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# Current state of Health related Physical Fitness of Vietnamese Swimming Athletes Aged 12-14 years

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**Abstract:**
The objective of this study was to identify the Health related Physical Fitness of Vietnamese swimming athletes aged 12-14, a researcher examine swimming athletes in 6 Health related Physical Fitness tests included 30 metres sprint, Grip strength (kg), Standing long jump (cm), Sit -ups (times), Shuttle run 4x10m (s), Sit and reach (cm).
Keywords: Health related Physical Fitness, Vietnamese swimming athletes, aged 12-14.

**Introduction**

In the modern athlete training system adopted by top sports countries like China, Russia, USA and Germany, the utilization of Health related Physical Fitness tests is of crucial importance for excellent athlete training. Russian sports scientists such as Bungacova, Gaida; German sports scientists such as Hebric, Harre; Chinese sports scientists such as Xing Wenhua, Deng Fanhui and Wang Lude, etc., has published a lot of findings about the application of Health related Physical Fitness tests to the examination, selection and training of swimming athletes.Due to the fact that physical fitness plays a significant role in helping athletes win the competition, scientists pay close attention to general and specialized physical fitness training exercises. In particular, swimming is a sport that needs speed and the strength of swimming athlete has emerged as the top concern of Vietnamese experts and coaches in their training process. The study will offer 6 Health related Physical Fitness tests invented by previous scientists on the participating athlete's included 30 metres sprint, Grip strength (kg), Standing long jump (cm), Sit -ups (times), Shuttle run 4x10m (s), Sit and reach (cm).

Research purpose: identify the Health related Physical Fitness of Vietnamese swimming athletes aged 12-14 years.

**Research method**

1. Sample size: 37 Athletes
7 male and 7 female athletes (12 years-old)
6 male and 6 female athletes (13 years-old)
6 male and 5 female athletes (14 years-old)

Participating athletes are all trained at 3 sports centers located in Hanoi, Hai Phong and Da Nang city.

2. Measurement: 6 Health related Physical Fitness tests included 30 metres sprint, Grip strength (kg), Standing long jump (cm), Sit -ups (times), Shuttle run 4x10m (s), and Sit and reach (cm).

**3. Statistical Data Analysis**

All data analyzed by using a computer statistical program $\overline{X}$ , δ, $C_v$, mX were be administered.

**Results and Discussions**

Table 1 Current state of the Health related Physical Fitness of swimming athletes aged 12 years

| Test | Gender | n | $\overline{X}$ | δ | $C_v$ | mX |
|---|---|---|---|---|---|---|
| 30 metres sprint | Male | 7 | 5.33 | 0.18 | 3.43% | 0.07 |
| | Female | 7 | 6.02 | 0.06 | 1.05% | 0.02 |
| Grip strength (kg) | Male | 7 | 27.14 | 1.09 | 4.02% | 0.41 |
| | Female | 7 | 23.71 | 0.90 | 3.81% | 0.34 |
| Standing long jump (cm) | Male | 7 | 179.14 | 6.96 | 3.89% | 2.63 |
| | Female | 7 | 159.86 | 6.23 | 3.90% | 2.35 |
| Sit -ups (times) | Male | 7 | 18.29 | 1.38 | 7.55% | 0.52 |
| | Female | 7 | 13.57 | 0.98 | 7.19% | 0.37 |
| Shuttle run 4x10m (s) | Male | 7 | 11.11 | 0.21 | 1.85% | 0.08 |
| | Female | 7 | 12.24 | 0.22 | 1.77% | 0.08 |
| Sit and reach (cm) | Male | 7 | 7.47 | 1.27 | 17.00% | 0.48 |
| | Female | 7 | 8.43 | 1.54 | 18.26% | 0.58 |

Table 2 Current state of the Health related Physical Fitness of swimming athletes aged 13 years

| Test | Gender | n | $\overline{X}$ | δ | $C_v$ | mX |
|---|---|---|---|---|---|---|
| 30 metres sprint | Male | 7 | 5.127 | 0.142 | 2.77% | 0.06 |
| | Female | 7 | 5.94 | 0.04 | 0.70% | 0.02 |
| Grip strength (kg) | Male | 7 | 34.4 | 1.02 | 2.97% | 0.42 |
| | Female | 7 | 28.08 | 0.74 | 2.63% | 0.30 |
| Standing long jump (cm) | Male | 7 | 197.17 | 9.67 | 4.90% | 3.95 |
| | Female | 7 | 166.83 | 2.34 | 1.40% | 0.96 |
| Sit -ups (times) | Male | 7 | 20.5 | 1.22 | 5.95% | 0.50 |
| | Female | 7 | 14.67 | 0.47 | 3.21% | 0.19 |
| Shuttle run 4x10m (s) | Male | 7 | 10.73 | 0.15 | 1.40% | 0.06 |
| | Female | 7 | 12.02 | 0.10 | 0.87% | 0.04 |
| Sit and reach (cm) | Male | 7 | 9.16 | 0.19 | 2.07% | 0.08 |
| | Female | 7 | 10.60 | 0.30 | 2.85% | 0.12 |

Table 3 Current state of the Health related Physical Fitness of swimming athletes aged 14 years

| Test | Gender | n | $\overline{X}$ | δ | $C_v$ | mX |
|---|---|---|---|---|---|---|
| 30 metres sprint | Male | 6 | 4.98 | 0.07 | 1.38% | 0.03 |
| | Female | 5 | 5.87 | 0.05 | 0.81% | 0.02 |
| Grip strength (kg) | Male | 6 | 40.55 | 0.85 | 2.10% | 0.35 |
| | Female | 5 | 31.34 | 0.45 | 1.44% | 0.20 |
| Standing long jump (cm) | Male | 6 | 213.83 | 9.70 | 4.54% | 3.96 |
| | Female | 5 | 170.40 | 1.82 | 1.07% | 0.81 |
| Sit -ups (times) | Male | 6 | 21.83 | 0.75 | 3.45% | 0.31 |
| | Female | 5 | 15.80 | 0.84 | 5.30% | 0.37 |
| Shuttle run 4x10m (s) | Male | 6 | 10.5 | 0.17 | 1.62% | 0.07 |
| | Female | 5 | 11.83 | 0.16 | 1.34% | 0.07 |
| Sit and reach (cm) | Male | 6 | 11.21 | 0.34 | 3.03% | 0.14 |
| | Female | 5 | 12.37 | 0.35 | 2.83% | 0.16 |

The result shown in the abovementioned tables has proved that the average value ($\overline{X}$) of Health related Physical Fitness including 30 metres sprint, Grip strength (kg), Standing long jump (cm), Sit -ups (times), Shuttle run 4x10m (s), Sit and reach (cm) in male and female athletes aged 12 – 14 years has the variable < 10% and mX is relatively low, all of which have shown the consistent value ($\overline{X}$).

**Conclusions**

Level of Health related Physical Fitness of male and female swimming athletes in the age class of 13 and 14 is absolutely higher than in the age class of 12 and 13 respectively.

**Recommendation**

Coaches or researchers can use data or figures of male and female swimming athlete's Health related Physical Fitness shown in this study as benchmarks for their general test and assessment through 6 tests on the Health related Physical Fitness of the swimming athletes aged 12 – 14 years who are practicing throughout nationwide cities and provinces.

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# Effect Of Selected Drills And Training On The Performance Related Variables Of Men Football Players

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**Abstract**
The purpose of this study was to find out the effect of selected drills and training on the performance related variables of men football players. By applying random sampling method, 40 students were selected from Perunthalaivar Kamarajar Arts College, Puducherry. Their age group ranged from 18 to 25. They were again divided into two equal groups at a random basis, in which Group I named as experimental group and Group II named as control group. This study consisting of selected drills and training programme. The following variables are used passing accuracy was measured by forward pass for accuracy, dribbling was measured in seconds by 25 yards and shooting accuracy was measured by shooting accuracy test. The initial and final tests were conducted on the above variables for both experimental and control groups. No treatment was given to control group whereas experimental group were given selected drills and training for 6 weeks. After 6 weeks of treatment the post test was conducted again for both groups and recorded the readings. The dependent 't' test was used to find out the difference between two groups. It was concluded that there was a significant improvement on performance related variables namely passing, dribbling and shooting due to drills and training.
Keywords: Passing, Dribbling and Shooting.

## Introduction

Soccer is the most popular sports in the world. Soccer is characterized as vigorous, high intensity, intermittent, ball and contact sports. The characteristics of soccer along with the required functional activities obviously places great demands on the technical and physical skills of individual players. The contemporary history of football spans more than 100 years. It all began in 1863 in England, when rugby on their different courses and the world's first football association was founded – The Football Association in England. Both forms of football stemmed from a common root and both have a long and intricately branched ancestral tree. Their early history reveals at least half a dozen different games, varying to different degrees and to which the historical development of football is related and has actually been traced back. Whether this can be justified in some instances is disputable. Nevertheless, the fact remains that playing a ball with the feet has been going on for thousands of years and there is absolutely no reason to believe that it is an aberration of the more "natural" form of playing a ball with the hands (Carolyn Calvin 1974).

## Methodology

This study was designed to deal with the effect of selected drills and training on performance related variables of men football players. By applying random sampling method, 40 students were selected from Perunthalaivar Kamarajar Arts College, Puducherry. Their age group ranged from 18 to 25. They were divided into two equal groups at a random basis, in which group I named as experimental group and control group II. This study consisting of selected drills and training programme. Hence the research scholar earnestly got interested to know whether there was any significant improvement or not in the following variables namely passing accuracy was measured by forward pass for accuracy, dribbling was measured in seconds by 25 yards and shooting accuracy was measured by shooting accuracy test.

The initial and final tests were conducted on the above variables for both control and experimental groups. No treatment was given to control group whereas experimental group were given selected drills and training for 6 weeks. After 6 weeks of treatment the post test was conducted again for both groups and carefully recorded the readings. The dependent 't' test was used to find out the improvement.

**Results**

The level of significance was set at 0.05 level of confidence which was considered adequate for the purpose of this study.

Table 1

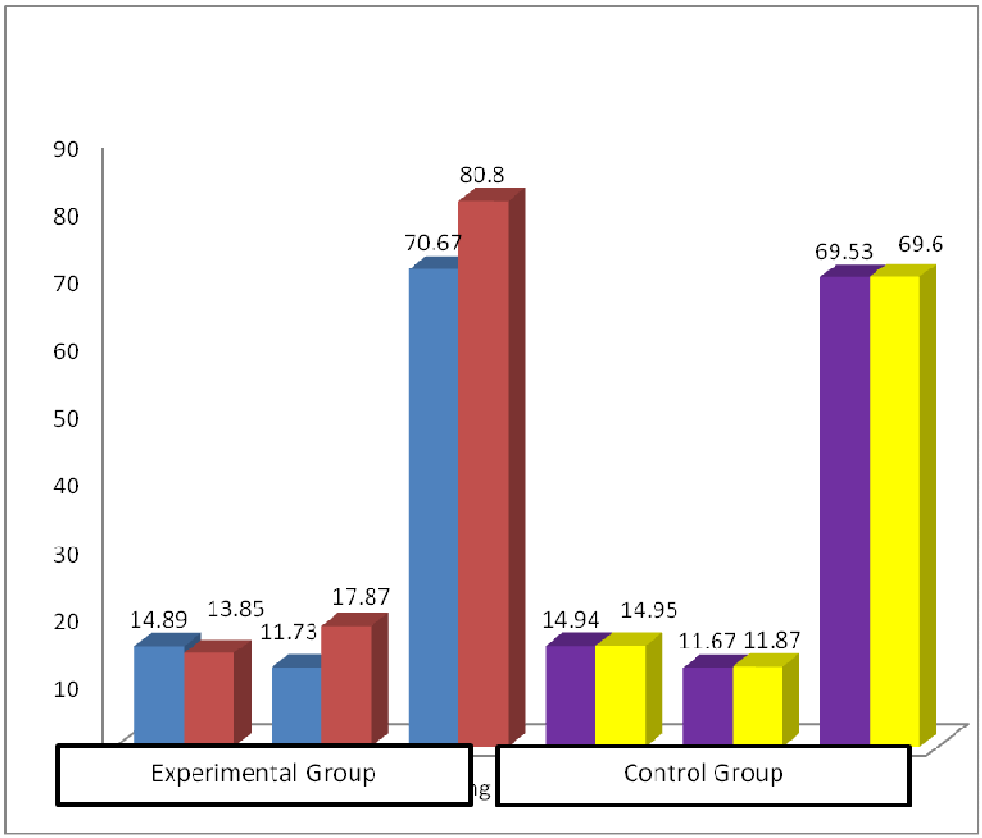
Computation of mean between pre and posttest on experimental group and control group on men football players

| Group | Variables | Pretest mean ±SD | Posttest mean ± SD | M. D | 't'-ratio |
|---|---|---|---|---|---|
| Experimental Group | Passing | 14.89±0.43 | 13.85±0.41 | 1.04 | 12.12* |
| | Dribbling | 11.73±1.71 | 17.87±1.92 | 6.13 | 16.30* |
| | Shooting | 70.67±2.41 | 80.80±2.68 | 10.13 | 21.26* |
| Control Group | Passing | 14.94±0.27 | 14.95±0.25 | 0.01 | 0.36 |
| | Dribbling | 11.67±2.09 | 11.87±1.60 | 0.20 | 0.72 |
| | Shooting | 69.53±2.72 | 69.60±2.82 | 0.07 | 0.05 |

*Significant at 0.05 level. Table value df 29 = 2.09

The table I shows that the t-value was 12.12, 16.30 and 21.26 to be significant at 0.05 level of significance for the df 19, the obtained t-value (2.09) was found to be higher than the table value, it was concluded that the mean difference between the pre and posttest on experimental group of passing, dribbling and shooting was statistically significant. The table 1 reveals that the t-value was 0.36, 0.72 and 0.05 to be significant at 0.05 level of significance for the df 19, the obtained t-value (2.09) was found to be lesser than the table value, it was concluded that the mean difference between the pre and posttest on control group of passing, dribbling and shooting was statistically insignificant.

Figure 1Mean values of pre and posttest on experimental group and control group on men football players



**Conclusion**

It was concluded that there is a significant improvement on performance related variables (Passing, Dribbling and Shooting.) between the experimental and control groups. (Dumas 1977) All sports activities depends upon the following motor qualities such as speed, strength, endurance, flexibility, agility and co-ordination with respect to nature of activity longer duration are mainly based on endurance.

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# A Study On Anxiety Of Sports And Non-Sports Personnel

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**Abstract**
Anxiety is one of the most interesting and important areas of focus in sports psychology and has continued to attract great research interest (Weiss & Gill, 2005). This research attempted to determine the state and trait anxiety of sports and non-sports personnel. To investigate the state and trait anxiety of athletes and non-athletes, we comprised 200 adolescents and divide according to sports and non-sports personnel (100 from each group) and 50 girls and 50 boys were selected from each sports and non-sports groups. Spielberger, Gorsuch, Lushane, Vagg and Jacobs (1983) State-Trait Anxiety Inventory (STAI) was administered on them. Mainly three conclusions were drawn from the study: 1. The Sports personnel possessed less state and trait anxiety than non-sports personnel. 2. Trait anxiety of sports girls was low as compared to non-sports girls. 3. Sports girls showed less trait anxiety than sports boys.
Keywords: Sports Psychology, State Anxiety, Trait Anxiety, Sports Personnel, Non-sports Personnel.

## Introduction

Sports bring out the best qualities in every individual. Every faculty of the human body, whether physical or mental, is stretched to its limits while playing a competitive game. In today's world, the standard of all games has increased considerably. Elite sportspersons are finding it increasingly difficult to sustain their dominance in their respective sports. The mental state of a sportsperson plays a vital role in his or her performance. Anxiety sets in when an individual begins to doubt his or her capacity to deal with the situation which builds stress. Quite often it is not the talent that decides your performance. It simply depends on the way you deal with the ups and downs of the game.

Anxiety is a natural reaction to threats in the environment and part of the preparation for the 'fight or flight' response. This is our body's primitive and automatic response that prepares it to 'fight' or 'flee' from perceived harm or attack. It is a 'hardwired' response that ensures survival of the human species. Sporting competition promotes similar psychological and bodily responses because there is often a threat posed towards the ego; our sense of self-esteem. Essentially, when the demands of training or competition exceed one's perceived ability, anxiety is the inevitable outcome. Anxiety is one of the most interesting and important areas of focus in sport psychology and has continued to attract great research interest (Weiss & Gill, 2005). The concepts of stress, anxiety, and psychological pressure are increasingly recognized as being of key importance and a large number of studies had shown the influence of these concepts on athletes' performance, regardless of sex, age or competitive level (Cruz, 1997).

Anxiety which is seen as an important determinant of performance in sports environments has been defined in many different ways by authors. As to Cox (1985), anxiety is "an increased physiological stimulation and distress". As to Anshel (1997) anxiety is "perceived threat". It is seen in two forms: The first one is trait anxiety which is a part of behavioural patterns of individuals. The latter is state anxiety. Trait anxiety is composed of feelings of distress and tension and it is relatively seen as a self-consistent character trait (Spielberger, 1972). Spielberger argued that individuals having high trait anxiety levels perceive many situations as threats (Woods, 1998). Barnes, Harp and Jung defines state anxiety (2002, p.604) as "a state fluctuating and a function of the stressors on an individual.

It is argued that state anxiety has a multi-dimensional structure (Craft, Magyar, Becker, & Felt, 2003; Martens, Burton, Vealey, Bump, & Smith, 1990). This structure containing cognitive state anxiety, somatic state anxiety and self-confidence dimensions is argued by Martens, Vealey and Burton (1990) in order to make an evaluation on competition anxiety in sports environments. Cognitive anxiety was defined as 'negative expectations and cognitive concerns about oneself, the situation at hand, and potential consequences' (Morris et al., 1981, p. 541). Somatic anxiety refers the physiological and affective components of anxiety experience. Self-confidence is characterized by the individual's belief to perform well (Martens et al., 1990). As it is understood from these definitions, cognitive anxiety and perceived self-confidence is related to performance and competence expectations (Gould et al., 1984).

In sports, individuals who are state anxious and low on the trait anxiety in tough situations, often deliver good performances consistently. Whereas, athletes who have higher levels of trait anxiety, added with the state anxiety, tend to perform below expectations.

Woodman and Hardy (2001) stated that anxiety is generally accepted as being an unpleasant emotion. Additionally, anxiety is seen as an emotion characterized by negative affect that can have a debilitating impact on performance (Eysenck, 1997). Spielberger (1966) defined anxiety in terms of state and trait anxiety, with state anxiety being referred to as "subjective consciously perceived feelings of tension and apprehension, associated with…arousal of the autonomic nervous system" (p. 17). State anxiety therefore refers to the thoughts and feelings that are specific to that moment in time and are subject to fluctuation, essentially more of a "right now" feeling of tension and apprehension in a specific situation (Gould, Greenleaf & Krane, 2002). In contrast, trait anxiety refers to a predisposition to view and interpret situations to be threatening that is more general and not situation specific (Hardy, Jones & Gould, 1996). In extreme cases, anxiety is believed to lead to "choking", a decrement in performance that can occur under conditions where the incentive to perform is heightened (Baumeister, 1984).

The aim of this study is to promote sports among adolescents. Adolescence is a sensitive state for adapting and growing emotions and giving shape of personality. Sports is a key for opening door to discover both physical and psychological strengths and weaknesses and promotes responsible behaviour, forms character and identity and enhance overall wellbeing of adolescents. From a purely behavioural perspective, sport and play is a highly functional activity that can teach us how to adapt and survive in the real world. This includes the development of leadership skills, respect for authority, competitiveness, cooperativeness, sportsmanship, self-confidence and reducing anxiety.

For this study we took two groups, sports personnel as experimental group and non-sports personnel were the comparison group. For understanding the true effect of sports on emotional competence of adolescents, we included the variables: sports and non-sports and gender of participants. The goal of the current study is to learn more to reduce anxiety through sports and encourage students for participation in sports.

The present study is an attempt to examine the difference between sports and non-sports personnel of Uttarakhand state with respect to anxiety of adolescent girls and boys.

Objectives

There are two main objectives studied in this paper:

To measure the anxiety of sports and non-sports personnel.

To compare anxiety of sports and non-sports personnel in terms of gender.

Hypothesis

The above aims enable us to formulate following hypothesis:-

Sports and non-sports personnel will differ significantly on Anxiety.

Gender of sports and non-sports personnel will affect significantly on anxiety.

**Methodology**

Design: A survey research design was used for the study to assess the anxiety of sports and non-sports personnel in Uttrakhand state in India.

Sample: Total sample comprised 200 subjects, 100 were sports personnel and 100 non-sports personnel subjects were included in the sample. Further, sample bifurcated according to gender (50 girls and 50 boys). We assigned only team players studying in $11^{th}$ and $12^{th}$ standard and represented their institution at least at district level. Data were collected during competition time from different districts of Uttrakhand state in India.

Tool Used:

The State-Trait Anxiety Inventory (STAI) was used as research tool. This inventory was designed by Spielberger, Gorsuch, Lushane, Vagg and Jacobs (1983) not only for the assessment of the anxiety loading of the individual but also for the distinction of two aspects of anxiety viz. state anxiety and trait anxiety. “State Anxiety” is conceptualised as a transitory level of anxiety, which is often situationally determined, and fluctuates with time and circumstances, whereas, “Trait Anxiety” is regarded as a latent predisposition, which is relatively stable and can be triggered by appropriate stimuli. This is considered as basic anxiety level.

STAI is a self-evaluation questionnaire. Both of the two parts of the inventory contains 20 items each. Items of this scale have been constructed in reverse- and non-reverse-keyed format, and instructions are given asking participants to rate their agreement with a statement on 4-point “Likert type scale”.

Statistical Analysis

The collected data were classified and tabulated in accordance with the objectives to arrive at the meaningful and relevant inferences by using arithmetic mean, standard deviation, t-test and ANOVA.

**Results and Interpretation**

To examine the significance of difference between sports and non-sports personnel on their anxiety (state and trait anxiety), obtained data was treated with the help of t-test and analysis of variance (2x2) statistical techniques. The outcomes of the analysis are presented in the tables (table 1, 2, 3, 4 and 5).

Table 1 indicates, significant difference between sports and non sports personnel on state anxiety ($t=2.25$, $p<0.05$) and trait anxiety ($t=2.71$, $p<0.01$). Mean value indicates that sports personnel (state anxiety =37.07 and trait anxiety=39.33) are less anxious in comparison to non-sports personnel (state anxiety =39.95 and trait anxiety=42.38).

Examination of table 2 reveals significant difference between sports and non-sports girls on trait anxiety ($t=3.37$, $p<0.01$). Non-sports girls show comparatively higher trait anxiety (M=41.74) than sports girls (M=36.48). While comparing sports and non-sports boys no significant difference found between the mean scores of anxiety level.

It is evident from Table-3 that girls and boys of sports personnel differs significantly from each other on trait anxiety ($t=3.68$, $p<0.01$). Mean values show that sports boys (M= 42.1800) are having more trait anxiety as compared to sports girls (M= 36.48). Remaining ‘t’ values not found significant on state and trait anxiety.

Analysis of the table 4 clearly revealed that sports and non sports affect the state anxiety of subjects. The only significant difference was found for type (Sports and Non-sports). It was observed that the type having F value 5.02 is significant at 0.05 level of confidence. It indicates that difference in type (Sports and Non-Sports) affects the state anxiety. The interactional F value of type x gender (F=.41) is not found significant at any level of confidence.

The mean score of subjects (sports and non sports) with gender (boys and girls) was analysed by 2x2 factorial design (table 5). A significant difference was found for type (Sports and Non-Sports) and gender. It is observed that the type having F value 7.78 and gender (F=10.18) are significant at 0.01 level of confidence. It indicates that difference in type (Sports and Non-Sports) and gender affects the trait anxiety. The interactional F value (4.08 df 1 and 196) (type x gender) is significant at both level of confidence. Therefore, it is clear that impact of sports and non-sports on trait anxiety in participants is dependent on the gender.

Discussion

The purpose of this study was to examine the trait and state anxiety (somatic, cognitive, and self-confidence) of sports and non-sports personnel. Athlete who is conditioned to win and perform well faces a huge stress. Since competition is not a physical challenge, it is a psychological and social challenge too.

So, sports which is the most effective and natural way to protect physical and psychological health deviates from its ultimate purpose and becomes a threat to psychological and physical health (Yavuz, 2002).The practice of a regular physical activity induces benefits for health. These benefits are not only physiological but are also psychological. In particular, physical training results in increased self esteem and perceived physical competence (Demarco et al., 1989; Sonstroem, 1984), especially when self-esteem is initially low (McAuley, 1994), and in reduced anxiety level (Landers and Petruzzello, 1994; Carmack et al., 1999; Katula et al., 1999). To define anxiety, a distinction between state and trait has become commonplace. State anxiety is defined by an unpleasant emotional arousal in face of threatening demands or dangers. On the other hand, trait anxiety is independent of specific situations and reflects the existence of individual differences in the tendency to respond with state anxiety in the anticipation of threatening situations (Spielberger, 1983). It is primarily through experiences that some individuals acquire low or high trait anxiety and persons who are high in trait anxiety tend to be anxious in many situations. In other words, does a regular physical activity practice help to limit problematic variations of self-esteem levels (decrease) and trait anxiety (increase)?

In the present study it is clearly observed from the table 1 that sports and non sports personnel differ significantly on state and trait anxiety. Results indicate that sports personnel possess less state and trait anxiety as compared to non-sports personnel.

In table 2, comparison of sports and non-sports personnel in respect of gender separately we found that sports and non-sports girls differs on trait anxiety and sports girls are lower on trait anxiety in contrast to non-sports girls. Furthermore, no significant difference exists between sports and non-sports boys on trait anxiety.

Analysis of table-3 showed that girls and boys of sports personnel differs significantly from each other on trait anxiety and sports girls possess less trait anxiety as compared to sports boys.

The findings are inconsistent with Costarelli and Stamou, 2009 results which showed no significant differences between athletes and non-athletes on state trait anxiety but anxiety levels (STAI) were significantly correlated with over 15 different constituents of EI (BarOn EQ-I), such as emotional self-awareness, self-actualization, reality testing and impulse control among others.

Dominikus et al (2009) revealed that there is a significant difference between male and female athletes in five subscales in OMSAT-2 i.e Goal setting with, fear control, activation, mental practice and competition planning. There is also no significant difference shown in the t-test between male and female athletes on self confidence, commitment, stress reactions, relaxation, imagery focus and refocus.

Rokka et al (2009) showed that male junior handball players reported lower scores of cognitive anxiety, which was facilitative to performance. On the other hand, females displayed a higher score in cognitive anxiety, which was rather debilitative to performance.

Carter, M.M and Weissbrod, C.S (2011) explored the relationship between gender and enjoyment of competition and various indicators of mental health and adjustment in a sample of college students who report that they highly value athletics. One hundred and thirty-seven students completed the Sports Anxiety Scale, Multi-perfectionism Scale, State-Trait Anxiety Inventory (Trait), Beck Depression Inventory, and Perception of Competition Scale. Results indicated that among women, enjoyment of competition was associated with decreased levels of athletic anxiety and a positive correlation between positive self-perception when winning and self-and socially oriented perfectionism, and between negative perception when losing and self-and socially oriented perfectionism. Among males, enjoyment of competition was related to decreased levels of general anxiety and depression, but not athletic anxiety. Furthermore, among men there was a positive correlation between enjoying competition and self-oriented perfectionism and between negative self-perception when losing and socially-oriented perfectionism. These data indicate gender differentially impacts the benefit of valuing athletics on measures of athletic anxiety and general measures of psychological well being. The above findings seem to support the existing theories on intensity (Mellalieu, Neil & Hanton, 2006; Parfitt & Pates, 1999; Stavrou, Psychoudaki, Zervaç, 2006; Woodman & Hardy, 2003; Wilson, & Raglin, 1997) which demonstrates that the more experienced player will show lower levels of cognitive and somatic anxiety than the less experienced player.

**Conclusion**

Following conclusions can be drawn from the present study:

The Sports personnel possess less state and trait anxiety than non-sports personnel.

Trait anxiety of sports girls is low as compared to non-sports girls.

Sports girls show less trait anxiety than sports boys.

Table 1: Mean, SDs and 't' values for anxiety of sports and non-sports personnel.

| Anxiety | Type | N | Mean | S.D | t |
|---|---|---|---|---|---|
| State Anxiety | Sports | 100 | 37.07 | 8.56 | |
| | Non-Sports | 100 | 39.95 | 9.54 | 2.25* |
| Trait Anxiety | Sports | 100 | 39.33 | 8.21 | |
| | Non-Sports | 100 | 42.38 | 7.72 | 2.71** |

Table 2: Comparison of gender between sports and non-sports personnel on anxiety.

| Gender | Anxiety | Type | N | Mean | S.D | t |
|---|---|---|---|---|---|---|
| Girls | State Anxiety | Sports | 50 | 36.28 | 8.96 | |
| | | Non-Sports | 50 | 39.98 | 10.32 | 1.91 |
| | Trait Anxiety | Sports | 50 | 36.48 | 7.62 | |
| | | Non-Sports | 50 | 41.74 | 7.97 | 3.37** |
| Boys | State Anxiety | Sports | 50 | 37.86 | 8.15 | |
| | | Non-Sports | 50 | 39.92 | 8.78 | 1.22 |
| | Trait Anxiety | Sports | 50 | 42.18 | 7.86 | |
| | | Non-Sports | 50 | 43.02 | 7.48 | .55 |

Table 3: Comparison between girls and boys of sports and non-sports personnel on anxiety.

| Type | Anxiety | Gender | N | Mean | S.D | t |
|---|---|---|---|---|---|---|
| Sports | State Anxiety | Girls | 50 | 36.28 | 8.96 | |
| | | Boys | 50 | 37.86 | 8.15 | .92 |
| | Trait Anxiety | Girls | 50 | 36.48 | 7.62 | |
| | | Boys | 50 | 42.18 | 7.86 | 3.68** |
| Non-Sports | State Anxiety | Girls | 50 | 39.98 | 10.32 | |
| | | Boys | 50 | 39.92 | 8.78 | 0.31 |
| | Trait Anxiety | Girls | 50 | 41.74 | 7.97 | |
| | | Boys | 50 | 43.02 | 7.48 | 0.83 |

Table 4: 2x2 ANOVA on state anxiety of sports and non-sports personnel.

| Source of Variation | Sum of Squares | df | Mean Square | F |
|---|---|---|---|---|
| Type (Sports and Non-Sports) | 414.72 | 1 | 414.72 | 5.02* |
| Gender (Girls and Boys) | 28.88 | 1 | 28.88 | .35 |
| Type x Gender | 33.62 | 1 | 33.62 | .41 |
| Residual | 16190.76 | 196 | 82.61 | |
| Total | | 199 | | |

Table 5: 2x2 ANOVA on trait anxiety of sports and non-sports personnel.

| Source of Variation | Sum of Squares | df | Mean Square | F |
|---|---|---|---|---|
| Type (Sports and Non-Sports) | 465.12 | 1 | 465.12 | 7.78** |
| Gender (Girls and Boys) | 609.01 | 1 | 609.01 | 10.18** |
| Type x Gender | 244.21 | 1 | 244.21 | 4.08* |
| Residual | 11724.46 | 196 | 59.82 | |
| Total | | | | |

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# Use of Animations and Video Clippings in Teaching Sports Skills

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## Introduction

Physical education and sports have become more paginate and important in the present day context, physical activates are aiming towards fitness and wellness the physical exercise and yogi practice have become part of every ones conceal. The changing environment leading to new life style and life problems . The government of Karnataka take as made an attempt to introduce Physical education one of compulsory in schools to develop the right habits and right attitudes to attending health and wellness.Now teaching physical education should also take different form apart form the technology which available today as to be used to make teaching more effective motivation. an attempt is main to make use of technology software's to this program more effective

Meaning of animation
Animation means:-
Animation is a type of optical illusion. It involves the appearance of motion caused by displaying still images one after another. Often animation is used for entertainment and also teaching purposes
There are two main categories of computer animation: Computer-assisted animation and computer generated animation. Computer-assisted animation usually refers to 2D and 3D 21/2 dimensional systems that computerize the traditional animation process.
**Video clip means:-** A video clip is a small section of a larger video presentation. A series of video frames are run in succession to produce a short animated video. This compilation of video frames results in a video clip.
**Purpose of the study:-**
Purpose of the study is to know the use of animation and video clipping effects in teaching physical education classes and sports skill classes.

## Methodology

Web sites are presented to animation and video clip enhance knowledge as regard to physical education.
Animation sites are given to uplift updated knowledge of sports skills and how to use animation in class room teaching-learning enhancement purpose.
How to and where to get the animation in internet?
What is the use of these animations in class room teaching?
***Here some new animation web sits***
http://www.freeanimations.co.uk/sport/athletics/athletic
This animation web site gives detailed information regarding Animated Sport Athletics animation of basic skills of Athletics, fitness development, tactics, strategies, etc. Are all available on free. Small video clipping of basic skills of Athletics are given directly in the web and user can view them.
2)http://www.freeanimations.co.uk/sport/basketball/basketball_1.html
This animation web site gives detailed information regarding Basketball animation of basic skills of Basketball, like (Dribbling .Ball holding then shooting ), fitness development etc. are all available on free.

3) http://animationlibrary.com/sc/100/Soccer//?page
This animation web site gives detailed information regarding soccer animation of basic skills of Soccer, juggling. Kicking, fitness development, tactics, strategies, etc this category contains 30 animations.
http://www.freeanimations.co.uk/sport/tennis
This animation web site gives detailed information Regarding Tennis animation of basic skills of Tennis, Tennis serve technique. Tennis smash technique, fitness development, tactics, strategies, etc
5) http://www.freeanimations.co.uk/sport/bodybuilding
This animation website gives detailed information Regarding Bodybuilding technique, fitness development, etc
6) http://www.sportaphile.com/2007/09/14/top-10-animated-sports
This video clippings website gives detailed information regarding How to do game skills

**Concussion**

When we are going to teach in class room by showing the sports related videos and animations it will be very beneficial to students in learning process. Teacher also can effectively communicate the concepts related physical education and sports lesson classes. The English proverb “A well beginning is half done” hold good if the animations and video clippings are used in the classes. Effective theoretical concept can hold good before learning practical skills

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# Hand Anthropometrics and its Linear Relation with Grip Strength in Female Collegiate Handball Players

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## Abstract

Handgrip strength is an easily obtainable measure of physical health and muscle function. The purpose of this study was to determine the extent to which select hand anthropometric characteristics are related to grip strength. One hundred and twenty female collegiate handball players participant in this study. Grip strength, hand length, arm length, forearm length, upper extremity length, forearm circumference and arm circumference were measured for dominant hand. Data were analyzed using by linear regression ($p \leq 0.05$). Forearm circumference and hand length were found to be statistically significant predictive of grip strength. From the findings of the present study, it may be concluded that, forearm circumference and hand length and hand grip strength might be an acceptable indicator for the excellent performance in handball as well as a useful selection criterion for this sport.
Key words: Hand anthropometry • Grip strength •Handball.

## Introduction

Handgrip strength is an easily obtainable measure of physical health and muscle function [1]. And it has often been used as an indicator of overall physical strength and health, performance of hand and forearm muscles and/or as an indicator of nutritional status [2]. Hand grip strength is a physiological variable that is affected by a number of factors including age, gender and body size among others. The power of hand grip is the result of forceful flexion of all finger joints with the maximum voluntary force that the subject is able to exert under normal conditions [3]. The hand does not function in isolation, and is dependent on the integrity of the shoulder and elbow complexes to allow the appropriate positioning of the hand in space to complete the desired task [4].

In several studies, the influence of anthropometric variables on hand grip strength has been studied in non- athletes. For example, Anakwe *et al*. [5] concluded that Forearm circumference predicted maximum hand grip strength for Healthy men. Chang-shui *et al*. [6] indicated that the hand length and hand width are independent predictor of grip strength in Healthy Young Adults. Nicolay and Walker [7] indicated that hand and forearm sizes generally serve as better predictors of grip strength than body height and body mass. In young females, the best single linear measurement to predict grip force is palm width.

Ball games require comprehensive ability including physical, technical, mental and tactical abilities. Among them physical abilities of players exert marked effects on the skills of the players themselves and the tactics of the team. For the ball games in which the use of the hand is essential, hand morphology and functional properties could be important for the performance [4]. In handball and basketball the longer the finger length the better the accuracy of the shot or throw. All shots and throws are finished with the wrist and fingers. It can be proposed that athletes with longer fingers and greater hand surface parameters also probably have greater grip strength [8].

The estimation of hand grip strength is of immense importance in determining the efficacy of different treatment strategies of hand and also in hand rehabilitation [3]. The assessment of hand grip strength assumes importance in a number of situations. Hand grip strength is an inevitable component in the evaluation of rheumatoid arthritis, neuromuscular, preoperative, post -operative patients and community dwelling older adults' functional capacity [10]. It may be used in the investigation and follow – up of patients with neuromuscular disease. It is also of use as functional index of nutritional status and can predict the extent of complications following surgical intervention in hospitalized patients [3]. Hand grip strength is a significant predictor of performance in various sports activities such lawn tennis, club volleyball, handball, ten-pin bowling, rock climbing [9]. The information regarding the association of hand grip strength and handedness is scanty, so the purpose of this study was to search the relation of dominant hand grip strength with 6 anthropometric variables, namely, hand length, arm length, forearm length, palmar length, forearm circumference and arm circumference among handball players in which hand functions are very important for the performance of the players [4].

**Materials And Methods**

This study was performed with the participation of 120 female handball players aged between 20-25 years. All of the participants were players of the college teams which have degrees in provincial tournaments. Exclusion criteria were set upon our knowledge of some genetic, psychological, neurological or chronic diseases affecting hand function and anthropometric characteristics. Diseased or disabled persons were excluded from the study according to the mentioned criteria. Informed consents of all participants were obtained. The Ethics Committee of Tehran University also endorsed its approval for the study.

6 anthropometric traits, hand length, forearm length, arm length, upper extremity length, forearm circumference and arm circumference and dominant hand grip strength were taken on each subject. All the anthropometric variables of the subjects were measured using the techniques provided by Lohman, Roche & Martorell [11].

Hand Length: hand length measured with a small sliding caliper from the styloid process of the radius to the tip of the middle finger. The subject sits with arms hanging relaxed and the forearms extended horizontally. The subject's hand and fingers, palm up, are extended in the direction of the longitudinal axis of the forearm. In this position the fingers are together and extended but not hyperextended [11].

Forearm Length: forearm length measured with a sliding caliper. The subject wears clothing that permits body positioning to be observed. The arms and shoulders are bare. The subject, unsupported by a wall or similar structure, stands erect on a flat equally distributed between both feet, and the shoulders drawn back. The subject breathes normally with the head in the Frankfort plane. The elbows are flexed to 90, and the palms face medially with the fingers extended in the direction of the long axes of the forearms. The fixed arm of the caliper is positioned to make firm contact with the most posterior point overlying the olecranon, while the sliding arm of the caliper is aligned with the most distal palpable point of the styloid process of the radius [11].

Arm Length: arm length measured with a sliding caliper. The subject wears clothes that allow the body position to be seen. The shoulders and arms were bare. The subject stood erect on a flat surface. The shoulders and upper arms were relaxed, with the shoulders drawn black and the upper arms hanging loosely at the subject's sides. Weight is distributed equally between the feet. Both elbows are flexed to place the ulnar surfaces of the forearms and the hands in the horizontal plane and parallel to each other. The beam of sliding caliper is positioned parallel to the posterior aspect of the arm. While maintaining the fixed blade of the sliding caliper in firm contact with the superolateral aspect of the acromion, the measurer moves the sliding blade of the sliding caliper into firm contact with the posterior surface of the olecranon process of the ulna. The measurement, which is the distance between the landmarks projected parallel to the longitudinal axis of upper arm [11].

Upper extremity Length: For this measurement the subject stood erect, with the arms hanging freely at the sides of the trunk and with the palms facing the thighs. The distance between acromion process to styloid process measured as upper extremity length.

Forearm circumference: For this measurement the subject stands with the arms hanging downward but slightly away from the trunk, with the palms facing anteriorly. The tape is placed loosely around the proximal part of the forearm, perpendicular to its long axis and moved up and down until the level of the maximum circumference is located. At this level the measurement is recorded [11].

Arm circumference: For this measurement the subject stood erect, with the arms hanging freely at the sides of the trunk and with the palms facing the thighs. The subject wears loose clothing without sleeves to allow total exposure of the shoulder area. To locate the midpoint, the subject's elbow is flexed to 90◌̊ with the palm facing superiorly. The measurer stands behind the subject and locates the lateral tip of the acromion by palpating laterally along the superior surface of the spinous process of the scapula. A small mark is mad at the identified point. The most distal point on the acromion process is located and marked. A tap is placed so that is passes over these two marks, and the midpoint between them is marked. With the arm relaxed and the elbow extended and hanging just away from the side of the trunk and the palm facing the thigh, place the tape around the arm so that it is touching the skin, but not compressing the soft tissues. The tap is positioned perpendicular to the long axis of the arm at the marked midpoint [11].
Grip Strength: The grip strength was measured using a standard adjustable hand grip dynamometer (Takei Scientific Instruments Co., LTD, Japan) at standing position with shoulder adducted and neutrally rotated and elbow in full extension. The subjects were asked to put maximum force on the dynamometer thrice from dominant hand. The average value was recorded in kilograms [3]. Linear regression was used for statistical analyses.
(p=0.05).

**Results**

Mean age, height; weight, athletic history, anthropometric variables and grip strength are listed in Table 1. Results of linear regression are shown in Table 2. Forearm circumference and hand length were found to be statistically significant predictive of grip strength ($p<0.05$).

Table 1. Mead and SD of characteristics and anthropometric measurement

| variable | Mean | SD |
|---|---|---|
| Age (year) | 21.79 | 3.01 |
| Weight (kg) | 59.54 | 8.15 |
| Height (cm) | 164.75 | 4.50 |
| Athletic experience | 5.27 | 3.12 |
| Upper extremity length (cm) | 54.11 | 3.08 |
| Arm length (cm) | 30.67 | 2.19 |
| Forearm length (cm) | 24.50 | 1.35 |
| hand length (cm) | 18.75 | .902 |
| Arm circumference (cm) | 27.93 | 2.51 |
| Forearm circumference (cm) | 25.14 | 1.72 |
| Dominant grip (cm) | 36.55 | 3.92 |

Table 2. Regression summary results when predicting hand grip based on anthropometric characteristics

| Model | Unstandardized Coefficients | | | |
|---|---|---|---|---|
| | B | SE | t | Sig |
| constant | -22.903 | 14.121 | -1.565 | .129 |
| Upper extremity length (cm) | .519 | .342 | 1.515 | .141 |
| Arm length (cm) | -.750 | .407 | -1.842 | .077 |
| Forearm length (cm) | -.464 | .754 | -.615 | .544 |
| hand length (cm) | 2.168 | .788 | 2.752 | .010* |
| Arm circumference (cm) | -.013 | .355 | -.038 | .970 |
| Forearm circumference (cm) | .975 | .437 | 2.229 | .034* |

Dependent variable. Dominant grip strength.
*p≤0.05

## Discussion

The aim of this study was to investigate the influence of hand anthropometric on handgrip strength in females participating in handball training. The Result of this study showed that forearm circumference and hand length to be statistically significant predictive of grip strength. Handball is a game of endurance as well as strength. Handball players often perform upper extremity passing, shooting, and dribbling skills and for performing these skills, use of forearm strength is essential. Greater forearm girth, arm girth, hand length and hand grip strength help the handball players to generate more force in game. In handball the longer the finger length the better the accuracy of the shot or throw. All shots and throws are finished with the wrist and fingers. It can be proposed that athletes with longer fingers and greater hand surface parameters also probably have greater grip strength [8]. In this direction Koley et al [3] reported in cricketers, right and left hand grip strength have significantly positive correlations with height, weight, BMI, triceps skinfold, subscapular skinfold, percent of body fat, arm muscle girth, arm muscle area, arm area, arm fat area and arm fat index. Koley *et al*. [9] observed a strong association of dominant right hand grip strength with height, weight, BMI, upper arm length, forearm length, total arm length, hand breadth, hand length, upper arm circumference, forearm circumference, triceps skinfold in male students and with height, weight, BMI, total arm length and upper arm circumference in female students. Yildirim *et al*. [12] reported that Handball player's hand grip strength of dominant hands are stronger than nondominant hands; and there is positive correlation between dominant hand grip strength with extension biceps circumference, forearm circumference, wrist circumference and upper arm diameters. Ju¨rima¨e *et al*. [2] found that Forearm girths significantly predicted handgrip strength in prepubertal boys (30.8%) and girls (43.4%). Whereas Dhara *et al.* [13] reported that different anthropometric measures, especially hand dimensions did not influence the hand grip strength of orthopedically challenged and normal persons. The findings of the study of Kunelius *et al.* [14] suggested that hand grip strength and height, weight, hand length, hand breadth were significantly correlated in a population of automotive workers. Semproli *et al*. [15] reported that in children, the basic anthropometric parameters (body height and BMI) contribute more to the prediction of handgrip strength than the specific anthropometric parameters. Though information is lacking regarding the hand grip strength and its association with physical and physiological traits, research findings are available in other sports. Tsunoda *et al.* [16] opined that grip strength was one of the determinant factors of radial bone mineral density in the dominant forearm of young college athletes. Whereas, Ducher et al. [17] found that forearm bone mineral content adjusted to lean tissue mass or grip strength was higher on the dominant side, suggesting that tennis playing exerted a direct effect on bone. Pugh *et al*. [18] observed that hand grip strength correlated with throwing speed in experienced pitchers. Gandhi *et al.* [19] showed that highly significant positive correlations between anthropometric characteristics (height, weight, BMI, five skinfold measurements - biceps, triceps, suprailiac, subscapular and calf) and, left and right hand grip strength were found among school going children aged 6-16 years of Amritsar. Chatterjee & Chowdhuri [20] concluded in the same direction that right and left hand grip strength was positively correlated with weight, height and body surface area. It is also reported that hand grip strength determines the muscular strength of an individual [21]. So, an increase in hand grip strength determines the physical strength of an individual. The findings of the present study would be of great values in medical anthropology researches. To diagnose various musculoskeletal deformities, especially related to upper extremities, and for their rehabilitation, the knowledge of hand grip strength and its association with physical and physiological traits is essential [3]. Also the findings of the present study carry immense practical application in sports anthropometry for the selection of talents in handball. Studies of hand grip strength, a common indicator of upper extremity strength, will be of ample use in all the departments of the game.

## Conclusion

Hand grip strength is a general term used by strength athletes, referring to the muscular strength and force that they can generate with their hands. For the selection of talents in handball the present findings can be of great use. From the findings of the present study, it may be concluded that, forearm circumference, hand length and hand grip strength might be an acceptable indicator for the excellent performance in handball as well as a useful selection criterion for this sport.

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# Sports Need assessment of Tehran Firemen with Management Procedure

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**Abstract**

The general aim of this research was to find firemen's sports needs of Tehran city with management procedure and based on stated needs of firemen. Research method was descriptive and metrical kind. Research universe includes all firemen of Tehran city that were 4500 people. Morgan and Korsi table were used for selecting sample volume and 351 people were selected as the volume of statistical sample and it was based on clustering sampling method. Research tool was questionnaire made by researcher and comments of experts, sports management professors and sports managers of fire department were used for determining fluidity of questionnaire. Permanency of questionnaire was calculated 82% with using Cronbach Alpha coefficient. The results showed that sports needs of firemen were swimming, physical fitness, volleyball and mountain climbing. The purpose of these sports activities was feeling health and happiness, reducing stress and anxiety while confronting to disasters or events and increasing profession exploitation. The methods of enhancement morale so as to participate in sports activities include cases such as setting sports-recreational trips, performing sports activities with family and establishing sports-educational classes. The lack of experienced coach, unsuitable costs, tiredness from sports activities and participation barriers in sports activities were mentioned.

Keywords
Sports Need Assessment, Firemen, Sports Participation, Participation Barrier

## 1.Introduction

Decreasing movement (or movement poverty) is the characteristics of modern world that has created due to development in technology and mechanized life and different jobs. This great evolution is the most important problems of today's human from perspective of health and safeness. Little movement causes problems such as increasing weight, blood pressure, heart and vessel diseases, health and therapy expenses, muscle erosion, decreasing respiratory- heart fitness, physical and morale exhausted and etc. human being is a multi-dimensional creature and has different needs (Ghaderzadeh, 2012). Health and dynamic manpower is one of the fundamental axes of development in different societies that is important in body and mind health, ability to creativity, innovation and applying different tools for achieving the aims of society. In today's comparative world, human is one of important means for creating organization evolution and survival and achieving to aims ideals. Human sources warrant evolution and organization survival

Human role in organization and attitude kind toward him will be effective in success or failure of organization (Hashemi, 2011). Many methods of life have been modified in such a way that sessions in a week are devoted to sports activities. This social procedure and guideline has lead to increase in attention and interest of people in creating and developing knowledge and expert information about various effects of physical activity and exercise for individual fitness and his health. The effect of activity and physical fitness can increase life (age). Organizations found sport as an effective action in happiness of manpower and deals to this affair with correct planning according to staff's sports need so that they can have exploitive organization. Need assessment is one the most important concepts in education and social services and is an analysis that locates two polar situations: present situation (where we are), ideal situation (where we should be) (Fathi and Ejargah, 2006). Need assessment is applying techniques that can help to collect suitable information about needs and achieve to needs pattern and individual, group and society demands (Summers, 1987). Based on what united Way of America (UWA) has published, need assessment is a process of collecting and analyzing information for decision making about sources allocation to determine services and goods that are necessary based on standards and public agreement. Need assessment advantage is that moves away guess, doubt, comment and interpretation from available information about needs and clarifies changes that are emerged in life pattern of people's behavior (Babaie, 2007).

Need assessment is a system-oriented process for determining aims, locating the distance between present status and aims and defining preferences for action (Badri Azarin, 2012). Need assessment is important as a means for developing in society but its performance is expensive. Need assessment can define non secured needs of society, be a document for supporting options and increase public corporation in policy making. If Need assessment performs correctly, it can be either a process or a method. As a process, it can create leadership and group cohesion and participation sense in society. Need assessment as a method helps plans and performance of immediate strategies in advised fields. Firms' decisions about staff's health are made with the purpose of saving in therapy costs and losses that cause from absence from work and desired efficiency of staff. So investment in preventing from damages and staff's diseases is more important. Performing these decisions needs investment and need assessment will be the best way for assuring from this investment. Sports Need assessment and physical activity is the first step for guarantying that sports projects meet individual needs. With doing a suitable sports need assessment is possible that is paid attention to these projects and has profits for groups. Holding each program including sports programs needs to recognize available conditions and needs of that society. Sports need assessment has been defined as a process of collecting and analyzing information from sports needs stated by individuals, groups and societies. The aim of physical education as a branch of educational sciences is to present different education services to people that is the first step in sports planning for presenting sports fields and recognizing society's needs (Johnston, 2008). On other hand, now sport and physical activities as a social phenomenon liable to studying and thinking, has acquired prominent place in local and world level. In social space, places and in collective life, moments have been marked with sport. Developing public sports like developing sports clubs, creating health stations in public places such as parks, walkways and so on as well as spending time for sport during the week by people in recent years is a sign of people's attention to body and mind health in urban society (Gholipour et al, 2013). In a research with title of sports need assessment of staff's Mobarekeh cementite institution and presenting functional methods that has been performed on 346 people by Lotfi (2009), the following results were acquired: Sports needs of staff were swimming, mountain climbing, football and bodybuilding.

Participants stated their aims to participate in sports activities as follow: Removing tiredness and pressure from work, increasing job exploitation, enhancement morale, fitness and health and happiness feeling. Participation barriers in sports activities are: time shortage, not accompanying with anybody, far distance to sports places and so on.

Gholipour et al (2013) in a research titled studying needs and youth exploitation rate of social, cultural and sports activities and programs of Tehran city showed that 31.2% of youth exercises every day and 16.15% never exercises. 56.5% from who exercise deal to sports alone and youth have more tendency to swimming, football and aerobic than other sports. 40.7% of reasons for not exercising refer to external problems such as lack of facilities and not accessibility and high costs and 59.3% of reasons concern to individual as not attempting, personal problems and lack of interest. Results confirm that pool, versatile saloon and sports assemble, natural and artificial grass land,

Alzahra sports assemble (for women), library, skate land and open land are facilities that youth confirms their necessity. Studying several researches about individual's participation barriers in sports activities shows that time shortage, facilities shortage, being busy, laziness and impatience are the most important individual's participation barriers in physical activities (El-Gilany et al (2011); Lavl et al (2010); Gomez et al (2010). Salimi et al (2013) in a research titled prioritizing private firms' financial support development barriers from championship sports based on summation of results of methods MADM with using integrative technique POSET showed that prioritization was given to economical barriers among six barriers for developing financial support of private firms from championship sport and among its subsets, not accessing to new market and lack of more relationship between firms and present customers through financial support were the most important barriers. In a research titled sport and sport and physical activity that was done on 26788 people throughout united Europe at 2009, these results have acquired: 40% of participants exercise at least one session in a week. Men participate more in sports activities than women. On average, the rate of exercising decreases with increasing age. The first reason for exercising is improving health. Physical fitness and entertainment are in next ranks.

The most important reason for not exercising is time shortage. Most responders exercise in parks and spaces that aren't devoted to sport. 8% responders also exercise in their work place. In a research titled evaluating physical fitness related to profession that was performed on some firemen in America was shown that fire department is one of the most important job situations related to body fitness and facing with risks (adventures). Injuries, diseases and death from this profession have defined fire department as the most dangerous jobs in the world. The events that firemen face to can cause cancer, respiratory and heart sick in longtime. Eye damages, inspiriting dangerous materials, muscle bound and burnt are the most popular damages. The results of this research showed that firemen must have high aerobic capacity, low fat, muscle power and strength with flexibility. So physical fitness will be an important aspect in decreasing injuries from work pressure and disease (Faiyaz, 2005). Fire department is the name of an institute, organization, private or public unit that its duty is fighting with fire and other events. In some countries including Iran, fire department duty isn't only fighting with fire. For example Tehran's fire department and security services have identified its duty as follow:

Controlling any fire
Rescuing confined people under collapsed building, accidental car, lifter and etc.
Preventing from falling trees and materials from height probable danger for citizens.
Rescuing fallen people in well, water canal, river, dam, pool and etc.
Fighting with wild animals
Rescuing injuries of events of meat minder, metal loops, and excavation machines and so on.
All other cases that is dangerous for property and life of citizens (Tehran security services and fire department site, 2011).

Firemen always face to many challenges so they should be ready from physical and mental aspects for undertaking their duties. Institutionalizing sport and physical activities among firemen is one of the methods to achieve this fitness or readiness. Due to above mentioned materials and present theoretical bases, this research with studying firemen's needs was following this question: what are Tehran firemen's sports needs based on prioritization. The aim of this research was that with studying performed researches about sports need assessment in Iran and other countries and relying on principle and scientific need assessment methods, defines needs and views of firemen towards sports activities and studies functional ways including individual and group attractive and happy sports programs and adopts as an agenda for fire department. Integral management in this field needs exact information about present status of programs, their effect rate and studied group needs.

## 2. Methodology of Research

Due to researcher was studying Tehran firemen's sports needs in this research; the research method is descriptive and metrical kind. On the other hand, as the results of this research can help sports managers of fire department in better planning for firemen; research is functional. Statistical universe of this research include all firemen of Tehran fire department that were 4500 people. Morgan (1970) and Kerjesi table was used for selecting sample volume and 351 people was selected as sample. Clustering sampling method was used because of operating regions and dissipation of fire department stations in Tehran city. First, an interview was done with 50 firemen that were selected randomly for measuring firemen's sports need assessment. Due to adopted responses from interview about firemen's sports needs and using questionnaires in internal and external researches, a new questionnaire was designed and planned.

This questionnaire had two sections. The first section was related to demographics characteristics such as age, education and so on. The second section was related to measuring firemen's sports needs. Due to research nature, the second section had 4 tables and 5 questions. Table (1) involves 36 sports fields presented for helping and guiding firemen for selecting used preferences. Each fireman selects 5 preferences and writes down respectively. For prioritizing sports fields, fields selected first get 5 score, second fields get 4 score, selected third fields get 3 score, fourth fields selected by firemen get 2 score and finally the fifth fields get 1 score. The score of each field includes frequency of each field multiple by preference score.

Table (2) is measuring firemen's sports participation aims with 8 varieties, table (3) is methods for increasing participation morale in sports programs with 9 varieties and table (4) is about firemen's sports participation barriers with 10 varieties. Responses have 5 options (completely agree, agree, no idea, disagree, completely disagree) that take scores 1,…, 5 respectively.

The comments of professors and sports managers of fire department were applied for measuring questionnaire fluidity that after receiving their comments and creating necessary changes in questionnaire, contextual fluidity was confirmed. After an introductory study and performing questionnaire on 30 firemen for measuring questionnaire permanency, questionnaire permanency coefficient was 82% with using Cronbach Alpha coefficient. Descriptive statistic and frequency statistical indexes, mean, standard deviation and son on have been used for ranking scores. One-variety T test and explorative factor analysis have been used for data inferential analysis. All data were processed in spss16 software. Due to questions factor loads, questions were allocated to factors. Factors were named due to allocated questions and theoretical concepts. The first factor was marked participation purpose (questions 1,…, 8), the second factor was named increasing morale (questions 9,…, 17) and the third factor was participation barriers (questions 18,…, 27). As you see in table (1), all varieties were considered in participation analysis because their factor load was 0/3 in more than one factor.

Table 1: explorative factor analysis with varimax rotation for distributing varieties in 3 factors.

| Varieties (questions) | Participation purpose | Increasing morale | Participation barriers |
|---|---|---|---|
| Q1 | ./19 | ./22 | ./24 |
| Q2 | ./22 | ./10 | ./72 |
| Q3 | ./19 | ./18 | ./62 |
| Q4 | ./16 | ./22 | ./24 |
| Q5 | ./20 | ./10 | ./29 |
| Q6 | ./18 | ./16 | ./29 |
| Q7 | ./14 | ./78 | ./20 |
| Q8 | ./20 | ./86 | ./17 |
| Q9 | ./26 | ./74 | ./17 |
| Q10 | ./11 | ./21 | ./11 |
| Q11 | ./17 | ./20 | ./18 |
| Q12 | ./10 | ./13 | ./24 |
| Q13 | ./23 | ./17 | ./66 |
| Q14 | ./18 | ./50 | ./28 |
| Q15 | ./19 | ./67 | ./21 |
| Q16 | ./21 | ./29 | ./28 |
| Q17 | ./26 | ./23 | ./45 |
| Q18 | ./25 | ./12 | ./17 |
| Q19 | ./21 | ./22 | ./23 |

| | | | |
|---|---|---|---|
| Q20 | ./41 | ./12 | ./23 |
| Q21 | ./10 | ./21 | ./19 |
| Q22 | ./19 | ./14 | ./23 |
| Q23 | ./16 | ./39 | ./13 |
| Q24 | ./23 | ./25 | ./23 |
| Q25 | ./12 | ./14 | ./22 |
| Q26 | ./29 | ./35 | ./28 |
| Q27 | ./31 | ./22 | ./13 |

Explorative factor analysis was done in order to discriminate or separate sports need assessment dimensions. The results of explorative factor analysis on need assessment dimensions showed that all factors in factor analysis in previous steps have suitable and high factor load. The size of sampling 0/85 suggests that factors can measure used variables in research.

**3. Research Results**

Among participants in this research, 18/2% participants were 18-25 years old, 40/2% were 26-35 years old, 28/8%, 36-45 years old and 1/1% were 56-60 years old. 17/7% participants were single and 82/2% were married. Education of 9/1 participants haven't diploma, 44/4% have diploma, 33/9% have post diploma and 11/7% have bachelor degree or higher.36/2% of firemen had job or service precedency less than 5 years, 19/1% between 5-9 years, 17/1% between 10-14 years, 14/2% between 15-19 years and 12/3% , 20 years or more.

Table (2): prioritizing sports fields based on quandary preferences

| Preference | Sports field | score | percent | preference | Sports field | score | Percent |
|---|---|---|---|---|---|---|---|
| 1 | Swimming | 634 | 42/26 | 18 | Automobile driving | 70 | 4/66 |
| 2 | Physical fitness | 514 | 34/26 | 19 | Weight lifting | 65 | 4/33 |
| 3 | Volleyball | 504 | 33/60 | 20 | Rock climbing | 58 | 3/86 |
| 4 | Mountain climbing | 474 | 31/60 | 21 | Body training | 53 | 3/53 |
| 5 | Footsal | 354 | 22/53 | 22 | Lifeguard | 50 | 3/33 |
| 6 | Football | 338 | 21/40 | 23 | yachting | 47 | 3/13 |
| 7 | Chess | 321 | 17/86 | 24 | Diving | 36 | 2/40 |
| 8 | Ping pong | 268 | 14/66 | 25 | Horseback riding | 34 | 2/26 |
| 9 | Track and field | 220 | 12/73 | 26 | Archery | 33 | 2/20 |
| 10 | Bodybuilding | 191 | 10/20 | 27 | Ski | 21 | 1/40 |
| 11 | Cycling | 153 | 10/13 | 28 | Handball | 18 | 1/20 |
| 12 | Ancient sport | 152 | 9/53 | 29 | Skate | 16 | 1/06 |
| 13 | Public sport | 143 | 8/26 | 30 | Land tennis | 14 | ./93 |
| 14 | Badminton | 124 | 7/46 | 31 | Gymnastic | 9 | ./60 |
| 15 | Motor cycling | 112 | 6/13 | 32 | Arrow and arch | 8 | ./52 |
| 16 | Basketball | 92 | 5/93 | 32 | Hepatic | 8 | ./52 |
| 17 | Epical sports | 89 | 4/66 | 33 | Hokey | 4 | ./26 |
| 18 | Wrestling | 70 | 4/53 | 33 | parachutism | 4 | ./26 |

According to results and after prioritization (as shown in table (1)) swimming field is in the first preference, physical fitness in the second rank and volleyball in the third rank. Mountain climbing, Footsal, football, chess, ping pong and track and field are located in next preferences.

Table (3) : one- variety T test results, comparing the mean of Tehran firemen's participation aims in sports activities.

| The aims of participating in sports activities | Medium level | Mean | Standard deviation | t | Significance level |
|---|---|---|---|---|---|
| 1-health and happiness feeling | 3 | 4/53 | ./67 | 42/20 | 0/001 |
| 2-reducing stress and anxiety facing with events | 3 | 4/46 | ./73 | 37/11 | 0/001 |
| 3-increasing job exploitation | 3 | 4/33 | ./67 | 37 | 0/001 |
| 4-increasing morale | 3 | 4/07 | ./99 | 20/26 | 0/001 |
| 5-removing tiredness from work | 3 | 4/04 | ./88 | 21/95 | 0/001 |
| 6- fitness | 3 | 3/71 | 1/04 | 12/74 | 0/001 |
| 7- recreation and entertainment | 3 | 3/59 | 1/10 | 10 | 0/001 |
| 8- participate in sports matches | 3 | 2/57 | 1/07 | -7/56 | 0/001 |

T test in level ($\alpha \leq ./.5$) was used in order to study significance level in inferential analysis and due to acquired means in all cases except "participate in sports matches" were greater than medium level (3), acquired t is also bigger than table's critical amount. So all mentioned cases were among firemen's aims from participating in sports activities and health and happiness feeling, reducing stress and anxiety while facing with events and increasing job exploitation are the most important factors (table 3)

Table (4): one- variety T test results, comparing the mean of increasing morale in Tehran firemen.

| Methods of increasing morale for participating in sports activities | Medium level | Mean | Standard deviation | t | Significance level |
|---|---|---|---|---|---|
| 1-holding sports-educational classes | 3 | 4/24 | ./78 | 29/56 | 0/001 |
| 2-setting up sports-recreational trips | 3 | 4/11 | ./90 | 22/78 | 0/001 |
| 3-hlding regular sports matches | 3 | 4/09 | ./63 | 30/97 | 0/001 |
| 4-doing exercising with family | 3 | 4/01 | ./81 | 25/26 | 0/001 |
| 5-constituting professional teams in different fields | 3 | 3/90 | ./91 | 19/39 | 0/001 |
| 6-playing music with sports activities | 3 | 3/86 | 1/01 | 15/88 | 0/001 |
| 7- providing suitable sports spaces and facilities | 3 | 3/79 | 1/05 | 17/47 | 0/001 |
| 8-training different sports fields | 3 | 3/78 | ./75 | 19/34 | 0/001 |
| 9-presenting sports attractive and various programs | 3 | 3/47 | ./98 | 14/63 | 0/001 |

T test in level ($\alpha \leq ./.5$) was used in order to study significance level and due to acquired means in all cases were greater than medium level (3), acquired t is also bigger than table's critical amount. So all mentioned cases were among the methods of increasing morale of firemen for participating in sports activities. Holding sports-educational classes and holding sports-recreational trips had the most effect (table 4).

Table (5): one- variety T test results, comparing the mean of Tehran firemen's participation barriers in sports activities.

| Participation barriers in sports activities. | Medium level | Mean | Standard deviation | t | Significance level |
|---|---|---|---|---|---|
| 1-the lack of experienced coach | 3 | 4/14 | ./90 | 23/69 | 0/001 |
| 2- the lack of enough facilities | 3 | 4/11 | ./83 | 24/74 | 0/001 |
| 3- Unsuitable costs | 3 | 3/78 | 1/04 | 14 | 0/001 |
| 4- Not having enough time | 3 | 3/53 | ./80 | 12/24 | 0/001 |
| 5- tiredness from sports activities | 3 | 3/49 | 1/11 | 8/22 | 0/001 |
| 6- not accompanying for exercise | 3 | 3/42 | ./83 | 9/43 | 0/001 |
| 7- Great distance to sports places | 3 | 2/96 | 1/03 | -./66 | ./504 |
| 8- frightened from damage while exercising | 3 | 2/62 | 1 | -7/03 | 0/001 |
| 9- having special disease | 3 | 2/26 | ./96 | -14/28 | 0/001 |
| 10- not aware of sports advantages | 3 | 1/74 | ./74 | -33/19 | 0/001 |

T test in level ($\alpha \leq ./5$) was used in order to study significance level and due to acquired means in cases (7-8-9-10) were smaller than medium level (3), one can't consider them as an effective factor for preventing firemen from sports activities. The lack of experienced coach and the lack of enough facilities are the most important barriers for not exercising.

4. Conclusion

The results about firemen's prioritization showed that swimming has the most advocates. In other words, swimming with 42/6% has been mentioned as the most fundamental firemen's sports needs. Swimming is one of the sports fields that is useful for all ages and causes peace and relaxation and reduces mental agitations and has many efficacies. Swimming causes to increase individual aerobic capacity and reinforce physical factors related to health (Gaieni and Rajabi, 2006). In studies by Elgiani et al (2011) on youth, swimming was recognized as one of the most important sports for doing sports activities. With considering results and mentioned cases, planning to do swimming sports activities by firemen was adopted as fire department's sports programs, this planning can include cases such as constructing new pools, contracting with private pools, establishing training classes for all staff and holding regular swimming matches in organization level. In studies by Walter (2010), Australia Sports Commission (2011), Azimi (2009) and Lotfi (2009), swimming was one of the individual quinary preferences and is parallel (same) with present research findings. Due to assimilation of present research finding with above mentioned researches, we can conclude that swimming is necessary and useful for all people of society and country sports managers should pay attention to this subject. Setting physical fitness, track and field and bodybuilding fields can be in basic preferences of firemen because of firemen's professional nature and knowing this point that having high physical fitness is the first principle in selecting fireman forces. So physical fitness will be an important aspect in reducing damages from job pressure and disease. The present research is parallel with researches of ataghiaa (1999), Lotfi (2009), Washington Network Institute (2007) and Australia Sports Commission (2001). Selecting volleyball as a third preference can have various reasons, but it is assumed that attractiveness, simplicity and creating correlation and union among team members are the most important reasons. Mountain climbing for reasons such as human relation with nature, creating union sense, increasing physical strength and plans that organization has done about this sport has located in fourth preference. The present research is the same with research of Totoni (1999) about volleyball and research of Lotfi (2009) about mountain climbing. In studies by Walter (2010), Australia Sports Commission (2011), Zarkhah (2009), Azimi (2009) and Lotfi (2009), football or soccer was among five individual preferences; this subject can be the effect of attractiveness of this sports field among most people of world. One should notice that sport role is important about firemen happiness. Encourage and pursuing firemen to different sports activities with various ways can be a positive step in meeting these needs.

Firemen are aware of sport advantages and do exercise for job exploitation, health and reducing anxiety. These are aims that sports managers wish to access them. In researches done by Lotfi (2009), America Human Services and Health Department, Beth Thomas (200) and a research performed all over Europe continent (2009), similar results of participation purpose in sports activities were acquired. Among methods of increasing firemen's morale, establishing sports-training classes was in first preference and presenting sports various and attractive programs were in the last priority. Every method increases to participate in sports activities and organization sports managers should pay attention to them.

Findings about participation barriers in sports activities suggested that cases as the lack of experienced coach, unsuitable costs, tiredness from sports activities, not having enough time, the lack of sufficient facilities and not accompanying with anybody are participation barriers in sports activities. Lack of awareness of exercise advantages, having special disease and frightened of injuries while exercising aren't an important barrier for exercising since they are located under medium level. For eliminating present barriers and attempt to participate firemen in sports activities, managers should adopt methods such as using experienced coaches in different fields, providing enough facilities for exercising, undertaking a portion of sports activities costs and providing welfare facilities as: transport services, using pool and Jacuzzi after exercising and so on. In addition, Elgiani et al (2011) reported that individuals body activity levels depend on countries' cultural and economical development; so it seems that studying activity levels as well as participation barriers and not participating are particular for every country with economical status and culture level and due to permanent variations in socio-economical status of countries especially a developing country such as Iran, studying these barriers should be permanent. Organization managers can reduce participation barriers with consistent planning with priorities. The present research is same as results of researches by Elgiani et al (2011), Lavl et al (2010), Gomez et al (2010) and Salimi (2013) about individuals' participation barriers in physical activities.

The results showed that staff feels need to physical health for doing duties; so sport development for all organizations is necessary and we should use effective and useful methods in this subject. Binding exercise in work place for firemen; providing equal sports facilities for all firemen and stations; constituting sports teams for all sports fields; installing and starting suitable sports equipment in stations; not concentrating on special sports fields; constructing pool and saloon for firemen; selecting suitable sports places for exercising, setting up sports-recreational trips with family; hiring suitable sports places for firemen; having professional coaches in different sports fields; holding matches in different fields between stations can present useful methods for achieving fire department long term aims and other organizations. Mentioned functional methods for meeting firemen's sports needs can be effective in developing sport among firemen and increase muscle strength and power for tolerating work. This can be effective in social aspect evolution of firemen personality and reduce mental pressure on them while doing operations. Organization sports managers should pay attention to this so that can achieve aims.

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# Comparison Of Electromyographical Responses In Forehand Technique Of Two Different Racquet Sports

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**Abstract**
This study aimed at comparing and investigating the EMG responses while performing the forehand technique in two different sports (i.e. Tennis and Squash).Fourteen male (age = 20.71 ± 2.12 years) all India university and national level players were selected from tennis (n = 7) and squash (n = 7) using purposive sampling. The maximum voluntary contraction (MVC) was recorded with the help of biograph infinity software (EMG). Surface ElectroMyoGraphy (SEMG) was used for measuring muscle (Triceps Brachii and Biceps Brachii)electrical activity that occurs during forehand drive in tennis and forehand storke in squash. Each subject performs ten trails, out of the several trails the mean value of first three correct trails were selected for the analysis. The results of the study reveals that, in case of muscles activation in Biceps Brachii, statistical differences was observed concluding that biceps brachii contributes more in tennis than in squash for the same stroke. However, No statistical difference was observed when comparing the EMG responses of Triceps Medialis muscle with the forehand technique of two different racquet sports. It means in case of triceps medialis similar type of muscles activation pattern was found in both the racquet sports while performing the forehand drive.
Keywords: Electromyography, Muscle activation, Forehand Technique (drive/stroke), Triceps Brachii and Biceps Brachii

## Introduction

Racket sports have been played for more than 130 years and in this time there have been many developments. The commercialization of racket sports in recent years has focused attention on improved performance and this has led to a more scientific approach to the study and understanding of all aspects of racket sports. This development, coupled with greater numbers of individuals with an interest in applying their scientific skills to racket sports, has seen a rapid growth in scientific endeavor (Lees, 2003). Both Squash and Tennis are moderate to high-intensity intermittent exercises. In squash, it will be of great interest to study the mechanics involved in all the movement of squash activities, particularly in identifying the key contributors to a powerful stroke. The forehand and backhand strokes are fundamental movements of both squash and Tennis. It is necessary for the player to develop an accurate and powerful stroke to achieve any degree of success in playing the game (Ariff, Osman and Usman, 2012). When playing tennis, a tennis player, depending on the adopted tactics and actions taken by the opponent, might use a variety of tennis strokes (Stępień, Bober&Zawadzki, 2011). Forehand drive is one of the basic strokes in tennis which requires more accuracy, control and perfect execution of the stroke.

Electromyography can be a very valuable tool in measuring skeletal muscle electrical output during physical activities (Soderberg, 1992). In EMG, the surface electrodes are more commonly used in movement studies. Surface ElectroMyoGraphy (SEMG) is a non-invasive technique for measuring muscle electrical activity that occurs during muscle contraction and relaxation cycles. As the subject then moves the joint and contracts the muscles, the EMG unit detects the action potentials of the muscles and provides an electronic readout of the contraction intensity and duration. EMG is the most accurate way of detecting the presence and extent of muscle activity (Floyd, 2012).When it comes to sports,Electromyographic studies help us to understand the location of the problem in the system of movement.

Electromyography is also used in morphological analysis of the motor unit. It is important to snychronize the systems that supply cinematic data with electromyography to determine the period when different muscles join the muscle movement. Surface EMG has increasing importance in sports and occupational medicine and in ergonomicstudies. It can also establish dynamic analysis and therefore is important in sports (Turker&Sze, 2013).
The purpose of the study was to compare and investigate the EMG responseswhile performing the forehand technique in two different sports (i.e. Tennis and Squash).

**Methods**

Participants

Fourteen male all India university and nationallevel playerswere selected from tennis (n = 7) and squash (n = 7) by using purposive sampling. The age of the subjects was ranged from 19 to 23 years and all were regular players with good level of skill. More specifically, each participant met our stringent requirement of at least 5 years training in their respective sports. The purpose of the research was explained to the subjects and they weremotivated to put their best during each attempt. The average height and mass of the subjects were 1.71 ± 0.13 m and 69 ± 4.0 kg, respectively. All subjects were free from injuries that would have limited their ability to perform the forehand technique. Before participation, informed consent was obtained from each subject.

Experimental Approach to the Problem

To compare the EMG response of forehand technique between two different sports, subjects were asked to perform 10 trails of the selected technique with surface electrodes positioned over the 2 muscle bellies (Triceps Medialis and Biceps Brachii). The subjects were also instructed to hit the ball hard and straight, but as per the technique they are supposed to hit the ball lawfully inside the court. Out of the several trails the mean value of first three correct trails were selected for the analysis.Surface ElectroMyoGraphy (SEMG) is a non-invasive technique for measuring muscle electrical activity that occurs during muscle contraction and relaxation cycles. The SEMG signal generated by the muscle fibers is captured by the electrodes, then amplified and filtered by the sensor before being converted to a digital signal by the encoder. It is then sent to the computer to be processed, displayed and recorded by the Infiniti software. The MyoScan-Pro sensor's active range is from 20 to 500 Hz. It can record SEMG signals of up to 1600 microvolts (μV), RMS. A/D Converter (Encoder; ProComp Infiniti) has 2 channels (C and D) sampling at 256 samples per second.

**Data collection**

The participants performed 10 trails of the forehand technique one by one. Sufficient recovery time was provided to the participants after each stroke. Bowling machine was used for feeding the ball more accurately to the tennis players. In tennis the subjects were instructed to hold the racquet at semi western grip. To see the actual effect of the forehand technique, the researcher used the zeroing option in EMG while players holding the racquet, so that the muscles response due to the different racquet (tennis and squash) weight can be minimized.

On the testing day, maximum muscle activation was recorded with the help of Biograph infinity version 5.0 (Electromyography Software). After shaving and applying the abrasive cream to the electrodes, the EMG electrodes were placed parallel to the muscle fiber on two locations (i.e. channel C for Triceps Brachii and channel D for Biceps Brachii). Raw EMG signals were recorded using a 15 foot optic fiber wire that is directly connected to A/C encoder. A 20 mega pixels extended video camera was synchronized with the EMG software (Biograph infinity version 5.0), to find out the maximum voluntary contractions (MVCs) of the selected muscles at the time of performing the exercises. Myoscan-pro sensor with triode electrode was used.

**Statistics**

The descriptive statistics (mean, standard deviation, skewness, kurtosis etc.) histograms, normal probability plots, and Shapiro–Wilk's test was used for testing the assumption of normality and to know the nature of data. All data are presented as mean with standard deviations. Individual t - test was used to detect the mean differences of forehand technique between two different sports. For this purpose Statistical Package for Social Science (SPSS) version 20.0 was used. The level of significance was set at 0.05.

**Results and Discussion**

As a guideline, a skewness value more than twice its standard error indicates a departure from symmetry. Since none of the variables skewness is greater than twice its standard error, hence all the variables are symmetrically distributed. Similarly, the value of kurtosis for the data to be normal of any of the variable is not more than twice its standard error of kurtosis hence none of the kurtosis values are significant. In other words the distribution of all the variables is meso-kurtic.

Further for testing the normality Shapiro – Wilks test was used. It compares the scores in the sample to a normally distributed set of scores with the same mean and standard deviation. If the test is non – significant (p>.05) it tells that the distribution of the sample is not significantly different from a normal distribution (i.e. it is probably normal) and vice – versa. Here from table – 1 we can see that none of the variables p – value is less than .05, hence the data is normally distributed.

Table 1: Descriptive Statistics and Test of Normality

| | **TENNIS** | | **SQUASH** | |
|---|---|---|---|---|
| | TRICEPS MEDIALIS | BICEPS BRACHII | TRICEPS MEDIALIS | BICEPS BRACHII |
| Mean | 396.0000 | 748.4286 | 453.2857 | 429.1429 |
| Std. Error of Mean | 45.52969 | 91.12546 | 45.43164 | 50.00877 |
| Std. Deviation | 120.46023 | 241.09532 | 120.20082 | 132.31078 |
| Skewness | 1.036 | -.098 | 1.062 | .469 |
| Std. Error of Skewness | .794 | .794 | .794 | .794 |
| Kurtosis | -.393 | -1.163 | 1.622 | -.387 |
| Std. Error of Kurtosis | 1.587 | 1.587 | 1.587 | 1.587 |
| Shapiro – Wilk (p-vaule) | .109 | .843 | .562 | .955 |

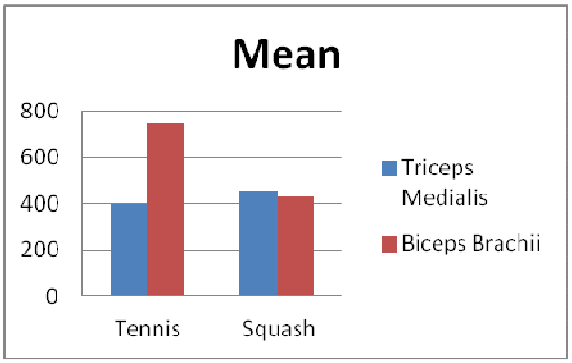


Figure 1: mean value of muscles activation (Triceps brachii and biceps brachii) in two different racquet sports.

From the above figure it can be seen that the mean value of biceps brachii in tennis is much higher than the mean value of the same in squash. However, the triceps medialis muscle shows almost similar muscle activity in both the racquet sport. To see the actual difference individual t – test was used. The results of the t – test was shown in table – 1.

| | Levene's Test for Equality of Variances | | t-test for Equality of Means | | | |
|---|---|---|---|---|---|---|
| | F | Sig. | t | Sig. (2-tailed) | Mean Difference | Std. Error Difference |
| TRICEPS MEDIALIS | .127 | .728 | -.891 | .391 | -57.28571 | 64.31941 |
| BICEPS BRACHII | 3.647 | .080 | 3.072 | .010 | 319.28571 | 103.94579 |

*Significant at 0.05 level Degree of freedom= 12

Table 2: A summary of the Individual t - test among the two racquet sports (i.e. Tennis and Squash), with regards to muscles activation in Triceps Medialis and Biceps Brachiimuscles while performing forehand storke.

To test the equality of variances, Levene's test was used. The F-value for testing the homogeneity of variances is insignificant as the p-value is more than .05. Thus the null hypothesis of equality of variances may be accepted, and it is concluded that the variances in the two racquet sports (i.e. Tennis and Squash) in respect to Triceps Medials and Biceps Brachii muscles are equal.

It can be seen from table 2 that for comparing the muscles activation in Triceps medialis, the value of t – statistic is -.891. This t – value is insignificant as its p – value is .391 which is more than .05. Thus in this case, the null hypothesis of equality of population means of two racquet sports is fail to be rejected, and it may be concluded that while performing the forehand strokethe muscle activation of triceps medialisin both the racquet sports is almost similar. When it comes to the muscle activation of biceps brachii, the above table clearly shows that the value of t – statistic is significant as its p – value is .01. Here, the null hypothesis of equality of population means of two groups is rejected. Thus, it may be concluded that the average muscles activation of Biceps Brachii while performing the forehand drive/stroke in squash is less than of the tennis forehand drive/stroke.

In the modern tennis forehand stroke, the upper arm, forearm, and wrist segments move as separate units to increase power (B. Elliott, et al., 1989). The elbow flexes during ball contact and follow through of the forehand and the wrist remains firm, but may slightly flex to increase racket velocity (B. C. Elliott, 1995). This flexion of the elbow in contact and follow – through increases the muscle activation of biceps brachii.

Ryu et al. reported in his study that Electromyography (EMG) analysis has shown that the pectoralis major, biceps brachii, subscapularis, and serratus anterior have high activity in the forward swing of a tennis forehand and should be targets of resistance training. Dynamic, explosive movements increase power and coordination in these involved muscles to increase the velocity of the forehand without sacrificing technique (Funk 2010).

However, in squash forehand drive Pronation of the forearm at the radio-ulnar joint and extension at the elbow joint both played a significant role in generating racket velocity in the period prior to impact (Elliott, Marshall &Noffal, 1996). The elbow joint rapidly extended as the upper arm reached its maximum rotation at an angle 0.63 rad, the elbow was remained extended until right after ball contact (Ariff, Osman and Usman, 2012). This extension in elbow joint prior to the impact in squash results in less muscles activation in biceps brachii as compared to tennis forehand drive.

**Conclusion**

The study comparedthe EMG responses of Triceps Medialis and Biceps Brachiiwhile performing the forehand drive/stroke in two different sports (i.e. Tennis and Squash).The muscles activation in biceps brachii found to be much higher in tennis forehand as compared to squash. It means the biceps brachii muscles contribute more in tennis than in squash for the same stroke. However in case of triceps medialis similar type of muscles activation pattern was found in both the racquet sports while performing the forehand drive. Due to the extension in elbow joint prior to the impact in squash slightly higher muscles responses in Triceps Medialiswere found as compared to tennis forehand drive.

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# The Relationship between Organizational Justice and Organizational Citizenship Behavior of Physical Education Teachers Working in North Khorasan Province in Iran

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**Abstract**
This study aims at analyzing the relationship between organizational justice and organizational citizenship behavior (OCB) of physical education teachers working in North Khorasan Province, Iran. The statistical population of our study consisted of all physical training teachers working in North Khorasan Province schools (n = 480) and the sample size was estimated 210 using Morgan Table. Totally, a number of 187 questionnaires were analyzed after discarding the unusable ones. Two standard questionnaires, organizational justice (Nihof & Morman, 1993) and Organizational Citizenship Behavior (Podsakoff, 1990), were used to collect data. Both questionnaires' validity was confirmed using reformative viewpoints of sport management university professors. Internal consistency reliability of the two questionnaires, e.g. organizational justice and OCB, was calculated using Cronbach's alpha (0.85 and 0.80, respectively). A descriptive correlation design was used to field test. Descriptive indexes, the Kolmogorov-Smirnov statistical tests, Pearson's correlation coefficient and multivariate regression were used to analyze data. The Kolmogorov-Smirnov test result confirmed that our data are normal ($p \leq 0.05$). The results of correlation test indicated that there is a positive and significant relationship between organizational justice and OCB ($p \leq 0.01$, $r = 0.627$). The regression analysis showed that OCB is influenced by organizational trust of physical training teachers who are working in North Khorasan Province schools.
Keywords: Organizational justice, Organizational Citizenship Behavior, Physical Education Teachers

Introduction: contemporary organizations emphasize the recruiting and retaining useful and committed employees who act beyond the expectations. Performance beyond expectations is an inseparable part of the performance management; as employees' contribution in such behaviors will be followed by their organization's success [1]. Organizational citizenship behaviors (OCBs) are a sample of such behaviors. Researchers believe that OCB is practically important because it improves the organizational effectiveness and efficiency through contribution in development of human resources, creativity and adaptability [2]. Historically, for studying the relation between occupational behaviors and organizational effectiveness researchers used to concentrate often on in-role performance of employees. However, OCB includes employees' voluntary behaviors, which are not among their formal duties and are not considered directly by the formal reward system but are considered as the extra-role performance [3]. Voluntary behaviors refer to the activities that would not be resulted in punishment, if are not carried out [4]. The difference between voluntary and compulsory

cooperation is very important. Under compulsory situation, one carries out his/her responsibilities in accordance with the regulations and acceptable standards of an organization and does not cross the imperatives; while under voluntary situation the responsibility is concentrated and people exert their efforts, energy and insight to develop their abilities in favor of their organization. In this case, people usually neglect their personal interests and prioritize their responsibility in favor of others' interests [5].

Researchers have not achieved any consensus on dimensions of the OCB, so far; as there are more than thirty different theories about citizenship behavior. Perhaps, it can be said that the most authenticated category proposed about the dimensions and components of OCB has been offered by Organ (1988), which is now used in various studies. These dimensions are altruism, Conscientiousness, sportsmanship, Courtesy and Civic virtue [4, 6].

Various researchers have pointed to many personal and organizational outcomes of the OCB. Sadev (2009) has classified the outcomes of OCB into three levels of personal, group and organizational [7]. Numerous empirical studies and evidence have supported the effect of OCB on personal level, through the effect which is applied by such behaviors in assessment of performance management and also in making decisions about pay rise and promotion [3]. Moreover, OCB affects the outcomes in group level; for instance, Chen et al (2005) showed that OCB enhances the group's performance, while it decreases job turnover [7]. Likewise, Podsakoff and Mackenzie (1997) indicated that OCB affects the organizational effectiveness. [1].

Observing justice is one of the most important effective factors of an organization's survival and its health in long term [8]. Observing justice is considered as one of the political imperatives of organizational behavior, because observing justice increases sense of belonging, loyalty and people's trust to their organization and maximize both human and social capitals of an organization [9]. Greenberg believes that justice plays a very significant role in forming employees' visions and behaviors. Those employees who feel inequality usually react through negative responds such as reluctance to make more efforts, evasion, weakened behaviors of organizational citizenship and even quitting the job [10]. For Bees and Trip (1995) in organizations justice refers to social laws and norms used in management of organizations which include: how to allocate inputs in the organization, trends used to make decisions and the nature of interpersonal behaviors in the organization (how people treat each other). The definition considers three dimensions for justice**: distributive justice**: involves with visions and thoughts of employees about how proper are inputs and their outputs. **Procedural justice**: it points to the idea of fairness in the processes that resolve disputes and allocate resources. **Interactional justice**: it is defined based on the perceived fairness from the interpersonal communications which considers the fairness of behavior of decision makers in the organizational decision making process [11]. According to the concept of the organizational justice offered by Bees and Trip, Biogrey (1998) has provided a more pervasive definition for organizational justice. Organizational justice is the perceived fairness from the interactions conducted in the organization which include socioeconomic interactions, relations between an individual and superiors, subordinates, colleagues and the organization, as a social system.

Many studies have been conducted about the relation between the organizational justice and OCB, out which the following items can be pointed out. Organ (1990) suggests that perceiving justice plays an important role to increase factors that motivate OCB [12]. Craker and Williams (2009) studied 217 employees and managers and found that two dimensions of justice (i.e. distributive and procedural) shed more lights on the role the interactional justice plays. Moreover, they demonstrate that investing in justice field will be followed by extraordinary behavioral responses [13]. Skarliki and Latam (1997), Pin and Pachrak (2000) and Asgyl (2005) indicated that OCB level in an organization will be improved when employees are treated fairly and there is a good relationship between employees and their administrators [14].

Since the physical education department of Education Organization is a major organization deals with the sport in Iran whose performance is reflected in training and basic sport dimensions and physical training teachers can play an important role in improving sport level in schools and also regarding the importance of organizational justice and OCB in management of organizational behavior and lack of sufficient studies about the relation between these two variables, which are important elements in human resource management and effectiveness of training environments including schools, the author decided to find an answer for this question: is there any relationship between organizational justice and its components and OCB?

**Methodology:** It is a correlational study and is sorted as an applied one in terms of its objectives. The sample of the study consisted of 210 physical training teachers of North Khorasan Province who have been selected from seven counties of the province (including Bojnord, Shirvan, Farooj, Esfarayen, Maneh and Samalghan, Garmeh and Jajarm, Raz and Jargalan). Teachers were sampled using simple random sample technique regarding the population of each city and the questionnaires were distributed among them. After collecting questionnaires it turned out that a number of 187 questionnaires were useable which according to the 5-point Likert scale the same was considered as the sample of the study. The reliability was measured using Cronbach's alpha (organizational justice α = 0.85 and OCB α = 0.80). Facial and content validity of surveys were verified by professors of physical education and management professors. Finally, data was analyzed, in two descriptive and deductive levels, (Kolmogorov-Smirnov test, Pearson's correlation and step-by-step multivariate regression) using SPSS software (version 20) ($p \leq 0.05$).

**Results**

**Table1. Coefficient of correlation between variables of organizational justice and OCB**

| | | Variables of organizational justice | | |
|---|---|---|---|---|
| | | Distributive justice | Procedural justice | Interactional justice |
| **OCB** | **Coefficient of correlation** | 0/682* | 0/427* | 0/473* |
| **N** | 187 | | | |

*P ≤ 0/05

Table2. The results of regression

| P | β | $R^2$ | R | P | F | Predicted variable | Predictor variables |
|---|---|---|---|---|---|---|---|
| 0/003 | 0/084 | 0/34 | 0/584 | 0/004 | 4/8 | OCB | Distributive justice |
| 0/642 | 0/057 | | | | | | Procedural justice |
| 0/032 | 0/112 | | | | | | Interactional justice |

**Discussion and Conclusion**

It seems that the feeling of the distributive justice in education system is mostly caused by certain distribution of interests and resources of the organization (salaries and promotion) and for employees the distributive inequalities are mostly caused by the organization itself rather the informal relations of colleagues. Results gained from analysis of hypotheses prepared in this study showed that that there is a positive and significant relation between organizational justice and citizenship behavior of teachers ($p \leq 0.01$; $r = 0.627$). Regarding the procedural justice, for achieving fair results people need to use fair methods and processes. Moreman and Jerald (1998) indicated that the procedural justice affects OCB through affecting the organizational support [12]. The interactional justice focuses administrators' behavior and their role in observing organizational justice. Conceptually, it resembles the informal quality of behavior. It seems that employees have a direct interaction with their administrators and managers' behaviors and consider their behaviors including how to make decision, how to interact and how to allocate rewards as their own basis for judging about the organization and job. Fair behavior of managers makes employees respectful of rules and commitments which in turn the latter's trust and satisfaction will be enhanced[15]. As our findings show all three dimensions of the organizational justice can predict the OCB; however, the distributive justice has the most correlation. Hence, managers of schools and the Education Organization need to pay more attention to development and fostering behavioral skills to interact with employees. They also need to perform organizational procedures and decisions without considering their personal interests, but based on the precise organizational regulations. These all help in formation of positive occupational visions such as commitment and trust and eventually citizenship behaviors in employees. Therefore, holding training courses about organizational citizenship behaviors can make employees familiar with the advantages of such behaviors. It helps them to arrange their activities in parallel with the

organization's interests and to reach one of advantages of the sustainable competition in the increasingly changing environment, i.e. team orientation or development of collective spirit in the organization and to assist the organization in achieving its goals.

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# Effects Of A 12-Week Circuit Resistance Training Program On Body Composition, Body Mass Index And Biomotor Abilities Of Malaysian Sports School Adolescent Athletes

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**Abstract**
The purpose of this study was to investigate the effectiveness of a 12 week circuit resistance training program on body composition, body mass index and biomotor abilities of the Malaysian Sports School adolescent athletes. Sixty four adolescent athletes aged between 13 to 15 years *(14.43 ± 0.79)* old boys and girls student athlete of the Bukit Jalil Sports School, Kuala Lumpur, Malaysia who were randomly assigned to 2 groups based on sexual maturation status. The experimental group (CRTUMB)*(n=32)* performed a circuit resistance training via a 10 station circuit using medicine ball twice weekly for 12 weeks, whereas the control (CON)*(n=32)* performed their normal training sessions for the same duration. All the participants were tested on three different performances parameters namely body mass index, body composition, and seven biomotor abilitiestests for pre and post intervention. Normality data showed that all data was normally distributed (Kolmogorov-Smirov test). SPANOVA analysis revealed a significant difference in body composition, body mass index and in all seven biomotor abilities ($p<.000$) from the pre-test and post-test of the experimental group compared to the control group with a significant level of $p<.05$. The findings indicated that the designed 12 weeks circuit resistance training program had effectively elicited a statistically significant and positive effect and improvements on body composition, body mass index and in improving and enhancing all seven biomotor abilities of the adolescent athletes of the experimental group compared to the control group. The results demonstrated that the designed circuit resistance training program is an effective training program to improve body composition, body mass index and biomotor abilities thus the administered training program should be able to assist coaches who aspire to developand enhance adolescent athletes in terms of training, physical capabilities and improving their biomotor abilities.
**Keywords:**circuit resistance training, adolescent, sexual maturation, body composition, body mass index, biomotor abilities.

## Introduction

Coaching means to help someone prepare for something and sports coaching means taking a well organized provision of athletes and to help them develop and improve their performance. Therefore, any designed training program should prioritize the overall development of athletes. Thus, the primary objective of training especially for the adolescent athletes should be to obtain a multilateral condition, to build solid foundation, to perfect the techniques of the chosen sport, to improve the specific physical abilities, to learn and enhance affirmative needed tactics, to improve biomotor abilities, to

monitor the athlete's health status, prevent injuries, to create an effective relationship between the coach and the athlete, and to enrich the athlete's knowledge related to the training. Thus, the purpose of this study was to determine the effects of a 12 week circuit resistance training on body composition, body mass index and biomotor abilities of the Malaysian Sports School adolescent athletes.

Physique is an important aspect in athletic performances. World class performances in sports are attributed to physique. Thus, the wide range of body sizes and body composition are evident in sport performances. Body composition as the physiological factor plays a critical role in performance by itself though there are other factors that determine sporting performances such as psychological, tactical, technical and morphological factors. As such body composition could be a limiting factor in athletic performances whereby a long distance athlete has a long slender physique with low body mass whereas a thrower has a larger physique and a higher fat free mass is required in both events and excess body fat is detrimental to top class performances.

Body composition consists of absolute and relative amounts of muscle, bone and fat tissues, water, minerals and other components of total body mass (Heyward, 1991). Generally, body compositionrefers to fat percentage, fat mass, and fat-free mass, with fat-free mass as body structures excluding fat-mass (Wilmore & Costill, 1994). Components such as fat-free mass respond to training and influences athletic performances.In addition body composition is one of the key components of an individual's health and physical fitness profile. It is important to realize that an individual may be look overly-fat even though they do not appear to be over-weight and this condition may due to lack of physical activity. Therefore body composition analysis assessment should be an integral part of each individual's physical fitness regardless of body weight. The average relative percentage body fat is 12-15% for college-age men and 22-25% for college-age women. But for optimal fitness, experts recommend the body fat level of 12-18% for men and 16-25% for women (Wilmore, 1986). Since body weight is composed of water, protein, mineral and fat. And these two component model of body composition divides the body into a fat component and fat-free body component. The fat component includes all extractable lipids from adipose and other tissues of the body. Thus, the fat weight is expressed relative to the total body weight. Whereas the fat-free body component consist of residual chemical sand tissues including water, muscle (protein) and bone (mineral).Consequently, body weight and body composition are directly related to energy balance in an athlete sporting career. Energy balance is influenced by expenditure from physical activity in one's daily life. As such, regular exercise has a positive effect on body weight and body composition (Jakicic & Otto, 2006; Andersen & Jakicci, 2009), through muscle based adaptations include hypertrophy, hyperplasia, fiber type modifications and architectural changes, consequently improving body composition (Faigenbaum, 2000; ACSM, 2002: Kraemer, et. al., 2002). A spectrum of varied exercise modes benefited body composition, improves health and enhances sport performances. Thus Moderate-intensity cardio respiratory induced exercises and strength training, regardless of gender, are effective for decreasing body fat, fat weight and body weight (Heyward, 1991).

As such, body mass index (BMI) or Quetelet is a widely used clinical assessment of appropriateness of a person's weight. This value is calculated by dividing the body weight (in kilograms) divided by height (in meters) squared to interpret body weight of an individual. BMI correlates with body fat (adipose tissue). It relationship varies with age and gender. For adults, BMI falls into these categories: below 18.5 (underweight); 18.5-24.9 (normal); 25.0-29.9 (overweight); 30.0 and above (obese) (National Center for Health Statistics, United States of America's Centers for Disease Control and Prevention, 1990). BMI is quick and easy method for determining if body weight is appropriate for body height but BMI does not differentiate between fat and fat free mass weight. So incorporating body composition analysis along with BMI screening provided a more complete measure of one's actual body composition. Whereas body composition measurement consist of measuring Body Fat (kg) (The percentage of total body weight that is fat); Fat Mass (kg) (The actual fat mass); Fat Free Mass (kg) (Fat free mass is comprised of muscle, bone tissue, water, and all other fat free mass in the body; a healthy ratio for the Fat Free Mass is approximately 5: 1 for females, and 7:1 for males thus males carry more muscle than females and therefore will report a higher fat free mass; and Total Body Water (kg) reflects the amount of water in the body. Hydration level is monitored using the following formula: Total Body Water/Weight x 100 =% hydration. According to dialysis standard, women should be approximately 50-60% hydrated, and men should be approximately 60-70% hydrated) (Rhodes & Pflanzer, 1992).

Therefore, body composition is directly related to performance, other physiological parameters and training adaptations.Thus monitoring the body composition of athletes on a regular basis provides useful information for training. Training is an integral part of any coaching program and training refers to a systematic process with a long duration of physical and mental exertion to improve an athlete's qualities to produce a higher level of performances in any sports. And with increasing participation of children in a wide variety of youth sports, there is a significant need for a better physical preparation to prevent sport-related injuries.

As a result, resistance training program has become a primary component of athletic conditioning, injury prevention, rehabilitation, enhancing general fitness program by inducing positive changes in altering body composition and improving athletic performances (Bompa, 2000; Kraemer & Fleck, 2005). Resistance training is defined as a specialized method of conditioning that involves the progressive use of wide range of resistive loads and a variety of training modalities that includes usage of free weights, body weight, medicine balls, elastic tubing, and weight training machines as means to increase one's ability to exert and resist force (ACSM, 2009 & NCSA, 2009). Although early studies questioned both the safety and the efficacy of resistance training, however recent evidence indicated that both children and adolescents can increase muscular strength due to resistance training, thus with proper supervision appropriate designed program young athletes participating in a resistance training can increase their strength. Previous studies, literature reviews and reports indicated that regular participation in a youth resistance training program increases strength, local muscular endurance (Faigenbaum, et.al, 1993), improve local muscular endurance, and enhance bone mineral density (Ramsey, et.al., 1990), and reduce the risk of injuries in sports and recreational activities (Avery, et. al, 1996; and Faigenbaum, et. al., 2009). Resistance training too has shown to improve sport performances, used in preventing injuries & strengthening muscles in rehabilitation of injuries, improve overall health by increasing maximal oxygen intake, alter body composition, increases overall muscle strength and motor performance (American Academy of Pediatrics, 2008; Avery, et. al., 1996). Children as young as eight old can participate safely in proper supervised resistance training and result have shown improvements in strength and coordination (Sports Medicine Institute for Young Athletes, Hospital for Special Surgery, 200).

Similarly, resistance training too can improve physical functions for daily activities, physical appearance, enhance psychological well being, reduction of body fat thus improving body composition (Hospital for Special Surgery, 2009), increase far-free mass (Malina, 1991), and are most easily observed in obese youth following resistance training (Watts, et. al, 2005; Sothern, et. al., 2000). And isotonic resistance training produces significant changes in body composition of men and women (Brown & Wilmore, 1974; Mayhew & Gross, 1974; & Wilmore, 1974). Previous studies and reviews indicated that resistance training helps to build fat-free mass as well as in promoting positive changes in body composition (Marra, et. al., 2005; and Ucan, 2013). Changes in biochemical, neurological and morphological components from resistance training had shown positive changes in body composition (ACSM, 2001& 2004). Thus improvements in fitness components, muscular strength and size, fat-free mass, and decreased body fat have a positive effect in athletic performance (Hoffman, 2002; Velez, et. al, 2010). Furthermore, resistance training of 8-12 exercises performed 2-3 times per week involving major group muscles enhanced the development, maintain and gain of muscular strength, lean body mass and athletic performances (Hass, et. al., 2001; and NSCA, 2009) and resistance training twice weekly for eight weeks had induced significant muscle mass gain (lean weight) (Wescott, et. al., 1995).

Therefore often the best way to include some strengthening exercises in the overall program training of young athletes is to set a circuit training or series of exercises to go through two or three times per week. Circuit training develops strength and endurance, thus plays a role of an appropriate form of training for most sports and it can be adjusted to suit age, fitness and health of the athlete, and the circuit training exercises are simple enough to make each athlete feel a sense of achievement in completing them, thus offering a wide range of exercises to select from which will maintain the athlete's enthusiasm. In additional to these health benefits, resistance training has potential better tolerated by youth because of its `circuit' format which is characterized by short periods of physical activities interspersed with brief rest periods between sets and exercise which has been observed to be more typical of how children move and play and how a sport is played (Faigenbaum, 2000 & 2003). Nevertheless, previous studies indicated that resistance training via circuit training using either untrained or recreationally trained athletes too had effectively improved and enhanced strength gains in bench press, seated row and squats (Velez, et. al., 2010), sprint-agility and anaerobic endurance

(Taskin, 2007), improved strength cardiovascular and muscular fitness in six selected FITNESSGRAM tests (Dorgo, et. al., 2009), improved $VO_2$ max by 18% which is similar to the gains produced by traditional aerobic programs and increased strength by 20% (Mosher, et. al., 1994), enhanced leg power to about 14.2% to 24.5% (Faigenbaum, et. al., 2002), yielded 55% to 74% strength gains after 8 weeks of training (Faigenbaum, et. al., 1993), increased strength by 12% to 55% after 10 to 12 weeks of training (Chilibeck, et. al., 1998), and strength gains (Tanimoto, et. al., 2008).

However the existing resistance training literature focusing on adolescent based sexual maturation status and the effects of resistance training intervention program on adolescent and sexual maturation are limited It is unclear if the resistance training as an intervention training program via circuit resistance training has any effect if imposed upon adolescent athletes based on sexual maturation status, thus raises questions regarding the recommendations of the per said training modalities and intervention program for active adolescent athletes. Consequently more research concerning sexual maturation status and circuit resistance training program via an intervention program, and how this intervention training program affects the body composition, body mass index and their biomotor abilities of adolescent athletes are paramount as to provide vital information for coaches who are coaching these age group athletes.Thus the main purpose of the study is to establish the effectiveness of a 12-week circuit resistance training intervention program on the body composition, body mass indexand biomotor abilities based on sexual maturation status of Malaysian Sports School adolescent athletes and to provide mechanistic (empirical) and practioners (practical) evidence based recommendations and feasible and realistic perspective that can be to enlist regarding circuit resistance training intervention program in order interventions can be designed, utilized and implemented successfully by the coaches, fitness trainers, conditioning experts, physical educators, parents, and interested individuals to improve and enhance the overall physical development, fitness profile level of an athlete and athletic performances of the athletes involved in sports especially the aspiring adolescent athletes to realize their potential in their chosen sports.

**Methodology**

A total of seventy, males *(n=40)* and females *(n=30)*participants were engaged for this study from Bukit Jalil Sports School, Malaysia aged between 13 to 15 years old who have novice level experience of resistance training and are of various sports namely, Track & Field, Netball, Field Hockey, Basketball, Squash, and Cricket, and following baseline testing the subjects were randomly assigned to either experimental group, circuit resistance training using medicine ball (CRTUMB) or control group (CON) based on sexual maturation status. Participants were volunteers and were informed of the experimental risks and the research was approved by Ministry of Education of Malaysia and Internal Research Committee of University of Malaya Sports Centre. All the testing and training procedure were fully explained, and written parental consent was obtained for each participant who agreed to participate in the study due to the age of the participants which is below 18 years old. Six participants were excluded from the study due to injuries not related to the study. Subsequently, all subjects completed a medical screening form. The characteristics of the remaining 64 subjects who completed the study are as in Table 1.

Table 1: Participants Characteristics: Group *Mean±SD*

| | Experimental Group | Control Group | *t*-test | *p*-values |
|---|---|---|---|---|
| Participants *(n)* | 32 | 32 | | |
| Age (years) | 14.49 ± *0.78* | 14.37 ± *0.81* | $t_{64}$ = .242 | .624 |
| Height (cm) | 1.70 ± *8.17* | 1.67 ± *5.34* | $t_{64}$ = 5.280 | .025 |
| Weight (kg) | 60.23 ± *1.10* | 57.28 ± *9.90* | $t_{64}$ = 1.122 | .293 |
| Sexual Maturation (pre-PHV or post-PHV) | 1.48 ± *.51* | 1.51 ± *.51* | $t_{64}$ = .000 | 1.000 |

**Procedure**

Participants underwent familiarization sessions that was designed to ensure consistency, to improve exercise technique, and accurate biomotor athletic performances during testing and training. Subsequent to familiarization, pre-tests was conducted before the commencement of the training

phase. All participants were tested on the three predetermined measurement: 1) Body mass index (BMI); 2) Body Composition (BC); and 3) Seven selected biomotor abilities tests for pre and post intervention, and were carried out at least 24 hours after the last training session to minimize the effects for BC and BMI whereas the aspect of fatigue on the results for biomotor abilities. Thus, it correlates with the purpose of this study which focuses on the effects of the designed resistance training intervention program on BC, BMI and biomotor abilities.

The prescribed amount of repetition or training load for each exercise was determined by the repetition maximum (RM) test based on the maximum repetition of effort the participants could executed within 60 seconds (1RM) with the rest between the test was set at 5 minutes permitting an adequate amount of time for recovery for all the selected exercises (Baechle, et. al., 2000; BASES, 2004) using the medicine ball (2kg for males and 3kg for females) (Jespen & Potvin, 2003; Jones, 1997). Nevertheless, the repetition maximum test was done earlier before the commencement of the training intervention program and the amount of repetition the participants needed to execute for each exercise was recorded. Subsequently, repetitions for each exercises for each station of the circuit training was then calculated based on 70% maximal motions load of 1RM test. Although, traditionally circuit training is considered to be a compromise between aerobic and strength training, and 8-12 repetitions per set are generally recommended to elicit improvements in muscular strength and endurance as well as muscle hypertrophy (ACSM, 2009; Fleck & Kraemer, 2004),however resistance or strength training that uses higher intensity loads with longer rest periods, usually 60-90% of 1RM with 1-5 minutes of rest developed greater strength (ACSM, 2002; NSCA, 2009).

A 10 station circuit resistance training with the loading of the main muscle group changes using varied selected exercises and the participants move from one exercise station to another in a sequence upon completing the calculated repetition. The participants performed 1-3 sets of calculated repetitions (i.e., calculated repetitions + 1-3 added repetition divided by 2 for 1 to 3 sets) based on the prior 1RM test on the subset of upper body, core muscle, and lower body exercises using the medicine ball, for the designated sessions accordingly. The participants were allowed to rest for 60-90 seconds (Arent, et. al, 2005) between exercises with exercises at each station are done at 70% maximal motion based on prior 1RM test of concentric and eccentric muscle actions with a slow to moderate intensity that would elicits strength gains due to the nature of the intervention training program, and the age of the participants involved, thus adapting to the principle of progressive overloading (Williardson, 2006 & 2008; Williardson & Burkett, 2008), with the rest interval between sets is 3-5 minutes is likely enough time to uptake $H^+$ and delay fatigue, then in turn likely will allow participants in the age specified for the study to complete the set repetition and volume of training, therefore improve and enhance strength gains (ACSM, 2009; Baechle, et al., 2000).

Each exercise station within the circuit is numbered and the participants worked in pairs and progresses from one station to another in sequence, completing a prescribed repetition of workout at each station which is recorded and read aloud by the partner-B to ensure the exercising partner-A will execute the calculated number repetition that needed to done in each exercising station, before moving on to another station, i.e. from station 1 to station 2 and so upon completion of the 10 stations in the circuit, thus completing one circuit or one set of circuit training than it's the partner B's turn to repeat the training with the assistance of partner A. The set rest for the performer is when he is assisting his or her partner doing the training with the medicine ball by counting the partner's targeted dose. Thus, the rest is actually is an active rest, between 3-5 minutes upon completion of all the 10 stations, thus complying the prerequisite of rest needed when training for strength gains (ACSM, 2009; Kreamer & Fleck, 2005 &2007; Williardson, 2006; Williardson & Burkett, 2008), and in accordance with the progressive overloading that is the continuous increase of workload on the body, tolerance in continuously increasing charges of which is imminent for progress in a program, thus the body continuous to adapt as long as it is given stimuli of a higher workload than of what it is used to. Therefore in the current study, after every three weeks, or six sessions or for every ten sets of training a new RM test was conducted and a new score is gathered, and a new amount of repetition was calculated based on 70% maximal motion of 1RM test that needed to be exercised at each of the 10 stations, and the training sessions progressed as in the previous stage and so on for 12 weeks upon completion of the current research (Lawrence & Hope, 2007; Scholich, 1992).

After baseline measurements, participants were randomly assigned to two groups-one experimental group (CRTUMB) *(n=32)* and one control group (CON) *(n=32)*, based on sexual maturation status. Subsequent to randomization, the participants of the CRTUMB group *(n=32)* engaged in the designed

circuit resistance training program that was divided into three sections: 1) Warming up and stretching (jogging, dynamic stretching and ABC drills) which lasted for 10 minutes to addresses the adequate joint mobility, neuromuscular compliance and functional range of motion capacities which is needed to carry out the intended resistance workouts that follow suit (Thomas, 2000); 2) Progressive Circuit Resistance Training via 10 stations circuit training using medicine ball of varied exercises namely, Toe Touch, Front Raise, Split Squat, Pelvic Thrust, Reverse Lunges, Overhead Toss, Lying Trunk Twist, Chest Press, Lunges, and Squat, Toss, Bounce and Catch using medicine ball (Benjamin & Glow, 2003; Jones, 1997) twice weekly for 12 weeks that lasted for 60 minutes for the resistance training that was designed to induce overall strength gains of the experimental group participants especially in the four major muscle groups namely, leg, abdomen, arms and shoulders, back, and trunk; and 3) Limbering Down (Striding and static stretching) that lasted for 10 minutes. Conversely, the experimental group participants through their respective coaches were asked to refrain from any additional resistance training other than the program prescribed by the researcher, whereas, the control group only performed their normal training session and abstain from any kind of formal or additional resistance training throughout the duration of the study, however both groups adhered to their normal training program, maximum of nine sessions that accumulated to 14 hours per week. The circuit resistance training intervention program lasted for approximately 90 minutes per session and took place at the Bukit Jalil Sports School gymnasium.

**Instrument**

The instruments utilized in this study consisted of Sexual Maturation Status which was determined based on a maturation index that was calculated using the Mirwald and colleague equation. This technique is a non-evasive and practical method of predicting years from peak height velocity (PHV) as a measure of maturity onset using anthropometric variables, thus avoiding ethical and technical complexities found in other techniques (Mirwald, et. al., 2002).
The measurement of body composition was done through the skinfold measurement of subcutaneous body fat with a skinfold caliper. Moreover measuring skinfold thickness is one of the most frequently performed tests to estimate percentage body fat. This quick, non-evasive, inexpensive method provides a fairly accurate assessment of percentage body fat. The value obtained by skinfold equation is typically within 3.5% of the value measured with underwater weighing. Skinfold measurement is based on the assumption that, as a person gains adipose tissue, the increase in skinfold thickness will be proportional to the additional fat weight (Howley & Franks, 2007). The major requirement for a skinfold caliper is that it exerts a constant force of 10 g/mm$^2$ throughout the range of measurement at the skinfold site, regardless of the skinfold thickness and the instrument used in the skinfold measurement of the body composition for this current study was the Harpenden Calipers. The Harpenden calipers traditionally are the ones most often used in research setting because of their precision and reliability. The Harpenden caliper has better scale precision of 0.2 millimeters (Harrison, et al., 1998).
Furthermore, experts in the field of anthropometry have developed standardized testing procedures and detailed descriptions for identification and measurement of skinfold site. Some of the most commonly used sites are described in the Anthropometric Standardization Reference Manual by the International Society for the Advancement of Kinanthropometry (ISAK) (2001), &Harrison, et al., (1988). The standardized sites as in the Anthropometric Standardized Reference Manual for the skinfold measurement are: 1) Chest; 2) Subcapular; 3) Midaxillary; 4) Suprailiac; 5) Abdominal; 6) Triceps; 7) Biceps; 8) Thigh; and 9) Calf.
As a result, for the current study the researcher took seven sites skinfold measurement as suggested in the Anthropometric Standardized Reference Manual by ISAK (2001). The seven skinfold measurement sites that were identified for the current study are: 1) Triceps; 2) Subscapular; 3) Bicep; 4) Suprailliac; 5) Abdominal; 6) Thigh; and 7) Calf.

For BMI the value is calculated by dividing the body weight (in kilograms) with height (in meters) squared to interpret body weight of an individual.
All the tests were done for pre and post intervention and were conducted by the National Sports Institute of Malaysia (NSI) ISAK level II qualified and certified staff at the NSI of Malaysia.

And for the biomotor abilities, seven biomotor identified abilities test administered to gauge the effectiveness of the resistance training intervention program were 50-yards Dash (50-D) for speed (AAHPERD, 1976), Sit & Reach (S&R) for flexibility (AAHPERD, 1976), T-Drills (TD) for agility (Pauole, et al., 2000), Seated Two-Hand Chest Pass Medicine Ball Put (STHMBP)for power (Kraemer

& Fleck, 2005), (a six pound medicine ball-Body Solid Medicine Ball, Champ Sports, USA was used for the test), Half Squat Jump (HSJ) for muscular strength (Johnson & Nelson, 1986), Modified Sit-Ups (MS) for abdominal strength (AAHPERD, 1980), and Multistage 20M Shuttle Run (MSR) for aerobic capacity (Leger & Lambert, 1982), and the Barnet, Chan and Bruce equation was used to calculate and predict the estimated $VO_2$ max of the subjects based on the score of the MSR as this equation yields a better and appropriate results due to the considerations given to the gender and age aspects of the participants involved (Barnet, et al., 1993).
All the biomotor abilities tests were done for pre and post intervention and were conducted at the school's gymnasium except for the 50-yards Dash test was held at the Malaysian National Sports Council's outdoor synthetic track surface.

**Results**

Subsequent to randomization division of groups, an independent t-test was used to determine any significant difference between the CRTUMB and CON group. The data from the pre test and post test was treated and analyzed using SPANOVA or known as Split-plot ANOVA. It is a 'mixed between-within subjects' ANOVA, and this two-way mixed design repeated measure analysis combines between subjects and within subjects variables in one analysis (Chua, 2009). Effect sizes ($ES_s$) too were calculated to compare the magnitude of changes in between the groups as well as the significance of the effects of the data analysis using Rhea's equation (Rhea, 2004). And α level of $p<0.05$ was used as the criterion to determine either significant main or interaction effects. Analysis was conducted using SPSS 16.0 statistical program.

The significant result based on the Mauchly's Sphericity Test shows that there is a need for adjustment of the *df* value. The result of the adjusted value of *df* using the Huynh-Feldt Test value was found that there is a significant treatment effect on BMI [$F$ (1, 62) = 4.90, $p$< .000; $ES_s$ = 0.73], BMI*BETWEEN GROUP was found significant [$F$ (1, 62) = 6.61, $p$< .013], and the BMI*GROUP INTERACTION EFFECT too was found to be statistically significant [$F$(1, 62) = 120.82, $p$< .000]. The results on pairwise comparisons using the Bonferroni method with the (mean difference between experimental and control group = .355, $p$ < 0.13] shows a significant difference between the experimental and control group.
Similarly, for BC, the result of the adjusted value of *df* using the Huynh-Feldt Test value too shows that there is a significant treatment effect on BC [$F$(1, 62) = 11.48, $p$< .001; $ES_s$ = 0.69], BC*BETWEEN GROUP was found to be statistically significant [$F$(1, 62) = 4.26, $p$< .043] and BC*GROUP INTERACTION EFFECT too was statistically significant [$F$(1, 62) = 335.25, $p$< .001]. The results on pairwise comparison using the Bonferroni method with the (mean difference between experimental and control group = 3.47, $p$< .001) too shows a significant difference between the experimental and control group (Table 2).

Table2: Pre-test and post-test Mean, Standard Deviation, Mean Differences and Split-Plot ANOVA or SPANOVA Analysis for the Effect of Resistance Training Program on Physiological Parameters-BMI and BC of the Current Study

| | Experimental Group | | Control Group | | Multivariate Huynh-Feldt Test | | Effect Size ($ES_s$) |
|---|---|---|---|---|---|---|---|
| Item | Pre-test Mean | Post-test Mean | Pre-test Mean | Post-test Mean | *F*-ratio value at (*df* = 1, 62) | *P* | |
| BMI | 20.50 | 18.39 | 20.38 | 21.79 | 120.82 | .000* | 0.73 |
| BC | 69.25 | 47.01 | 63.56 | 78.85 | 335.25 | .001* | 0.69 |
| Total | 44.86 | 32.70 | 41.97 | 50.32 | 228.04 | .000* | |

Note. *$p<.05$

Table 2 illustrates the statistical differences for both the Body Mass Index (BMI) and Body Composition (BC) derived from the administered circuit resistance training program. From the analysis performed, it can be concluded that the treatment (the circuit resistance training program) instigated a statistically significant effect on the physiological parameters-BMI ($p$< .000; $ES_s$ = 0.73), and BC ($p$< .001; $ES_s$ = 0.69) by controlling and lowering the body mass index (5.5%) and reducing the body fat percentage (19.2%) of the participants of the experimental group compared to the control group of the current study and the analysis too shows the same result even after controlling for age and sexual maturation factors (Table2, Figure 1 and Figure 2).As for the biomotor abilities, the summary of the pre-test and post-test means, standard deviation and the SPANOVA analysis of the biomotor abilities

are presented in Table 3. Descriptive analysis indicated the CRTUMB participants' mean scores have improved from pre to post test, and the SPANOVA analysis test of significance too indicated that there is a significant treatment effect on all seven biomotor abilities, in addition the Hyunh-Feldt test too confirmed that there is also a significant interaction effect due to the treatment administered, and pairwise comparison using the Bonferroni method too yielded a significant difference on all the tested biomotor athletic performances of the experimental group (within group) compared to the control group (between group), the 50-yards Dash, the experimental group pre-test, post-test means and standard deviation (6.91 ± *.58*), (6.48 ± *.56*) and control group's (6.63 ± *.54*), (6.58 ± *.56*) and the SPANOVA analysis on 50-yards Dash ($p<.000$; $ES_s=0.74$) too demonstrates that there is a significant treatment effect, however 50-yards Dash between group was found to be not significant ($p<.536$); Sit & Reach, the experimental group's (36.75 ± *3.27*), (37.55 ± *3.28*), and the control group's (37.48 ± *5.07*), (37.52 ± *5.05*) and the SPANOVA analysis shows that there is a significant intervention effect on Sit & Reach ($p < .000$; $ES_s=0.24$), but Sit & Reach between group was found to be not significant ($p<.742$); T-Drills, the experimental group's (11.39 ± *.75*), (10.66 ± *.70*) whereas the control group's (10.90 ± *.86*), (10.68 ± *.73*), and the SPANOVA on T-Drills too shows that there is a significant intervention effect ($p<.000$; $ES_s=0.97$), however T-Drills between group was found to be not significant ($p<.211$); Seated Two-Hand Chest Pass Medicine Ball Put, the experimental group's (2.88 ± *.57*), (4.04 ± *.70*) whereas the control group's (3.71 ± *.84*), (3.97 ± *.82*), and the SPANOVA analysis on Seated Two-Hand Chest Pass Medicine Ball Put shows that there is a significant effect ($p<.000$; $ES_s=2.04$); Half Squat Jump, of the experimental group's (51.88 ± *6.62*), (66.63 ± *6.36*), whereas the control group's (60.25 ± *6.70*), (64.56 ± *5.85*) and the SPANOVA analysis on Half Squat Jump shows that there is a significant intervention effect ($p<.000$; $ES_s=2.23$); Modified Sit-Ups, the experimental group's (40.19 ± *5.96*), (56.25 ± *5.98*), whereas the control group's (43.56 ± *6.56*), (42.06 ± *5.84*) and the SPANOVA analysis on Modified Sit-Ups too indicates that there is a significant effect ($p<.000$; $ES_s=2.69$); and Multistage 20m Shuttle Run, the experimental group's (52.18 ± *1.98*), (55.89 ± *1.44*) whereas the control group (53.66 ± *2.42*), (52.27 ± *2.37*) and the SPANOVA analysis on Multistage 20m Shuttle Run showed that there is a significant intervention effect ($p<.000$; $ES_s=1.91$).

Table 3: Pre-test and post-test Mean, Standard Deviation, Mean Differences and SPANOVA analysis for the Biomotor abilities tests-50-yards Dash, Sit & Reach, T-Drills, Seated Two-Hand Chest Pass Medicine Ball Put, Half Squat Jump, Modified Sit-Ups, and Multistage 20m Shuttle Run

| | Experimental Group | | | Control Group | | | Multivariate Huynh-Feldt Test | | |
|---|---|---|---|---|---|---|---|---|---|
| | Pre-test | Post-test | *M*D | Pre-test | Post-test | *M*D | *F-ratio value at (df=1,62)* | *P* | *Effect Size ($ES_s$)* |
| 50-D | 6.91 ± *.58* | 6.48 ± *.56* | -0.43 | 6.63 ± *.54* | 6.58 ± *.56* | -0.05 | 116.64 | .000* | 0.74 |
| S&R | 36.75 ± *3.27* | 37.55 ± *3.28* | .80 | 37.48 ± *5.07* | 37.52 ± *5.05* | .04 | 73.62 | .000* | 0.24 |
| TD | 11.39 ± *.75* | 10.66 ± *.70* | -0.73 | 10.90 ± *.86* | 10.68 ± *.73* | -0.22 | 62.59 | .000* | 0.97 |
| STH MBP | 2.88 ± *.57* | 4.04 ± *.70* | 1.16 | 3.71 ± *.84* | 3.97 ± *.82* | .26 | 190.56 | .000* | 2.04 |
| HSJ | 51.88 ± *6.62* | 66.63 ± *6.36* | 14.75 | 60.25 ± *6.70* | 64.56 ± *5.85* | 4.31 | 132.95 | .000* | 2.23 |
| MSU | 40.19 ± *5.96* | 56.25 ± *5.98* | 16.06 | 43.56 ± *6.56* | 42.06 ± *5.84* | -1.50 | 222.39 | .000* | 2.69 |
| MSR | 52.18 ± *1.94* | 55.89 ± *1.44* | 3.71 | 53.66 ± *2.42* | 52.27 ± *2.37* | -1.39 | 357.82 | .000* | 1.91 |
| Total | 28.88 | 33.93 | | 30.88 | 31.09 | | 165.22 | .000 | |

Note. **p<.05*

## Discussion

The findings of the study indicated that compared to a typical a non active as a control group and active experimental group of participants in most experimental studies, the 12-week designed circuit resistance training program utilizing actively training participants has resulted in significant positive changes and improvements in mean scores of body mass index by 5.5%, body composition (fat percentage) by 19.2% and increases in all seven biomotor ability performances. The circuit resistance training group demonstrated significant increase and improvements in both the physiological parameters measured (BMI & BC), and all seven biomotor abilities measures compared to the control

group from pre-test to posttest indicating that training at varied volume and intensity manipulation resulted in positive changes in body mass index and body composition, thus leads to a decrease in the experimental groups' body fat percentage and resulted in significant strength gains this then leads to improvements in biomotor abilities thus seems to a correlation between controlling the body mass index, body composition, increases in strength and performances (AAHPERD (1976).

Consequently, the results are similar to previous studies that found that resistance training improves athletic performances (Faigenbaum, et al., 1999), improvements in sprint agility (Taskin, 2009), where the subjects were male physical education students, improvements of the $VO_2$ max and body composition (Mosher, et. al., 1994), where the subjects were college women, improvements in upper body strength (DeRenne, et. al., 1996), where the subjects were pubescent male baseball players, and improvements in sit & reach and seated ball put (Faigenbaum, et al., 1993), where the subjects were children and in the physiological aspect, the findings of the study too are similar to previous studies that found that resistance training does decreases the percentage of body fat whereby, Shaw, et al., (2009), findings demonstrated that 16 weeks of resistance training for 3 times per week on twenty five health males resulted in significant decrease in body fat, total skinfold and BMI. Similarly, Ferreira, et al., (2010), study on 14 sedentary females aged 35-45 years old using a 3 day per week circuit training program for 10 weeks resulted in increased in free fat mass and decrease in fat mass and body fat percentage. Ucan (2014) study on twenty eight active males on 3 days per week circuit resistance training that lasted for 12 weeks resulted in increase in free fat mass and decrease in body fat percentage of the experimental group.
However, Wilmore (1974) study using a 2 days per week of resistance training for 10 weeks on twenty six males and seven males with mean age of 20.3 years indicated that at the of the duration of study, there was no change in body weight but relative fat mass decreased by 10% for males and 7.6% for females respectively. Conversely, findings of Brown & Wilmore (1974) study on seven throwers aged 16-23 years old with 3 days per week resistance training program for 6 months resulted in a considerable gain in strength but there is no change in body fat percentage and body weight. And in Hanson, et al., (2009) study on 3 days per week of resistance training on eighty one healthy subject aged 65-85 for 22 weeks demonstrated that there was an increase in free fat mass with no difference in body fat percentage in both males and females. And Harber, et al. (2004) study on the effect of 3 times per week of ten exercise circuit training program for 10 weeks on ten young adult men aged 18-35 years old resulted in no difference in body weight, free fat mass, fat mass and percentage of body fat.

Whereas, the effect size for the physiological measurements in the current study is as for BMI is 0.73 and for the BC is 0.69, this denotes a small effect size based on the scale for determining the magnitude of effect sizes in resistance or strength training research that categorize the current study participants in recreationally trained individuals whereby, this individual falls in individual who trained consistently from 1-5 years (Rhea, 2004). And the effect size for the biomotor abilities tests are from trivial to large that is for 50yards Dash is 0.74, Sit & Reach is 0.24, T-Drills is 0.94, Seated Two-Hand Medicine Ball Put is 2.04, Half Squat Jump is 2.23, Modified Sit-Ups is 2.69, Multistage 20M Shuttle Run is 1.91. The continuum in the effect size from trivial to large for BMI, BC and biomotor abilities may due to the lifestyle of the participants of the current study who are student athletes of a Malaysian Sports School who actively trains nine sessions per week and only abstain from any kind of formal resistance or strength training during the duration of the study, but they do train other required health and motor related skills to hone their talent in the respective sports, games or events they were identified to excel in.

Even though, the present study findingsindicated that the 12 week circuit resistance training has elicited a statistically significant effect on all seven biomotor ability tests for within group but it was found that the 50-yards dash test for speed, sit & reach test for flexibility, and T-drill test for agility between group was not significant. However, based on the effect size it can be concluded that the designed circuit resistance training program had instigated a significant effect on BMI, BCA and certain type of biomotor ability tests in the current study namely, seated two-hand chest pass medicine ball put test for power, half squat jump tests for muscular endurance, modified sit-ups test for strength, and multistage 20m shuttle run test for aerobic capacity.

Nevertheless, the present study is distinct from the past research due to the combination of 2 aspects: adolescent and sexual maturation status. Although previous studies clearly outlined the advantages of circuit resistance training, but there's little empirical as well as practical evidence related studies with

regards to effects of circuit resistance training program on adolescents based on sexual maturation status. Therefore the findings of the current study could be useful and can be adopted by coaches, physical trainers and conditioning experts who are working with individuals whom aspired in enhancing their physical appearance and fitness profile especially the health and wellness aspect, and with the young athletes to effectively induce positive changes in body composition and improving thus enhancing their athletic performances as well.

## Conclusion

As a result the administered 12-week circuit resistance training program significantly has induced a significant and positive effect in controlling BMI by 5.5% and decreasing the body fat percentage by 19.2% in adolescent athletes of the experimental group participants compared to the control group. Consequently, it can be concluded that the administered treatment-circuit resistance training intervention program has instigated a statistically significant effect in controlling the body mass index, improving body composition and enhancing all seven biomotor abilities. The findings of this study demonstrated that a well designed, planned and executed circuit resistance training program reduces fat percentage especially in adolescent athletes and improve biomotor abilities. Furthermore, the result of this study could be reasonably enhanced further if it could be carried consistently over a period of time as in a periodized training plan. Moreover, the presence of the life-like structure of the designed circuit resistance training program structure of the studythat is characterized with brief rest periods between sets and exercises which has been observed to be more typical of how young athletes play as in playing a game or sport, and could be reasonably assumed that it would be adequately challenging to maintain motivation of the athletes.

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# Effect Of Six Weeks Yogic Exercises Training On Muscular Strength Development Of Athletes

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**Abstract**
Yogic exercises not only increase the general strength but also tone up the muscles because these exercises stretch out the muscles and due to their slow stretch and hold nature along with breathing mechanism improves the muscular tone and strength of the muscles.
To achieve the purpose of the study six weeks yoga training was administered and Kraus–Weber test is framed to find out the minimum muscular strength required to participate in the training programme and also to find out the improvement in muscular strength after the training programme. The 120 athletes (Boys) who represented Gulbarga (20), Raichur (20), Bidar (20), Yadgir (20), Bellary (20) and Koppal (20) districts in the state level athletic meet ranging from 15-17 years of age were drawn as subjects. The results clearly indicated that the six weeks yoga training was improved muscular strength. Hence it is concluded that there is a positive and significant effect of yogic exercises in the improvement of muscular strength of athletes.
**Key words:** Yogic Exercises, Muscular strength

## Introduction

The person who is physical fit will be able to carry out the essential of his job without undue fatigue. Fitness is characterized by man's ability to function efficiently with in his potentialities. Fitness implies not only the acquisition of certain physical skills but also the ability to withstand the emergency demands training and competitions. High level of strength is essential to good performance in all-athletic games and in some events strength is of almost important. Greater strength often results in better performance. Its relative significance various depending of the nature of the particular activity.
A person having muscular fitness can carry out his daily routine efficiently and effectively with least effort and strain. Muscular fitness plays an important role in all aspects of athlete's performance improvement.Yogic practices not only make the internal organs fit but also strengthen the muscles. Yogic exercises increase the general strength and tone up the muscles because these exercises stretch the muscles, due to their slow movement and held position with breathing mechanism improves the muscle tone.
The word "Training' has been a part of human language since ancient times. It denotes the process of preparation for some task. This process invariably extends to a number of days and even months and years.

## Essence Of Yoga In The New Millennium

All yoga exercises and processes aim at purification, nervous control and coordination of muscles. They give gentle exercise to the body as a whole including individual organs. The simplicity of technique, lack of fatigue and non-requirement of any accessories are great advantage of yogic exercises. Yoga can make people aware of their bodies and further make them realize the need of emotional and physical well being.
Now amongst the physical exercises most effective ones are Yoga and Naturopathy. The main target is health and mind culture. I express my heartfelt realization to the elite assembly that yoga exercises can help mankind in this endeavor to solve the physical problems so that health for everybody in the 21$^{st}$ century can be ensured. These Yoga practices especially Yogasana can cure and help in preventing diseases, helps in regulating the breathing mechanism and increasing vital capacity,

develops the muscular fitness, Fitness, endurance, strength and flexibility and is considered as the most cost benefit therapy.

**Objectives Of The Study:**

The purpose of the study is to assess the selected yogic exercises intervention on strength (muscular strength) development among the athletes. To study the effect of yogic exercises on the muscular strength of the athletes.

**Methodology**

The Kraus- Weber test consists of six tests; the first five tests were used to find out the muscular strength and the last one to indicate the flexibility. All the six tests, namely Abdominal Psoas (A+), Abdominal minus Psoas (A-), Psoas and lower abdomen (P), Upper Back (UB), Lower Back (LB) and Length of back & hamstring muscles (BH) are modified and were used to test 120 athletes ranging from 15 to 17 age group. The modified Kraus-Weber test were conducted on the athletes, the pre training performance of athletes is recorded. After the training again the Kraus-Weber test was administered to find out the improvement in the muscular strength of the athletes.

**Test Administration**

In order to assess the muscular strength of the subjects the modified Kraus-Weber tests were administered are given below.

**Tests**

Abdominal Plus Psoas muscles (A+),Abdominal Minus Psoas muscles (A-),Psoas and Lower abdomen (P),Upper Back (UB),Lower Back (LB) and Back and Hamstring (BH)

**Apparatus**

Wrestling mat,Stop watch and Yogic exercises

The yogic training consists of the following selected yogic exercises.

**Sitting yogic exercises**

Paschimotanasana (The Posterior Stretch),Ardha Matsyendrasanas,Padmasana (The lotus Posture) Sawankasana (The Hare Posture),Standing yogic exercises,Talasana (Palm Tree posture) Trikonasana (The Triangle Posture),Padahastasana (The Feet and Hands Posture)Utkatasana

**Procedure**

The modified Kraus-Weber Tests were administered to the athletes. The each test item is demonstrated correctly to the athletes and then asked them to do the same. The yogic exercises are also demonstrated correctly and asked them to do the same.

**Training Schedule**

| **WEEKS** | **MORNING** | **EVENING** |
|---|---|---|
| 1st week | Sitting yogic exercises 30 minutes | Standing yogic exercises 30 minutes |
| 2nd week | Sitting yogic exercises 40 minutes | Standing yogic exercises 40 minutes |
| 3rd week | Sitting & Standing yogic exercises 50 minutes | Sitting & Standing yogic exercises 50 minutes |
| 4th week (6 days) | -do- | -do- |
| 5th week (6 days) | Sitting & Standing yogic exercises 40 minutes | Sitting & Standing yogic exercises 40 minutes |
| 6th week (Alternate one session each day) | Sitting & Standing yogic exercises 40 minutes | Sitting & Standing yogic exercises 40 minutes |

**Statistical Technique**

Mean, Standard deviation and t-value were used to compute the data.

**Analysis And Interpretation Of Data**

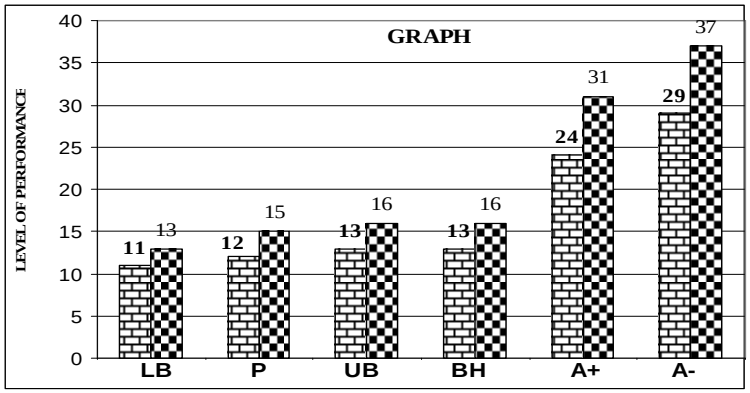
From the data obtained the flowing are tabulated for analysis.

**Table-1:Pre and Post-traning performance of athletes**

| Training | | A+ (in 1mt.) | A- (in 1mt.) | P (in secs) | UB (in secs) | LB (in secs) | BH (in secs) |
|---|---|---|---|---|---|---|---|
| Pre-traning | M | 24 | 29 | 12 | 13 | 11 | 13 |
| | SD | 3.4 | 4.1 | 2.8 | 3.1 | 2.6 | 3.1 |
| Post-traning | M | 31 | 37 | 15 | 16 | 13 | 16 |
| | SD | 4.9 | 4.6 | 3.4 | 3.9 | 3.3 | 4.2 |
| t - value | | 9.7* | 10.78* | 5.65* | 5.00* | 3.95* | 4.77* |

*Significance at 0.05 level

Table-1 and graph shows the mean scores of pre and post training performance in modified Kraus-Weber test. It clearly shows the significance difference in the performance of the athletes in two conditions. Thus, yogic asana introduced to the athletes are responsible for bringing improvement in the muscular strength. The Yogic exercises influence the muscular strength in the athletes is proved.




**Conclusions**

The selected yogic exercises intervention improved the strength (muscular strength) among the athletes. The positive and significant effect of yogic exercises on the muscular strength of the athletes. The selected yogic exercises because of their slow movement and held position improve the muscular tone. This improved muscle tone of the abdominal, lower back, upper back and back & hamstrings is responsible for the improvement of muscular strength of the athletes.

**Recommendations**

The results of the survey taken of the muscular fitness of the athletes should be great concern to the coaches and trainers in the welfare of the athletes. The results bring out the weakness of the athletes and also suggest the importance of including suitable yogic exercises for the improvement of muscular fitness. A larger sale of study may be conducted on state, national and international athletes and also on different genders for longer periods.

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# Impact Of Pranayama On Selected Physiological Variables Among Inter Collegiate Women Cricket Players

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**Abstract**
The purpose of the study was to analyze to find out the effect of pranayama on selected physiological variables among inter collegiate cricket players. Twelve inter collegiate women cricket players were selected from Department of physical education and sports sciences,Bldecollege considered as experimental group.Data were considered before and after training programme of six week. The collected data were statistically analyzed dependent t test.It was found that there was significant development on pulse rate and holding time due to the practice of pranayama.

**Introduction**
'Today's children are tomorrow's citizens'.
Hence it is the duty of everybody concerned to see that our future citizens are strong, healthy and have a perfect personality.
Yoga and sports are the essential aspects of every one's life. In order to overcome the health and physical challenges posed by sedentary and post modern life, adaptation of such techniques is become inevitable. The curriculum, education department, parents and other concern stakeholders are largely neglected the need and importance of sports and yoga in education at all the levels. It is so important to give due importance in the primary and secondary levels of education. Sports and yoga not only help for the development of the physic of children but also the in order to develop children psychologically and intellectuality. It is to be noted that, the significance of sports and yoga was not considered and due priority was hardly given by the primary stakeholders of education. Thus, calls for a scientific study of enquiry to prove the role of sports and yoga in overall development of the children in order to have healthy youth in future and development of the nation.
Exercise is also known to relieve stress. Some children experience as much stress, depression and anxiety as adults do. Since exercise improves health, a fit child is more likely to be well rested and mentally sharp. Even moderate physical activities have been shown to improve a child's skill at arithmetic, reading and memorization.Schools are dynamic setting for promoting health and wellness through various correlated areas such as physical education and sports. There is a growing awareness that the health and psycho-social wellbeing of young children is of paramount importance and schools can provide a strategic means of children's health, self-esteem, life skills and behaviour.

**Methodology**
To achieve the purpose of the study 12 inter collegiate women cricket players were selected from Department of physical education and sports sciences,BLDEcollege selected sports women were randomly selected as subjects.The selected subjects were gone under the six weeks of pranayama practice(anulomavilomasuryabedanapranayama,Chandrabedanapranayama,nadishuddipranayama,naduanusandanapranayama,A-kara,U-kara,M-kara,Aum,om).
The following physiological variables such as resting pulse rate and holding time were selected. The resting pulse rate and breath holding time were tested through pulse beats and nose holding method.

The pretest data were collected before the training programme.In both the cases the data were collected in single day the same day.

Table I Selection of variables and test administration

| Sl.No. | Variables | Test Name |
|---|---|---|
| 1 | Resting pulse rate | Pulse beats |
| 2 | Breath holding Time | Nose holding |

Table II The mean, Standard Devation,Standard error and t Ratio of inter collegiate women cricket players on resting pulse rate

| Physiological variables | Test | Mean | S.D | S.E | "t"Ratio |
|---|---|---|---|---|---|
| Resting pulse rate | Pre | 69.5000 | 6.4456 | 1.8607 | 4.468* |
| | Post | 59.0000 | 4.2212 | 1.2185 | 1.2185 |

*Significant$_{.05}$(11)=1.79

From the table, the dependent "t" values of resting pulse rate between the pre and posttest means of experimental groups was greater than the table value of 1.79 with df 11 at 0.05 level of confidence. Due to the effect of pranayama practice the experimental group had significant development on resting pulse rate.

The Mean value of pre and post test inter collegiate women cricket players for resting pulse rate are presented in figure I

Figure I The Mean Values Of Resting Pulse Rate For Inter Collegiate Women Cricket Players

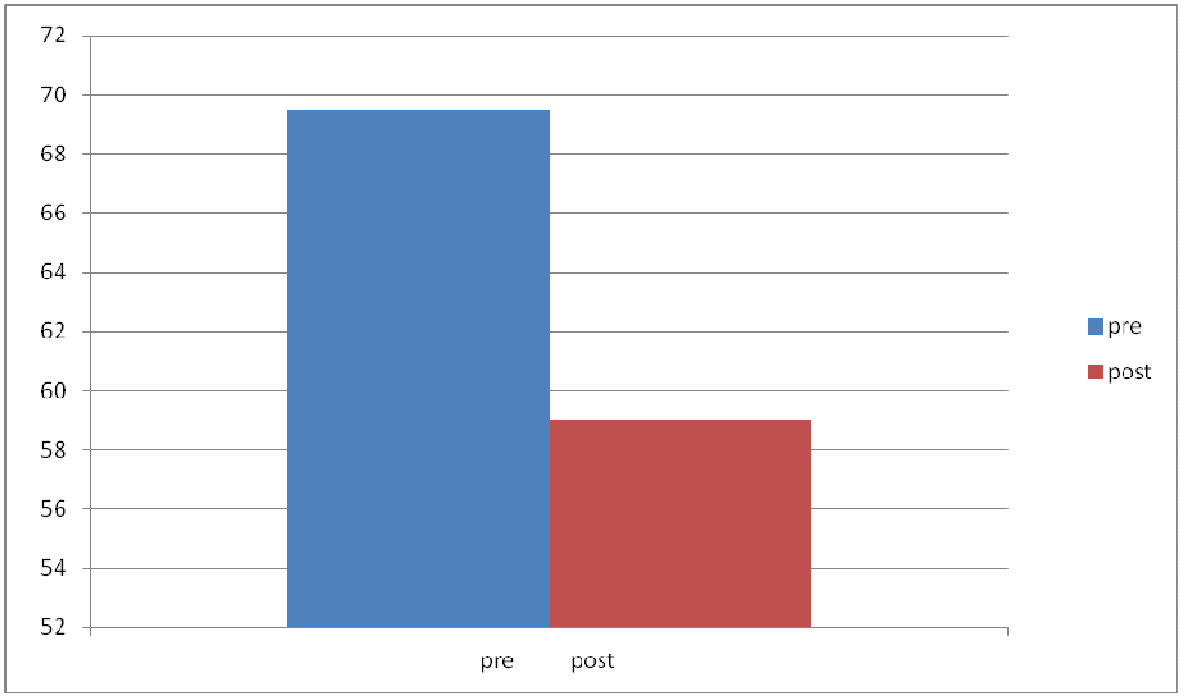



Table III The Mean, Standard Devation,Standard Error And 'T'ratio Of Inter Collegiate Women Cricket Players On Breath Holding Time.

| Physiological Variables | TEST | MEAN | S.D | S.E RATIO | T |
|---|---|---|---|---|---|
| Breath Holding Time | PRE | 24.5392 | 5.6163 | 1.6213 | 6.303* |
| | POST | 65.2500 | 25.2195 | 7.2802 | |

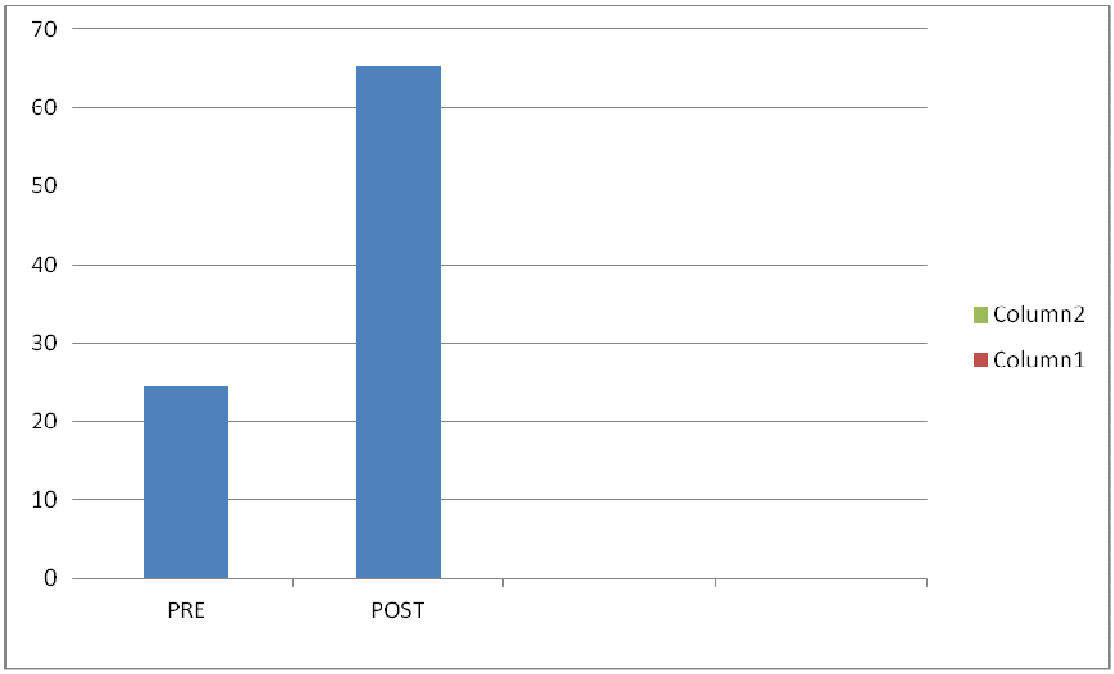
Significant$_{.05}$ (11)=1.79

From the table,the dependent t test values of breath holding time between the pre and post test mean of experimental group was greater than the table value of 1.79 width df 11 at 0.05 level of confidence.

Due to the effect of pranayama practice the experimental group had significant improvement on breath holding time.

The mean values of pre and post inter collegiate women cricket players for breath holding time are presented in figure II

Figure II The Mean Values Of Breath Holding Time For Inter Collegiate Women Cricket Players.




**Conclusion**

From the analysis of the Data, the following conclusion were drawn.

1. Six week of training pranayama practice improves on resting pulse rate.
2. Six week of training pranayama practice improves on breath holding time.

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# Adipolin and insulin resistance Changes in response to one session of endurance training in sedentary women

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**Abstract**
Adipolin (CTRP12), is a novel anti-inflammatory adipokine mostly synthases and expresses in adipose tissue. Adipolin improves Insulin sensitivity and decreases circulating glucose levels. This study investigated effect of one session of endurance training on adipolin levels and insulin resistance index (HOMA-IR) in obese women. 18 sedentary postmenopausal obese women (BMI>30Kg/$m^2$, aged 50-65 years) randomly assigned in to experimental (n=10) and control (n=8) groups. Subjects in experimental group participated in one session of endurance training(running on treadmill at 60% of maximal heart rate), 30minutes per session and three sessions per week. Levels of adipolin, insulin and fasting glucose measured before and immediately after training session. Statistical analysis was done by paired and independent t-test and Pearson correlation and P<0.05 considered significant. Serum levels of adipolin significantly decreased following one session of endurance training(P=0.000); however, insulin levels and HOMA-IR did not significantly change(P>0.05). Furthermore, between groups changes of adipolin (P=0.046) were significant. According to Pearson correlation, no correlation existed between pre training changes of adipolin levels and those of blood factors assessed and anthropometric indices (P>0.05), however, post training changes of adipolin negatively correlated with changes of insulin levels (P=0.001). Therefore, one session of endurance training can not regulate adipolin levels in sedentary postmenopausal obese women and more studied is necessary to identify the effective training protocol.
Key words
Endurance Training, Adipolin, Insulin Resistance, Obese Women.

## Introduction

Adipose-tissue derived adipokines are an important class of metabolic regulators. These secreted hormones and cytokines function in an autocrine, a paracrine, and/or an endocrine manner to modulate whole-body insulin sensitivity and energy balance**Error! Reference source not**

**found.**.Recent effort to discover novel metabolic regulators has led to the identification of a family of fifteen secreted proteins designated as CTRP1 to CTRP15(2).

Recent studies suggest that CTRPs regulate glucose and fatty acid metabolism, as well as playing diverse roles in the immune, skeletal, vascular, and sensory systems. CTRP12 is an insulin-sensitizing adipokine predominantly produced by adipose tissue in humans(3)(4). While expression and circulating levels of CTRP12 are decreased in the obese state, anti-diabetic drugs such as rosiglitazone enhance its expression in adipocytes(5). Recombinant CTRP12 administration acutely lowers blood glucose and improves insulin sensitivity in obese and insulin-resistant mice, in part by enhancing Akt signaling in liver and adipose tissue(3)(4), as well as by reducing the circulating levels of resistin known to induce hepatic insulin resistance. Independent of insulin, CTRP12 promotes glucose uptake in adipocytes and suppresses *de novo* glucose production in hepatocytes via the PI3 kinase-Akt signaling pathway(3)(4).While the general metabolic function of CTRP12 has been established, important questions concerning its regulation remain unanswered. As exercise and physical activity are one of the best non pharmacological procedure advised for prevention and treatment of obesity and its related disorder such as insulin resistance and diabetes**Error! Reference source not found.**(7), this study investigated the effect of one session of endurance training on adipolin and insulin resistance index (HOMA-IR) in sedentary postmenopausal obese women(8).

**Methodology**

18 sedentary postmenopausal obese women (BMI>30Kg/$m^2$, aged 50-65 years) randomly assigned in to experimental (n=10) and control (n=8) groups. Subjects in experimental group participated in one session of endurance training(running on treadmill at 60% of maximal heart rate), 30 minutes per session and three sessions per week. Levels of adipolin, insulin and fasting glucose and anthropometric indices measured before and immediately after training session. The homeostasis model assessment of insulin resistance (HOMA-IR) was calculated using the HOMA-IR equation ([fasting insulin ($\mu UmL^{-1}$) × fasting glucose ($mmolL^{-1}$)]/ 22.5).Statistical analysis was done by paired and independent t-test and Pearson correlation and P<0.05 considered significant.

Result

Serum levels of adipolin significantly decreased following one session of endurance training(P=0.000); however, insulin levels and HOMA-IR did not significantly change (P>0.05) (table 1). Furthermore, between groups changes of adipolin (P=0.046) were significant. According to Pearson correlation, no correlation existed between pre training changes of adipolin levels and those of blood factors assessed and anthropometric indices (P>0.05), however, post training changes of adipolin negatively correlated with changes of insulin levels (P=0.001).

Table 1. mean ±SD of factors assessed before and after o one session of endurance training

| | | Experimental | Control |
|---|---|---|---|
| Adipolin | Pre | 525.9±67.1* | 556.13±81,46 |
| | Post | 502,9±64,67 | 622.82±31,45 |
| Insulin | Pre | 4.62±0.22 | 5.3±1.84 |
| | Post | 4.67±0.11 | 5.21±0.67 |
| Glucose | Pre | 87.9±13.65 | 85.87±5.17 |
| | Post | 92±13.02 | 85.87±7.2 |
| HOMA-IR | Pre | 1±0.34 | 1.26±0.58 |
| | Post | 1,2±0.53 | 1.15±0.42 |

* indicates significant difference (P<0.05)

**Discussion**

One session of endurance training decreased the adipolin levels in sedentary post-menopausal obese women. According to our knowledge, there is no study investigating the effects of exercise on adipolin level.

One of the most important factor regulating adipolin levels is inflammatory status of body as adipolin levels decrease in obesity. TNF-α is pre-inflammatory adipokine secreted from adipose tissue and decrease adipolin expression via up-regulation of furin(9)(10). Furin, which is upregulated in obesity, is aproprotein convertases (PCSK) and likely the endogenous endopeptidase that cleaves CTRP12 to generate the gCTRP12 isoform in adipocytes(10)(11). Therefore, improvement in adiposity and body composition would result in decreases of TNF-α and consequently furin and finally increases adipolin to the physiological normal levels. However, one session of endurance training inn our study was not sufficient enough to improve body composition and increase adipolin level. On the other hand, insulin

is one of down-regulator of adipolinupregulatingfurin expression in adipocytes and promotes adipolin cleavage(3). In this study insulin levels increased insignificantly following training and therefor resulted in decreases adipolin levels.

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# Effect Of Carbohydrate Gel Provision On Endurance And Fluid Balance During Exercise In Warm Condition: Pilot Study

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**Abstract:**
**Purpose:**The purpose of this study was to determine the individual and combined effects on performance and hydration status by using sports gel with water, sports gel alone and water alone, to clearly compare and delineate the difference during prolong high intensity exercise longer than 1-hour duration. Secondly to determine the effect of CHO gel alone, CHO gel with water and water alone on fluid balance and endurance capacity to complete 10-km endurance time trial in warm condition. **Method:**One trained male un-acclimatised athlete of 32 years age was recruited for present study, with height (191cm), weight 84 ± 05 kg, $VO_{2max}$ of 54 ml/min/kg, and weekly training was 12-15 hours. Present experimental study was single blinded; placebo controlled repeated measured research design. One familiarisation and three experimental trials of 60min preloaded endurance running in three different condition I, conditions II and condition III after ingestion of water (W), carbohydrate gel with water (CGW) and carbohydrate gel (CG) in 30℃ at 60% relative humidity in environmental chamber. **Results:**The difference of 1.54 min improvement in performance in CGW (50.51 min) against the CG (52.05 min) was observed in CGW trial. Body mass loss in W (2.3%), CG (2%) and CGW (0.6%) and during self-paced 10 km time trial the decrease of body mass was more in CGW (1.93%), CG (1.9%) and in W (1%). But overall the combined effect of 60min running and 10km time trial induced higher BM change in CG (3.9%) and W (3.3%) and in CGW (2.53%). Urine osmolality (0.475) in CG trial increased above the pre-exercise, where osmolality was more decreased in W (0.305) than in CGW (0.013) trial.Blood glucose level was reduced more in CGW (0.83 mmol) and CG (0.81 mmol) than in W trial (0.39) trial.**Conclusion:**10km endurance performance with sports gel with water trial was better compared to water and only sports gel trials. After feeding of sports gel with water trial (CGW) in warm condition substantially improved the time trial performance compared to only gel (CG) and water (W) trial. But the difference of magnitude was greater by 1.54 min in CGW with lower indication of cardiovascular stress and reduced body temperature compared with other two W and CG trial. Lower rate of sweat loss and decrease in reduction of body mass was remarkable in CGW compared to W trial.

**Key Words: - Sports gel, Endurance performance, Fluid balance, Hyperthermia, Dehydration**

**Introduction:**

In recent years, novel forms of CHO supplements have been introduced into the market, including concentrated CHO gels. These new products provide athletes with more options for CHO supplements during endurance training and competition based on personal preference and portability. CHO in the form of a gel is now widely accepted and used by both professional and recreational athletes. Hence sports gels along with water during exercise should give the athlete the same benefits as a sports drink, but as yet there has been no scientific evidence to indicate that they work to help improve performance during warm condition.

Based on previous studies in heat of 1 hour duration (Below *et al*, 1995), prolonged exercise (Galloway *et al*, 2007), intermittent high-intensity running (Patterson *et al*, 2007), time-trial running (Stafford *et al* 1997; Pfeiffer, 2009), cycling time trial (Peake*et al*, 2008) have reported a trivial to significant effects on the performance after using carbohydrate electrolyte, different forms of

carbohydrate of carbohydrate supplements and sports gel in heat condition but among these no studies have considered the dehydration aspects in the their investigation; similarly the gel studies of marathon running (Burke *et al*, 2005) also have reported the improved performance in CHO trial but the authors findings doesn't support or discussed the tentative limitation on performance due to dehydration in the heat. Due to lack of direct data on carbohydrate gel studies with implications to the negative effect of dehydration and hyperthermia on the fluid balance and endurance it warrants the investigation to clearly delineate the understanding from present and previous findings to understand the mechanism to determine the influence of either CHO ingestion or fluid replacement on performance during higher intensity exercise (i.e. greater than 80% of $VO_{2max}$). There is lack of information on CHO supplement in form of sport gel ingestion for performance in warm condition. This is unfortunate since many competitive athletics events are completed under these conditions (e.g. endurance running, long distance running, triathlon etc.). The present investigation is focused on whether additional water with CHO in form of gel or gel alone can affect body fluid status and performance during high intensity exercise lasting longer than 1 hr in warm condition. This study aim to determine the individual and combined effects on performance and hydration status by using sports gel with water, sports gel alone and water alone, to clearly compare and delineate the difference during prolong high intensity exercise longer than 1 hr duration (pre-loaded endurance time trial). Secondly to determine the effect of CHO gel alone, CHO gel with water and water alone on Fluid balance and endurance capacity to complete 10-km endurance time trial. No previous investigation has systematically tested the both factors in the same study. In majority of CHO feeding studies performed, CHO is consumed as sports drink or diets or oral solution form and their effects are compared to non-caloric water or placebo. Not many literatures are available on sport gel for prolong intensive exercise in warm condition; due to this dearth of information specifically for prolong activity in warm condition using sport gel as a source of performance warrants the investigation.

**Method**

**Participant:**

One trained male un-acclimatised athlete of 32 years age was recruited for present study, with height (191cm), weight 84 ± 05 kg, $VO_{2max}$ of 54 ml/min/kg, and weekly training was 12-15 hours.Present experimental study is single blinded; placebo controlledrepeated measured research design was used. One familiarisation and three experimental trials of 60min preloaded endurance running in three differentcondition I, conditions II and condition III after ingestion of water (W), carbohydrate gel with water (CGW) and carbohydrate gel (CG) (Fig:1) in an environmental chamber of 30℃ at 60% relative humidity at Carnegie research institute were used. Information letter for participants, technique and procedure used on participants for data collection in present study was reviewed and approved by institutional review board for research ethics at Carnegie Research Institute; Leeds Metropolitan University for ethical approval. Participants were informed through participants information sheet and they made aware of voluntary participation nature in present study. Consent letter was signed by participant to ensure voluntary participation. Pre exercise screening questionnaire, resting heart rate blood pressure was recorded for each visit of baseline, familiarisation and experimental trials by using mercury sphygmomanometer and stethoscopein physiology laboratory at Carnegie research institute.

**Baseline ($VO_{2max}$)Measurement:**

$VO_{2max}$was measured by using a graded exercise to exhaustion with 1% gradient increase after every minute on motorised treadmill.Oxygen consumption $VO_{2max}$and carbon dioxide production ($VCO_2$) was measured using an online gas analyser (Metalyser, Cortex, Germany- Appendix12). Heart rate change was recorded by using Polar Vantage NV, Kemple, Finland. The highest value of $VO_2$, respiratory exchange ratio (RER) and heart rate achieved over a 20-s period within last 2 min of exercise are recorded as the maximum values.For validity criteria for VO2max 1) Plateau of $VO_2$ (defined as an increase of $VO_2$ of < 2 $ml.kg^{-1}.min^{-1}$ with increased workload, 2) RER >1.10 and **3**) Maximum heart rate within 10 beats of age-predicted maximum (max heart rate = 208 - (0.7) (age) as per predicting equation) (Tanaka, *et al* 2001).The data obtained after baseline test, was then used to decide the running speed of 65% $VO_{2max}$ capacity.

**Familiarisation trial**:

After 30 min of active rest followed by the $VO_{2max}$test, subject then performed practice of 60-min preload and 10-km time trial with 3-min rest in between. The purpose of the practice test is to familiarise the subjects with treadmill and equipment and to reduce a potential learning curve from the first to second trials (Schabort*et al*, 1998). Since the food and fluid will not controlled before practice test and the results will not be analysed statistically.

**Experimental protocol:**

Experimental protocol consisted of60-min preload running at 65% $\dot{V}O_{2\ max}$running speed followed by 3 min break and 10km time trial which had to be completed in shortest run time with self paced speed on motorised treadmill. Schematic representation of modified protocol as described by Russell *et al* (2003) with CV (1%) in the same laboratory and same treadmill where the practice trial was conducted (Fig.1.).

**Experimental Procedure:**

After participant arrived at laboratory health screening was done before the start of experiment followed by urine and resting blood sample was collected from fingertip. Supplement-A was consumed orally 20 min before the start of the protocol. Supplement-B was ingested 5min before the start of protocol and third aliquot (supplement-C) after 60 min running during 3 min breakAfter five minutes warm up of with self paced on treadmill (Appendix-6) 60-min preload run started with 1% inclination is assigned for most participants during the preload and time trial to assimilate the oxygen cost of outside running (Jones, *et al* 1996). However, for fast runner if the treadmill limits (maximal velocity e.g. 266.67m.min$^{-1}$) the velocity of runner then 2-3% inclination was assigned during preload run and 10-km time trial. In 60-min preload run the participant run in steady pace, which elicits $VO_2$ of 65% of $\dot{V}O_{2\,max}$, which was initially determined during the baseline practice trial. During 3-min of break between 60-min preload run and 10-km time trial, participants was instructed to complete the time trial in least time (Russell *et al*, 2003). Participant ran with respiratory maskthroughout the protocol for online gas collection except at 3 min break for aliquot of supplement-C. Sampling was performed at rest, and every 20 minutes of 60 min preload run and post 10km time trial.

**Table 1: Composition of supplement A, B and C during water (W), carbohydrate gelwith water (CGW) and carbohydrate gel (CG) trial.**

| | Supplementation A | Supplementation B | Supplementation C |
|---|---|---|---|
| (W)- Condition-I | 400ml water | 400ml water | 100ml water |
| (CGW)-Condition-II | 400ml water<br>+<br>40g CHO gel | 400ml water<br>+<br>40g CHO gel | 100ml water<br>+<br>10g CHO gel |
| (CG)-Condition-II | 40g CHO gel | 40g CHO gel | 40g CHO gel |

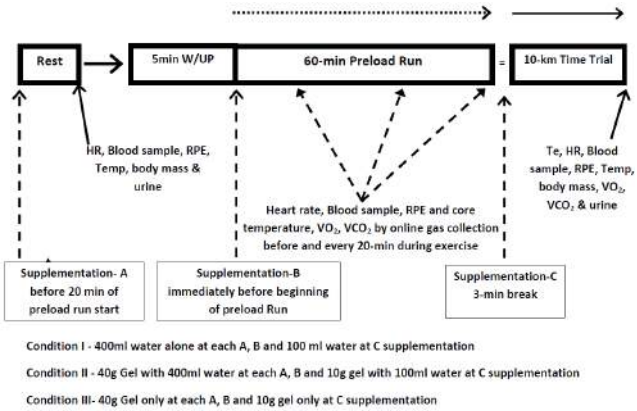



**Figure: 1. Schematic fig. 1 representation 60-mi preload 10-km Time Trial protocol, modified (Russell *et al*, (2003).**

**Details of Carbohydrate used in the study:**
Accel gel commercial brand of Pacific (Matawan, New Jersey) health laboratoryand composition of gel with 4:1 carbohydrate (20g) and protein (5g) with 37gm in each packet with 100 calorie citrus flavour was used in the present study.

**Supplement Ingestion:**
Supplementation of prescribed carbohydrate gel with (CGW or without water (CG) or placebo (water) will be assigned randomly for each experimental trial. First aliquot of supplementation-A was consumed orally before 20 min prior to start of 60 min preload run, second aliquot of supplementation-B will be ingested immediately 5 min before 60 min preload run and supplementation-C was ingested immediately after 60 min running during 3min break. According to condition I, II and III, the type of ingestion will be decided (Fig -1). Participants during gel with water or water trials only are allowed to drink the prescribed volume of water during exercise, but participant in carbohydrate gel alone trial was not allowed for additional water intake during trials.

**Data Collection**
**Heart rate (HR):**
HR was recorded at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Polar Vantage NV, Kemple, Finland, radio telemetry heart monitor was placed around the torso, just below the pectoral muscles and just above the xiphisternal joint on the sternum.
**RPE:**
RPE was recorded at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-kmendurance time trial. Using standard Borg scale (Borg, 1998).
**Body mass (BM):**
Change in body mass was at rest, 60 minutes of 60 min preload run and at post 10-kmendurance time trial. Participant was asked to step onto Electronic scales (Secca Alpha Model 770, Germany) stand still, whilst the scales measured the body mass reading. To avoid error in measurement was repeated instantly for three times.
**Sweat loss volume:**
To determine the sweat loss volume, the simplified equation described by King *et al* (2008) with correction for only ingested volume of fluid and substrate.
(BML= Body mass loss & IF= Ingested fluid)

$$\text{Sweat Loss} = \text{BML} + \text{IF}$$

**Body Temperature:**
Temperature from ear was recorded at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial, will be used. Body temperature was measured using Braun Pro 3000, Thermoscan ear thermometer.
**Blood Lactate:**
Blood sample of 5 ml from fingertip was collected at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Blood lactate concentration was determined by using YSI 2300 STAT PLUS Glucose and Lactate Analyser. Error check was done at0.02 mmols-8mmols range for glucose and lactate standard. Crosschecked whether machine is reading withinthe acceptable error (0.02mmol). YIS machine was calibrated as per manufacturer manual instruction to use the equipment before every trial baseline, familiarisation and experimental trials.
**Blood Glucose:**
Blood sample of 5 ml from fingertip was collected at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Blood glucose concentration was determined by using YSI 2300 STAT PLUS Glucose and Lactate Analyser (Appendix-12). Error check was done at 0.02 mmols -8mmols range for glucose and lactate standard. Crosschecked whether machine is reading within the acceptable error (0.02mmol). YIS machine was calibrated as per manufacturer manual instruction to use the equipment before every trial baseline, familiarisation and experimental trials.

**Haemoglobin:**Blood sample of from fingertip was collected in microcuvette at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Haemoglobin concentration was determined by using HemoCue Plasma/Low Photometer Sweden.

**Haematocrit**

Blood sample of from fingertip was collected in capillary tube at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Hematocrit was determined using Micro HematocritMk.IV triplicate centrifuge, United Kingdom (Appendix-8) and equipment was set for standards before trial by using manufacturer manual instruction to use the equipment.

**$VO_2$& $VCO_2$**

Respiration metabolite was recorded at rest, 20, 40 and 60 minutes of 60 min preload run and at post 10-km endurance time trial. Using online gas analysis system (Metalyser, Cortex-B, Germany-Appendix-11). Metalyzer was calibrated before trial as per manufacturer manual instruction to use the equipment.

**Plasma volume**

Change in plasma volume was calculated from hematocrit and haemoglobin using formula described (Dill and Costill, **1974**).

$$\%\Delta PV = 100 \times \left[ \frac{Hb_{con}}{Hbt} \times \frac{[1 - Hct_1 \quad X \quad 100]}{[1 - Hctcon \quad X \quad 100]} \right] - 100$$

**Time to Complete 10-Km Trial**

Performance time was recorded at the end of subsequent 10-km trials by using electronic stopwatch and PP55 Med 1 wood way motorised treadmill for running.

**Urine Osmolality**

Urine sample was collected at rest and post 10-km time trial using universal container (10ml sample) Laboratory measurement using osmometer (CRI). To ensure the participant's euhydration status before commencing test trial.CryoscopicOsmometer, (Osmomat 030-D Gonotec, Germany) was used with range of 300 mOsmol. $Kg^{-1}$. $H_2O$.

**Pre trial Diet and Fluid uptake:**

Pre trials diet and fluid intake was controlled only for three experimental trials and not for the peak performance and familiarisation trial. Participant was asked to follow the same diet and fluid intake for all three subsequent trials. Carbohydrate feeding was the major purpose of the process.

**Results**

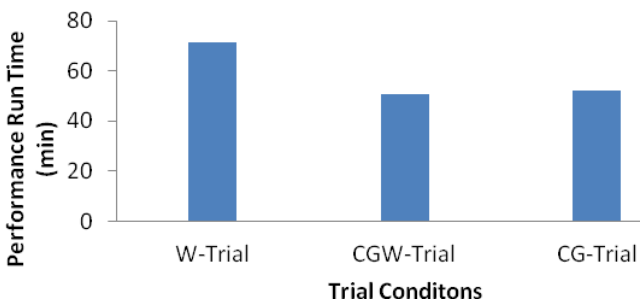
**Endurance performance:**

The performance time to complete 10 km time trial was faster in CGW (50.51 min) by 21%, in CG (19.43min) trial by 19.43% compared to W (71.48min) trial (Fig: 2).

**Table: 2.Time (min) to complete each kilometre distance during water (W), Carbohydrate gel with water (CGW) and carbohydrate gel (CG trial).**

| | Distance (km) | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **Trial** | 1km | 2km | 3km | 4km | 5km | 6km | 7km | 8km | 9km | 10km | **Total (min)** |
| W | 7.78 | 7.7 | 7.26 | 7.66 | 7.08 | 7.04 | 7.07 | 6.86 | 7.41 | 5.92 | 71:48 |
| CGW | 5.43 | 5.14 | 5.61 | 5.21 | 5.13 | 6.94 | 4.44 | 3.62 | 4.92 | 4.07 | 50:51 |
| CG | 5.06 | 5.14 | 5.13 | 5.03 | 4.96 | 5 | 5.23 | 5.71 | 5.23 | 5.56 | 52:05 |

**Figure:**




**2 Performance run**

**time (min) during water (W), carbohydrate gel with water (CGW) and carbohydrate gel (CG)**

**Table: 3. Absolute change in body mass (kg) during water (W), Carbohydrate gel with water (CGW) and carbohydrate gel (CG trial).**

| Trial | t-1 | t-2 | t-3 | Δ BMkg |
|---|---|---|---|---|
| | Rest | Post 60min | Post 10-km | |
| W | 84.4 | 82.1 | 81.1 | 3.3 |
| CGW | 84.2 | 83.6 | 81.67 | 2.53 |
| CG | 83.8 | 81.8 | 79.9 | 3.9 |

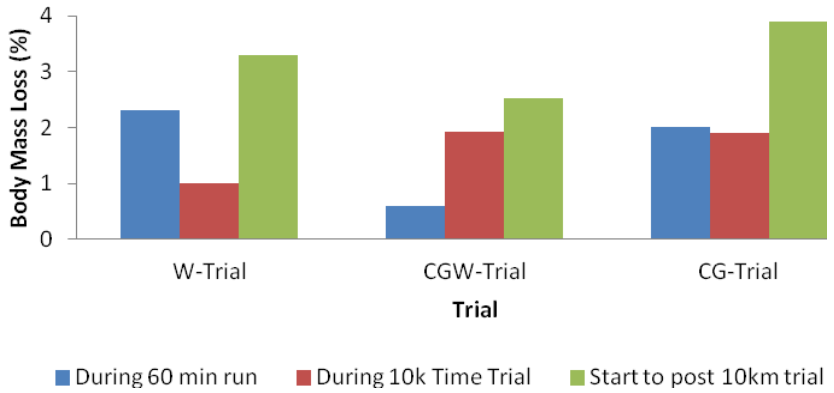



**Figure: 3. Loss of body weight (%) during 60 min preload run, during 10 km performance and combined (60 min run+10k time trial) during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

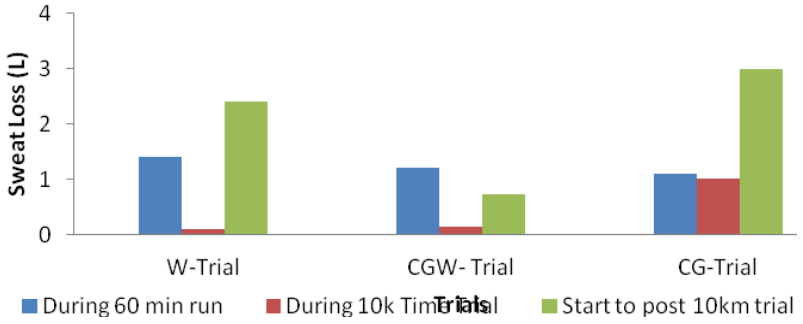



**Figure: 4. Sweat loss (L) during 60 min preload run, during 10 km performance and combined (60 min run+10k time trial) during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

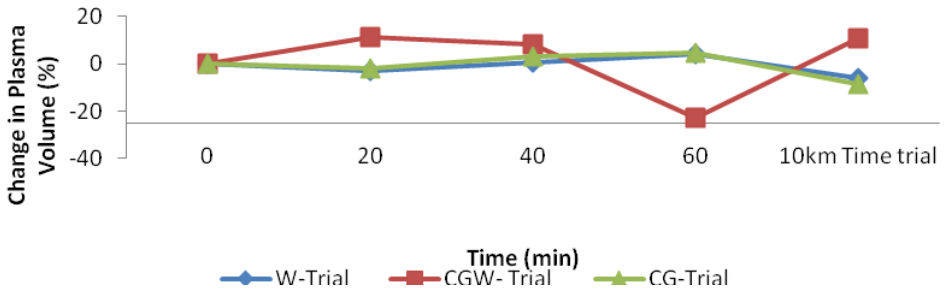



**Figure: 5. Percent change in plasma volume (%) during 60 min preload run, during 10 km performance and combined (60 min run+10k time trial)during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

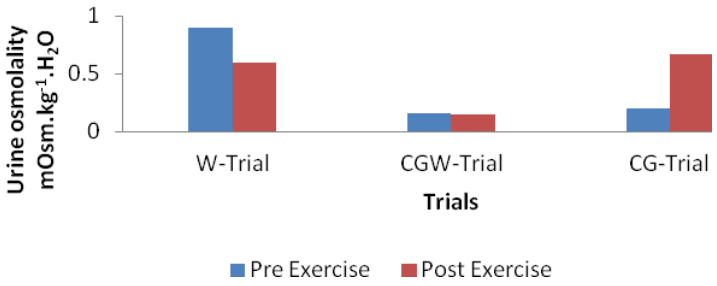



**Figure: 6.Change in urine osmolality at pre and post exercise during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

**Table: 4. Indicate the changes in Respiratory exchange ratio (RER), Perceived exertion (RPE), Heart rate (HR), Haemoglobin (Hb), Hematocrit (Hct)**

| | | Exercise time (min) | | | | |
|---|---|---|---|---|---|---|
| | **Trials** | **Rest** | **20 min** | **40 min** | **60 min** | **Post 10km** |
| RER | W | 0.84 | 1.01 | 1.04 | 1.08 | 1.04 |
| | CGW | 0.61 | 0.76 | 0.79 | 0.82 | 0.9 |
| | CG | 0.84 | 1 | 1.05 | 2.34 | 1.3 |
| RPE | W | 1 | 13 | 12 | 13 | 13 |
| | CGW | 1 | 9 | 12 | 12 | 12 |
| | CG | 1 | 7 | 9 | 12 | 13 |
| HR | W | 84 | 146 | 159 | 178 | 175 |
| (beats.min$^{-1}$) | CGW | 78 | 153 | 156 | 157 | 191 |
| | CG | 85 | 151 | 168 | 176 | 195 |
| Hb (g/L) | W | 156 | 164 | 163 | 160 | 174 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | CGW | 152 | 156 | 159 | 159 | 165 |
| | CG | 166 | 169 | 164 | 157 | 182 |
| Hct (%) | W | 46 | 1 | 0 | 1 | 1 |
| | CGW | 42 | 6 | 5 | -12 | 6 |
| | CG | 50 | 0 | 0 | 0 | 53 |

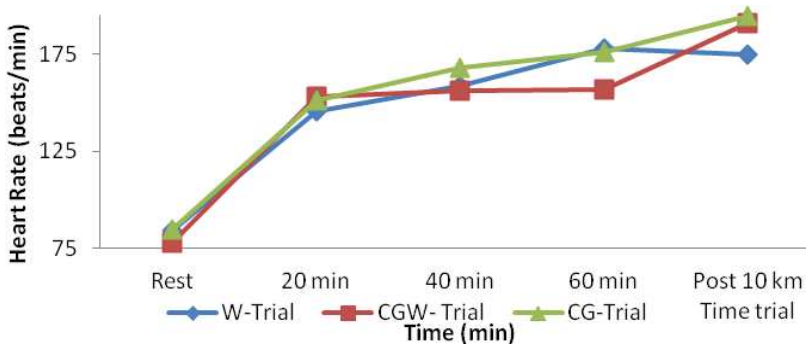



**Figure: 7.Heart Rate during 60 min preload run, during 10 km performance and combined (60 min run+10k time trial) during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

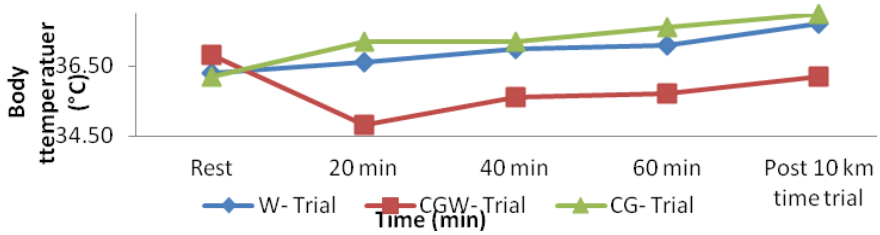



**Figure: 8. Change in Body Temperature during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

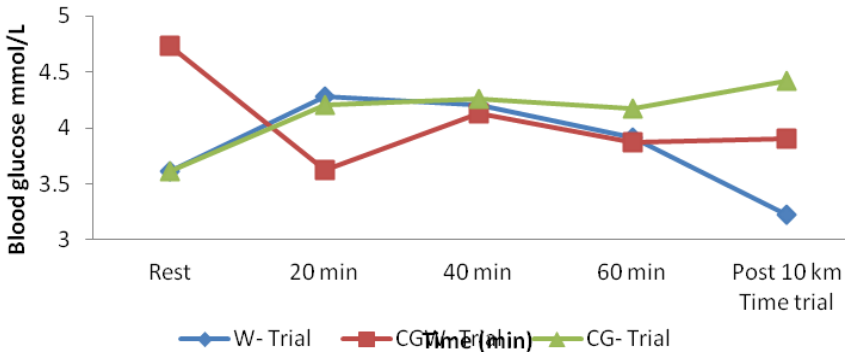



**Figure: 9. Change in Blood glucose during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

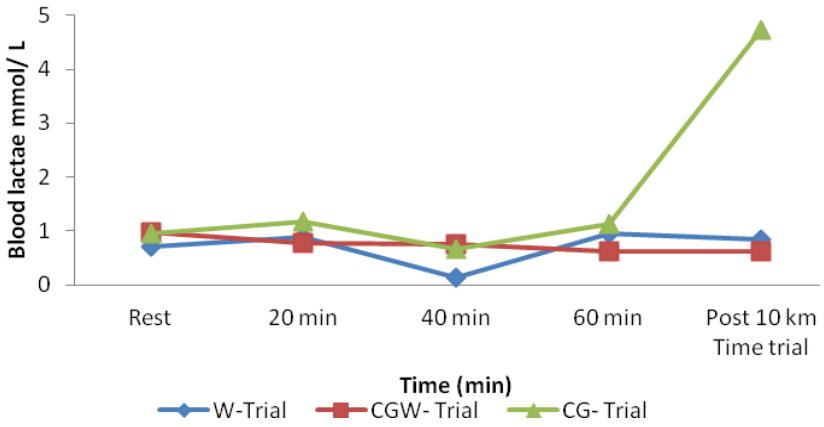



**Figure: 10. Change in Blood lactate during three trials of W (water), CGW (CHO Gel + Water) and CG (CHO Gel).**

**Discussion:**

In a significant point of view it is to be noted that results are calculated from data collected from one single participant and they are further gathered in discussion to magnify the effect of carbohydrate gel provision with and without water on endurance performance and fluid balance during exercise in warm condition. The main finding of present investigation is that the performance to complete 10km time trial was improved in carbohydrate gel with fluid (CGW) than carbohydrate gels without water (CG) compared to water W trial in 30℃ at 60% relat ive humidity (RH). In comparison to W trial the performance was improved by a magnitude of ~21% when participant consumed carbohydrate gel with water (CGW) and by ~19% when participant consumed carbohydrate gel only (CG) (Figure-1). The difference of 1.54 min improvement in performance in CGW (50.51 min) against the CG (52.05 min) indicates the apparent combined additive effect of fluid and CHO substrate in CGW trial. But it was also noticeable improvement in performance during CG trial in comparison with only water trial W (71.48 min). Though from the results of average time to complete every kilometre distance was not different in both CG and CGW trials, but the additional of water consumed in CGW had taught to improve the performance at later stages after the end of 8 km distance (Table:2).Below *et al* (1995) report of additive and independent effects of carbohydrate alone or water or in combination during 50 min cycling performance in heat; clearly supports our result in CGW trial likely reflects the additive and combined mechanism behind the improved performance. However in present study the greater difference observed in the performance during Carbohydrate gel trials against the W trial; the increased performance of 2.95% observed between CGW and CG trial was higher than performance reported in earlier investigation of Burke *et al* (2005) investigation found little improvement of 0.3% in running performance during half marathon running outside the laboratory, runners in Burke *et al* (2005) study followed identical carbohydrate gel supplementation modality as the researcher used in present study but the apparent GEL effect in (Burke *et al*, 2005) investigation was trivial by 14s compared to placebo. Where as in present study it is 1:54minutes between CG and CGW trial.However Patterson *et al* (2007) exercised the participants to perform prolonged intermittent high intensity shuttle running the performance expressed in run time to exhaustion during CHO Gel increased by 45% compared to placebo trial. Although Burke *et al* and Patterson *et al* experiments were successful to get the performance effect in thermo neutral conditions whereas our findings in the present study in heat are supported by reports of Stafford *et al* (1997) during 15 km time trial self paced running performance in heat at 27.2℃ to 28.3 ℃ 62% RH using 6%, 8% CHO-E and water ingestion, the performance of running in the first 13.4 km run times were not different between trials; however, the final 1.6 km performance was faster as it is appeared in our study in first 8 km distance running during CGW and CG trial (Table:2). Similar benefits were observed in present study at the later stage of 10 km time trial after first 8 km in CGW trial. Hence the performance benefit indicates the agreement with earlier investigation study of Montain and Coyle (1993), which is further discussed in thermoregulatory benefits in present study. Whereas the interesting improvement of ~21% and ~19% in the performance between CGW (50:51min) and CG (52.02min) compared to water (W) trial in present study can be attributed to over cautiousness of runner to run in lower speed in the

beginning of 10k time trial to avoid fatigue in later stage during the first sequence of experimental W trial. But the mechanism behind the consistent performance during CG trial compared to W trial in present study is unclear but it can be understood that there may be a ergogenic effect of carbohydrate presence on central nervous system as they were observed in carbohydrate mouth rinsing investigation of Jeukendrup et al (1997) and Carter et al (2003). Though the distance measured after participant run 60 min preload run at 65% $VO_{2max}$ was not much different in all three W (10.131 km), CGW (10.721 km) and CG (10.869 km) trials; but the loss in body mass was more in W (2.3%), CG (2%) and CGW (0.6%) and during self paced 10 km time trial the decrease of body mass was more in CGW (1.93%), CG (1.9%) and in W (1%). But overall the combined effect of 60min running and 10km time trial induced higher BM change in CG (3.9%) and W (3.3%) and in CGW (2.53%) (Table: 3).

Figure: 3 shows the result of Body Mass change indicates possible high rate of sweating and theoretically the rate of sweating secreted onto the skin because sweating is decided by on need of heat to be dissipated, which is again determined by the rate of heat production and ambient temperature (Maughan and Noakes 1991). Further during exercise heat production is directly proportional to the intensity of exercise, where as for exercise like prolong running heat production is therefore a function of speed and thus from this it greater sweating is obvious if the exercise is performed in warm conditions which poses extra limitation on the capacity to exercise (Hargreaves 2008).

Similar earlier warm conditions studies of 1-hour duration (Below *et al*, 1995), prolonged exercise (Galloway *et al* 2007), intermittent high-intensity running (Patterson *et al* 2007), time-trial running (Stafford *et al* 1997, Pfeiffer 2009) and cycling time trial (Peake*et al* 2008) have reported trivial to significant effects on the performance in heat but in above studies the dehydration aspects was not have considered in the their investigation; similarly the gel studies of marathon running (Burke at al 2005) too have the limited explanation on dehydration in the reports. Due to lack of direct data on dehydration studies we derive our interpretation towards the possibility that when running, decrease in body mass weight due to loss of body fluid might have lowered the oxygen cost of movement directly influencing the aerobic capacity for performance.

Therefore during 10 km performance in present study it clearly noticeable in CGW (1.93%) trial even though there is higher BM loss than CG (1.90%) and W (1%) trial in later stage to be dissipation through the sweating. This loss was compensated with the presence of additional water and CHO to attenuate the negative effect of heat store in body due to exercise and ambient temperature. The exogenous CHO substrate present during exercise might have prevented the muscle glycogen depletion in CGW (Febrraio et al, 1994); but in CG this process increased heat store due to dehydration might have negatively affected the performance time and induced hyperthermia (Armstrong etal, 1991). Besides higher BM loss of 3.9% in CG trial showed lower tendency due to exercise and ambient temperature induced increase in urine osmolality (0.475) above the pre-exercise result, where osmolality was more decreased in W (0.305) than in CGW (0.013) trial. Further effect on fluid balance was investigated by determining sweat loss volume from start of 60 min run to end of 10 km time trial have resulted in higher sweat loss in CG (3 L) trial than in W (2.4 L) and CGW (0.73%). This indicates the occurrence of greater hyperthermia disadvantage on sweat loss in CG may have induced greater sweat evaporation to dissipate the heat.

The sweat loss results did showed agreement with previous findings ofSawka*et al* (1996) with greater magnitude of relationship of high rate of sweating experience reported by the participants during exercise in heat. Though the likely performance benefit of sweat loss was also reflected with narrow difference in time to complete the 10km trial in CG trial compared to CGW, and higher association of body temperature and sweat loss was noted in CG than in CGW trial. Figure: 4 show the notable proportion of sweat loss in CG trial during performance of 10km trial evidently agrees with claims on gradient difference between body temperature and environment, duration and intensity dictates the sweat rate (Sawka*et al*, 1996). In present study there was no such greater difference were observed between all three trials sweat loss during 60 min exercise; but during the performance of 10km trial, higher sweat loss observed in CG(1 L) compared to CGW (0.13 L) trial indicates the possible implication of higher heat production was dissipated through sweating in CG trial.

As a result of greater decrease in body mass and sweat loss in heat have greater implication to alter the plasma volume (Maughan*et al*, 1985). For example if a person of 70kg male will have total body water of 42 L and this is distributed into intracellular (28 L) and extracellular (14 L) water and 3.2 L in plasma volume will consist of 3.2 L of water (Guyton *et al*, 1975). Our result in present study clearly indicate the higher correlation between calculated decrease in ΔPV and ΔBM, ΔPV and sweat loss as similar reports of higher association in the previous study (Maughan*et al*, 1985) of competitive marathon runner completed the 42.2 km distance with mean decrease of 2.1 ± 0.8 kg after drinking total of 1.4 L of water during race.

Higher value of decrease in plasma volume (PV) indicates greater loss from intracellular compartment, than from the extracellular space (Astrand*et al* 1977). But the conflicting results of plasma volume reduction as an effect of 60 min exercise and 10km time trial during W trial (4.49%) compared with CG trial (3.31%) likely suggest the major error in the calculation to measure the change in plasma volume.

Figure: 5 show the results of considerable PV expansion during 10km time trial indicates fluid ingestion in CGW have greatly contributed for the improved performance by maintaining the adequate fluid volume in intracellular fluid these results of present study are consistent with Olsson *et al* (1971) reports. However in core temperature point of view the reduced or lower body temperature it clearly reflects to contradicts the earlier claims of no effect on sweat rate in relation to plasma volume expansion in investigation of Sawak*et al* (1983).

Figure: 7 represent the results of higher hematocritconcentration in present study during CG and W trial clearly support the possible two mechanism to induce the change in plasma volume; first, as the duration of exercise in present study in heat was long enough to in heat was enough to induce the greater sweat loss (Harrison *et al* 1985) and second is intracellular osmotic pressure which can responsible for efflux of water to an intercellular space from blood space due to accumulation of metabolites like lactate and potassium in working muscle (Harrison *et al*, 1985). Similar observation in present study of higher concentration blood lactate accumulation in CG indicates the occurrence of intracellular osmotic pressure to induce the changes in plasma volume and cause fluid loss.Water consumption during exercise have been shown to decrease the increase in body core temperature, prevent stroke volume and cardiac output during prolonged exercise (2 h) in warm condition of 20-22℃ (Hamilton *et al* 1991; Montain and Coyle, (1992) in addition it also attenuate the utilization of muscle glycogen over 2 h exercise at 20-22℃ (Hargr eaves *et al*., 1996). The benefits of water on cardiovascular or thermoregulatory during exercise in hot environments are thought to be main factors resulting to delay the onset of fatigue (Coyle and Hamilton, 1990). Below *et al* (1995) observed no such difference in participants heart rate or core temperature response to exercise performance of 50 min at 31℃ with ingestion of carbohydrate with wat er and water alone, but core temperature was lowered by 0.33±0.04℃ and heart rate 4±1 beats.min $^{-1}$ lower than in large fluid than the small fluid volume ingestion. This indicates that during exercise in heat fluid volume is important for the reduction in the core temperature and heart rate responses.

In present study due to very small sample size of one participant; researcher was unable to apply statistical procedures to find significant effect on thermoregulatory or cardiovascular between W, CGW and W trials. However, the observed tendency for lower heart rate in CGW and W trials than in CG trial during 60min preload run and 10km time trial performance suggests the lesser stress on cardiovascular system in CGW and W trial than in CG trial and also indicates a increased capacity to dissipate body heat in hot ambient condition.

Similarly the difference of 1.20℃ and 0.20℃ in re spective CG and W trial indicate the extra stress placed on the cardiovascular to minimise the heat store by increased heart rate by 94 beats.min$^{-1}$ in W, 91 beats.min$^{-1}$ in CG trial and 79 beats.min$^{-1}$ in CGW trial. Though we found very smaller cardiovascular or thermoregulatory benefits in trials, but the above mentioned increased heart rate and body temperature difference are greater than values mentioned in Below *et al* (1995) investigation thus our results are indicative of significant effect on body temperature and cardiovascular system.

However the benefits of fluid ingestion are also demonstrated by studies of Montain and Coyle (1993) during 140 min of exercise in the heat to be realized the cardio vascular and thermoregulatory benefits after 40 to 60 min of ingestion (Noakes*et al*2007; Schedl*et al*., 1994). Based on these studies we interpret further that during prolong exercise in heat in present study there was cardiovascular and thermoregulatory benefits of fluid ingestion along with carbohydrate gel trial, but the same benefits were not observed in W and CG trials in the form of lower heart rate and body temperature (Figure: 7 & 8).

The reduced muscle glycogen and hypoglycaemia have been associated to be the cause of fatigue and decreased performance during prolonged and strenuous exercise (Coyle *et al*, 1986) duration from 1-2 hr duration in thermo neutral conditions, but the same is not implied during prolong exercise in heat condition (Morris et al, 1998; Fink *et al*, 1975). During exercise in heat the muscle glycogen depletion increases significantly (Parkin *et al* 1999; Febbraio*et al*, 1994; Fink *et al*, 1975) with concomitant increase in both carbohydrate oxidation and lactate accumulation; Febbraio et al (1994a) thought the increased muscle temperature is the responsible mechanism for this enhanced muscle glycogenolysis during prolong exercise. Similarly there is exaggerated hyperglycaemia reported during exercise in heat due to a greater liver glucose output, without any change in the exercise-induced increase in peripheral glucose uptake (Hargreaves *et al*, 1996).

Given in the events lasts more than 90 min ingestion of CHO provides sources for increased CHO oxidation due to increased muscular glucose uptake in later stage to prevent hypoglycaemia, therefore the muscle oxidation reaches very high level at late in prolonged exercise (Hargreaves*et al*, 1988). Despite the greater mobilization of and utilization of carbohydrate substrate during exercise, carbohydrate depletion was not the cause of fatigue during exercise in heat since muscle glycogen store remain high (Parkin *et al*, 1999) and total amount of carbohydrate oxidized relatively low (Pitsiladis and Maughan, 1999) when exercise is terminated. In present study during CGW trial the glucose disappearance in blood (Figure: 9) during 60 min preload-run and after 10 km time trial was similar to findings of Parkin*et al* (1999, Febbraio*et al*, (1994) and Fink *et al*, (1975). Blood glucose level was reduced more in CGW (0.83 mmol) and CG (0.81 mmol) than in W trial (0.39) trial. But in CG trial despite the higher level of glucose present throughout the 60 min exercise at the end of 10 km time trial, performance was reduced by 1.54 min it likely reflects the possible mechanism for this would be increase hepatic/ liver glycogenolysis (Parkin *et al*, 1999) as a function of the exercise intensity observed by (Felig and Wahren, 1975).Further the higher rate of blood glucose disappearance in CGW trial during exercise likely indicate the higher rate in glucose uptake process through contraction mediated mechanism in exercising muscles (Douen*et al*, 1990) in CGW than in CG and W trial. It is given that during exercise under heat stress there is shift of more blood flow toward the skin than exercising muscle to reduce the effect of heat accumulation; in present study during CGW we further interpret that the blood flow was able to supply the glycogen to exercising muscles where as this process was not observed in the W and CG trial during exercise and 10 km performance. But the presence of CHO in CG trial could justify the better performance in CG than W due central ergogenic effect (Figure: 11).Although the rate of perceived exertion and body temperature showed higher association during exercise in present study, but the perceived exertion level was quite lower in CG trial than CGW and W trial (Table: 2).

**Conclusion and Recommendation:**

In summary the feeding of carbohydrate gel with water trial (CGW) in warm condition substantially improved the time trial performance compared to only gel (CG) and water (W) trial. But the magnitude was very greater by 1.54min in CGW with lower indication of cardiovascular stress and reduced body temperature compared with other two W and CG trial. Beside the lower rate of sweat loss and decrease in reduction body mass was remarkable in CGW compared to W trial.Therefore based on the present study's results of variable and performance of CGW trial it reasonably concluded that during prolong exercise in warm conditions the consumption of carbohydrate in the gel form with addition of intake fluid performance and fluid balance status can be monitored by preventing sweat loss, body mass change, body temperature and plasma volume homeostasis

**Limitations of present study**

**Small Sample Size:**As the sample size a paramount of any experimental study design to determine the interaction between independent and dependent variables. Therefore, it was the major limitations of the present study, which confine the generalisation findings for athlete in real life scenario. As all the results calculated by using data collected from one single participant because of this limitation effect size not substantiate the significant effect due intervention of carbohydrate gel provision on performance and fluid balance.

**Lack of statistical procedure application:**Second major limitation of present study was that all the calculated result were based on the difference observed in the measurement, due to lower number of sample size of one participant therefore it was reasonably impossible for investigator to apply any statistical procedure/technique/calculation to find the significant interaction/effect in the experiment therefore it very difficult to claim the scope of the findings for generalization.

**Experimental protocol selection:**The main aim of the designing the protocol by Russell *et al* (2003) was to prepare the reproducibility of endurance performance on treadmill using preloaded time trial and reported CV 1% in thermo neutral conditions. However by modification of the protocol with 3 min break between preload run and time trial, in addition the demand due to high ambient temperature might have largely affected the coefficient of variance in reproducibility of endurance performance during trial in the present study.

**Variability or inconsistent set up to experiment control:**Though every attempts were made to setup a required standard experimental environment to technical fault which might be of beyond researcher control to monitor the effect those variability might have influence on the outcome physiological variable and this could have mislead results of findings **No fluid drink in CG trial:**As pointed out by Noakes*et al* (2007) "the result of trial without drink, ends up with reduced performance as this deliberate avoidance situation doesn't coincide with athletes real life situation during training and competitions". Further it is suggested that during such trial no drink at all trial "thirst is determining factor for the fatigue or performance is dictated with sensation thirst" Noakes*et al* (2007).

Therefore in present study in CG trial the no drink at all might limited the performance, in fact only carbohydrate gel trial inclusion was very much essential in the research design of the present study to quantify the effects of only gel (CG) compared with water (W) and carbohydrate gel with water (CGW) to reflect the actual effects on endurance and fluid balance when carbohydrate gel is used by the athletes.

**Researcher knowledge and experience:**With above major limitation, even researcher's knowledge, experience and ability to identify the experiment's interaction dynamic for data interpretation may have also effected the interpretation presented which also limits the dissemination of findings and information of the present study

**Diet variability:**Though the participant was informed to maintain the same diet and fluid intake pattern for all the subsequent trials, it impracticable for the researcher to monitor or restrict the athlete diet pattern for longer duration if the study span is more. Therefore the any deviations to strictly follow the same diet pattern before each trial might have increase the variability on the results of the present study.

**Quality control:**Every attempt was made possible to maintain the higher quality during data collection and experimental process. Even the error could have happened due to lack of consistency in handling and controlling the equipment used in the procedure may have influenced outcome results. There to minimise the possible human error 1-3 reading of variable measurement were record to cross check on data (e.g. Body temperature, blood glucose, blood lactate, heart rate, time trial performance runtime with three time keepers, participant's observations to ensure maximum effort)

**Single blind design:**It is observed in running and cycling time trial experimental studies the use of double blind have maximised the effectiveness of findings. But in present study could not have been executed because of the Gel nature of treatment/consumption couldn't be blinded from the investigator. Therefore the performance time, speed of running during 10km time trial was blinded to researcher. Participant was blinded for nearly all variables like BM change, HR, running speed during 10km performance and time taken to complete the 10km time trial.

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# Cricket For Boosting Relations Between Two Nuclear Power

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**Abstract.**
This paper will describe and analyze the role of Cricket for the development of better relations between India and Pakistan the 2 SAARC Nations which are Atomic Power in this region. Cricket is is a sport which has always worshiped as a 3rd biggest religion in south Asia especially in these two nations. India and Pakistan has played so many Cricket series since their partition and the sport of Cricket has very important role for the development of positive relations between two countries in the history since their independence and after the two wars. In May 2015 Indian Prime Minister Mr. Modi has called to play a cricket series for the breaking of Ice between two nations so that relations could be better in future. India's PM Modi has given his best wishes to the Pakistani cricket team for world cup 2015. Pakistan's President General Zia was the first to use it when he made a sudden visit to India in the mid-1980s to watch an India-Pakistan game and ease tensions arising from a military exercise by India along the Pakistan border. PCB Pakistan Cricket board Chairman Mr. shahyar khan said in the press Conference Under the MOU signed last year after the formation of the Big three governance system in the ICC the Pakistan and Indian cricket boards agreed to play six series against each other from 2015 to 2022 with the first which will mark revival of bilateral ties in the UAE in December. May 24, 2015, 09.26
**Keywords:** cricket, peace, diplomacy, historical Back ground of India and Pakistan. Cricket series, cricket world cup.

## Introduction

The game of cricket was spread in to the African and Asian countries with the rapid expansion of the British Empire. Sports have very important element in the life and has very important role at international level throughout the history. The use of sports for the development of better relations and peace was also effective in ancient Olympics and there are so many evidence which shows the truce during the games in antiquity times and the war was strictly prohibited during the Olympics games. The IOC international Olympic committee has also developed a truce which means there should be peace for 2 weeks during the Olympics games with the cooperation of united nation and other all international communities and regions. Mr. Genral Zia-UL-Haq was the first leader of Pakistan who use the Cricket Diplomacy to established the relations between these two nations.However, the Sharif government seemed to have believed that conflict and issues with India could only be resolved through rationalist interaction and cricket will be the successful diplomacy for better relations in future.

Historical background

History of India is one of the grand epics of world history and can be best described in the words of India's first Prime Minister Jawaharlal Nehru as "…a bundle of contradictions held together by strong but invisible threads". Indian history can be characterized as a work in progress, a continuous process of reinvention that can eventually prove elusive for those seeking to grasp its essential character**. The history of this astonishing sub-continent dates back to almost 75.000 years ago when the evidence of human activity of Homo sapiens. The Indus Valley Civilization which thrived in the northwestern part of the Indian subcontinent from 3300- 1300 BCE was the first major civilization in India.

The Bronze Age

The Bronze Age in the Indian subcontinent dates back to around 3.300 BCE with the early Indus Valley Civilization. Historically part of ancient India, it is one of the world's earliest, urban civilizations, along with Mesopotamia and Ancient Egypt. Inhabitants of this era developed new techniques in metallurgy and handicraft and produced copper, bronze, lead and tin**.

Vedic Period

The Vedic Period is distinguished by the Indo-Aryan culture, which was associated with the texts of Vedas, sacred to Hindus, and that were orally composed in Vedic Sanskrit. The Vedas are some of the oldest extant texts, next to those in Egypt and Mesopotamia. The Vedic era in the subcontinent lasted from about 1500-500 BCE, laying down the foundation of Hinduism and other cultural dimensions of early Indian society. The Aryans laid down Vedic civilization all over North India, particularly in the Gangetic Plain**.

The Mughal Empire

In 1526, Babur, a descendant of Timur and Gengis Kahn from Fergana Valler (present day Uzbekistan) swept across the Khyber Pass and established the Mughal Empire, which covered modern day Afghanistan, Pakistan, India and Bangladesh. The Mughal dynasty ruled most of the Indian subcontinent till 1600; after which it went into decline after 1707 and was finally defeated during India's first war of Independence in 1857**.

Colonial Era

From the 16th century, European powers such as Portugal, Netherlands, France and the United Kingdom established trading posts in India. Later, they took advantage of internal conflicts and established colonies in the country. The British Rule in India began with the coming of the British East India Company in 1600 and continued till Indian independence from British rule in 1947**.

Indo-Pak upbringing

Pakistan's Islamic history began with the arrival of Muslim traders in the 8th century in Sindh. The collapse of the Mughal Empire in the 18th century provided an opportunity to the English East India Company to extend its control over much of the subcontinent**. In the west in the territory of modern Pakistan, the Sikh adventurer Ranjit Singh carved out a dominion that extended from Kabul to Srinagar and Lahore. British rule replaced the Sikhs in the first half of the 19th century**. In a decision that had far-reaching consequences, the British permitted the Hindu Maharaja of Kashmir, a Sikh appointee, to continue in power. Pakistan emerged over an extended period of agitation by many Muslims in the subcontinent to express their national identity free from British colonial domination as well as domination by what they perceived as a Hindu-controlled Indian National Congress**. Muslim anti-colonial leaders formed the All-India Muslim League in 1906**. Initially, the League adopted the same objective as the Congress--self-government for India within the British Empire--but Congress and the League were unable to agree on a formula that would ensure the protection of Muslim religious, economic, and political rights**.

The Partition

The idea of a separate Muslim state emerged in the 1930s. On March 23, 1940, Muhammad Ali Jinnah, leader of the Muslim League, formally endorsed the "Lahore Resolution," calling for the creation of an independent state in regions where Muslims constituted a majority**. At the end of World War II, the United Kingdom moved with increasing urgency to grant India independence. The Congress Party and the Muslim League, however, could not agree on the terms for a Constitution or establishing an interim government**. In June 1947, the British Government declared that it would bestow full dominion status upon two successor states--India and Pakistan, formed from areas in the subcontinent in which Muslims were the majority population**. Under this arrangement, the various princely states could freely join either India or Pakistan. Accordingly, on August 14, 1947, Pakistan, comprising West Pakistan with the provinces of Punjab, Sindh, Balochistan, and the Northwest Frontier Province (NWFP), and East Pakistan with the province of Bengal, became independent. East Pakistan later became the independent nation of Bangladesh. The Maharaja of Kashmir was reluctant to make a decision on accession to either Pakistan or India. However, armed incursions into the state by tribesman from the NWFP led him to seek military assistance from India**. The Maharaja signed accession papers in October 1947 and allowed Indian troops into much of the state. The Government of Pakistan, however, refused to recognize the accession and campaigned to reverse the decision. The status of Kashmir has remained in dispute**.

**Sports and Peace**

The popularity of sport and its convening power further contribute to sport being a powerful voice for communicating messages of peace and site for symbolic public acts on the global and local levels especially in the war areas. Sport is an effective element in the community based initiatives that aim to create sustainable peace in the world. The skills and values learned through sport are many of the same skills and values taught in peace education to resolve and prevent conflict and create conditions conductive to peace, from the interpersonal to the international**. Well-crafted sport activities teach respect, honesty, communication, cooperation, especially to young people, in a way that is fun and participatory.

Sport is an international language. Its ability to cross culture enables sport- related programs to bridge social and ethnic divides**. As a result sport can be powerful tool to promote peace both symbolically on the globe level and very practically within two neighboring countries such as India and Pakistan. There are so many international examples. Sport has successfully brought together the two Koreas, most recently seen at 2003 Pan Asian games, where the North and South Korean teams marched side by side in the opening ceremony**.

An 11-member Pakistani wrestling team, which arrived in Patiala on Wednesday 4th september 2004. for a wrestling tournament, believes that promotion of sports between India and Pakistan can improve ties between the two countries**. Bopanna and Qureshi, who doubled up in 2007 and shot to fame by finishing as runners up in last year's US open, have been poster boys for Indian-Pakistani rapprochement at a time of deep suspicion between the nuclear-armed rivals.

Cricket As Revilary For The Peace.

This hostility is part of the legacy of British colonialism: three separate wars, nuclear weapons, and continued fighting over the disputed territory of Kashmir. But the British also left behind the sport of cricket, and a sporting rivalry that is as heated as any in the world, charged with decades of geopolitical heat, while also serving as a form of needed catharsis, and a meaningful cultural exchange between two countries that have very few of those. The World Cup semifinal between India and Pakistan in 2011 was watched by 1.5 billion television viewers across the world. None of the other major sporting contests in the world pit nation against nation in a way that India vs Pakistan does in cricket. In the South Asian subcontinent, cricket is anecdotally referred to as the third major religion after Islam and Hinduism. Before India-Pakistan contests, Hindus perform rituals like offering 101 coconuts to deities and conducting havans (sacred fire). Muslims say mannats (special prayer), sacrifice lambs, and distribute the meat. But it only takes one bad performance for people's reverence for their "gods" to turn to the other end of the spectrum. During the 1996 Cricket World Cup, in a show of goodwill, players from India and Pakistan's national cricket rosters formed a team together for a one-off match against Sri Lanka. Indian batting and Pakistani bowling came together in a dream scenario for cricket fans. Pakistani captain Wasim Akram played under the Indian captain Mohammad Azharuddin. India's Tendulkar and Pakistan's Saeed Anwar opened the innings together.

**Cricket at the Peace**

The ICC international cricket council has confirmed the bilateral cricket series between 2 south Asian nations India and Pakistan which will be held in Dec 2015. The cricket series between two nations will be start from Dec 2015 in UAE and will lead until 2022. Despite apprehensions raised by some BJP MPs about a proposed India-Pakistan cricket series, Prime Minister Narendra Modi is determined to break the ice with the neighboring country through "cricket diplomacy", informed sources here said. Prime Minister Narendra Modi "We have taken the decision to start a cricket series between both countries to improve our relations," said Modi on Tuesday during a parliamentary party meeting, a BJP MP who was present said on the condition of anonymity. Soon after a resolution was adopted appreciating initiatives taken by the Modi government during its first year in office, the prime minister said some of the members have expressed concern against the series and that is why he was "clearing the air", said the source. May 13, 2015 07:53

The last bilateral series between the two countries was played in December 2012 and January 2013 when Pakistan toured India for three ODIs and two T20s. Bilateral cricketing ties between the two countries were snapped after the Mumbai terror attacks in 2008 until the series in 2012-13, although India and Pakistan have played each other in the World Cup, Champions Trophy, Asia Cup and the World T20. The prime minister Mr. Yusif Raza Gilani went to see the semi-final of the cricket world cup 2011 which was held in India by the invitation of the Indian Prime Minister Munn Mohann Singh for the revival of the good relations. The hugely-anticipated match is due to be hosted in the northern Indian city of Mohali. Earlier, Pakistan's cricket team arrived for their first visit to India since the 2008 Mumbai (Bombay) attacks. Relations between the nuclear-armed rivals are still tense after Pakistan-based militants targeted the city. More than 170 people were killed in the attacks, which Pakistan admitted were partly planned on its soil. The two sides have met a number of times over the past year and Pakistan's foreign minister was scheduled to visit India by July to discuss the resumption of peace talks. Formal invitations from Prime Minister Manmohan Singh will be delivered to the Pakistani High Commission for Pakistani President Asif Ali Zardari and Prime Minister Yousuf Raza Gilani, Indian media said Soutik Biswas BBC News, Delhi. A foreign office spokesman in the Pakistani city of Islamabad said no decision had been made on whether to accept the invitation, the Reuters news agency reported. Pakistan's cricket team slipped into India almost unnoticed, despite a frenetic build-up to the match that has already been billed as the ultimate show down, the BBC's Sanjoy Majumder in Delhi says. Almost half of the team has never been to India. Heavy security is already in place for the match but this was stepped up after police said on Thursday they had arrested a man they

believed was planning an attack during the World Cup. Across India and Pakistan there is a mad scramble for tickets for next week's face-off, our correspondent says. India has issued 5,000 visas to Pakistanis with confirmed tickets and the government is under pressure to ease restrictions and allow more people in from across the border. Pakistan trounced the West Indies earlier this week to reach the semi-final Before the Mumbai attacks, the two sides held formal peace talks known as a "composite dialogue" for several years but made little headway, apart from a number of confidence-building measures. The main disputes between the two sides centre on counter-terrorism and the Himalayan territory of Kashmir - which both countries claim. But there are also a number of economic issues and smaller territorial disagreements which divide the sides.

The Most Complex Divorce in History

India and Pakistan gained independence from Great Britain in 1947, as British India was partitioned into two separate states for the subcontinents Hindus and Muslims respectively. Both countries are part of the same geographical region of South Asia, and they share a social, cultural, and civilization past, but their postcolonial history, mired in interstate conflicts, has deeply divided the region (Behera, 2002:211). The rivalry between the two remains to this day one of the most enduring and unresolved conflicts in the world (Paul, 2005:3). History of relations between the neighbors is in many ways a history of failure; compounded by the bloodbath accompanying Partition, four wars in sixty years, and the intractable question of Kashmir (Racine, 2004:112). In short, there has been a climate of suspicion and continual accusation throughout the history of Indo-Pakistani relations. The relationship between Pakistan and India can best be described as 'the story of a divorce that went wrong,' which has given rise to the bitterness, resentment and suspicion that has characterized dealings between the states (Ibid. 113). The most contentious point at the time of Partition in 1947, described by Lapierre and Collins (2006:212) as the 'most complex divorce in history,' was the question of Kashmir. Kashmir, in many ways 'the proverbial powder keg' (Schofield, 2003:18), has continued to be the focal point of conflict for the good part of the two countries' histories. The Kashmir conflict is linked to conceptions of identity as the region can be characterized as a symbol of the 'idea of nationhood on which each of the two states has been founded' (Racine, 2002:212). Pakistan is the revisionist state in the region, as it considers Kashmir as the unfinished business of Partition. To India, on the other hand, Partition was completed in 1947, they are therefore happy maintaining the status quo (Ganguly & Hagerty, 2005:35; Paul, 2005:8-9; Schofield, 2003:225). The magnitude of the conflict is highlighted by Cohen (2001:221) who argues that 'the Kashmir problem is so complicated that one is hard pressed to say how the parties involved might ever begin to resolve it.' Of the four wars India and Pakistan have fought, only the 1971 war was not linked to the Kashmir issue. Furthermore, the stakes in this conflict are now perhaps higher than any other political dispute in the world, as both nations have become nuclear powers (Ganguly & Hagerty, 2005:10). The conflict born out of Partition has been extremely persistent, and fits the description of what Paul (2005:3) has termed an 'enduring conflict,' defined as conflicts between states that 'last more than two decades with several militarized inter-state disputes punctuating the relationship in between.' Like other such conflicts, it seems to draw its energy from 'an inexhaustible supply of distrust' (Cohen, 2001:199). This makes it hard for any side to offer concessions or compromise on even minor issues because such an act might give the other side an impression of one's own weakness and risk inviting further demands. Furthermore, easing of tensions can be a tricky challenge when any triumph over the other 'in any sphere of life is taken as a cause of celebration; any setback is seen as a national humiliation' (Chatterjee, 2004:625). Thus, mutual distrust and suspicion fosters only renewed animosity. Breaking this pattern of mutual distrust and enmity must therefore be a key component of any attempt at easing tensions in the Indo-Pakistani relationship. The question is whether cricket can help to solve this conflict.

**Origins of Cricket in India and Pakistan**

The first to play cricket on the subcontinent were British sailors and soldiers as early as 1721, according to Mukharji (2004:351). They played the game among themselves, and against other British teams, in their bungalows, colonial towns and cantonments (Guha, 1998:158). Cricket started in England, and that was to determine its outreach, as the popularity of cricket is 'limited almost exclusively to the countries that at one time formed the British Empire' (Varney, 1999:558). Today, this includes Bangladesh, India, Pakistan and Sri Lanka in South Asia, all highly ranked and highly passionate cricketing nations. Cricket watching, as well as playing, soon proved to be an appealing collective and participatory exercise, 'indulging the Indian taste for chatter and disputation, gossip and debate,' according to Guha (2002:339). Cricket may just be among the most complex and at the same time subtle of all sports, leaving a lot for discussion (Varney, 1999:558). The leisurely pace of cricket, which originally had no time constraints, has also added to the appeal of cricket to Indians and Pakistanis alike. It has been argued that it is exactly these 'underlying rhythms and mythic structures of the game that makes it profoundly Indian and that it is therefore appropriate that the game should

be most enthusiastically appropriated by those from South Asian cultures' (Mills, 2005:4). They, as the first Indians to adopt the game, were the Parsis of Bombay (present-day Mumbai), an educated, prosperous, Westernized, and relatively small community, who lived in India after exile from Persia (Guha, 1998:158). The first Indian cricket club – the Oriental Cricket Club, which successor is still going strong today – was founded by Parsi men in 1848 (Guha, 2002:14). The other communities of Bombay soon followed the Parsis in their taste for cricket. The Hindus started playing cricket in 'a spirit of competitive communalism' because of their long-standing social and business rivalry with the Parsis in the city (Guha, 1998: 159). The Muslims followed not long after, and even Catholic and Jewish groups formed teams along the same communal lines. This pattern was followed all across the subcontinent when teams were formed. Guha (1998), a prominent historian of cricket in South Asia, provides an account of how these rivalries were played out. At first, the British thought little of their subjects' attempts to take to their national game. After a while, however, the Indians slowly began acquiring aptitude, and in 1877 the Parsis were invited to play a match against the Bombay Gymkhana, the association that represented the Europeans of Bombay. The Hindus started playing the Europeans from 1886, and in 1907 the so-called Triangular Tournament brought the three together in an annual competition. The Muslims, too, joined in to make it a four-way competition. Finally, the competition became the Pentangular in 1937 by adding the other communities under a catch-all category simply called 'The Rest.' The tournament was held in its various forms every year until 1946, and was to 'play a formative role in the development of cricket' in South Asia, argues Guha (1998:160). The Bombay tournament spawned similar tournaments all over British India, thus competitive cricket was organized along communal lines. Sown into this segmented system, no doubt, were the seeds of social conflict (Ibid.165). What had during British rule been a city-specific rivalry turned into a countrywide rivalry between Hindus and Muslims, would after Partition be replaced by a cross-border rivalry of dimensions. The entire history of cricket in India and Pakistan has as a result been fraught by communal rivalries. From its earliest introduction by British sailors and soldiers to the subcontinent, cricket teams were formed along communal lines with Hindus and Muslims having their own teams. Guha (2002:428) argues that the history of cricket relations between India and Pakistan thus almost exactly mirrors the history of cricket relations between Hindus and Muslims in British India. The post-independence years have been marred by a search for identity and conflict off the field, and this has of course had repercussions for the cricket rivalry with the attachment of symbolic significance to the winning or losing of cricket matches against the archenemy, either it being India or Pakistan.

Cricket As Identity In South Asia.

Cricket serves as an important symbolic determinant of national identity in South Asia. Thus, especially in a country as ethnically divided as Pakistan, cricket serves as one of the major components that bind society together (Shahzad, 2002). Khan (2005:Viii) claims that cricket is the 'strongest unifyingforce amongst its people, young and old, rich and poor, man or woman, Shia or Sunni, Pathan or Sindhi' as it brings 'a unity in peacetime only achieved in times of war.' Bhattacharya (2005:51) argues in the same vain, quoting a former high-ranking PCB official as saying that 'cricket is the great leveler in Pakistani society,' and that there are only two things that 'run right through this country, through all regions, through all sections, through everything – one is Urdu, which is the national language of the Pakistan and the other is cricket.' Thus, the fate of the national cricket team can be considered the main factor that unites Pakistan (Khan, 2005:179).

**Recommendations:**

The Cricket series of 2015 in UAE must be with the name of Cricket for peace or Bowling for peace message.The government of both sides should not release any press conference related to the cause of tension.Both foreign offices should be sent their foreign secretaries for the development of relationships and talk in both countries.Every year a cricket series should be played with the name of Peace.ICC must help both countries to organized cricket series between two nations on their home land.Both nations must respect each other at all forums especially when they play cricket.

An International Peace and Sport forum should be held every year in both countries. The issue of Kashmir must be resolved with the wish of both Governments including the wish of Kashmir.

The Government of both countries needs to reorganize their policies related to sport.

Cricket series should be organized in the homeland not in other country.

• Organize an international peace forum with the cooperation of united nation, UNESCO and IOC international Olympic committee annually in both countries.

• The armed forces of both countries must respect each other border sides and there should not be any fire from both sides.

• Both the countries must organized a cricket series every year or may be after two years in both lands because cricket is very famous in both countries and this sporting event can play crucial role for the development of sustainable peace in both countries and can resolve the conflict.
• Both countries should start a movement between the peoples through peace educational progarmmes so that peoples could be aware.
• The nature of both countries needs to be changed through positive campaign.
• The international truce program should be introduced every year.
• Pakistani government should declare to India as most favorite country to play cricket so that the conflict could be resolved between both countries.
• Both countries should declare some of the Cricket, Players who are very famous in the public as promoter of peace every year.
• Media of both countries including international media and international and national NGO's should encourage to the peoples of both countries for the spreading of peace through sport.
• International Cricket matches must be organized in the area of Kashmir if possible.
• Peoples of kashmir should have a right to their participation in international sporting events with their country of choice either; they want to play from India or Pakistan.
• Political parties of both the countries should avoid creating any conflict through media and they must have role to delivered good message for the peoples of both countries.

**Conclusion.**

Cricket has always come in handy for the leaders of India and Pakistan to signal good will towards each other and break political ice at difficult moments in bilateral relations. There is no doubt that the prime minister of India made a such announcement to brake the ice through cricket diplomacy but the cause which has been always a hurdle to established the peace between two nations in the history is the issue of Kashmir. In the tense strategic context of cross-firing at the Line of Control (LoC), the Pakistan and Indian cricket teams played with each other in the Cricket World Cup 2015. Very surprisingly, PM Modi, a day before the match, called his Pakistani counterpart and talked about cricket. One hopes this ushers in a new phase of cricket diplomacy to resolve outstanding conflicts meaningfully. Otherwise, Pakistan-India relations will only oscillate between conflict and cricket and the current Cricket diplomacy will not be useful for developing positive relations and peace.

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# Attitude Of Secondary School Students Towards Physical Education

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**Abstract**
Education is the most powerful instrument of social and economic transformation. The aim of education is to develop an individual with all Physical, Mental, Spiritual and Social Know-how. So that one can stand, erect, face and accept all changes and challenges of this fast changing modern world. The aim of this study was to study '*The Attitude of Secondary School Students Towards Physical Education'*. It was further aimed to help the Sports Scientist, Educationists, Psychologists and Administrators to enable them to formulate a better Education Policy, syllabus and system for Secondary School Students. The study was undertaken on a total of one hundred and twenty students. Of the 120 students participating in the survey, 18 (15%) were 14 years old, 54 (45%) were 15 and 48 (40%) were 16, the mean age was 15.3 years old. Research shows that physical education in school can increase physical activity levels during youth and later in life. Consequently, physical education not only contributes to a healthy body, but a healthy mind. Also, research indicates that physical education has the ability to impact self-esteem, well-being and reduce stress, depression and anxiety.

Key words: Attitude, Choice, Competition, Perception, Secondary school

**Introduction**

Student's attitudes towards physical education are of great concern to future educators. Campbell (1968) stated, "attitude play an important role because the attitude determines an individual's willingness to learn" (p. 456). Safrit and Wood (1995) stated, "an attitude is a feeling one has about a specific attitude object, such as a situation, a person, or an activity" (p.23). One can see the importance of identifyingstudent's likes or dislikes of physical education and possible reasons for these feelings; this would be invaluable information for future educators to possess. Ryan, Fleming, &Maina (2003) defined how attitudes are developed by stating, "people's attitudes are developed and expressed as behaviors in a context that is social; it contains other people who are actually present or who are invisibly present in the social norms that define social groups to which we do or do not belong" (p. 28). Furthermore, Ryan et. al., (2003) relate the importance of student's attitudes to physical education by stating, "the development of attitudes is important because teachers, coaches, and others must consider attitude everyday as they evaluate and judge the potential of others" (p.28).
Sixty-five percent of adults, 15% of adolescents (ages 12-19), and 15% of children (ages 6-11) globally are considered to be overweight or obese. In Delhi 14% of all students are considered to be at risk for overweight and 10% is considered overweight. Also in Kolkata 40% of high school students poled admitted to not electing to take physical education classes. Finally, in India, high school students' daily energy intake has increased some 300 calories in the past 20 years whereas their physical activity has decreased. One can see the importance of students maintaining positive attitudes toward physical education. Positive attitudes will elicit more interest in physical education and the importance in developing and maintaining active lifestyles beyond high school and into adulthood, thus producing less overweight and obese adults. The future of physical education throughout the country is bleak to say the least. More current research in the area of student's attitudes is needed to assist in stifling the movement to eliminate physical education from the core curriculum in schools.There have been a number of studies, which have investigated student perceptions of physical education and a multitude of theories have emerged from their findings. Selected research has been narrowed to include only student perceptions and attitudes in physical education as it relates to gender, decision-making, athletic ability, ethnicity, age, and student grade

level for this review. First, identification of several interesting conclusions of past research will be introduced to build a solid foundation for understanding students and their perceptions of and attitudes towards physical education.
Then this report will identify a research area yet to be developed, in which further study will produce a topic and explore its relevance to physical education and more importantly it's relevance to the development of student attitudes.

**Methodology**

The purpose of this study was to examine attitude of secondary school students towards physical education. A survey was used to extract information about the student's attitudes.
Selection of subjects: This study was conducted at Bokaro Steel City (Bokaro) in the state of Jharkhand with secondary school students from Bokaro Ispat Vidyalayas. Students at these schools undergo physical education programs as per norms and syllabus prescribed by Central Board of Secondary Education (CBSE), New Delhi.
For the purpose of this study, a survey was carried out at different Bokaro Ispat Vidyalayas. Participants were from series of Bokaro Ispat Vidyalayas, which were opened during the period of 1993. These schools are affiliated to CBSE and follow the syllabus prescribed by them. Total strength of these schools consists of over 20,000 students.
Tools of the study:Data were collected using single stage research method during this study. An attitude instrument (Subramaniam & Silverman, 2000)using a Likert Scale, was used to collect data. Students were made to complete an attitude survey questionnaire (Subramaniam & Silverman, 2000) during their physical education class. Questions were answered using a 5-point Likert scale ranging from strongly disagree to strongly agree. Responses received from all these students (subjects) and their identity were kept anonymous to the school authority and teachers/ other students. Students were ensured that their confidentiality and anonymity would be maintained throughout the study.
Results and discussions: The attitude survey was undertaken on a total of one hundred and twenty students. Of the 120 students participating in the survey, a total of 42 (35 %) students were boys and 78 (65 %) students were girls. Also, thirty six students (30%) were in $8^{th}$ class, forty two students (35 %) in class $9^{th}$ and same number of students (35 %) were in class $10^{th}$. Descriptive data analysis was conducted for each gender and grade level independently and collectively as well as for the two dimensions of attitude. A multi-variate analysis of variance (MANOVA) was used to examine attitude scores (Enjoyment andPerceived Usefulness) as the dependent variables with gender and grade level as the independent variables. A significant MANOVA was followed by discriminant analysis, ANOVA.
The study revealed that; overall, students had moderately positive attitudes toward physical education (M = 70.00 out of a possible 100 points, s.d.= 16.71). Both boys (M = 71.41, s.d.= 16.38) and girls (M = 76.91, s.d.= 16.99) had moderately positive attitudes toward physical education. Also, it is noticed that there is a variation in the attitude of students towards physical education with respect to grade level (class/ standard) (Class 8: M = 66.66, s.d.= 16.80; Class 9: M = 80.90, s.d.= 16.39; Class 10: M = 80.90, s.d.= 16.45).
When the two components of attitude (Enjoyment and Usefulness) were examined separately, the overall values were 71.88 (s.d. = 8.97) for Enjoyment and 69.58 (s.d. = 8.49) for Perceived Usefulness, respectively, out of a total possible score of 100. Females and males had similar scores on both components of attitude. Means for Enjoyment and Perceived Usefulness for females were 71.62 (s.d. = 8.91) and 68.94 (s.d. = 8.19), and for males were 72.18 (s.d. = 9.01) and 70.34 (s.d. = 8.74), respectively.
Student–Newman–Keuls test for group differences revealed significant differences between Class 10 (M = 74.96, s.d. = 8.85) and the other two grades (Class 9: M = 72.30, s.d. = 8.66, Class 8: M = 74.94, s.d. = 9.01) in relation to the affective dimension of attitude.

**Conclusion**

It was concluded that Secondary school students, in this study, had a generally positive attitude toward physical education. Students felt physical education teachers made learning fun for them and the curriculum content was perceived as useful. Also, secondary school students in this study perceived choice in physical education as a positive attribute to their experience. Students felt choice provided them with an opportunity to participate in activities and sports they were interested in. Also, it was established that enthusiastic teachers in physical education class positively influenced these secondary school students' attitudes in this study.

**Recommendation**

Further research is imperative for understanding the attitudes of secondary school students towards physical education. Studies involving a larger population would be useful in making inferences about secondary school students attitude towards physical education. Research comparing student attitudes in traditional and experimental physical education programs could be beneficial and would extend the research.

Another research option would be to study school students in elementary settings about their attitudes toward physical education. Also, it would be particularly interesting to evaluate parental and administrative attitudes toward the physical education program their students are participating in.

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# Relation Of Selected Motor Fitness Components With Performance In Gymnastics

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**Abstract**
The quality of performance Gymnasts requires explosive strength, flexibility, balance, perception and upper body strength endurance. Among these flexibility, balance and the perception quality influence the aesthetic part of gymnastics. The aim of this study was to find out the relation of performance in gymnasticswith flexibility, balance and perception of national level gymnasts. The study was conducted with 20 male national level gymnasts of 16-20 yrs. of age. The measured variables wereperformance in gymnastics, flexibility, balance and perception.The variables were measured through the standard procedure. The result showed thatbalance (right leg) & perception and performance & flexibility bearmoderate positive significant co-rrelations. Perception bears very low negative co-rrelations with performance, flexibility and balance on left leg. From the results it may be concluded that flexibility was the most influential factor among those variables.
Key words: gymnasts,explosive strength, flexibility, balance, perception

**Introduction:**
As in other sports Gymnasts success or failure also resulted from thecombination of physical, mental, technical and environmental factors. For Gymnastics basic fitness can be classified into four main components such as strength, balance, flexibility and perception. Flexibility is the ability to move the different body parts with its maximum range of movement through the different joint. Balance is the ability to maintain the specific body position considering different posture while in movement or in a static condition. Perception in gymnastics is the sensory ability to justify the specific position with respect to a frame of reference.Different evidences showed thatdifferentphysiological and anthropometricfactors might influence the gymnast's performancealong with many other factors [7].Gymnasticsdemanding well-developed anaerobic qualities in the form of power, agility and speed andthe performancesof most gymnasts correlate highly with their flexibility and balance[6].Indeed physical parameters and fitness characteristics of elite athletes are different among varioussports and certain body types may be advantageous for championperformances[1]. Anthropometric,physiological and psychological profiles are the most important factors to identify the qualities and characteristics of performers. Gymnastics performancesusuallylast under 90 seconds and fully of anaerobic type.Four apparatuses for women - the balance beam,uneven bars, the floor, vault and five for men – the high bar, parallel bars, pommel horse,floor, vault demands explosive strength, pushing and pulling skills,together with balance and artistic skill on [6].Elevated anaerobic capacity, muscle resistance, explosive power, flexibilityand agility are the most important factors needed to achieve success in gymnasticscompetitions [8]. In gymnastics the small body image is ideal [4].For lower center of gravity this type of structure gets some extra advantage in case of balance. Gymnastics isoften unique in that it provides competitive opportunities for the smallest and lightest athletes.Small stature is actually beneficial for gymnasts in performing better and avoidinginjury [2]. In gymnastics, body weight is carried therefore greatermass cannot be an advantage [4]. Also gymnastic performance is significantlyrelated to height [13]. Small gymnasts are able to create optimum torqueand high speed spine [14] and this trait is closely related to high-level.Flexibility is an essential aspect of gymnasticstraining and performance. Flexibility is frequently included in talent identificationand screening measures for gymnasts [12]. Gymnasts emphasizes onflexibility to execute their performance. The flexibility is the most significant and a unique aspect of gymnastics that keeps it different from other sports [13]. In regards to other data (profiles of athletes involved in other sports), it has found that flexibility of gymnastics is found tobe higher than in most other sports [12].

Gymnastics require extraordinary static and dynamic balance abilities. Among different others posture thehandstands and the T-stands are probably the most recognized balance skills in gymnastics.Gymnasts learn tobalance on their feet and their hands in case of static balance as well as in case of dynamic balance they maintain their balance through this hand and feet. Interestingly, gymnasts tend to develop a higher tolerancefor imbalance or disturbances in their balance.Evidence has showed that standing andactive gymnasts balance waselevated among the elite participants than low level gymnasts[9].Perceiving through sensory organ provides a mental picture to activate a specific performance. Perceiving and predicting the actions ofother people is an important skill forcoaches, judges, and athletes in the sportsdomain [11][15]. In gymnastics it has found that theimprovement of skill depends mainly on the observation of the execution of skill [10]. It was furthermoredemonstrated, thatgymnasts benefit fromobservational learning when acquiringcomplex skills [3]. Research has shown that visualperceptual processes are not equal amongparticipants with different levels of motorexpertise, but rather differ as a function ofthis expertise [5]. Considering the said view the aim of the present study was to find out the relationship of perception, balance and flexibility with the performance in gymnastics.The researcher has tried to find out the relation of performances with the three most important motor fitness components such as flexibility, balances and perception in gymnastics.

**Methodology:**

20 senior district level boys Gymnasts of 16-20 years of age at Kolkata were selected as the subjects. The subject did not have any earlier experience about organized test. The balance, perception, flexibility and performance were the measured variables. For balance the subject were instructed to take the bass stick test (crosswise). Perception was measured by the perceptual motor obstacle course of Nelson. The flexibility was measured by the V-sit and reach test.For performance execution on the floor are evaluated on the basis of following four factors subdivided for the A & B juries and the process are describe here in very brief:

A – Jury – Difficulty- 2.40
Special Requirement- 1.20
Bonus Paints- 1.40
Total- 5.00

B Jury - Exercise Presentation
(Technique & Position)- 5.00
Total- 10.00

CRITERION MEASURED:

*A. The fitness variables were:-*

a. Balance b. Perception c. Flexibility

*B.* Performance

*DESIGN:*

The said criteria were measured through three days.At the beginning the name and age were recorded. Then the different fitness variables were measured and at last the performances were measured. The standard tests were used for the physical fitness variables.

**Results And Discussions:**

The mean, standard deviation and the co-rrelation co-efficient of different fitness components and the performance are presented in the following two tables.

Table 1: The Mean, Standard Deviation of the different motor fitness components

| Variable | Flexibility (cm.) | Average Balance (sec.) | Perception (min.) | Performance |
|---|---|---|---|---|
| Mean ± S.D. | 39.8 ± 28.52 | 26.7 ± 18.28 | 1.5 ± 1.14 | 08 .61 ± 1.08 |

Table 2: Co-efficient of Co-rrelation among performance and different fitness components.

| Variables | Performance | Flexibility | Perception |
|---|---|---|---|
| Performance | - | - | - |
| Flexibility | 0.34* | - | - |
| Perception | -0.16 | -0.27 | - |
| Balance Right Leg | 0.14 | 0.11 | 0.46* |
| Balance Left Leg | 0.27 | 0.03 | -0.11 |

From the above table it is clear that the co-efficient between performance and flexibility is moderately positive and significant. Most gymnastics coaches would agree that flexibility is an essential aspect of gymnastics training and performance. Flexibility is frequently included in talent identificationand screening measures for gymnasts [12]. Gymnastics emphasizesflexibility due to the need for gymnasts to adopt certain specific positions in order to performskills. The flexibility demands of gymnastics are the most significant and uniqueaspects of gymnastics that serve to separate gymnastics from most other sports [13]. Gymnastics require extraordinary standing and active balance abilities. Of course,handstands are probably the single most recognized balance skills. Gymnasts learn tobalance on their feet and their hands. Interestingly, gymnasts tend to develop a higher tolerancefor imbalance or disturbances in their balance. Our data showed that standing andactive gymnasts balance was elevated among the current participants than low level gymnasts[9].Gymnastics is aphysically demanding sport requiring well developed anaerobic qualities and the performancesof most gymnasts correlate highly with their body power, flexibility and balance[6].

**Conclusion:**

Balance, perception and flexibility, among these physical fitness factors flexibility is the most influential factor to indicate the high performance level.

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# The Effect Of 10- Weeks Core Stability Training On Psychological Variables In Malaysian Rhythmic Gymnasts

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**Abstract**
This study was conducted to identify the effect of 10-weeks core stability training on psychological variables of Malaysian Rhythmic gymnasts. Forty female young rhythmic gymnasts from 2 clubs in Kuala Lumpur (n = 40); (age 8 to 12 years old) were recruited. These subjects were randomly divided into two groups, the experimental group (n = 20) and the control group (n = 20). The experimental group underwent regular training with additional core stability intervention programme and control group they did only regular RG training. Psychological tests, Psychological Performance Inventory (PPI) for both groups was obtained twice; pre-test and post-test. The distribution of dependent variables in both groups was subjected to normality test. According to the result of repeated measure multivariate Anova (MANOVA) the interaction effect between time and group was significant for most of the psychological variable (Wilks' Lambda = 0.04 , $F_{(1,38)}$= 21.59, $p<0.01$ , $\eta 2= 0.36$) which means the core training intervention program had a significant effect on the psychological variables of Rhythmic Gymnasts.The result of Bonferroni Post Hoc test revealed a significant difference between pre and post-test in all the psychological variable include of (Self-confidence, negative energy control, attention control, visualization and imagery control, motivation, positive energy and attitude control) while there was no significant differences between control and experimental group in pre-test for these variables.
Keywords: Rhythmic Gymnastics (RG), Core StabilityTraining, Psychological Tests

## Introduction

As sport, the RG is an essentially feminine sporting modality that requests a high level of development of certain physical qualities, with high development demands aiming at the technical perfection of the complex movement's execution with the body and with apparels (Menezes &Filho, 2006). RG is an artistic sport, performed with technical apparatus (rope, hoop, ball, clubs and ribbon). Leaps are fundamental gymnast movements that require complex motor coordination of both upper and lower body segment (Ashby &Heegaard, 2002). Rhythmic Gymnastics (RG) is a sporting modality that has been technically developing through alterations of the punctuation code and adaptations in the competition levels, of age group and others. More and more, for those that long for high results, the course becomes more difficult (Zisi et al.,2009).

The core has been identified as a key component for functional athletic performance in the field of sports science. The core is referred as the region of the body that provides an adequate support for upper and lower extremity movements, during athletic performance (Dendas, 2010).Some studies defined core stability as "The ability to control the position and motion of the trunk over the pelvis and legs to allow optimum production, transfer, control of force and motion to the terminal segment in integrated kinetic chain activities (Kiblerj et al.,2006).

Regular physical activity has been identified as an important factor in the maintenance and improvement of physical health and well-being. In addition to these physical benefits, a variety of psychological benefits have been attributed to regular physical activity. These include (a) enhanced mental performance and concentration; (b) improved self-image and feelings of confidence and well-being; (c) perceived improvement in quality of sleep, energy level, mood, and tension and stress levels; and (d) decreased anxiety, depression, and hostility (deVries, 1987; Doyne, Chambless, &Beutler, 1983; Morgan &Goldston, 1987; Raglin& Morgan,1985; Schwartz, Davidson, & Coleman, 1978; Taylor, Sallis, & Needle, 1985).

According to these studies physical activity is beneficial for psychological performance so in ourstudy we investigate the effect of Core training on psychological variables. For many strength and conditioning professionals, core stability is considered a key component in training to improve sport performance (Leetun et al.,2004). Many investigators have examined the effectiveness of core training programs on athletic performance levels (Scibek et al.,2001) ; in each of these studies measures of core stability were also taken before and after training.Although it has been established that focused core training has a positive effect in numerous sports, little is known about the effect of core training in rhythmic gymnastics.Therefore, the purpose of this study was to investigate the effect of core stability training on psychological attributes of rhythmic gymnastics performance.

**Objectives**

To compare the significance differences of psychologicalattributes between Pre and Post Intervention.
To compare the significance differences of psychological attributes between the experimental group and the control group after 10-week of intervention.

**Methodology**

*Subjects*

The subjects of this research were chosen from 2 RG clubs in Kuala Lumpur. A total of 40 subjects (N = 40) were chosen to become the subjects of this research. The subjects were equally divided into two groups using a random sampling with a draw session. All subjects had picked up a number from a box which contained no.1 or 2 where no.1 is experimental group and no.2 is control group.The experimental group (n = 20)and the control group (n = 20). The experimental group underwent regular training with additional core stability intervention program in 10-week (2 session per week)and control group they did only regular RG training in 10-week (2 session per week). The subject's ages between 8 and 12 years were recruited for the study.The researcher managed to get approval to distribute the questionnaire after convincing the manager of the clubs. The researcher and her assistants distributed the questionnaires to the participants and briefly reviewed the questionnaires for the participants. This procedure took place right before their routine of gymnastic class. They were given 30 minutes to fill up the questionnaires.

Measurements

Psychological attributes, were assessed for each subject using the Psychological Performance Inventory by remaining relaxed, calm and energized. Loehr, 1986 further suggested that mentally tough athletes have the ability to increase their flow of positive energy in adversities. Although recent research findings identified twelve attributes of mental toughness (Jones et al., 2002; Middleton et al., 2005), the seven fundamental attributes of mental toughness suggested by Loehr, 1986, show similarities to those identified by recent researchers like Fourie, 2001; Jones et al., 2002 ; Middleton et al., 2005. Therefore in this study we considered the seven fundamental attributes of mental toughness suggested by Loehr, 1986. Specifically, the mental toughness attributes include (1) self-confidence, (2) negative energy, (3) attention control, (4) visualization and imagery control, (5) motivation level, (6) positive energy control, and (7) attitude control.(Kuan& Roy, 2007).

**Procedure**

The all subjects of experimental group were informed and explained that a research entitled "The Effect of 10-Weeks Core Stability Training on Psychological Attributes of Malaysian RhythmicGymnasts". They were fully informed of identified procedures prior to enrolment in the study. According to Sato & Mokha ( 2009) the total session volume should increase to challenge strength improvement rather than performing the same volume throughout them treatment. Therefore, this study was designed to increase the volume of exercise sessions every 2 weeks (Sato & Mokha, 2009). All subjects in experimental training groups successfully completed the entire 10-weeks program. After completion of the 10-weeks of core stability training, both subjects from experimental group (n = 20) and the control group (n = 20) were asked to perform post-test using the same psychological performance inventory.

Table 1 shows: Core Training (2 days per week) Adapted from (Bassett & Leach, 2011; Stanton, Reaburn, & Humphries, 2004)

*Table 1:* Core training intervention program:

**Results**

There was a significant differences of the psychological attributes between the pre and post-test for the experimental group in all variables: Self Confidence ($F_{(1, 38)}$ = 19.59, p<0.01, □2= 0.34), negative energy control ($F_{(1, 38)}$ = 13.39, p<0.01, □2= 0.26), attention control ($F_{(1, 38)}$ = 19.05, p<0.01, □2= 0.33), imagery control ($F_{(1, 38)}$ = 28.56, p<0.01, □2= 0.43), motivation ($F_{(1, 38)}$ = 11.88, p<0.01, □2= 0.24), positive energy ( $F_{(1,38)}$= 21.59, p<0.01 , □2=0.36) and attitude control ($F_{(1, 38)}$ = 13.14, p<0.01, □2= 0.26)On the other hand, this study revealed that no significant differences of the psychological

| Core Training | Week1 | Week2 | Week3 | Week4 | Week5 | Week6 | Week7 | Week8 | Week9 | Week10 |
|---|---|---|---|---|---|---|---|---|---|---|
| Abdominal Crunch | 2*6 | 2*8 | 2*10 | 2*12 | 3*6 | 3*8 | 3*10 | 3*12 | 3*14 | 3*14 |
| Swiss Ball Wall Squat | 2*6 | 2*8 | 2*10 | 2*12 | 3*6 | 3*8 | 3*10 | 3*12 | 3*14 | 3*14 |
| Superman on the Ball | 2*6 | 2*8 | 2*10 | 2*12 | 3*6 | 3*8 | 3*10 | 3*12 | 3*14 | 3*14 |
| Kneeling Ball Roll | 2*6 | 2*8 | 2*10 | 2*12 | 3*6 | 3*8 | 3*10 | 3*12 | 3*14 | 3*14 |
| Hamstring Curl | 2*6 | 2*8 | 2*10 | 2*12 | 3*6 | 3*8 | 3*10 | 3*12 | 3*14 | 3*14 |

*Note: 2 & 3 = Set of exercises, * Repetition of exercise

attributes between the control and experimental group in pre-test for psychologicalattributes.

Table 1: Result of ANOVA within–between Subject Effects

| Variable | Source | MS | F | P value | Partial Eta Squared |
|---|---|---|---|---|---|
| Self-Confidence | Time | 31.25 | 23.15 | 0.00 | 0.38 |
| | Group | 26.45 | 1.02 | 0.32 | 0.03 |
| | Time * Group | 26.45 | 19.59 | 0.00 | 0.34 |
| Negative Energy | Time | 52.81 | 30.60 | 0.00 | 0.45 |
| | Group | 23.11 | 0.99 | 0.37 | 0.02 |
| | Time * Group | 23.11 | 13.39 | 0.001 | 0.26 |
| Attention Control | Time | 52.81 | 36.44 | 0.00 | 0.49 |
| | Group | 27.61 | 1.27 | 0.27 | 0.03 |
| | Time * Group | 27.61 | 19.05 | 0.00 | 0.33 |
| Imagery Control | Time | 48.05 | 37.65 | 0.00 | 0.40 |
| | Group | 36.45 | 1.19 | 0.29 | 0.03 |
| | Time * Group | 36.45 | 28.56 | 0.00 | 0.43 |
| Motivation Level | Time | 45.00 | 14.68 | 0.00 | 0.28 |
| | Group | 36.45 | 1.66 | 0.20 | 0.04 |
| | Time * Group | 36.45 | 11.88 | 0.00 | 0.24 |
| Positive Energy Control | Time | 45 | 36.74 | 0.00 | 0.49 |
| | Group | 26.45 | 0.98 | 0.33 | 0.03 |
| | Time * Group | 26.45 | 21.59 | 0.00 | 0.36 |
| Attitude Control | Time | 59.51 | 41.14 | 0.00 | 0.52 |
| | Group | 19.01 | 0.95 | 0.34 | 0.02 |
| | Time * Group | 19.01 | 13.14 | 0.00 | 0.26 |

Table 2 shows the result of Bonferroni Post-Hoc test. These result revealed a significant difference between pre and post-test while there was no significant differences between control and experimental group in pre-test for positive energy.

Table 2:Bonferoni post-hoc test for comparing between pre and post test

| Variable | Time | Experiment (Mean±SD) | Control (Mean±SD) | Mean Difference (I-J) | SE | p value |
|---|---|---|---|---|---|---|
| Self-Confidence | Pre test | 22.6±3.9 | 22.6±3.9 | 0.0 | 1.23 | 1.00 |
| | Post test | 25±3.2 | 22.7±3.74 | 2.3* | 1.1 | 0.04 |
| Negative Energy | Pre test | 22.7±3.79 | 22.7±3.79 | 0.00 | 1.10 | 1.00 |
| | Post test | 25.4±3.17 | 23.25±3.37 | 2.15* | 1.03 | 0.04 |
| Attention Control | Pre test | 22.7±3.56 | 22.7±3.56 | 0.00 | 1.12 | 1.00 |
| | Post test | 25.5±3.12 | 23.15±3.36 | 2.35* | 1.02 | 0.03 |
| Imagery Control | Pre test | 22.8±4.34 | 22.8±4.3 | 0.00 | 1.38 | 1.00 |
| | Post test | 25.7±3.01 | 23±4.14 | 2.70* | 1.15 | 0.02 |
| Motivation Level | Pre test | 23.6±3.59 | 23.6±3.59 | 0.00 | 1.14 | 1.00 |
| | Post test | 26.45±3.44 | 23.75±3.51 | 2.70* | 1.00 | 0.02 |
| Positive Energy | Pre test | 22.8±4.03 | 22.8±4.03 | 0.00 | 1.28 | 1.00 |
| | Post test | 25.45±3.07 | 23.15±3.83 | 2.30* | 1.00 | 0.04 |
| Attitude Control | Pre test | 22.95±3.44 | 22.95±3.44 | 0.00 | 1.09 | 1.00 |
| | Post test | 25.65±2.87 | 23.7±3.29 | 1.95 | 0.98 | 0.05 |

**Discussion**

The purpose of this study was to determine the effect of 10-week Core Stability Training on Psychological Attributes of Malaysian RhythmicGymnasts. The major finding of this study was that the intervention often weeks (2 sessions per week) for the experimental group (n = 20) induced significant differences (Wilks' Lambda = 0.04, $F_{(1, 38)} = 21.59$, $p<0.01$, $\eta 2= 0.36$) on psychological attributes of Malaysian RhythmicGymnasts However, we have not identified significant differences between control and experimental group in pre-test for all variables.To our knowledge, this is the first empirical study to examine the effects of core training on psychological performance, as measured by PPI, in Malaysian RG. Core training remains a popular adjunct to training for many athletes and anecdotal evidence supports their widespread use, the results of the present study support current anecdotal evidence. In addition, while a wealth of anecdotal evidence supports the use of core training to enhance psychological characteristics; this has not been substantiated by valid scientific investigation. Kuan & Roy(2007) examined the association between goal orientations and mental toughness and its influence on performance outcomes in competition. Wushu athletes (n = 40) competing in Intervarsity championships in Malaysia completed Task and Ego Orientations in Sport Questionnaire (TEOSQ) and Psychological Performance Inventory (PPI). The present study only is in contrast with (Kuan & Roy, 2007) for using PPI in Malaysia athlete but in our study we investigated RG. A systematic review determined by (Ekeland, Heian, Hagen, & Coren, 2005) if exercise alone or as part of a comprehensive intervention can improve self-esteem in children and young people. Twenty three randomized controlled trials from 3 years of age to young people up to 20 years old were analyzed. A synthesis of several small, low quality trials indicates that exercise may have short term beneficial effects on self-esteem in children and adolescents. The present study is in agree with the conclusion of cited study only with positive effect of exercise on psychological factors but in our study we have investigated the effect of core training on psychological factors of RG but the cited study had investigate the effect of some other exercise on children and young people.The result of this study expressed that there was a significant differences of the psychological attributes between the experimental and control group during post-test (Wilks' Lambda = 0.04, $F_{(1, 38)} = 21.59$, $p<0.01$, $\eta 2= 0.36$). The results supported that core stability training can improve the psychological attributes of rhythmic gymnasts well within short period of time (during 10 weeks). From the result of this study it can be concluded that traditional core stability training is beneficial to gymnasts in terms of enhancing psychological attributes, which will be beneficial in performance.

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# A Comparative Study of Anxiety among Sprinters & Wrestlers of Hyderabad District in Telangana

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**Abstract:**
Anxiety, or feeling physically and mentally anxious can present in different ways, such as fear and nervousness, which creates hindrances to achieve high performance in sports. Sprint involves the athlete to attempt to run at peak speed for the complete duration of the race. **Wrestling** is a combat sport involving grappling type techniques such as clinch fighting, throws and takedowns, joint locks,pins and other grappling holds.The purpose of the study is to find out the level of Anxiety among Sprinters and Wrestlers. The sample for the study consists of 50 Sprinters and 50 Wrestlers of Hyderabad those who have participated in various Tournaments in the state. Sinha's Comprehensive Anxiety Test (Scat) is used for the study. It was found the Wrestlers are have significantly high anxiety than the sprinters. The decision must be made by Long distance runners is final for their performance. Whereas in sprints, their muscle power and technique is needed. Anxiety differs from each event and persons.
Key words: Anxiety, excel, athletes, sprints, long distance etc.

**Introduction**

Sport Psychology is the scientific study of people and their behaviours in sport. The role of a sport psychologist is to recognize how participation in sport exercise and physical activity enhances a person's development. Anxiety or feeling physically and mentally anxious can present in different ways, such as fear and nervousness, which creates hindrances to achieve high performance in sports.

Track and Field dominated the ancient Greek athletic festivals, and was also popular in Rome, but declined in the Middle Ages. In England track was revived sporadically between the 12th and 19th century the first college meet occurred in 1864 between Oxford and Cambridge universities.SPRINT involves the athlete to attempt to run at peak speed for the complete duration of the race. The period of the race is essentially short lasting fraction of seconds and even before this period of time is reached, the killing effect of lack of oxygen the vital fuel for moment is starting to paralyze the muscle involves it.

**Wrestling** is a combat sport involving grappling type techniques such as clinch fighting, throws and takedowns, joint locks,pins and other grappling holds. A wrestling bout is a physical competition, between two (occasionally more) competitors or sparring partners, who attempt to gain and maintain a superior position. There are a wide range of styles with varying rules with both traditional historic and modern styles. Wrestling techniques have been incorporated into other martial arts as well as military hand-to-hand combat systems.

Purpose of the study:
The purpose of the study is to find out the level of Anxiety among Sprinters and Wrestlers

**Methodology:**
The sample for the study consists of 50 Male Sprinters and 50 Male Wrestlers of Hyderabad those who have participated in various Tournaments of the state between the age group of 19-22 Years. SINHA'S COMPREHENSIVE ANXIETY TEST (SCAT) Is developed and standardized by A.K.P. Sinha and L.N.K. Sinha. The test consisted of 90 Items. The subjects were required to respond to each item in terms of 'YES' OR 'NO'. The Questionnaire were administered in small groups both Sprinters and Wrestlers during their practice sessions.

Table No. 1
Sprinters and Wrestlers Shows the Mean, S.D, S. E. and t value of Anxiety

| Group | *MEAN* | *S.D* | *SE* | N | df | t |
|---|---|---|---|---|---|---|
| Sprinter | 22.58 | 2.28 | 0.19 | 50 | 98 | 37.21 |
| Wrestlers | 32.86 | 2.50 | 0.20 | 50 | | |

Mean of anxiety score of the sprinters Mean is 22.58 and that of the Wrestlers Mean is 32.86 The difference between the two mean is highly significant ('t'= 37.21, df =98, P < 0.01) . And graph it was found that the Wrestlers are have significantly high anxiety than the sprinters.

**Results:**
It was found the Wrestlers have significantly high anxiety than the sprinters. Wrestlers will fought in Indoor and Sprinters mostly do in open stadium events. There will be differs in the anxiety level of both the sports persons.

**Discussion:**
Feeling of anxiety can also be confused with fear but there is a significant difference between two emotions. Elite sports persons tend to have lower scores on anxiety scales than average performers Making them more resilient, emotion stable, highly motivated and remain calm in the stressful situations.

**Conclusion:**
It is concluded that Wrestlers. have significantly high anxiety than the sprinters. Because they concentrate more tactics to give level best performance to win the Competition, where as the Sprinters concentrate on technique at the start & finish and muscle power to give the high level of performance. It is recommended that special coaching is to be given to overcome Anxiety to achieve high excellence in sports. The Coaches must prepare all the sports persons with high level psychological preparation to excel in sports and games.

**Recommendations**
1. While selecting the runners for specific event it is recommended that on the findings of the research regarding the specific anxiety should be considered.
2. This type of Study is useful to the Coaches and Physical Education Teachers to train the Students as per the requirements of the Psychological variables for the performance in sports.
3. Conducting a similar study, by adding other psychological factors such as goalsetting, Achievement motivation, concentration and imagery.
4. Doing a similar study on Individual and Team Games.
5. Comparing anxiety and self confidence between elite and non-elite athletes indifferent regions.
6. Conducting a similar study among female sprinters and long distance runners.

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# Knowledge About Chess Game among Upper Primary School Students Of Industrial Area Of Palavancha, Telangana State.

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## Introduction

Chess is a very old, historical, a classic game of strategy. Chess is played between two persons on a board called chess board. It is played with specially designed pieces on a square board made up of sixty four alternating black and white squares arranged in eight Rows and eight Colum's. The player with white pieces begins the game by moving a piece to another square following the rules that govern piece movement. The player move alternately until one player either checkmated, resigns or there is a draw. The objective of the game is to force the opponent's most important piece the king into checkmate. This is a position in which the king cannot be moved to avoid capture.Chess is an easy game to learn but a difficult game to master. Chess is part of the curriculum in nearly more than 30 countries. It is one of the subjects in many public schools. A few children learn to play as young as four years.Chess does not need big fancy equipment to play. It is also good to have a chess set at home to practice with family members, play in friend's house or even in your local neighborhood park's so that they get interest in game. Some time's one can play alone in computer also.

Chess is believed to have originated in India in between 280 to 550AD in the Gupta Empires . Legend has it that the ruler asked.

His wise men to invent a devise to teach the children of the royal family to become better thinkers and better generals on the battle field. In its early form in the 6thcentury was known as a Chaturanga In Sanskrit. Around 600 A D Is Found By The Name Chatrang. After The Islamic Conquest Of Persia It Is Named As Shatrarij With Deferent Languages And Days Passed Exeunt It Licit It Named As Chess.

Chaturanga Spread Trough Out The Middle East, Asia And Europe Around 750 A D. China To Korea, Japan. By 10th Century Spread Trough Out Western Europe And Russia. At 13th Century It Is Known Throughout The World. There are several major changes made the game around 1475 what we know today.

Writing about the theory of how to play chess began to appear in 15th century. In 19$^{th}$ century chess organization developed quickly and many clubs, books and journals appeared. Chess problems became a regular part of news papers.

There were corresponding matches between cities. The first modern tournament was organized in London in 1851.in 1914 chess grand master started .as in 19$^{th}$ century the number of master tournament's and matches held anomaly quickly grown. In1925 Paris world chess federation founded. the women's world chess champion ship started in 1927.

The first computer chess program was introduced in 1960.As steadily improvement in technology and algorithms led to the 1996 defeat of world champion Garry Kasparov by a computer called Deep Blue. On computer we can play against us, and also help us better player by learning more. At peasant the computer work to gather with us is known as chess engines. At peasant online chess playing cites are also available.

## Purpose of the Study:

The study is to determine the knowledge of the game chess. To know the impact on their psychological at upper primary level.

**Methodology**

The subjects of this study were the students of the upper primary school at the age level of 11to13 years of the industrial area of Palavancha, khammam district, Telangana state. This was sampled thru total present study with 50 respondents. The questionnaire method was adopted since the present study is concerned with the traditional, indigenous, Indoor, an Indian organ game of the chess. The researcher used the questionnaire as the main tool of the study which is constructed by self. The statistical tools such as the mean average, percentages were used in making the interpretation of the data clear and understand able. So that the knowledge of the game will be answered. Frequency or percentage was also used to determine the knowledge of the game in the industrial area of palavancha.

The average weight of mean was used to determine the extent of knowledge of the chess game is to develop students interest and availability of known persons of the game.

**Results;**

The analysis of the data shows that the knowledge of the game minimum only. Only 34%of the students are have know the game of chess by 6to7 years of age.12%are know the castling.

**Conclusion:**

the game of chess learning programs should be created. To promote this game of the chess children should be developed for the longer range of goals and taken steps to bringing them about the knowledge. They also taught of need to reevaluate their plans as new developments changes the situations.Chess is a game of 'quiet intensity. It is a fascinating. The game of chess focus on many hidden values like observation, visualization, thinking, presence of mind, analyzing, memory, planning, tolerance, temperance and so many psychological variables'. None of these skills are specific in chess game which can be noticed by children. As a tool we can start implementing chess game in schools, to stimulate the children's mind and help them to built in-**errant** qualities. While enjoying the game several qualities can be developed without notice of the children.

I would like to be introducing the game of chess to be played at least ones in a week as a curriculum. It will have directly contribution to academic and psychological impact on the children smartness. The chess game can provide a life time hobby.

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# Predominance of Selected Anthropometric and Motor Fitness Variables of Successful and Less Successful Soccer Players

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**Abstract**
The study was proposed to comprehend the selected Anthropometric and Motor Fitness variables that contributed to the classification of soccer players as successful and less successful. One hundred and sixty five (165) male football players from universities comprised of 3 successful and six less successful from among those participated in the All India Inter University football tournament held in Kottayam during the last week of December 2013, were selected as subjects with an informed consent. The age of the selected subjects ranged from 18 through 25 years. The selected subjects were categorized as successful team players (N = 58) **[HOW]** and less successful team players (N = 107) **[HOW]** based on their team's tournament standings. The Anthropometric measurements and Motor Fitness variables were assessed utilizing calibrated instruments, standardized methods, procedures and tests. The experimental design used in this study was stratified group design involving convenient sampling. Discriminant analysis was performed to analyze the data collected using SPSS. In all cases the level of confidence was fixed at 0.05 for significance. The results show that statistically significant difference on calf girth, leg length, explosive strength and speed endurance among soccer players with different levels of achievement success. Yet, discriminant equation with inclusion 4 of 16 independent variables (A*nthropometric and Motor Fitness Variables*) in computing the equation as: D = – 43.504 + 0.125 (Calf girth) + 0.231 (Explosive strength) – 2.104 (Speed) + 3.023 (Speed endurance), and consequently it implies that soccer players with the potential for success can be predetermined as it is predominantly influenced by selected Anthropometric and Motor Fitness variables.
Keywords: A*nthropometric, Motor Fitness, success in soccer, discriminant analysis.*

**Introduction**
Nowadays the evolution of human scientific knowledge is dramatic in all walks of life and it is factual in the area of games and sports. Sports performance is indeed an aspect of complex human performance, which has several dimensions. Sports researchers often accept that a top-notch feat is the result of numerous aspects, advocating a multidimensional approach in studies on talented players (Regnier *et al*., 1993; Reilly *et al*., 2000). Burwitz *et al*. (1994) also recommend interdisciplinary performance-related sports science research.
Successful sports performance is influenced by morphological and anthropometric characteristics, functional parameters (Scott, 1991; Singh *et al*., 2010) and fitness (Nikitushkin & Guba, 1998). Soccer is the most popular sport, played in many countries throughout the world. The soccer skills are more complex as dribbling, kicking, juggling, and so forth are to be performed mostly by foot and other parts of the body except hands, which makes it interesting to participate and witness. Excelling in team sports like soccer at higher level demands for multidimensional characteristics.
Indeed, research in male professional soccer has shown that the physical characteristics of players (Nevill, Holder & Watts, 2009) and the fitness demands in official competition have substantially evolved over recent decades (Strudwick & Reilly, 2001). The capability of a sportsperson in a team game emanates from various anthropometric and motor fitness variables of the players. Contemporary science is enormously concerned in approximating the optimum anthropometric make-up of a player. So the scanning and selection of a particular player may be achieved successfully to a great extent by measuring anthropometric components.

Anthropometric and motor fitness variables are dimensions of the structure of the human body taken at specific sites to give measures of girth and width. They include the body size and body proportions.

Measurements of body size include such descriptive information as height, weight and surface area, while the measures of body proportions describe relationship between height, weight, length, width and girths of various body segments. It has been observed that top athletes in some sports tend to have those proportions to biologically aid the performance (Mathews, 1973). Fitness is the capacity of an individual to perform a given task requiring muscular force. The greater the fitness, the longer a person can work and the more efficient will be his performance and his capacity for recovering from fatigue (Willgoose, 1961).It would be of interest to explore the predominant anthropometric and motor fitness variables that categorizes soccer players as successful and less successful, since there has been a very little source with regard to it. Thus, the researcher is encouraged to verify the predominance of anthropometric and motor fitness variables that determines the soccer player's level of success. This study was proposed to comprehend the selected anthropometric and motor fitness variables that contribute to the classification of soccer players as successful and less successful.

Methods and ProceduresOne hundred and sixty five (165) football players from nine (9) universities who participated in the All India Inter University football tournament held in Kottayam during the last week of December 2013, were selected as subjects with an informed consent. The age of the selected subjects ranged from 18 through 25 years. The selected subjects were categorized as successful team players (N = 58) **[HOW]** and less successful team players (N = 107) **[HOW]** based on their team's tournament standings. The anthropometric measurements and motor fitness variables were assessed utilizing calibrated instruments, standardized methods, procedures and tests. The experimental design used in this study was stratified group design involving convenient sampling. The discriminant analysis was performed to analyze the data collected using SPSS. In all the cases level of confidence was fixed at 0.05 for significance.

**Results of the Study**

In order to comprehend the anthropometric and motor fitness variable that contributes to the classification of soccer players, discriminant analysis was applied. Non-standardized canonical discriminant function coefficients were used to derive the regression equation that classifies soccer team players as successful and less successful based on their anthropometric and motor fitness variables. The data on anthropometric and motor fitness variables among soccer players with different levels of achievement success is analyzed and given in Table 1.

Table 1 reveals a statistically significant difference in the level of certain anthropometric (*calf girth and leg length*) and motor fitness (*explosive strength and speed endurance*) variables among soccer players with different levels of achievement success.

**Table 1**

**ANOVA on Selected Anthropometric and Psychomotor Variables among different Levels of Successful Soccer Team Players**

| Determinant Variables | Different Levels of Soccer Team Success | | | | F ratio | Sig. |
|---|---|---|---|---|---|---|
| | Successful Soccer Team Players (N = 58) | | Less Successful Soccer Team Players (N = 107) | | | |
| | Mean | SD | Mean | SD | | |
| Height | 170.31 | 5.32 | 168.97 | 5.15 | 2.501 | .116 |
| Weight | 64.29 | 5.25 | 63.33 | 5.67 | 1.123 | .291 |
| BMI | 22.16 | 1.51 | 22.28 | 1.77 | .196 | .659 |
| Fat percent | 13.24 | 3.39 | 14.64 | 7.16 | 1.979 | .161 |
| Thigh girth | 52.34 | 3.58 | 51.32 | 3.86 | 2.804 | .096 |
| Calf girth | 35.81 | 2.32 | 34.95 | 2.35 | 5.051 | .026 |
| Arm length | 77.09 | 2.93 | 76.24 | 3.00 | 3.055 | .082 |
| Leg length | 99.64 | 4.26 | 97.95 | 4.25 | 5.936 | .016 |
| Elbow width | 6.62 | 0.44 | 6.54 | 0.44 | 1.243 | .267 |
| Knee width | 8.66 | 0.66 | 8.54 | 0.65 | 1.375 | .243 |
| Explosive strength | 55.41 | 1.56 | 54.67 | 1.71 | 7.518 | .007 |
| Flexibility | 12.81 | 5.11 | 12.65 | 4.92 | .037 | .848 |
| Agility | 12.32 | 0.72 | 12.16 | 0.70 | 2.095 | .150 |
| Speed | 5.67 | 0.45 | 5.76 | 0.34 | 2.215 | .139 |
| Speed endurance | 12.99 | 0.28 | 12.82 | 0.32 | 11.377 | .001 |
| Reaction time | 12.91 | 3.56 | 12.61 | 4.32 | .213 | .645 |

Source: Primary Data

**Table 2**
**Test of Equality of Group Covariance Matrices using Box's M**

| GROUP | | Rank | Log Determinant | Box's M | Approx. F | df1 | df2 | Sig. |
|---|---|---|---|---|---|---|---|---|
| 1 | Successful | 4 | -1.956 | 19.438 | 1.885 | 10 | 64884.010 | .042 |
| 2 | Less Successful | 4 | -2.185 | | | | | |
| Pooled within-groups | | 4 | -1.986 | | | | | |

Source: Primary Data

Table 2 reveals the test of the multivariate normality of the data. The Rank (4) of the covariance matrix indicates that this is a 4 x 4 matrix, the number of variables in the discriminant equation. The natural log of the determinant of successful and less successful players' covariance matrices is -1.956 and -2.185 respectively. Pooled within groups covariance matrix composed of the means of each corresponding value within the two 4 x 4 matrices of the successful and less successful players are -1.986.The Box's M value of 19.438 is a measure of multivariate normality, based on the similarities of the determinants of the covariance matrices for the successful and less successful players. The approximate *F* value of 1.885 reveals that the determinants from the two levels of the dependent variable (*successful and less successful players*) differ considerably as the significance value is 0.042, and thereby it suggests that the obtained data is not found to be multivariate normal.

**Table 3Eigen values and Wilks' Lambda**

| Function | Eigen value | % of Variance | Cumulative % | Canonical Correlation | Test of Function | Wilks' Lambda | Chi-square | df | Sig. |
|---|---|---|---|---|---|---|---|---|---|
| 1 | .220[a] | 100.0 | 100.0 | .424 | 1 | .820 | 31.976 | 4 | .000 |

Source: Primary Data

a. First 1 canonical discriminant functions were used in the analysis.

The Eigen value of 0.220 is the proportion of variance explained by factor for the first (1) canonical discriminant function. The % of variance for the function 1 is 100%, and cumulative % of the function accounts for 100%. The correlation among players with different levels of achievement success for discriminant scores is high as the obtained canonical correlation of 0.424 ($p < 0.05$), which indicates that canonical discriminant function discriminates the two different levels of dependent variables (*successful and less successful*) well.To conduct a discriminant analysis that predicts membership into two groups based on the dependent variable categories (*successful and less successful*) and creating the discriminant equation with inclusion 4 of 16 independent variables (*anthropometric and motor fitness*) selected by stepwise procedure based on the minimization of Wilks' lambda at each step with an F-to-enter of 1.15 and an F-to-remove of 1.00. The observed chi-square value of 31.976 denotes that there is a significant difference among players' with different levels of achievement success based on the discriminant function

Table 4Analysis of Unstandardized Canonical Discriminant Function Coefficients

| Constructs | Functions |
|---|---|
| | 1 |
| Calf girth | .125 |
| Explosive strength | .223 |
| Speed | -2.104 |
| Speed endurance | 3.023 |
| (Constant) | -43.504 |

Source: Primary Data

Table 4 shows the list of coefficients and the constant of the discriminant equation. Each subject's discriminant score would be computed by entering their construct values for each of the 4 variables in the equation. The discriminant equation was as follows:

D = – 43.504 + 0.125 (Calf girth) + 0.231 (Explosive strength)
– 2.104 (Speed) + 3.023 (Speed endurance)

The discriminant score of the data collected for successful and less successful players' is graphically illustrated in Figure 1 and 2.

Figure 1: Graphical Representation of Canonical Discriminant Function 1 of the Successful Team Players

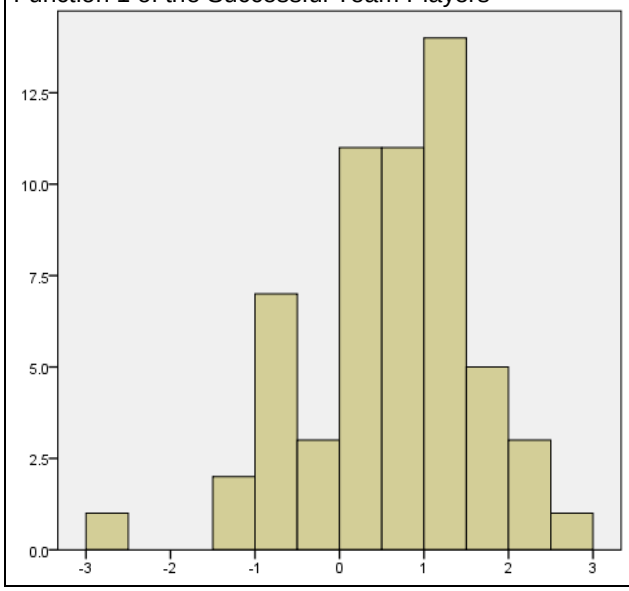


Figure 2: Graphical Representation of Canonical Discriminant Function 1 of the Less Successful Team Players

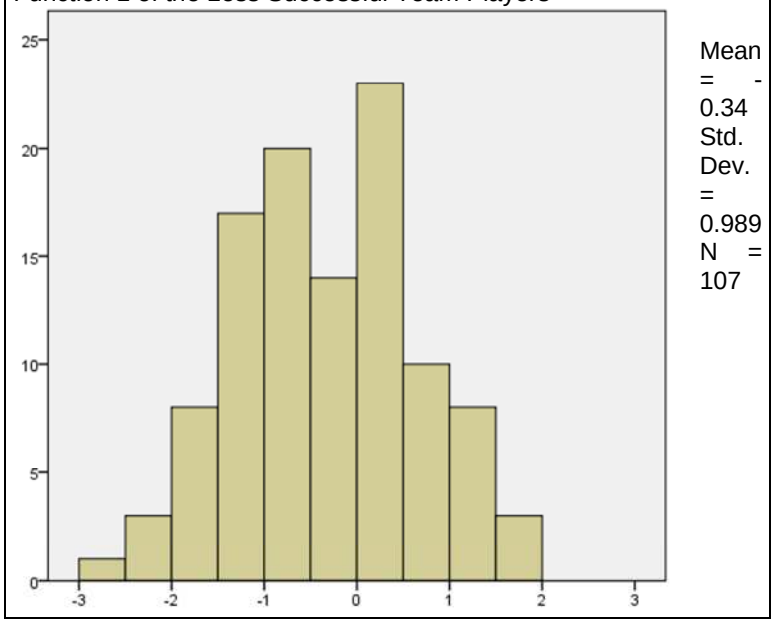


Table 5
Classification Results

| | | Group | Predicted Group Membership | | Total |
|---|---|---|---|---|---|
| | | | successful team | less successful team | |
| Original | Count | successful team | 41 | 17 | 58 |
| | | less successful team | 35 | 72 | 107 |
| | % | successful team | 70.7 | 29.3 | 100.0 |
| | | less successful team | 32.7 | 67.3 | 100.0 |

Source: Primary Data

a. 68.5% of original grouped cases correctly classified.

Table 5 summarizes the number and percentage of players classified correctly and incorrectly as successful and less successful players. It is found that 41 of 58 players classified as successful soccer team players is correct, while 17 of them were incorrect as the analysis predicts them to be as less successful soccer team players. Furthermore, it is found that 72 of 107 players classified as less successful soccer team players were correct, but 35 of them were incorrect as the analysis predicts them to be as successful soccer team players. Thereby 68.5% of original grouped cases (*players*) were correctly classified.

**Conclusions**

The results of this study imply that soccer players with the potential for success can be predetermined as it is predominantly influenced by selected kinanthropometric and psychomotor variables.

[3 findings with supportive evidence and explanation]

Recommendation:

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Note: Dr. Ravindran Sir made a note:

1. How (N=58) & (N=107) had come we have to explain about it
2. 3 findings with supportive evidence and explanation]
3. Recommendation: has to be briefed

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# Comparison of Explosive Strength among Sepak Takraw Players and Foot Ball Players of Hyderabad District in Telangana

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**Abstract**
Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport was a compromise between Malaysia and Thailand, the two powerhouse countries of the sport. **Football** refers to a number of sports that involve, to varying degrees, kicking a ball with the foot to score a goal.The Purpose of the study is to find out the Explosive Strength among Sepak Takraw Players and Foot Ball Players of the Hyderabad District in Telangana. The Sample for the Study consists of 20 Sepak Takraw Players and 20 Foot Ball Players of Hyderabad District between the age group of 20-22 Years. To assess the explosive strength the Standing Broad Jump Test is conducted by the Technical Officials of Athletics. The results of the study shows that the Sepak Takraw Players are good in Explosive Strength and than foot ball players.. Sepak Takraw combines ball skills with the agility and acrobatic moves of gymnasts and the instinctive reflexes of competitive badminton Players. Foot ball players conditioning has become the more specific and scientific and explosive Strength is very important for football players .It is concluded that the Sepak Takraw Players are good in Explosive strength because they require good jumping ability to hit the ball and foot ball players are also require explosive strength to hit the ball and excel in foot ball.
Key words: explosive strength, sepak takraw, foot ball etc.

**Introduction:**
"Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport was essentially a compromise between Malaysia and Thailand, the two powerhouse countries of the sport."Sepak" is the Malay word for kick and "takraw" is the Thai word for a woven ball, therefore sepak takraw quite literally means to kick ball. The choosing of this name for the sport was essentially a compromise between Malaysia and Thailand, the two powerhouse countries of the sport. Strength and agility is important for football players and sepak takraw players. The basic elements of speed, mobility and strength are all functions of explosive power and agility. Sepak Takraw is Playing Volleyball with the Feet.Sepak takraw is a skill ball game originated from Asia. It combines the teamwork of volleyball, the dexterity of soccer and the finesse of badminton. In Thailand it is called takraw, but the official name of this internationally recognized game is sepak takraw. Without a doubt it is one of the world's most exciting sports, both to play and to watch, yet it is relatively unknown outside of Southeast Asia. Playing the sport requires little in the way of equipment or preparation but it does require quick reflexes, coordination, agility and, above all, technique. Thick skin is also helpful; a skilfully kicked takraw ball can travel at speeds of over 60mph!
The game is played by two opposing Regus, a team of three players each, on a court separated by a net similar to badminton. It begins with the service, executed by a ball toss from one player to the Server. Then, the players try to beat their opponents using their legs and head, except their hands, inside three kicks.

The highlight is the "spike".This is the most dramatic and explosive move in the game for spectators to watch as players go mid-air, twisting and turning to power the ball down into the opponent's court. To play takraw, players can use either a net, a hoop, or simply stand around in a circle formation. Whatever the style, the object is to kick the ball to another player without the ball touching the ground. Sepak takraw combines ball skills (kicking and juggling) with the agility and acrobatic moves of gymnasts and the instinctive reflexes of competitive badminton players This sport seems to have its origins in ancient Thailand and was invented about 500 years ago. There is a strong martial arts tradition in Thailand with Muay Thai Boxing originating from and still being widely practiced there today. Because of this strong tradition of martial arts which relies on powerful kicks, the sport may have come about as a side project of a few Muay Thai boxers. The kicking aspect of Muay Thai and the kicking aspect of Sepak Takraw are fairly similar and agility and dexterity in kicking very high objects and flexibility all play a part in both sports

**Football** refers to a number of sports that involve, to varying degrees, kicking a ball with the foot to score a goal. Unqualified, the word football is understood to refer to whichever form of football is the most popular in the regional context in which the word appears: association football (also known as soccer) in the United Kingdom and most of the non-English speaking world; gridiron football (specifically American football or Canadian football) in the United States and Canada; Australian rules football or rugby league in different areas of Australia; Gaelic football in Ireland; and rugby football (specifically rugby union) in New Zealand.
Common rules among the foot ball include.
Two teams of usually between 11 and 18 players; some variations that have fewer players (five or more per team) are also popular.
A clearly defined area in which to play the game.
Scoring goals or points, by moving the ball to an opposing team's end of the field and either into a goal area, or over a line.
Goals or points resulting from players putting the ball between two goalposts.
The goal or line being defended by the opposing team.
Players being required to move the ball—depending on the code—by kicking, carrying, or hand-passing the ball.
Players using only their body to move the ball.
In all codes, common skills include passing, tackling, evasion of tackles, catching and kicking.http://en.wikipedia.org/wiki/Football - cite_note-Douge-8 In most codes, there are rules restricting the movement of players offside, and players scoring a goal must put the ball either under or over a crossbar between the goalposts.

**Methodology:**
The sample for the present study consists of 20 Male Sepaktakraw Players and 20 Male Foot ball Players of Hyderabad District between the age group of 20 to 22 Years of Telangana State. To asses the explosive strength the Standing Broad Jump Test is conducted by the qualified Technical Officials of athletics.

**Standing Broad Jump:**
The Standing long jump, also called the Broad Jump, is a common and easy to administer test of explosive leg power.
purpose: to measure the explosive power of the legs
equipment required: tape measure to measure distance jumped, non-slip floor for takeoff, and soft landing area preferred. Commercial Long Jump Landing Mats are also available. The takeoff line should be clearly marked.
procedure: The athlete 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.
Scoring:The measurement is 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. attempts are allowed.

**Results and Discussion:**
The results of the study shows that the Sepak Takraw Players are good in Explosive Strength Compare to foot Ball players. Both plays with the foot for the Performance.

**Table I showing the Mean values and Independent Samples Test of Standing Broad Jump between Sepak Takraw and Foot Ball Players**

| Variables | Group | Mean ± SD | t | P - Value |
|---|---|---|---|---|
| Standing Broad Jump | Sepak Takraw Players | 2.30 ± 0.157 | 3.55 | 0.001 |
| | Foot Ball Players | 2.26 ± 0.159 | | |

*Significant at 0.05 level
In Table –I the Mean Values of Sepak Takraw Players in Standing Broad Jump is 2.30 and foot ball Players is 2.26. The Standard Deviation on Sepak Takraw Players is 0.157 and foot ball Players is 0.159 and t is 3.55 and P-Value is 0.001

The Mean values of Sepak Takraw Players in Standing Broad Jump is 2.30 and foot ball Players is 2.26 in Standing Broad Jump. Hence the Sepak Takraw Players are having good explosive Strength compare to foot ball Players. Sepak Takraw players uses leg strength to hit the ball, hence they might be having more explosive strength compare to foot ball players because they ball in air more than foot ball players.

**Sepak Takraw Players in action**

**Foot Ball Players in action**

**Conclusions:**
It is concluded that the Sepak Takraw Players are good in Explosive strength because they require good jumping ability to hit the ball and Foot Ball players are also require the explosive strength.
Sepak takraw combines ball skills (kicking and juggling) with the agility and acrobatic moves of gymnasts and the instinctive reflexes of competitive badminton players As in volleyball, there are passes, sets, and spikes but all without the use of hands or arms. The players are allowed to use their head, chest, feet, and thighs to propel the ball over the net. Both setting and spiking is done with the feet and the two most commonly used spikes are the “sun back” spike and the “roll” spike which are performed aerially requiring immense agility, precision, leg strength, timing, and skill. Like badminton, squash, and tennis, the intensity of the game is intermittent, depending on the length of rallies following a serve.

**Recommendations:**
Similar Studies can be conducted among females and in other Sports and games. This study is useful to the Coaches to prepare the conditioning program to improve their skills in Sepak Takraw and Foot Ball Players

**Acknowlegements:**
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# A study on variation of Reaction Time of team game players in the age group of 18 – 21 years with respect to their field positions/specializations in selected games.

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**Introduction:**

Humans have a multitude of senses. Sight (ophthalmoception), hearing (audioception), taste (gustaoception), smell (olfacoception or olfacception), and touch (tactioception) are the five traditionally recognized. While the ability to detect other stimuli beyond those governed by the traditional senses exists, including temperature (thermoception), kinesthetic sense (proprioception), pain (nociception), balance (equilibrioception), and various internal stimuli (e.g. the different chemoreceptors for detecting salt and carbon dioxide concentrations in the blood), only a small number of these can safely be classified as separate senses in and of themselves.

Chronoception refers to how the passage of time is perceived and experienced. Although the sense of time is not associated with a specific sensory system, the work of psychologists and neuroscientists indicates that human brains do have a system governing the perception of time, composed of a highly distributed system involving the cerebral cortex, cerebellum and basal ganglia. This research is concerned with Reaction Time which is one of the important aspects of human senses in sports and games.

**Statement of the Problem:**

The purpose of the study is to study the variation of Reaction time of team game players in the age group of 18 – 21 years with respect to their field positions/specializations in selected games.

Hypotheses:

The following hypotheses were drawn for the present study

There might not be significant variation in Reaction time with respect to field positions of team game players.Goal Keepers in Football, Batsman in Cricket, Libero in Volleyball and Point Guard in Basketball are assumed to have better Reaction Times when compared to others.

Delimitations:

The following are the delimitations set for the present study.The subjects selected for this study are all boys in the age group of 18 -21 years.The players of 4 team games (Basketball, Cricket, Football and Volleyball) were studied. Visual and Auditory reaction times were only be taken into consideration for the study. Reaction times were measured using a simple electronic Vernier Chronometer.

Limitations:

The training age of the subjects is not taken into consideration.The food habits, health and hygienic conditions of the subjects are not taken into consideration.The changes in climatic condition during the testing period cannot be controlled and the influence on the results of the study is recognized as a limitation.

**Research Design**

For this study the research design comprises of measurements of Visual Reaction Times (Simple & Discriminative), Auditory Reaction Times (Simple & Discriminative) and Choice Reaction Times of players of Basketball, Cricket, Football and Volleyball using a Simple Vernier Chronometer. The mean values of each category are tabulated individually first.

To achieve the result of this research SPSS Version 17 has been used to calculate the significance through ONE WAY ANOVA to study the variation of Reaction Time from position to position within a given game.

**Analysis And Conclusions**

Variation of Reaction Times of team game players from position to position in Basketball.

A total of 40 Basketball players were selected for the study. These subjects were further divided into two groups depending on their playing positions as follows

1. Backcourt (Point guard & Shooting guard) & 2. Frontcourt (forwards and centre)

It was found that

The mean value of SART of Back Court players 244 ± 63ms and that of Front court players is 231 ± 63ms which means that the Front court players in Basketball have better Simple Auditory Reaction Times when compared to Back court players.

The mean value of DART of Back Court players 273 ± 64ms and that of Front court players is 264 ± 62ms which means that the Front court players in Basketball have better Discriminative Auditory Reaction Times when compared to Back court players.

There is a significant difference in the Simple Auditory (SART) and Discriminative Auditory Reaction Times (DART) of Back Court players and Front Court players in Basketball ($p < 0.05$).

There is no significant difference in the Visual Reaction times (SVRT & DVRT) and Choice Reaction Time (CRT) of Back Court players and Front Court players ($p > 0.05$).

Variation of Reaction Times of team game players from position to position in Cricket.

A total of 40 Cricket players were selected for the study. These subjects were further divided into three groups depending on their playing positions as follows

1. Batsman, 2. Bowler & 3. Wicket Keeper

It was found that

The mean Simple Auditory Reaction Times of Batsman, Bowler and Wicket Keeper were found to be 216 ± 90ms, 240 ± 79ms and 230 ± 79ms respectively. It is known from these mean values that the SART of Batsman in Cricket is quicker than Bowlers and Wicket Keeper. There exists a significant difference ($P < 0.05$) in Simple Auditory Reaction Time (SART) between the Batsman & Bowler and also between the Batsman and the Wicket Keeper.

The mean Simple Visual Reaction Times of Batsman, Bowler and Wicket Keeper were found to be 236 ± 91ms, 244 ± 80ms and 249 ± 80ms respectively. It is known from these mean values that the SVRT of Batsman in Cricket is quicker than Bowlers and Wicket Keeper. There exists a significant difference ($P < 0.05$) in Simple Visual Reaction Time (SVRT) between the Batsman and the Wicket Keeper.

The mean Discriminative Auditory Reaction Times of Batsman, Bowler and Wicket Keeper were found to be 256 ± 89ms, 264 ± 78ms and 285 ± 79ms respectively. It is known from these mean values that the DART of Batsman in Cricket is quicker than Bowlers and Wicket Keeper. There exists a significant difference ($P < 0.05$) in Discriminative Auditory Reaction Time (DART) between the Batsman & Wicket Keeper and also between the Bowler and the Wicket Keeper.

The mean Discriminative Visual Reaction Times of Batsman, Bowler and Wicket Keeper were found to be 275 ± 81ms, 283 ± 81ms and 292 ± 73ms respectively. It is known from these mean values that the DVRT of Batsman in Cricket is quicker than Bowlers and Wicket Keeper. There exists a significant difference ($P < 0.05$) in Discriminative Visual Reaction Time (DVRT) between the Batsman and the Wicket Keeper.

The mean Choice Reaction Times of Batsman, Bowler and Wicket Keeper were found to be 296 ± 94ms, 325 ± 83ms and 310 ± 84ms respectively. It is known from these mean values that the CRT of Batsman in Cricket is quicker than Bowlers and Wicket Keeper. There exists a significant difference ($P < 0.05$) in Choice Reaction Time (CRT) between the Batsman and the Bowler.

Variation of Reaction Times of team game players from position to position in Football.

A total of 40 Football players were selected for the study. These subjects were further divided into four groups depending on their playing positions as follows

1. Goalkeeper (GK), 2. Defender (DF), 3. Midfielder (MF) & 4. Forward (FW).

It was found thatThe mean Simple Auditory Reaction Times of Forwards, Midfielders, Defenders and Goal Keepers were found to be 252 ± 87ms, 253 ± 90ms, 261 ± 67ms and 253 ± 98ms respectively. It is known from these mean values that the SART of Forward players in Football is quicker than Midfielders, Defenders and Goal Keepers. There is no significant difference in Simple Auditory Reaction Time (SART) between the players of four positions in Football ($p > 0.05$).

The mean Simple Visual Reaction Times of Forwards, Midfielders, Defenders and Goal Keepers were found to be 287 ± 89ms, 273 ± 91ms, 303 ± 59ms and 290 ± 90ms respectively. It is known from these mean values that the SVRT of Forward players in Football is quicker than Midfielders, Defenders and Goal Keepers. There exists significant difference in Simple Visual Reaction Time (SVRT) between Midfielders & Defenders and between Midfielders and Goal Keepers ($p < 0.05$).

The mean Discriminative Auditory Reaction Times of Forwards, Midfielders, Defenders and Goal Keepers were found to be 298 ± 88ms, 292 ± 90ms, 281 ± 47ms and 301 ± 98ms respectively. It is known from these mean values that the DART of Defenders in Football is quicker than Forwards, Midfielders and Goal Keepers. There exists a significant difference in Discriminative Auditory Reaction Time (DART) of Defenders and Goal Keepers ($p < 0.05$).

The mean Discriminative Visual Reaction Times of Forwards, Midfielders, Defenders and Goal Keepers were found to be 317 ± 80ms, 313 ± 82ms, 316 ± 98ms and 302 ± 90ms respectively. It is known from these mean values that the DVRT of Goal Keepers in Football is quicker than Forwards, Midfielders and Defenders. There is no significant difference in Discriminative Visual Reaction Time (DVRT) between the players of four positions in Football ($p > 0.05$).

The mean Choice Reaction Times of Forwards, Midfielders, Defenders and Goal Keepers were found to be 344 ± 93ms, 356 ± 94ms, 348 ± 83ms and 364 ± 62ms respectively. It is known from these mean values that the CRT of Forward players in Football is quicker than Midfielders, Defenders and Goal Keepers. There is no significant difference in Choice Reaction Time (CRT) between the players of four positions in Football ($p > 0.05$).

Variation of Reaction Times of team game players from position to position in Volleyball.

A total of 40 Volleyball players were selected for the study. These subjects were further divided into four groups depending on their playing positions as follows

1. Setter, 2. Attacker & 3. Libero/Defensive Specialists.

It was found that

The mean Simple Auditory Reaction Times of Attackers, Setters and Liberos were found to be 216 ± 89ms, 211 ± 78ms and 206 ± 80ms respectively. It is known from these mean values that the SART of Liberos in Volleyball is quicker than Attackers and Setters. There exists a significant difference in Simple Auditory Reaction Time (SART) between Attackers and Liberos ($p < 0.05$).

The mean Simple Visual Reaction Times of Attackers, Setters and Liberos were found to be 232 ± 82ms, 234 ± 80ms and 226 ± 81ms respectively. It is known from these mean values that the SVRT of Liberos in Volleyball is quicker than Attackers and Setters. There is no significant difference in Simple Visual Reaction Time (SVRT) between players of three specializations in Volleyball ($p > 0.05$).

The mean Discriminative Auditory Reaction Times of Attackers, Setters and Liberos were found to be 258 ± 81ms, 260 ± 78ms and 247 ± 80ms respectively. It is known from these mean values that the DART of Liberos in Volleyball is quicker than Attackers and Setters. There exists a significant difference in Discriminative Auditory Reaction Time (DART) between Setters and Liberos ($p < 0.05$).

The mean Discriminative Visual Reaction Times of Attackers, Setters and Liberos were found to be 277 ± 74ms, 282 ± 71ms and 266 ± 73ms respectively. It is known from these mean values that the DVRT of Liberos in Volleyball is quicker than Attackers and Setters. There exists a significant difference in Discriminative Visual Reaction Time (DVRT) between Setters and Liberos ($p < 0.05$).

The mean Choice Reaction Times of Attackers, Setters and Liberos were found to be 309 ± 85ms, 299 ± 83ms and 304 ± 83ms respectively. It is known from these mean values that the CRT of Setters in Volleyball is quicker than Attackers and Liberos. There is no significant difference in Choice Reaction Time (CRT) between players of three specializations in Volleyball ($p > 0.05$).

**Recommendations**

In the present study the research has been carried out only with respect to Auditory and Visual Reaction Times. Similar studies can be carried out for Tactile Reaction times also.

The sample size of the study for studying the variation of Reaction Time with respect to playing positions was small. Bigger sample sizes with respect to position of players may give the best analysis.Research was limited to only 4 team games. Similar studies can be carried out in case of other games also which may yield interesting useful results.Reaction time is one among various Psycho-motor abilities of a human being. So, interest can be shown in studying the other Psycho-motor abilities such as Hand-eye coordination, Movement time etc.

As studied in this research in case of team games, the variation of Reaction Times from game to game may also be studied with respect to different individual games.

Much more advanced equipments can be used to carry out better useful research for the field of Sports Psychology.

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# Comparison of Speed among Kabbadi and Kho Kho Players of Telangana

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**Introduction:**

Kabaddi) is a contact sport that originated in Ancient India International Kabaddi.National Kabaddi recognised by the Amateur Kabadi Federation of India: National style (which resembles the Sanjeevani style), Circle style (the Punjab style), Indoor and national games, Beach Kabaddi and National professional league Kabaddi.The three national styles recognised by the International Kabaddi Federation:http://en.wikipedia.org/wiki/Kabaddi - cite_note-2Sanjeevani, Gaminee and Amar; Punjab Circle style governed by the Amateur Circle Kabaddi Federation of India. A number of similar contact sports which are peculiar to various regions such as *hadudu* in Bangladesh, *baibalaa* in Maldives, *chedugudu* in Andhra Pradesh, *sadugudu* in Tamil Nadu and Hututu in Maharashtra.Kabaddi initially became famous in Punjab Region as it was part of their per martial tradition, and is popular throughout South Asia, and has spread to Southeast Asia, Japan and Iran.
Pro Kabaddi League was introduced in 2014 in India based on Indian Premier League. The first edition of the tournament had begun at 26 July 2014 with eight franchises based at eight different cities in India consisting of players from all over the world. Jaipur Pink Panthers won the inaugural edition. The other teams in the competition were U Mumba based at Mumbai, Bengaluru Bulls based at Bengaluru, Delhi Dabbangs based at Delhi, Puneri Paltans based at Pune, Telugu Titans based at Vizag\Visakhapatnam, Bengal Warriors based at Kolkata and Patna Pirates based at Patna. The broadcast rights were purchased by the star sports network. The Pro Kabaddi League uses the National Kabaddi style.

Kho kho is a tag sport played by teams of twelve players who try to avoid being touched by members of the opposing team, only 9 players of the team enter the field.http://en.wikipedia.org/wiki/Kho_kho_-_cite_note-1 It is one of the two most popular traditional tag games of the Indian subcontinent, the other being kabbadi. Apart from the Subcontinent, it is also played in South Africa.Asian Kho Kho Federation (A.K.K.F.) was established in the year 1987 during 3rd SAF Games, held at Kolkota, India. The member country was India, Bangladesh, Pakistan, Sri Lanka, Nepal and MaldivesKho Kho made its entry Into INTERNATIONAL SPORTS Arena Via 1st ASIAN KHO KHO CHAMPIONSHIP Held At Kolkata, India In 1996, Organized By West Bengal Kho Kho Association Under The Auspices Of Kho Kho Federation Of India And SIAN Kho Kho Federation On "Tera Flex" Court at Netaji Subhash Indoor Stadium, Kolkota, West Bengal, India in a most beautiful manner. India and Bangladesh were Winner and Runner-up respectively. The participants were Bangladesh, Pakistan, Sri Lanka, Nepal and host India.2nd Asian KhoKho Championship was held in Bangladesh in the year 2000 at Mirapur Indoor Stadium, Dhaka, Bangladesh has strengthened the approach of the game KhoKho in the International Arena. India, Sri Lanka, Pakistan, Nepal, Japan, Thailand and host Bangladesh were participants of the Championship.

**Significance of the Study:**

This study will determing the speed among Kho and Kabbadi Players and also useful to Coaches to give scientific training to develop the speed.

**Methodology:**

AIM: To find out the Speed between Male Kabbadi Players and Male Kho Kho Players of Sri Vasavi Raja Pratap College of Physical Education, Jadacherla, Mahabubnagar

**Sample:**
The sample for present study consists of 20 Male Kabbadi Players and 20 Male Kho Kho Players studying in the Sri Vasavi Raja Pratap College of Physical Education, Jadcherla, Mahabubnagar. This Study is limited to the Students of Sri Vasavi Raja Pratap College of Physical Education, Jadcherla, Mahabubnagar district those who are good in Kabbadi and Kho.

TOOLS: 30 Meter Run is used to collect the data for speed .
30 Meters sprint Test:
Objective:To monitor the development of the athlete's maximum sprint speed.
To undertake this test you will require:
• Flat non-slip surface, Cones and Stopwatch
• Assistant
This test requires the athlete to sprint as fast as possible over 30 metres
• The athlete warms up for 10 minutes
• The assistant marks out a 30 metre straight section with cones
• The athlete starts in their own time and sprints as fast as possible over the 30 metres
• The assistant starts the stopwatch on the athlete's 1st foot strike after starting and stopping the stopwatch as the athlete's torso crosses the finishing line
• The test is conducted 3 times
• The assistant uses the fastest recorded time to assess the athlete's performance.

**Results and Discussion:**
The results of the Study shows that Kho Kho Players are having good Speed Compare to Kabbadi Players.

Table: 1 Showing the Performance of Kabbadi Players and Kho Kho Players in 30 M Run

| Group | N | Mean | Std. Deviation | t | Sig. |
|---|---|---|---|---|---|
| Kabbadi | 20 | 4.520 | 0.224 | 0.484 | 0.630 |
| Kho Kho | 20 | 4.493 | 0.217 | | |

In Table –I the Mean Values of Kabbadi Players is 4.520 and Kho Kho Players is 4.493. The Standard Deviation of Kabbadi Players is 0.224 and Kho Kho Players is 0.217 and t is 0.484. The Mean average shows that Kho Kho Players are good Compare to Kabbadi Players.

**Conclusions:**
It is concluded that Kho Kho Players are having slightly higher speed Compare to Kabbadi Players.

**Recommendations:**
Similar Studies can be conducted among females and in other sports and games. This type of studies is useful for preparing the coaching and condition program for improvement of motor qualities among the sports Persons.

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# A Comparative Study of Speed among Foot Ball and Hockey Players of Rayalaseema College of Physical Education, Proddatur

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**Abstract:**
The purpose of the present study to find out the Speed among Foot Ball and Hockey Players of Rayalseema College of Physical Education. The sample for the present study consists of 30 Male Sports Students studying in Rayalseema College of Physical Education i.e. 15 Foot Ball Players and 15 Hockey Players.To assess the Speed the 50 M Run Test Were conducted.. It was found that Foot Ball Players are having good speed compare to Hockey Players.Key Words: speed, Foot Ball, Hockey etc.

**Introduction:**
Speed and quickness are skills that can be taught with number of specialised acceleration training techniques and football specific conditioning protocols, which change movement patterns and stimulate both the muscular and the nervous system, footballers can improve their speed, agility, acceleration and power..Foot Ball Players need to be physically fit and also poses excellent motor fitness and technical skills. Speed is the essential motor quality in foot ball players.
Speed is a game defining physical quality in Field Hockey. It allows players to win races to the ball, create separation on the pitch and ultimately produce a higher number of goal scoring opportunities whilst minimising attacking threats in defence. The games football and hockey are most popular sports in the world in terms of spectator sports. It is fast,agile, quick and aggressive. Research Studies have revealed that reaction time is independent of speed. Although it is also known that physical training has positive effects on both reaction time (Davranche et al. 2006) and speed (Little & Williams 2005) the relationship between reaction time and speed has not been extensively investigated in the literature. In the physical education field some sports activities like field games (football and hockey) and long distance running need aerobic capacity to perform the activity in a better manner

**Methodology:**
AIM: The purpose of the present study to find out the Speed among Foot Ball and Hockey Players of Rayalseema College of Physical Education, Proddatur, A.P.
SAMPLE:
The sample for the present study consists of 30 Male Sports Students studying in Rayalseema College of Physical Education i.e. 15 Foot Ball Players and 15 Hockey Players
**Administration of 50 m. Run Test**
The test involves running a single maximum sprint over 50 meters by the time recorded. A thorough warm up should be given, including some practice starts and acceleration. Start from a stationary standard position with one foot in front of the other. The front foot must be behind the starting line. Once the subject is ready and motionless, the starter gives the instructions ‘Set’ then ‘go’. The tester should provide hints for maximizing speed and the participant should be encouraged not to slow down before crossing the finish line.

Scoring
Two trials were allowed and the best time is recorded to the nearest 2 decimal places. The timing starts from the first movement or when the timing system was triggered and finishes when the torso crossed the finish line .

**Results and Discussion:**

The Results of the study shows the Foot ball Players are having better speed compare to Hockey Players.

**Table: 1 Showing the Mean Values of Foot Ball Players and Hockey Players in 50 M Run**

| Group | N | Mean | Std. Error Mean | t-value | Sig. |
|---|---|---|---|---|---|
| Foot Ball Players | 15 | 7.15 | 0.113 | -1.733 | .459 |
| Hockey Players | 15 | 7.45 | 0.130 | | |

Significance at 0.05 level

Table 1 indicates that the mean value of the speed of Football player is 7.15 and Hockey players are 7.45 The result shows that Football players are having good speed compare to the Hockey players. S.D. of Football and hockey players

**Conclusions:**

On the basis of the result of the study, it can be concluded that there was a significant difference between the Football and Hockey of Male Players in relation to speed ability. Football players have speedier in comparison to Hockey players due to the nature of the game, training schedule, ground length and flat running according to game demand and also time play of 90 Minutes.

**Recommendations:**
Similar Studies can be conducted among females and in other events in athletics. This type of studies is useful for preparing the coaching and condition program for improvement of motor qualities among the long jumpers and sprinters.

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# Injuries among Basket Ball Players and Hand Ball Players of Rayalaseema Region- A Review

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Abstract:
The sample for the study consists of 50 male players i.e. 25 Basket Ball Players and 25 Hand Ball Players of Rayalaseema region between the age group of 18 to 22 Years. The Data is collected through questionnaire from Basket Ball and Hand Ball Players.Questionnaire forms were used to collect the data and were distributed to participants who regularly practiced Hand Ball and Basket Ball in different playgrounds in Rayalseema region..The form included items on age, gender, length of practice, injury diagnosis. Lower Extremities Upper Extremities,Head,Neck and Spine.The Results of the Study shows that Basket Ball Players are having the Upper Extremities injuries are 15 %, lower extremities injuries are 55 %, Head 15%, Neck 15 % and vertebral Column 10%. The Results of the Study shows that Hand Ball Players are having the Upper Extremities injuries are 15 %, lower extremities injuries are 40 %, Head 15%, Neck 10 % and vertebral Column 20%. This type of study is useful to coaches to give proper coaching for development of motor qualities for prevention of injuries among Basket ball and Hand ball players. Key words: Injuries, lower extremities, upper extremities, Vertebral column etc.

**Introduction:**

Engaging in Sports Activities has numerous health benefits but also carries the risk of Injury. At Every Age Sports Persons sustain a wide variety of soft tissue, bone, ligament, tendon and nerve injuries caused by direct trauma or repetitive stress. Different sports are associated with different patterns and types of injuries, whereas age, gender and type of activity influence the prevalence of injuries. Sports trauma commonly affects joints of the extremities i.e.knee,ankle, hip, shoulder, elbow, wrist and spine. The sports injuries that occur in competition or practice has loss of time for participation in Sport.

J. Yde, A.B.Nielsen (1990) Sports Injuries in adolescents ball games: soccer, hand ball and basket ball,
In a prospective study of 302 adolescent players in three ball games (soccer, handball and basketball), 119 incurred injuries. The injury incidence (number of injuries per 1000 playing hours) was 5.6 in soccer, 4.1 in handball and 3.0 in basketball. Ankle sprains accounted for 25 per cent of the injuries, finger sprains 32 per cent, strains in the thigh and leg 10 per cent, and tendinitis/apophysitis 12 per cent. The most serious injuries were four fractures, one anterior cruciate ligament rupture, and two meniscus lesions. The most serious injuries, with the longest rehabilitation period, occurred in soccer. In soccer, many injuries occurred during tackling and contact with an opposing player, while the injuries in handball and basketball were often caused by ball contact and running.

**Methodology:**

The sample for the study consists of 50 male players i.e. 25 Basket Ball Players and 25 Hand Ball Players. The Data is collected through questionnaire from Basket Ball and Hand Ball Players.Questionnaire forms were used to collect the data and were distributed to participants who regularly practiced Hand Ball and Basket Ball in different playgrounds in Rayalseema region..The form included items on age, gender, length of practice, injury diagnosis. Lower Extremities Upper Extremities,Head,Neck and Spine

**Results:**

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Table 1: Percentage of Injuries among Basket Ball Players

| lower extremities injuries knee,lowerleg lower ankle | Upper Extremities | Head | Neck | Vertebral Column |
|---|---|---|---|---|
| 55 | 15 | 15 | 5 | 10 |

The Results of the Study shows that Basket Ball Players are having the Upper Extremities injuries are 15 %, lower extremities injuries are 55 %, Head 15%, Neck 15 % and vertebral Column 10%

Table 2: Percentage of Injuries among Hand Ball Players

| lower extremities injuries knee,lower leg lower ankle | Upper Extremities | Head | Neck | Vertebral Column |
|---|---|---|---|---|
| 40 | 15 | 15 | 10 | 20 |

The Results of the Study shows that Hand Ball Players are having the Upper Extremities injuries are 15 %, lower extremities injuries are 40 %, Head 15%, Neck 10 % and vertebral Column 20%.

**Conclusions**::

Sufficient warm-up, proper technique, correct bio mechanics, proper conditioning, optimizing balance, coordination, optimizing reaction times, optimal diet, adequate rest, positive attitude will reduce the risk of injuries. Increase your flexibility by performing dynamic warm up prior to practice and competition followed by static stretching post activity.

**Recommendations' for further Research**:
Consult a Coach or Physical Trainer to incorporate the conditioning Programmes during the practice. Have a pre-season physical examination and follow your doctor's recommendations.Avoid overuse injuries — more is not always better! Many sports medicine specialists believe that it is beneficial to take at least one season off each year. Try to avoid the pressure that is now exerted on many young athletes to over-train. Listen to your body and decrease training time and intensity if pain or discomfort develops. This will reduce the risk of injury and help avoid "burn-out"Speak with a sports medicine professional or athletic trainer if you have any concerns about injuries or injury prevention strategies.

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