	Pre-Test	Post-Test	Pre SD	Post SD	T-Ratio
B.P.Ed.	54.65	58.25	4.20	4.05	2.06
M.P.Ed.	59.75	64.70	2.65	2.24	4.79

Significant at 0.05 level

t 0.05 (58) = 2.00

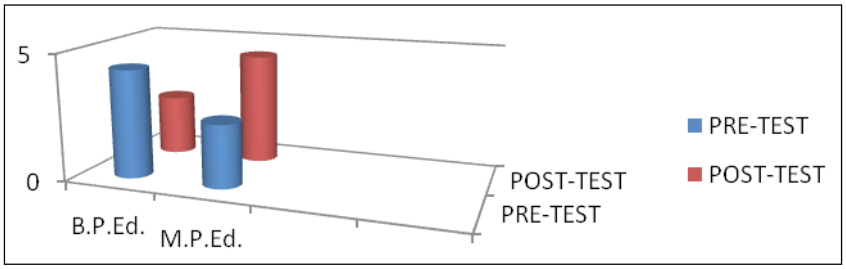

Figure 1: Pre and Post Mean Scores of B.P.Ed. and M.P.Ed Subjects in Total Body Weight

Table 1 indicates significant difference between the pre and post test means of B.P.Ed. and M.P.Ed. students in total body weight. The table indicates t-ratios of 4.79 and 2.06 respectively, both of which are significant at 0.05 level. The above finding indicates significant improvement in total body weight from pre to post test for both B.P.Ed. and M.P.Ed. students. Thus the hypothesis was rejected in case of total Body Weight. The two groups also differ with respect to improvement in total body weight from pre to post test as M.P.Ed. students shows better improvement than B.P.Ed. students.

Table 2: Pre and Post Scores of B.P.Ed. and M.P.Ed Subjects in Total Body Composition (Sum of Triceps and Calf Skinfolds)

Group	Pre-Test	Post-Test	Pre SD	Post SD	T-Ratio
B.P.Ed.	36.85	32.75	5.08	4.05	5.32
M.P.Ed.	25.45	20.10	2.70	2.85	2.74

Significant at 0.05 level

t 0.05 (58) = 2.00

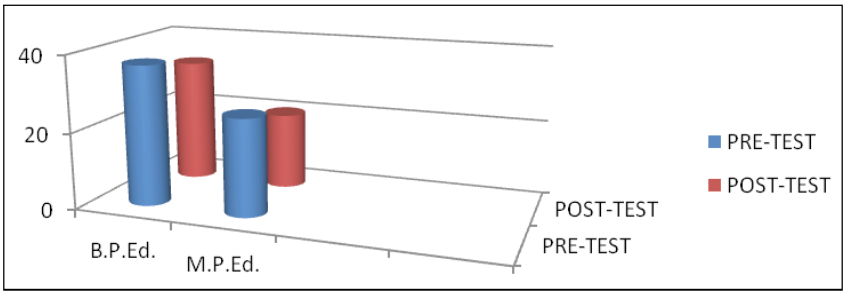

Figure 2: Pre and Post Mean Scores of B.P.Ed. and M.P.Ed Subjects in Total Body Composition (Sum of Triceps and Calf Skinfolds)

Table 2 indicates significant difference between the pre and post test means of B.P.Ed. and M.P.Ed. students in sum of triceps and calf skinfold. The table indicates t-ratios of 5.32 and 2.74 respectively, both of which are significant at 0.05 level. The above finding indicates significant decrease in sum of triceps and calf skinfold from pre to post test

for both B.P.Ed. and M.P.Ed. students. Thus the hypothesis was rejected in case of sum of triceps and calf skinfold. The two groups also differ with respect to reduction of sum of triceps and calf skinfold from pre to post test as M.P.Ed. students shows better improvement than B.P.Ed. students.

Table 3: Pre and Post Scores of B.P.Ed. and M.P.Ed Subjects In Lean Body Mass

Group	Pre-Test	Post-Test	Pre Sd	Post Sd	T-Ratio
B.P.Ed.	36.70	38.90	5.90	6.24	1.16
M.P.Ed.	45.10	46.14	1.62	1.68	1.78

Significant at 0.05 level

t 0.05 (58) = 2.00

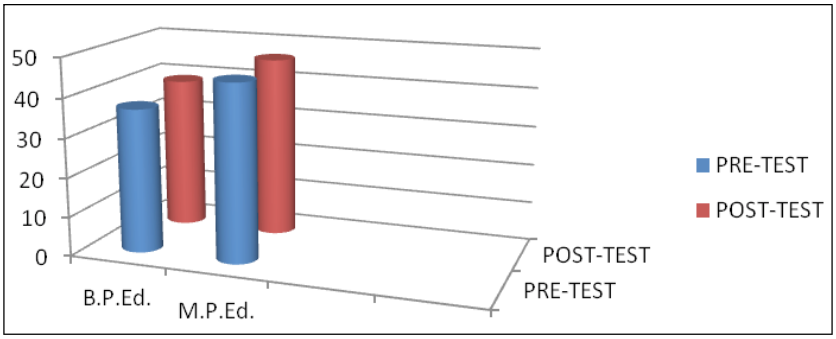

Figure 3: Pre And Post Mean Scores Of B.P.Ed. And M.P.Ed Subjects In Lean Body Mass

Table 3 indicates significant difference between the pre and post test means of B.P.Ed. and M.P.Ed. students in lean body mass. The table indicates t-ratios of 1.16 and 1.78 respectively, both of which are not significant at 0.05 level. The above finding indicates no significant improvement in lean body mass from pre to post test for both B.P.Ed. and M.P.Ed. students. Thus, lean body mass was not increased to the level of significance as a result of participation in three months physical education programme.

Table 4: Pre and Post Scores of B.P.Ed. and M.P.Ed Subjects in Fat Weight

Group	Pre-Test	Post-Test	Pre SD	Post SD	T-Ratio
B.P.Ed.	12.80	11.20	2.42	2.68	2.10
M.P.Ed.	9.20	7.25	2.76	2.78	2.38

Significant at 0.05 level

t 0.05 (58) = 2.00

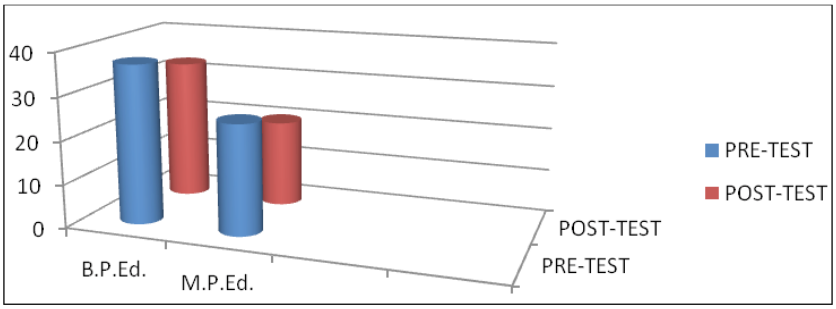

Figure 4: Pre and Post Mean Scores of B.P.Ed. and M.P.Ed Subjects in Fat Weight

Table 2 indicates significant difference between the pre and post test means of B.P.Ed. and M.P.Ed. students in fat weight. The table indicates t-ratios of 2.10 and 2.38 respectively, both of which are significant at 0.05 level. The above

finding indicates significant decrease in fat weight from pre to post test for both B.P.Ed. and M.P.Ed. students. Thus the hypothesis was rejected in case of fat weight. The two groups also differ with respect to reduction of fat weight from pre to post test as M.P.Ed. students reduce more fat weight than B.P.Ed. students.

6. CONCLUSION

The three months physical education programme showed beneficial effects on the selected body composition variables of male subjects by an improvement in their total body weight and decrease in sum of triceps and calf skinfold and fat weight.

The finding of the study indicates significant reduction of body fat, where as lean body mass was not increased to the level of significance as a result of participation in two months physical education programme.

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Constructing Norms for selected Physical Fitness Test Items of Kabaddi Players: Fitness for Health

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Abstract:
The research aimed to construct norms for selected physical fitness test items of kabaddi players. To obtain data for this study, the investigator had selected sixty (N=60), male Kabaddi Players of Panjab University, Chandigarh between the age group of 18-25 years (Mean ± SD: age 22.80±1.36 years, height 174.56±3.49 m, body mass 73.11±3.08 kg). All the subjects were informed about the objective and protocol of the study. The Handgrip Strength Test was used to measure Muscular Strength, Vertical Jump Test was used to measure Muscular Power, Chin up Test was used to measure Muscular Endurance, 20 Meter Dash Test was used to measure Running Speed, Illinois Agility Test was used to measure Running Agility, Standing Long Jump Test was used to measure Jumping Ability, Overhead Medicine Ball Throw test was used to measure Throwing Ability, Sit and Reach Flexibility Test was used to measure Flexibility and Stork Balance Stand Test was used to measure Balance. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e., very good, good, average, poor and very poor.

Keywords:
Norms, Physical Fitness Test Items, Kabaddi Players

1. INTRODUCTION

Physical fitness is the fundamental necessity for any sporting activity. It is defined as a set of inherent or achieved personal attributes that relate to the capacity to perform physical activity or exercise[1]. It involves most correctly performing physical education exercises, and indicates the existing physical fitness of the body along with the physical endurance. Physical fitness is categorized into performance-related fitness and health-related fitness[2]. Health-related fitness refers to the components of fitness that are affected by habitual physical activity and includes body composition, aerobic capacity, muscular strength and endurance, flexibility, and balance[3, 4]. However, performance related fitness has a minimal relationship to health and relates to individual's performance in a test or a sports competition. An individual's ability to perform compound motor tasks has been considered to be a possible determinant of physical fitness[5, 6, 7]. The physical performance components that are identified by researches like strength, endurance, speed, flexibility, agility, coordination and balance are manifested through the fundamental skills of running, jumping, lifting, throwing or holding, which make up the basic pattern of movement[8]. A highly physically fit player is able to perform from the beginning of the game till the end by maintaining the same level of performance. Kabaddi is a team game in which every player has a specific role to play in defense and offense and the motor qualities and specific abilities of players differ from other sports. Hence it is important to have specific norms of physical fitness test items to assess the musculoskeletal and motor fitness of kabaddi players adequately. The present study was conducted with the purpose to construct norms for a selected physical fitness test items for Kabaddi players for assessing their sports potential.

2. MATERIAL & METHODS

2.1. SUBJECTS

For the purpose of the present study, sixty (N=60), male Kabaddi Players of Panjab University, Chandigarh between the age group of 18-25 years (Mean ± SD: age 22.80±1.36 years, height 174.56±3.49 m, body mass 73.11±3.08 kg) volunteered to participate in the study. All the subjects were informed about the objective and protocol of the study. The details of subjects are exhibited in Figure 1.

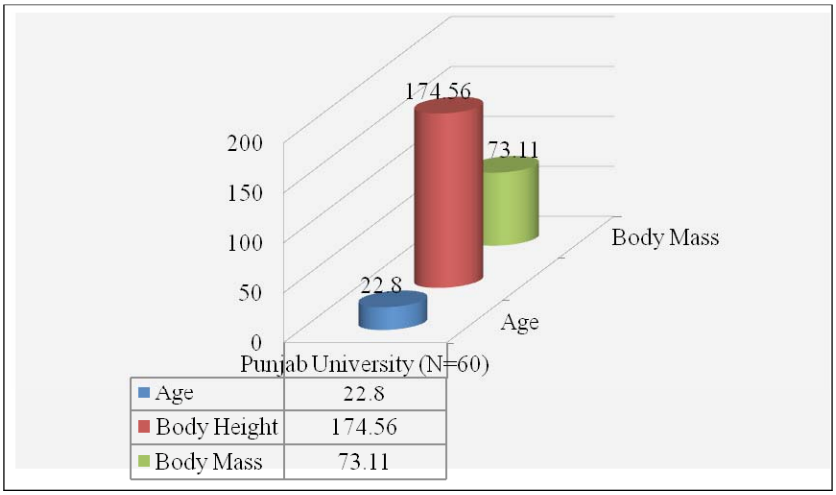

Figure 1: Subject's Demographics

2.2. METHODOLOGY

The Handgrip Strength Test was used to measure Muscular Strength, Vertical Jump Test was used to measure Muscular Power, Chin up Test was used to measure Muscular Endurance, 20 Meter Dash Test was used to measure Running Speed, Illinois Agility Test was used to measure Running Agility, Standing Long Jump Test was used to measure Jumping Ability, Overhead Medicine Ball Throw test was used to measure Throwing Ability, Sit and Reach Flexibility Test was used to measure Flexibility and Stork Balance Stand Test was used to measure Balance.

3. STATISTICAL TECHNIQUE EMPLOYED

The data, which was collected by administering tests, was statistically treated to develop for all the test items. In order to construct the norms, Percentile Scale was used. Further, the scores were classified into five grades i.e. very good, good, average, poor and very poor.

4. RESULTS

For each of the chosen variable, the result pertaining to Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of selected Physical Fitness Test Items of Kabaddi Players (N=60) of Panjab University, Chandigarh are presented in the following tables:

Table 1: Descriptive Statistics (Mean & Standard Deviation) and Percentile Plot (Hi & Low) of selected Physical Fitness Test Items of Kabaddi Players (N=60) of Panjab University, Chandigarh

Sr. No.	Test Items	Mean ± Standard Deviation		Hi	Low
1.	Muscular Strength	Mean	49.100	57.00	41.00
		SD	4.29		
2.	Muscular Power	Mean	45.183	49.00	42.00
		S.D	1.88		
3.	Muscular Endurance	Mean	5.9167	9.000	4.000
		SD	1.24		
4.	Running Speed	Mean	4.5767	4.800	4.400
		SD	0.109		
5.	Running Agility	Mean	17.215	18.20	16.00
		SD	0.561		
6.	Jumping Ability	Mean	228.77	245.0	221.0
		SD	4.97		
7.	Throwing Ability	Mean	12.200	15.00	10.00
		SD	1.25		
8.	Flexibility	Mean	3.1167	5.000	2.000
		SD	1.14		
9.	Balance	Mean	33.383	43.00	23.00
		SD	5.56		

Table 1 shows that in Muscular Strength, the mean score was 49.100 and standard deviation score was 4.29. In Muscular Power, the mean score was 45.183 and standard deviation score was 1.88. In Muscular Endurance, the mean score was 5.9167 and standard deviation score was 1.24. In Running Speed, the mean score was 4.5767 and standard deviation score was 0.109. In Running Agility, the mean score was 17.215 and standard deviation was 0.596. In Jumping Agility, the mean score was 228.77 and standard deviation was 4.97. In Throwing Ability, the mean score was 12.200 and standard deviation score was 1.25. In Flexibility, the mean score was 3.1167 and standard deviation score was 1.14. In Balance, the mean score was 33.383 and standard deviation score was 5.56 of Kabaddi Players. The Descriptive Statistics (Mean & Standard Deviation) of selected Physical Fitness Test Items of Kabaddi Players (N=60) of Panjab University, Chandigarh has been presented graphically in Figure 2.

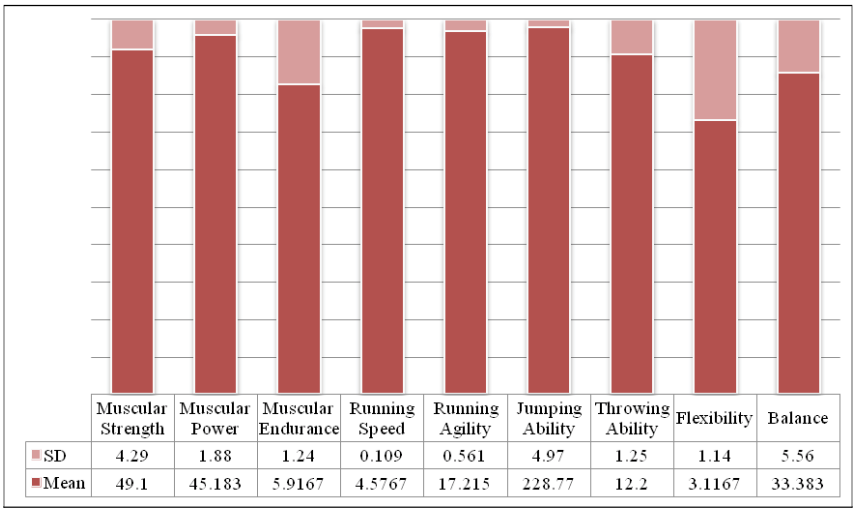

Figure 2: Descriptive Statistics (Mean & Standard Deviation) of Selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power, c. Muscular Endurance, d. Running Speed, e. Running Agility, f. Jumping Ability, g. Throwing Ability, h. Flexibility & i. Balance) of Kabaddi Players (N=60) of Panjab University, Chandigarh

5. DISTRIBUTION OF GRADES UNDER NORMAL DISTRIBUTION

For each of selected Physical Fitness Test Items of Kabaddi Players of Panjab University, Chandigarh (N=60) five types of classification/grades i.e., Very Poor, Poor, Average, Good & Very Good have also been prepared under Normal Distribution. Grades have been presented in table 2.

Table 2: Grading for Kabaddi Players of Panjab University, Chandigarh (N = 60) for the Physical Fitness Test Item

Test Items	Very Poor	Poor	Average	Good	Very Good
Muscular Strength	Less than (<) 40.52	40.52-44.81	44.81-53.39	53.39-57.68	Greater than (>) 57.68
Muscular Power	Less than (<) 41.423	41.423-43.303	43.303-47.063	47.063-48.943	Greater than (>) 48.943
Muscular Endurance	Less than (<) 3.437	3.437-4.677	4.677-7.157	7.157-8.397	Greater than (>) 8.397
Running Speed	Greater than (>) 4.795	4.795-4.686	4.686-4.468	4.468-4.359	Less than (<) 4.359
Running Agility	Greater than (>)18.337	18.337-17.776	17.776-16.654	16.654-16.093	Less than (<) 16.093
Jumping Ability	Less than (<) 218.83	223.8-218.83	223.8-233.74	233.74-238.71	Greater than (>) 238.71
Throwing Ability	Less than (<) 9.7	9.7-10.95	10.95-13.45	13.45-14.7	Greater than (>) 14.7
Flexibility	Less than (<) 0.837	0.837-1.977	1.977-4.257	4.257-5.397	Greater than (>) 5.397
Balance	Less than (<) 22.263	22.263-27.823	27.823-38.943	38.943-44.503	Greater than (>) 44.503

The values listed in Table 2 gives a guide to expected scores for Kabaddi Players of Panjab University, Chandigarh (n_2=60) for the Physical Fitness Test Item. In Muscular Strength, the scores below 40.52 are considered very poor, from about 40.52-44.81 is considered poor, 44.81-53.39 is considered average, 53.39-57.68 is considered good and the scores above 57.68 are considered very good. In Muscular Power, the scores below 41.423 are considered very poor, from about 41.423-43.303 is considered poor, 43.303-47.063 is considered average, 47.063-48.943 is considered good and the scores above 48.943 are considered very good. In Muscular Endurance, the scores below 3.437 are considered very poor, from about 3.437-4.677 is considered poor, 4.677-7.157 is considered average, 7.157-8.397 is considered good and the scores above 8.397 are considered very good. In Running Speed, the scores above 4.795 are considered very poor, from about 4.795-4.686 is considered poor, 4.686-4.468 is considered average, 4.468-4.359 is considered good and the scores below 4.359 are considered very good. In Running Agility, the scores above 18.337 are considered very poor, from about 18.337-17.776 is considered poor, 17.776-16.654 is considered average, 16.654-16.093 is considered good and the scores below 16.093 are considered very good. In Jumping Ability, the scores below 218.83 are considered very poor, from about 223.8-218.83 is considered poor, 223.8-233.74 is considered average, 13.45-14.7 is considered good and the scores above 240.14 are considered very good. In Throwing Ability, the scores below 9.7 are considered very poor, from about 9.7-10.95 is considered poor, 10.95-13.45 is considered average, 13.45-14.7 is considered good and the scores above 14.7 are considered very good. In Flexibility, the scores below 0.837 are considered very poor, from about 0.837-1.977 is considered poor, 1.977-4.257 is considered average, 4.257-5.397 is considered good and the scores above 5.397 are considered very good. In Balance, the scores below 22.263 are considered very poor, from about 22.263-27.823 is considered poor, 27.823-38.943 is considered average, 38.943-44.503 is considered good and the scores above 44.503 are considered very good.

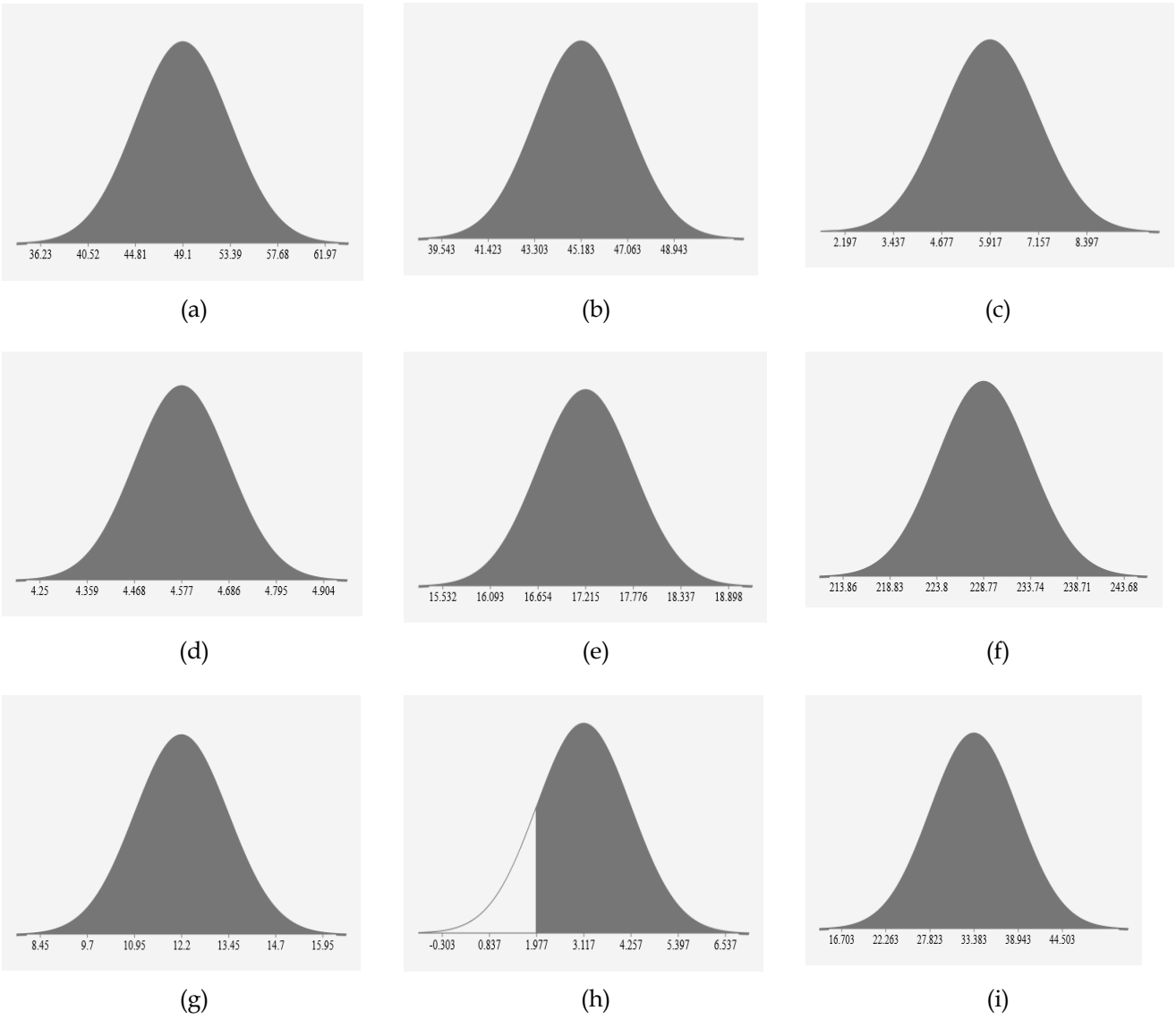

Figure 3: Normal distribution of selected Physical Fitness Test Items (i.e., a. Muscular Strength, b. Muscular Power, c. Muscular Endurance, d. Running Speed, e. Running Agility, f. Jumping Ability, g. Throwing Ability, h. Flexibility & i. Balance) of Kabaddi Players (N = 60) of Panjab University, Chandigarh.

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Relationship of the Health Related Fitness Components with the Performance of Novice Swimmers

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Abstract:
The purpose of the study was to find out the relationship between the health related fitness components with the performance of the novice swimmers. An intact group of 20 new swimmers of the Swimming Academy, L.N.I.P.E. Gwalior were selected as subjects for the study. To evaluate the health related fitness of the novice swimmers, selected test for the selected variables of the health related fitness components were administered based on the validity and reliability of the tests developed in FITNESSGRAM. Each subject swam a 100m and time was taken for the distance to evaluate the speed as performance of the swimmers. Pearson's Product Moment Correlation was used to find out the relationship between the independent and the dependent variables. The analysis of the data showed significant relationship between flexibility, muscular endurance and muscular strength but was insignificant on the part of cardio respiratory endurance and body composition.
Key words: novice swimmers, health related fitness and swimming performance.

1. INTRODUCTION

Swimming is a fully supported, partially-intense activity. It places considerable demands on the respiratory, cardiovascular and energy producing systems of the body. The uniqueness of swimming has made it popular all around the world which provides us the best workout and also the finest time to relax and rejuvenate. Regular swimming sessions definitely help us to have a very healthy life and although daily swimming would not be for all of us, but still the goodness from the activity is too much to be ignored. 'Aquatic Locomotion' is the scientific way of referring to swimming. Swimming should be carried on regularly to experience long-term results. It provides an amazing workout and also helps to build muscle strength, endurance and cardio-vascular fitness. Most important advantage of swimming is that it helps us to attain higher muscle activity and enhanced heart rate.

Fitness is a vitally important component of success in swimming. There are many components of fitness that make up a good swimmer; importance of each of these depends on the race distance and stroke. The fitness tests used to access a swimmer should also reflect the range of fitness components, and the interpretation of the results should also be relative to the importance of each of these attributes.

Physical fitness is typically defined with focus on two goals: performance or health. Health related physical fitness can be defined as the ability of a person to perform daily activities with vigour, and by traits and capacities that are associated with a low risk for the development of chronic diseases and premature death. Despite chronic diseases and cardiovascular diseases events occur most frequently during or after fifth decade of life, there is evidence indicating that the precursors of cardiovascular disease have their origin in childhood and adolescence. Therefore, assessment of health related fitness at childhood and adolescence is of public health and clinical interest (Manuel J. Castillo Garzon, 2009)

2. MATERIALS AND METHODS

An intact group of 20 students, age ranging 8-15 years of Swimming Academy of L.N.P.I.E., Gwalior, who have newly joined swimming classes, have been selected as subjects for the study. To evaluate the health related fitness of the novice swimmers, selected test for the variables of the health related fitness components were administered based on the validity and reliability of the tests developed in FITNESSGRAM. All the subjects were tested in 6 min run and walk (cardio respiratory), sit-ups (muscular endurance), sit and reach (flexibility), flex arm hang (muscular strength) and skinfold measurement (body composition) in order to assess their health related fitness. After measuring the skin fold thickness of the four sites (triceps, subscapula, biceps, and suprailliac), they were added together and were referred to conversion table. J.V.G.A. Durnin & MM Rahman chart was used to compare the percentage of fat of individual subjects obtained through the skinfold measurement.

A swim time of 100m was taken in order to measure speed to evaluate the performance of the subjects.

The correlation matrix i.e. Pearson's Product Moment Correlation Coefficient was used to find out the relationship between the health related fitness components and the performance. The analysis was done using standard statistical package SPSS.

3. RESULTS

The statistically analyzed data on flexibility, muscular endurance, muscular strength, cardio respiratory endurance, body composition and swimming performance are presented in this section. Mean and standard deviation of the health related fitness components and the performance are given in Table 1.

Table 1: Mean and Standard Deviation of The Health Related Fitness Components and Performance

Sl. No.	Variables	Mean	Standard Deviation
1.	Flexibility	11.6750	2.44624
2.	Muscular endurance	32.8500	6.88746
3.	Muscular strength	41.5000	17.12954
4.	Cardio respiratory	1652.5000	253.12520
5.	Body composition	23.8350	4.86986
6.	100m swim performance (speed)	0.9101	0.3808

The values of coefficient of correlation of the components of health related fitness with the swimming performance have been shown in Table-2

Table 2: Relationship of the Health Related Componentswith the 100M Swimming (Speed) Performance

Sl. No.	Variables	Mean	Correlation Coefficient (R)
1.	Flexibility	11.6750	0.942*
2.	Muscular Endurance	32.8500	0.557*
3.	Muscular Strength	41.5000	0.472*
4.	Cardio Respiratory	1647.5000	0.439
5.	Body Composition	23.8350	-0.005

*To be significant, $r_{0.05}(18) = 0.444$

Table 2 clearly revealed that three components (flexibility, muscular endurance and muscular strength) have significant positive correlation with the 100m swimming performance but, cardio respiratory endurance and body composition has shown insignificant result in relation to the speed of the swimmers. That is swimming performance is significantly correlated to flexibility, muscular endurance and muscular strength except cardio respiratory endurance and body composition.

4. DISCUSSION

The values of coefficient of correlation of the health related components as shown by the results were: Flexibility (0.942), Muscular Endurance (0.557), Muscular Strength (0.472), Cardio Respiratory (0.439) and Body Composition (-0.005).

Based on the findings of the study it can be said that the components such as flexibility, muscular endurance and muscular strength have significant contribution towards the performance of the swimmers. On the other hand cardio respiratory endurance and body composition seems to be less contributory as the analysis is concerned. The obtained results revealed that flexibility is highly significant to the swimming speed. So based on the findings flexibility can be considered as one of the important performance variables'. The subject for the study were children of age 8-15 years and flexibility is the prerequisite factor among the children and swimming is such an activity where greater range of motion in the joints is required for the movements to be efficient while executing the technique. The findings also revealed that muscular endurance and muscular strength have significant correlation with the swimming speed. In order to propel in water repeated movements are performed in swimming and muscular endurance helps the muscles to make repeated contractions over a period of time, and muscular strength helps a swimmer to decrease resistance acting against own body weight and fluid resistance. Whereas, cardio-respiratory endurance has shown insignificant correlation with the swimming speed. This could be attributed to the fact that 100m swim is an anaerobic event and not much cardio respiratory endurance is required in it. Body composition, a major factor is highly in significant and negatively correlated to the speed in swimming. It indicates that it is the k\ least contributory factor among the other health related fitness components towards the swimming performance. It may be due to the fact that higher body composition in terms fat % may be the limiting factor for strength and endurance which can ultimately hinder the performance. From the above points it can be concluded that health and fitness attributes play an important role in swimming performance and along with good level of health related fitness if the young novice swimmers could improve their techniques and skill could excel more in the swimming performance.

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A Comparative Study of Postural Status among Government Employer, Shopkeeper and Farmer

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Abstract:
Abstract : Posture is a sound skeletal framework associated with muscular system. A good posture is one which requires a minimum expenditure of energy for the maintenance of good alignment. It also permits mechanically efficient functioning of joints. The present study was conducted to investigate the difference in postural status among government employer, shopkeeper and farmer who possess different life style. Total ninety male (N = 90) age ranged from 45 to 50 years were acted as subjects of the study among where thirty were government employers (n1 =3 0), thirty were shopkeepers (n2 = 30) and rest of thirty were general farmers (n3 = 30). Postural statuses of the subjects were measured by Iowa posture test. One way analysis of variance was computed for statistical calculation, where significant difference occurred LSD test was applied to identify the significant differences between the paired group means. The level of significance was set at 0.05. The result of the study shows the significant difference in standing, walking and sitting posture where as "stopping to pick up light object" posture shows insignificant difference. The results clearly indicated that in standing posture significant difference between employer and shopkeeper, employer and farmer whereas no significant difference between other groups means was observed. In case of walking posture significant difference was discovered between employer and farmer but no significant difference was observed between other group means. Further the result pointed out that significant difference between employer and farmer as well as shopkeeper and farmer whereas no significant difference between other groups was observed in sitting posture.

Keywords:
Posture, Govt. Employer, Shopkeeper, Farmer

1. INTRODUCTION

Human being has an upright posture. He/ she supports his/ her body on his two legs unlike most mammals that carry themselves on fours. This situation has caused significant changes in man's mechanics of sitting, standing, sleeping, running breathing, muscular growth and development, coordination etc. as well as placement of his visceral organs- heart, lungs, liver, kidney, and intestines.

Posture may well claim to be "all things to all people." To the physical anthropologist posture may be a racial characteristic, to the orthopedic surgeon it may be an indication of the soundness of the skeletal framework and muscular system, to an artist it may be an expression of the personality and the emotion, to the physician, biologist, employer, dancer etc. to each of these, posture has a different significance. Each sees posture within the framework of his or her own profession and interest. This is no less true of kinesiologically oriented therapists and educators. To them, posture is a gauge of mechanical efficiency, kinesthetic sense, muscle balance and neuromuscular coordination.

A good posture is one which requires a minimum expenditure of energy for the maintenance of good alignment, whereas utilization of excess energy and effort indicate poor posture. Good posture permits mechanically efficient functioning of joints wherein friction in the joints is minimized, tensions of opposing ligaments are balanced and pressures within the joints are equalized, requiring minimum wear and tear of the joints.

Therefore, the researchers found it importance and worthwhile to investigate the difference in postural status among Government employer, shopkeeper and farmer and therefore such study was undertaken. The result of the study might be helpful to ascertain the postural status of the subjects considered for the study and also provided the encouragement to the general people who suffered from various postural deformities and to take up necessary steps to overcome those postural deformities.

2. OBJECTIVE OF THE STUDY

The foremost objective of the study was to compare and determine the postural status of the male government employers' shopkeepers, and farmers.

3. METHOD

This study was confined in to three categories of profession i.e. Government employers, shopkeepers and general farmers. Only males were included in this study whose ages were in between 45 to 50 years. Each group had 30 (Thirty) male subject where all the subjects were from Muktarpur and Champadanga, Hoogly and Bishnupur, Bankura, West Bengal. Here the Government employers groups were delimited to teachers, clerks and bank employers where as the shopkeepers group included the subjects who were involved to grocer, stationer, and tailor. In spite of all, the different categories of people were not from the same culture inheritance, economical status, educational and family back ground, food habits, nutrition and mental growth etc. So any influence of these factors on postural status was beyond the control of the investigator. As a criterion measure 'Iowa posture test' was used to measure the Postural Status and age, height & weight was measured as personal data. One way analysis of variance was employed to investigate the existence of significant difference, if any among three groups in physical posture status undertaken in this study. In case of existence of significant differences, the LSD test was applied in order to investigate the significant differences between the paired group means.

4. RESULTS AND DISCUSSION

Results of the study was shown in tabular as well as graphical form.

Table 1: Represents the Mean of Personal Data I.E. Age, Height, Weight of the Subjects of Three Groups

Parameters	Employer	Shopkeeper	Farmer
	Mean	Mean	Mean
Age(Yrs.)	46.8	47.77	48.33
Height(Cm.)	165.96	165.93	163.43
Weight(Kg.)	66.95	65.53	60.80

Table 1 indicates that mean age of farmer is slightly higher than that of employer and shopkeeper. Mean body weight of employer is slightly higher than that of shopkeeper and higher than that of farmer. However both employer and shopkeeper were similarly in body weight and slightly higher than that of the farmer.

Table 2: Analysis of Variance of the Means in Different Postures among Three Groups

Different Postures	Sum of Squares	DF	Variance	'f' Ratio
STANDING POSTURE	A=2.28	2	1.14	**9.5***
	W=10.71	87	0.12	
WALKING POSTURE	A=1.75	2	0.88	**3.14***
	W=24.74	87	0.28	
SITTING POSTURE	A=3.09	2	1.55	**5.54***
	W=24.07	87	0.28	
STOPPING TO PICK UP LIGHT OBJECT POSTURE	A=0.08	2	0.04	0.17
	W=20.41	87	0.23	

*Significant at 0.05 level of significance, Tab $F_{0.05}(2,87) = 3.09$

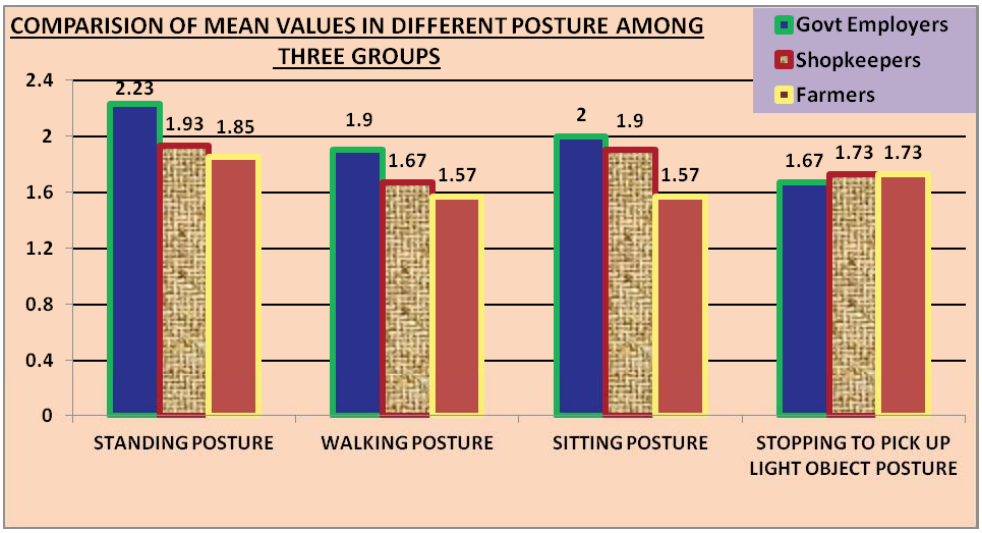

Figure 1: Comparision of Mean Values in Different Posture amomg Three Groups

Table 3: Paired Group Means Differences in Standing Posture among Three Groups

Employer	Shopkeeper	Farmer	Mean Difference	CD at 5% Level
2.23	1.93		0.30*	0.18
2.23		1.85	0.38*	
	1.93	1.85	0.08	

Table 4: Paired Group Means Differences in Walking Posture among Three Groups

Employer	Shopkeeper	Farmer	Mean Difference	CD at 5% Level
1.90	1.67		0.23	0.27
1.90		1.57	0.33*	
	1.67	1.57	0.10	

Table 7: Paired Group Means Differences in Sitting Posture among Three Groups

Employer	Shopkeeper	Farmer	Mean Difference	CD at 5% Level
2.00	1.90		0.10	0.27
2.00		1.57	0.43*	
	1.90	1.57	0.33*	

5. DISCUSSION OF FINDINGS

It is reveals that in standing posture, significant difference between employer and shopkeeper, employer and farmer was observed. Among three mentioned group employer has higher mean value in case of standing posture. The result may occur due to the nature of their profession. Govt. employers have an opportunity to enjoy break in between their duties. They have scheduled recess time during their working hour. The teacher can also deliver their duties by standing position. Frequent variation in movement pattern is observed in case of Employers which may lead this group for better in standing posture. But other two groups engaged in mono movement pattern at a stretch for longer duration in compare to employer. Restless- lengthy, hard- laborious work of farmer and shopkeeper other than standing position may lead these groups move away from the correct standing posture. No significant difference is disclosed between shopkeeper and farmer in standing posture due to their less opportunity to keep stand in their nature of job for prolonged period.

In case of walking posture significant difference was discovered between employer and farmer but no significant difference was observed between other group means. Usually farmer engaged in their task nearby to their home. So walking opportunity is less for this group in comparison to other group. After a prolonged hardy work fatigue may block to develop the proper walking habits among farmer. But employer generally employ in their service far from their native place. Somehow they obtain chance for walking in their way of service place. In other hand after stipulated working hours employers may use their leisure time by developing proper walking habits to regain their energy. This healthy habit may be the reason of greater mean value of employer in case of walking posture.

Further the result point out that significant difference between employer and farmer as well as shopkeeper and farmer whereas no significant difference between other group mean is observed in sitting posture. Explanation may be given that at a stretch monotonous, variation-less work pattern of shopkeeper and farmer may exert extra pressure of upper body on trunk, which deviate these groups from proper sitting posture. In reverse way short duration activity with proper break of Govt. employer group reduce the excess pressure on trunk muscle which helps them to maintain accurate sitting posture.

Further the result shows in case of stopping to pick up light object posture have no significant difference among the three groups. Reason may be, three mentioned groups have uniformly developed this very particular posture irrespective of their nature of profession.

6. CONCLUSION

It is concluded from the obtained result that Govt. employers are better postural status in comparison to shopkeepers and farmers.

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Moderate Hypoxia on Selected Biochemical Variables of Middle and Long Distance Runners

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Abstract:
The purpose of this study was to determine the Effect of Moderate Hypoxia on Selected Biochemical Variables such as, H.D.L., L.D.L., Blood Lactate, Haemoglobin, R.B.C. and W.B.C. of Middle and Long Distance Runners. 40 college level middle and long distance runners were selected and divided in to two groups. The selected subjects were trained athletes. This is to avoid the acclimatization problem. The experimental group exposed to the experimental training at high altitude and control group undergone their training at sea level. The training was given for a period of six months. All the subjects were tested in the selected Biochemical Variables before and after the training program. Variables tested with the help of lab experts. Dependent't' test was used to find out the mean differences since the groups will be equal and will be independent on the same treatment variable.

Keywords:
Moderate Hypoxia, Altitude Training, Blood Lactate

1. INTRODUCTION

In the last few decades' sports have gained tremendous popularity all over the globe. The popularity of sports is still increasing at a fast pace and this happy trend is likely to continue in the future also. Sports have become an important social and cultural activity in the modern world, which is being given the rightful place it deserves by the nations and societies of the world. The area of performance sports is not merely a glamorous area of sports. It also fulfils its certain valuable social functions due to which it has been accorded high importance all over the world. It contributes towards the all round development of the personality and enhances the horizons of awareness among the competing sports men with regard to the fact that they are representing particular states or countries of their origin. Different training methods have been commonly used to improve physical fitness and its related standards of performance of athletes. The training methods include weight training, circuit training, plyometric training, fartlek training, altitude training, resistance training and interval training.

Altitude training traditionally referred to as altitude camp, is the practice by some endurance athletes of training for several weeks at high altitude, preferably over 2,500 m (8,000 ft) above sea level, though more commonly at a lower altitude due to the lack of availability of a suitable location. At this altitude the air still contains approximately 20.9% oxygen, but the barometric pressure and thus the partial pressure of oxygen is reduced. More common nowadays is the use of an altitude simulation tent, altitude simulation room, or mask-based hypoxicator system where the barometric pressure is kept the same, but the oxygen content is reduced which also reduces the partial pressure of oxygen. Such devices have enabled different altitude training techniques including Live High, Train Low, or the practice of merely performing occasional exercise sessions at altitude.

2. METHODOLOGY

Forty college level athletes selected and divided in to two groups. The selected subjects were trained athletes. This is to avoid the acclimatization problem. The experimental group exposed to the experimental treatment at high altitude and control group undergone their training at sea level. The training was given for a period of six months. The intensity and repetitions were increased after every two weeks. The subjects tested in Blood lactate, HDL, LDL, Haemoglobin, W.B.C and R.B.C (These Biochemical variables tested with the help of lab experts). Dependent't' test was used to find out the mean differences since the groups will be equal and will be independent on the same treatment variable.

3. RESULTS AND DISCUSSION

The data collected on each variable was described by finding out the mean and standard deviation. To find out whether the mean difference is significant or not dependent't' test was employed. The variable wise statistical analyses were given in the following tables.

Table I: Mean Comparison of HATG and SLTG on Selected Variables

Variables	Groups	Mean	St Dev	SEM	df	t
HDL	HATG	2.15	1.87153	0.41849	19	5.138*
	SLTG	0.05	1.76143	0.39387	19	0.127
LDL	HATG	3.4	3.05	0.6821	19	4.985*
	SLTG	0.05	2.76205	0.61761	19	0.081
Blood Lactate	HAT G	3.215	3.6615	0.81874	19	3.927*
	SLTG	0.11	0.5884	0.13157	19	0.836
Hb	HATG	0.54	0.29092	0.06505	19	8.301*
	SLTG	0.01	0.14832	0.03317	19	0.302
RBC	HAT G	0.11	0.10208	0.02283	19	4.819*
	SLTG	0.005	0.02236	0.005	19	1.00
WBC	HATG	120	703.0759	157.212	19	0.763
	SLTG	5	195.9457	43.8148	19	0.114

*Significant at t.05 (19, 2) = 2.093.

From the table it is clear that the High Density Lipoprotein (HDL) had significantly improved since the calculated't' value of 5.138 was greater than the required table value. In the case of SLTG there were no significant changes, Low Density Lipoprotein **(**LDL) had significantly reduced since the calculated't' value of 4.985 was greater than the required table value. In the case of SLTG there were no significant changes, blood lactate level had significantly reduced since the calculated't' value of 5.138 was greater than the required table value. In the case of sea level training group (SLTG) there were no significant changes, haemoglobin (Hb) had significantly improved since the calculated't' value of 8.301 was greater than the required table value. In the case of SLTG there were no significant changes, Red Blood Cells (RBC) had significantly improved since the calculated't' value of 8.301 was greater than the required table value. In the case of SLTG there were no significant changes. Table reveals that in the case of the HATG no significant changes were noticed in White Blood Cells (WBC) following eight weeks of high altitude training. Since the't' value obtained for White Blood Cells (WBC) was 0.763, which is lesser than the required table value. In the case of SLTG also there were no significant changes.

4. DISCUSSION ON FINDINGS

The results of the study showed that eight weeks moderate hypoxic training program had significant improvement on selected biochemical variables namely, High Density Lipoprotein (H.D.L), Haemoglobin (Hb), Red Blood Cells (R.B.C.), and decrease of Low Density Lipoprotein (L.D.L.) and Blood Lactate.

The biochemical assessment of exercising persons aims at protecting or improving their health and increasing their performance. The first target covers all exercising individuals, while the second concerns primarily athletes. Good health is the sound foundation on which sports performance is built. Thus, good health ought to be primarily concern of a biochemist, as any scientist, who is monitoring the athlete.

As to the scope of the assessment, one can measure biochemical parameters in samples collected at different time point relative to exercise. Samples collected at rest, Samples collected during exercise and Sample collected after exercise. For the purpose of this study the samples were collected before and after the experimental period, based on which the following findings were made:

4.1. HIGH DENSITY LIPOPROTEIN

Moderate hypoxic training program had significantly improved High Density Lipoprotein of middle and long distance runners which was substantiated by the studies conducted by **Richalet (1993) and Rathat (1988).**

4.2. LOW DENSITY LIPOPROTEIN (L.D.L.)

Moderate hypoxic training program had significantly reduced the level of Low Density Lipoprotein of middle and long distance runners which was in agreement with the findings of the studies conducted by **Rathat (1988) and Sigmund (1980).**

Chronic exercise can affect both the concentration of total cholesterol in the plasma and its distribution in LDL and HDL. Endurance athlete and other persons training aerobically have total cholesterol concentrations below those of untrained persons. However, this is due to the lower body mass and fat mass usually seen in physically active people. The same holds for LDL cholesterol. It is lower in aerobically trained individuals. But this is apparently due to lower body mass and fat. An exercise bout of high energy expenditure can decrease total cholesterol and increase HDL cholesterol in the plasma, with regular aerobic exercise involving considerable weekly energy expenditure increases HDL cholesterol**.**

4.3. BLOOD LACTATE

Moderate hypoxic training program had significantly reduced the level of blood lactate of middle and long distance runners which was substantiated by the studies conducted by **Saltin (2001), Kayser (1996), Hall *et al.*, (2001) and Bailey (1998).**

The blood lactate response at altitude is often referred to as the lactate paradox. **Reeves *et al.*, (1992)** described the lactate paradox as a physiological response in which blood lactate concentration during sub-maximal exercise is increased upon acute altitude exposure but is decreased with altitude acclimatization. The lactate paradox relates to the fact that there is a decrease in sub maximal exercise lactate concentration as a result of altitude acclimatization, without an equivalent and concomitant reduction of hypoxic stress**.**

4.4. HAEMOGLOBIN

On the basis of result obtained, it was concluded that moderate hypoxic training program had significantly increased the level of haemoglobin (Hb) of middle and long distance runners which was in consonance with the findings of the studies conducted by **Robach *et al.*, (2012), Wehrlin (2006) Bailey and Davis (1997).**

One of the primary reasons endurance athletes live and train at altitude is to stimulate an increase in erythropoietin (EPO), which in turn produces an increase in RBC mass and haemoglobin concentration. An increase in haemoglobin and RBC will improve oxygen transport to the working muscles during submaximal and maximal exercises, contributing to an enhancement in endurance performance**.**

4.5. RED BLOOD CELLS (RBC)

Moderate hypoxic training program had significantly increased the level of Red Blood Cells (RBC) of middle and long distance runners which was substantiated by the studies conducted by **Dufour, Ponsot, and Zoll (2006), Wehrlin (2006).**

One of the primary reasons endurance athletes live and train at altitude is to stimulate an increase in erythropoietin (EPO), which in turn produces an increase in RBC mass and haemoglobin concentration. An increase in haemoglobin and RBC will improve oxygen transport to the working muscles during submaximal and maximal exercises, contributing to an enhancement in endurance performance**.**

4.6. WHITE BLOOD CELLS (WBC)

There were no relevant changes in White Blood Cells (WBC) following eight weeks moderate hypoxic training program.

A generalization of various studies **(Levine *et al.*, 1992, Terrados 1997, Martin 1994, Saltin 1997, Hartmann 1995)** is that altitude training is a developmental stimulus because the organism adapts to the reduced oxygen partial pressure and the resulting lack of oxygen. In addition to this, the specific climatic conditions have a long lasting positive effects on the main functional parameters of organism like erythrocyte volume, haemoglobin, myoglobin, cardiovascular and respiratory system (heart rate, Ventilatory minute volume, oxygen uptake), cell, number of mitochondria, number of enzymes, hormonal regulation, acid tolerance etc**.**

5. CONCLUSION

The results of the study permitted the following conclusions:

Participation in eight weeks high altitude training program resulted in improvement on High Density Lipoprotein (H.D.L.), Haemoglobin (Hb), Red Blood Cells (R.B.C.) and decrease of Low Density Lipoprotein (L.D.L.), and Blood Lactate and it made no significant effect on White Blood Cells (WBC).

6. RECOMMENDATIONS

In the light of conclusions drawn, the following recommendations are made:

A study may be under taken for different age group and on female athletes. Longitudinal studies may be undertaken by increasing the duration and intensity of training program. Studies may be under taken for players from team sports and games requiring high amount of speed endurance. Similar studies may be under taken at a higher altitude.

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Comparison of Cognitive Intervention among Inter College and Inter University Soccer Players

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Abstract:
The use of psychological interventions in competitive sport to enhance performance has become increasingly popular. Hence, based on individual differences it was profound to have the cognitive differences among selected soccer players. The primary objective of this research finding was to determine the significant level of cognitive differences among inter-collegiate and inter-varsity soccer players. Sixteen selective soccer players were taken from each participating team (inter-collegiate and inter-varsity) for the purpose of the study as the sample within Dibrugarh University campus (Assam). The range of the subjects lie between 18–25 years of age and the samples were chosen randomly. To measure the cognitive quality the questionnaire of the "ICEDIP" model of creative process of Anne de A'Echevarria was used. For the analysis and the interpretation of collected data's the statistical tools of t-test was deployed. The significance of hypothesis was tested at 0.05 level of confidence. The calculated t-value of 3.61 is quite greater than the tabulated t-value of 2.042 and hence there is significant differences between the means of cognitive intervention of inter college and inter university soccer players of 0.05 level of confidence at 30 degree of freedom. It was also inferred that inter-university soccer players have strong and effective cognitive intervention than the inter-college level soccer player. Therefore the factor of level of difference is a matter of concern.

Keyword:
Cognitive Intervention, Mental Training

1. INTRODUCTION

Currently, sports psychologist utilizes numerous intervention and techniques intended to enhance the performance of athletes in competition. Performance in physical activity or sports not only demands systematic training to develop physical and physiological variables but also demands training and consideration of psychological characteristics for success in this field. The success or failure of an individual athlete depends on the blending of physical ability, conditioning, training mental preparation and the ability to perform well under pressure. The player must needs to adopt new ideas with their cognitive domain and response to the situation.

Soccer being most viewed and a major competitive sport requires constant action and continuous adaptation to change situations as an individual as well as team players as a whole. Although it is a team game, there is ample room for the players to display their brilliance through individual performance with the ball as well as through the team play involving improvisation and tactical knowledge which is assisted by an individual cognitive functioning. Cognitive refers to the process of thinking and making sense of what is seen. And thus it is a term referring to the mental processes involved in gaining knowledge and comprehension, knowing, remembering, judging and

problem-solving. These are higher-level functions of the brain and encompass language, imagination, perception and planning as a matter of fact it plays a very role in attainment of high level performance. Cognition is the scientific term for mental processes. Vigorous physical performance is not only focal point in games and sports, whereas to be more precise- thinking, knowing, remembering, judging and problem-solving abilities of humans encompasses cognitive quality that should be given equal importance in case of any competitive games and sports.

2. METHODOLOGY

To determine the cognitive difference among inter-university and inter-college level soccer players, sixteen players were taken in each representing team from Dibrugarh University. The subjects for both the groups were selected by using simple random method exclusively for male players. To measure the cognitive quality, the questionnaire of the "ICEDIP" model of creative process of Anne de A'Echevarria was used. Questionnaire pertaining to this test tries to discover how effectively we use the creative process during problem solving, design, invention, artistic expression etc. In this test the subject's show how much they agree or disagree with the statements as "3" means strongly agree; and "0" means strongly disagree. The author stated that the relative scores are meaningful and the phases with the lowest scores may well be the subject's weakness. The responses of the subjects were converted into numerical form with the help of the scoring key and all the scores are calculated individually. For the analysis and interpretation of the data's- t- test was employed in the study.

2.1. HYPOTHESES

H_1: There may be significant cognitive differences among university level and inter-college level soccer players.

H_2: It may have higher cognitive intervention to university level soccer player than the level of inter collegiate players.

3. RESULTS AND DISCUSSION

The results pertaining to the responses of their cognitive intervention were shown in Table 1, as to how individual players among university level and inter-collegiate were precisely used in competitive sports participation.

Table 1: Comparison of the Mean of Cognitive Intervention between Inter College Level Soccer Players and Inter University Level Soccer Players

Groups	Mean	S.D.	M.D.	S.E.	t-ratio
Inter College players	76.18	10.20	12.13	3.36	3.61@
Inter University players	88.31	8.80			

Tabulated t 0.05(30) = 2.042

It is evident from the above table-1 that the calculated t-value of 3.61 is quite greater than the tabulated t-value of 2.042. Hence there is a significance difference between the means of cognitive intervention of inter college and inter university soccer players at 0.05 level of confidence for 30 degree of freedom.

The differences of means of cognitive intervention of inter college and inter university soccer players have been shown graphically in Fig. 1.

The finding of the table shows that there was significant mean difference in terms of cognitive intervention among inter college level and inter university level soccer players. It may be attributed to the fact that twin combination of both skill and physical fitness is indispensible for a player without either of which he will not be able to achieve much, specifically in order to play any ball game competently. To be precise our mind is one of the most powerful pieces of sports equipment we will ever own. By understanding the power of our mind and being able to use it to our advantage, we can improve our performance. It is through cognitive domain that player needs to adopt new ideas and response to the situation demand as required.

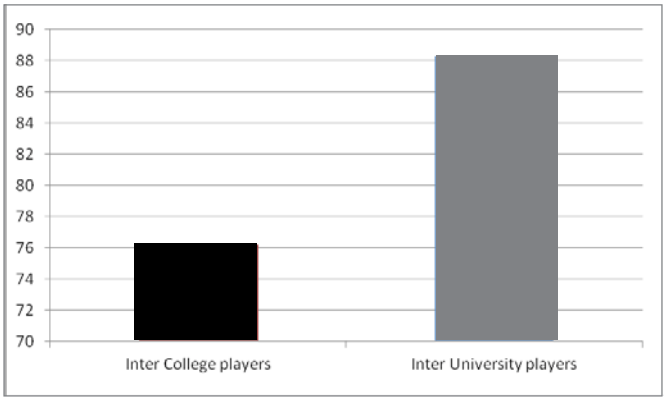

Figure 1

Cognition is a mental process encompasses creativity, decision making, reasoning etc. and intervention refers to the involvement; hence interference of player's cognition reflects in the performance of the game. As the study revealed that inter university players have strong and better cognitive intervention than the inter college level soccer players, the factor of level of differences is the matter of concern. University soccer team represent efficient cognitive intervention than the inter-college level soccer players, the reason may be due that they are technically and mentally more advanced. Moreover it can also be attributed to the fact that university level soccer players may have got advanced level of training as a team than inter-collegiate level players. Since the level of competition is tougher at university level the cognitive level of intelligence and decision making also requires higher level of understanding. Hence to exhibit good performance, players must have strong cognitive intervention so as to achieve optimum level in competition. There is no greater power in the field than the player's creativity and precise decision making in a given situation as this study reveals the significant differences between the groups.

4. CONCLUSION

On the basis of this research finding conclusions were drawn that there is a significant difference of cognitive intervention between inter college level and inter university level soccer players. It was found that Inter university level players are much better in cognitive functioning than inter college players due to that fact that they have the ability to cope with more pressure and anxiety at higher level of competition. Technical skills as well as the level of mental training to university level players were more resonance than intercollegiate players. However significant level of cognitive interventions was also found in some players of intercollegiate soccer players.

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Effect of whey Protein Consumption on the Selected Physical Fitness variables of Male Sprinters

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Abstract:
The purpose of the study was to investigate the effect of whey Protein consumption on the selected physical fitness variables of male sprinters. The total number of 20 male sprinters which equally divided 10 in each group i.e. experimental and control groups. The sample was belong to, who had participated at inter college level under Lakshmibai National Institute of physical education, North east regional center in the age group of 18 to 25 years. whey Protein gives to 10 experimental groups for 12 week thrice a week of alternate days with milk. After the 12 weeks physical fitness test was taken on 20 male sprinters, experimental as well as control groups. In conclusion; keeping the results and discussion in view the conclusions drawn that the significant effect of whey Protein consumption on sprinters related to their standing broad jump (Meters), 50 yard dash (Seconds), pull-ups (Minutes), sit–ups (Minutes), shuttle run (Second), 12-min. run/walk.

Keywords:
Whey Protein, Physical fitness, Sprinters

1. INTRODUCTION

Whey protein is traditionally used for general strengthening and recovery. Every sprinter understands, or should understand, the important of protein supplementation. Sprinters required more protein than sedentary folks. Without protein (which the body breaks down into amino acids), you cannot build muscle. As far as study concerned, no matter what kind of diet one follow – whether it is low or high in complex carbohydrates or fats – and despite the number of calories you taken in, your diet must be rich with protein. There are many different types of protein sources available to all. Qualitative protein can be found in whole foods like eggs, milk, cottage cheese, beef, fish, poultry, etc. and, there are also a variety of protein supplements on the marked milk and egg protein, soy, beef, even vegetable protein. Out of all these different protein supplements, everyone absolutely convinced that whey protein is the best. Not only does it have a superior biological value (which means it may "yield" most usable grams of amino acids than other protein (supplements), it is also very low in lactose. Whey protein – ion-exchanged, micro filtered whey protein/ is extremely high quality and very easy to use which is another thing that is terrific about it. There are so many ergogenic aids for improving the performance; supplementary foods are one of them. During the training schedule or period a sportsman wants much more energy for completion of their schedule. The sources of energy in our body is limited i.e. the sportsman needs extra energy. The ultimate aim of sportsman is achieving highest performance in sports and games. If the sports are depend on strength, endurance, speed then the supplementary food is much more needed.

2. MATERIALS AND METHODS

2.1. STUDY DESIGN AND SETTING

Simple random sampling technique was used to select the sample. The total number of 20 male sprinters which equally divided 10 in each group i.e. experimental and control groups. The sample was belong to, who had participated at inter college level under Lakshmibai National Institute of physical education, North east regional center in the age group of 18 to 25 years.

2.2. SAMPLING TOOLS

The following physical fitness test items was used for data collection for this study was Standing broad jump (Meters), 50 yard dash (Seconds)(6), Pull-ups (Minutes), Sit –ups (Minutes), Shuttle run (4*10 yard) (Second)(5), 12 min. run/ walk (Minutes) (1).

Researcher was took the sample of 20 male sprinters. Pre-test on 10 male sprinters then divided into two groups 10 experimental and 10 control groups. After the pre-test body weight was taken of experimental group, that fall in between 50 to 59kg weight category they were taken whey Protein 2.5gm and those lie above 60kg weight category they were taken whey Protein 3gm. whey Protein give to 10 experimental groups for 12 week thrice a week of alternate days with milk. After the 12 weeks physical fitness test was taken on 20 male sprinters, experimental as well as control groups.

2.3. STATISTICAL ANALYSIS

To analysis the data statistically found the significant difference between experimental and control groups mean, correlation and "t" test was used. (7)

3. RESULTS

The study was conducted to show the effect of whey Protein consumption on the selected physical fitness variables of Male sprinters. The statistical analysis of the data collected on twenty (N=20) male sprinters is presented. For each of the chosen variable, the results pertaining to significant difference, if any, between groups were assessed by "t" test and are presented in tables:

Table 1 shows that mean of standing broad jump of whey Protein consumption and control group was 2.683 and 2.071 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 2.93. Since cal. t (=2.93)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance.

The mean of 50 Yard Dash of whey Protein consumption and control group was 6.27 and 6.66 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 2.48. Since cal. t (=2.48)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance.

The mean of Pull Ups of whey Protein consumption and control group was 9.8 and 9.13 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 2.44. Since cal. t (=2.44)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance.

The mean of Sit Ups of whey Protein consumption and control group was 39.26 and 40.26 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 2.66. Since cal. t (=2.66)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance.

Table 1: Mean Value, Pearson Correlation and 't' Value of Physical Fitness of whey Protein Consumption and Control Group

Group	Variables	Number	Mean	Pearson Correlation	't' Value
Whey Protein	Standing Broad Jump	10	2.683	0.189	2.93
Control		10	2.071	0.526	0.70
Whey Protein	50 Yard Dash	10	6.276	0.124	2.48
Control		10	6.667	0.146	1.78
Whey Protein	Pull Ups	10	9.8	0.584	2.44
Control		10	9.13	0.250	1.76
Whey Protein	Sit Ups	10	39.26	0.102	2.66
Control		10	40.26	0.182	1.46
Whey Protein	Shuttle Run	10	9.668	0.124	3.14
Control		10	9.981	0.458	0.50
Whey Protein	12 Min. Run Walk	10	23.21	0.274	3.02
Control		10	24.19	0.332	0.53

The mean of Shuttle run of whey Protein consumption and control group was 9.66 and 9.98 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 3.14. Since cal. t (=3.14)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance.

The mean of 12 Min. Run Walk of consumption of whey Protein and control group was 23.21 and 24.19 respectively. The 't' value in case of standing broad jump of whey Protein consumption was 3.02. Since cal. t (=3.02)> tab t 0.05 (9) (=2.26), Ho (null hypothesis) is rejected at 0.05 level of significance. Thus, the physical fitness of whey Protein consumption showed significant improvement in standing broad jump, 50 yard dash; pull ups, sit ups, shuttle run and 12 minute run walk and insignificant result in control group. As per the study the above remark can be given at 95% confidence.

4. DISCUSSION

The result of present study shows the significant effect of whey Protein consumption on sprinters related to their Standing broad jump (Meters), 50 yard dash (Seconds) , Pull-ups (Minutes), Sit –ups (Minutes), Shuttle run (Second), 12 min. run/walk. Whey Protein is traditionally used for general strengthening and recovery. Strengthen to the muscular Skelton system as well making this wonder full tonic. It is self-evident that the fit citizens are a nation's best assets and weak ones its liabilities. It is therefore the responsibility of every country to promote physical fitness of its citizens because physical fitness is the basic requirement for most of the tasks to be undertaken by an individual in his daily life. So present study show whey Protein consumption increase the strength and coordinate ability so there is no side effect recommended by the doctors and ashwagandha help to increase the strength and coordinative ability of the players and use for other games which requires more explosive strength, abdominal strength and coordinative ability.

In conclusion; keeping the results and discussion in view the conclusions drawn shows the significant effect of whey Protein consumption on sprinters related to their Standing broad jump (Meters), 50 yard dash (Seconds), Pull-ups (Minutes), Sit –ups (Minutes), Shuttle run (Second), 12 min. run/walk. With reference to the physical fitness between whey Protein consumption (experimental) and control, significant difference is noted in all diameters including standing broad jump, 50 yard dash, Pull-ups, Sit –ups, Shuttle run, 12 min. run/walk.

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