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GLIMPSES of 7th International Strength lifting Championship, Nagpur, India

Dr. Kaukab Azeem (President, Asian Strength lifting Federation and Vice President, WORLD Strength lifting Federation) had attended and addressing the gathering on the opening ceremony of the 7th International Strength lifting Championship at Nagpur, India from 18th to 20th Jan 2019.
Dr. Abdulhameed Al Ameer enlightening candle during the opening ceremony of International strengthlifting championship along with other dignitaries.

2nd L - Shri Babbul Bikas Partronobis Gen Secretary WSLF, extreme right
Shri. Mukambetov Dzheenbek, Chairman, WSLF during Medal Ceremony
R-Mr. Saquib A President TSLA at Medal Ceremony. Shri. Hemant Dogaonkar Facilitated at the Champ

L-R-Dr. Shrikanth Warankar facilitated to Mr. Mukambetov Dzheenbek, Chairmen, WSLF and in the back ground other dignitaries can be seen.
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CONDITION OF CHILDREN’S OBESITY OF ELEMENTARY SCHOOL CHILDREN IN BOSNIA AND HERZEGOVINA: CASE STUDY HERCEGOVINA- NERETVA CANTON

Ekrem Čolakhodžić1, Rijad Novaković1, Damir Dedović1, Almir Popo1, Azer Korjenić1, Nedžad Vuk2, Ćamil Habil3, Adi Palić1, Adnan Ademović1

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ABSTRACT

According to WHO data, 41 million children under 5 years of age and over 340 million children and adolescents from 5 to 19 years old, have excessive body mass or are overweight (WHO, 2016.). Sedentary lifestyle and improper diet at children and adolescents lead to a range of health problems, mental disorders, and disease in old age. The impact of global changes is also reflected in society in Bosnia and Herzegovina. Determining obesity is of general importance for public health and society as a whole. There are rare researches that deals with this issue in BiH, and this research has been conducted so that the results are available to the general public. The state of nourishment of children from grades I - IX in the Herzegovina - Neretva Canton (HNK) state on a sample of 2626 pupils was determined. The height and weight of the body were measured, by which the body mass index (BMI) was calculated. The data of the respondents are arranged in a static sequence for each class and gender, and then 3, 15, 85, and 97 percentile are determined, as well as percentages and frequencies for each category. The results show that normal body weight has 67.88% of children, while 15.60% has an increased body mass or obesity. In comparison to gender, overweight or obese 1337 boys, 339 have them (15.62%), and 1289 girls have 201 (15.59%). It is worth to notice that 15.98% of respondents are moderately malnourished or malnourished, and by gender, the same number of malnourished girls compared to boys (15.97% vs 15.98%). Almost every third child in HNK has a nutrition disorder (31.61%), which is troubling and alarming. The highest proportion of girls with normal body weight (69.23%) is in the IV grade, while in the boys in the second grade (69.23%). The smallest percentage of normal bodyweight in pupils is in IX grade (67.22%), and for boys in grade VI (66.87%). The results indicate the necessity of preventing obesity in order to prevent unwanted consequences at a later age, as well as encouraging all active participants in the educational process in BiH to prevent the development of obesity through education of the importance of proper nutrition and physical activity through greater activation of children in sections and clubs. BiH has no developed strategy to fight these global health problems, and therefore these results should serve the wider social community as a fact about the state of nutrition of children in the area of HNK and as a recommendation for the prevention of obesity.

Keywords: obesity, BMI, children, nutritional status, obesity prevention

INTRODUCTION

Obesity (lat. Obesites) is a chronic disease that is caused by excessive accumulation of fat in the body and increased body mass. Any increase of more than 10% of the ideal mass is considered to be obesity. Obesity is a disease that depends on many factors and is one of today’s global health problems. The epidemic of this disease is increasing, and it is one of the leading diseases of modern civilization. This disease has a negative effect on many organs and organic systems, and obesity
increases the risk of cardiovascular disease. Increased intake of high-fat foods rich in fat and refined sugars with inadequate physical activity leads to the generation of excess energy, which is stored in the body in the form of fat. It can be said that obesity is a disparity between increased intake and decreased energy consumption, resulting in the storage of excess energy in the fatty tissue. Technological advances and modern lifestyles contribute to prolonging the average lifespan but, on the other hand, lead to new psycho-somatic and health threats and problems. Changes in lifestyle that have occurred in the last decades have influenced significantly both the adult and the children's population. A sedentary lifestyle causes children to have a less and less physical activity while simultaneously unlimited access to large amounts of high-calorie food, which increases the risk of developing obesity and associated diseases. The health consequences of this kind of situation in the population are particularly fatal for children and adolescents, as apart from later contributing to a range of bodily deformities and illnesses, they also contribute to mental disorders and illnesses (Wabitsch, 2000.). The number of obese children in developed western countries has increased more than three times in twenty years (Doyle et al., 2007.). In the younger population over the past 20 years, an epidemic of metabolic disorders related to thickness has been observed, and which until then had been characteristic of the older age. Increased prevalence of obesity also increases the number of young people affected by metabolic syndrome and type 2 diabetes (Ille et al., 2008). Unfortunately, it is known that with the diagnosis of type 2 diabetes in the younger age, there are increased risks for certain diabetic complications (Yokoyama et al., 1998), which are a major burden for both the sick and the society. According to the latest global estimates of the World Health Organization (WHO) in 2016, there are currently billions and 600 million people over 18 years of age with overweight (BMI > 25) in the world, of whom more than 650 million people were obese (BMI > 30). In 2016, 39% of adults over 18 years of age (39% of men and 40% of women) were overweight. In total, about 13% of the adult population in the world (11% of men and 15% of women) were obese in 2016. The prevalence of obesity in the world almost tripled between 1975 and 2016. As for children, it is estimated that in 2016, 41 million children under the age of 5 were overweight or obese. Excessive body weight and obesity are now on the rise in low- and middle-income countries, especially in urban areas. In Africa, the number of children overweight up to 5 years has increased by almost 50 percent since 2000. Almost half of the children under the age of 5 who had an excessive body mass or who were obese in 2016 live in Asia. More than 340 million children and adolescents aged 5 to 19 years were overweight or obese in 2016. The prevalence of overweight and obesity in children and adolescents at the age of 5-19 years increased dramatically from just 4% in 1975 to slightly over 18% in 2016. The increase is similar in boys and girls: in 2016, 18% of girls and 19% of boys were overweight. While slightly less than 1% of children and adolescents aged 5 to 19 were obese in 1975, more than 201 million children and adolescents (6% of girls and 8% of boys) was obese in 2016. On a global scale, there are more people who are obese than malnourished - this is happening in every region other than parts of sub-Saharan Africa and Asia. The largest increase in BMI in children and adolescents over four decades was in Polynesia and Micronesia for boys and girls, and in Central Latin America for girls. The smallest increase in BMI for children and adolescents over four decades covered by research is visible in eastern Europe. The country with the highest increase in BMI for girls was Samoa, which grew by 5.6 kg/m², while for the boys it was the Cook Islands, which grew by 4.4 kg/m². Regarding malnutrition, India had the highest prevalence of moderate and severe obesity over the past four decades (24.4% of girls and 39.3% of boys had moderate or severe malnutrition from 1975, and 22.7% of girls and 30.7% of boys in 2016). In India, 97 million of the world's children were moderately or severely malnourished in 2016. The assessment of child nutrition in Croatia
for the period 1997-2002 (National Action Plan for Children's Rights and Interests, 2006) showed that 69.5% of children were properly fed on average, while elevated body weight was 11% of children, and obesity there were 5.2% of children. The results of the BMI study for children aged 11-15 in 31 countries testify to this unfavorable trend in changes in the body weight of young people in Croatia. In the period from 2002 to 2006, Croatia moved up to a dozen places in the ranking of the countries involved in the study in each of the examined groups, indicating a significant and worrying relative increase in body weight and obesity in this age group (Behavior on Health in children of school age, 2008). These data are alarming because fatness is associated not only with significant health problems among the population of children and adolescents, but also an important risk factor for morbidity and mortality in adulthood (Caprio et al., 2005.). The results of the study of the obesity of children in BiH, which were conducted in the Sarajevo Canton (KS) in 2016, which included a total of 33,200 students from the I to IX grade, show that an extremely large number of children with increased body mass (Abazović and associates, 2016). Of the total number of respondents covered by this survey, as much as 39.6% (13,159) were obese. Observing separately gender respondents, obesity is more prevalent among boys. Out of a total of 16,960 boys, 7,451 (43.9%) had an increased body mass or were overweight, while out of 16,241 girls, 5,798 (35.2%) had an increased body mass or obese. Also, the results of this study show that 9.7% (3 206) of students in KS is malnourished and in observing separately, there are more malnourished girls compared to boys, ie (10.1% vs. 9.2%). Early prevention and treatment of overweight are important not only because of the health and social risks that are exposed to excessively severe and obese children but also in order to reduce the number of adult populations with these disorders later on. The influence of parents on the body weight of children is the result of a number of factors associated with the adoption of certain habits that favor the development of excessive body weight, such as eating habits and physical activity. If children in the family are provided with healthy foods, and if parents are happy to eat, children will create a preference for such a type of food (Hood et al., 2000.). Similarly, the physical activity of parents is very important in shaping these habits in children. Even pre-school children whose parents regularly practice physical exercise have almost six times the probability of being physically active (Durant, 1994.). Parents also influence factors that indirectly affect the excessive body mass of children. Parents have the duty to regulate the amount of time children spend watching TV, both from others and for reasons related to the prevention of obesity (Gortmaker, 1996.). In addition to the health risks associated with the fatness, the risks of social and emotional functioning, especially among girls (Swallen et al., 2005.), are also associated with childhood and adolescence. Obese children are more often exposed to teasing teenagers compared to children of normal body weight. The majority of obese children attributes their own difficulties in social relations to their body mass, and 90% of them think that teasing will stop when they lose weight, and more than half of them think that they would have more friends in that case. The stereotypes that other children, but often adults, have about obesity in children, are indeed negative. There are beliefs that obese children are lazy, stupid, dirty, mean, and that they could lose weight if they wanted it (Schwartz et al., 2003.). In assessing obesity for young children, one of the possibilities is weighing and comparing body weight with reference values for a certain age or height, while for older children and adolescents there are several anthropometric methods that have a clearly defined methodology and measurement procedure, from measuring skin folds or measurements of the volume of extremities in certain places, up to modern measurement procedures of bioelectric resistance measurement (Bioelectrical Impedance Analysis - BIA). The emergence of new methods is the most commonly used trend, but for the diagnosis of obesity, BMI is most often used, and this measure is a gold
standard recommended by the WHO and the World Federation for Obesity and the US Center for Disease Control and Prevention (CDC). When it comes to BMI estimates, the standardized protocol for estimating body weight and height proposed by Lohman and associates in 1988 is still used in field and laboratory conditions.

Most authors recommend measuring in the morning (Malina et al., 2004; Lohman et al., 1992). BMI, as an indication of nutrition, is calculated by dividing the body mass of a person in kilograms with a square of height in meters. BMI and this way of comparing the mass were developed by the Belgian scientist Adolphe Quetelet in the mid-19th century, which is why BMI is often referred to as the Quetelet index. BMI categorization is relatively simple for adults and, after calculating the formula, it is possible to determine exactly whether the person is malnourished, whether there is a normal or increased body mass. The normal range of BMI for adults has a value between 18.5 kg / m² and 24.9 kg / m² (National Institutes of Health, 2000.; WHO, 1998.; Cornier et al., 2011.). It is important to note that these are limit values exclusively for adults, while for persons under 20 years of age the age limit varies with age, and are also different in gender. According to the classification established by WHO, a 9-year-old who has a BMI value of 22 may be presumed to be obese, while for 14-year-olds with the same BMI value it can be said to have a normal body mass because the value of his BMI- according to the same classification, is within normal limit values. Reference tables for people under the age of 20 are created according to the expected changes that occur between the gender and due to normal growth and development. The US Center for Disease Control and Prevention (CDC) and WHO created these tables, subliming the results of several studies and found that children above 85% had an increased body mass. These two organizations have different criteria when it comes to obesity. According to CDC, obese children are all those with BMI above 95%, while, according to the WHO, the limit value is 97 percentile (Kuczmarski et al., 2000; Ogden et al., 2012). In addition, the International Obesity Task Force known as the Federation of Obesity in the World created a BMI pediatric reference plate in 2000 (Cole et al., 2000). It is important to emphasize that the WHO is most active in the creation of pediatric tables, and currently WHO is the most widely used in the world (WHO, 2006). Although some authors state that CDC 2000 reference tables, when comparing with WHO, classify a larger number of children in the "overweight" class, and approximately the same in the "obesity" class, it is important to indicate that the CDC 2000 norms were created exclusively on the American population of children (Kuczmarski et al., 2000; Kuczmarski et al., 2010). Freedman et al. (2007) state that children within 99-100 percentiles will almost certainly continue the same trend in adulthood. Although there are some differences between the studies that sought to answer this question, according to the opinion of the majority (Power and sar., 1997; Must and sar., 1999; Strauss, 2000; Freedman et al., 2007), it can be concluded that about 40% of children have these problems in adulthood.

METHOD

The aim of the research is to determine the condition of obesity in children of elementary school age (from I to IX grade) in the area of Herzegovina-Neretva Canton (HNK) in Bosnia and Herzegovina, during the school year 2017./18. years. The obtained results of this study were taken and processed according to the WHO and CDC standards of the USA in that the individual data of the respondents were obtained, for each class and gender, respectively arranged in a statistical sequence. Then, 3, 15, 85 and 97 percentile ranges according to the formula were determined: 

\[ i = \frac{P}{100} \times n \]
where is it
• i - the position of the requested percentile in distribution,
• P - the required percentile,
• n - total number of results in distribution.

After determining percentual ranks for each grade and gender, percentage and frequency of children for each ranking are determined.

**The sample of respondents**

The sample of respondents in this study consisted of 2626 elementary school students from the HNK area (Table 1). The sample consisted of 1337 boys and 1289 girls from the I to the IX grade of eight elementary schools from Mostar, Konjic, Jablanica, Stolac, and Capljina.

<table>
<thead>
<tr>
<th>Grade</th>
<th>n</th>
<th>Age (years) Mean</th>
<th>Standard Deviation</th>
<th>Height (cm) Mean</th>
<th>Standard Deviation</th>
<th>Mass (kg) Mean</th>
<th>Standard Deviation</th>
<th>BMI (kg/m²) Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>133</td>
<td>6.63</td>
<td>.543</td>
<td>126.52</td>
<td>5.34</td>
<td>27.52</td>
<td>6.04</td>
<td>17.12</td>
<td>2.91</td>
</tr>
<tr>
<td>II</td>
<td>130</td>
<td>7.75</td>
<td>.597</td>
<td>133.49</td>
<td>6.18</td>
<td>31.24</td>
<td>6.64</td>
<td>17.43</td>
<td>3.01</td>
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<tr>
<td>III</td>
<td>122</td>
<td>8.60</td>
<td>.507</td>
<td>137.95</td>
<td>6.69</td>
<td>33.60</td>
<td>7.95</td>
<td>17.57</td>
<td>3.26</td>
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<tr>
<td>IV</td>
<td>143</td>
<td>9.51</td>
<td>.579</td>
<td>144.06</td>
<td>6.78</td>
<td>38.40</td>
<td>8.91</td>
<td>18.36</td>
<td>3.32</td>
</tr>
<tr>
<td>V</td>
<td>123</td>
<td>10.65</td>
<td>.650</td>
<td>148.78</td>
<td>6.98</td>
<td>41.10</td>
<td>9.69</td>
<td>18.43</td>
<td>3.11</td>
</tr>
<tr>
<td>VI</td>
<td>160</td>
<td>11.55</td>
<td>.523</td>
<td>155.76</td>
<td>7.75</td>
<td>49.03</td>
<td>12.51</td>
<td>20.03</td>
<td>4.03</td>
</tr>
<tr>
<td>VII</td>
<td>167</td>
<td>12.54</td>
<td>.545</td>
<td>162.32</td>
<td>8.73</td>
<td>54.03</td>
<td>12.99</td>
<td>20.32</td>
<td>3.80</td>
</tr>
<tr>
<td>VIII</td>
<td>176</td>
<td>13.50</td>
<td>.534</td>
<td>167.66</td>
<td>8.88</td>
<td>57.57</td>
<td>13.00</td>
<td>20.39</td>
<td>3.63</td>
</tr>
<tr>
<td>IX</td>
<td>183</td>
<td>14.54</td>
<td>.541</td>
<td>174.27</td>
<td>6.99</td>
<td>65.01</td>
<td>13.24</td>
<td>21.33</td>
<td>3.75</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Grade</th>
<th>n</th>
<th>Age (years) Mean</th>
<th>Standard Deviation</th>
<th>Height (cm) Mean</th>
<th>Standard Deviation</th>
<th>Mass (kg) Mean</th>
<th>Standard Deviation</th>
<th>BMI (kg/m²) Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>I</td>
<td>141</td>
<td>6.64</td>
<td>.522</td>
<td>125.46</td>
<td>5.64</td>
<td>26.44</td>
<td>5.85</td>
<td>16.68</td>
<td>2.72</td>
</tr>
<tr>
<td>II</td>
<td>125</td>
<td>7.68</td>
<td>.559</td>
<td>130.66</td>
<td>6.15</td>
<td>29.04</td>
<td>6.55</td>
<td>16.89</td>
<td>2.97</td>
</tr>
<tr>
<td>III</td>
<td>117</td>
<td>8.63</td>
<td>.534</td>
<td>136.22</td>
<td>6.33</td>
<td>33.57</td>
<td>7.98</td>
<td>17.94</td>
<td>3.36</td>
</tr>
<tr>
<td>IV</td>
<td>116</td>
<td>9.59</td>
<td>.527</td>
<td>143.32</td>
<td>7.61</td>
<td>38.00</td>
<td>9.76</td>
<td>18.39</td>
<td>3.84</td>
</tr>
<tr>
<td>V</td>
<td>116</td>
<td>10.54</td>
<td>.609</td>
<td>149.31</td>
<td>7.02</td>
<td>41.78</td>
<td>9.46</td>
<td>18.59</td>
<td>3.21</td>
</tr>
<tr>
<td>VI</td>
<td>190</td>
<td>11.49</td>
<td>.541</td>
<td>155.88</td>
<td>7.54</td>
<td>46.51</td>
<td>10.48</td>
<td>19.00</td>
<td>3.37</td>
</tr>
<tr>
<td>VII</td>
<td>150</td>
<td>12.55</td>
<td>.512</td>
<td>160.30</td>
<td>6.67</td>
<td>53.76</td>
<td>11.66</td>
<td>20.84</td>
<td>3.98</td>
</tr>
<tr>
<td>VIII</td>
<td>154</td>
<td>13.51</td>
<td>.526</td>
<td>163.51</td>
<td>6.52</td>
<td>55.15</td>
<td>10.38</td>
<td>20.56</td>
<td>3.36</td>
</tr>
<tr>
<td>IX</td>
<td>180</td>
<td>14.47</td>
<td>.500</td>
<td>165.96</td>
<td>6.41</td>
<td>59.95</td>
<td>11.36</td>
<td>21.72</td>
<td>3.66</td>
</tr>
</tbody>
</table>

The survey was conducted between 1. and 31. May 2018. During the measurements, all subjects had the same conditions, were psycho-physically healthy and included in the regular teaching of physical and health culture. Measurement is carried out in the morning hours at the same time of day (± 2 hours).

**The sample of variables**

The sample of variables represent morphological measures (body height and body mass) used to calculate the body mass index (BMI):
- Body height - measured by Martin's anthropometer with an accuracy of 0.1 cm while the subject standing upright barefoot on a flat surface. The distance from the base to the head of the head is measured.
• Body mass - was measured by a medical weigh-in, while the subjects were standing on a weighed dressed only in underwear.
• Body mass index BMI (BMI) = body mass (kg) / body height² (m)

RESULTS AND DISCUSSION

Observing the general results on the basis of a survey conducted to determine the obesity of primary school children in HNK, involving a total of 2626 pupils, a very large number of children with increased body mass (Table 2 and Chart 1) were recorded. Of the total number of students enrolled in this study, as much as 15.60% (410) were overweight or obese. Looking at separate boys and girls, it can be noticed that excessive body weight is equally present in boys and girls. Out of a total of 1337 boys, 339 (15.62%) have an increased body mass or are overweight, while out of 1289 girls, 201 (15.59%) have an increased body mass or are obese. In addition, it is worth noting that 15.98% (420) of respondents are moderately malnourished or malnourished and that, by observing a separate gender, in this case, there are also approximately the same number of malnourished girls compared to boys (15.97% vs 15.98%). Namely, 46 (3.56%) girls are malnourished, while in boys this number is 53 (3.96%). According to the obtained results, almost every third child in HNK has a nutrition disorder (31.61%), which is extremely worrying and alarming.

Table 2. - BMI frequencies and percentages of students in HNK by categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>%</th>
<th>Boys</th>
<th></th>
<th>%</th>
<th>Total</th>
<th></th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td></td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>46</td>
<td>3.56%</td>
<td>53</td>
<td>3.96%</td>
<td>99</td>
<td>3.76%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>160</td>
<td>12.41%</td>
<td>161</td>
<td>12.04%</td>
<td>321</td>
<td>12.22%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Normal body weight</td>
<td>882</td>
<td>68.42%</td>
<td>914</td>
<td>68.36%</td>
<td>1796</td>
<td>68.39%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Overweight</td>
<td>156</td>
<td>12.10%</td>
<td>160</td>
<td>11.96%</td>
<td>316</td>
<td>12.03%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Obesity</td>
<td>45</td>
<td>3.49%</td>
<td>49</td>
<td>3.66%</td>
<td>94</td>
<td>3.57%</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>1289</td>
<td>100,0</td>
<td>1337</td>
<td>100,0</td>
<td>2626</td>
<td>100,0</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Graph 1.- The percentage of BMI students in HNK by category

BMI by category-total sample

- 3.76% MALNOURISHED
- 12.22% MODERATELY MALNOURISHED
- 68.39% NORMAL BODY WEIGHT
- 12.03% OVERWEIGHT
- 3.57% OBESITY
Observing the total sample of subjects covered by this study, results showed that the normal body mass had 67.88% of children. Considering the large age range, the charts and charts show the values recorded in each class individually as well as by gender (Chart 2). Observing the classes separately, it is noticeable that with the normal body mass the highest percentage of girls (69.23%) in the fourth grade, while the boys in the second grade (69.23%). When it comes to the lowest value, the normal body mass is the highest in the ninth grade (67.22%) and in the sixth grade (66.87%). When disaggregated by sex, the lowest percentage of students with normal body mass was recorded in the ninth grade (67.49%). The results of the frequency and the percentage of the number of children classified into one of the categories of slaughter by class and sex are shown in tables 3-11.

**Graph 2. - Percentage values of BMI of girls and boys in HNK by grade**

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>5</td>
<td>3.54%</td>
<td>6</td>
<td>4.51%</td>
<td>11</td>
<td>4.01%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>17</td>
<td>12.05%</td>
<td>15</td>
<td>11.27%</td>
<td>32</td>
<td>11.67%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>96</td>
<td>68.08%</td>
<td>90</td>
<td>67.66%</td>
<td>186</td>
<td>67.88%</td>
</tr>
<tr>
<td>Overweight</td>
<td>18</td>
<td>12.76%</td>
<td>17</td>
<td>12.78%</td>
<td>35</td>
<td>12.77%</td>
</tr>
<tr>
<td>Obesity</td>
<td>5</td>
<td>3.54%</td>
<td>5</td>
<td>3.75%</td>
<td>10</td>
<td>3.64%</td>
</tr>
<tr>
<td>Total</td>
<td>141</td>
<td>100,0%</td>
<td>133</td>
<td>100,0%</td>
<td>274</td>
<td>100,0%</td>
</tr>
</tbody>
</table>

**Graph 2. - Percentage values of BMI of girls and boys in HNK by grade**

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Total</th>
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</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>5</td>
<td>4.00%</td>
<td>5</td>
<td>3.84%</td>
<td>10</td>
<td>3.92%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>15</td>
<td>12.00%</td>
<td>15</td>
<td>11.53%</td>
<td>30</td>
<td>11.76%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>86</td>
<td>68.80%</td>
<td>90</td>
<td>69.23%</td>
<td>176</td>
<td>69.01%</td>
</tr>
<tr>
<td>Overweight</td>
<td>14</td>
<td>11.20%</td>
<td>15</td>
<td>11.53%</td>
<td>29</td>
<td>11.37%</td>
</tr>
<tr>
<td>Obesity</td>
<td>5</td>
<td>4.00%</td>
<td>5</td>
<td>3.84%</td>
<td>10</td>
<td>3.92%</td>
</tr>
<tr>
<td>Total</td>
<td>125</td>
<td>100,0%</td>
<td>130</td>
<td>100,0%</td>
<td>255</td>
<td>100,0%</td>
</tr>
</tbody>
</table>
Table 5. - Frequencies and percentage values of BMI by category – 3rd class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls Frequencies</th>
<th>%</th>
<th>Boys Frequencies</th>
<th>%</th>
<th>Total Frequencies</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnourished</td>
<td>4</td>
<td>3.41%</td>
<td>5</td>
<td>4.09%</td>
<td>9</td>
<td>3.76%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>14</td>
<td>11.96%</td>
<td>14</td>
<td>11.47%</td>
<td>28</td>
<td>11.71%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>81</td>
<td>69.23%</td>
<td>84</td>
<td>68.85%</td>
<td>165</td>
<td>69.03%</td>
</tr>
<tr>
<td>Overweight</td>
<td>14</td>
<td>11.96%</td>
<td>14</td>
<td>11.47%</td>
<td>28</td>
<td>11.71%</td>
</tr>
<tr>
<td>Obesity</td>
<td>4</td>
<td>3.41%</td>
<td>5</td>
<td>4.09%</td>
<td>9</td>
<td>3.76%</td>
</tr>
<tr>
<td>Total</td>
<td>117</td>
<td>100.0%</td>
<td>122</td>
<td>100.0%</td>
<td>239</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 6. - Frequencies and percentage values of BMI by category – 4th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls Frequencies</th>
<th>%</th>
<th>Boys Frequencies</th>
<th>%</th>
<th>Total Frequencies</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnourished</td>
<td>4</td>
<td>3.41%</td>
<td>6</td>
<td>4.19%</td>
<td>10</td>
<td>3.86%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>14</td>
<td>11.96%</td>
<td>17</td>
<td>11.88%</td>
<td>31</td>
<td>11.96%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>80</td>
<td>69.23%</td>
<td>98</td>
<td>68.53%</td>
<td>178</td>
<td>68.72%</td>
</tr>
<tr>
<td>Overweight</td>
<td>14</td>
<td>11.96%</td>
<td>17</td>
<td>11.88%</td>
<td>31</td>
<td>11.96%</td>
</tr>
<tr>
<td>Obesity</td>
<td>4</td>
<td>3.41%</td>
<td>5</td>
<td>3.49%</td>
<td>9</td>
<td>3.47%</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>100.0%</td>
<td>143</td>
<td>100.0%</td>
<td>259</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 7. - Frequencies and percentage values of BMI by category – 5th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls Frequencies</th>
<th>%</th>
<th>Boys Frequencies</th>
<th>%</th>
<th>Total Frequencies</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnourished</td>
<td>5</td>
<td>4.31%</td>
<td>5</td>
<td>4.06%</td>
<td>10</td>
<td>4.18%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>13</td>
<td>11.20%</td>
<td>14</td>
<td>11.38%</td>
<td>27</td>
<td>11.29%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>80</td>
<td>68.96%</td>
<td>85</td>
<td>69.10%</td>
<td>165</td>
<td>69.03%</td>
</tr>
<tr>
<td>Overweight</td>
<td>14</td>
<td>12.06%</td>
<td>15</td>
<td>12.19%</td>
<td>29</td>
<td>12.13%</td>
</tr>
<tr>
<td>Obesity</td>
<td>4</td>
<td>3.44%</td>
<td>4</td>
<td>3.25%</td>
<td>8</td>
<td>3.34%</td>
</tr>
<tr>
<td>Total</td>
<td>116</td>
<td>100.0%</td>
<td>123</td>
<td>100.0%</td>
<td>239</td>
<td>100.0%</td>
</tr>
</tbody>
</table>

Table 8. - Frequencies and percentage values of BMI by category – 6th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls Frequencies</th>
<th>%</th>
<th>Dječaci Frequencies</th>
<th>%</th>
<th>Total Frequencies</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Malnourished</td>
<td>6</td>
<td>3.15%</td>
<td>6</td>
<td>3.75%</td>
<td>12</td>
<td>3.42%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>24</td>
<td>12.63%</td>
<td>21</td>
<td>13.12%</td>
<td>45</td>
<td>12.85%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>131</td>
<td>68.94%</td>
<td>107</td>
<td>66.87%</td>
<td>237</td>
<td>67.71%</td>
</tr>
<tr>
<td>Overweight</td>
<td>23</td>
<td>12.10%</td>
<td>21</td>
<td>13.12%</td>
<td>44</td>
<td>12.57%</td>
</tr>
<tr>
<td>Obesity</td>
<td>6</td>
<td>3.15%</td>
<td>5</td>
<td>3.12%</td>
<td>11</td>
<td>3.14%</td>
</tr>
<tr>
<td>Total</td>
<td>190</td>
<td>100.0%</td>
<td>160</td>
<td>100.0%</td>
<td>350</td>
<td>100.0%</td>
</tr>
</tbody>
</table>
Table 9. - Frequencies and percentage values of BMI by category – 7th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>5</td>
<td>3.33%</td>
<td>6</td>
<td>3.59%</td>
<td>11</td>
<td>3.47%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>20</td>
<td>13.33%</td>
<td>20</td>
<td>11.97%</td>
<td>40</td>
<td>12.61%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>10 2</td>
<td>68.00%</td>
<td>115</td>
<td>68.86%</td>
<td>217</td>
<td>68.45%</td>
</tr>
<tr>
<td>Overweight</td>
<td>17</td>
<td>11.33%</td>
<td>20</td>
<td>11.97%</td>
<td>37</td>
<td>11.67%</td>
</tr>
<tr>
<td>Obesity</td>
<td>6</td>
<td>4.00%</td>
<td>6</td>
<td>3.59%</td>
<td>12</td>
<td>3.78%</td>
</tr>
<tr>
<td>Total</td>
<td>150</td>
<td>100</td>
<td>167</td>
<td>100</td>
<td>317</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 10. - Frequencies and percentage values of BMI by category – 8th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>6</td>
<td>3.89%</td>
<td>6</td>
<td>3.40%</td>
<td>12</td>
<td>3.63%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>18</td>
<td>11.68%</td>
<td>22</td>
<td>12.50%</td>
<td>40</td>
<td>12.12%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>105</td>
<td>68.18%</td>
<td>121</td>
<td>68.75%</td>
<td>226</td>
<td>68.48%</td>
</tr>
<tr>
<td>Overweight</td>
<td>20</td>
<td>12.98%</td>
<td>19</td>
<td>10.79%</td>
<td>39</td>
<td>11.81%</td>
</tr>
<tr>
<td>Obesity</td>
<td>5</td>
<td>3.24%</td>
<td>8</td>
<td>4.54%</td>
<td>13</td>
<td>3.93%</td>
</tr>
<tr>
<td>Total</td>
<td>154</td>
<td>100</td>
<td>176</td>
<td>100</td>
<td>330</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 11. - Frequencies and percentage values of BMI by category – 9th class HNK

<table>
<thead>
<tr>
<th>Category</th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Total</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
<td>Frequencies</td>
<td>%</td>
</tr>
<tr>
<td>Malnourished</td>
<td>6</td>
<td>3.33%</td>
<td>8</td>
<td>4.37%</td>
<td>14</td>
<td>3.85%</td>
</tr>
<tr>
<td>Moderately malnourished</td>
<td>25</td>
<td>13.88%</td>
<td>23</td>
<td>12.50%</td>
<td>48</td>
<td>13.22%</td>
</tr>
<tr>
<td>Normal body weight</td>
<td>121</td>
<td>67.22%</td>
<td>124</td>
<td>67.75%</td>
<td>245</td>
<td>67.49%</td>
</tr>
<tr>
<td>Overweight</td>
<td>22</td>
<td>12.22%</td>
<td>22</td>
<td>12.02%</td>
<td>44</td>
<td>12.12%</td>
</tr>
<tr>
<td>Obesity</td>
<td>6</td>
<td>3.33%</td>
<td>6</td>
<td>3.27%</td>
<td>12</td>
<td>3.30%</td>
</tr>
<tr>
<td>Total</td>
<td>180</td>
<td>100</td>
<td>183</td>
<td>100</td>
<td>363</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Given that, for obesity in the world it is said that it has gained global proportions, and also for easier insight into the condition of children of elementary school age in HNK, it is also important to make comparisons of them with the values of other research. In the tables from 12-15, a comparison of the obtained percentile ranks was obtained for 3, 15, 50, 85 and 97 percentile ranges according to WHO, Sarajevo Canton (KS) and Herzegovina-Neretva Canton (HNK) for I, III, V and VII grade by gender. By comparing the boundary values of percentile ranks, we see that the limit values recommended by the World Health Organization (WHO) and the limit values for Canton Sarajevo in relation to HNK do not have a drastic difference other than the category of obesity where the WHO reference values are little lower for this category. If these reference values were used on our sample, the percentage of children belonging to this category in the HNK would be significantly higher. The fact is that these values can be used as reference values in future research of this type and that the development of (positive or negative) obesity in the HNK and BiH area will be more easily monitored. Based on the differences in the reference values for diagnosing obesity compared to those recommended by the World Health Organization (WHO), but also in relation to results in the Sarajevo Canton, it can therefore be concluded that there is a
need for creating precisely these normative limit values that will be the starting point for all future research. Starc and Strel (2011) state that for the purpose of defining and diagnosing malnutrition, normal and increased body weight it is more important to create specific limit values, but it is still better to do it at the national level because, as they state, national-specific limit values of the body mass index are a better means of classifying nutrition, in line with all that a particular geographical climate carries.

Table 12.- Limit values for BMI category for I class recorded according to the WHO; KS and HNK

<table>
<thead>
<tr>
<th>Research</th>
<th>Gender</th>
<th>Malnourished</th>
<th>Moderately malnourished</th>
<th>Normal BW</th>
<th>Overweight</th>
<th>Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Girls</td>
<td>12.82</td>
<td>13.83</td>
<td>15.33</td>
<td>17.2</td>
<td>19.15</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>13.21</td>
<td>14.09</td>
<td>15.38</td>
<td>16.94</td>
<td>18.49</td>
</tr>
<tr>
<td>HNK</td>
<td>Girls</td>
<td>13.10</td>
<td>14.40</td>
<td>16.00</td>
<td>19.50</td>
<td>22.70</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>13.60</td>
<td>14.70</td>
<td>16.30</td>
<td>19.50</td>
<td>24.30</td>
</tr>
<tr>
<td>Percentil</td>
<td></td>
<td>3</td>
<td>15</td>
<td>50 (Medijan)</td>
<td>85</td>
<td>97</td>
</tr>
</tbody>
</table>

Table 13.- Limit values for BMI category for III class recorded according to the WHO; KS and HNK

<table>
<thead>
<tr>
<th>Research</th>
<th>Gender</th>
<th>Malnourished</th>
<th>Moderately malnourished</th>
<th>Normal BW</th>
<th>Overweight</th>
<th>Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Girls</td>
<td>13.13</td>
<td>14.21</td>
<td>15.86</td>
<td>18.10</td>
<td>20.56</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>13.51</td>
<td>14.46</td>
<td>15.88</td>
<td>17.72</td>
<td>19.70</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>13.44</td>
<td>15.06</td>
<td>17.60</td>
<td>21.75</td>
<td>26.03</td>
</tr>
<tr>
<td>HNK</td>
<td>Girls</td>
<td>13.50</td>
<td>14.70</td>
<td>17.40</td>
<td>21.40</td>
<td>25.60</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>13.60</td>
<td>14.70</td>
<td>16.70</td>
<td>20.70</td>
<td>25.50</td>
</tr>
<tr>
<td>Percentil</td>
<td></td>
<td>3</td>
<td>15</td>
<td>50 (Medijan)</td>
<td>85</td>
<td>97</td>
</tr>
</tbody>
</table>

Table 14.- Limit values for BMI category for V class recorded according to the WHO; KS and HNK

<table>
<thead>
<tr>
<th>Research</th>
<th>Gender</th>
<th>Malnourished</th>
<th>Moderately malnourished</th>
<th>Normal BW</th>
<th>Overweight</th>
<th>Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Girls</td>
<td>13.80</td>
<td>15.00</td>
<td>16.90</td>
<td>19.51</td>
<td>22.57</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.01</td>
<td>15.05</td>
<td>16.67</td>
<td>18.88</td>
<td>21.43</td>
</tr>
<tr>
<td>KS</td>
<td>Girls</td>
<td>13.78</td>
<td>15.56</td>
<td>18.50</td>
<td>22.67</td>
<td>26.67</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.02</td>
<td>15.82</td>
<td>18.90</td>
<td>23.33</td>
<td>27.50</td>
</tr>
<tr>
<td>HNK</td>
<td>Girls</td>
<td>14.20</td>
<td>15.80</td>
<td>17.80</td>
<td>21.60</td>
<td>26.20</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.00</td>
<td>15.40</td>
<td>18.20</td>
<td>21.70</td>
<td>25.10</td>
</tr>
<tr>
<td>Percentil</td>
<td></td>
<td>3</td>
<td>15</td>
<td>50 (Medijan)</td>
<td>85</td>
<td>97</td>
</tr>
</tbody>
</table>

Table 15.- Limit values for BMI category for VII class recorded according to the WHO; KS and HNK

<table>
<thead>
<tr>
<th>Research</th>
<th>Gender</th>
<th>Malnourished</th>
<th>Moderately malnourished</th>
<th>Normal BW</th>
<th>Overweight</th>
<th>Obesity</th>
</tr>
</thead>
<tbody>
<tr>
<td>WHO</td>
<td>Girls</td>
<td>13.78</td>
<td>15.00</td>
<td>16.80</td>
<td>19.01</td>
<td>22.57</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.01</td>
<td>15.05</td>
<td>16.67</td>
<td>18.88</td>
<td>21.43</td>
</tr>
<tr>
<td>KS</td>
<td>Girls</td>
<td>13.78</td>
<td>15.56</td>
<td>18.50</td>
<td>22.67</td>
<td>26.67</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.02</td>
<td>15.82</td>
<td>18.90</td>
<td>23.33</td>
<td>27.50</td>
</tr>
<tr>
<td>HNK</td>
<td>Girls</td>
<td>14.20</td>
<td>15.80</td>
<td>17.80</td>
<td>21.60</td>
<td>26.20</td>
</tr>
<tr>
<td></td>
<td>Boys</td>
<td>14.00</td>
<td>15.40</td>
<td>18.20</td>
<td>21.70</td>
<td>25.10</td>
</tr>
<tr>
<td>Percentil</td>
<td></td>
<td>3</td>
<td>15</td>
<td>50 (Medijan)</td>
<td>85</td>
<td>97</td>
</tr>
</tbody>
</table>
CONCLUSION

Based on a research conducted to determine the obesity of primary school children in HNK, which included a total of 2626 students, it was noted that 15.60% of children with excessive body weight or obese. Excessive body mass is equally present in boys and girls. Out of a total of 1,337 boys, 15.62% of them have an increased body mass or are overweight, while out of 1289 girls 15.59% have an increased body mass or are obese. In addition, it should be noted that 15.98% of the respondents are moderately malnourished or malnourished and that, by observing a separate gender, in this case, the same number of malnourished girls compared to boys (15.97% vs. 15.98%) are also in this case. According to the obtained results, almost every third child has a nutrition disorder (31.61%) in the HNK space, which is extremely worrying and alarming. Taking into account the results of this research, as well as the fact that eating habits and dealing with physical activity under the influence of the environment, we can conclude that in the prevention and treatment of obesity, the foundation stone is to encourage children and their environment to adopt proper dietary habits and achieve the recommended level of physical activity. For children aged 5-18, WHO (2016) recommends a minimum of 60 minutes of moderate to intensely strong physical activity every day. Activities for children should certainly be fun and adapted to their age. In order to make the result better, it is advisable to involve parents, as they are the main drivers of change in lifestyle. Therefore, it is of very important that prevention in the form of education of parents and educators so they can find problems in time and, with professional staff, directs children to proper nutrition and keeping of the body with various preventative exercises for strengthening body muscles and various orthopedic aids in order to prevent further progression of deformities and long-lasting harmful consequences that can accompany them throughout their lives. It is questionable whether the education system and 2 hours of physical and health education, as currently in elementary and secondary schools in BiH, can respond to all the problems that the sedentary lifestyle brings, which we have proved in this research. BiH does not have a developed strategy to combat global health issues, and therefore these results should serve the wider community as a fact about the state of nutrition of children in the HNK area and as a recommendation for the prevention of obesity. The leading role should be taken by the Ministry of Education and School through the modification of curricula, increasing the number of classes of P.E. education of children, teachers, and parents, changing menus in children in schools and kindergartens, as well as other recommendations. Normal and healthy growth and development of children is crucial for the overall development and health of man throughout the lifetime.

ACKNOWLEDGMENTS

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EFFECT OF TRADITIONAL DANCES ON HEALTH RELATED PHYSICAL FITNESS TRAITS AMONG HIGH SCHOOL STUDENTS IN ETHIOPIA

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ABSTRACT
The purpose of this study was to evaluate the effect of Tigray regional state Traditional dances on health related physical fitness traits among high school students. To achieve the purpose of this study, 100 high school students were selected randomly. And their age ranged between 15 and 17 years. The selected participants were categorized into experimental group consists of four Traditional dances that was Awris, Hura, Kuda and Shediva and control group with twenty subjects in each. The experimental group performed traditional dances for a period of 16 weeks three days per week whereas participants in the control group were informed to follow their usual daily activity. All participants were tested on selected criterion measures on muscular strength, flexibility, cardiovascular endurance and body composition prior to and after the 16 weeks of the training period. The data pertaining to the variables in this study were statistically examined using ANOVA for each variable separately, whenever ‘F’ ratio of adjusted post-test was found to be significant, the Scheffe’s test was used to determine the paired mean differences. The level of significance was fixed at 0.05. Following the 16-weeks traditional dance training, significant change was observed on muscular strength, flexibility and cardiovascular endurance, but there was no significant improvement in body composition as compares the experimental groups with the control group. Therefore it can be concluded that Tigray traditional dance training program can notably improve physical fitness level of high school students.

Key words: Traditional dance, physical fitness, Tigray region

INTRODUCTION
Health and fitness afford the people an opportunity to live longer and they add to the quality of everyday life. So to enjoy an optimal state of health and physical fitness, exercises are quite indispensable. Exercises are helpful in maintaining the sound body throughout life. As several studies have proved that, the human body can be strengthened by physical activity and can also be impaired by physical inactivity (L. Almond, 2010). Therefore, as an aerobic exercise, Traditional dance brings well known benefits in improving the health related components of physical fitness. Dance as a form of exercise is suitable for all ages as it seems to have a particular beneficial effect on physical health (Lykesas et al., 2017). Dance helps participants develop physical fitness and
thus shares many of the health benefits of other sporting events (Nhamo & Magonde, 2013). Folk dance training can significantly improve the physical fitness level of per-Scholl children (Biber et al., 2016). Furthermore Chinese Traditional dance training can improve flexibility, cardiorespiratory endurance, and muscle strength of college level students (Nordin et al., 2009) and (Moyi Li et al., 2015). Dance can increase people’s physical fitness, strength and abilities, often more effectively than other forms of exercise, increase people’s motivation to participate in physical activity and maintain that participation, because they see dance as fun, expressive, non-competitive and sociable (Facts, 2011). The Go Dance Research Project (Elsa Urmston, Dr Angel Chater, 2012) commissioned by a consortium of dance organization examine the impact of 12 weeks dance course training and consequently found a positive impact on the healthy lives of boys and girls. Other results from this study indicate that, participating in a dance project during school time can inspire positive behavior and change in terms of physical activity levels. Dance is a popular recreational activity for people and can contribute to the physical health and wellness of an individual (Gardner, S. et al., 2008). As there is growing concern over the effects of the sedentary lifestyle on the health of young people (Biddle et al., 2004), physical activity via behavior such as dancing should be encouraged. However, it is seldom used as an intervention to increase physical activity even among studies advocating culturally-specific interventions (M. Farr et al., 1997). As a result, empirical data about a culturally-specific dance intervention to generate health benefits and reduce health disparities common in sedentary African American women is paramount (Murrock, C. J., & Gary, 2010). Traditional dance is one of the most common types of aerobic exercise practices in the world. Presently, dance is a popular activity, performed by small groups of all ages. Music with slow or fast rhythm tempos helps to control and pace the movement of selected body segments, allowing for an overall body workout. As with other forms of aerobic exercise, dance performed within a target heart rate of between 60% to 80% of the maximal heart rate (MHR) has demonstrated cardiovascular and metabolic benefits such as increased maximal oxygen consumption (VO₂max), improved aerobic endurance capacity, decreased percent fat and increased energy production via the mitochondrial respiration system (ACSM, 1998). On the base of above mentioned research reports, researchers are pursuit on the consequence of Traditional dances of Tigray regional state on health related physical fitness traits. Tigray regional state has different Traditional dances. Each Traditional dances has a very unique step and rhythm with a unique form of movement (Martin, 2018) and (Teffera, 2006). By
considering the above facts researchers objectives of this study is to investigate the effect of Traditional dances of Tigray regional state namely Awris, Hura, Kuda and Shediva) on health related physical fitness traits among high school students Tigray region.

**METHOD**

**Participants**

Out of 207 students 100 male and female students aged 15-17 years, from grade nine and ten Mekelle University community school was taken using a scientific sample determination technique or formula (Steven K.Thompson, 2012) and finally the samples were selected using simple random sampling technique and they were participated voluntary.

\[
n = \frac{1}{\frac{1}{n_0} + \frac{1}{N}}
\]

Where: n is sample size, n₀ is before considering the sample, N is total population and Confidence level was 95%, Precision level was ±7% and Maximum variability was 0.5

**Study design**

Randomized controlled parallel trial was used for this study because it was considered the most appropriate (Marquez et al., 2014) and (Serrano-Guzman, 2016). All the 100 participants were randomly categorized into four experimental and one control group, each group consists of twenty participants (n=20). The experimental group was given the four traditional dances of Tigray regional state (Awris, Hura, Kuda and Shediva) for a period of sixteen weeks excluding the period of utilized for pre-test and post-test. The control group was not participated in any training program during the experimental period.
Mekelle University community school: N = 207

Random sampling method

Study participants: (n=100)

Pre test

Health related physical fitness
- Muscular strength
- Flexibility
- Cardiovascular endurance
- Body composition

Random sampling method

Awris (n=20)  Hura (n=20)  Kuda (n=20)  Shediva (n=20)  Control group (n=20)

Six months Traditional dance training program

Post test

Analysis of data

Outcome
Data collection tools

To collect data, first permission was taken from the respective sources that were from administrators, students and experts. All the necessary information about the study was explained to the participants in advance. All the participants were orient to ready for the pre-test in the health related physical fitness traits. Having experts, instruments and facilities for measuring purpose necessary data was collected with standardized procedure in both the pre and post-tests.

Table 1 Variables and criterion Measures

<table>
<thead>
<tr>
<th>Variables</th>
<th>Tests/tools used</th>
<th>Units</th>
</tr>
</thead>
<tbody>
<tr>
<td>Muscle strength</td>
<td>Sit-Ups</td>
<td>Count</td>
</tr>
<tr>
<td>Flexibility</td>
<td>Shoulder flexibility test</td>
<td>Cms</td>
</tr>
<tr>
<td>Cardiovascular endurance</td>
<td>1000m run test for boys, 800m run test for girls</td>
<td>Seconds</td>
</tr>
<tr>
<td>Body composition</td>
<td>BMI</td>
<td>Kg/m²</td>
</tr>
</tbody>
</table>

Training protocol

The dance styles used were characterized as a traditional dance of Tigray. It involves a variety of steps, such as delicate neck motion, rhythmical shoulder movement, jumping steps, courting and so on. The physical demands of the dance classes were gradually increased, with the initial four weeks performed at a very light intensity. The program was taken sixteen (16) weeks three times per week. Each dance classes consisted of warm-up, main dance and cool-down sections, with music used to increase enjoyment and aid in highlighted various movement dynamics. The warm-up was lasted for 10 minutes and involved gentle joint mobility, alignment, body awareness and weight transference activities, as well as opportunities for individual choice and expression. The main dance section was lasted 40 minutes and consists of increasingly complex traditional dance movements that offered varied dynamic and expressive phrasing of the upper and lower body. These provided accumulative complexity e.g. awareness of space, directional change, and use of levels which were progressed from the warm-up and include partner dancing and social interaction.
The cool-down lasted 5 minutes and involved gentle movements of the major bodily joints as well as deep and slow inhalation and exhalation respiration cycles. The participants of the control group were not allowed to participate in any of the training programs. However, all the participants of different training groups and control group were participated in their routine activities of the school.

**Statistical technique**

The data collected were analyzed statistically using SPSS statistical software version 23 under the guidance of a statistician. Descriptive statistics such as mean and standard deviation were found in order to get the basic idea of the data distribution. The significance of adjusted post-test mean differences between the experimental and control group for each variable ANOVA (Analysis of variance) test was used. Whenever the 'F' ratio was found to be significant, Scheffe’s test was used to determine which of the paired means differed significantly. Level of significant was set at 0.05.

**RESULT**

The following tables illustrate the statistical results as an effect of Traditional dances of Tigray regional state on muscular strength, flexibility, cardiovascular endurance and body composition among high school students.
Table 2: Analysis of variance for the pre-test and post-test data on muscular strength, flexibility, cardiovascular endurance and body composition score of Awris, Hura, Kuda, Shediva and control groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Tests</th>
<th>Awris Dance</th>
<th>Hura Dance</th>
<th>Kuda Dance</th>
<th>Shediva Dance</th>
<th>Control group</th>
<th>Sum of squares</th>
<th>df</th>
<th>Mean squares</th>
<th>F ratio</th>
</tr>
</thead>
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<td><strong>Muscular strength</strong></td>
<td>Pre test</td>
<td>Mean 16.00</td>
<td>14.25</td>
<td>13.90</td>
<td>12.30</td>
<td>13.55</td>
<td>B 143.300</td>
<td>4</td>
<td>35.825</td>
<td>1.924</td>
</tr>
<tr>
<td></td>
<td></td>
<td>SD 4.75</td>
<td>5.42</td>
<td>4.22</td>
<td>2.88</td>
<td>3.87</td>
<td>W 1768.700</td>
<td>95</td>
<td>18.618</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Post test</td>
<td>Mean 19.10</td>
<td>17.10</td>
<td>16.55</td>
<td>15.90</td>
<td>13.70</td>
<td>B 306.360</td>
<td>4</td>
<td>76.590</td>
<td>4.005*</td>
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<tr>
<td></td>
<td></td>
<td>SD 4.52</td>
<td>5.73</td>
<td>4.19</td>
<td>2.82</td>
<td>4.09</td>
<td>W 1816.550</td>
<td>95</td>
<td>19.122</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Adjusted</td>
<td>Mean 17.127</td>
<td>16.853</td>
<td>16.649</td>
<td>17.577</td>
<td>14.144</td>
<td>B 144.873</td>
<td>4</td>
<td>36.218</td>
<td>35.494*</td>
</tr>
<tr>
<td></td>
<td>Post test</td>
<td>W 95.919</td>
<td>94</td>
<td>1.020</td>
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<td></td>
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<td></td>
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<tr>
<td><strong>Flexibility</strong></td>
<td>Pre test</td>
<td>Mean 35.10</td>
<td>27.55</td>
<td>35.95</td>
<td>30.65</td>
<td>28.35</td>
<td>B 1180.160</td>
<td>4</td>
<td>295.040</td>
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<td>SD 10.02</td>
<td>13.31</td>
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<td>14.26</td>
<td>W 14430.800</td>
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<td>Post test</td>
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<td>33.75</td>
<td>27.95</td>
<td>28.05</td>
<td>B 139.189</td>
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<td>34.797</td>
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<td>SD 9.25</td>
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<td>9.00</td>
<td>13.80</td>
<td>14.42</td>
<td>W 145.821</td>
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<td>1.585</td>
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<td>Adjusted</td>
<td>Mean 27.549</td>
<td>29.433</td>
<td>29.417</td>
<td>28.801</td>
<td>31.150</td>
<td>B 131.832</td>
<td>4</td>
<td>32.958</td>
<td>20.437*</td>
</tr>
<tr>
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<td>Post test</td>
<td>W 11.591</td>
<td>94</td>
<td>1.613</td>
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<tr>
<td><strong>Cardiovascular Endurance</strong></td>
<td>Pre test</td>
<td>Mean 2.82</td>
<td>2.60</td>
<td>2.71</td>
<td>2.70</td>
<td>2.77</td>
<td>B 5547.299</td>
<td>4</td>
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<tr>
<td></td>
<td></td>
<td>SD 18.92</td>
<td>31.29</td>
<td>26.58</td>
<td>24.69</td>
<td>35.21</td>
<td>W 73990.999</td>
<td>95</td>
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<tr>
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<td>Post test</td>
<td>Mean 2.36</td>
<td>2.23</td>
<td>2.28</td>
<td>2.34</td>
<td>2.67</td>
<td>B 23715.207</td>
<td>4</td>
<td>5928.802</td>
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<td>Adjusted Posttest</td>
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<td>2.299</td>
<td>2.360</td>
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<td>B 16301.288</td>
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<td>4075.322</td>
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<td>W 65502.273</td>
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<tr>
<td><strong>Body composition</strong></td>
<td>Pre test</td>
<td>Mean 18.32</td>
<td>18.05</td>
<td>18.38</td>
<td>18.38</td>
<td>18.61</td>
<td>B 3.149</td>
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<td></td>
<td>SD 2.77</td>
<td>2.08</td>
<td>2.47</td>
<td>2.70</td>
<td>2.92</td>
<td>W 645.621</td>
<td>95</td>
<td>6.796</td>
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<tr>
<td></td>
<td>Post test</td>
<td>Mean 17.29</td>
<td>16.92</td>
<td>17.64</td>
<td>17.24</td>
<td>18.51</td>
<td>B 29.565</td>
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<td></td>
<td></td>
<td>SD 2.59</td>
<td>2.08</td>
<td>2.57</td>
<td>2.69</td>
<td>2.82</td>
<td>W 625.712</td>
<td>95</td>
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<tr>
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<td>Adjusted Posttest</td>
<td>Mean 17.315</td>
<td>17.211</td>
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<td>18.260</td>
<td>B 15.670</td>
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<td>W 23.253</td>
<td>94</td>
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</tr>
</tbody>
</table>
The table below presents the results of Scheffe’s test for differences of the adjusted post-test paired means of muscular strength, flexibility, and cardiovascular endurance.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Adjusted Posttest Mean</th>
<th>Mean Differences</th>
<th>Confidence Interval</th>
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<tbody>
<tr>
<td></td>
<td>Awris Dance</td>
<td>Hura Dance</td>
<td>Kuda Dance</td>
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<td><strong>Muscular strength</strong></td>
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</table>

*Significant at 0.05 level

The result presented in table 1 indicate that, the Traditional dance treatment groups had shown significant improvement in health related physical fitness traits namely muscular endurance, flexibility and cardiovascular endurance when compared with a control group as well as base line after underwent sixteen weeks Traditional dance training program. However no significant difference was observed in body composition. And table 2 revealed that, significant difference were observed between the groups except between Awris and Hura and Hura and Kuda in muscular strength, between Hura and Kuda in flexibility and between Awris and Hura, Awris and Kuda,
Awris and Shediva, Hura and Kuda, Kuda and Shediva and Hura and Shediva in cardiovascular endurance.

Figure 1: Bar diagram on pre test, post test and adjusted post test means of Muscular strength

Figure 2: Bar diagram on pre test, post test and adjusted post test means of Flexibility
Figure 3: Bar diagram on pre test, post test and adjusted post test means of Cardiovascular endurance

Figure 4: Bar diagram on pre test, post test and adjusted post test means of Body composition
DISCUSSION

Today the health problems that were common a century ago do not exist. They are replaced by conditions associated with hypokinetic diseases such as high blood pressure, obesity, coronary heart disease and so on. So to prevent such conditions and have healthy life style fitness is a key factor. To achieve this healthy life style, humans perform variety of activity such as morning or evening walk, performing gym activities, swimming clubs, martial arts, recreational clubs and so on, and as a result one has to spend lots of money. Out of infinite options, traditional dance is also an approachable system to achieve the target of fitness M. Tensay et al., (2015). The present research finding also proved that, the sixteen weeks Traditional dance training program significantly improve health related physical fitness traits namely muscular strength, flexibility and cardiovascular endurance of high school students. However no significant difference was observed in body composition. The above result was in agreement with the following studies conducted by (S. Kim, H. Park, B. Min et al., 2018) proved that Korean traditional dance program improved the health related fitness of Korean elderly female. (Biber, 2016) folk dance training significantly improved children’s physical fitness development. As Vordos Z et al., (2017) proved that, traditional Greek dance significantly improve muscular strength and lower limb endurance. Belle et al., (1983) reveal that, aerobic dance without dietary control, does not alter body composition in sedentary middle aged women.

CONCLUSION

It was concluded from the results of the study that, the Traditional dance treatment groups had shown significant improvement in health related physical fitness traits specifically in muscular endurance, flexibility and cardiovascular endurance when compared with a control group as well as base line after underwent sixteen weeks Traditional dance training program. However no significant difference was observed in body composition due to the fact that, from the base line the participants BMI was less than 18 mean that the participants didn’t had excessive accumulation of body fat.
REFERENCE


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CONSTRUCTION OF ATTITUDE SCALE TOWARD PHYSICAL EDUCATION AND SPORTS FOR HIGH SCHOOL BOYS

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ABSTRACT

The present study was contemplated to construct and standardize the “Attitude Scale towards Physical Education and Sports” to measure the attitude of high school boys towards physical education and sports. Based on the review of literature and discussion with the experts, 72 statements were enlisted on academic aspects, psychological aspects, general aspects, and social aspects and health aspects. Out of 72 statements 40 were retained in the final scale (8 statements in each aspect such as academic, psychological, social, health and general). To improve accuracy of despondence equal number of positive and negative questions covered in each aspect. The possible minimum and maximum scores of this scale is 40 and 200 respectively. The response could be collected on a five point continuum, namely strongly agree, agree, undecided, disagree and strongly disagree with assigned score 5,4,3,2 and 1, for positive statements and vice versa for negative statements. The scale developed was found reliability 0.89 on split-half method, face validity and construct validity. The attitude score of a respondent can be calculated by adding up the scores obtained by him on all the items. Higher the attitude score indicates the high favorableness of respondents towards physical education and sports and lesser the attitude score indicates less favorableness towards physical education and sports.

Keywords: Attitude Scale, Construction, Physical Education and Sports, High-school Boys.

INTRODUCTION

Academic aspects of school curriculum address on mental growth. Regular and structured physical education program is essential in every school to ensure optimal physical growth and fitness. Hence physical education is introduced as an integral part of the total education of every child at different levels from primary through higher education. The goal of physical education in the institutions is to provide physical cultured people who have the knowledge, skill and confidence to enjoy a life time of healthful physical activity. Physical education makes the students to learn the fundamentals of active lifestyle and know the scope of health such as healthy habits, diet, knowledge about our body and different ways of doing physical activities etc..
Physical inactivity in children and youth in India is a major public health problem. The 2016 Indian Report Card on Physical Activity for Children and Youth has been conceptualized to highlight this epidemic by appraising behavior, contexts, strategies and investments related to physical activity of Indian children and youth. This report states “most Indian children do not achieve recommended levels of physical activity and spend most of their day in sedentary pursuits”.

William James of Harvard University said, “The greatest discovery of my generation is that human beings can alter their lives by altering their attitudes of Mind”. This statement says, our action can influence our attitude and attitude can in turn affect our behavior. Attitude and behavior can influence each other in a cyclical manner. Hence an individual behavior/action is depends on his attitude regardless of chosen filed and it applies to every sphere of his life, including one’s personal and professional life. Hence a person with a positive attitude is like a fruit of all seasons. He is always welcome. Hence people with positive attitudes towards physical education and sports have certain personality traits such as healthy, caring, confidence, patient, and humble to participate actively in physical education and sports program. Whereas, negative attitude towards physical education and sports create an unpleasant environment at home, school and make him to lead sedentary life style, suffer hyperkinetic diseases and become a liability to society. They pass on their negative behavior to other around them and to future generation. With this background, the present study focuses on the development of standardizes scale to measure the attitude of high school boys towards physical education and sports.

**DEVELOPING AND STANDARDIZING ATTITUDE SCALE:**

Attitude is an organized predisposition to think, feel, perceive and behave towards a cognitive object. Liker (1932) defined attitude is the degree of positive or negative disposition associated towards an innovation, objects, program etc. Similarly, Thustone (1946) also defined that attitude is a degree of positive or negative effects associated with some of positive or negative effects associated with some psychological object like symbol, person, institute, ideal or idea towards which people can differ in varying degrees.

Attitude in this study is operationally defined as the positive or negative mental predisposition of high school students towards physical education and sports. The method of summated rating suggested by Likert (1932) was followed in the development of the scale. The
following steps were considered for the developing attitude scale to measure the attitude of high school boys towards physical education and sports.

ASPECTS OF STUDENTS’ ATTITUDE TOWARDS PHYSICAL EDUCATION AND SPORTS SCALE:

The information about the different aspects of physical education and sports was obtained through the discussion with the field experts, Professors, Researchers and Physical Education Teachers. The literature and scientific evidence in the area of physical education and sports were also reviewed and considered while construction of scale to find out high school boys attitude towards physical education and sports. On the basis of review of literature, expert’s suggestion and scientific evidences in the field of physical education and spots, researcher drawn five different aspects, they are Academic Aspects, Psychological Aspects, General Aspects, Social Aspects and Health Aspects and Questions were framed on each aspect.

COLLECTION OF ITEMS:

The objective of collection of items/statements for the attitude scale construction is to select the items in such a way that acceptance and rejection of each one will imply favorable or unfavorable attitude towards physical education and sports. The items have been carefully edited and selected in accordance with set criteria as the items in any psychological test. The first step in the construction of attitude scale was to collect exhaustive number of statement/items pertaining to the physical education and sports, accordingly, each one expressing some opinion about the psychological object under the study. A large number of items were collected by reviewing the journals, books and informal discussion with physical education personnel and experts from selected area. Tentative list of 72 statements pertaining to the five aspects of attitude of high school boys towards physical education and sports were selected in primary form shown in the table no.

1. TABLE NO. 1: STATEMENTS INCLUDED IN PRIMARY FORM

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>TITLE OF THE COMPONENTS</th>
<th>SELECTED STATEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>1</td>
<td>Academic Aspects</td>
<td>7</td>
</tr>
<tr>
<td>2</td>
<td>Psychological Aspects</td>
<td>7</td>
</tr>
<tr>
<td>3</td>
<td>General Aspects</td>
<td>8</td>
</tr>
<tr>
<td>4</td>
<td>Social Aspects</td>
<td>8</td>
</tr>
<tr>
<td>5</td>
<td>Health Aspects</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Total Questions</td>
<td>39</td>
</tr>
</tbody>
</table>
EDITING OF ITEM:

The items/statements collected were edited and modified as attitude statements as per the 14 criteria suggested by Liker (1932), Edwards and Kilpatrick (1948), Thurstone and Chave (1932), Bird (1940). These 14 criteria were as below:

1. Avoid the statements related to past, rather than present.
2. Avoid factual statements.
3. Avoid the statements giving more than one meaning.
4. Avoid the statements which are not related to the psychological object, considered.
5. Avoid the statements for which all endorse equally.
6. Select the statements, related to all the matter of the subject of interest.
7. Use simple, clear and comprehensive language.
8. Statements should be precise, which do not exceed 20 words.
9. Express only one idea in one statement.
10. Statements using universality like all, always, none, never show ambiguity, hence they should be avoided.
11. Instead of selecting compound or complex statements, select simple statement.
12. Words like only, just, merely should be used carefully and that too in moderation.
13. Avoid the words which could not be understood by the examinee.

Finally, out of 72 statements, 61 statements were retained as attitude statements on the basis of 14 criteria and the remaining 12 statements were eliminated.

TABLE 2: STATEMENTS INCLUDED RELEVANCY TEST OFTER EDITING IN ATTITUDE SCALE TOWARDS PHYSICAL EDUCATION AND SPORTS

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>TITLE OF THE COMPONENTS</th>
<th>SELECTED STATEMENTS</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Academic Aspects</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>2</td>
<td>Psychological Aspects</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>3</td>
<td>General Aspects</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>4</td>
<td>Social Aspects</td>
<td>6</td>
<td>6</td>
</tr>
<tr>
<td>5</td>
<td>Health Aspects</td>
<td>7</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Total Questions</td>
<td>31</td>
<td>30</td>
</tr>
</tbody>
</table>

RELEVANCY ANALYSIS:

Sixty one (61) statements were mailed to 91 experts comprising of Assistant professor, Assistant Director, Physical education teachers, who had 3 years of work experience in high schools of Mysore division, perceived Master degree in physical education and studied sports psychology as one of the subject, were selected for critically judge the items on basis of their relevancy to measuring the high school boys attitude toward physical education and sports. They were asked to check each of the statements carefully for being relevant or not relevant using five
point continuum viz., Most Relevant (MR), Relevant (R), Somewhat Relevant (SWR), Less Relevant (LR) and Not Relevant (NR) with the score of 4, 3, 2, 1 and 0 respectively. The judges were also requested to make necessary modifications and additions or deletion of components, if they desire so. A total of 71 judges returned the questionnaires duly completed were considered for further processing. The relevancy score for each item was found out by adding the score on rating scale for all 71 judges’ responses. From this data ‘relevancy percentage’ and ‘mean relevancy score were worked out for all the statements by using the following formula as below:

\[
Relevancy\ Percentage = \frac{(MR \times 4)(R \times 3)(SWR \times 2)(LR \times 1)(NR \times 0)}{\text{No of Judges responded}} \times \frac{100}{\text{Maximum Score}}
\]

\[
\text{Mean Relevancy Score} = \frac{MR \times 4 + R \times 3 + SWR \times 2 + LR \times 1 + NR \times 0}{\text{No. of judges responded}}
\]

Where,

MR = Most Relevant, R = Relevant, SWR = Somewhat Relevant, LR = Less Relevant, NR = Not Relevant, Maximum Possible score = 355 (71x5), Number of Judges = 71

Accordingly, components having relevancy percentage of 80 and above and mean relevancy score of 4.00 and above were considered for further processing and suitably modified as per the comments of experts wherever applicable. Finally, 51 components were selected for item analysis.

### TABLE 3: STATEMENTS INCLUDED IN ATTITUDE SCALE TOWARDS PHYSICAL EDUCATION AND SPORTS AFTER RELEVENCY TEST

<table>
<thead>
<tr>
<th>SL.NO</th>
<th>TITLE OF THE COMPONENTS</th>
<th>SELECTED STATEMENTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Positive</td>
</tr>
<tr>
<td>1</td>
<td>Academic Aspects</td>
<td>05</td>
</tr>
<tr>
<td>2</td>
<td>Psychological Aspects</td>
<td>05</td>
</tr>
<tr>
<td>3</td>
<td>General Aspects</td>
<td>05</td>
</tr>
<tr>
<td>4</td>
<td>Social Aspects</td>
<td>05</td>
</tr>
<tr>
<td>5</td>
<td>Health Aspects</td>
<td>06</td>
</tr>
<tr>
<td></td>
<td>Total Aspects</td>
<td>26</td>
</tr>
</tbody>
</table>

**ITEM ANALYSIS:**

To delineate the items based on the extent to which they can differentiate the attitude items about physical education and sports as favorable or unfavorable, item analysis was carried out on the 51 items/statements selected after relevancy analysis. To fulfill this objective pilot study was done on 100 high school boys of Hassan district according to the strata given in the table – 4.
TABLE 4: SAMPLES FOR PILOT STUDY OF THE ATTITUDE SCALE TOWARDS PHYSICAL EDUCATION AND SPORTS

<table>
<thead>
<tr>
<th>TYPES OF SCHOOL</th>
<th>HIGH SCHOOL BOYS</th>
</tr>
</thead>
<tbody>
<tr>
<td>Government</td>
<td>25</td>
</tr>
<tr>
<td>Government Aided</td>
<td>25</td>
</tr>
<tr>
<td>Private</td>
<td>25</td>
</tr>
<tr>
<td>International</td>
<td>25</td>
</tr>
<tr>
<td>Total</td>
<td>100</td>
</tr>
</tbody>
</table>

The Selected high school boys were asked to indicate their degree of agreement or disagreement with each statement on a five point continuum ranging from ‘strongly agree’ to “strongly disagree”. The scoring pattern adopted to 1-5, in which 5 score to strongly agree response, 4 score to agree response, 3 score to undecided response, 2 to disagree response and 1 to strongly disagree response for the positive statement in case of the negative statement scoring pattern was reversed. Maximum score a respondent can have is 255. In administering the attitude scale, proper care was taken while subjects were responding to the items included in the attitude scale.

Based upon the total scores, the respondents were arranged in Descending order. The top 25 percent of the respondents with their total scores were considered as high group and the bottom 25 percent as low group. These two groups provide criterion groups in terms of evaluating the individual statements suggested by Edwards (1969). ‘t’ value was calculated for each of the statement by using the following formula.

\[
t = \frac{\bar{X}_H - \bar{X}_L}{\sqrt{\frac{\sum (X_H - \bar{X}_H)^2}{N(N-1)} + \sum (X_L - \bar{X}_L)^2}}
\]

Where,

\[
\sum (X_H - \bar{X}_H)^2 = \sum X_H^2 - \frac{\sum X_H^2}{n}
\]

\[
\sum (X_L - \bar{X}_L)^2 = \sum X_L^2 - \frac{\sum X_L^2}{n}
\]

\(\bar{X}_H = \) The mean score on a given statement for the high group

\(\bar{X}_L = \) The mean score on a given statement for the low group

\(X_H^2 = \) Sum of squares of the individual score on a given statement for high group

\(X_L^2 = \) Sum of squares of the individual score on a given statement for low group
TABLE 5: CALCULATION OF ‘t’-VALUE AND DECISION REGARDING SELECTION OR REJECTION OF THE STATEMENT OF THE ATTITUDE SCALE

<table>
<thead>
<tr>
<th>No. of Statements</th>
<th>‘t’-Value</th>
<th>Selected/Rejected</th>
<th>No. of Statements</th>
<th>‘t’-Value</th>
<th>Selected/Rejected</th>
<th>No. of Statements</th>
<th>‘t’-Value</th>
<th>Selected/Rejected</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5.033</td>
<td>Selected</td>
<td>18</td>
<td>1.891</td>
<td>Rejected</td>
<td>35</td>
<td>0.002</td>
<td>Rejected</td>
</tr>
<tr>
<td>2</td>
<td>3.534</td>
<td>Selected</td>
<td>19</td>
<td>6.938</td>
<td>Selected</td>
<td>36</td>
<td>4.738</td>
<td>Selected</td>
</tr>
<tr>
<td>3</td>
<td>1.195</td>
<td>Rejected</td>
<td>20</td>
<td>3.796</td>
<td>Selected</td>
<td>37</td>
<td>6.542</td>
<td>Selected</td>
</tr>
<tr>
<td>4</td>
<td>4.094</td>
<td>Selected</td>
<td>21</td>
<td>3.682</td>
<td>Selected</td>
<td>38</td>
<td>3.517</td>
<td>Selected</td>
</tr>
<tr>
<td>5</td>
<td>4.355</td>
<td>Selected</td>
<td>22</td>
<td>5.649</td>
<td>Selected</td>
<td>39</td>
<td>3.635</td>
<td>Selected</td>
</tr>
<tr>
<td>6</td>
<td>4.752</td>
<td>Selected</td>
<td>23</td>
<td>0.250</td>
<td>Rejected</td>
<td>40</td>
<td>7.554</td>
<td>Selected</td>
</tr>
<tr>
<td>7</td>
<td>9.572</td>
<td>Selected</td>
<td>24</td>
<td>3.577</td>
<td>Selected</td>
<td>41</td>
<td>6.118</td>
<td>Selected</td>
</tr>
<tr>
<td>8</td>
<td>7.813</td>
<td>Selected</td>
<td>25</td>
<td>5.088</td>
<td>Selected</td>
<td>42</td>
<td>0.000</td>
<td>Rejected</td>
</tr>
<tr>
<td>9</td>
<td>6.349</td>
<td>Selected</td>
<td>26</td>
<td>3.361</td>
<td>Selected</td>
<td>43</td>
<td>8.248</td>
<td>Selected</td>
</tr>
<tr>
<td>10</td>
<td>0.021</td>
<td>Rejected</td>
<td>27</td>
<td>0.000</td>
<td>Rejected</td>
<td>44</td>
<td>0.018</td>
<td>Rejected</td>
</tr>
<tr>
<td>11</td>
<td>3.670</td>
<td>Selected</td>
<td>28</td>
<td>4.510</td>
<td>Selected</td>
<td>45</td>
<td>5.050</td>
<td>Selected</td>
</tr>
<tr>
<td>12</td>
<td>3.703</td>
<td>Selected</td>
<td>29</td>
<td>4.986</td>
<td>Selected</td>
<td>46</td>
<td>5.551</td>
<td>Selected</td>
</tr>
<tr>
<td>13</td>
<td>5.783</td>
<td>Selected</td>
<td>30</td>
<td>7.095</td>
<td>Selected</td>
<td>47</td>
<td>4.019</td>
<td>Selected</td>
</tr>
<tr>
<td>14</td>
<td>4.839</td>
<td>Selected</td>
<td>31</td>
<td>5.492</td>
<td>Selected</td>
<td>48</td>
<td>0.050</td>
<td>Rejected</td>
</tr>
<tr>
<td>15</td>
<td>1.098</td>
<td>Rejected</td>
<td>32</td>
<td>5.062</td>
<td>Selected</td>
<td>49</td>
<td>9.532</td>
<td>Selected</td>
</tr>
<tr>
<td>16</td>
<td>7.008</td>
<td>Selected</td>
<td>33</td>
<td>5.422</td>
<td>Selected</td>
<td>50</td>
<td>8.461</td>
<td>Selected</td>
</tr>
<tr>
<td>17</td>
<td>4.442</td>
<td>Selected</td>
<td>34</td>
<td>0.155</td>
<td>Rejected</td>
<td>51</td>
<td>7.501</td>
<td>Selected</td>
</tr>
</tbody>
</table>

After computing the ‘t’-value for all the 51 statement, 40 statements with highest ‘t’-value equal to or greater than the tabulated ‘t’-value 2.678 for df 48 at 0.01 level of significance were selected and included in the scale to measure the attitude of high school students toward physical education and sports.

RELIABILITY OF THE SCALE:

Reliability refers to the precision or accuracy of the measurement or scale. A well-made scientific instrument should yield accurate results both at present as well as over time (Ray and Mondal, 2011). Split-half method was used for testing reliability score of two halves and to find out the reliability co-efficient. The split half test reliability formula used is as follows:
Where,

\[ X = \text{sum of the scores of the odd number items}, \quad Y = \text{sum of the scores of the even number items}, \quad X^2 = \text{sum of the squares of the odd number items}, \quad Y^2 = \text{sum of the squares of the even number items}. \]

Split-half method of reliability is used with instrument that has many items and where pairs of items can be considered equivalent. Equivalence indicates the internal consistency of measuring device. The scale developed for the study was administered to 100 high school students (25 students from government, government aided, private and international schools each). Further scale was divided into two halves based on odd and even numbered statement and scores were found out from the same respondents for each half. The score of each respondent was calculated with a scoring pattern of 5,4,3,2 and 1 for positive statement and for negative statements scores were reversed. The value of correlation co-efficient was 0.89, which is higher than the standard of 0.70 indicating higher reliability of the scale indicating the constructed attitude scale was highly reliable and dependable in its measurement.

VALIDITY OF THE SCALE:

Validity refers to the ability of the instrument to measure what it proposed to measure (Mulay and Sabarthanam, 1980). Validity of a scale is the property which ensures that the test scores obtained measure the variable they are supposed to measure. Content validity or construct validity or criterion validity are the methods generally followed to kn-for the validity of the scale.

According to Kerlinger(1973), content validity is the representativeness or sampling adequacy of the content-the substance, the matter and the topics of a measuring instrument. He further stated that, content validation consists essentially in judgment. Alone or with other, one judges the representativeness of the item.

In the very beginning of construction of the primary form of present attitude scale, the investigator studied some related literature and eminent experts in physical education. In the whole procedure of preparing the final form of the attitude scale out of 72 statements of the primary form 40 questions were selected for the final attitude scale keeping proper attention on content validation of each statement. In the post-test procedure of calculation of score, it is found that the
statements selected were satisfactory to the tune of measuring the requisite objectives from the test. Thus, it can be said that the present attitude scale is undoubtedly valid as far as the content used in the formation of the statement is concerned.

Guilford states that, “A more scientifically and professionally justifiable reason for face validity is to make it palatable to the examinee. If he feels that a test is relevant, he is likely to have increased motivation in taking it and uniformly high motivation is an important testing condition”. Hence, relevancy test was found to find out the face validity. Looking at the response of the subjects, teachers, experts and all those who studied this attitude scale, the investigator came to the conclusion that the present attitude scale possessed god and effective face validity.

Hence, the validity co-efficient was also found very high. Therefore, the scale developed is both reliable and valid. The delineation of statements at various steps of attitude scale construction is presented in table

**TABLE 6: DELINEATION OF STATEMENT AT VARIOUS STEPS OF ATTITUDE SCALE CONSTRUCTION 1.**

<table>
<thead>
<tr>
<th>Steps in attitude scale construction</th>
<th>No. of Statement</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Statement considered</td>
</tr>
<tr>
<td>Collection of items</td>
<td>82</td>
</tr>
<tr>
<td>Editing of items</td>
<td>72</td>
</tr>
<tr>
<td>Relevancy analysis</td>
<td>61</td>
</tr>
<tr>
<td>Item analysis</td>
<td>51</td>
</tr>
<tr>
<td>Reliability and Validity</td>
<td>40</td>
</tr>
</tbody>
</table>

**TABLE 6: STATEMENT CONSIDERED MEASURING THE ATTITUDE OF HIGH SCHOOL STUDENTS TOWARDS PHYSICAL EDUCATION AND SPORTS**

<table>
<thead>
<tr>
<th>ACCADEMIC ASPECTS</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Compulsory physical education and sports is an ideal thing to be implemented at school level</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>One of the most encouraging trend in modern education is the growing recognition of the importance of physical education and sports</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical education and sports programs in the school are not able to meet the needs and interest of the students</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical education and sports programs should be an integral part of the school education system</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Physical education and sports has little value and should be eliminated from the school curriculum</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Students participating in physical education and sports programs feel tired and not able to study during the study time | SA | A | UD | DA | SDA
---|---|---|---|---|---
Students in the schools should be made aware of the values and benefits of physical education and sports programs | SA | A | UD | DA | SDA
Physical education and sports programs should not be considered as a part of school education | SA | A | UD | DA | SDA

**PSYCHOLOGICAL ASPECTS**

Participation in physical education and sports improve the mental abilities of the students and thereby the academic objects also. | SA | A | UD | DA | SDA
---|---|---|---|---|---
Physical education and sports programs help to develop qualities like courage, cooperation, decision making etc. and make positive attitude of the students. | SA | A | UD | DA | SDA
Physical education and sports activity are important for developing mental health of the students | SA | A | UD | DA | SDA
Physical education and sports activity help to develop emotional stability and thereby controlling short temper | SA | A | UD | DA | SDA
Participation in physical education and sports makes the students more bold in facing difficulties and challenges in life | SA | A | UD | DA | SDA
Participation in physical education and sports make no contribution to the development of personality | SA | A | UD | DA | SDA
Physical education and sports activities develop unhealthy relationship and rivalry among students | SA | A | UD | DA | SDA
Emotional expressions cannot be brought under control through participation in physical education and sports. | SA | A | UD | DA | SDA

**GENERAL ASPECTS**

Physical education and sports should be made optional in school for those who are not interested in it | SA | A | UD | DA | SDA
---|---|---|---|---|---
Student should be given awards and privileges those who are outstanding in physical education and sports. | SA | A | UD | DA | SDA
Physical education and sports programs are meant only for those who are physically fit and not for others. | SA | A | UD | DA | SDA
Physical education and sports do not provide opportunities for learning moral spiritual values of life | SA | A | UD | DA | SDA
Physical education and sports activities are meant only for fun and enjoyment | SA | A | UD | DA | SDA
Accepting the abilities and a question of others are learnt through participation in physical education and sports | SA | A | UD | DA | SDA
Participation in physical education and sports programs develops punctuality and descriptive among students | SA | A | UD | DA | SDA
Participation in physical education and sports do not make a person more human in his attitude | SA | A | UD | DA | SDA

**SOCIAL ASPECTS**

<table>
<thead>
<tr>
<th>[ ]</th>
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</tr>
</thead>
</table>

---|---|---|---|---|---|

Students who participate for physical education and sports are more sociable

<table>
<thead>
<tr>
<th>Participation in physical education and sports programs provide ample opportunities for making friends more easily than in the classroom</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical education and sports programs help to develop the individual leadership qualities</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Participation in physical education and sports do not help to promote social adjustments</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Physical education and sports contribute nothing valuable to our culture</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>There is feeling among students that those who participate in physical education and sports may lose their character</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Participation in physical education and sports do not help to overcome the barriers of caste, creed, religion etc.</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Skills and qualities learnt from physical education and sports programs are essential for social life</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
</tbody>
</table>

HEALTH ASPECTS

<table>
<thead>
<tr>
<th>Some physical ailments can be presented through regular participation in physical education and sports</th>
<th>SA</th>
<th>A</th>
<th>UD</th>
<th>DA</th>
<th>SDA</th>
</tr>
</thead>
<tbody>
<tr>
<td>It is possible to improve the health and wellness of the students without physical education and sports program</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Physical education and sports plays a vital role in the growth and development of the students</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Physical education and sports are concerned with muscle building only</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>A healthy mind is developed in a healthy body through physical education and sports</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Physical education and sports programs are need not essential for the development and maintenance of good health</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Participation in physical education and sports do not help the students in acquiring good health habits</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
<tr>
<td>Participation in physical education and sports give no benefits to health and well being</td>
<td>SA</td>
<td>A</td>
<td>UD</td>
<td>DA</td>
<td>SDA</td>
</tr>
</tbody>
</table>

The final scale (table II) consists of 40 statements of which, 20 positive statements and the remaining 20 statements are negative. The response could be collected on a five point continuum, namely strongly agree, agree, undecided, disagree and strongly disagree with assigned score 5, 4, 3, 2 and 1, for positive statements and vice versa for negative statements. The minimum and maximum score one could get is 40 and 200, respectively. The attitude score of a respondent can be calculated by adding up the scores obtained by him on all the items. The respondents will be
categorized into less favorable, favorable and more favorable categories by considering percentile score. Higher the attitude score indicates the high favorableness of respondents towards physical education and sports and lesser the attitude score indicates less favorableness towards physical education and sports.

CONCLUSION

It can be concluded that the attitude scale developed was found to reliable and valuable; therefore it can precisely measure the attitude of high school boys towards physical education and sports. Hence researcher can use this attitude scale to measure attitude of high school boys towards physical education and sports in his study.

REFERENCES

KINANTHROPOMETRIC DIMENSIONS OF CHAMPION AND NON-CHAMPION KABADDI PLAYERS. A COMPARATIVE STUDY

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ABSTRACT

Aim: The purpose of this study is was to evaluate kinanthropometric attributes between champion and non-champion kabaddi players at university level. Sample- The sample of the present research work was selected from different colleges of Punjab a sample of 50 kabaddi players were taken 25 champion and 25 non champions.

Tools.
- Height was measured by using Portable stadio-meter to the nearest 0.5cm.
- Age: Age of the students was verified from the school record.
- Weight: weight was assessed to the nearest 0.1 kg using a certified electronic scale.
- Chest Circumference: The chest circumference was taken at the level of 3rd and 4th sternebrae. The tape was wrapped around the chest so that it gently touched inferior angles of scapula at the back and directly about the nipples in the front.
- Upper Arm circumference: The measurement was taken at the midpoint of the upper arm between inferior, border of acromion and the superior border of the head of the radius was marked.
- Hip Circumference: It measured the circumference of hip at their widest portion.
- Thigh circumference: The steel tape was wrapped around the thigh just beneath in gluteal fold. It was ensured that no pressure was applied on the tape and the tape touched gently around the thigh.
- Calf Circumference: The measurements were taken at right angle to the long axis of the lower leg where the girth was maximum.
- Biceps Skinfold: The biceps skinfold was measured over biceps muscle in the middle of upper arm.
- Triceps Skinfold: Triceps skinfold was measured over the triceps muscle at the level where the upper arm circumference was measured.
- Sub-Scapular Skinfold: This skinfold is measured below the angle of the scapula.
- Supra-Iliac skinfold: it was measured about 1cm above and 2cm medial to the anterior superior-iliac-spine.
- Calf Skinfold: It is the thickness of the double layer of skin plus subcutaneous fat on the medial side of calf in line with the long axis of the leg exactly at the level of calf circumference.

Statistical Analysis: To determine whether the relationship among the research variables exists or not, Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean and T-value.

Results- results reveals that significant exist at p<0.5 on the variable of age, time, weight, chest circumference, upper arm circumference, thigh circumference, hip circumference, biceps skinfold, triceps skinfold, calf skinfold, subscapular skinfold and suprailiac skinfold. Conclusion- champion had unique physical dimension than the non-champions which surpass the rest population.

Keywords: skinfolds, Skinfold caliper, Anthropometric rod, Kinanthropometry

INTRODUCTION

The human Body is the result of the interaction between the genotype (the genes of a subject) and environment, the surrounding conditions to which an individual is subjected, including sport training, nutrition, climate, lifestyle, habits etc. kinanthropometry, the study of the human body in terms of size, proportion, composition (in terms of fat and fat free mass) and function, in order to understand growth, performance and nutritional status, especially in relation to sport practice.
Different Kinanthropometric attributes helps in the success of elite athletes but the combination of different traits that helps them to become champion found only in small sample of population. Hence, it is expected from top-level athletes to have a specific physical, psychological, and physiological etc traits suited to the functional requirements of the sport in question. The relationship of body dimensions to physical functioning and natural process has been considerably inquired in the field of sports. It is well established and wide accepted that performance in sports need specific human traits. Sports scientists working overnight to find new methods and techniques so that human body be shaped to perform to its maximum limits. Scientists also study the traits of elite sports persons so that from general population these traits be selected and refined further for sports performance. Kabaddi is basically a traditional game of rural India, which requires skill, agility and power. It has the characteristics of wrestling and rugby. Kabaddi a combative team game require no equipment, it is less expensive game require minimum infrastructure. Kabaddi is played both outdoor and indoor played on a rectangular clay court having two set of games of 20 minute duration and 4 time intervals of 30 second each. Team Kabaddi is a composite intermittent game, which requires players to have well acquired aerobic and anaerobic capacities. Motor ability, sprinting, jumping, flexibility and throwing velocity represent physical activities that are considered as important aspects of the game and contribute to the high performance of the team. Successful performance requires explosive power of the legs and arms, sprint velocity. Sibila(1997). Anthropometric characteristics are very relevant for Kabaddi players because the game of Kabaddi entails physical contact in which specific physiques with a high level of strength and power may provide an advantage.

**Aim of the Study:** The purpose of this study is was to evaluate kinathropometric attributes of champion and non-champion kabaddi players at university level.

**Champions**- Those who attain first three positions at university level.

**Non-champions**- Those who did not attain first three positions at university level.

**METHOD**

**Sample**- The sample of the present research work was selected from different colleges of Punjab a sample of 50 kabaddi players were taken 25 champion and 25 non champions.

**Limitation**- The study is limited to Punjab only and to National style Kabaddi players.

**Statistical Analysis** - To determine whether the relationship among the research variables exists or not, Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean and T-value. Data was analyzed using SPSS (statistical package for the social sciences). Statistical significance was set at p < 0.05.

**Tools** –

**Age**- Age of the students was verified from the college record/Date of Birth certificate.

**Weight**- Weight was assessed to the nearest 0.1 kg using a certified electronic scale (scale certified by weight and measure department).
Height
Portable Stadio-meter was used for measuring height. The subjects were made to stand bare footed against a wall with his heels, buttocks, and upper back and back of head in contact with the wall. The heels were touching each other and head was so held that the Frankfurt plane was horizontal. Arms were hanging down on the sides. The anthropometric rod was held vertically and the horizontal arm was brought so that it touched the highest point on the head in the mid saggital section (vertex). Height was taken without socks. Height was recorded to 1/10 of a centimeter.

Chest Circumference
Subject position: The subject assumes a relaxed standing position with the arms hanging by the sides and slightly abducted.

Method: This girth is taken at the level of the Mesosternale. The anthropometrist stands to the right of the subject who abducts the arms to the horizontal position allowing the tape to be passed around the thorax. The stub of the tape and the housing are then both held in the right hand while the anthropometrist uses the left hand to adjust the level of the tape at the back to the adjudged level of the marked Mesosternale. The anthropometrist resumes control of the stub with the left hand and using the cross-hand technique positions the tape in front at the level of the marked Mesosternale. The subject is instructed to lower their arms to the relaxed position with the arms slightly abducted. The tape is then readjusted as necessary to ensure it has not slipped and does not excessively indent the skin. The subject should breathe normally and the measurement is taken at the end of a normal expiration (end tidal). The measurement was recorded up to nearest 1/10 of centimeter.

Upper Arm circumference

The measurement was taken with taken with a steel tape. The measurement was taken while the arm is handing down freely in a relaxed position. The midpoint of the upper arm between inferior, border of acromion and the superior border of the head of the radius was marked. The measurement was taken at the marked level knee, ping the tape horizontal. It was ensured that the tape was touching gently and not pressing anywhere. Measurement was taken up to nearest 1/10 of a centimeter.

Hip Circumference
Subject position: The subject assumes a relaxed standing position with the arms folded across the thorax. The subject’s feet should be together and the gluteal muscles relaxed.

Method: The girth is taken at the level of the greatest posterior protuberance of the buttocks which usually corresponds anteriorly to about the level of the symphysis pubis. The anthropometrist passes the tape around the hips from the side. The stub of the tape and the housing are then both held in the right hand while the anthropometrist uses the left hand to adjust the level of the tape at the back to the adjudged level of the greatest posterior protuberance of the buttocks. The anthropometrist resumes control of the stub with the left hand, and using the cross-hand technique,
positions the tape in front and the sides so that the tape is held in a horizontal plane at the target level. The tape is then readjusted as necessary to ensure it has not slipped and does not excessively indent the skin.

**Thigh circumference**

**Subject position:** The subject assumes a relaxed standing position with the arms folded across the thorax. The subject’s feet should be separated with the weight evenly distributed.

**Method:** This is the right mid-thigh girth at the marked Mid-trochanterion-tibiae-laterale site. It is usually helpful to have the subject stand on a box or stool for this measure. The anthropometrist passes the tape between the lower thighs and then slides the tape up to the correct plane. The stub of the tape and the housing are both held in the right hand while the anthropometrist uses the left hand to adjust the level of the tape to the target level. The anthropometrist resumes control of the stub with the left hand and using the cross-hand technique positions the tape so that it is held in a perpendicular plane. The tape is then readjusted as necessary to ensure it has not slipped and does not excessively indent the skin.

Reading was recorded up to nearest 1/10 of centimeter.

**Calf Circumference**

The subjects were asked to stand with feet slightly apart and body weight equally supported on both the legs. A steel tape was used for the measurements. The measurements were taken at right angle to the long axis of the lower leg where the girth was maximum.

**Subject position:** The subject assumes a relaxed standing position with the arms hanging by the sides. The subject’s feet should be separated with the weight evenly distributed.

**Method:** The maximum girth of the calf at the marked skinfold site. The subject stands in an elevated position. The elevated position will make it easier for the measurer to align the eyes with the tape. The anthropometrist passes the tape around the calf and then slides the tape to the correct plane. The stub of the tape and the housing are both held in the right hand while the anthropometrist uses the left hand to adjust the level of the tape to the marked level. The anthropometrist resumes control of the stub with the left hand and using the cross-hand technique positions the tape so that it is held in a plane perpendicular to the axis of the leg. The tape is then readjusted as necessary to ensure it has not slipped and does not excessively indent the skin. Reading was recorded up to 1/10 of a centimeter.

**Biceps Skinfold**

The biceps skinfold was measured over biceps muscle in the middle of upper arm. Skinfold caliper was used for measuring skinfold. Biceps skinfold is skin and subcutaneous tissue fold over the biceps muscle at the marked midpoint picked up about 1 cm in line with the cubical fascia.
Jaws of caliper were applied at the marked level. Measurement was noted after applying full pressure for 2 seconds. Measurements were recorded up to nearest 1/10 of a centimeter.

Triceps Skinfold

Triceps skinfold was measured over the triceps muscle at the level where the upper arm circumference was measured. Skinfold was picked up about 1cm above marked level. The jaws of skin fold caliper were applied to the skinfold and reading was noted after two seconds. Reading was recorded up to nearest 1/10 of a centimeter.

Sub-Scapular Skinfold

This skinfold is measured below the angle of the scapula. The skinfold was picked a little below the angle of the scapula, pointing downwards and outwards, while the subjects stood erect. The jaws of skinfold caliper were applied to the fold and measurement was noticed after two seconds. The measurements were recorded up to 1/10 of a centimeter.

Supra-illiac skinfold

The suprailliac skinfold was measured about 1cm above and 2cm medial to the anterior superior-iliac-spine. Subjects were in standing posture. The skinfold was picked at the above mentioned site and jaws of skinfold caliper were applied to the fold. The measurement was taken after 2 seconds. The measurement was recorded up to nearest 1/10 of a millimeter.

Calf Skinfold

It is the thickness of the double layer of skin plus subcutaneous fat on the medial side of calf in line with the long axis of the leg exactly at the level of calf circumference. The subject was asked to sit on the corner of a tabletop in such a way that his one leg was in front of the longer side of table and other leg was in front of the breadth side of table. The tester picked up the skinfold on the medial side of the left leg of subject and applied the jaws of the caliper exactly in the line with the marked level where the calf circumference was measured as usually, the reading corrected up to 0.2mm is recommended about two seconds after releasing the full pressure on the jaws of the caliper.

Administration of test and scoring: Before administration of test the students were explained briefly the purpose of test.

Kinanthropometric measurements

All the kinanthropometric measurements were taken on the left side of the body. Instruments used for taking measurements were-

i) **Skinfold caliper**- Skinfold callipers require a constant closing compression of 10g.mm–2 throughout the range of measurements. They should ideally be
calibrated to at least 40 mm in 0.2 mm divisions. Skinfold calipers require regular calibration.

ii) **Protable Stadiometer**- (Charder HM-200P Portstad) be used to measure height

iii) **Anthropometric tape**- A flexible steel tape of at least 1.5 m in length is recommended for girths. This should be calibrated in centimetres with millimetre gradations. Any tape used should be non-extensible, flexible, no wider than 7 mm.

iv) **Weighing machine**. Electronic scales is used to measure weight. The accuracy of the instrument is to within 50 g. Calibration of scale be done before use.

All the 12 kinanthropometric measurements (Body weight, height, chest variables circumference, upper arm circumference, thigh circumference, calf circumference, hip circumference, biceps skin fold, triceps skin fold, calf skin fold, supra Iliac skin fold, sub scapular skin fold) were taken according to Singh and Bhasin[3] 1989. The investigator noted all the measurements of 50 players (25 champion 25 non-champion).

### KINANTHROPOMETRIC MEASUREMENTS OF CHAMPION AND NON-CHAMPION KABADI PLAYERS

**Table-1**

<table>
<thead>
<tr>
<th></th>
<th>Champion</th>
<th></th>
<th></th>
<th></th>
<th>Non-champion</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>SE m</td>
<td></td>
<td>Mean</td>
<td>S.D</td>
<td>SE m</td>
<td>t-value</td>
</tr>
<tr>
<td>Age</td>
<td>21.55</td>
<td>1.33</td>
<td>0.27</td>
<td></td>
<td>20.74</td>
<td>1.68</td>
<td>0.33</td>
<td>1.88*</td>
</tr>
<tr>
<td>Time</td>
<td>5.144</td>
<td>0.8</td>
<td>0.16</td>
<td>3.78</td>
<td>1.27</td>
<td>0.25</td>
<td>4.51*</td>
<td></td>
</tr>
<tr>
<td>Weight kg</td>
<td>60.88</td>
<td>3.87</td>
<td>0.74</td>
<td>67.24</td>
<td>2.68</td>
<td>0.53</td>
<td>5.69*</td>
<td></td>
</tr>
<tr>
<td>Height cm</td>
<td>181.328</td>
<td>2.84</td>
<td>0.57</td>
<td>170.944</td>
<td>32.03</td>
<td>6.4</td>
<td>1.61</td>
<td></td>
</tr>
<tr>
<td>Chest cir cm</td>
<td>86.56</td>
<td>1.27</td>
<td>0.25</td>
<td>83.416</td>
<td>1.44</td>
<td>0.28</td>
<td>8.2*</td>
<td></td>
</tr>
<tr>
<td>Upperarm cir cm</td>
<td>28.64</td>
<td>0.87</td>
<td>0.17</td>
<td>24.988</td>
<td>1.68</td>
<td>0.33</td>
<td>9.63*</td>
<td></td>
</tr>
<tr>
<td>Thighcir cm</td>
<td>52.142</td>
<td>1.09</td>
<td>0.22</td>
<td>50.874</td>
<td>0.83</td>
<td>0.16</td>
<td>4.61*</td>
<td></td>
</tr>
<tr>
<td>Calfcir cm</td>
<td>34.25</td>
<td>0.78</td>
<td>0.16</td>
<td>34.33</td>
<td>2.2</td>
<td>0.44</td>
<td>0.17</td>
<td></td>
</tr>
<tr>
<td>Hicpcir cm</td>
<td>79.93</td>
<td>0.6</td>
<td>0.12</td>
<td>81.54</td>
<td>1.56</td>
<td>0.31</td>
<td>4.81*</td>
<td></td>
</tr>
<tr>
<td>Bicepsskinfold mm</td>
<td>3.16</td>
<td>0.23</td>
<td>0.05</td>
<td>3.73</td>
<td>0.5</td>
<td>0.1</td>
<td>5.09*</td>
<td></td>
</tr>
<tr>
<td>Tricepsskinfoldmm</td>
<td>5.53</td>
<td>0.48</td>
<td>0.1</td>
<td>5.96</td>
<td>0.47</td>
<td>0.09</td>
<td>3.25*</td>
<td></td>
</tr>
<tr>
<td>Calfskinfoldmm</td>
<td>6.09</td>
<td>0.3</td>
<td>0.06</td>
<td>6.4</td>
<td>0.16</td>
<td>0.03</td>
<td>4.54*</td>
<td></td>
</tr>
<tr>
<td>Subscapularskinfold mm</td>
<td>7.88</td>
<td>0.57</td>
<td>0.11</td>
<td>8.37</td>
<td>0.56</td>
<td>0.11</td>
<td>3.1*</td>
<td></td>
</tr>
<tr>
<td>Suprailiacskinfold mm</td>
<td>7.96</td>
<td>0.46</td>
<td>0.09</td>
<td>8.42</td>
<td>0.28</td>
<td>0.06</td>
<td>4.32*</td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05,
RESULT AND DISCUSSION

Table 1 shows the distribution of mean values and standard deviation and t-value of different kinanthropometric measurement among Champion and non-champion Kabaddi players.

On the variable of age the Champion have higher mean value of 21.55 years than the non-champion having mean value of 20.74 years showing significant difference among them as t-value is 1.88. This shows that with the increase in age the player become more experienced and polished his skill which help him to become champion.

Regarding (time period for which game has been played) the Champion has higher mean value of 5.14 years against non-champion having mean value of 3.78 years. The mean difference is significant, as t-standing is 4.51. It is significant at 0.05 levels. This shows that longer time spent on training is no doubt an attribute of champions.

The mean value of weight of champions is 60.88 kg and the mean value of non-champions is 67.24 kg, showing significance difference at 0.05 levels among them as t-value is 5.69. The result of Devaraju and Needhiraja[12] (2012) revealed that speed, agility, weight and flexibility become the common characteristics which can predict the playing ability in Kabaddi players.

In case of height the champion’s shows higher mean value 181.3 cm. than non-champions 170.94 cm having t-value 1.61. From means it may be concluded that the champions have mechanical advantage of height over the non-winner players. There is non-significant difference among them. The results of Kaushik Halder et.al[15](2016) corresponds with results of the study.

In case of chest circumference champion players have mean value 86.56 cm than the non-champion players having mean value of 83.416 cm, showing significant difference among them as t-value is 8.2. The results of Tanner[1] (1964) and Chuhan M.S, Tanwar Bhupinder[11](2012) are in accordance with the results of the study. Tanner was of the view that Olympic athletes had broader chest circumference when compared to ordinary athletes, which shows that broader chest gave better leverage for better performance.

Regarding upper arm circumference the champion players have mean value of 28.64 cm than the non-champion players having mean value of 24.988 cm, showing significant difference among them as t-value is 9.63. The results of Franchini Eet al[6] (2005) correspond with results of the study. The results of the above studies show that elite athletes have more muscle mass as compared to ordinary athletes.

On the variable of thigh circumference the champion players have mean value of 52.142 cm than the non-champion players having mean value of 50.874 cm showing significant difference among them as t-value is 4.61. The results of Kutlu Mehmet et.al[7] (2007) corresponds with the studies, they were of view that due to intense training elite sports persons had more muscular cross sectional area as compared to non champions which help the thigh muscles to contract with greater force hence perform better.
In case of calf circumference the champion players have smaller mean value of 34.25 cm than the non-champion players having mean value of 34.33 cm showing non-significant difference among them as t-value 0.17 which corresponds accordance to the need of the event. The study of Romero Juan J. Fernández et.al [17] (2016) do not corresponds with the results of the study. In case of hip circumference the non-champion players have higher mean value of 81.54 cm, than the champion players having mean value of 79.93 cm. The difference is significant, as t-value is 4.81 resulting more adipose tissue deposit around the hip joint, which further reduces the mobility of the joint and decreases the performance. Stephens Patrick [5] (2004) supports the results of the above study, which shows that smaller hip circumference has better mechanical advantage of trunk mobility than the wider hip circumference. On the variable of biceps skin fold once again the non-champion players have higher mean value of 3.73 mm than the champion players having mean value of 3.16 mm. This exhibits highly significance difference, as t-value is 5.09. The reason for this is that non-winners have more fat deposit in arms, which is responsible for restricted mobility. Singh Kuldeep and Ram Mange [14] (2013) supports the result of the above study, which shows that champion players have more muscle mass as compared to non-champion players. Regarding triceps skinfold the champion players have smaller skinfold thickness 5.53 mm and against it non-champion players triceps skinfold mean stands at 5.96 mm. The difference between means is significant, as t-value is 3.25. The finding of S. Singh et.al [15] (2013) supports the results of the above study, which shows that less fat present in triceps region helps powerful extension of elbow joint during activity. In case of calf skinfold the champion players have lower mean value of 6.09 mm than the non-champion players having mean value of 6.4 mm. This exhibits significant difference, as t-value is 4.54. Findings reveal that winners have less fat deposit in responsible for better performance by them. The results of Holwaya Francis E and Seara Mariano [11] (2011) were accordance with the above study. On the variable of subscapular skinfold the champion players have lower mean value of 7.88 mm as compared to non-champion players having mean value of 8.37 mm. The difference between means is significant, as t-value is 3.1. The findings of Shyamal Koley et. al. [10] (2010) supports the findings of the above study. They are of the view that elite athletes possess less fatty tissue when compared to ordinary athletes, which shows that scapular region of winners athletes is better developed which helps the shoulder girdle to work at wider range and to exert maximum power during running, jumping and throwing. In case of suprailliac skinfold the champion players have lower mean value of 7.96 mm as compared to non-champion players having mean value of 8.42 mm showing non-significant difference among them as t-value is 4.32. The findings of Cortell-Tormo Juan Manuel et.al [9] (2010) support the results of the above study. Smaller skinfold shows that winner athletes have better abdominal muscles when compared to non-winner athletes, which helps them for better mobility of pelvic girdle during activity.

CONCLUSION
The following conclusions were drawn from the present study. Significant differences exist at p<0.5 on the variable of age, time, weight, chest circumference, upper arm circumference, thigh circumference, hip circumference, biceps skinfold, triceps
skinfold, calf skinfold, subscapular skinfold and suprailiac skinfold. No significant differences exist on the variable of height and calf skinfold. From the above results we came to conclusion that before selecting the game or for talent identification coached and physical educationist must compare the physique of individual with the results of the study. Hence we can conclude that specific event need specific kinanthropometric measurements, elite sports persons had unique physical attributes than the general population.

**REFERENCE**

THE INTENSITY OF SPORTS COMPETITION AND ITS IMPACT ON THE FITNESS LEVEL OF FOOTBALL PLAYERS
(Field study of some clubs of the first regional league (category senior) - Batna – Algeria)

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ABSTRACT
The objective of this study is to identify the intensity of sports competition and its impact on the level of physical fitness of football players, in order to adopt policies that enhance the positive aspects and correct the negative aspects, and maintain their mental health and develop their physical abilities and development of their skills. In order to achieve this, the researcher used the descriptive approach to fit this study on a random sample of 45 football players of the first regional division-batna - Algeria. Where the questionnaire was applied and found that the intensity of sports competition is negatively reflected in the level of physical fitness of football players, and should be interested in programming of matches and physical aspect improves, the results of the teams due to the intensity of sports competition. In light of the results of the research, the researcher is recommended to rely on specialists and experts in programming matches r, and follow the modern scientific methods in the physical preparation of fitness and in the process of retrieval during sports competitions.

Keywords: Intensity sports competition, fitness level, football.

INTRODUCTION
The sport of our time has become very important. It is one of the highest forms of movement in human beings. It is an advanced stage of play. It is the most organized and the most skilled (Amin Anwar Al-Khuli 1996,15). But became a science of education based on the goals of each athlete to get the best results and through the preparation of good and integrated, whether psychologically or physically and based on the basis of methodology and scientific modern return to the athletes with good results enable them to gain time and avoid physical damage from injuries and exhaustion. And sport is considered a muscular and mental effort requiring human life since ancient times, in view of what has been revealed by the reality of human societies in ancient times and in modern times, everything in this life has its purpose and purpose, that is, that man lives and rises as an element of the community and in the community his individual behavior becomes an interactive function with others(Mohamed Awad al-Bassiouni, Faisal Yassin al-Shati 1992,30), as is the case with football practitioners, they have established goals that they seek to achieve.

The sport of football is one of the most popular games and sports that the masses and the media attach to great importance because of the intense sports competition between the different teams, and often hear after every sporting competition talk about the reasons for winning or defeat through the media and the statements of managers and coaches or players in themselves. To many factors and different reasons. Some of them talk about difficult mobility, lack of pitch, and the other talks about lack of physical preparation or even the difficulty of sports competition in itself..... etc. In
In view of the requirements of modern football and what players spent muscle effort during the matches, with the development of the organization and the formation of various championships, which has become the players to play a large number of games (intensity of competition), resulting in the implications for the level of fitness for players as well as psychological. In this regard, our study focused on "the intensity of sports competition and its impact on the fitness level of football players of the regional league - Batna - Algerian football teams."

**METHOD**

The descriptive approach, which is the appropriate approach for our study, which is based on the study of the phenomenon as it exists in reality and its precise description, in order to determine the nature and characteristics of certain phenomena to analyze the relationships between different variables, and try to quantify them in order to draw conclusions and objective predictions (Zahaf Mohamed 2017, 64). The research population is represented in the players of the regional league teams Patna Football for the 2014/2015 sports season, the sample was chosen in a simple random way, consisting of 43 football players, with a percentage of 11.25% of the study population. In our study we relied on the questionnaire to collect field data, It is defined as a list consisting of a set of questions that have a strong relationship with the subject of the research. Its design derives from the basic methodological stages that the researcher must pay attention to, and the results of the research are to be adopted (Rachid Zerwati 2007, 220). It was built from theoretical framework, previous studies and some measures to come out in final version consist of i three axes, which are as follows.

- The first axis: the level of fitness and intensity of sports competition.
- The second axis is programming and the intensity of sports competition.
- The third axis is physical preparation and the intensity of sports competition.

Statistical data were processed using SPSS version 20, which included processing of the following statistical methods: - Repetition and percentages to describe the characteristics of the study community, and to determine the response to the axis and dimensions of the study. Arithmetic average and standard deviation to measure consistency and non-dispersion. - Chi-square test ($\chi^2$) for matching between independent and dependent variables.

**RESULTS**

Table (01) shows the extent to which sports competition intensity affects the fitness level of football players.

<table>
<thead>
<tr>
<th>Statistical conclusion</th>
<th>Degree of freedom</th>
<th>Level of significance</th>
<th>Chi-squared ($x^2$)classified</th>
<th>Chi-squared ($x^2$) Calculated</th>
<th>percentage of repetition %</th>
<th>Repetition</th>
<th>the answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistically significant</td>
<td>1</td>
<td>0.05</td>
<td>3,841</td>
<td>10,256</td>
<td>%74,42</td>
<td>32</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>%25,58</td>
<td>11</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td>43</td>
<td>Total</td>
</tr>
</tbody>
</table>
The table shows that 74.42% of the sample respondents see the intensity of the competition as having an impact on their level of fitness, and 25.58% of the respondents see the opposite. To confirm this, we calculated the Chi-square test where we note that the calculated Chi-squared ($\chi^2$) value (10,256) is greater than the Chi-square (3,841) classified at the significance level (0.05) and the freedom level is equal to (1). From this we conclude that there is a statistical significance which is reflected in the fact that the intensity of competition is negative for the fitness level of the players during the sports competition. Because of the many games played, the instability of the level of performance of players, and the impact of fatigue and exhaustion on the performance of players during the competition. In addition, the intensity of competition leads to negative cases, lack of time for recovery, and the decline in performance, and the large number of injuries. These results are in agreement with the study by (Nahoui Imad and others, 2012) that concludes that the intensity of sports competition in football has a negative effect on the level of physical fitness of players and overall performance.

Table (02): shows that poor programming of matches leads to the intensity of sports competition.

<table>
<thead>
<tr>
<th>Statistical conclusion</th>
<th>Degree of freedom</th>
<th>Level of significance</th>
<th>Chi-squared ($\chi^2$) classified</th>
<th>Chi-squared ($\chi^2$) Calculated</th>
<th>percentage</th>
<th>Repetition</th>
<th>the answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistically significant</td>
<td>1</td>
<td>0.05</td>
<td>3,841</td>
<td>6,721</td>
<td>% 100</td>
<td>43</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>% 00</td>
<td>00</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td>43</td>
<td>Total</td>
</tr>
</tbody>
</table>

The table shows that 100% of the sample respondents agreed that the poor programming of the match leads to the intensity of the sports competition. We also note that the calculated Chi-square is 10,256, which is greater than the classified Chi-square (3,841) at the significance level (0.05) and the freedom level is equal to (1), which indicates a statistical indication that poor programming of match leads to the intensity of sports competition. By this we conclude that most players assert that poor programming for match leads to the intensity of sports competition, and this is due to the random planning, which caused the low level of performance of the players and the large number of injuries and fatigue and exhaustion, And well as the decline in the results of the team due to his participation in various sports competitions, and his inability to achieve good results in addition to some other cases as a force participating teams and lack of good preparation and instability and administrative problems.

Which refers to the lack of seriousness in decision-making by the sport management and this is confirmed by Herbert Simon, "the decision is the heart of the administration and planning is one of the most important principles (Kamal Mohammad Amiri and Essam Badawi 1992, 175)."
Table (03): Shows the importance of physical preparation in improving the performance of players during the intensity of competition.

<table>
<thead>
<tr>
<th>Statistical conclusion</th>
<th>Degree of freedom</th>
<th>Level of significance</th>
<th>Chi-squared ((x^2)) classified</th>
<th>Chi-squared ((x^2)) Calculated</th>
<th>percentage</th>
<th>Repetition</th>
<th>the answers</th>
</tr>
</thead>
<tbody>
<tr>
<td>Statistically significant</td>
<td>1</td>
<td>0.05</td>
<td>3,841</td>
<td>5,140</td>
<td>% 58,14</td>
<td>33</td>
<td>Yes</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>% 41,86</td>
<td>10</td>
<td>No</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>100%</td>
<td>43</td>
<td>Total</td>
</tr>
</tbody>
</table>

The table shows that 58.14% of the respondents agreed that physical preparation leads to improved performance of the players during the intensity of the competition while 41.86% see the opposite, and we note that the calculated Chi-squared \((k^2)\) 5,140, which is larger than the classified Chi-square 3,841 at the significance level (0.05) and the freedom level is equal to (1), Which indicates a statistical indication that physical preparation leads to improved performance of players during the intensity of competition. From this we conclude that physical preparation has an effective role in improving their performance during the competition, through the awareness of the players of the importance and effectiveness of the physical preparation of the good, which has a positive impact in improving their performance, and is a factor of success and excellence of the player during the intensity of competition. And that their level is affected by the psychological situation when they are not in full fitness during the intensity of competition and this highlights the importance of physical preparation and its role in improving the performance of players during the games, which reflects on the performance and the return of the team. These results consistent with the study of (Said Boubakri and others, 2006) the effectiveness of the physical preparation period on the profitability of football players during the competition phase. The longer the duration of physical preparation in size and intensity, the more profitable the players are during the competition phase.

CONCLUSION

We conclude from this study that the intensity of the competition has a negative impact on the level of fitness for football players, and this is reflected in the low level of fitness due to the large number of games played and its role in the instability of the performance of the players in addition to the impact of fatigue and exhaustion on the level of performance during competitions.

We conclude from this study that the intensity of competition has a negative impact on the level of fitness of football players, and this is reflected by the low level of fitness due to the large number of games played and its role in the instability of the performance of players and the decline of the results of the team, and inability to achieve good results. In addition to the impact of fatigue and
exhaustion on the level of performance during competitions, and the strength of the participating teams and lack of good preparation and instability and administrative problems. Where the poor programming of the competition leads to the intensity of competition and this through the random planning, which in turn leads to a large number of injuries and increase anxiety. And physical preparation is one of the most important factors in helping to raise the level of performance of players and the real goal is to develop the fitness of the player because it is the most important elements affecting the performance, and overcome fatigue and exhaustion during the competitions and follow the methods necessary for development and improvement and this guarantee for the performance of the players during the Period of competition, overcome the effects of competition intensity and achieve better results. From here we can say that the results obtained are a beacon for officials and specialists and take seriously to allow them to build the foundations of football and the most important future competitions and access to a high level. Despite the results obtained, this study remains very modest, and we want to attract attention and interest, because scientific research is a continuous and unfinished circle, and there is room for researchers as long as there are many negatives and problems experienced by the teams football, Especially those that have the intensity of sports competition And the lack of good results that we may not be able to reach through this study.

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EFFECTS OF IMAGERY ON BATTING SKILL PERFORMANCE OF CRICKET PLAYERS AT THE ZONAL AND UNIVERSITY LEVELS

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ABSTRACT

Imagery is a modern tool used in coaching of players to improve their performance in sports. Its aims at achieving a higher level of skill proficiency in their respective games. Batting in cricket contains a wide variety of strokes with a lot of importance given to the execution of the skill to achieve a mastery in the skill. In this study the purpose was to examine the relationship of imagery and its effects on the batting skill. Players were divided into two groups namely control group (CG) and Experimental Group (EG) each consisting of thirty players each. The Batting skill test score of the Experimental Group (EG) had a pre-test mean value of 9.97±4.40and a post-test value of 12.5±2.80 which is significant with t=-2.664 and p-value=0.010<0.05. The pre-test and post-test score of the Control Group (CG) had a mean value of 7.75±2.71 and post-test is 8.87±2.48. It is not significant with t=-1.665 and p-value=0.101>0.05. As a result, one can conclude that there is a significant change in the Experimental Group (EG) due to the imagery intervention when compared with the Control Group (CG).

Key words: Cricket, cover drive, imagery, Experimental Group. Control Group.

INTRODUCTION

Due to the expansion of facilities, more and more people are taking to sports as a daily feature in their life. Cricket has become a very sophisticated technical game and it has developed into a highly competitive sport which requires high level of physical and psychological fitness. The development of modern cricket game especially one day cricket and twenty-twenty cricket is accompanied by evolving several new training methods. Coaches have been constantly employing different methods of training to improve the performance and to determine the superiority of one method to the other. Of all cricket skills, batting is the most glamorous. At the highest level of the game, scoring runs and not being dismissed will bring fame and glory of a kind that is possibly unique in the world of sports. In 1930s, the cricketing world regarded Sir Donald Bradman with the kind of awe reserved for monarchs and film stars; Brain Lara’s 375 against England in 1994 earned him a similar status. At the summit of batting achievement lies immense prestige. But batting in cricket will also take the most time to learn and perfect. This process begins with understanding the how and why of the art. Success in sports is partly attributed to physique the psychological makeup and a many of other factors. While the knowledge of morphology of
sportsmen belonging to various discipline is abundant, that of cricketers is very scantily this prompted the present investigation.

THE SCIENCE OF BATTING

Batting is a science, one that uses a number of skills:

- **Visual and neurological skills**—watching the ball, judging where it goes, processing this information (a lightening-swift unconscious process), decision- making and shot selection.
- **Physical and biomechanical skills**—creating the correct body movements so that shot-making corresponds with length and line of the ball, timing the hitting of the ball.
- **Psychological skills**—dealing with the elation and depression associated with scoring a hundred or a duck.

Vision and batting

While technique and tactics have been central to cricket manuals for over a century, the physiology of the game is relatively new in the popular consciousness in the game.

There are many selective factors that will determine the level to which a cricketer can advance: concentration, desire, courage, application, fitness and so on. But the most obvious, at least for batters, are the dual but different abilities of their subconscious brains to process information quickly enough to deal with incoming fast deliveries, and precisely enough to play the deceptive flights and spins produced by slow bowlers. Without these capabilities, often simplistically labelled ‘hand-eye-co-ordination’ a batter will never reach the highest levels of sport. This is the law of the sporting jungle, and it applies across the board. Batting will always be easier for those who can subconsciously select the relevant visual information and process it more quickly, there by having more time to choose the most appropriate shot and execute it with exquisite precision.

In this way, cricket has evolved ‘to produce a balanced contest between the visual-motor skills of the batsman and the strength and skills of the bowler. Batting is possible (or batsmen would refuse to play), but not all the time (or bowlers would refuse to play). The abilities of the best batsman against the fastest bowlers reveal the limits of the (human) visual-motor system’ (Land and McLeod, 2000).

As the bowler runs in, the batsman begins his search for anticipatory cues that will allow the earliest possible detection of the future flight pattern and velocity of the delivery. Once the ball has been released, the batter views it for as long as he needs to make a decision on the exact stroke he will play. This is known as viewing time (VT). Having decided which stroke to play, the batsman then experiences a latency time (LT) during which his motor response to the delivery is organized and the necessary information travels via the various nervous pathways from his brain.
to his muscles. This latency time approximates what is known as the ‘reaction time’ and lasts about 180 milliseconds. Finally, the LT phase ends when the brain commands finally reach the muscles and initiate a response from those muscles that produce the batter's specific stroke. This is known as movement time (MT).

Using a temporal occlusion study (one in which they allowed batters to see only part of the flight of the ball), Abernethy (1982) and Abernethy and Russell (1984) found that top batsman can make accurate shot selections from shorter viewing times than less good batsmen. Furthermore, they suggested that the more skilled batters are better at generating useful information from advance cues than less good batters.

Penrose and Roach (1995) showed that skilled batsmen were significantly better than the less skilled at using advance cues that predict the subsequent line (radial variability) of bowling deliveries. They evaluated this by showing batsmen videos of different deliveries that ended 80 milliseconds before the bowler released the ball. This is known as video-occlusion technique.

**IMAGERY**

Imagery is described as an experience that mimics real experiences and involves using a combination of different sensory modalities in the absence of actual perception. White and Hardy (1998) explain that “we can be aware of ‘seeing’ an image, feeling movements as an image, or experiencing an image of smell, taste or sounds without experiencing the real thing” (p.389), whereas Moran (2004) defines imagery as “perception without sensation”.

Visualization can be a highly effective tool in centring yourself before an innings or a match or in putting you in a positive and confident frame of mind. But as part of your pre-inning routine, it can also serve another much more practical purpose: it can tighten up your technique, help you see the ball earlier and better, ang get your shots working before you even set foot on the field. (Bob woomer.2008)

**Objectives**

To study the relationship of the effects of imagery intervention and improvement in execution of cover drive skill in batting.

**METHOD**

For the purpose of the study the 60 cricket subjects were divided into 2 groups each and were coined as Experimental Group (EG) comprising of 30 subjects and a Control Group (CG) comprising of 30 subjects. The experimental group (EG) of 30 subjects had to undergo 4-week imagery intervention program were the subjects were given 5-time imagery intervention in a week for 4 weeks which included reading of the imagery skill script and also watching of the videos related to the skills and then ending with an imagery session with eye closed and the subject
imagining himself doing the skill in match situations. The control group (CG) which also consisted of 30 subjects was however not given any such imagery training as the experimental group.

**Imagery Script:** The subjects were made to read the imagery script which was developed by the researcher. The script included the steps involved in imagery. The subjects were made to sit in a hall and were told to do deep breathing and later on they had to read the script which had details of the cover drive skills. The script consists of the very details of the cover drive skill. The subjects had to then rehearse the skill in a match situation at a match speed of execution of the cover drive skill.

**Batting skill test:** The batting skill test was developed by Cricket Australia Centre of Excellence (COA) Mark Portus.et.al (2010). It was developed to quantify the physical execution aspects of the batting skill. The test was developed by COA to establish performance benchmarks for batters in the high-performance pathway and to provide coaches and batters a profile of their strength and weakness about their skill in batting.

**Purpose of the test:** The researcher for the study has selected cover drive as the primary skill for the subjects. The purpose the study was to establish a relationship between the effects of imagery and the level of changes in the execution of the cover drive skill in the Experimental Group (EG) after the completion of the imagery intervention as compared to the Control Group (CG) who were not given imagery training.

**Methodology of the test:** The batting skill test was undertaken by the 60 subjects each who belonged to the Experimental Group and the Control Group. Testing took place on a matting wicket surface at the centre pitch. The aim of the test was to play the cover drive and measure the physical skill of the ability of playing the cover drive into a designated target which was positioned at the cover region along with gaps demarked with cones were the batter had to play in between those gaps to attain scores.

![Figure 1. Layout for the test in detail.](image)
The batter was given 3 trials to understand and adjust to the length of the ball, pace of the ball. Accordingly, the length was adjusted as per the choice of the batter as different batters had different level of footwork reach to play the stroke. The line of the ball was adjusted to outside off stump and the length was adjusted to drive length. The batter was instructed by the researcher to play the ball towards the cover region where the layout for scoring was set. The trials score was not considered for the purpose of the test. The batsmen after taking his stance at the crease would face the deliveries from the bowling machine and the batter had to play the cover drive subsequently. The feeder who was designated to feed the ball into the machine would call out to the batsman before feeding the ball into the bowling machine. The batter was given time in between deliveries which he faced during the testing. It was compulsory for the batter to wear all equipment’s which is usually used during the matches.

**Method of scoring:** Scorers were designated during the administration of the test who would write down the scores after the competition of each trials. The designated cover drive target had a designed layout with a wicket in the center and cones evenly placed near it with equal distance. The batter was given six balls to face which was fed with the help of the bowling machine. The target in the cover region had 4 cones. A score of 4 was awarded when the ball travelled through the middle 2 cones of the nominated target and a score of 1 if passing through the outer 2 cones. A score of 0.5 was given if the batter executed a well-crafted shot and the ball travelled near the targets, but not through them. This was a subjective scorer assessment and the researcher himself who is a certified cricket coach and trained in this assessment of a 0.5 score judged these strokes to ensure consistency.

**Equipment Used:** Pace MH cricket bowling machine was used for the batting skill test to feed the ball a consistent pace, line and length.

Dimple balls made of Poly Urethane was used in the study. These balls were specially designed to be used for bowling machines.

Batter was compulsorily made to wear all safety equipment during the trials.
RESULT AND DISCUSSION

The following is the findings in the study:

As shown in Table 1, in Batting Accuracy Control Group (BACG) we observe that pre-test score is 7.75±2.71 and post-test is 8.87±2.48. It is not significant with t=-1.665 and p-value=0.101>0.05. Level of Batting Accuracy Experimental Group (BAEG) before imagery practice was 9.97±4.40 and after practice is 12.5±2.7947 which is significant with t=-2.664 and p-value=0.010<0.05. The results show that accuracy level of experimental group has significantly changed after imagery practice.

Table 1

Comparison of Batting Accuracy Test between the Experimental Group (EG) and Control Group (CG).

<table>
<thead>
<tr>
<th>Skill</th>
<th>Group</th>
<th>Mean Pre-test</th>
<th>Mean Post-test</th>
<th>“t” Value</th>
<th>“p” Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Batting Accuracy Test</td>
<td>Experimental Group</td>
<td>9.97 ± 4.4</td>
<td>12.5 ± 2.8</td>
<td>-2.664</td>
<td>0.010 HS</td>
</tr>
<tr>
<td></td>
<td>Control Group</td>
<td>7.75± 2.71</td>
<td>8.87 ± 2.48</td>
<td>-1.665</td>
<td>0.101 NS</td>
</tr>
</tbody>
</table>

*Note.* Values are given as Mean ± SD for groups of thirty subjects each. The level of significance is taken at 0.5 with df 58.

*Figure 1.* Comparison of Batting Accuracy Test between the Experimental Group (EG) and Control Group (CG).
CONCLUSION

The result of the study in relationship to the Batting skill shows that there is a significant change in the Batting Accuracy of the Experimental Group (EG). The change was not significant in the Control Group (CG). Hence it can be concluded that the change which was seen as significant in the Experimental Group (EG) was due to the Imagery intervention of four-week period consisting of a 5 session Imagery Intervention per-week.

REFERENCES

ROLE OF INTRINSIC AND EXTRINSIC MOTIVATIONAL FACTORS AND PARTICIPATION IN SPORTS
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ABSTRACT
Aim: The Aim of this study is to assess motivation level of engagement in sports between athletes and sportspersons of different games. Method: For present research work a sample of 50 male athletes and 50 sports persons of different games from mansa district were selected. Tools: To evaluate the sports motivation among sport persons, The Sport Motivation Scale (SmS-28) Luc G. Pelletier, Michelle Fortier, Robert J. Valierand, Nathalie M. Briere, Kim M. Tuson and Marcel R. Blais, 1995 was used. Statistical Analysis: To find out the relationship among the research variables exists or not, t-test was used to test the significance of difference between the variables. Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean. Data was analysed using SPSS (statistical package for the social sciences). Statistical significance was set at p < 0.05. Results and Discussion: significant difference exist on all variables of intrinsic, extrinsic and A motivation. Athletes shows higher motivation level of engagement by Intrinsic motivation - to know, Intrinsic motivation - to accomplish, Extrinsic motivation - to identified, Extrinsic motivation – to introjected and Extrinsic motivation - to external regulation, where as players of other games were motivated by Intrinsic motivation - to experience stimulation and by A motivation. The results also indicate that internal and external factors influence the participation in sports activity. Conclusion: Motivations for engaging people in sports activity was influenced by both intrinsic and extrinsic factors.

Keywords: Intrinsic Motivation, Extrinsic Motivation, Self-motivation,

INTRODUCTION
A simple definition of motivation comes from Ryan and Deci[9] (2000). The authors summed up the core meaning of motivation in a simple but nicely written sentence; “people who are motivated tend to be moved to do something”. Thus, those who seek participation in a task may be characterized as motivated, whereas those who feel no inspiration to engage in an activity may be characterized as unmotivated. Motivation is expressed by a particular state of psychic tension based on the correlation between perception and thought. The foundation of motivation is represented by all needs and interests of athletic performance. Motivation determines focus and will, and energetically supports the efforts of training and participation in competitions (Mihăilescu et al.,[6] 2011). Motivation is an inner vital force that influences all faces of our conduct; it also strikes on how we think, look and interact with others. In sport, high motivation is widely recognised as a necessary requirement in getting sportmen to accomplish their potential. Today sports scientists trying hard to exploit the motivational force to its full extend. Motivation has impact on athletes learning, performance and other psychological factors influencing sports performance; if the sportsperson is not in good psychological state one cannot expect better results from him. There are three types of motivation that influence participation in sports.

1) **Intrinsic Motivation**- This type of motivation comes directly from the performer. Intrinsic factors are personal satisfaction or enjoyment.

2) **Extrinsic Motivation**- Extrinsic Motivation refers to action or behaviour performed in the hopes of receiving an external reward or outcome. Extrinsic factors may be money, reward, etc.
iii) **Self-motivation**- This is almost the same as intrinsic motivation. Cratty[31] (1989) suggested that there are a number of factors that motivate us to take part in sport, which include a desire to achieve a sense of mastery, a wish for status, friendship, the challenge which the face, or simply intensity level the excitement of taking part.

The structure of motivation is framed of all the motives that stimulate human behavior. It is essential to know that a person’s motivation for an action does not lie in the presence of a certain motive, but in the stratified of all the motives, which results in the actual form and structure of motivation. Generally, when athletes begin participation in a particular sport, they are motivated by both intrinsic and extrinsic factors. Motivation is the basis all athletic drives and achievement. Without your desire and decision to improve your sports performances, all of the other mental factors i.e. self-confidence, intensity, concentration, and feelings, are meaningless. To become the best athlete you can be, you must be motivated to do what it takes to maximize your power and attain your goals. The motives of sports activity are extremely varied, being sometimes found in one and the same person, who has in this way a richer motivation for sports activity. Motives are dynamic; they change, so that the same activity acquires very different motivations over time. Motive is an internal factor that triggers, supports and directs an activity and has two functions: activation or energy mobilization, and behavior channeling. Motivation (an internal factor) is conditioned by its object; the external factor has a triggering effect only in relation to specific needs, desires and aspirations. It is considered that external factors are interwoven with internal factors causing the self-regulation, adaptation of individuals, so that they act spontaneously and on their own based on their motives (Mihăilescu et al.,[7] 2012). Motivation characteristics not only influence the sports performance but also helps in shaping the individual for future.

Aim of the Study: The Aim of this study is to assess motivation level of engagement in sports between athletes and sportspersons of different games at intercollegiate level of Mansa District.

**METHOD**

**Sample:** For present research work a sample of 50 male athletes and 50 sports person of different games of inter college level was taken randomly from all games and athletic events. The subjects were selected randomly from Mansa District (Punjab).

**Limitation**- The study is limited to inter college level male sports persons of Mansa District only.

**Tools**—Motivation for engaging in sports was assessed by using, The Sport Motivation Scale (Sms-28). Luc G. Pelletier, Michelle Fortier, Robert J. Vallerand, Nathalie M. Brière, Kim M. Tuson and Marc R. Blais[5](1995). The Sport Motivation Scale consist of 28 self-report questionnaire for the assessment of motivation. The SMS response are rated on a 7-point likert scale with response ranging from does not correspond at all to Corresponds exactly. The SMS has 7 subscale to assess the different kinds of motivation.
1. Intrinsic motivation - to know, represent the following questions (2, 4, 23, 27)

2. Intrinsic motivation - to accomplish, represent the following questions (8, 12, 15, 20)

3. Intrinsic motivation - to experience stimulation, represent the following questions (1, 13, 18, 25)

4. Extrinsic motivation – to identified, represent the following questions (7, 11, 17, 24)

5. Extrinsic motivation – to introjected, represent the following questions (9, 14, 21, 26)

6. Extrinsic motivation - to external regulation, represent the following questions (6, 10, 16, 22)

7. Amotivation, represent the following questions (3, 5, 19, 28)

**Administration of Test**

Questionnaire schedule was distributed among sports persons and the purpose of the test was explained to the sports persons any difficulty in filling the questionnaire was sought out, the scoring pattern was explained to the sports persons. After completing the test the questionnaire schedules were collected for scoring.

**Scoring**

Scoring was done by using the 7 point scale assessing motivation level of engagement in sports between athletes and sports persons, Does not correspond at all=1, correspond very little=2, correspond a little=3, correspond moderately=4, correspond quite a bit=5, correspond quite a lot=6, correspond completely=7. The scale is designed to assess 7 different category of motivation and each category consist of 4 questions. Scoring range were between (4 to 28) with higher scores indicating higher level of motivation. In Amotivation part the scoring is done reversely.

**Statistical Analysis**

To find out the relationship among the research variables exists or not, t-test was used to test the significance of difference between the means. Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean. Data was analyzed using SPSS (statistical package for the social sciences). Statistical significance was set at p < 0.05.

**RESULTS AND DISCUSSION**

<table>
<thead>
<tr>
<th>Games</th>
<th>Mean</th>
<th>SD</th>
<th>SEm</th>
<th>Athletic</th>
<th>Mean</th>
<th>SD</th>
<th>SEm</th>
<th>t-score</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intrinsic motivation - to know</td>
<td>19.4</td>
<td>2.69</td>
<td>0.54</td>
<td>21.04</td>
<td>2.75</td>
<td>0.55</td>
<td>2.13*</td>
<td></td>
</tr>
<tr>
<td>Intrinsic motivation - to accomplish</td>
<td>22</td>
<td>1.66</td>
<td>0.33</td>
<td>23.68</td>
<td>1.86</td>
<td>0.37</td>
<td>2.65*</td>
<td></td>
</tr>
<tr>
<td>Extrinsic motivation - to experience stimulation,</td>
<td>23</td>
<td>3.00</td>
<td>0.60</td>
<td>20.76</td>
<td>3.27</td>
<td>0.65</td>
<td>2.0279*</td>
<td></td>
</tr>
<tr>
<td>Extrinsic motivation – to identified</td>
<td>23</td>
<td>1.87</td>
<td>0.37</td>
<td>24.16</td>
<td>2.12</td>
<td>0.42</td>
<td>1.91*</td>
<td></td>
</tr>
<tr>
<td>Extrinsic motivation – to introjected</td>
<td>20</td>
<td>3.77</td>
<td>0.75</td>
<td>23.40</td>
<td>2.52</td>
<td>0.50</td>
<td>3.4*</td>
<td></td>
</tr>
<tr>
<td>Extrinsic motivation - to external regulation,</td>
<td>24</td>
<td>1.99</td>
<td>0.40</td>
<td>26.20</td>
<td>2.08</td>
<td>0.42</td>
<td>4.37*</td>
<td></td>
</tr>
<tr>
<td>Amotivation</td>
<td>14</td>
<td>4.09</td>
<td>0.82</td>
<td>11.52</td>
<td>3.93</td>
<td>0.79</td>
<td>1.87*</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>145</td>
<td>10.37</td>
<td>2.07</td>
<td>150.76</td>
<td>6.35</td>
<td>1.27</td>
<td>2.35*</td>
<td></td>
</tr>
</tbody>
</table>
The above Table 1 shows that the mean value of Intrinsic motivation - to know, for athletes the mean value is 21.04 and of sports persons is 19.4 showing significant difference at t-value of 2.13, the results indicate that athletes were more curious and feel pleasure while engaging in sports than sports persons of different games, results of Teo Eng-Wah et.al[11](2015) also indicate that intrinsic factors affects participation in sports. In case of Intrinsic motivation - to accomplish, the sportspersons shows less mean value 22 as compared to athletes showing mean value of 23.68 showing significant difference at t- value of 2.65 at P<0.5, indicating that athletes were more task oriented and eager to master difficult techniques during training than sports persons of different games, Pedersen Darhl M [8](2002) results also corresponds with the present study. The results of Intrinsic motivation-to experience stimulation indicate higher mean value 23 of sportsperson than athletes showing mean value of 20.76 showing significant t-value of 2.02, the results reveals that sports person of different game experience stimulating sensations (e.g., sensory pleasure, aesthetic experiences, as well as fun and excitement) derived from one's engagement in the activity more than the athletes, The study conducted by Gunnarsson Hjörtur Þórisson og Magnús Pálmí[4](2017) also supports the results of the above study showing intrinsic factors influence participation in sports.

Regarding Extrinsic motivation – to identified, the sports persons indicate less mean value of 23 than athletes showing mean value of 24.16 showing significant t-value of 1.91 at p<0.05 level, the results reveal that athletes were more focused to achieve personal goals and self determined than the sports persons of different games, Study done by Mladenović Marijana and Marjanović Aleksandra[5](2011) also of the view that extrinsic motivation to identified encourage the sportsperson for participation. In case of Extrinsic motivation – to introjected, the athletes shows the tendency of higher mean value of 23.40 than the sports persons involved in games having mean value of 20 indicating t-value -3.4, the result is significant at p < .05, the results indicates that athletes were more self centred and focused than sports person of other games, the study conducted by Trude David C[12](2011) was also of opinion that external factors enhance sports participation. The results of Extrinsic motivation - to external regulation, reveals higher mean value 26.20 by athletes than sports persons showing mean value of 24 showing significant results at t-value of 4.37, indicating athletes were more motivated by external factors like praise and self respect than sportspersons, Vallerand Robert J and Losier Gaétan F[13](1999) were also of the view that external factors helps in participation in sports. In Amotivation the sports persons score high indicating higher mean value of 14 than the athletes having mean value of 11.52 showing significant result at t-value of 1.87, the results indicates that sportspersons of different games were less motivated than athletes for engagement in sports, The results of Calvo Tomás García et.al[1](2010) and CH van Heerden[2](2014) supports the results of above study. In overall motivation the athletes indicate higher mean value of 150.76 than the sports persons of different games showing 145 mean value, The results were significant showing t-value of 2.35, this shows that athletes were more motivated for the participation in sports than sports persons of other games, Study conducted by Steven J MeeraKomarrajua and Schmecka Karaub1 Ronald R[10](2009) also shows the same results.
CONCLUSION

From the above study it shows that significant differences exists on all the variables and it was concluded that people’s motivation for engaging in sports activity was influenced by both intrinsic and extrinsic factor’s. Athletes shows higher motivation level of engagement by Intrinsic motivation - to know, Intrinsic motivation - to accomplish, Extrinsic motivation – to identified, Extrinsic motivation – to introjected and Extrinsic motivation - to external regulation, where as players of other games were motivated by Intrinsic motivation-to experience stimulation and by Amotivation. In totality athletes were more motivated for engagement in sports than players of other games, which indicate that internal and external factors influence the participation in sports activity.

REFERENCE

10. Steven J MeeraKomarraju and Schmecka Karaub1 Ronald R (2009) Role of the Big Five personality traits in predicting college students' academic motivation and achievement. Learning and Individual DifferencesVolume 19, Issue 1, 1st Quarter, Pages 47-52
BASIC MOVEMENT SKILLS AND PHYSICAL ACTIVITY AMONG POVERTY-STRICKEN RISING GENERATION: A CROSS-REFERENCED STUDY

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ABSTRACT

Background: Elevated levels of physical activity participation enhances youngsters’ physical, social, cognitive and psychological developments & reduces symptoms of anxiety, depression, improved self-esteem & confidence. Youngsters from low socio-economic backgrounds are significantly less active than those of middle and high backgrounds. Schools play a crucial role in this context. Beyond, lunchtime and recess periods offer ideal opportunities for them to be active. Furthermore, after-school, “the critical window”- a unique span where youngsters generally have discretion to choose their own activities. Potential factors are linked with physical activity during key time periods for developing targeted physical activity interventions for youngsters. Although review of related literature validated that rising generation with large-scale of basic skill competency are more active throughout the day, little is known regarding rising generation’s basic movement skill competency and their physical activity during key time periods of the school day: lunchtime, recess and after-school. Purpose was to examine the associations between BMS competency and objectively measured (MVPA) throughout the school day among rising generation attending primary schools in poverty-stricken communities.

Methods: Eight primary schools from poverty-stricken rising generation and 460 youngsters (8.5 ± 0.6 years, 54% girls) were involved in the study, basic movement skill competency (TGMD-2; 6 locomotor and 6 object-control skills), objectively measured physical activity (Acti Graph GT3X and GT3X + accelerometers), height, weight and demographics were assessed. Multilevel linear mixed models were used to assess the cross-referenced associations between BMS and MVPA.

Results: After adjusting for age, sex, BMI and SSE status, locomotor skill competency was positively linked with total ($P = 0.002, r = 0.15$) and after-school ($P = 0.014, r = 0.13$) MVPA. Object-control skill competency was positively linked with total ($P < 0.001, r = 0.20$), lunchtime ($P = 0.03, r = 0.10$), recess ($P = 0.006, r = 0.11$) and after-school ($P = 0.022, r = 0.13$) MVPA.

Conclusions: Object-control skill competency appears to be a better predictor of youngsters’ MVPA during school-based physical activity opportunities than locomotor skill competency. Improving BMS competency, particularly object-control skills, may contribute to increased levels of youngsters’ MVPA throughout the day.

Keywords: School Object-control Locomotor Lunchtime Recess After-school,

INTRODUCTION

Physical activity participation is essential for attractive one’s physical, social, cognitive and psychological improvement. Elevated levels of physical activity in youngsters are linked with enhanced fitness, superior bone health and reduced body fat. Furthermore, children who regularly participate in physical activity reduces symptoms of anxiety and depression, and better self-esteem and confidence. Nevertheless, youngsters not participating in physical activity to mount up the connected health settlement, is a universal concern. Furthermore, youngsters from low socio-economic backgrounds are notably less active than those of middle and high socio-economic backgrounds. Schools cooperate a vital role in furnishing opportunities for youngsters to be physically active, have required tools, human resources, amenities and curriculum to uphold activity. Further than, physical education and school sport, lunchtime and recess phases suggest perfect opportunities for youngsters to be active every day. If provided the choice to be active, the combined lunchtime and recess phases has the impending to put in up to good amount % towards youngsters’ every day physical activity recommendations. It is an exclusive stage of time where youngsters usually have the discretion to decide their own activities and if occupied in active pursuits, can add to roughly 25 % of their daily physical activity. It is thus key to explore possible factors that are connected with physical activity during key time stages for mounting targeted physical activity interventions for kids. BMS are considered the building blocks for movement and offer the base for specialized and sport-specific movement skills requisite for input in a range of physical activities. BMS can be categorized as locomotor, object-control, and stability skills. Mastery of BMS is low among Indian primary school-aged kids and those from deprived backgrounds frequently reveal lowest levels of proficiency. Higher levels of BMS proficiency will offer superior opportunities for youngsters to employ in a range of physical activities, games and sports. Uninterruptedly, kids who are additional skilled will decide upper levels of physical activity, while youngsters who are less skilled will select lesser levels of physical activity. A recent systematic appraise of the health benefits connected with BMS proficiency set up strong evidence for a positive relationship between BMS proficiency and physical activity in youngsters, but also noted that the majority of studies used self-report measures of physical activity. Such dealings are restricted by youngsters ability to precisely evoke their behaviors and normally have low levels of validity and reliability in youth populations. A further concern is that few studies have in tuned their analyses for weight status, which may fair the relationship between physical activity and...
motor skill expertise. The links between BMS proficiency and weight status has been well recognized, with BMS proficiency being inversely linked with weight status in youngsters. In addition, youngsters who have a superior weight status contribute in considerably inferior amounts of MVPA. Consequently, the intention of this study was to look at the links between BMS proficiency and impartially measured MVPA during time of the day that symbolize type physical activity opportunities for youngsters attending primary schools in low-income communities.

**Study Design:**

Baseline data from the Supporting Youngster’s Outcomes using Rewards, Exercise and Skills group randomized controlled trial was used for the current study. In summary, SCORES was a 12-month multi-component physical activity and BMS intervention for kids attending primary schools in low-income communities. Baseline assessments were conducted in February-April 2012 (summer-autumn). School Principals, teachers, parents and study participants provided written informed consent.

**Setting and participants:**

SEIFA index of relative socioeconomic disadvantage was used to identify eligible primary schools (grades 3 and 4). The SEIFA index (scale 1 = lowest to 10 = highest) summarizes the characteristics of people and households within an area and was developed using the following data: employment, education, financial wellbeing, housing stress, overcrowding, home ownership, family support, family breakdown, family type, lack of wealth (no car or telephone), low income, Indigenous status. Sixteen aided primary schools, Amravati, Maharashtra, India with a SEIFA index of ≤5 (lowest 50%) participated in the study and eight schools (mean SEIFA index of 3 ± 1.3) consented to participate (50% consent rate). From the 592 eligible youngsters at the eight schools, 460 youngsters consented to participate (78% consent rate).

**Physical activity:** Physical activity was assessed using triaxial Acti-Graph (GT3X and GT3X + accelerometers). Output from the vertical axis was used. Vertical axis output from ActiGraph accelerometers appear to be comparable between different generations of ActiGraph accelerometers. Accelerometers were worn by participants during waking hours for seven consecutive days, except while bathing and swimming. Data were collected and stored in 10-second epochs with a frequency of 30 Hz. Valid wear time for school-day physical activity
(lunchtime, recess and after-school) was defined as a minimum of three weekdays with at least ten hours (600 minutes/day) of total wear time recorded. Valid wear time for total physical activity was defined as a minimum of three days including a weekend day with at least ten hours of total wear time recorded; non-wear time was defined as strings of consecutive zeros equating to 20 minutes. Thresholds for activity counts were used to categorize physical activity into moderate-to-vigorous intensity activity and minutes spent in this activity intensity. The cut-points used were published as 15-second thresholds and were divided by 15 and then multiplied by 10 to create cut-points for 10-second data. Data was further categorized into lunchtime and recess time periods based on individual school timetables. The lunchtime time period ranged from 45 to 50 minutes in duration and the recess time period was 20 minutes in duration. After-school time period was defined as the period of time from when school ended for all participants 3.00 to 6.00 pm.

**Basic movement skills:** BMS proficiency was evaluated using TGMD 2 which has established validity and reliability in youngsters. The TGMD-2 includes six locomotor (i.e., run, gallop, hop, leap, horizontal jump, slide) and six object-control (i.e., striking a stationary ball, stationary dribble, kick, catch, overhand throw, underhand roll) skills. Participants performed each skill twice and skills were video-taped for assessment. Each skill includes several behavioral components. If the participant performed a behavioral component correctly they received a score of 1; if they performed it incorrectly they received a 0. This procedure was completed for each of the two trials, and scores were summed to obtain a total raw skill score. The raw skill scores were then added to obtain a raw locomotor subtest score and a raw object-control subtest score. Inter-rater reliability (98% agreement rate) and intra-rater reliability (97% to 99% agreement rate) were established using pre-coded video tapes before movement skills were assessed by two assessors. Kappa values were also calculated to take into account agreement beyond chance. These were 0.97 for inter-rater reliability and ranged from 0.94 to 0.98 for intra-rater reliability. **Height and weight:** Height was recorded to the nearest 0.1 cm using a portable stadiometer. Weight was measured in light clothing without shoes using a portable digital scale to the nearest 0.1 kg. BMI was calculated using the standard equation (weight[kg]/height[m]^2) and BMI-z scores were calculated using the ‘LMS’ method.
Participant demographics: Obtained demographic information including age, sex, language spoken at home, cultural background, the suburb of the youngster’s residence was used to determine their SES using the SEIFA index of relative socioeconomic disadvantage.

Statistical analyses: All analyses were performed using IBM SPSS Statistics for Windows. Prior to analyses, normality of the data was assessed and transformed where necessary. Total daily, lunchtime, recess and after-school MVPA minutes were log transformed. Sex differences in demographics, BMS and MVPA measures were tested using unpaired t-tests. To assess the cross-referenced relations between BMS and MVPA multilevel linear mixed models were used, with MVPA after-school MVPA as the outcome variable, BMS as the predictor variable, sex, age, BMI-z score and SES as fixed factors (i.e. covariates), and school as a random factor. The mixed models were performed separately for each of the BMS measures and MVPA measures. The results of the multilevel linear mixed models were also expressed in the form of standardized regression coefficients. These coefficients were computed by initially calculating the mean and standard error for the variable. A new variable was subsequently created by subtracting the mean from the original value, and then dividing the difference by the standard error. The new standardized variables were used in the mixed models regression analyses. This process was performed for all outcome and predictor variables of interest. In all analyses, statistical significance was set at $P < 0.05$.

RESULT

Participant characteristics- Summary data and sex differences for participants’ background, BMS and physical activity are presented in Table 1. Participating youngsters (N = 460, 54% girls) had a mean age of 8.5 ± 0.6 years. Most of the participants (97.6%) reported English as their first language. 100 % of participants reported Indian as their cultural background. 22.8% of the sample was overweight and 17% were obese. No sex differences were identified for age, BMI-z score or SES. Participating youngsters’ mean scores for locomotor and object control-skills were 25.7 ± 5.8 and 24.2 ± 6.2 respectively. Girls were more proficient on average in locomotor skills ($P = 0.008$), while boys were found to be more proficient in object-control skills ($P < 0.001$). Participating youngster spent an average of 54.8 ± 19.7 minutes daily in MVPA. Compared with girls, boys...
spent more minutes in MVPA. Data shows that participating youngster accumulate approximately 50% of their daily MVPA during lunchtime, recess and after-school time periods combined.

Table 1. Showing the descriptive statistics, comparative statistics and characteristics such as sex differences for youngsters’ background, basic movement skills and physical activity of subjects

<table>
<thead>
<tr>
<th></th>
<th>All</th>
<th></th>
<th>Girls</th>
<th></th>
<th>Boys</th>
<th></th>
<th>Sex difference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
<td>Mean</td>
<td>SD</td>
<td>n</td>
</tr>
<tr>
<td>Background</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Age (years)</td>
<td>460</td>
<td>8.5</td>
<td>0.6</td>
<td>249</td>
<td>8.5</td>
<td>0.6</td>
<td>211</td>
</tr>
<tr>
<td>BMI-z score</td>
<td>458</td>
<td>0.75</td>
<td>1.25</td>
<td>248</td>
<td>0.67</td>
<td>1.22</td>
<td>210</td>
</tr>
<tr>
<td>SES a</td>
<td>460</td>
<td>3</td>
<td>2</td>
<td>249</td>
<td>3</td>
<td>2</td>
<td>211</td>
</tr>
<tr>
<td>BMS (raw)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Locomotor skills</td>
<td>430</td>
<td>25.7</td>
<td>5.8</td>
<td>220</td>
<td>26.4</td>
<td>5.2</td>
<td>210</td>
</tr>
<tr>
<td>Object-control skills</td>
<td>456</td>
<td>24.2</td>
<td>6.2</td>
<td>247</td>
<td>21.9</td>
<td>5.3</td>
<td>209</td>
</tr>
<tr>
<td>Physical activity</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total daily MVPA minutes</td>
<td>220</td>
<td>54.8</td>
<td>19.7</td>
<td>125</td>
<td>49.1</td>
<td>17.0</td>
<td>95</td>
</tr>
<tr>
<td>Lunchtime MVPA minutes</td>
<td>325</td>
<td>5.4</td>
<td>3.8</td>
<td>185</td>
<td>4.6</td>
<td>3.3</td>
<td>140</td>
</tr>
<tr>
<td>Recess MVPA minutes</td>
<td>325</td>
<td>5.8</td>
<td>4.4</td>
<td>185</td>
<td>4.8</td>
<td>4.1</td>
<td>140</td>
</tr>
<tr>
<td>After-school MVPA minutes</td>
<td>325</td>
<td>15.5</td>
<td>11.7</td>
<td>185</td>
<td>14.4</td>
<td>13.2</td>
<td>140</td>
</tr>
</tbody>
</table>

**Abbreviations:** BMS, basic movement skills; MVPA, moderate-to-vigorous physical activity; BMI, body mass index; SES, socio-economic status. aSocio-Economic Indexes for Areas (SEIFA) index of relative socio-economic disadvantage (1 = most disadvantaged, 10 = least disadvantaged). *Significant difference between girls and boys, P < 0.05.

**Locomotor skills and MVPA:** After adjustment for sex, age, BMI-z score and SES, locomotor skill competency was positively associated with total (P = 0.002) and after-school (P = 0.014) MVPA, but not with lunchtime (P = 0.075) or recess (P = 0.108) MVPA (Table 2).
Table 2. Relationships between MVPA minutes and locomotor skills

<table>
<thead>
<tr>
<th></th>
<th>Total Daily MVPA</th>
<th>Lunchtime MVPA</th>
<th>Recess MVPA</th>
<th>After-school MVPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$\beta$</td>
<td>95% CI</td>
<td>$r$</td>
</tr>
<tr>
<td>Locomotor skills</td>
<td>21</td>
<td>0.01</td>
<td>0.004</td>
<td>0.015</td>
</tr>
<tr>
<td>BMI-z score</td>
<td>21</td>
<td>−0.031</td>
<td>−0.057</td>
<td>−0.014</td>
</tr>
</tbody>
</table>

**Abbreviations:** MVPA, moderate-to-vigorous physical activity; BMI, body mass index; socio-economic status. All analyses were adjusted for sex, age, BMI-z score and SES and the effects of clustering by school. $\beta$ values are logged therefore cannot be interpreted in the unit values of the variable.

**Object-control skills and MVPA:** Table No. 03 depicts the object control skill and MVPA. After adjustment for sex, age, BMI-z score and SES, object-control skill proficiency was significantly positively connected with total ($P < 0.001$), lunchtime ($P = 0.030$), recess ($P = 0.006$) and after-school ($P = 0.022$) MVPA (Table 3).

Table 3. Showing the relationships between MVPA minutes and object-control skills

<table>
<thead>
<tr>
<th></th>
<th>Total Daily MVPA</th>
<th>Lunchtime MVPA</th>
<th>Recess MVPA</th>
<th>After-school MVPA</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$n$</td>
<td>$B$</td>
<td>95% CI</td>
<td>$r$</td>
</tr>
<tr>
<td>Object-control skills</td>
<td>219</td>
<td>0.01</td>
<td>0.010</td>
<td>0.02</td>
</tr>
<tr>
<td>BMI-z score</td>
<td>219</td>
<td>−0.03</td>
<td>−0.06</td>
<td>−0.03</td>
</tr>
</tbody>
</table>

**Abbreviations:** MVPA, moderate-to-vigorous physical activity; BMI, body mass index; SES, socio-economic status. All analyses were adjusted for sex, age, BMI-z score and SES and the effects of clustering by school. $\beta$ values are logged therefore cannot be interpreted in the unit values of the variable.

DISCUSSION

The study establishes that object-control skill proficiency, but not locomotor skill proficiency, was considerably connected with MVPA during lunchtime and recess breaks. Games and activities such as soccer and basketball are popular break-time activities which are greatly active and require elevated levels of object-control skill proficiency. It is possible that the more skilled youngsters govern these games and the areas available for activity, thus increasing their activity levels and reinforcing the divide between the low skilled and high skilled youngsters. The school environment and existing policies may also influence youngsters’ activity levels during recess and lunch breaks. Providing Youngsters with access to facilities, spaces and equipment’s may encourage physical activity by increasing feelings of choice and supportive environments that foster physically active behaviors. However, it is possible that such approaches will support the activity levels of more skilled Youngsters and fail to engage the least skilled individuals. With increasing time duration - after-school period spent indoors using electronic entertainment, it is important to identify the determinants of children’s physical activity during this time. These results are consistent with existing evidence of cross-referenced studies in primary school aged Youngsters. However, although the explicit development of movement skills appears to be an important focus for increasing Youngsters’ physical activity levels, it is also important to consider the impact of movement opportunities. It is suggested that if the relationship between skill proficiency and physical activity is viewed as a “positive feedback loop”, skill development and increasing physical activity should be simultaneously targeted. This has important implications for school and after-school programs policy and practice. Providing quality teaching of BMS during physical education and sport, may be as equally important as ensuring the lunchtime and recess environment is conducive to physically active choices.

CONCLUSION

Youngsters who are more proficient in BMS spend more time engaged in MVPA, in particular during time periods of day that represent key physical activity opportunities for Youngsters. More skilled Youngster in object-control, are engaged in more MVPA during lunchtime and recess breaks at school, and kids who demonstrate a superior level of proficiency in locomotor skills and object-control skills engage in more MVPA after-school. Object-control skill proficiency appears-better predictor of Youngsters MVPA during school-based physical activity opportunities than
locomotor skill proficiency. This suggests that improving movement skill proficiency, particularly object-control skills, among Youngsters is a potential avenue for promoting youngsters MVPA throughout the day. The study substantially contributes to understanding of physical activity behaviors in Youngsters and assists in evidence-based school practice, polices and intervention design to increase physical activity

REFERENCES

PERCEIVED CONSTRAINTS TO PHYSICAL ACTIVITY AMONG POSTGRADUATE STUDENTS OF PONDICHERY UNIVERSITY

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ABSTRACT

The purpose of this study was to investigate physical activity (PA) constraints as perceived by postgraduate students of Pondicherry University. Five indicators were included which were lack of skill, lack of time, academic anxiety, academic workload, and religious activities. The study adopted a survey design with 278 respondents selected from fifteen schools using stratified and clustered sampling technique. A self-developed questionnaire validated by experts with a reliability coefficient of .78 was used as the main instrument for data collection. The data generated were analyzed using percentages and mean to answer the research questions, while chi-square statistical tool was used to test the null hypotheses at .05 level of significance. The results revealed that self-skill, lack of time, academic anxiety, academic workload and religious activities were perceived as significant constraints to physical activity among postgraduate students of the Pondicherry University. It was recommended that the University directorate of sport should organize such activities requiring little or no special skills, proper scheduling of leisure and PA compatible with the school time table, the school should provide a framework for emergency healthcare particularly for sport injuries and individuals should take responsibilities for their own health by enjoying the leisure time. Also, school authority should work in collaboration with various religious leaders within the campus to establish control and effective time management.

Keywords: Physical activity, Constraints, Postgraduate students, Leisure activity

INTRODUCTION

Campus recreational sports programs are designed to provide an on-campus leisure opportunity for college life and providing a means for the efficient use of free time. Young, Ross and Barcelona (2013) stated that campus recreational sports are a service provided to offer students an opportunity to participate in sport activities. Most campuses provide a wide variety of programs and activities through sport and games. This is purposely done as it is recognized that not all students prefer to participate in the same way or in the same type of activity. In spite of this, researches still indicate that large number of students on many campuses still do not participate or perform physical activities (PA). For instance, Douglas, Collins and Warren (2005) indicated that 42.2 percent of under-graduates college students did not participate in moderate or vigorous physical activity prior to their survey. Rosen (2010) reported that 74 percent of college students did not engage in vigorous PA during the week prior to his study. Similarly, Suminski and Petosa (2012) found that
47 percent of the college students in their study did not engage in vigorous or leisure services provided within the campus. Professionals responsible for providing these programs often organized over those non-participants asking questions such as “Why are more students not participating?” or “What can be done to attract more students to utilize the available leisure services?” Young, Ross and Barcelona (2013) stated that understanding why people choose not to participate in PA or recreation and make wise use of the leisure time to utilize the available leisure services has been the focus of study for more than 25 years.

The term “physical activity constraints” has been defined by Jackson (2010) as the factors that are assumed by researchers and/or perceived or experienced by individuals to limit the formation of PA preferences and or inhibit or prohibit participation and enjoyment in PA. The author further stated that constraints of PA participation are relative to the individual and his/her circumstance. In other words, perception of constraints varies from individual to individual and from type of PA, yet they may also be shared widely within the community, as a result, investigation of PA constraints should be focused on specific types of physical activities within a single community (Jackson, 2010).

**Theoretical Perspective**

Elkins and Beggs (2007) explained that Crawford and Godbey in 1987 put forth a three-level model to conceptualized constraints to leisure services utilization. This mode identified three levels of constraints which are intrapersonal, interpersonal and structural constraints. Intrapersonal constraints involve individual psychological states and attributes that interact with leisure preferences and influence individual preference. These factors include personality traits, attitudes and moods. Young, Ross and Barcelona (2013) noted that intrapersonal constraints are considered the most powerful determinants of participation and these include feelings towards participation and competition, shyness, stress, anxiety, perceived self-skill and subjective evaluations of the appropriateness of a particular activity. The second level of constraints consists of interpersonal constraints. This type of constraints is the relationship between individual’s character or the lack of a friend or partner with whom to participate in an activity for a variety of reasons, including differing levels of skills or not having similar blocks of available free time (Young, Ross and Barcelona, 2013). Elkins and Beggs (2007) stated that interpersonal constraints also involve the individual’s activities and constraints as it relates to the workload and occupation. This may significantly influence leisure preference and participation. The third level which is the structural constraints as explained by Elkins and Beggs (2007) include such factors as the lack of opportunities or the cost of activities that result from the external conditions in the environment. This also involves the lack of time or a lack of money to participate. Similarly, Young, Ross and Barcelona (2013) noted that structural constraints consists of intervening factors that get in the way of participation and this include lack of time or money,
attributes of the facilities, (that is, too crowded, not accessible), or commitments to family, job or another activity. When considering it from the structural constraints, lack of facilities within the school and lack of time has constantly been a significant constraint to leisure services utilization among university students. Akinduture and Oyeinyi (2011) stated that lack of standard facilities and equipment, academic stress and university policy on sports has been some of the inhibiting factors to participation in recreational sport activities. Similarly, Oyeniyi (2002) submitted that facilitates and equipment are the power house of sport, hence, they are indispensable to competitive and recreational sports. Young, Ross and Barcelona (2013) noted that lack of adequate facilities do not only act as a barrier to PA and sports participation but also modifies and influence the preference of physically active college students. When considered from interpersonal constraints perspective group support is essential. As explained by Drakou, Tzetzis and Mamantzi (2008) peer group and parental influences tend to be some of the factors considered as constraints to PA. When friends have a common activity with similar time frame, it tends to stimulate or motivate each other to participate in recreational activities and leisure services. Parents who understand and regularly participate in recreational activities encourage and motivate their children to participate in PA.

The university environment has been considered as one the most stressful environment for both students and of staff as different activities ranging from academic to social are constantly been carried out (Akindutire & Oyeniyi, 2011). It is a common phenomenon that stress build tension within an individual that must be released in one way or the other to ensure a healthy lifestyle. PA and leisure time has been identified as one effectively way of easing tension and pressure. It has been observed that most Pondicherry University postgraduate students do not participate in recreational or PA with the available leisure opportunities been underutilized such as the basketball court, the volleyball courts, the hand ball courts, etc often remain vacant. This observation agrees with the report of Douglas, Collins and Warren (2005), Rosen (2010) and Suminski and Petosa (2012) report which indicated that 42.2 percent, 74 percent and 47 percent of campus students respectively did not engage in PA. Often neglected in recent research is the effects of sports skill levels, academic anxiety and religious activities on campus which are basically intrapersonal and interpersonal constraint. This why this study aims as investigating PA constraints as perceived by postgraduate students of Pondicherry University. It is hoped that this will provide understanding to the problem and become the basis for finding solutions.

The following hypotheses were also formulated to guide the study.

1. Lack of self skill is not a significant constraint to leisure utilization among postgraduate students of Pondicherry University.
2. Lack of time is not a significant constraint in the utilization of leisure among postgraduate students of Pondicherry University.
3. Academic anxiety is not a significant constraint to the utilization of leisure among postgraduate students of Pondicherry University.
4. Academic workload is not perceived as a significant constraint to leisure utilization among postgraduate students of Pondicherry University.

5. Religious activities on campus are not perceived as a significant constraint to leisure utilization among postgraduate students of Pondicherry University.

METHOD

The research design adopted for this study was the survey design. This design was considered appropriate based on the fact that the information in this study was needed exactly the way they existed in the population. According to Akpabio and Ebong (2009), this design is relevant when the researcher is required to undertake a systematic collection, analysis and presentation of data to give account of the characteristics of particular individuals, groups or the state of events without the manipulation of data as applicable in experimental studies. Since the study was aimed at seeking information on the perceived constraints of Pondicherry University students towards PA, the design was considered suitable.

The target population for this study comprised of all Pondicherry University postgraduate students, irrespective of programme or level. The on campus population of University postgraduate students for the academic 2017/18 year stood 5800. A sample size of three hundred respondents was drawn for this study using stratified and clustered sampling technique. Stratification involved dividing the population into separate strata on characteristics to be closely associated with variables under study, and clustered sampling technique is one where more than one stage of selection is used. Pondicherry University has 15 schools and in each school there are cluster of faculties and departments. Response was taken from 20 students from each school and a sample of 300 students was gathered. The researchers personally administered the questionnaires to the respondents with the help of two trained research assistants. The students that were sampled are those from the chosen faculties. The researcher and the research assistants visited the venue of their lecture halls of the selected faculties, the questionnaires were distributed after seeking the consent of the students. The completed questionnaires were retrieved on the spot to ensure a high successful return rate of 278 out of the 300 distributed. The data generated from the questionnaire were coded, summarized and analyze using chi-square statistics to test the null hypotheses at .05 level of significance.

A 20 item self-developed questionnaire was used as instrument for data collection. The instrument was divided into the sections, A and B. Section A was designed to collect bio-data of respondents while section B was designed to collect data relevant to the variables under study, that is, self-skill, time, anxiety, academic workload and religious activities and leisure utilization. A four type of Likert scale were used with Strongly Agreed, Agreed Disagreed and Strongly Disagreed scale.

Results and findings

**Hypothesis 1:** Lack of confidence is not a significant constraint to leisure utilization among postgraduate students of Pondicherry University.
The result in the table above show that the chi-square calculated value of 163.8 is greater than the critical value of 7.82 at .05 level of significance and degree of freedom of 3. This result is significant, hence, the null hypothesis rejected, meaning that lack of self skill is perceived as a significant constraint to PA among University students.

In the course of this study, the first finding was that self-skill is perceived as a significant constraint to PA among University students. It was found that 77.6 percent of the respondents indicated that they are aware that every PA requires some level of confidence in which they do not consider themselves to possess such level. Also, they feel they do not have the stamina/energy required and this limit their PA participation. The test of the hypothesis yielded a significant result of 163.8 as against the critical value of 7.82 at .05 level of significance. This result is in line with the opinion of Menon (2008) which stated that the efficacy and successful participation of an individual in any physical activity largely depends on his/her perception about his/her energy level, self-skill required for the activities and the perceived benefit of the activities. The result is also similar to that Philips (2009) who reported that in his study, lack of will power (98.5%) was the most important barrier to leisure activity participation, followed by lack of energy and self-skill (91.0%).

**Hypothesis 2:** Lack of time is not a significant constraint to the utilization of leisure among postgraduate students of Pondicherry University.

The chi-square test of the above hypothesis shows that the chi-square calculated value of 73.29 is greater than the critical value of 7.82 at .05 level of significance and degree of freedom of 3. And because of this, the result is considered significant, thus, the null hypothesis is rejected, meaning
that lack of time is perceived as a significant constraint to leisure utilization among University students. It was found that 65.1 percent of the respondents agreed that lack of time has been their major constraint as they have numerous engagement and most leisure and PA scheduling conflict with the important engagements which leaves them with limited time to think of PA participation. The test of the hypothesis yielded a significant result of 73.29 against critical value of 7.82 at .05 alpha level. This result is in line with Daskapan, Tazun and Eker (2006) who reported that the most commonly cited barrier by University students in their study was lack of time due to study commitments and responsibilities related to family and social environment. Similarly, Cheng and Hashem (2007) noted that for any type PA to be attractive to students significantly, the scheduling of the activity, coupled with adequate equipment, supplies of facilities and staffing must be considered.

**Hypothesis 3:** Academic Anxiety is not a significant constraint to the utilization of leisure among postgraduate students of Pondicherry University.

<table>
<thead>
<tr>
<th>Options</th>
<th>Values</th>
<th>$\chi^2$-Cal</th>
<th>$\chi^2$-Crit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agreed</td>
<td>45</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreed</td>
<td>101</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagreed</td>
<td>63</td>
<td>22.98</td>
<td>7.82</td>
<td>Significant</td>
</tr>
<tr>
<td>Strongly Disagreed</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>278</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$df = 3, P \leq .05$. The result in the above table shows the chi-square calculated value of 22.98 to be greater than the critical value of 7.82 at .05 level of significant and degree of freedom of 3. This means that the result is significant; hence, the null hypothesis is rejected. This result means that academic anxiety is perceived as a significant constraint to PA by postgraduate students of the University. It was found that 52.5 percent of the respondents considered leisure and PA to stressful, fear of injuries, poor performance and the perception of others have hindered their participation in leisure activities. The test of the hypothesis gave a significant result of 22.98 at .05 level of significance. This result agrees with the earlier report of Jones (2008) which stated that anxiety may arise from such situations as societal expectations, feeling of dissatisfaction, concern for personal safety and issue of self-skill. In the same way, Omolayo, Olawo and Omole (2013) reported that some young adults are afraid that fitness exercise would be too stressful and could harm them, this leads to non-participation.

**Hypothesis 4:** Academic workload is not perceived as a significant constraint to leisure utilization among postgraduate students of Pondicherry University.

The result from the chi-square test of the above hypothesis are indicated in Table 4, and is significant because the chi-square calculated value of 129.42 is greater than the critical value of 7.82 at .05 level of significance and a degree of freedom of 3. Therefore, the null hypothesis is
rejected meaning academic workload is perceived as a significant constraint to PA by University students.

<table>
<thead>
<tr>
<th>Options</th>
<th>Values</th>
<th>$\chi^2$-Cal</th>
<th>$\chi^2$-Crit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agreed</td>
<td>77</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreed</td>
<td>115</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagreed</td>
<td>63</td>
<td>129.42</td>
<td>7.82</td>
<td>Significant</td>
</tr>
<tr>
<td>Strongly Disagreed</td>
<td>23</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>278</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$df = 3, P \leq .05$.

It was found that 69.1 percent of the respondents indicated that the lectures last late into the evening, they spend most of time on school work with bulky materials to cover and numerous assignment to be submitted in limited time. This takes better part of their time limiting the leisure utilization. The test of the hypothesis yielded a significant result of 129.42 at .05 alpha level.

**Hypothesis 5:** Religious activities on campus are not perceived as a significant constraint to leisure utilization among postgraduate students of Pondicherry University.

<table>
<thead>
<tr>
<th>Options</th>
<th>Values</th>
<th>$\chi^2$-Cal</th>
<th>$\chi^2$-Crit</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td>Strongly Agreed</td>
<td>32</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Agreed</td>
<td>76</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Disagreed</td>
<td>101</td>
<td>35.12</td>
<td>7.82</td>
<td>Significant</td>
</tr>
<tr>
<td>Strongly Disagreed</td>
<td>69</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>278</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

$df = 3, P \leq .05$.

The result as presented in the above table shows that the chi-square calculated value of 35.12 is greater than the critical at .05 level of significance. This result is significant thus, the null hypothesis is rejected, meaning, religious activities is a significant constraint to PA among University students. The result revealed that 38.8 percent of the respondents strongly agreed and agreed that they have temple and masjid activities every day of the week, belonging to different religious organizations demanding their time and presence.

**CONCLUSIONS AND RECOMMENDATIONS**

University students are always on intense stress and if this remains unmanaged it can have adverse effects on the health of the students. Leisure and PA can provide a good opportunity for students to enhance their own well-being. The result from this study has been able to reveal that the available leisure activities within the campus have been under-utilized by students. This is because some barriers such as lack of self-skilled, lack of time, academic anxiety, academic work load and religious activities have become barriers to effective use of leisure time. The school is not just established to provide only educational services, but also other services such as health services, recreational services, etc. It therefore beckons on the school authority to take a critical look at these barriers and find a way to conscious remove or reduce such barriers and promote a healthy, active lifestyle among students and the general campus community.

The recommendations given in this study are based on the findings reported above and it is hoped that when adopted, they will increase PA participation by students and promote good health.
1. The university sport directorate should launch sensitization program’s to educate the students on some simple leisure and recreational activities requiring little and no special skills for participation. This can be done by creating various sports clubs mandating every newly admitted student to belong to one. This will provide better understanding of leisure and recreation clearing the wrong perception about specialized skills required to leisure utilization and which will help in raising their confidence level.

2. Scheduling of leisure activities within the campus and equipping students with proper time management skills by introducing such topics into the General courses offered by school. This will stimulate the interest of students to make themselves available at the recreational and leisure time activities provided by the school.

3. The University authority should provide a framework for providing emergency healthcare particularly for sport accidents. Employees of such units should always come out to provide first aid for students at different recreational venues within the campus. This will provide psychological boost for students and giving them a feeling of satisfaction when participating in leisure activities.

4. Curriculum and time table planners within the university should work hand in hand with the sport directorate to develop a time table that recognizes the importance of leisure and recreational activities giving ample time to students to participate in such activities as designed by the school sport directorate.

5. The University authority should work with religious leaders operating fellowship and religious meetings within and around the school that have students as majority of its members. Such religious leaders should also work with the consciousness that the school has its own program’s and proper scheduling of both activities can help and limit their meeting days to twice or thrice a week, also students should take responsibilities for their own well-being understanding the need for leisure and making efforts to avail themselves of such opportunity.

This study is limited to a population of 278 participants attending a public university. Future studies can be conducted to compare populations at both public and private universities as well as cross-cultural populations. While this study is a quantitative study that examined 20 items related to 5 constraining factors, additional qualitative studies may provide a deeper understanding of LTPA constraints among university students, including the relationship between PA levels and constraints. Moreover, a next step should concentrate on developing ways to limit the effects of these constraints by either intervening in the PA environment or raising awareness among university students about the problems of inactivity.

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A COMPARATIVE STUDY ON PHYSICAL FITNESS LEVEL AMONG URBAN AND RURAL STUDENTS OF KASHMIR

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ABSTRACT

The present study is a comparative study on physical fitness level among urban and rural students of Kashmir. In this study total 60 subjects for the study in which 30 from urban and 30 rural players were randomly selected samples. The total physical fitness of rural and urban students of Kashmir and in sit ups on comparison of t-test was 3.4. While as the physical fitness of rural and urban students of Kashmir in standing broad jump on comparison of t-test were 0.04. While as the physical fitness of rural and urban students of Kashmir in speed on comparison of t-test were 4.07. The two t-test values are significant and one t-test value is insignificant at 0.04.

Key words: Physical Fitness Test, Speed, Muscular Endurance, Power.

INTRODUCTION

Education in India has been given a fillip after the attainment of independence in 1947. The ministry of education at the center was reconstituted and separate into central as well as state ministry of education. Education has been made a state subject and the initiatives for educational development has been left to the resources of the respective states. Physical education plays an important role in the achievement of goals of education. Physical education is an essential aspect of general education in which physical activities are used as a means of education or modifying a person for wellness. Physical activities are educational tools in the hands of the teachers who aim at the education of the body and mind. Education of the whole man is the objective, which goes far beyond the attainment of my ‘Physical Vigor’ so that the individual may grow and develop fully and be, enabled to live the abundant life, now as a child and later as an adult. Physical education has distinct contribution to make towards the enrichment of general education and seeks to further the purpose of modern education namely the attainment of the finest king of living.
Physical fitness is not being able to perform certain feats that show one's strength. It is the condition of your body as a whole. The physiological biochemical and mental state. When physically fit one can efficiently work, play, resist chronic disease and meets constant demands. Everyone has different level of complete physical fitness which once reached, rewards you with a richer and more enjoyable life. Physical fitness is to human body what fine-tuning is to an engine. It enables us to perform up to our potential. Fitness can be described as conidians that helps us for better look, Pleasant feel and do our best

**METHOD**

For assessment of the selected physical fitness test, researcher has adopted following tests:

<table>
<thead>
<tr>
<th>Sr. No</th>
<th>Variables</th>
<th>Test</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Speed</td>
<td>100 Mts</td>
</tr>
<tr>
<td>2.</td>
<td>Muscular endurance.</td>
<td>Bend knee set ups test</td>
</tr>
<tr>
<td>3.</td>
<td>Power</td>
<td>Standing broad jump</td>
</tr>
</tbody>
</table>

1. **100-Mtr Sprint:**

   **Procedure:** Every 100-Mtr sprinter must begin the race with his feet in the starting blocks. The official race starter will call the sprinters to their blocks and on command the runners will adopt a set position. The position requires the runners to have both feet in the blocks and adopt a position with the body weight on their hands. On the starter’s gun all runners begin the race. There is a one official on starting line and other officials where every lane on ending line where they collect the timing of runners. And there is a one scorer on ending.

2. **TEST: SIT-UPS**

   **Procedure:** The standing position of the test is back lying position with knees flexed, feet on floor, and heels between 12 to 18 inches from the buttocks. The arms are crossed on the chest with the hand on opposite shoulder. A partner holds the examinee the feet to keep them in contact with the testing surface. The examinee curls to a sitting position, maintain arm contact with chest. The chin should be tucked on the chest and should remain in the position until the completion of the sit ups. When the elbow touches the thighs the sit up is complete. The examinee curls back down on the floor until the mid-back contacts the testing surface. Another sit up may be attempted. The examinee beings executing consecutive sit ups on the word GO. Using the signal ready GO At the end of 60 seconds the test is ended with the word stop the score is the number of sit ups executed correctly during the time. Pausing between sit ups is permissible. The score is the number of sit ups executed correctly during 60 seconds incorrect execution includes failure to curl up.
Pulling the arms away from the chest failure to touch the thighs with the elbows and failure to touch the mind back to the testing surface in the down position, Devinder K Kansal 1996.

3. TEST STANDING BROAD JUMP

Procedure: The standing broad jump test may be either conducted in an athletic field area or in a gymnasium. Ask the subject to stand in a standing position back to the line marked by the investigator with both legs together and both feet near to each other than with the swing of the hand take a jump so that you can covered long distance. The distance covered by the subject in meter. The trails are given to the subject and best of it taken into consideration for scoring K. Kansal 1996.

Sampling Technique

The researcher took simple random sampling technique as an appropriate tool for selecting the desire subjects of the study. In the present study 60 subjects for the study (30 from urban and 30 rural.) were selected from school level in Kashmir.

Collection of data: The investigator to go for maximization of systematic variance and explains to exercise the control over the unwanted variables and [min] gives and understanding to minimize error variables so as to ensure disciplined data that contribute to a sound generalization. While verifying research hypothesis, a properly designed research tells what to do and what not indicates the steps to be taken in sequential manner for collecting the empirical data [John W. Best abd James V. Khan 2003]. Selecting a proper research design and justifying its relevance the present researcher further moved for its implication with a view to testing the hypothesis Present investigation is an associational predicative study that considers the principals of basic research. The comparison of physical fitness status of 14 to 16 years boys students of rural and urban students of Kashmir.

Statistical Technique: The present study utilized quantitative techniques that included descriptive statitistic, such as means, standard deviations and T. Scale

\[
\text{Mean} = \frac{\sum x}{n} \quad \text{Standard Deviation} = \sqrt{\frac{\sum x^2}{N}} \quad \text{T. Scale} = \frac{x_1 - x_2}{\sqrt{\left(\frac{(SD_1)^2}{n_1 - 1}\right) + \left(\frac{(SD_2)^2}{n_2 - 1}\right)}}
\]

Degree of freedom = N1 – 1 + N2 – 1

FINDINGS

The Rural students in sit ups having less mean (18.05) and S.D (1.38) as compared to the mean (25.0) and S.D (1.62) of the urban students. While as in standing broad jump the rural students having less mean (1.55) as compared to the mean (1.63) and S.D (0.13) of the urban students. While as in speed put the rural students having meaner (19.04) and S.D (0.69) as compared to the mean (16.12) and S.D (0.33) of the urban students.
In case of “t” test the rural and urban students of Kashmir in sit ups having “t” test = 3.4, which is significant. While in case of standing broad jump, the t-tests of rural and urban students of Kashmir t-test is =0.045 which is insignificant. While as in speed put, the t-test of both groups is 4.07, which is significant.

Table No. 1: Mean, Standard deviation and t-test of both the groups of sit-ups

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>MEAN</th>
<th>SD</th>
<th>Df</th>
<th>‘t’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL. STUDENTS</td>
<td>18.05</td>
<td>1.38</td>
<td>58</td>
<td>3.4</td>
</tr>
<tr>
<td>URBAN. STUDENTS</td>
<td>25</td>
<td>1.62</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The calculated mean and S.D of 60 second Sit-Ups of Rural and Urban students obtained are 18.05 (1.38) and 25 (1.62) respectively. The calculated “t” value is 3.4 at 0.05 level of significance. The table value for 58 degree of freedom is 2.00. Hence the difference among the rural and urban students in their abdominal strength is found significant.

Table No 2: Mean, Standard deviation and t-test of both the groups of standing broad jump

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>MEAN</th>
<th>SD</th>
<th>Df</th>
<th>‘t’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL. STUDENTS</td>
<td>1.55</td>
<td>0.138</td>
<td>58</td>
<td>0.04</td>
</tr>
<tr>
<td>URBAN. STUDENTS</td>
<td>1.63</td>
<td>0.132</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The calculated mean and S.D of standing broad jump rural and urban students of Kashmir obtained are 1.55 (0.138) and 1.63 (0.132) respectively. The calculated “t” value is 0.04 at 0.05 level of significance. The table value for 48 degree of freedom is 2.00. Hence the difference among the rural and urban students of Kashmir in their thigh Muscle strength is found insignificant.

Table No. .3 : Mean, Standard deviation and t-test of both the groups of Speed

<table>
<thead>
<tr>
<th>VARIABLES</th>
<th>MEAN</th>
<th>SD</th>
<th>df</th>
<th>‘t’ Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>RURAL. STUDENTS</td>
<td>19.04</td>
<td>0.69</td>
<td>58</td>
<td>4.07</td>
</tr>
<tr>
<td>URBAN. STUDENTS</td>
<td>16.12</td>
<td>0.33</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
The calculated mean and S.D of speed Put of rural and urban students of Kashmir 19.04 (0.69) and 16.12 (0.33) respectively. The calculated “t” value is 4.07 at 0.05 level of significance. The table value for 58 degree of freedom is 2.00. Hence the difference among the rural and urban students of Kashmir is found significant.

Discussion of Findings

The rural students in sit ups having less mean (18.05) and S.D (1.38) as compared to the mean (25.0) and S.D (1.62) of the urban students. While as in standing broad jump the rural students having less mean (1.55) as compared to the mean (1.63) and SD (0.13) of the urban students. While as in speed put the rural students having meaner (19.04) and SD (0.69) as compared to the mean (16.12) and S.D (0.33) of the urban students.

In case of “t” test the rural and urban students of Kashmir in sit ups having “t” test = 3.4, which is significant. While in case of standing broad jump, the t-tests of rural and urban students of Kashmir t-test is =0.045 which is insignificant. While as in speed put, the t-test of both groups is 4.07, which is significant.

Discussion of Hypothesis

Further discussion is made regarding hypothesis.

1 The sit ups performance is not the same in both rural and urban students of Kashmir. Which shows that they are not equal in their muscular endurance and strength.

2 The standing broad jump performance was the same in both regions of rural and urban students of Kashmir. Which shows that they are same in cardio vascular endurance.

3 The 100 m speed performance is not the same in both regions of rural and urban students of Kashmir, Which shows that they are not equal in speed performance

Hence it can be concluded that there is difference in the physical fitness level of both regions of students of same age group in spite of different culture environment geographical difference now we can say that our hypothesis become correct that there would be significance level between rural and urban areas of Kashmir.
CONCLUSION

From the statistical analysis of the result of this study, the following conclusion can be drawn.

1. The null hypothesis is that there was no significant difference in physical fitness between Rural and Urban students of Kashmir is rejected.

2. The first hypothesis is that there may be significant level of difference physical fitness of Rural and Urban students of Kashmir is accepted.

3. The second hypothesis is that the physical fitness of urban students of Kashmir in speed is more than rural students of Kashmir are accepted.

4. The third hypothesis is that the physical fitness of rural students of Kashmir is in sit-ups is more than urban students of Kashmir is rejected.

Acknowledgement

We the authors are thankful to the participants, sports department for providing us safe environment to conduct this study.

REFERENCES

2. Albarwani,S., Effects of overweight and leisure-time activities on aerobic fitness in urban and rural adolescents Metabolic Syndrome and Related Disorders 7 (4), (2009) pp. 363-373
EFFECTS OF PHYSICAL EXERCISE ON MALE AND FEMALE REPRODUCTIVE HORMONES

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ABSTRACT

The effects of regular exercise on hormones have been subject of many research and as a result, the idea that hormonal changes respond to physical activity by metabolic and endocrine adaptation has gained weight. However, it was observed that studies conducted in male groups might be inadequate in term of hormone profile determination. Female athlete who engages in high intensity exercise is at risk as a consequence of hormonal changes which result in menstrual disturbances. Impaired production of gonadotrophins, which leads to luteal phase deficiency and an ovulation, is a common hormonal finding with exercise-induced menstrual disturbances. There is a strong agreement in responsibility of low energy availability due to imbalance between energy intake and energy expenditure during exercise to impairment hypothalamus ovarian axis (HPO) and reduction in hypothalamus, gonadotropin hormones and subsequently menstrual disorder. However, increase in stress hormone levels through hypothalamus adrenal axis (HPA) activated by strenuous physical activity has been introduced as a responsible for HPO axis impairment by some other studies. The purpose of the study is to examine the effects of regular exercise on blood levels of reproductive hormone and the moderate exercise may elicit positive changes in prolactin hormone, observed changes in the Follicle stimulating hormone (FSH), Luteinizing hormone (LH), Estrogen, and Progesterone level in individual data after moderate exercise practice.

Keywords: Reproductive hormone, Exercise, Physical, Menstrual, Hypothalamus, Expenditure.

INTRODUCTION

Physical activity has become a common life style among the most developed populations due to the many benefits it provides. Athletes are exposed to the same causes of infertility as men in the general population. However, in of infertility. Type of physical activity and various natural parameters (such as volume, intensity, frequency, level of repeat and organization) are the important variables. (1). The endocrine system play a key role in the regulation of almost all body activities including reproduction, growth, development, behavior, and water electrolyte balance. (2). Hormones are regulatory molecules that control reproduction, energy production and maintain its storage. Reproductive and endocrine systems are particularly susceptible to the training stress of an athlete, and unfortunately malfunctions occur in these system under excessive stress. Steroid hormones not only regulate reproductive function, but also heavily impact the nervous, skeletal and cardiovascular systems. (3).The effects of regular exercise on hormone secretion are nowadays an important aspect of sports medicine and physiology research. Regular and healthy reproduction cycle (eumenorrhoea) is a complex process comprising the coordinated interaction of neurotransmitter system, hypothalamic, releasing factors, anterior pituitary hormones, gonadal sex
steroid hormones, and various growth factors. Ovarian hormones such as estrogen and progesterone are main hormones for female reproductive and menstrual cycle. The ovarian cycle is stimulated by hormones in the circulation, i.e. follicle stimulating hormone (FSH) and luteinizing hormone (LH), which are, in turn, regulated by the hypothalamic gonadotropin releasing hormone (GnRH). GnRH released by hypothalamus stimulates anterior pituitary gland to release LH and FSH. These hormones enhance ova, i.e. egg development in ovaries.

Duration of normal reproductive cycle in female is about 26-35 day and divided into two phases, i.e. follicular phase and luteal phase. The follicular phases is characterized by high concentration of FSH and gradually increase in estrogen level which mainly secreted by ovaries, the luteal phase is characterized by high concentration of LH and increase in estrogen and progesterone secretion by corpus luteum. Estrogen and progesterone secreted by ovaries prepare uterus for pregnancy. The primary and secondary sex characters maintain by these hormones like as; Prolactin, Follicle stimulating hormone, Luteinizing hormone, Estrogen, Progesterone plays a crucial role in human physiology.

**Prolactin**
Prolactin (PRL) also known as luteotropic hormone or luteotropin hormone, is a protein that in human is best known for its role is enabling female mammals to produce milk, however it is influential over a large number of functions. Prolactin is secreted from the pituitary gland, in response to eating, mating, estrogen treatment, ovulation and nursing. Prolactin is secreted in a pulsatile fashion in between these events. Prolactin is also plays an essential role in metabolism, regulation of the immune system and pancreatic development. Prolactin also acts in a cytocrine like manner and as an important regulator of the immune system; it has important cell cycle related function as a growth, differentiating and anti- apopetic factor. Pituitary Prolactin secretion is regulated by endocrine neuron in the Hypothalamus. Prolactin has a wide range of effects it is stimulates the mammary glands to produced milk (lactation) increased serum concentration of Prolactin during pregnancy caused enlargement of the mammary glands of the breast and prepare for the production of milk.

**Follicle stimulation hormone**
Follicle stimulating hormone (FSH) is a glycoprotein hormone found in the humans. It is synthesized and secreted by gonadotropes of the anterior pituitary glands regulate the development, growth, pubertal maturation and reproductive process of the body. FSH and Luteinizing hormone (LH) act synergistically in reproduction. Its structure is similar to those of LH, TSH .FSH stimulates the maturation of germ cell. In male, FSH induces sertoli cells to secreted androgen binding protein regulated by inhibins negative feedback mechanism on the anterior Pituitary. In females FSH initials follicular growth specially affecting granulose cells control of FSH release from the Pituitary gland is unknown. Gonadotropin releasing hormone (GnRH) form Hypothalamus has been shown to play an important role in the secretion of FSH. FSH is subject to estrogen feedback from the gonads via the hypothalamic pituitary gonadal axis. In the following graph reference ranges for the blood content of FSH level during menstrual cycle is presented.
Luteinizing Hormone

Luteinizing hormone (LH) is a heterodimeric glycoprotein. Its structure is similar to other glycoprotein hormone FSH, Thyroid stimulated hormone, chorionic gonadotropin. LH is essential for reproduction. In female LH support theca cells in the ovaries that provide androgens and hormonal precursors for estradiol production. At the time of menstruation FSH stimulates follicular growth, specially affecting granulose cells with the raise in estrogen; LH receptors are also expressed on the maturing follicle, which cause it to produce more estradiol. The level keeps rising through the follicular phase these result in the peak of LH. The increase in LH production only last for 24 - 48 hours. This LH surge triggers ovulation, there by not only releasing eggs from follicle but also initiating conversion of the residual follicle into a corpus luteum. That, in turn, produces progesterone to prepare the endometrium for a possible implementation. If pregnancy occurs LH level will decreases and the luteal will instant be maintain by the action of human chronic gondotropin a hormone very similar to LH but secreted from new placenta. In the following the reference ranges for the blood contain of LH during menstrual cycle is presented.
Estrogen

Estrogen or Oestrogen is the primary female sex hormone and is responsible for development and regulation of the female reproductive system and secondary sex characteristics. The name estrogen come from Greek, literally meaning ‘verve’ or ‘inspiration’. Like steroid hormones estrogen readily diffuse across the cell membrane.

Estrogen in female are produce primarily by the ovaries and during pregnancy the placenta. FSH stimulate the ovarian production of estrogen by the granulose cells of the ovarian follicles and corpora lutea. Some estrogen are also produced in smaller amounts by other tissues such as the liver, adrenal gland and the breast. These secondary sources of estrogen are especially important in post-menopausal women.

Estrogen level varies through the menstrual cycle with levels highest near the end of the follicular phase just before ovulation. The action of estrogen are mediated by estrogen receptors.

Estrogen has anti-inflammatory property help in immunological problems. Estrogen is consider to play a significance role in women’s mental health. Sudden estrogen withdrawal, fluctuating estrogen and periods of sustained estrogen low levels correlated with significant mood lowering. Depression has also been shown in the shift of estrogen level. Estrogen may play a role in suppressing being eating.

Progesterone:

Progesterone (P4) is an endogenous steroid and progesterone sex hormone involve in the menstrual cycle, pregnancy, embryogenesis of human. It belong to a group of steroid hormones called the progesterone. Progesterone is also a crucial metabolic intermediate in the production of other endogenous steroid including the sex hormone and the cortico steroid and plays an important role in brain function as a neuro steroid. Progesterone is producing high amount in the ovaries (by the corpus luteum), from the onset of puberty to menopause and is also produced in smaller amounts.
by the adrenal glands after the onset of adrenarche in both males and females to a lesser extent. Progesterone is produced in nervous tissue especially in the brain and in adipose tissue, as well. During human pregnancy progesterone is produced in increasingly high amount by the ovary and placenta. An additional animal source is milk product. After consumption of milk product the level of bio available progesterone goes up. In women progesterone level are relative low during the pre-ovulatory phase of the menstrual phase, rise after ovulation and are elevated during the luteal phase. Progesterone level during the menstrual cycle presented in the following chart.

Progesterone level tend to be less than 2 ng/mL prior to ovulation and greater than 5ng/mL after ovulation, if pregnancy occurs human chronic gonadotropin is release maintaining the corpus luteum allowing it to maintaining level of progesterone. Between 7-9 weeks the placenta begins to produce progesterone in the place of the corpus luteum. After luteal placenta shift progesterone level starts to raise further and may reach 100-200 ng/mL. After delivery of placenta and during lactation progesterone level are very low.

It increases core temperature during ovulation. It reduces spasm and relaxes smooth muscles. It act as anti-inflammatory agent and regulates the immune responses. It reduces gallbladder activity. Progesterone normalizes blood clotting and vascular tone, Zink copper level, cell oxygen level and use of fat store for energy. It may offer gum health, increasing risk of gum inflammation. It appears to prevent endometrial cancer. Progesterone plays an important role in the signalling of insulin release and pancreatic function.

MATERIAL AND METHODS

Research subjects consisted of an exercise group that regularly trained 1hours daily, 4day per week to develop strength, endurance and speed (professional football players, n=20, age:22.9±1.4yrs) and a sedentary group, (n=20, age:19±1.9yrs). All measurement were performed after 16 week training period. For 16 week athletes and sedentary subject have never received any nutritional supplements. The body mass indices (BMI)of the volunteers were calculated according to the formula “BMI=body weight (kg)/[height(m)]²”.participants,productive hormone level, namely testosterone, FSH, LH, prolactin, estradiol, and TSH were obtained from blood serum. Participants were informed in advance that they should not consume any solid or liquid food before
the blood test. On specified dates and times, the 40 participants were taken to the sub district hospital sopore in four groups, at the same time of the day. Volunteers were chosen among subject who fulfilled the following criteria: to be free from any illness or sever disabilities, not having surgery with the last six months, to be non – smoker, aged 18-25 years old and non - user of any medication that would affect hormonal regulation.

**Biochemical Analysis** participants blood samples biochemical analyses were performed at the said hospital laboratory about 5ml of blood was extracted with the help of Lab. Technician taken from all participants between the time period 9:00 am to 10:00 am from an forearm elbow vein. The blood was transferred from the syringe to a red capped, vacuumed biochemical test tube that does not contain anticoagulants and was allowed to clot. Following blood clotting, the whole body samples were centrifuged at rpm for 15 min at +4° c on centrifuge to separate the serum. Serum hormone level were examined through ELISA kits and group results were compared.

**Statistical Analysis** the statistical tool like IBM corps, was used to evaluate the data. For descriptive statistics, arithmetic mean and standard deviation (SD) of the data was calculated, and the level p 0.05 was considered significant. In order to determine the statistical method to be used for the obtained data, a normality test was applied firstly. As a result of the shapiro- wilk test, the data was shown to have normal distribution (p less than 0.05).findings were analyzed by the independent sample t-test, and results were compared.

**RESULTS**

Although some had high SD figures all measured hormonal level of the subjects participating in the study were within the normal reference interval. Mean and standard deviation values for age, height, body weight and BMI of the group are shown in table 1. Mean and standard deviation findings of serum hormone levels for the athletes and the sedentary group, and the independent sample t-test that compared these levels are given in table 2.

**Table 1. Average age, height and body weight of sedentary subjects and athletes**

<table>
<thead>
<tr>
<th>Groups</th>
<th>Age (yr)</th>
<th>Height (m)</th>
<th>Body weight (kg)</th>
<th>BMI (kg/m²)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sedentary (n=20)</td>
<td>22.9 ± 1.4</td>
<td>1.77 ± 0.04</td>
<td>76.9 ± 7.8</td>
<td>21.2 ± 2.0</td>
</tr>
<tr>
<td>Athletes (n=20)</td>
<td>19.1 ± 1.9</td>
<td>1.74 ± 0.05</td>
<td>71.0 ± 6.5</td>
<td>19.9 ± 2.2</td>
</tr>
</tbody>
</table>

BMI: Body mass index; figures as (mean ± SD); SD: standard deviation
CONCLUSION

The present study reports that regular exercise may cause difference in some hormonal levels between athletes and the sedentary group, which could affect the neuro endocrine system. The findings of the present study indicate that this effect is observed not because of pathological events, but that the hormonal changes most likely occur due to metabolic and endocrine adaptation in response to physical activity. The absence of sperm quality and hypothalamic – pituitary adrenal axis findings constitutes a limitation.

In females, the moderate vigorous exercise causes some changes in the reproductive hormone level in females with significant decrease in day 3 estrogen, LH, FSH and significant increase in day 21 progesterone hormone level. The hormonal pattern shown that moderate-vigorous exercise may increase the responsiveness and sensitivity of the follicle to FSH and LH with attendant increase in ovulatory status in young females.

REFERENCES

ANTIOXIDANT ENRICHED NUTRI BAR SUPPLEMENTATION ON THE SERUM ANTI-OXIDANT STATUS AND PERFORMANCE OF TRACK AND FIELD ATHLETES

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ABSTRACT

Background: Adequate nutrition knowledge among athletes becomes vital. Knowledge, attitude and practices (KAP) regarding food intake of athletes become essential more so to have antioxidant rich diets. Antioxidants supplementation may provide protection against negative health consequences of oxygen free radicals caused by aerobic and re-sustained exercise. Aim: is to find out the efficacy of anti-oxidant rich nutria bar supplementation on the anti-oxidant status and physical fitness components of the athlete’s .Methods: Single blind study was employed. Study group (n=20) subjects were supplemented with the formulated nutria bars daily for a period of 3 months and control group with a placebo. Bio-chemical parameters GSH, GSH-px, SOD, Vitamin C, lipid profile, serum LPO and physical fitness tests were assessed at baseline and after 90 days. Statistical analysis was performed using SPSS (version 15).

Results: The mean age was 18 ±3.2 yrs . 60 % of the selected athletes were males and 40% females. The main source of nutrition information was from coaches (56%) and magazines (30%). Supplemented group athletes showed a significant increase in serum levels of SOD (p=0.000), LPO (p=0.005), GSH (p=0.000) than control group. Significant decrease was observed in total cholesterol (p=0.000) and LDL Cholesterol (p=0.000) than placebo. Vitamin C levels and GSH-px, HDL decreased in supplemental group but there was a significant decrease in control group (p=0.000,p=0.02, p=0.000).Significant improvement in all six physical fitness tests was observed in supplemented group (p=0.000), whereas in control group pushups test, vertical jump and agility tests alone did not find statistical significance. Conclusion: False beliefs, food fads, have brought in major drawback in performance; hence appropriate nutrition knowledge is necessary for winning. Antioxidant effects of the formulated food were useful in improving the endurance of athletes.

Key words: Nutrition, Attitude, Food fads, Knowledge
INTRODUCTION

The sport of athletics is defined by the many events which make up its competition programs. All events within the sport are forms of running, walking, jumping or throwing. These events are divided into the sub-sports of track and field, road running, race-walking and cross country running.

An adequate diet in terms of quality and quantity before, during and after training and competition will maximize performance.

Presently, the unorganized sports scenario in India is in the active transformation phase and steadily evolving to become more structured. Likewise, the field of sports medicine and sports science are gaining importance. A decade ago, this branch of medicine was non-existing. But, increased exposure of athletes, coaches, team officials to international sporting events has made them appreciate the importance of performance enhancement. Importance of a sports nutritionist has also increased demand. However, there is still a long way to go.

As far as the nutritious diet of sportsperson is concerned, there are lot many things that deserve proper attention like selection of foods, timing of food intake, selection of nutrition supplement and many more. It is well recognized that athletic performance is enhanced by optimal nutrition (American College of Sports Medicine, American Dietetic Association, and Dietitians of Canada, 2000).

An active body consumes significantly more oxygen than a less active body, so it follows that regular physical activity may result in a persistent state of oxidative stress and, therefore, greater antioxidant needs. Among the well-known biological anti-oxidants- glutathione (GSH), glutathione per- oxidase (GSH-Px) and superoxide dismutase (SOD) have a significant role as a suppressor on scavenging free radicals (Hengstermann, 2008 and Sikka, 1996). Diets high in vegetables and fruits, which are good sources of antioxidants, have been found to be healthy; however, researches have not been conclusive in antioxidant supplementation to be beneficial for athletic population. Studies that focused on the effect of antioxidant supplementation of athletes were scarce. Lack of awareness about different sports nutrient supplements among the athletes is the main concern of a sports nutritionist. The demand for sports nutrition products continued to be low, which poses a high demand on the nutritionist to concentrate on the various forms of nutrition supplements.

The novel way of incorporating the anti-oxidants into their diet is by involving indigenous, underutilized ingredients which are abundantly rich in anti-oxidants. The requirements vary at different sport level and they can provide wonders in athletes’ performance. Keeping the above mentioned importance of antioxidants, the purpose of the present study is to test an antioxidant rich nutri bar prepared from underutilized ingredients, which would be of great help in order to ensure the athletic performance. Nutri bars are mostly preferred by athletes as they are ready to eat.
foods and could be easily picked up by them before, during and after the event. Therefore, the study has been designed with the following objectives:

- To assess the nutritional status of selected athletic men and women (track and field events).
- To supplement an antioxidant rich nutri bar to the athletes and
- To find out the impact on the antioxidant status such as superoxide dismutase (SOD), lipid peroxides (LPO), Vitamin C, Gluathione (GSH) and Glutathione Peroxidase (GSH-px) of the athletes.

**MATERIALS AND METHODS**

**Study design and participants**

This study is a single-blind randomized prospective intervention design with control group. Sample size calculation suggested statistical power of 0.80, with significance (p<0.001) which gave rise to 20 athletes and in order to take care of probable attrition, 40 subjects were recruited for the study.

The study has been done between March 2014 and May 2014. Inclusion criteria were athletic men and women aged between 18 and 22 years, who have a minimum of 3 years of experience with track and field events and who are willing to participate and who filled in the printed informed approval. These athletes were recruited from sport academies in Chennai, India. Exclusion criteria included having any chronic diseases, who were < 18 and > 22 years of age and those who are on other nutrient supplements were excluded from the study. Voluntary participation was emphasized and a printed informed approval was acquired from them to be integrated in the study. The study was officially declared by the institutional Ethical board of Human Research Ethics Committee of PSG College of Arts and Science Coimbatore, India for Nutrition departments. (REF: REC/NCND/K14 003).

**3-day record**

Subjects belonging to the experimental and control group were requested to preserve a three-day food documentation so as to determine the modifications in the nutrient intake. It was collected at baseline, and at twelve weeks of the supplementation. Nutritional ingestion through 3 day record was evaluated via DIETCAL software.

**Formulation**

Initially a pilot study was conducted to arrive at the acceptable formulation. The most acceptable variation (variation B) was prepared thrice and evaluated to verify the consistency of results. The evaluation was carried out in a suitable ambience by the same set of semi-trained panel members.
Thereafter, the nutri-bars were prepared for sensory evaluation. Acceptability test was conducted for the prepared bars in three variants by evaluating the different sensory attributes like appearance, colour, flavor, texture, taste and overall acceptability by ten semi-trained members. **Five point hedonic scales** were used to evaluate the nutri-bars.

The Nutri-bar was also subjected to organoleptic evaluation by the general public. The focus group considered were young adults with an age ranging from 18 to 25 yrs. Acceptability test was rated by 20 athletes of the Sports Academies in Chennai.

The Standardized recipe was followed for the bulk preparation of nutri-bars. Exact quantity of the ingredients was measured each time and the detailed step by step procedures for preparation and cooking (including cooking temperature, time, type of size of utensil used) was followed at all times. The dry ingredients are mixed and baked into granola (nutri-bars). The nutri-bars were made up into 50 gm (each bar weight) and two bars were provided for the athletes as per the anti-oxidant content of the bars. 110 mg of anti-oxidants as per standardization is incorporated into 100 gm of the nutri-bars. This was divided into two bars weighing 50 gm each.

**Estimation of nutrient analysis**

The prepared bars using antioxidant rich ingredients were subjected to nutrient analysis. The nutrients namely total carotene, vitamin A, C, E, energy, proteins, carbohydrates and fats were analysed by the following methods.


<table>
<thead>
<tr>
<th>Nutrients</th>
<th>Composition/100gm</th>
</tr>
</thead>
<tbody>
<tr>
<td>Energy</td>
<td>524.5 kcals</td>
</tr>
<tr>
<td>Protein</td>
<td>24.48gms</td>
</tr>
<tr>
<td>Carbohydrates</td>
<td>39.14gms</td>
</tr>
<tr>
<td>Fats</td>
<td>30.87gms</td>
</tr>
<tr>
<td>Vitamin A</td>
<td>15.6 mcg</td>
</tr>
<tr>
<td>Vitamin E</td>
<td>20.2 mg</td>
</tr>
<tr>
<td>Vitamin C</td>
<td>50.6 mg</td>
</tr>
<tr>
<td>TOTAL ANTIOXIDANTS</td>
<td>115.8 mg</td>
</tr>
</tbody>
</table>
Microbial Analysis

Microbial analysis was carried out by total plate count (TPC). Standard plating in nutrient agar was carried out, which is called as total plate count method. The total microbial load (TPC) of nutri bars were determined in nutrient agar media according to the method given by Harrigan and McCance (1966), on 0th day and then again after 7 days and 14 days.

Supplementation

Those subjects in the study group who were assessed were supplemented with the formulated nutri bars daily for a period of 3 months (12 weeks). Two bars per day were given to the subjects during the day (morning and evening sessions) and it was monitored personally by the investigator whether athletes consumed the nutri-bar supplement or not. Those subjects in the control group were provided with appropriate nutritional counseling about the importance of anti-oxidant rich foods and a placebo was given. The nutritional intake and the blood reports were collected at 12 weeks of the supplementation from both the study and control groups to check for any improvement in the anti-oxidant status.

Blood analysis

The bio-chemical parameters, namely Glutathione peroxidase, Glutathione concentration, superoxide dismutase, Vitamin C concentrations and lipid peroxides (LPO) in plasma serum, were estimated before and after supplementation of anti-oxidant rich nutri- bars to find out the impact on these blood parameters.

A sterile disposable syringe was used to draw blood from the femoral vein in the morning. 10ml of blood was drawn from each subject before and after the period of study. Part of blood was transferred into heparinized tubes and the rest used for serum separation. Resting blood samples were collected using two different vacutainers. The heparinized vacutainer was used to determine plasma TBARS, the erythrocyte glutathione concentration (GSH) level, and glutathione peroxidase (GSH-Px) activities. Five hundred micro liters of whole blood were stored at 4°C for one day before determining enzymes activity and 150 µL of whole blood were frozen at –20°C for GPx activity determination (with a maximum conservation of 20 days). For GSH analysis, 500 µL of whole blood were centrifuged at 2500 g for five min at 4°C. The plasma supernatant was discarded and the erythrocyte pellets were suspended in four volumes of MPA (6% 1:1 in water). After shaking vigorously, it was centrifuged at 3000 g (10 min, 4°C). The acidic protein-free supernatants were stored at –80°C until analysis. The rest of the blood samples were centrifuged (1500 g, 10 min, 4°C) and the plasma used to determine LPO (500 µL) for experiment.
Physical Fitness tests

The following physical fitness tests were also performed.

i. Cooper’s 12 Minutes Test
ii. Harvard Step test
iii. Push-ups Test
iv. Vertical Jump test (Sargent Jump)
v. Sixty-metre dash
vi. Hexagon Agility test.

Statistical Analysis

Paired ‘t’tests were used to assess the difference between the groups (treatment and control groups). A significant $P$ value ($P \leq 0.05$) for the interaction term was considered a demonstration of a treatment effect. Significance was found between the placebo and the treatment group at either time interval. Statistical analysis performed using SPSS (version 15).

RESULTS AND DISCUSSION

General Profile

The mean age of participants were 18 ±3.2 yrs with a range of 18 to 21 yrs. 60% of the selected athletes were males and 40% females. According to a report by a Statistical Review of Australia (2012) on sports and physical recreation, in organized sport, the participation rate was similar for men and women in organized sport.

Nutrient Intake

FIG 1- DIETARY INTAKE OF ATHLETES BELONGING TO EXPERIMENTAL AND CONTROL GROUPS
Young athletes in their quest for victory by recognizing that children and adolescents generally need more calories and protein per kilogram of body weight than adults. Nutrient needs further elevate and reach their peak during adolescence. The results reveal that nutrition counseling is important for athletes to consume the nutrients as per the RDA as well as pertaining to their specific sport activity.

**Results of Organoleptic Evaluation**

<table>
<thead>
<tr>
<th>ATTRIBUTES</th>
<th>MAX SCORE</th>
<th>A1</th>
<th>A2</th>
<th>A3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>30</td>
<td>19</td>
<td>20</td>
<td>21</td>
</tr>
<tr>
<td>Colour</td>
<td>30</td>
<td>19</td>
<td>19</td>
<td>22</td>
</tr>
<tr>
<td>Flavour</td>
<td>30</td>
<td>19</td>
<td>20</td>
<td>24</td>
</tr>
<tr>
<td>Texture</td>
<td>30</td>
<td>20</td>
<td>20</td>
<td>23</td>
</tr>
<tr>
<td>Taste</td>
<td>30</td>
<td>20</td>
<td>22</td>
<td>24</td>
</tr>
<tr>
<td>Overall acceptability</td>
<td>30</td>
<td>20</td>
<td>19</td>
<td>24</td>
</tr>
<tr>
<td>Total score</td>
<td>180</td>
<td>117</td>
<td>120</td>
<td>138</td>
</tr>
</tbody>
</table>

The three variants (A1, A2, and A3) were made different with varying proportions of rolled oats, dehydrated carrots, groundnuts and almonds to achieve a highly acceptable product. It was thus observed from table III that variant A3 had scored highest in attributes of appearance, colour,
flavor, texture, taste and overall acceptability. The variant A3 was accepted well with a total score of 24. Overall, the A3 was acceptable and tasted good.

**Anti-oxidant Levels - SOD, LPO and Vitamin C of Experimental and Control Groups**

The mean initial levels of SOD and LPO between experimental and control groups showed no significant difference (SOD t value-0.12(0.90 NS) LPO t value-1.36(0.18 NS)) indicating no difference in the levels at baseline, whereas mean initial levels of vitamin C{t value-2.38(0.02***)} alone showed a difference (p<0.05) between the groups. At the end of 90 days of supplementation, the mean final levels of SOD showed a significant difference (p<0.001) between the groups. However, LPO and vitamin C levels between experimental and control groups showed no significant difference {LPO t value-0.08(0.93 NS)} and vitamin C {t value-0.841(0.40 NS)}.

**FIG- 2 Mean SOD Levels (Initial and Final) of Experimental and Control Groups**

* - Significant at p<0.001

From the above table, it is evident that the biochemical parameters such as superoxide dismutase (SOD), LPO and vitamin C before supplementation were found to be statistically not significant between experimental and control groups. The mean standard deviation of Superoxide dismutase (SOD) has been found to be 42.08±13.16 in experimental group and 18.68 ± 21.158 in control group showing a vast difference between the two groups after supplementation (p<0.001), while other parameters such as LPO and Vitamin C showed no significant results.

- The significant improvement in the SOD levels(p<0.001) of the experimental group (initial 37.42 ± 12.01 Units/min/ml, final-42.08±13.16 Units/min/ml) is due to the daily consumption of anti-oxidant rich nutri bars formulated by the investigator and effective nutritional counseling provided. The mean initial level of SOD was 36.96± 10.79 Units/min/ml which decreased to18.68 ± 21.15 Units/min/ml at the end of 90 days (p<0.001) in the control group. Since the athletes of this group were not supplemented with anti-oxidants, the SOD values were decreased.
FIG-3 LPO Levels (Initial and Final) of Experimental and Control Groups

**LPO Levels Initial and Final in Experimental Group**

- In experimental group, the mean initial levels of LPO was 2.89 ±0.82 µg/ml which increased to 3.80±1.37 µg/ml post intervention (p<0.01) in view of daily consumption of anti-oxidant rich nutri bars. In the control group, there was a significant increase from 3.44 ± 1.59 µg/ml to 3.85 ± 1.87 µg/ml (p<0.05). This significant increase could be due to the fact that the athletes of the control group were also well trained.

***- Significant at p<0.05, **- Significant at p<0.01

FIG-4 Vitamin C Levels (Initial and Final) of Experimental and Control Groups

**Vitamin C Levels Initial and Final in Experimental Group**

- Vitamin C levels decreased after 90 days of supplementation from 4.14 mg/dl to 3.62 mg/dl in the experimental group with statistically not-significant results. However, in the control group there was a significant decrease from 5.14 mg/dl to 3.32 mg/dl (p<0.001).

**Comparison of GSH and GSH px between experimental and control groups**
TABLE III

Level of Significance of Glutathione (GSH) and GSH px (Glutathione peroxidase- GSH px) between experimental and control groups

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Experimental MEAN ± SD</th>
<th>Control MEAN ± SD</th>
<th>‘t’ test (P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>GSH (µg/ml)</td>
<td>209.76 ± 8.17</td>
<td>214.12 ± 7.4</td>
<td>1.76 (0.08 NS)</td>
</tr>
<tr>
<td>Initial</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>244.58 ±33.36</td>
<td>188.88 ±38.3</td>
<td>4.90 (0.00*)</td>
</tr>
<tr>
<td>Change</td>
<td>-34.82</td>
<td>25.24</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>4.42(0.000*)</td>
<td>2.80(0.011**)</td>
<td></td>
</tr>
<tr>
<td>GSH Px (µg/ml) Initial</td>
<td>17.15± 15.25</td>
<td>15.30±12.13</td>
<td>0.42(0.67 NS)</td>
</tr>
<tr>
<td>Final</td>
<td>18.65 ± 8.9</td>
<td>9.20±6.32</td>
<td>3.84(0.000*)</td>
</tr>
<tr>
<td>Change</td>
<td>-1.5</td>
<td>6.1</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>0.45(0.65 NS)</td>
<td>2.48(0.02***)</td>
<td></td>
</tr>
</tbody>
</table>

* - Significant at p<0.001,
** - Significant at p<0.01,
*** - Significant at p<0.05,
NS - Not Significant

The table III highlights the effect of GSH and GSH-px between experimental and control groups before and after supplementation. The mean glutathione levels were found to be 209.76 ± 8.17 in the experimental group and 214.12 ± 7.42 in the control group respectively. There seems to be not much of a difference before supplementation between the two groups. But after supplementation the mean glutathione levels were 244.58±33.36 in the experimental group and 188.88±38.3 in the control group respectively, which was found to be significant (p<0.01). Whereas, athletes of control group who were not supplemented found to show a decreased GSH level (214.120 ± 7.42 to 188.88±38.3) and is not significant (t= 2.803). This could be due to depletion of GSH level during the aerobic exercise/ training program.

GSH-Px level found to be 17.15± 15.25 in experimental group in the initial stage and mildly elevated to 18.65 ± 8.9 during study course, showing statistically not significant results. This may due to indication of long exercise during marathon induce caused modification of GSH-Px activity (Feri, 1994). GSH-Px level was found to be decreased from15.30±12.13 to 9.20±6.32 in control group showing not significant results. Studies have shown that glutathione and reduced glutathione levels are enhanced with anti-oxidant supplementation. Tauler et al, 2002 studied the diet supplementation with vitamin E, vitamin C and β-carotene cocktail enhancing the basal neutrophil antioxidant enzymes in athletes for 90 days' supplementation with placebo or an antioxidant cocktail of vitamin E (500 mg/day) and β-carotene (30 mg/day) and the last 15 days also with vitamin C (1 g/day) on sportsmen's basal neutrophil antioxidant defenses and analyzed the activities of catalase, glutathione peroxidase, glutathione reductase. The antioxidant-
supplemented group presented a significantly higher glutathione versus glutathione disulfide ratio in neutrophils (about 20%) than the placebo one.

Physical Fitness tests

TABLE IV

<table>
<thead>
<tr>
<th>Parameters</th>
<th>Experimental MEAN ± SD</th>
<th>Control MEAN ± SD</th>
<th>‘t’ test (P value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>12 mins (m) Initial</td>
<td>1.44±0.142</td>
<td>1.43±0.132</td>
<td>0.16(0.87NS)</td>
</tr>
<tr>
<td>Final</td>
<td>1.56 ± 0.134</td>
<td>1.47±0.13</td>
<td>2.24(0.03***)</td>
</tr>
<tr>
<td>Change</td>
<td>-0.12</td>
<td>-0.04</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>20.99(0.000*)</td>
<td>7.02(0.000*)</td>
<td></td>
</tr>
<tr>
<td>Step test (nos) Initial</td>
<td>68.65±5.51</td>
<td>64.65±6.38</td>
<td>2.12(0.04***)</td>
</tr>
<tr>
<td>Final</td>
<td>78.35±4.004</td>
<td>69.90± 6.82</td>
<td>4.77(0.000*)</td>
</tr>
<tr>
<td>Change</td>
<td>-9.7</td>
<td>-5.25</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>16.83(0.000*)</td>
<td>12.81(0.000*)</td>
<td></td>
</tr>
<tr>
<td>Push-ups (nos) Initial</td>
<td>22.25 ±3.97</td>
<td>25.65±4.55</td>
<td>2.51(0.02***)</td>
</tr>
<tr>
<td>Final</td>
<td>29.70±3.40</td>
<td>26.20±3.86</td>
<td>3.04(0.004**)</td>
</tr>
<tr>
<td>Change</td>
<td>-7.45</td>
<td>-0.55</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>20.34(0.000*)</td>
<td>0.73(0.46 NS)</td>
<td></td>
</tr>
<tr>
<td>vertical jump(cm) Initial</td>
<td>60.00±5.620</td>
<td>53.50±7.96</td>
<td>2.98(0.005**)</td>
</tr>
<tr>
<td>Final</td>
<td>63.75±6.043</td>
<td>53.25±9.49</td>
<td>4.17(0.000*)</td>
</tr>
<tr>
<td>Change</td>
<td>-3.75</td>
<td>0.25</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>7.55(0.000*)</td>
<td>0.25(0.80 NS)</td>
<td></td>
</tr>
<tr>
<td>Speed(sec) Initial</td>
<td>6.5940±0.258</td>
<td>6.6010±0.312</td>
<td>0.07 (0.93 NS)</td>
</tr>
<tr>
<td>Final</td>
<td>6.7435±0.25</td>
<td>6.5415±0.30</td>
<td>2.26(0.02***)</td>
</tr>
<tr>
<td>Change</td>
<td>-0.14</td>
<td>0.06</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>6.67(0.000*)</td>
<td>2.55(0.01**)</td>
<td></td>
</tr>
<tr>
<td>Agility (Sec) Initial</td>
<td>12.255±0.42</td>
<td>12.205±0.39</td>
<td>0.38(0.70 NS)</td>
</tr>
<tr>
<td>Final</td>
<td>12.400±0.51</td>
<td>12.110±0.52</td>
<td>1.76(0.08 NS)</td>
</tr>
<tr>
<td>Change</td>
<td>-0.15</td>
<td>0.095</td>
<td></td>
</tr>
<tr>
<td>‘t’ test (P value)</td>
<td>2.48(0.02***)</td>
<td>1.36(0.18 NS)</td>
<td></td>
</tr>
</tbody>
</table>

*- Significant at p<0.001, **- Significant at p<0.01, ***- Significant at p<0.05. NS- Not Significant
Table IV revealed:

- The initial values of 12min run tests in experimental group was 1.44±0.142m and the final values did show a significant rise (P<0.001). However the distance covered by the control group in 12 mins was 1.43±0.132m at baseline and 1.472 m after 90 days, though the increase was minimal, yet it was significant at p<0.001.

- The number of steps taken by athletes of experimental group had significantly increased from 68.65±5.518 to 78.35±4 (P<0.001) while there was only a marginal increase from 64.65±6.385 to 69.90± 6.820 in the control group (P<0.001).

- In vertical jump test the athletes of the experimental group subjects showed a significant increase from 60.00±5.620cm to 63.75±6.043cm (P<0.001) and control group showed a marginal decrease from 53.50±7.964cm to 53.25±9.497cm which is statistically not significant.

- Push-ups tests which demonstrates the improvement in the endurance of athletes showed a significant increase from 22.25±3.972 to 29.70±3.404 (p<0.001) in the experimental group. Though there was an increase from 25.65±4.55 to 26.20±3.861 in control group, it was not statistically significant.

- The athletes belonging to experimental group had a significant increase from 6.5940±0.2588 seconds to 6.7435±0.2576 seconds (P<0.001) in the overall speed, while in the control group it decreased from 6.6010±0.3126 sec to 6.5415±0.303 sec(P<0.01)

- Agility tests showed the improvement in the endurance of athletes with significant increase from12.255±0.42 sec to12.400±0.51 sec (p<0.05) in the experimental group. In control group a decrease from12.205±0.39 sec to12.110±0.52 sec was observed statistically not significant.

Limitations of the Study

1. Anthropometrical measurements such as MAC, TSF and MAMC have not been performed.
2. Dietary information was not obtained after the supplementation.

CONCLUSION

Knowledge about free radicals and anti-oxidants is quite poor. It is apparent that further research examining the relationship between nutrition knowledge and dietary behaviors is warranted.

Antioxidant effects of the formulated food improved the bio- markers and physical fitness components. Supplementation of antioxidant rich nutri bars hence had beneficial effects on the oxidative stress of the athletes. Future research may explore the effect of other nutritional antioxidants that can benefit the athletes. The anti-oxidant requirements for athletes have to be computed for recommendations.
REFERENCES


EFFECT OF POLYMERIC EXERCISES ON SPEED, POWER AND BALL CONTROLLING ABILITY OF WOMEN FOOTBALLERS

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ABSTRACT

The purpose of the study was to find out the effect of plyometric exercises on speed, power and ball controlling ability of Women Footballers. For this purpose, 16 Girls studying at BIT Campus Tiruchirappalli were selected as subjects for this study. The subjects were regular members of the College women football team. The experimental group underwent polymeric exercises for duration of 12 weeks in addition to the regular practice. The most successful player should have superior ball controlling ability and dynamic bio motor fitness to integrate them for excellent performance. So, in this study speed, power and ball controlling ability was selected as dependent variables. Plyometric exercise is a relatively new concept of training and it implies the specificity principles regarding the pre stretch condition of the muscle prior to explosive contraction. So, plyometric exercise was selected as independent variables (training means) to test speed, power and ball controlling ability women footballers. As per the available literature, 50mts. run, vertical jump and Mc Donald Soccer test were used to collect relevant data on speed power and ball controlling ability respectively. It is inferred that polymeric training had significantly influenced on selected criterion variables, such as speed, power and ball controlling ability which are the basis for women footballers.

Keywords: Speed, Power, Ball Controlling Ability, Polymeric Exercise

INTRODUCTION

Training is not a recent discovery. In ancient times people were trained for military and Olympic endeavors. Today athletes systematically prepare themselves for a goal through endeavor. Athletes are not developed overnight and a coach cannot create miracles by cutting corners through overlooking scientific and methodological theories (Bompa, 1999).

Sports training are a basic preparation for better performance through physical exercise. It is based on scientific principles of aiming at education and performance enhancement Sports activities consist of motor movement and action and their success depends to a great extent on how correctly they are performed. Techniques of training and improvement of tactical efficiency play a vital role in a training process. The main components, which influence the physical performance of an athlete, are strength, speed, agility, endurance, power and coordinative abilities. Action potential depends on natural abilities and at the same time fundamentals act as the foundation for excellence (Singh, 1991).
Polymeric Training

The term polymeric was first used in 1975 by Fred Will, former Olympic runner and present women's track coach at Purdue University. According to Will, he got the term from European track and field coaches where plyometric was in use at least ten years before his time. The Soviets were strong users of plyometric and their early success in the jump events was credited in large part to this type of training. Plyometric exercises rapidly became known to coaches and athletes as exercises or drills aimed at linking strength with speed of movement to produce power. The plyometric training becomes essential to athletes who play, jump, lift or throw by using plyometric coaches and athletes achieve success and it is becoming universally accepted. Plyometric has many forms but in general, it revolves around jump activities. For example single or double leg hops, triple jump, jumps for height, distance or a combination of both, jumps downs with a following jump upward (depth jumps). Such jumps are used to develop either the arm or leg explosiveness or a combination of both. Thus plyometric training is the key to develop maximal explosive power and speed of movement, which in turn are the key elements involved in sports by doing various plyometric exercises one can increase the performance level greatly.

Statement of the Problem

The Study was intended to investigate the effect of plyometric exercises on speed, power and ball controlling ability among Women Footballers.

Hypothesis

There may be a significant improvement in speed, power and ball controlling ability due to plyometric training.

METHOD

The purpose of the study was to find out the effect of plyometric exercises on speed, power and ball controlling ability of Women Footballers. For this purpose, 16 girls studying at BIT Campus Tiruchirappalli were selected as subjects for this study. The subjects were regular members of the College women football team. The experimental group underwent plyometric exercises for duration of 12 weeks in addition to the regular practice. The most successful player should have superior ball controlling ability and dynamic bio motor fitness to integrate them for excellent performance. So, in this study speed, power and ball controlling ability was selected as dependent variables. Plyometric exercise is a relatively new concept of training and it implies the specificity principles regarding the pre stretch condition of the muscle prior to explosive contraction. So, plyometric exercise was selected as independent variables (training means) to test speed, power and ball controlling ability women footballers. As per the available literature, 50mts. run, vertical jump and Mc Donald Soccer test were used to collect relevant data on speed power and ball controlling ability respectively.
Training Program and Collection of the Data

During the training period, the experimental group underwent the polymeric exercise program, three days per week (alternate day) over 12 weeks in addition to the regular practice. Every training on lasted for 45 to 60 minutes approximately, including up and cool down. Pre-test data were collected two days before training program and post-test data two days after the training program on speed, power and ball controlling for the experimental group.

Experimental Design and Statistical Technique

The experimental design used in this study was similar to single group design. The concept of dependent-test and magnitude of improvement were used to analysis the data for significant difference. The confidence interval was fixed at 0.05 level.

DISCUSSION ON RESULTS

Summary of Dependent t-ratio and Magnitude of Improvement of Pre & Post Test data on Speed, Power & Ball Controlling Ability of Women Footballers

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre – test</th>
<th>Post – test</th>
<th>t-ratio</th>
<th>M.I.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Speed</td>
<td>6.6</td>
<td>6.3</td>
<td>5.39*</td>
<td>4.5%</td>
</tr>
<tr>
<td>Power</td>
<td>38.45</td>
<td>42.15</td>
<td>7.14*</td>
<td>10.2%</td>
</tr>
<tr>
<td>Ball Controlling Ability</td>
<td>55.26</td>
<td>58.74</td>
<td>6.88</td>
<td>5.9%</td>
</tr>
</tbody>
</table>

*Significant at 0.05 level. Table value required for significance with df 15 if 2.14.

The obtained t-ratio values of speed, power and ball controlling ability are 5.39, 7.14 and 6.88 respectively which are greater than the table value of 2.14 at 0.05 level of confidence. Them a gnitude of improvement of speed, power and ball controlling ability are 4.5%, 10.2% and 5.9% respectively due to the influence of plyometric training over 12 weeks.

CONCLUSION

It is inferred that plyometric training had significantly influenced on selected criterion variables, such as speed, power and ball controlling ability which are the basis for Women Footballers.

RECOMMENDATION

It is recommended from the result of the study that plyometric training should be included in the preparation of soccer players for higher performance.
REFERENCES

INFLUENCE OF FIELD TRAINING WITH AND WITHOUT YOGA PRACTICE ON SELECTED SKILL OF VOLLEYBALL PLAYERS

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ABSTRACT

The objective of the study was to investigate the influence of game-specific training on selected skill performance parameters of college-level Volleyballs players. Forty eight male college-level Volleyballs were randomly selected from various affiliated colleges of Saurashtra University and their age was 18 and 25 years. Initially the Volleyball playing ability of the subjects were rated by four qualified coaches and the bases of the score the subjects were classified into three matches group, each having sixteen subjects. Group-I: Control Group was not exposed to any specific training Group-II: Training schedule without yogic practice was involved in game specific field training and Group-III: Training schedule with yogic Practice was given game-specific field training combined with yogic practice. The game specific field training schedule was specially designed to improve the Volleyball playing ability and fitness level of the Volleyball Players. The game specific training package designed by the investigator was administered for a period of twelve weeks, five day a week, two sessions each day, each session lasting two hoarse. The yogic practice was given for 45 minutes to Group-III either before or after the game-specific field Training. The Pre and post tests were conducted one day before and after the experimental treatment. Analysis of covariance was used to analyze the collected data. Scheffe’s test was used as a post hoc test to determine which of then paired means differed significantly.

Key word: Training, Yoga, Volleyball, Performance

INTRODUCTION

Yogic practice is an Indian method of exercise which has been practiced over thousands of years to keep the human body physically and mentally fit. Bera (1991) reported that Yogic training improves Performance in track and field. The Indian Hockey team, prior to 1996 champions Trophy, was given Yogic Practice at Coimbatore.

The purpose of the study was to compare the influence of training whith and without selected Yogic practice on the skill level of Volleyballs.
METHOD

Forty-eight Volleyballs of Inter-Collegiate level from Saurashtra University were selected as subjects and their age ranged from 18 to 25 years. They were divided into three groups, in which each group containing 16 Players. By using the match procedure on the basis of their initial test performance score, subjects were divided into three equal groups.

EXPERIMENTAL DESIGN

Random design was used

Group-I: Control Group

Group-II: Training schedule without Yogic practice.

Group-III: Training schedule with Yogic practice

Treatment

The Experimental for Group-II and III was given for 12 weeks, 5 days per week. Group-I acted as control group and was not exposed to any specific training or conditioning, but they were playing Inter-Collegiate matches at least once in 2 weeks. A training schedule, which was specially designed to improve the Volleyball playing ability and fitness components essential for a Volleyball were formulated. The training was given to Group-II and III for two sessions each day and each session lasting for about two hours. Selected Yogic practice was given to the subjects of Group-III for 45 minutes in the morning in either before or after training.

In yogic practice following formed

(A)ASANA:
12.Savasana, 13.Yogamudra,

(B)PRANAYAMA:
1.Ujjai
2.sitali
(C) MEDITATION:
1. Breath counting meditation
2. Mantra méditation

DATA COLLECTION:

Three judges, who are trained Volleyball coaches, recorded the performance of the subjects during the pre and post-tests. The investigator giver guidelines to the Coaches for subjective rating of performance. The technical skill level was recorded in points. A maximum of 5 points each were awarded for techniques and improvisation as shown in the rating scale in tables 1& 2.

**TABLE - 1**

**RATING SCALE**

<table>
<thead>
<tr>
<th>ATTACKING</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technique</td>
</tr>
<tr>
<td>1. Stance</td>
<td>1</td>
</tr>
<tr>
<td>2. Steps</td>
<td>1</td>
</tr>
<tr>
<td>3. Take off</td>
<td>1</td>
</tr>
<tr>
<td>4. Hit</td>
<td>1</td>
</tr>
<tr>
<td>5. Landing</td>
<td>1</td>
</tr>
</tbody>
</table>

**TABLE - 2**

<table>
<thead>
<tr>
<th>DIFENCING</th>
<th>POINTS</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Technique</td>
</tr>
<tr>
<td>1. Stance</td>
<td>1</td>
</tr>
<tr>
<td>2. Hands Position</td>
<td>2</td>
</tr>
<tr>
<td>3. Leg Movement</td>
<td>2</td>
</tr>
</tbody>
</table>

The score ranged from 1 to 10. The average of score from four judges for each subject was recorded as individual performance score.
To study the outcome between control group-I group-II : training schedule without Yogic Practice Group-III: Training schedule with yogic practice and to find out the significant mean differences, the analysis of Co-Variance technique was employed.

RESULTS AND DISCUSSION

TABLE - 3

COMPARISON OF PRE-TEST AND POST-TEST PERFORMANCE

<table>
<thead>
<tr>
<th>Group</th>
<th>Pre-Test Mean</th>
<th>Pre-Test S.D.</th>
<th>Post-Test Mean</th>
<th>Post-Test S.D.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group - I Control</td>
<td>5.0012</td>
<td>1.29402</td>
<td>5.0562</td>
<td>1.01717</td>
</tr>
<tr>
<td>Group - II (Experimental-I)</td>
<td>5.0938</td>
<td>1.19970</td>
<td>6.4625</td>
<td>0.99323</td>
</tr>
<tr>
<td>Group - III (Experimental-II)</td>
<td>5.0313</td>
<td>1.19929</td>
<td>7.2562</td>
<td>1.15699</td>
</tr>
</tbody>
</table>

Summarized in Table-3. in control group-1 there was no significant difference in pre-test and post-test in skill level. The table also revels significant difference in Group-II and III. After training with and without Yogic practice both Group -II and III improved their technical skill level significantly, but the percentage of improvement was batter in training with Yogic practice group. The analysis of data in Table-4 shows that there is a significant mean difference among the three groups.

TABLE - 4

ANALYSIS OF VARIANCE OF THE MEAN DIFFRENCE OF EXPERIMENTAL GROUP AND CONTROL GROUP IN POST TEST

<table>
<thead>
<tr>
<th>Test</th>
<th>Source of Variance</th>
<th>df</th>
<th>Sum of square</th>
<th>Mean sum of square</th>
<th>‘F’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Initial</td>
<td>Between the groups</td>
<td>2</td>
<td>0.198</td>
<td>0.099</td>
<td>0.065</td>
</tr>
<tr>
<td></td>
<td>within the group</td>
<td>45</td>
<td>68.281</td>
<td>1.517</td>
<td></td>
</tr>
<tr>
<td>Final</td>
<td>Between the groups</td>
<td>4</td>
<td>39.720</td>
<td>19.860</td>
<td>17.734*</td>
</tr>
<tr>
<td></td>
<td>within the group</td>
<td>45</td>
<td>50.396</td>
<td>1.120</td>
<td></td>
</tr>
</tbody>
</table>

Significant at 0.05 level of confidence F (2, 45) = 3.21
In Table-4 the result of One-Way ANOVA of initial and final test scores are presented. From the table it can be seen that the calculated “F” value of 0.065 for the initial test is insignificant (P>0.05). The calculated F value of 17.734 for the final test is greater than the table value of 3.21 indicated that it is significant at 0.05 level (P<0.05). Since the F value for the final test is significant the ANCOVA was computed.

**TABLE - 5**

**ANALYSIS OF CO-VARIANCE THE MEAN DIFFERENCE OF EXPERIMENTAL GROUP AND CONTROL GROUP**

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>Sum of square</th>
<th>Mean sum of square</th>
<th>‘F’ value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between the groups within the group</td>
<td>2</td>
<td>37.470</td>
<td>18.735</td>
<td>28.672*</td>
</tr>
<tr>
<td></td>
<td>44</td>
<td>28.751</td>
<td>0.653</td>
<td></td>
</tr>
</tbody>
</table>

*P<0.05 Significant at 0.05 level of confidence F (2, 45) = 3.21

In the above table the analysis of data and the result of the ANCOVA for the skills are presented. In the analysis of co-variance the final means of three groups were tested for significance.

**TABLE-6**

**SCHAFFER’S POST-HOC TEST**

<table>
<thead>
<tr>
<th>CONTROL GROUP</th>
<th>Training without Yogic Practice</th>
<th>Training with Yogic Practice</th>
<th>MD</th>
<th>CI</th>
</tr>
</thead>
<tbody>
<tr>
<td>5.103</td>
<td>6.421</td>
<td>-----</td>
<td>1.318</td>
<td>0.286</td>
</tr>
<tr>
<td>5.103</td>
<td>------</td>
<td>7.250</td>
<td>2.147</td>
<td></td>
</tr>
<tr>
<td>------</td>
<td>6.421</td>
<td>7.250</td>
<td>0.829</td>
<td></td>
</tr>
</tbody>
</table>

In Table-6 the result of Scheffe’s Post-hoc test are presented. From this table, it can be seen that the mean difference of Experiment group-II is superior than that of the Experimental group-I and the control group.
THE MEAN VALUES OF PRE, POST AND ADJUSTED POST TEST DATA ON SELECTED SKILLS OF EXPERIMENTAL AND CONTROL GROUPS

The result of the study indicate that selected skills of the training with Yogic practice group improved significantly when compared to other groups by undergoing training with yogic practice program for 12 weeks. Hence, the study indicate that 12 weeks of training with yogic practice had improved Volleyball playing ability skill level of Volleyball Players. At the same time, Training without yogic practice group showed considerable improvement, when it was compared to the control group.

CONCLUSION

From the above finding, discussion and within the limitation of the present study the following conclusion are drawn:

1. There was significant improvement in skill level
2. Training with Yogic practice showed more improvement in skill level.

REFERENCES

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8. www.teamusa.org/usa-volleyball/highperformance/hp-indoor
REACHING WELLNESS THROUGH LIFESTYLE MANAGEMENT

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ABSTRACT

In modern era here of a fit and well lifestyle may seem complex and out of reach to you right now. Many people fall into a life style that puts them at risk. Some are not aware of the damage they’re doing, others don’t want to or know how to change, and still others want to change but can’t seem to get started. These are all very real problems, but they are not insurmountable. If they were, there would be no ex-smokers, recovering alcoholics, or people who have successfully lost exercise body weight. People can and do make difficult changes in their lives. What are the important components of successful lifestyle management? First knowledge is required and also need know about yourself, our strength, weakness and conditions or diseases at risk and then you need specific information about how to make lasting changes in our life and manage through Life management. Life style management, internal locus of control is an advantage because it reinforces motivational and commitment. An external locus of control can actually sabotage effort to change behavior. This article investigates the characteristics of wellness programs through lifestyle management.

Key words: Lifestyle, Wellness, Health, Exercise

INTRODUCTION

Looking a head

An out of shape college students begins riding her bike across town instead of driving. A hard working business executive enrolls in a stress management seminar. A former smoker anticipates his impulse to start smoking again and joins a smoking - cessation support group. What do these people have in common? They’ve all made a commitment to take charge of their health.

Today many people are striving for optimal health. They are changing their diets, getting more exercise, and having their blood pressure and cholesterol levels checked regularly. They realize that medical since can prolong their lives but that their own choices and behaviors determine how healthy and full those lives will be. They want not just to live long but also to live well -to be healthy throughout their entire lives (Figure 1)
Due to improved medical and environmental practice the average life expectancy of incised greatly during the twentieth century. - Source: Adapted from National center for health statistics. 1994 Healthy people 2000 review, DHHS Pub.

2. Wellness

As important as it is, Physical fitness is not the only components of good health. A person who gets enough exercise but smoke cigarettes, eat a high-fat diet, or drives under the influence of alcohol does not have a healthy lifestyle. The concept of wellness - optimal health and vital well being - includes physical fitness but also encompasses several other dimension (Figure 1 - 3). Wellness involves an awareness of all these dimensions, an understanding of their importance in well-being, and a conscious effort to develop and balance them. The following have been identified as important dimensions of wellness.

2.1 Physical: Maintaining the body’s health by eating well, exercising, avoiding unhealthy habits, making responsible decisions about sex, being aware of the symptoms of disease, having regular checkups, and taking steps to prevent injuries.

2.2 Emotional: Maintaining a positive self-concept, dealing constructively with feelings, developing such qualities as optimism, trust, and self-confidence.

2.3 Intellectual: Keeping an active, curious, open mind with the ability to think critically about issues, pose question, identify problems, and find solution.

2.4 Spiritual: Developing faith in something beyond yourself as well as the capacity for compassion, altruism, joy and forgiveness; finding meaning and purpose in life, whether through religion, meditation art, nature service to other, or some other practice.
2.5 Inter personal and social: Developing meaningful relationship, cultivating a network of supportive friends and family members, and contributing to the community

2.6 Environmental: Protecting yourself from environmental hazards and minimizing the negative impact of your behavior on the environment

3. Reaching wellness through lifestyle management:

What are the important components of successful lifestyle management? First Knowledge is required. You need facts and information about health and wellness, answer to basic question: How much fat should you eat? How much you exercise will keep your heart and lungs healthy? What are the risks of not wearing a seat belt? You also need knowledge about yourself what are your strength? And what is your weakness? Finally, you need specific information about how to make lasting changes in your life.

For lifestyle management, an internal locus control is an advantage because it reinforces motivation and commitment. An external locus of control can actually sabotage efforts to change behavior. Once you have the knowledge, Motivation and commitment, behavioral self-management techniques will give you the means to change your behavior.


What follows is a Self- management model that you can apply to behaviors you want to change. The key to success in this six-step approach is to be both consistent and persistent. Don’t skip steps or rush through. You may think you know everything there is to know about your behavior, for example, but people are almost always surprised by patterns they discover through this plan.
4.1 Monitor your behavior, and gather data.

Bagging by isolating a target behavior that you wish to change. Concentrate on one behavior at a time making even a few small changes in your life requires energy and effort.

4.2 Examine the data, and identify patterns

Now examine your records to discover patterns. When are you most likely to eat a candy bar? What events seem to trigger your desire for candy? What are you doing? Who are you with? Note any connections between your feelings and environmental factors, such as time of day, location, and the action of other around you.

4.3 Set specific goal:

Whatever your ultimate goal it’s a good idea to break it down into a few small steps. Your plan will seem more manageable. Incising to likelihood that you will stick with it. Breaking it down into piece will also give you milestone.

4.4 Make a Personal contract:

Once you have set your goals, prepare a personal contract. A serious personal contract clearly states your objective and your commitment to reach it. You may include detail of your plan, such as the date you’ll begin and the date you expect to reach your goal.

RESULTS AND DISCUSSION

Health consists of five components: Physical, social, mental, emotional, and spiritual. Physical fitness is one component of physical health, albeit an important.

Wellness is maintaining the components of health in sufficient amounts and in balance with one another. An ideal state of wellness is one in which no signal components of health is emphasized at the expense of any other components.

Physical fitness encompasses cardiorespiratory endurance, muscular strength and many components.

Many people fall into a lifestyle that puts them at risk. Some are not aware of the damage they’re doing, others don’t want to or know how to change, and still others want to change but can’t seem to get started. These are all very real problems, but they are not insurmountable.

CONCLUSION

This paper will introduce you to the main components of a fit and well lifestyle, show you how to assess your current health status and help you put together a program that will lead to
wellness. Moreover it is difficult to control every aspect of your health. You can take charge of your health in a dramatic and meaningful way. FIT AND WILL SHOW YOU HOW

REFERENCES

A STUDY OF SELF CONTROL BETWEEN MALE AND FEMALE SPORTS PERSONS

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ABSTRACT

Aim: The purpose of this study is to find the relation between age, self-control among male and female sports persons of Mansa District. Method: For present research work the sample was taken from all sports events from Mansa District (Punjab) Total 50 male sports persons were taken. The subjects were selected randomly from Mansa district. Tools.- Self-control level was measured using 10 items questionnaire developed by Tangney, J.P., Baumeister, R.F., Boone, A.L.[6]. (2004). Statistical Analysis: To find out the relationship among the research variables exists or not, t-test was used to test the significance of difference between the means. Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean. Data was analysed using SPSS (statistical package for the social sciences). Statistical significance was set at p < 0.05.

Results and Discussion: significant differences exist between male and female sports persons in self-control at p<0.5 level. No significant differences exist between male and female sports persons at the variable of age. Conclusion: From the above discussion we can conclude that as the sports person gain experience through competition and training his self-esteem increase and he learn how to control anxiety level.

Keywords: Self-control, Trait, State, Sports

INTRODUCTION

Self-control is defined as the ability to manage your actions, feelings and emotions. Self-control is the quality that allows you to stop yourself from doing things you want to do but that might not be in your best interest. For example, without self-control, you might bubble and bane non-stop. Researchers vary in their conceptualizations of self-control, defining it as the ability to delay gratification (Metcalfe & Mischel[3], 1999; Mischel, Shoda, & Rodriguez,[1] 1989), resist temptations (Fudenberg & Levine[11], 2006), overcome impulses (Hofmann, Friese, & Strack[10], 2009), avoid procrastination (Ariely & Wertnbroch[5], 2002), or override short-term goals which block long-term goals (Fishbach & Shah[9], 2006; Hofmann et al., 2009[12]; Muraven & Baumeister[4], 2000). Self-control is of two types, the first type of self-control is state self-control and second type of self-control is trait self-control. State self-control can fluctuate with the passage of time and is an exhaustible behavior but trait self-control is a part of personality and is stable
within one individual behavior. Studies show that high trait self-control is a predictor of performing self-control related behavior (De Ridder et al.,[14] 2012) and especially for behavior that is related to a successful life (Tangney et al.,[6] 2004). People high in trait self-control may be tempted as much as people with low trait self-control but they are better in resisting to act on those temptations (Hofmann & Friese, [12] 2009). Self-control can be managed by controlling these two components i.e. anxiety and anger because these two factors helps in losing the self-control. Anxiety and anger when controlled helps the athletes to focus for positive results. To boost self-control one must avoid high enticement situation further self-control can also be encouraged by inducting positiveness in behaviour, promoting self-directed motivation for task engagement, reaffirming long-term destinations and higher-order values, and taking breaks or engaging in relaxation between self-control tasks. Physiologically self-control can be boosted by controlling blood level glucose.

Self-control not only helps in focusing on goal but also helps in developing social relations, an athlete having trait self-control develops friendly relationship with society because he can control his anger, aggression, anxiety and arousal etc. according to the situation in the sports and in the society. So a sportsman having trait self-control can performs better in life and can achieve high than the state self-control so self-control is very essential in all walks of life.

Aim of the Study: The purpose of this study is to find the relation between age, self-control among male and female sports persons of Mansa District.

METHOD

Sample- For present research work a sample of 50 male sports persons and 50 female sports women were taken randomly from all games and sports events from Mansa District.

Limitation- The study is limited to Mansa District only.

Tools
To measure self-control Tangney, J.P., Baumeister, R.F., Boone, A.L. (2004). 10-Item Self-Scoring Self-Control Scale was used to measure the self-control among sports persons.

Administration of Test
Questionnaire schedule was distributed among sports persons and the purpose of the test was explained to the sports persons any difficulty in filling the questionnaire was sought out, the scoring pattern was explained to the sports persons. After completing the test the questionnaire schedules were collected for scoring.

Scoring
Self-control questionnaire consist of 10 Items, All items are answered using a 5-point Likert scale format ranging from not like me to very much like me. Giving not like me 5 point, A little like
me 4 points, some what like me 3 points, mostly like me 2 points and very much like me 1 points. Question no 4, 5 and 6 are reverse scored. Next, add up all the points for the checked boxes and divide by 10. The maximum score on this scale is 5 (extremely self-controlled), and the lowest scale on this scale is 1 (not at all self-controlled).

**Statistical Analysis** –

To find out the relationship among the research variables exists or not, t-test was used to test the significance of difference between the means. Statistics for each characteristic were calculated; Mean, Standard deviation, Standard error of Mean. Data was analyzed using SPSS (statistical package for the social sciences). Statistical significance was set at p < 0.05.

**RESULT AND DISCUSSION**

Table-1, Shown **Self Control level between Male and Female sportspersons**

<table>
<thead>
<tr>
<th></th>
<th>Male</th>
<th>Female</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Mean</td>
<td>SD</td>
</tr>
<tr>
<td>Age</td>
<td>21.06</td>
<td>3.11</td>
</tr>
<tr>
<td>Self-control</td>
<td>3.58</td>
<td>0.70</td>
</tr>
</tbody>
</table>

P<0.5

The results of the above table shows the mean value of male age is 21.06 and of female sports persons is 21.72 showing t-value 1.26, no significant difference exist between the two variables. In case of self-control the male shows less mean value 3.58 as compared to female sportsperson showing mean value of 3.87 showing significant t-value of 2.50 at P<0.5. The results reveals that female sports person shows more self-control as compared to male sports person shows that female were more focussed and had better control over anger and anxiety than male sportspersons. The results of Gottfredson and Hirschi\(^2\) (1990) predict that females will have higher levels of self-control. Indeed, research has consistently supported the claim that females have higher self-control than males (Blackwell & Piquero,\(^7\) 2005; Gibson, Ward, Wright, Beaver, & DeLisi\(^{13}\), 2010; Hope & Chapple\(^8\), 2005). Supports the results of above study. Female sports women were more shows more self-control the reason being natural instinct and social brought up of females this helps the female sports persons to focus on aim and better control on emotions during competition.

**CONCLUSION**

From the above study following conclusions were drawn. Non-significant differences exists on the variable of age among male and female sports persons. Significant difference exist at P<0.5 level on the variable of self-control between male and female sports persons.
REFERENCES

INFLUENCE OF YOGIC INTERVENTION ON COGNITIVE ABILITY AMONG ENGINEERING VARSITY STUDENTS

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akilandeswarikanagaraj@gmail.com

ABSTRACT

Background: Yoga is a physical as well as a mental exercise which provides a broader benefit to enhance the cognitive ability. Aim: The aim of the study was to evaluate the influence of yogic intervention on cognitive ability among engineering varsity students. Method: To achieve the purpose of the study 100 healthy Engineering students from Avinashilingam Institute for Home Science and Higher Education for Women, Coimbatore, Tamil Naidu, India were randomly selected of the age between 17 – 25 years. The experimental group was trained Yoga techniques for 8 weeks. Pre test and Post were conducted using Post Graduate Institute Memory Scale (PGIMS) and they were assessed in their memory and concentration. Result and Discussion: The results showed statistically significant improvement in memory and concentration of experimental group (P < 0.001) when compared with the control group. Conclusion: This study concludes that there was a significant improvement after the Yogic intervention in cognitive ability. There are also changes in personality development, coping skills easily, reduction in mind wavering due to yogic training.

Key words: Yoga, memory, concentration and Post Graduate Institute Memory Scale.

INTRODUCTION

In recent days, health issues become common in all age groups from childhood to old hood. Due to fastest routine life style and unhealthy food habits humans are towards so many health issues not only physically and also mutually. Today, the younger generation are very much conscious in their future but not on their health. Naturally, anxiety, stress, mental tensions become the permanent emotional problem of engineering students especially among the girls which leads to depression, lack of memory and concentration. Yoga is an intervention to relax and develops the cognitive ability. Yoga in anxiety scientific way of life which included postures, meditation, Pranayama and changing Yoga can be done to focusing on mental resources by providing broader benefit than memory training and also helped with mood, anxiety and coping skills. It was proved that yoga has positive impact on mental health and well-being and increases the ability to concentrate, and improve memory. Brain power and its functions are related with different cognitive process and associated with yoga practices. Yoga and meditation are the best way to would my person in their behavior, lifestyle, mind body and spirit. Researches have done by discovering the impact of practicing yoga regularly has significantly proven in impending remunerations in cognitive ability. Various studies and results have ascertained the yogic intervention a solution for so many psychological problems. Same studies recommended that both physical and mental well-being in possible only with the relationship between the physical
and cognitive ability among the students. Cognitive components were assessed are memory and concentration. These are the essential component of the administrative function of the brain. It forms with planning, abstract thinking and task coordination. This study has focused to find out the role of yoga on the improvement of memory and concentration. The purpose of this study was to evaluate the influence of yogic intervention on cognitive ability among engineering varsity students.

METHOD

To achieve the purpose the study 100 healthy engineering students from Avinashilingam Institute for Home Science and Higher Education for Women were randomly selected of the age between 17 - 25 years. The participants who had neurological diseases were excluded from the study. The study design was oriented to the participants and made them aware of the yogic program of their participation, with the assurance of their personal data will be confidential. Yoga schedule was implemented daily for 45 minutes in the morning session for 8 weeks.

STUDY DESIGN

The participants were divided into experimental group and control group consists of 50 in each group. Post Graduate Institute Memory Scale Questionnaire was briefed to them. Participants have reported to the Department of Physical Education for the assessment. The data were collected before and after intervention to all the participants (n=100).

INTERVENTION

The students were oriented and trained for 1 week before the intervention. They undergone the training program with the assistance of Yoga trainer for about 45 minutes, for 5 days a week, and for a duration for 8 weeks. Training schedule includes Om Chanting, Super brain Yoga, Surya Namaskar, Pranayama and Meditation.

STATISTICAL ANALYSIS:

A collected data of Pre and Post Intervention between experimental and Control group was carried out by paired ‘t’ test in SPPS statistical software package.

RESULTS AND DISCUSSION

Pre and Post intervention scores between Experimental group and Control group in memory and concentration was done using paired ‘t’ test. The results along with mean and standard deviation which shows significant improvement in memory and concentration of about t=3.601 which gives P < 0.01 and t = 4.137 which gives P<0.001 respectively. The control group results insignificant improvement at 0.05 level.
### Table – 1
Control Group

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean± SD</th>
<th>‘t’ Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Test</td>
<td>Post Test</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>9.23 ± 1.05</td>
<td>9.50 ± 1.00</td>
<td>1.26</td>
</tr>
<tr>
<td>Concentration</td>
<td>17.01 ± 2.55</td>
<td>16.59 ± 2.54</td>
<td>1.78</td>
</tr>
</tbody>
</table>

Insignificant at 0.05 level.

### Table – 2
Experimental Group

<table>
<thead>
<tr>
<th>Component</th>
<th>Mean± SD</th>
<th>‘t’ Value</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pre Test</td>
<td>Post Test</td>
<td></td>
</tr>
<tr>
<td>Memory</td>
<td>10.56 ± 1.02</td>
<td>11.01 ± 1.09</td>
<td>3.601</td>
</tr>
<tr>
<td>Concentration</td>
<td>17.09 ± 2.60</td>
<td>19.10 ± 3.00</td>
<td>4.137</td>
</tr>
</tbody>
</table>

Significant at P<0.01 level

### DISCUSSION

The result suggests that the group practiced Yoga had a significant improvement in memory and concentration when compared to Control group. It may be due to yoga there is a self-discipline, behavior, enhanced memory and concentration.

A study shows that practicing Yoga and meditation leads to higher level of reification that results in growth and allows the brain to process the information rapidly. There are studies which have shown that the Yoga practice promotes attention on breathing and specific muscles in the body.

Yoga aids to stimulate the sensitivity of Postsynaptic membrane and effective inhibition of distracting signals. Moreover another study reveals that Yoga leads a person to learn and control conscious thoughts for better concentration.

Memory and concentration are the main cognitive components for brilliant performance and it is possible through Yogic intervention which is very well proved in this study. This improvement can be attaining with proper activation of neural pathways and release of neurotransmitters.
CONCLUSION

This study was concluded that daily Yoga practice helps to improve memory and concentration of engineering students. The researcher also suggests that Yoga is the best approach for the current educational settings. The result may also considered with few study limitations and may further implemented with many more methods and for different group.

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SWIMMING: AS ONE OF THE BEST PHYSICAL ACTIVITY FOR BETTER LIFESTYLE MANAGEMENT

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ABSTRACT

The purpose of present research work is to highlight swimming as one of the best-suggested forms of physical activity. The researcher studied the literature and the research’s conducted by leading countries in swimming. The investigator during her Master’s & M.Phil research work/dissertation conducted a survey study which highlighted the importance of physical activity and lifestyle management through swimming. Swimming as a sport has evolved over centuries and the science has contributed in a big way. As we are aware that WHO has declared physical inactivity as global public health problem. This bring in the scope for all sports scientist, physical educationist and all allied area associates to experiment, evolves and suggest the best possible ways to eradicate physical inactivity from society. Few developed countries have Physical activity & lifestyle management professors in all prestigious universities that highlight the importance given to this area of work in the field of Physical Education & sports Sciences field. We in India certainly have a long way to go. The research paper brings out how swimming is one of the best suggested forms for physical activity and lifestyle management.

Key words: Swimming, Health, Fitness and physical activity.

INTRODUCTION

Our country India is on the path of progress & development surely the economy has grown the GDP is gone up but on the other side the health & fitness parameters are going down and physical inactivity now is looked as Global Public Health Problem. Our country which is looked as an young nation where the nation is having more than 60% of the population (18-40 year) is struggling to keep with the health of citizens. Physical inactivity, (a lack of physical activity) is an independent risk factor for chronic diseases, and overall is estimated to cause 1.9 million deaths globally. Regular physical activity – such as walking, cycling, or dancing – has significant benefits for health. For instance, it can reduce the risk of cardiovascular disease, diabetes and osteoporosis, help control weight, and promote psychological well-being and leads to better lifestyle management. One of the necessities of life is water. The habitation started and expanded around the water bodies to ensure availability of water. Civilization developed being surrounded by water, which forced the mankind to learn swimming for “Health, Pleasure and Safety” purposes. Now-a-days, swimming is a popular water sports activity, which attracts the attention of masses throughout the world. The swimming as a sport has gained popularity with the passage of time, because the quest for speed gave new dimension to swimming and has brought about revolutionary changes in the swimming style in the past two and one half centuries and it is on the path of further advancements.
The improvement in swimming is brought about mainly by the refinement of technique. The techniques used by the swimmers today are not to be considered ultimate refinement as the scope of improvement is always there. No doubt, the application of the scientific methods and related allied disciplines of sports sciences like: Exercise Physiology, Kinesiology, Biomechanics, Kinentropometry, Sports Medicine and Sports Training which is contributory factors to refine the potentiality but on the other side the increased availability of infrastructure also enhanced the positive diversion of the society towards swimming and contributes towards wellbeing of an Individual.

METHOD

The presenter has been an International swimmer of her time and has done several research works on swimming, has studied and kept pace with developments made nationally & internationally with regard to swimming. Based on her previous research work and data collected & analyzed she would like to recommend swimming as one of the best form of physical activity for Better Lifestyle Management

RESULTS, RECOMMENDATIONS & DISCUSSIONS

All over world highly recommended is that everyone should engage in at least 30 minutes of moderate physical activity every day.

Swimming as a sport has been progressive in our country but the pace is slow and debatable but its benefits cannot be ruled out and is suggested as one of the best physical exercise.

Swimming helps maintain the blood pressure and cholesterol of a person, thus ensuring the well-being of his/her heart.

Swimming is a non-weight-bearing sport," says Dr. Ronald W. Davidson, a New York City general practitioner. "You can actually move your arms and legs without the problem of gravity.

At times what movements you can do in a swimming pool cannot be done on land. Swimming is perfect for those people who have a hard time carrying out weight-bearing, land-based physical activities.

This is because your weight in water is about 1/10 of your weight on land. You feel lighter. Swimming minimizes the risk of injuries from physical activity.
It is good for the health of your lungs and also reduces the risk of stroke, heart attack and diabetes. Doctors recommend that indulging in swimming can help post-surgery patients, the heart patients and those who adopt an otherwise sedentary lifestyle to avoid muscular atrophy.

Swimming enhances the flexibility of your joints and provides the scope for boosting your physical activity workout level. It not only helps you in the management of weight but offers you great variety of water related activity programmes like water aerobics.

The people who are suffering from arthritis and back pain problem who cannot indulge in a normal workout, can undertake swimming. Swimming has been associated with relieving the joint pains as well. It is found to have soothing effect on the mind as well as the body of a person, mainly by regulating breathing and stimulating circulation.

Further, research’s done on the disable or the people with weak muscles & limbs have shown improvement in the gaining of strength of weaker muscles.

With my own experience of teaching swimming to the differently abled students I noticed not only the gain of physical strength & stamina but I noticed tremendous sense of confidence and empowerment.

Swimming is also recommended as one of the safest modes of exercise for pregnant women. Researchers conducted indicate that you relieve and manage back pain during pregnancy and its low-impact too.

Moving on from the physical and physiological benefits to the psychological benefit of swimming, if you don’t control than & you allow it to occur.

Relax and swim with a very low effort. Let your mind wander, focusing on nothing but the rhythm of your stroke. This form of meditation can help you gain a feeling of well-being, leaving your water session refreshed and ready to go on with the rest of your day or swimming at the end of the day as well refreshes you and help in distressing.

Many swimmers find an in-direct benefit form swimming. They develop life skills such as sportsmanship, time-management, self-discipline, goal-setting, and an increased sense of self-worth through their participation in the sport.

CONCLUSION

As the study highlights the benefits of swimming and aqua therapy. Certainly one can say swimming is one of the best-suggested forms for physical activity and lifestyle management. Over the years slowly –
slowly from a seasonal sports swimming is gripping as all seasonal sport. Hope more and more people can enjoy the benefits from the sport and learn swimming for health, pleasure and safety.

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A STUDY ON THE LEVEL OF ANXIETY AND ADJUSTMENT OF MALE AND FEMALE KHO - KHO PLAYERS

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ABSTRACT

To find out, access and analyse the anxiety level among Kho – Kho players at Intercollegiate level between 18 -25 years of age. The data will be collected from the intercollegiate level Kho – Kho male and female participants. The test will be administered in standardized Sinha’s Anxiety Scale and Bell’s Adjustment Tests. The subjects were selected from different colleges those who participate in intercollegiate level Kho-Kho competition held at Arts Science and Commerce College Naldurg Dist. Osmanabad (M.S.) from 21 to 22 September 2018. The selected males and females players were in between the age group of 18 to 25 years approximately. The subjects were tested in anxiety and adjustment quality questionnaire through standard questionnaires. Much of the samples were collected from Dr. B. A. M. University, Aurangabad as they were representing their college which are located in the jurisdiction of the Dr. B. A. M. University. The scores are then entered individually in the forms provided accordingly.

Key Words: Test Anxiety, Adjustment, Kho-Kho Players,

INTRODUCTION

Kho- Kho is the most popular Indian game not only in Maharashtra but also in India. The Indian games are simple in nature, easy to organise, less expensive and common people also can participate. Hence Kho - Kho reaches to common people and both sex. Anxiety is an unpleasant state of inner turmoil, often accompanied by nervous behaviour, such as pacing back and forth, somatic complaints and rumination. It is the subjectively unpleasant feelings of dread over something unlikely to happen, such as the feeling of imminent death. Anxiety is not the same as fear, which is felt about something realistically intimidating or dangerous and is an appropriate response to a perceived threat; anxiety is a feeling of fear, worry, and uneasiness, usually generalized and unfocused as an overreaction to a situation that is only subjectively seen as menacing. It is often accompanied by restlessness, fatigue, problems in concentration, and muscular tension. Anxiety is not considered to be a normal reaction to a perceived stressor although many feel it occasionally. Tests and examinations are the way through which the academic achievements and accomplishments of the students have been measured in their formal education. It is an integral part of education as the certification of the students depends on it. In present era, the competition in every sphere of life makes it more essential and the students have to secure a good mark in their examination for their future accomplishments and success. Hence, numerous students feel anxious about their forthcoming examinations. The term ‘anxiety’ did
not gain currency in the psychological literature until the 1930’s (Sarbin, 1968). Anxiety is a response to threat (Campbell, 2004). Today, anxiety is a common phenomenon of everyday life. It plays a crucial role in human daily life because all of us are victim of anxiety in different ways (Goodstein and Lanyon, 1975). Anxiety is one of the most common psychological disorders in school-aged children and adolescents worldwide (Costello, Mustillo, Erkanli, Keeler & Angold, 2003). Anxiety is an emotional and behavioural disorders caused by the activation of sympathetic nervous system (Rao, 2014) under the autonomic nervous system (MacIntyre and Gardner, 1991) in our body. Anxiety is a complex and multidimensional phenomenon (Rao, 2014) and can be defined as a “Subjective feeling of tension, apprehension, nervousness and worry associated with an arousal of the automatic nervous system” (MacIntyre and Gardner, 1991). There are different forms and different symptoms of anxiety. Test anxiety is a notable form of anxiety. Adjustment is an important phenomenon in the life of human being (Verma & Kumari, 2016). The world is always change with diverges (Tamannaeifar & Nezhad, 2014). Each and every individual is required to adapt and adjust to these diverge changes in order to benefit a balanced life (Tamannaeifar & Nezhad, 2014) in better ways. The term adjustment is often used as adaption and accommodation (Thakur and Modi 2014) which is a popular expression used by people (Makwana and Kaji, 2014) in our daily life to physical environment as well as to social, emotional and so on. Adjustment is the person’s level of psychological adaptation, settlement in his or her surrounding environment. Adjustment is a continuous process (Verma & Kumari, 2016; Revika, 2013) by which a living organism maintains a balance between the needs and the Circumstances (Taviyad & Patel, 2014). Adjustment as a stable condition of life when each and every human being is more or less in harmony with personal, biological, emotional, psychological, social and educational needs and with the demands of the atmosphere (Alam & Halder, 2017). Gates and Jersild (1970) defined adjustment as a continual process in which a person varies his behaviour to produce a more harmonic relationship between himself and his environment. Adjustment: In psychology, adjustment is studied especially in abnormal psychology and also in social psychology. In our daily life there has been a continuous struggle between the needs of the individual and the external forces, since time immemorial. According to Darwin’s theory of evolution those species which adapted successfully to the demands of living survived and multiplied while who did not died. Therefore adaptation or changing of if one self or one’s surroundings according to the demands of external environment became the basic need for our survival. It is as true today with all of us as it was with Darwin’s primitive species. Adjustment generally refers to the modification to compensate for to meet special conditions. In the dictionary the term adjustment means to fit, make suitable, adapt, arrange, modify, harmonize or make correspondence. Whenever we make an adjustment between two things adapt or modify one of both or both to correspond to each other. For example wearing of clothes according to the requirement of the seasons is an example of adjustment. We modify our self according to seasons because we cannot modify the seasons, before understanding the adjustment as a process it is necessary to examine some of the definitions of adjustment given by the researchers.

METHOD
The data will be collected from the intercollegiate level Kho - Kho male and female participants. The test will be administered in standardized Sinha’s Anxiety Scale and Bell’s Adjustment Tests. Overall 150 students are considered for data collection. The subjects were selected from different colleges those who participate in intercollegiate level Kho-Kho competition held at Arts Science and Commerce College Naldurg Dist. Osmanabad (M.S.) from 21 to 22 September 2018. The selected males and females players were in between the age group of 18 to 25 years approximately. The subjects were tested in anxiety and adjustment quality questionnaire through standard questionnaires. Much of the samples were collected from Dr. B. A. M. University, Aurangabad as they were representing their college which are located in the jurisdiction of the Dr. B. A. M. University. The scores are then entered individually in the forms provided accordingly.

**Coding procedure:**
Male Kho - Kho players – M -101 to M -175
Female Kho - Kho players – F-201 to F-275

**VARIABLES:**

**Independent Variables:**
1. Sinha’s Anxiety test;
2. Bell’s Adjustment Inventor;

**Dependent Variables:**
1. Kho – Kho players (Male and Female)

**TOOLS AND MEANS:**

(1) Sinha’s Anxiety Test:
In Sinha’s Anxiety Scale, for any response indicated as ‘yes’ the test would be awarded the score of one and zero for ‘no’ the sum of all the positive or ‘yes’ responses would be total anxiety score of the individual.

The test scores interpretation is:

<table>
<thead>
<tr>
<th>Males</th>
<th>Females</th>
<th>Interpretation</th>
</tr>
</thead>
<tbody>
<tr>
<td>30 - 69</td>
<td>29 - 71</td>
<td>Extremely high</td>
</tr>
<tr>
<td>28 - 29</td>
<td>27 - 28</td>
<td>High</td>
</tr>
<tr>
<td>17 - 23</td>
<td>20 - 25</td>
<td>Normal</td>
</tr>
<tr>
<td>14 - 15</td>
<td>15 - 16</td>
<td>Low</td>
</tr>
<tr>
<td>3 - 12</td>
<td>4 - 13</td>
<td>Extremely Low</td>
</tr>
</tbody>
</table>

(2) Bell’s Adjustment Questionnaire: Published by Agra Psychological Research Cell, Tiwari Kothi, Belanganj. Agra, India. Through this inventory, an attempt has been made to study your adjustment of different areas. Please give your answers without any hesitation, because your answer will be kept strictly confidential. If you agree with the content of question then put a mark
‘X’ in front the column of ‘Yes’ and if you feel disagreement than put a mark (X) in front of ‘No’ you have to answer of all questions. Please try to finish the work as early as possible.”

Name:  
Age:  

Name of School:  
Class:  

Rural / Urban:  

Description of the test:  

The original Bell’s Adjustment inventory was in English, and for the purpose of standardization in Indian conditions it was translated in Hindi by Dr. Mrs. Lalita Sharma. The Hindi version of the inventory consists of 80 statements which are related to 4 areas of adjustment.

<table>
<thead>
<tr>
<th>Area of Adjustment</th>
<th>Number of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>Home (Family)</td>
<td>21</td>
</tr>
<tr>
<td>Social</td>
<td>20</td>
</tr>
<tr>
<td>Emotional</td>
<td>21</td>
</tr>
<tr>
<td>Health</td>
<td>18</td>
</tr>
<tr>
<td>Total</td>
<td>80</td>
</tr>
</tbody>
</table>

Two categories of responses ‘yes’ or ‘no’ have been provided for answer to each item. Reliability of the present inventory was calculated both by split-half method and by test-retest method. Split-half and test-retest reliabilities are 0.927 and 0.897 respectively. The validity co-efficient was found to be very high i.e., 0.834.

Scoring and Results: the scoring of this inventory is simple which can be scored simply by counting the number of correct answers in each area of adjustment. High scores on the inventory indicate low adjustment, whereas low scores indicate high adjustment, in different areas of adjustment as well as adjustment taken as a whole. Scores are converted into percentile by referring the appropriate table in the manual.

RESULT AND DISCUSSION
Table 1 Indicate the Mean values and percentile obtained in different aspects of adjustment in 75 Male and 75 Female Kho – Kho intercollegiate level players. The mean and percentage distribution of Home, Social, Emotional and Health in the schematic design in figure 1

Table 2 Indicate the mean values and percentile obtained in anxiety level of 75 Male and 75 Female Kho – Kho intercollegiate level players in the jurisdiction of the Dr. B. A. M. University.

The raw score and percentage distribution on the table.

Table: 1, Mean values and percentile obtained in different aspects of adjustment in 75 Male and 75 Female Kho – Kho players

<table>
<thead>
<tr>
<th>ADJUSTMENT</th>
<th>HOME</th>
<th>SOCIAL</th>
<th>EMOTIONAL</th>
<th>HEALTH</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td>M-101 to M-175 &amp; F-201 to F-275</td>
<td>Mean 6.17</td>
<td>4.94</td>
<td>6.04</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td>Percentile</td>
<td>65</td>
<td>85</td>
<td>70</td>
<td>90</td>
</tr>
<tr>
<td>Male</td>
<td>Mean 6.17</td>
<td>4.8</td>
<td>6.37</td>
<td>3.92</td>
<td>21.26</td>
</tr>
<tr>
<td></td>
<td>Percentile</td>
<td>65</td>
<td>85</td>
<td>60</td>
<td>95</td>
</tr>
<tr>
<td>Female</td>
<td>Mean 6.17</td>
<td>4.94</td>
<td>6.04</td>
<td>4</td>
<td>21.16</td>
</tr>
<tr>
<td></td>
<td>Percentile</td>
<td>65</td>
<td>85</td>
<td>70</td>
<td>90</td>
</tr>
</tbody>
</table>

Table: 2, Mean values and percentile obtained in anxiety level of 75 Male and 75 Female Kho – Kho players

<table>
<thead>
<tr>
<th>Anxiety</th>
<th>GROUP</th>
<th>CODE</th>
<th>Raw Score</th>
<th>Percentile</th>
</tr>
</thead>
<tbody>
<tr>
<td>Male</td>
<td>Mean 13.14</td>
<td>15.66</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Female</td>
<td>Mean 16.16</td>
<td>17.42</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

CONCLUSION

1. All the above statements and values obtained it can be concluded that the correlation of adjustment among the Male and Female Kho – Kho players is very low and is insignificant.

2. The correlation value obtained in total adjustment among the Male and Female Kho – Kho players of is found 0.056 which is also very low.

3. The correlation values obtained of anxiety level among the Male and Female Kho – Kho school players is 0.0043 and percentile correlation value is -0.113 which is very low, hence it can be concluded that the correlation of anxiety level among the Male and Female Kho – Kho intercollegiate level players is insignificant.

4. There is high anxiety deference of Kho- Kho Female players in compared to Male Kho – Kho players.
RECOMMENDATIONS & SUGGESTIONS

The same study may be done considering other psychological characteristics which may also be responsible for the performance in Kho - Kho.

1. The study may also be implemented on the higher performing teams section of the same Inter University Level.
2. The same study may also be implemented in comparison with the achievement of the other University players.
3. The factors which are not matching the perfect psychological set up which in helpful in achieving the higher performance.
4. The findings of the study may find implications in enriching the other lacunas among the players and their mind set about anxiety and adjustment.

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INDIAN YOUTH IN SPORTS

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Key words: Youth, Sports, Performance, Fitness

INTRODUCTION
Youth being enthusiastic, vibrant, innovative and dynamic in nature is the most important section of the population. Youth shows strong passion, motivation and will power which also make them the most valuable human resource for fostering economic, cultural and political development of a nation. A country’s ability and potential for growth is determined by the size of its youth population. The energy and passion of the youth if utilized properly, can bring huge positive change to the society and progress to the nation. Youth are the creative digital innovators in their communities and participate as active citizens, eager to positively contribute to sustainable development. This section of the population need to be harnessed, motivated, skilled and streamlined properly to bring rapid progress for a country.

YOUTH CONCEPTS IN – INDIA AND THE WORLD
Conventionally, period from adolescence to middle age is termed as youth. However, National Youth Policy, 2014 modified it and defined ‘youth’ as persons in the age-group of 15-29 years. In the present report, we have adopted 15-34 years.

According to ‘World Population Prospects: The 2015 revision’ Population Database of United Nations Population Division, India has the world’s highest number of 10 to 24-year-olds, with 242 million—despite having a smaller population than China, which has 185 million young people.

India has the relative advantage at present over other countries in terms of distribution of youth population. As per India’s Census, the total youth population increased from 168 million in 1971 to 422 million in 2011. India is seen to remain younger longer than China and Indonesia, the two major countries other than India which determine the demographic features of Asia.

MAJOR ISSUES CONCERNING YOUTH
1. Education
Education is central to development and to the improvement of the lives of young people globally, and is needed to ensure that they acquire the knowledge, capacities, skills and ethical values needed to fulfill their role as agents of development, good governance, social inclusion, tolerance and peace. Knowledge and education are key factors to the full and effective participation of youth in the processes of social, economic and political development. Literacy rate in India reached 73% as per 2011 census.

2. Employment
Youth are the major seekers of employment as they traverse their journey of life from adolescent to youth. A significant proportion of youth take over the business of their family as heir apparent, but the major proportion of youth becomes the first time job-seekers and searches for economic opportunities as existing in their country of residence.

**3. Migration:** Young people may choose to move within their home countries as internal migrants or beyond their national borders as international migrants. The decision to migrate is often related to important life transitions, such as pursuing higher education, securing employment or getting married.

**4. Crime and Youth** Involvement of youth in crimes and social abuse like drug addiction etc. is the consequence of this failure. Although a majority of crimes are committed by youth by virtue of their large physical energy, there is no separate statistics for age wise segregation of criminals involved in serious crimes like murder, dacoit, theft etc.

**5. Sports:** Sport is one of the most popular activities among youth all over the world. The most popular sports are association football and swimming. Sport based youth development programs are wide range of learning and life skill development. youth Involvement in athletics encourages youth to live a healthy and happy lifestyle.

**SPORTS EDUCATION**

Physical Education is “Education through the physical”. It aims to develop students’ physical competence and knowledge of movement and safety, and their ability to use these to perform in a wide range of activities associated with the development of an active and healthy life style.

Quality physical education programs are needed to increase the physical competence, health-related fitness, self-responsibility and enjoyment of physical activity for all students so that they can be physically active for a lifetime.

**SPORTS FOR YOUTH**

Sports and recreational activities form an essential component of the growth and development of a young individual. Sports activities promote physical, mental and emotional growth. They help support a healthy lifestyle and ensure the youth are engaged and productive. Participation in sports can inculcate the spirit of competitiveness and teamwork which helps in the holistic development of the youth. Sports is increasingly being considered a viable professional option. Representing the country in international sporting events fosters national pride and helps inculcate a feeling of national unity and belonging amongst the youth.

Broad basing of sports: The government is working towards broad basing sports by providing access to sports facilities and coaching in both urban and rural areas.

- Panchayat Yuva Krida aur Khel Abhiyan (PYKKA)
- National Playing Fields Association of India (NPFAI)
National Institute of Sports (NIS) and Lakshmibai National Institute of Physical Education (LNIPE) provide academic courses at graduate and post graduate levels in the area of sports.

Promoting excellence in sports:

Centres of Excellence (COE), Special Area Games (SAG) and SAI Training Centre (STC) provide training facilities and a platform to promising young sports persons to participate in various local, national and international competitions. In addition, both the Central and State Governments provide incentives and awards to sports persons who excel at various levels.

All those athletes who are toiling with blood, sweat and tears to be at the top of their game and their sport, so that they can do their best for their nation on the world stage, and hopefully win some medals, so that India can raise its head proudly and it is a result of their, their families and coaches hard-work, dedication, and determination.

- Saina Nehwal is also known as the golden girl of Indian badminton. She has reached the zenith of sports by making it to the top three badminton players in the world.
- MC Mary Kom is also known as the “Million Rupee Baby” in India. This tough lady is a five-time boxing world champion and also has an Olympic Bronze medal.
- Mithali Dorai Raj is one of the best batters and is the highest run scorer in women’s international cricket. She is also the only woman to score more than 6000 runs in ODIs.
- Deepika Kumari, an ace archer, has a rating of World No. 2. This superstar won a gold medal at the 2010 Commonwealth Games

WHY WE (INDIANS) DISCOURAGE OUR CHILDREN FROM PLAYING SPORTS

As a rule, our society insists on children being pushed more towards academics than any other co-curricular. In such a scenario, sports fades into the background and just becomes a temporary hobby. In India, it is only for the first few years of a child’s life that the parents are enthusiastic about his/her involvement in sports. As soon as children near their 10th or 12th grade, they are pulled out of sports because it is seen as a diversion more than anything else. Parents do not think about the benefits that, Sports improve a person’s cognitive functions, train their mind to strategise, builds muscle memory and inspires concentration and team spirit. Ask anyone what they are expected to do after high school, and they will answer with either doctor, engineer, CA or MBA. Rare are the people who take the path less taken. This is because India does not take sports seriously. And we should. We really should.

ROLE OF GOVERNMENT IN SPORTS POLICY

Despite the efforts of various stakeholders to support the development of sports in the nation, significant progress must be made to reach the levels of participation and excellence of countries like China.

- Increase access to sports facilities and training
Access to sport and physical education opportunities still remains highly inadequate, especially in rural areas and the poorer parts of urban areas, setting up playgrounds and sports facilities especially in schools, colleges and community areas.
- Promotion of sports culture among youth
Current participation levels in sports activities are very low in India as compared to countries like China. A sports culture needs to be promoted among youth. The youth must be enabled to consider sports not just as recreational activity but also as potential career option. State Governments, educational boards and the National Cadet Corps (NCC) programme must be leveraged and further integration of sports into formal education system can be achieved by strengthening existing infrastructure.

- **Support and development for talented sports persons**
  A significant proportion of the youth, and hence the sporting talent of the nation, is in the rural areas. Therefore, it is imperative to develop robust models to identify and train high potential sportspersons in rural areas. Coordination and collaboration between SAI, various sports federations, state level organizations and local associations is required in order to achieve this goal.

- **Direct employment programmes for talented Athletes**
  The Government of India has to implement direct employment programmes for skilled individuals. There is need to place due emphasis on special requirements for the employment of talented Athletes.

- **Planning Commission**
  To develop Physical Health And Fitness of the youth it must implemented in five years plan because “Health for all”. It must introduced to inculcate sports culture at the grass-root level by encouraging the youth of village and district levels to participate in sports

**CONCLUSION:**

- Truly, the youth are the most important and dynamic segment of the population in any country. Sports is increasingly being considered a viable professional option.
- Representing the country in international sporting events fosters national pride and helps inculcate a feeling of national unity and belonging amongst the youth.
- Sports and life is about achieving one’s personal best. In addition, youth sports develop positive attributes including healthier lifestyles, self-esteem, fair play and good citizenship.
- Playing sports at a young age enables children to participate in social interactions and build skills such as teamwork, leadership, and responsibility as they learn to work with others to achieve a common goal.
- Playing sports teaches youth to control their emotions in all sorts of situations. They learn to show respect for their coaches and teammates not only when it’s easy because things are going well, but also when it’s hard because the game or practice is not going their way.

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3. The National Youth Policy, 2014 (NYP-2014)

4. Indian Youth
CORRELATION OF PSYCHOLOGICAL VARIABLES AND PLAYING ABILITY AMONG FOOTBALL PLAYERS AS A FUNCTION OF GENDER

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ABSTRACT

The purpose of the study was to find out psychological correlates of playing ability among football players as a function of gender. To achieve the purpose of this study the investigator selected 100 football players consisting of 50 men and women. The subjects were randomly selected from players who competed at intercollegiate level competitions held at Chennai. The selected subject’s age group were ranging from 19 to 25 years. Selected psychological Variable Team Cohesion was measured through Group Environment Questionnaire; Mental Toughness was measured through Sports Mental Toughness Questionnaire (SMTQ) and Subjects playing ability in football was assessed subjectively through three experts in football in a playing situation. To examine the relationship between playing ability in football and psychological variables, mental toughness and team cohesion simple correlation using Pearson Coefficient of Correlation was used. The results proved that though men and women football players” psychological levels in team cohesion and mental toughness were positively related with their playing ability, comparing between men and women football players, it was found that men football players were found to me more accurately related with the selected psychological variables than the football players.

Key words: Psychology, Mental Toughness, Cohesion, Players

INTRODUCTION

According to Whitakar (1986), in every tactical move in football one depends on team work and the individual skills such as good dribbling, stopping the ball, controlling the ball, passing the ball, anticipating the ball and keeping eyes on the ball and moving players. Tactics will succeed only through mastery on individual fundamental skills and with players thinking as a team.

Morehouse and Miller (1967) are of opinion that "skill is the element of performance which enables the performer to accomplish a large amount of work with a relatively small amount of effort. Skill is acquired mainly through a refinement of the co-ordination of different muscle groups. When one has mastered the fundamental skills of the game, the player gains a feeling of wellbeing. Thus high level of performance in Football is dependent upon the mastery over the fundamental skills. Debey (1990) quotes that practice can be defined as any activity which a player
undertakes in order to try to modify or consolidate skilled actions. Sample repetition of an action is not enough and all types of practices should stress quality. Quantity alone is not sufficient and indeed the practice of wrong movements may only serve to confirm bad habits and so will be detrimental. Normally it is accepted that shorter, more frequent practice sessions are most beneficial. But if the criterion of quality is applied, then it can be seen that length and distribution of practice sessions will be determined by how much a player can absorb and how long he or she can sustain the standard of the practice.

A football player must have speed, agility, endurance, dexterity as well as the power and skills. Skill is the ability to use the correct muscle at the correct time with the exact force necessary to perform the desired movements in the proper sequence and timings. In football, there are many skills such as dribbling, passing, tackling, stopping, throwing and shooting etceteras.

Mental toughness is a contested term, in that many people use the term liberally to refer to any set of positive attributes that helps a person to cope with difficult situations.

Cohesion has been defined in many ways. In the sporting world, one definition is most widely used and accepted, and it is the one we will use. Cohesion is the total field of forces which act on members to remain in a particular group (Festinger, Schacter, & Back, 1950).

**METHOD**

The purpose of the study was to find out psychological correlates of playing ability among football players as a function of gender. To achieve the purpose of this study the investigator selected 100 football players consisting of 50 men and women. The subjects were randomly selected from players who competed at intercollegiate level competitions held at Chennai. The selected subject’s age group was ranging from 19 to 25 years. Selected psychological Variable Team Cohesion was measured through Group Environment Questionnaire; Mental Toughness was measured through Sports Mental Toughness Questionnaire (SMTQ) and Subjects playing ability in football was assessed subjectively through three experts in football in a playing situation. To examine the relationship between playing ability in football and psychological variables, mental toughness and team cohesion simple correlation using Pearson Coefficient of Correlation was used.
RESULTS AND DISCUSSION

Table I, Showing Descriptive Statistics, number of Subjects, Means and Standard Deviation on Selected Psychological Variables and Playing Ability of the Football players

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variables</th>
<th>No. of Subjects</th>
<th>Mean</th>
<th>Standard Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MEN FOOTBALL PLAYERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Team Cohesion</td>
<td>50</td>
<td>69.52</td>
<td>5.14</td>
</tr>
<tr>
<td>2</td>
<td>Mental Toughness</td>
<td>50</td>
<td>90.62</td>
<td>12.40</td>
</tr>
<tr>
<td>3</td>
<td>Playing Ability</td>
<td>50</td>
<td>38.10</td>
<td>5.63</td>
</tr>
<tr>
<td></td>
<td>WOMEN FOOTBALL PLAYERS</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>Team Cohesion</td>
<td>50</td>
<td>66.34</td>
<td>5.94</td>
</tr>
<tr>
<td>2</td>
<td>Mental Toughness</td>
<td>50</td>
<td>87.74</td>
<td>8.97</td>
</tr>
<tr>
<td>3</td>
<td>Playing Ability</td>
<td>50</td>
<td>36.76</td>
<td>5.94</td>
</tr>
</tbody>
</table>

Table I shows that the mean values of team cohesion was 69.52 with standard deviation ± 5.14. The mean values of mental toughness was 90.6 with standard deviation ± 12.40. The mean values of playing ability of men football players was 38.10 with standard deviation ± 5.63.

Table I shows that the mean values of team cohesion of football women players” was 66.34 with standard deviation ± 5.94. The mean values of mental toughness was 87.74 with standard deviation ± 8.97. The mean values of playing ability of women football players was 36.76 with standard deviation ± 5.94.

RESULTS ON COEFFICIENT OF CORRELATION FOOTBALL PLAYERS

The obtained Pearson Correlation Coefficient between criterion variable (playing ability) and independent psychological variables of men football players are presented in Table II.
Table II, Showing Pearson Coefficient Correlation between Criterion and Independent Variables of Men Football Players

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variables PLAYING ABILITY Vs</th>
<th>No. of Subjects</th>
<th>Obtained ‘r’</th>
<th>Required ‘r’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Team Cohesion</td>
<td>50</td>
<td>0.844*</td>
<td>0.273</td>
</tr>
<tr>
<td>2</td>
<td>Mental Toughness</td>
<td>50</td>
<td>0.886*</td>
<td>0.273</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level.

The results presented in Tables II showed that there was significant relationship between playing ability and team cohesion (r: 0.844), playing ability and mental toughness (r: 0.886) among men football players.

The obtained Pearson Correlation Coefficient between criterion variable (playing ability) and independent psychological variables of women football players are presented in Table III.

Table III, Showing Pearson Coefficient Correlation between Criterion and Independent Variables of Women Football Players

<table>
<thead>
<tr>
<th>S.No</th>
<th>Variables PLAYING ABILITY Vs</th>
<th>No. of Subjects</th>
<th>Obtained ‘r’</th>
<th>Required ‘r’</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Team Cohesion</td>
<td>50</td>
<td>0.401*</td>
<td>0.273</td>
</tr>
<tr>
<td>2</td>
<td>Mental Toughness</td>
<td>50</td>
<td>0.669*</td>
<td>0.273</td>
</tr>
</tbody>
</table>

* Significant at 0.05 level.

The results presented in Tables III showed that there was significant relationship between playing ability and team cohesion (r: 0.401), playing ability and mental toughness (r: 0.669) among women football players.
CONCLUSION

The results proved that though men and women football players’ psychological levels in team cohesion and mental toughness were positively related with their playing ability, comparing between men and women football players, it was found that men football players were found to me more accurately related with the selected psychological variables than the women football players.

REFERENCE

SPORTS INJURIES IN HANDBALL

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ABSTRACT
This researcher is in pursuit to understand the probable injuries in Handball at various levels with respect to level of performance of the players. The players get injured due to opponent, lack of level of fitness and conditioning required for the performance, due to poor conditions of equipment and court, infrastructure facilities, improper warming-up, improper attire or kit of the players, officiating, etc. The researcher has tried to show various muscular, ligament, joints, tendon, bone, skin and other type of chronic and acute injuries through various techniques viz., Grabbing the Ball, Falling, Defensive Blocking, Jumping and Landing, Close to the free throw line and goal area line, etc. The researcher also established emphasis on the prevention of injuries among handball players.

Key words: Injuries, Health, Sports, Anaerobic power

INTRODUCTION
Handball is a game of anaerobic power, explosiveness, speed, skill and agility. A fast action game in 40 metres x 20 metres of Synthetic and wooden court by 16 players is strenuous and requires abrupt change of acceleration, jumps, leaps and landings. Sudden movements make the game fast and more prone to injuries to the players. Different movements in the game in different areas of courts where the ball change ends rapidly, leads to different kind of injuries. As a team it is the endeavour of every coach, player, sports physician and referee to understand the peculiarities of the game and avoid injuries. An injuries is much sooner forgotten than insult is an old saying in the sports field where aspirations for achievement and perfection in sports is high. Number of hours lost, in training, due to injuries cannot be compensated thus it becomes important to not only prevent the injuries but also to nurse the injuries to achieve a rapid recovery. Physiologically it has been proved that Handball requires a good amount of anaerobic power, explosive strength, accuracy to shoot and agility to move in a small area under the built up of good cardio respiratory endurance. All these motor qualities and physical characteristics are essential to be developed to prevent injuries. In spite of good conditioning and level of physical fitness, injuries are a part of sportsman’s training and will have to be treated. In order to treat such specialised injuries it is
imperatives to have the knowledge of common injuries, depending upon the positional play, by
the coach and sports physicians.

**Grabbing the Ball**

Main aspect of the game is to take the hold on the handball which can be had in the form of
powerful, accurate passes. Imperfect passes leads to hyperextension of the hand and especially of
the fingers. Striking of the ball especially on the hyper-extended exposed fingers is a common
injury and leads to rupture of medical or lateral collateral ligament of small inter-phalangeal joint
depending upon the direction of the force applied by the striking ball. The condition is called
stubbed fingers a painful condition with tenderness at joint line and swelling coming invariably
fast. In such an injury even a chip fracture of the phalanx, can be seen due to sudden hyper-
extension of the extensor tendon slips attached to the phalanges which pulls away a fraction of
bone. Powerful pass with a good speed may also damage the extensor retinaculum or collateral
ligament of wrist leading to Sprain another hyperextension injury. Similarly, in rebound ball to
catch ball from a height down to protective position can also cause similar injuries to the fingers
even dislocation of inter-phalangeal joints. In jump ball disputed ball after the declaration by
referee as held ball leads to jump ball where two players try to possess the ball. This condition
leads to pulling and jerking and may injure the shoulder joint. Capsular strain of shoulder can occur
while the pulling action is performed. Shoulder, when it is in a state of flexion, abduction and
external rotation, Super spinouts muscle strain can occur. Due to the landing after leaping, stubbing
of feet leading to contusion injury in foot can also be seen.

**Falling**

Due to fast movements in the handball game, falls on a synthetic and wooden court are quite
common and can happen on losing balance while running or after leaping for the ball. Fall may
take place on an out stretched hand, a common protective mechanism by any one maintaining the
body balance while falling. Such a fall can lead to scaphoid or even clavicular fracture. Impact of
force may cause sprain or dislocation of elbow, shoulder, acromio-clavicular or sterno-clavicular
joint. In other words all joint of upper extremity are vulnerable. Occasionally, a fall, when a player
is on, the run, leads to slipping and then slides on the court for quite a distance. This particular fall
shall cause removal of complete dermis leading to red fiery skin injury called Strawberry burn or
also tabled friction burn. Proper hygiene of the court is important to prevent supper added infection
of the wound. Falls may take place of either to weak player when there is collision between the
opponents. This can lead to landing on the buttocks, causing contusion of gluteus maximum or even sprain back. Occasionally such a collusion can cause a serious injury in the form of cranial concussion when head strikes the ground for which a player may require, observation and admission in the hospital.

Due to sudden twisting movements, falls are more common and can cause ankle and knee sprains which are the commonest injuries practically in every sport and so in handball. Knee injuries can more graver when damage is to semilunar cartilage and collateral ligaments. Ankle injuries include fracture of the lower end of Tibia, Fibula or Tarsal bones. This shall depend upon the degree of movement beyond the passive range of individual’s joint and the force from the momentum. Sudden movements involve also movements of trunk which include flexion, extension and rotation and leads to strain of lower back muscle especially erector spinae and sprain of inter spinous ligament of lumbar region. Protective ankle shoes should be worn by handball players for preventing against trauma to ankle and knee joints. Properly fitting shoes with cushioned sole and resin is required for sudden stoppages and turns. Improper shoes leads to twisting of femur over fixed tibia condyle resulting in meniscus injury of the knee joint which can be catastrophe for an active player.

Apart from proper footwear, good hygienic conditions of the court and proper warming up are essential requirements to prevent injuries especially occurring due to falls. Methods of falling like rolling, tumbling, calisthenics and gymnastics exercises should be included in the training programme to avoid serious mishaps. Training should also include exercises to control balance since number of moves in a game are based on turning and twisting movements.

**Defensive Blocking**

While blocking a pass, dribble of the ball or shot of ball the intention is to block the speeding ball with exposed fingers. In such a situation damage is to fingers resulting in hyperextension injury of inter phalangeal joint as discussed in grabbing the ball. Wrist sprains and capsular strains of elbow joint are also seen in this particular action when a powerful pass is tried for interception. Occasionally forceful speeding ball at the time of passing or at the time of goal may land on face, causing contusion or even laceration injuries.

**Jumping and Landing**

Handball is a game where there is leaping involved to quite in extent at the time of catching the ball, overhead pass and at the time of shot the handball goal. Due to constant jumping and landing,
apart from twisting injuries seen due to loss of balance described above, there are also certain chronic overuse injuries caused by repeated actions of these particular movement. Maximum strain is seen on the anterior patellar tendon of the knee leading to condition called patellar tendonitis or jumper’s knee. This condition is also seen in Volleyball, Basketball players and also jumpers and Hurdlers. Where powerful leaping is involved. This clinical condition is seen with pain in the lower pole of patella along with localised tenderness and occasional swelling. It has remissions and relapses before turning into a chronic from. Pathologically due to repetitive sudden contraction of quadriceps muscle, the tendon remains under constant pressure and result in focal degeneration of the tendon strengthening of quadriceps muscle, proper shoe and early diagnosis can prevent this condition from becoming a competitive hazard for a sportsman similar condition may be seen in Achilles tendon causing Achilles per tendonitis due repeated action of plantar and dorsal flexion seen in leaping. This condition is equally disabling and incapacitating and requires a dynamic treatment by the sports physician at its earliest onset. Other area where the impact of force seen is at the heel, where bruising can take place due to heavy landing on the heel. Painful heel with occasional haematoma may be seen. Chronic nature of such a trauma is overgrowth of calcaneus bone at its inferior surface causing calcaneal spur. This is again seen in number of disciplines of sports and is an adaptation change of the skeletal system. Exostosis or the overgrowth bisects the plantar fascia attached there and leads to painful condition with signs of inflammation. X-ray confirms the diagnosis and requires energetic treatment in the form of cold compresses, heel padding, and ultra sound while resistant cases may have to be given local infiltration of corticosteroid injection.

**Close to the free throw line and goal area line**

Area close to free throw line and goal area line is the field where maximum activity is seen by both the defenders as well as the opponents. While player attacking has to stabilize himself to jump and shoot accurately the opponents wait under the goal hoping a missed goal and there is grappling for the ball to secure possession. In such cases elbows are the dangerous weapons causing injury either intentionally or accidently such injuries can be seen mainly on head and face. Fracture of cheek bone and nose bone to splitting of lips, broken teeth, cuts on the eyebrow and even a serious repercussion to the extent of concussion of head and even, internal eye damage like retinal detachment can be caused. Blow on ears can cause hemotympanum or pneumotympanum a painful ear condition. On the other hand defender sometimes crouches intentionally under the shooter.
while he is jumping to take the shot. This condition what is known as tunnelling bridging or submarining can cause injuries to head and spine especially so rupture of interspinous ligament or sprained back. Head injuries can again be in the form of contusion when knees of the shooter strike the defender and can cause from splitting of scalp to concussion. Since most of the injuries are due to elbowing foul play must be restricted by referee and should be especially cautious to note the intentional elbowing by the players.

**To prevent injuries in handball special emphasis should be laid on the following:**

- Physical fitness and skill component of the players.
- Unfair play should be discouraged.
- Gymnastic exercises should be a part of the training regimen.
- Proper warming up and cool down after every training session.
- Proper protective ankle shoes with good heel cup cushion behind and under the heel.
- Special care of feet and properly trimmed nails of hands feet.
- Proper lighting and ventilation arrangements of indoor courts.
- Synthetic and wooden surface of the court should be checked and cleaned for every training session.

Immediate first aid in the court itself in acute injuries shall curtail the convalescence and reduce the rehabilitation period which is of utmost importance in case of competitive players. Rehabilitation is a team work if coaches, sports physician and physiotherapists to advise the right intensity, duration and repetitions of the exercise to maintain cardio-respiratory endurance and enhance recovery, Specific exercises should be advocated to maintain the muscular balance and cardio-respiratory fitness while not hampering with the repair taking place, in the injured tissue.

**CONCLUSION**

From the above it may be concluded that there are few possibilities of getting injured may be avoided through proper physical fitness and skill component of the players Unfair play should be discouraged, Gymnastic exercises should be a part of the training regimen, Proper warming up and cool down after every training session, Proper protective ankle shoes with good heel cup cushion behind and under the heel, Special care of feet and properly trimmed nails of hands feet, Proper lighting and ventilation arrangements of indoor courts, Synthetic and wooden surface of the court should be checked and cleaned for every training session.
RECOMMENDATIONS

To avoid injuries the following recommendations were made by the researcher based on the observations and findings of the statistics; the researcher has tried to show various muscular, ligaments, joints, tendon, bone, skin and other type of chronic and acute injuries through various techniques and preventions:

- Proper warming-up
- Physical fitness and skill component of the players.
- Unfair play should be discouraged.
- Gymnastic exercises should be a part of the training regimen.
- Proper warming up and cool down after every training session.
- Proper protective ankle shoes with good heel cup cushion behind and under the heel.
- Special care of feet and properly trimmed nails of hands feet.
- Proper lighting and ventilation arrangements of indoor courts.
- Synthetic and wooden surface of the court should be checked and cleaned for every training session.

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COMPARISON OF COORDINATIVE ABILITIES BETWEEN BADMINTON AND TABLE TENNIS PLAYERS

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ABSTRACT

Objective: The present study was aimed to investigate coordinative abilities between badminton and table tennis players.

Methods: For the purpose of the study the investigators collected data from students of Kalyani and Calcutta University. A total number of Thirty (N=30) male badminton and table tennis players were selected and divided into two groups (15 from badminton playing group and 15 from table tennis group). Data were collected through Random sampling method by applying coordinative ability Test developed by Petr Hirtz (1975), There are five items in the coordinative ability test. Those are Differentiation ability, Orientation ability, Reaction ability, Balance ability and Rhythm ability

Statistics: Mean and Standard Deviation of each variable were calculated. For comparison of the variables between the groups of subject statistical t-test was applied.

Result: Results revealed that in terms of orientation ability, differentiation ability and reaction ability table tennis players are found better than the badminton players. On the other hand, in terms of balance ability and rhythm ability badminton players are found better than the table tennis players.

Keywords: Coordinative abilities, Differentiation ability, Orientation ability, Reaction ability, Balance ability and Rhythm ability

INTRODUCTION

Table Tennis and badminton are well-known to us as a racket games. Despite their similarities, the two sports also have many differences in playing style and in strategy. While the basic principle is the same, the two games differ in their rules, terminology, playing equipment, number of players, field size etc. In sports today best performance can only be achieved through inaccurately planned, executed and controlled training system loosed on the scientific knowledge, theoretical and methodical fundamentals of sport training.

Table Tennis and badminton are sports which demands high level of coordination. The term “coordination” has been defined as the ability to perform complex motor exercises. Hirtz (1985), proposed a list of 5 basic coordination abilities viz. Reaction, Rhythm, Balance, Kinesthetic Differentiation and Space-Time Orientation. It has been suggested that coordination abilities should be practiced during childhood and adolescence with “additional technique training”. This term includes additional exercises that will improve virtuosity, stability and the coordination of special athletic techniques. In most sports the technique training alone is not enough for learning and stabilizing a new skill, thus, there is a need of specific exercises which will facilitate the development of the technique. Previous studies developed a theory with regard the coordination requirements for each sport.

A sportsman can compete effectively only by acquiring certain coordinative mastery of the techniques. Coordination ability means an ability to quickly and purposefully perform difficult spatio-temporal movement structures. Within this context, coordination abilities are understood as
an externally visible manifestation of the control and regulation processes of the motor activity of the central nervous system. Coordinative abilities enable the sportsman to do a group of movements with better quality and effect.

Coordinative abilities are also needed for maximum utilization of conditional abilities, technical skills and tactical skills. Without the adequately developed coordinative abilities, a sportsman cannot make maximum use of his psychobiological capacities and reserves. The coordinative abilities, to a great extent, determine the maximum limits to which sports performance can be improved in several sports especially the sports which depends largely on technical and tactical factors. Because of this reason assessment of coordinative abilities and the possibilities of their further development takes an important role of the process of talent identification in sports.

The speed of learning of skill and its stability is directly dependent on the level of various coordinative abilities. Coordinative abilities are needed for maximal utilization of conditional abilities, technical skills and tactical skills. In different sports requirement of coordinative abilities are different and these abilities ensures higher movement efficiency and movement economy, whereas some sports events they helps in higher movement frequency with high explosiveness and force application. In strength sports they help in putting maximum effort in a short time and at the right time. But, where the technique dominates the event the sea abilities helps in better learning, stabilization, variability and autoimmunization. In sports seven coordinative abilities are of key importance. In different sports the relative importance of these abilities is however different.

Differentiation ability enables the sportsman to perceive micro-differences regarding the temporal, dynamic, spatial aspect of movement execution and the differentiation can be in regards to an implement or movement Orientation permits the sportsman to determine the position and movement of his own body and/or of a moving object (opponent, partner) with regard to space. Coupling or combination movement allows the sportsman to coordinate partial movement of his body with regard to space, time, and dynamics. Reaction ability permits the sportsman to effective action quickly and purposefully according to a signal and for a sudden change in situation. Balance ability helps in keeping the total body in a certain position or to establish it. Rhythmic ability enables the sportsman to perceive the externally given rhythm and to reproduce it in a motor action.

The optionally developed coordinative ability especially in the childhood is an invaluable asset for learning of complex technique in advancement stage is dependent upon the level of required coordinative ability. They are prerequisite of Badminton and table tennis performance.

Significance of the Study:
The present study is likely to reveal which of the coordinative abilities have relevance in racquet sports for the coordinated footwork of the badminton and table tennis players. The study will also indicate the difference in their dominance in footwork activities. After having identified the various coordinative abilities, the experts in these sports will be in a position to prepare a specific training program for these abilities in order to improve the performance in Badminton and Table Tennis which otherwise is likely to stagnate at higher levels because of poor coordinative exploitation of the sportsman.

Statement of the Problem:
The present investigation is a comparative type study with test to identify the coordinative ability as five groups of differentiation, orientation, reaction, balance and rhythm ability between badminton and table tennis players. So the problem can be stated as: “Comparison of Coordinative Abilities between Badminton and Table Tennis Players”.
Purpose of the Study:
The objective of the study was to compare the various components of coordinative abilities viz. Differentiation, Orientation, Reaction, Balance and Rhythm Ability between the Badminton and Table Tennis players.

METHOD

Selection of the Subjects:
For the purpose of the study 15 Badminton players and 15 Table Tennis players were randomly selected from various colleges from University of Kalyani and University of Calcutta. The players play regularly for their districts, associations and states. The minimum eligibility criterion for selection is at least district level participation for both badminton players and table tennis players. Everything regarding the test was made clear and finally requested to participate whole heartedly in the present study as subject.

Personal data

Height: Each subject was asked to stand on a horizontal surface and stretch as much as possible taken in case that heel is touching in front of a wall. The highest point of the head touching the wall recorded in centimeter.

Weight: The subject stands on the standard weighing machine maintaining correct posture. The body weight is recorded in kg.

Selection of variables
On the basis of available literature in the coordinative abilities and their tests the following coordinative abilities were selected for this study.
1. Orientation ability measured by numbered medicine ball run test and was measured in 1/10 of seconds.
2. Differentiation ability measured by backward medicine throw test and was measured in accordance with point scored by each subjects.
3. Reaction ability measured by ball reaction exercise test and was measured in meter and centimeters.
4. Balance ability measured by long nose test and was measured in meter and centimeters.
5. Rhythm ability assessed by sprint at given rhythm test and was measured in seconds.

RESULT AND DISCUSSION
In this chapter the data collected from different measurements were statistically analyzed adopting the method mentioned in previous chapter. The results that obtained from the measurements and discussions have been presented here.

The data for the different parameters and their statistical analysis have been presented in the following-

Personal Data
The personal data of the subjects mainly age, height, weight, their Mean and Standard Deviation (SD) have been presented in Table 1
Table-1: Mean and SD of age height and weight of badminton and table tennis players

<table>
<thead>
<tr>
<th>Group</th>
<th>Age</th>
<th>S.D</th>
<th>Height</th>
<th>S.D</th>
<th>Weight</th>
<th>S.D</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>21.62</td>
<td>±1.032</td>
<td>171.4</td>
<td>±5.83</td>
<td>58.82</td>
<td>±6.79</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>22.52</td>
<td>±1.060</td>
<td>170.2</td>
<td>±8.04</td>
<td>56.25</td>
<td>±6.45</td>
</tr>
</tbody>
</table>

Statistical Procedure
After the collection of relevant data, to compare the selected coordinative abilities between badminton and table tennis players ‘t’-test was employed. The level of significance was set at 0.05.

Table 2: Comparison of mean and standard deviation between badminton and table tennis players on orientation ability

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>S.D</th>
<th>SEM</th>
<th>t-value</th>
<th>Significance or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>7.884</td>
<td>0.804</td>
<td>0.113</td>
<td>8.768*</td>
<td>Significant</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>9.477</td>
<td>1.022</td>
<td>0.14</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significance value-at 0.05 level = 2.05 (Df =28)

The mean and the S.D of the badminton players and table tennis players on orientation ability were found to be 7.884±0.804 and 9.477±1.022 respectively. To observe the significant difference between the mean values ‘t’ was calculated and found to be 8.768 which was significant at 0.05 level. So in terms of orientation ability table tennis players are found better than the badminton players.

Table 3: Comparison of mean and standard deviation between badminton and table tennis players on differentiation ability

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>S.D</th>
<th>SEM</th>
<th>t-value</th>
<th>Significance or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>11.12</td>
<td>2.677</td>
<td>0.379</td>
<td>6.766*</td>
<td>Significant</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>14.88</td>
<td>2.876</td>
<td>0.407</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significance value-at 0.05 level = 2.05 (Df =28)

The mean and the S.D of the badminton players and table tennis players on orientation ability were found to be 11.12±2.677 and 14.88±2.876 respectively. To observe the significant difference between the mean values ‘t’ was calculated and found to be 6.766 which was significant at 0.05 level. So in terms of differentiation ability table tennis players are found better than the badminton players.

Table 4: Comparison of mean and standard deviation between badminton and table tennis players on reaction ability

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>S.D</th>
<th>SEM</th>
<th>t-value</th>
<th>Significance or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>1.547</td>
<td>0.207</td>
<td>0.029</td>
<td>6.846*</td>
<td>Significant</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>1.832</td>
<td>0.208</td>
<td>0.029</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significance value-at 0.05 level = 2.05 (Df =28)

The mean and the S.D of the badminton players and table tennis players on reaction ability were found to be 1.547±0.207 and 1.832±0.208 respectively. To observe the significant difference between the mean value ‘t’ was calculated and found to be 6.846 which was significant at 0.05
level. So in terms of reaction ability table tennis players are found better than the badminton players.

**Table 5: Comparison of mean and standard deviation between badminton and table tennis players on balance ability**

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>S.D</th>
<th>SEM</th>
<th>t-value</th>
<th>Significance or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>9.826</td>
<td>1.123</td>
<td>0.158</td>
<td>4.01*</td>
<td>Significant</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>8.818</td>
<td>1.375</td>
<td>0.194</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significance value - at 0.05 level = 2.05 (Df = 28)

The mean and the S.D of the badminton players and table tennis players on balance ability were found to be 9.826±1.123 and 8.818±1.375 respectively. To observe the significant difference between the mean value ‘t’ was calculated and found to be 4.01 which was significant at 0.05 level. So in terms of balance ability badminton players are found better than the table tennis players.

**Table 6: Comparison of mean and standard deviation between badminton and table tennis players on rhythm ability**

<table>
<thead>
<tr>
<th>Group</th>
<th>Mean</th>
<th>S.D</th>
<th>SEM</th>
<th>t-value</th>
<th>Significance or not</th>
</tr>
</thead>
<tbody>
<tr>
<td>Badminton players</td>
<td>1.712</td>
<td>0.19</td>
<td>0.354</td>
<td>2.36*</td>
<td>Significant</td>
</tr>
<tr>
<td>Table tennis players</td>
<td>1.78</td>
<td>0.211</td>
<td>0.620</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Significance value - at 0.05 level = 2.05 (Df = 28)

The mean and the S.D of the badminton players and table tennis players on rhythm ability were found to be 1.712 ±0.19 and 1.78±0.211 respectively. To observe the significant difference between the mean value ‘t’ was calculated and found to be 2.36 which was significant at 0.05 level. So in terms of rhythm ability table badminton players are found better than the tennis players.

**Discussion of the study**

The statistical analysis of data shows that there were significant differences for coordinative abilities i.e. Differentiation Ability, Orientation Ability, Balance and Reaction Ability between badminton and table tennis players. On the basis of the results of the study, the hypothesis that there will be insignificant difference of coordinative abilities was rejected. The findings were in consonance with the study undertaken by Farrow (1975), Bakshi (1994). These differences may be attributed in the fact that the different aspects of game needs different type of coordinative abilities. The tennis players require better reaction ability, orientation ability, differentiation ability and rhythm ability in comparison to the badminton group. The badminton group had performed better in balance ability in comparison to the table tennis group.

In both badminton and Table Tennis different coordinative abilities play significant role with the Playing Ability. The nature of activities involved in Table Tennis requires sound coordinative abilities which are required very much for a player to sense movements as well as they need quick movements as quick reactions to the balls coming from the opponents side. Apart from this the significant difference of differentiation, Balance, Orientation and Rhythm Coordinative Ability might be caused due to the factor that Table Tennis involves the change of position and movements of the body in time and space in relation to a definite field of action more than badminton. In the other hand badminton players have better control over much needed balancing ability, may be due to their attribution to the court lines. It is considered that coordination abilities
are basic elements for an athletic skill. Practicing those abilities with specific exercises has a better result at improving the technique of those skills (Druckman & Swets, 1988).

**CONCLUSION**

On the basis of result and discussion on chapter 4 the following conclusions can be drawn –

1. In terms of orientation ability table tennis players are found better than the badminton players.
2. In terms of differentiation ability Table Tennis players are found better than the badminton players.
3. In terms of reaction ability table tennis players are found better than the badminton players.
4. In terms of balance ability badminton players are found better than the table tennis players.
5. In terms of rhythm ability badminton players are found better than the table tennis players

**REFERENCES**

COMPARATIVE EFFECT OF FOOT REFLEXOLOGY AND MENTAL TRAINING ON ANXIETY AND STRESS AMONG MEN DIABETES

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ABSTRACT

The aim of this study was to find out the effect of foot reflexology and mental training on anxiety and stress among men diabetes. The investigator randomly selected 45 male adult suffering from Diabetics in the age group of 30 to 45 years. The subjects were randomly divided into three groups, namely, Foot Reflexology Training (FRT) group and mental training group (MNT) group, and the third group was kept under control. Prior to the experimental treatment the subjects level of anxiety and stress due to Diabetics were collected using standard questionnaires. Apart from their usual medication, the FRT group and MNT group subjects were provided with foot reflexology Training and mental training for 12 weeks and the control group was not participated in any special treatment. After the experimental treatment, post test scores were obtained on anxiety and stress using the same questionnaires. The differences between the initial and final scores on selected variables were considered as influence of respective treatments. The ANCOVA results proved that FRT training was better than MNT training on anxiety and stress. Compared to control group FRT group and MNT group have significantly altered FRT training and MNT graining. However, these differences between FRT and MNT training were not significant. It was concluded that FRT and MNT can be safely used for the benefit of Diabetic patients to reduce their anxiety and stress.

Key words: Reflexology, Anxiety, Mental, Performance

INTRODUCTION

Vedantha Maharshi (1983) in his Simplified Kundalini Teaching says Foot Reflexology helps Nature achieve homeostasis. Overactive glands or organs can be helped to return to normal. Conversely, if an organ or a gland is underactive, Reflexology can help return it to its normal functioning level. It is important to note here that the normalization action of reflexology is never one of opposite extreme. In other words, once homeostasis or a normal condition is achieved, working the area too much cannot unbalance it. Overworking can cause some minor reactions such as diarrhea or perhaps some nasal mucus being secreted (runny nose). These reactions though are cleansing poisons from the body. Succinctly, Reflexology cannot harm a system, it simply brings it back into balance. Reflexology helps Nature achieve homeostasis. Overactive glands or organs can be helped to return to normal. Conversely, if an organ or a gland is underactive, Reflexology can help return it to its normally functioning level. It is important to note here that the normalization action of reflexology is never one of opposite extreme. In other words, once
homeostasis or a normal condition is achieved, working the area too much cannot unbalance it. Overworking can cause some minor reactions such as diarrhea or perhaps some nasal mucus being secreted (runny nose).

Mildred Carter (1969) defined “Reflexology is Nature’s push-button” Secret of Vibrant health more dynamic living, abundant personal energy, better living without pain for the perfection in activities”. Reflexology is a science that deals with the principle that there are reflex areas in the feet and hands that correspond to all of the organs and systems in the body. Doing reflexology means more than working on your feet. It is actually working with the person, attempting to mobilize inner energies (physical and mental in conflation) in order to fight any imbalance in the system. The reflexologists, systematically approach, with much empathy that neglected area between body and soul where modern medical practice normally stops short. And indeed, how often we hear medical experts tell us that ultimately recovery depends on the determination, trust, and optimism of the patient. Unfortunately, medicine has little to say about the means of cultivating such an attitude, and here is where Advanced Foot Reflexology performs so well.

Reflexology deals with the principle that there are reflex points on the hands and feet which correspond to all of the body’s glands, organs and structures. By manipulating or applying specific pressure techniques to the different reflex points, it is possible to initiate healing in the corresponding area of the body. When illness or imbalances occur, the energy channels that flow through our bodies become blocked. A Reflexology treatment aims to destroy these blockages, allowing energy to flow freely again and restoring the body’s natural balance and good health. (Judith Berger and Judith Sachs, 1997)

The ability to focus and concentrate is indeed a mental skill which is in part learned, and through practice can be improved. Using mental imagery is really a way of letting the mind tell the body what to do (or what not to do) in its own way and in doing so allow for the full potential of both the mind and body to be utilized. If a person who runs for the exercise benefits (cardiovascular fitness or weight control) but does not enjoy running, then mental imagery can assist him in dealing with factors such as fatigue and boredom in a more pleasant manner.

Diabetes mellitus often referred to simply as diabetes, is a syndrome of disordered metabolism, usually due to a combination of hereditary and environmental causes, resulting in
abnormally high blood sugar levels. Blood glucose levels are controlled by a complex interaction of multiple chemicals and hormones in the body, including the hormone insulin made in the beta cells of the pancreas. Diabetes mellitus refers to the group of diseases that lead to high blood glucose levels due to defects in either insulin secretion or insulin action. (Robert, 2007)

Although, foot reflexology and mental training cannot cure diabetes, but it can complement the lifestyle changes which are necessary to keep the symptoms in diabetics under control. It also helps in keeping the person in good health and well-being.

In the Art of Mindful Living, Thich Nhat Hanh masterfully expounds on how Eastern meditative techniques can be applied to everyday situations. His philosophy emphasizes the numerous benefits of being mindful (focused) on what you are doing while you are doing it. One of his basic focusing exercises employs a commonly accepted principal in focus training. This principal holds that it is easier to concentrate on a physical sensation than on a thought. This exercise is called breathing in and breathing out. You begin with focusing your attention on the sensation of taking air into the lungs and as you are doing this silently say to yourself this is my in breath. Then as you exhale, pay close attention to the sensation of letting air out of your lungs and silently say to yourself this is my out breath.

Mental and emotional components are often as important as the physical aspects of performance in determining success in everyday life. In view of the growing importance of anxiety in the diverse fields of human activity, psychiatrists, educationists and physical educationists explored on the method of measuring individual anxiety level, controlling anxiety through different methods etcetera in most of their investigations. Anxiety is both a trait and state. As a trait, anxiety is more or less permanent inborn characteristic of human personality and as a state, it is a universal, environmental phenomenon. “Anxiety is one of the important psychological factors influencing sports performance. Anxiety, a complex emotional state, may be characterized as a general fear or forbidding usually accompanied by tension. It is related to fear of failure, either real or anticipated”. (Sivaramakrishnan, 1992)

“Stress occurs when the pressures upon us exceed our resources to cope with those pressures”. Indignant of achievement is predominant in almost all animals and human beings. Man as a special being in gifted with invaluable mental stamina, which at times remains hidden or rather
found suppressed due to the environment and sociological function to which the individual is exposed to.” (Mirka, 1996)

Schwickert M, et.al. (2006) found that Between 60 and 90% of patients consult their family doctor for stress-associated complaints. Santaella DF, et.al. (2006) studied the acute after effects of exercise and relaxation, performed alone and in combination, on blood pressure (BP) measured at baseline and during stressful conditions. Gupta N, et.al. (2006) documented that considerable evidence exists for the place of mind body medicine in the treatment of anxiety disorders. Excessive anxiety is maladaptive. It is often considered to be the major component of unhealthy lifestyle that contributes significantly to the pathogenesis of not only psychiatric but also many other systemic disorders. This study is aimed at finding out whether foot reflexology or mental training influences to alter anxiety and stress of diabetes which will help the diabetes to lead a healthful living.

METHOD

45 male adult suffering from Diabetics volunteered to serve as subjects were randomly selected. Their age ranged from 30 to 45 years. All the subjects were taking usual drugs as suggested by their physician and attended this study from their homes. The subjects were randomly divided into three groups, namely, Foot Reflexology Training (FRT) group and mental training group (MNT) group, and the third group was kept under control. Only the subjects with reasonable physical ability and willingness to undergo the experimental training programme voluntarily were included in the study. Prior to the experimental treatment the subjects level of anxiety and stress due to Diabetics were collected using standard questionnaires. The FRT group and MNT group subjects were provided with foot reflexology Training and mental training for 12 weeks and the control group was not participated in any special treatment. After the experimental treatment, post test scores were obtained on anxiety and stress using the same questionnaires. The differences between the initial and final scores on selected variables were considered as influence of respective treatments. The collected data were subjected to statistical treatment using ANCOVA.
RESULTS

Tab 1: Effects of FRT and MNT on Anxiety and Stress among Men Diabetess

<table>
<thead>
<tr>
<th></th>
<th>FRT Group</th>
<th>MNT Group</th>
<th>CONTROL GROUP</th>
<th>Source of Variance</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Squares</th>
<th>Obtained F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>ANXIETY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Pre Test Mean</td>
<td>29.93</td>
<td>28.13</td>
<td>26.53</td>
<td>Between</td>
<td>86.80</td>
<td>2</td>
<td>43.40</td>
<td>3.23</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>564.40</td>
<td>42</td>
<td>13.44</td>
<td></td>
</tr>
<tr>
<td>Post Test Mean</td>
<td>27.13</td>
<td>26.40</td>
<td>28.53</td>
<td>Between</td>
<td>35.24</td>
<td>2</td>
<td>17.62</td>
<td>1.53</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>483.07</td>
<td>42</td>
<td>11.50</td>
<td></td>
</tr>
<tr>
<td>Adjusted Post Test Mean</td>
<td>25.74</td>
<td>26.45</td>
<td>29.87</td>
<td>Between</td>
<td>129.28</td>
<td>2</td>
<td>64.64</td>
<td>21.91</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Within</td>
<td>120.98</td>
<td>41</td>
<td>2.95</td>
<td></td>
</tr>
<tr>
<td>Mean Diff</td>
<td>2.80</td>
<td>-1.73</td>
<td>2.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

|                      |           |           |                | STRESS             |                |     |              |            |
| Pre Test Mean        | 27.07     | 25.67     | 25.00          | Between            | 33.38          | 2   | 16.69        | 1.41       |
|                      |           |           |                | Within             | 496.27         | 42  | 11.82        |            |
| Post Test Mean       | 23.07     | 23.53     | 24.47          | Between            | 15.24          | 2   | 7.62         | 0.58       |
|                      |           |           |                | Within             | 548.40         | 42  | 13.06        |            |
| Adjusted Post Test Mean | 22.06     | 23.75     | 25.26          | Between            | 72.43          | 2   | 36.21        | 8.76       |
|                      |           |           |                | Within             | 169.55         | 41  | 4.14         |            |
| Mean Diff            | -4.00     | -2.13     | -0.53          |                    |                |     |              |            |

* Significant at 0.05 level.

Tab 2: Multiple Comparisons of Paired Adjusted Means and Scheffe’s Post Hoc Analysis Results on Anxiety and Stress

<table>
<thead>
<tr>
<th>FRT Group</th>
<th>MNT Group</th>
<th>Control Group</th>
<th>MEAN DIFF</th>
<th>Reqd. C.I</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anxiety</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22.06</td>
<td>23.75</td>
<td>-1.69</td>
<td>1.92</td>
<td></td>
</tr>
<tr>
<td>22.06</td>
<td>25.26</td>
<td>-3.21</td>
<td>1.92</td>
<td></td>
</tr>
<tr>
<td>23.75</td>
<td>25.26</td>
<td>-1.52</td>
<td>1.92</td>
<td></td>
</tr>
<tr>
<td>Stress</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25.74</td>
<td>26.45</td>
<td>-0.71</td>
<td>1.62</td>
<td></td>
</tr>
<tr>
<td>25.74</td>
<td>29.87</td>
<td>-4.12</td>
<td>1.62</td>
<td></td>
</tr>
<tr>
<td>26.45</td>
<td>29.87</td>
<td>-3.41</td>
<td>1.62</td>
<td></td>
</tr>
</tbody>
</table>

*Significant at 0.05 level.

DISCUSSIONS

The results presented in Tables I and II proved that experimental treatments that FRT training and MNT training were significantly reduced men diabetes anxiety and stress. The mean values, adjusted mean values and multiple comparisons of adjusted means proved that FRT training was better than MNT training on anxiety and stress. Compared to control group FRT
group and MNT group have significantly altered FRT training and MNT training. However, these differences between FRT and MNT training were not significant. Bagheri-Nesami M et al. (2014) found significant reduction in anxiety due to foot reflexology massage. Moyle W et al. (2013) explored effectiveness of foot massage for care and concluded foot reflexology improved mood, reduced anxiety and lower blood pressure in long-term care. Santaella DF, et.al. (2006) studied the acute after effects of exercise and relaxation, performed alone and in combination, on blood pressure (BP) measured at baseline and during stressful conditions. Thus, the findings of this study are in agreement with the previous researches, that FRT and MNT reduces anxiety, improves mood, reduction in pain which are the causes for reduction in anxiety and stress among men diabetes as found in this study.

CONCLUSIONS

It was concluded that FRT and MNT can be safely used for the benefit of Diabetic patients to reduce their anxiety and stress.

REFERENCES

A COMPARATIVE STUDY ON TRUNK FLEXIBILITY BETWEEN MALE KHO - KHO PLAYERS OF THE SOUTH INDIA INTERVARSITY TOURNAMENT

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ABSTRACT

Flexibility is the functional capacity of the joints to move through a full range of motion. The functional range of motion refers to the ability to move the joint without incurring pain or limit to performance, the flexibility is one of the important motor components of physical fitness. Evaluation of a player’s static posture is very important process in a scientific sports training system, it provides an effective method for identifying muscular imbalance and structural deficiencies developed as a result of repetitive sport related movement or prior musculoskeletal injury. The primary objective of this study is to find out the Trunk flexibility of the men Kho – Kho players who performed in semifinals of south India inter university Kho- Kho tournament. According to YMCA sit and reach test the findings of the study indicate that all the players have performed well average. Materials and Methods: To achieve this objective Sit and Reach test was conducted to all the teams, total 12 numbers of players in age group of 18 to 27 were present from each teams and the procedure of the test was explained very clearly to all of them. The collected data are adapted properly to the statistical applications as per the necessity of the study for the study of mean value, Standard Deviation, t-test were applied to analyze the data. Conclusion: On the basis of comparison of data Mangalore University players have comparatively better with 35.8333 score The Calicut University players have performed very close to Mangalore University with 35.75 Score and the Mysore University Players Scored 34.75 and the Kuvempu University players have performed 32.6667. The Standard deviation shows that the variations of the flexibility level among the players in Mangalore University have 6.42 levels of variation Mysore University players have 3.768 level of variation, Kuvempu University players have 8.161 level of variation and the Calicut University players have 6.397 level of variation among them.

Key Words: Trunk, Flexibility, Kho-Kho, Performance
BACKGROUND

The flexibility is one of the important motor components of physical fitness. Evaluation of a player’s static posture is very important process in a scientific sports training system, it provides an effective method for identifying muscular imbalance and structural deficiencies developed as a result of repetitive sport related movement or prior musculoskeletal injury. By screening these movements’ coaches can easily identify the functional movement restrictions and joint- specific mobility and stability limitations. These limitations reduce the effects of sports performance training and increase the possibility of distress sports related injuries.

INTRODUCTION

Physical fitness is the most important determinant of excellent performance in sports. However, importance of various components of fitness varies with different sports for better performance. Physical fitness is possible through the study of motor fitness. The motor fitness can be understood by analysis of its components like speed, strength, endurance, flexibility, agility and coordination ability and balance, although physical fitness is conditioned by heredity, physical organic and behavioral components. Robson, M. et.al (1978). Flexibility is the functional capacity of the joints to move through a full range of motion. The functional range of motion refers to the ability to move the joint without incurring pain or limit to performance. Flexibility depends on which muscle and joint is being evaluated. The joint mobility of the player is the combination of normal joint range of motion and sufficient muscular flexibility. This is very important for proper mechanics and injury prevention. Joint mobility allows the body to move in all six degrees of motion and it allows the generation of elastic energy between muscles. In Kho – Kho the specific fitness is refers to the Speed, Endurance, Agility and Flexibility. Fitness training equips the sports man to face the physiological and psychological changes that came his way in his competitive sports career. Specific fitness enables the player to perform the unusual movements required by the concerned sports which the non-sports person does not perform in his everyday routine. Specific fitness depends a lot on general fitness and this is the reason why the sports person has to give equal importance to general as well as specific fitness to achieve his goal.
The origin of Kho–Kho is difficult to trace, but many historians believe that it is a modified form of ‘Run Chase’, which in its simplest form involves chasing and touching a person. With its origins in Maharashtra, Kho–Kho in ancient times was played on ‘raths’ or chariots, and was known as Ratha.

**METHOD**

The main objective of this study is to find out the trunk flexibility of men Kho–Kho players who have participated in the semifinals of South India inter university Kho–Kho tournament. The Study was carried out in 48 male players (12 from 4 teams) aged between 18 to 27 years. To achieve this objective YMCA Sit and Reach test was conducted to all the teams. For the YMCA sit and reach test a Yardstick is placed on the floor and tape is placed across it at a right angle to the 15-inche mark. The subject sits with the yard stick between the legs and legs extended at right angle to the taped line on the floor. Heels of the feet should touch the edge of the taped line and be about 10 to 12 inches apart. Repeat the remainder of procedures from the previous protocol.

<table>
<thead>
<tr>
<th>AGE</th>
<th>Percentile</th>
<th>18 - 25</th>
<th>26 - 35</th>
<th>36 - 45</th>
<th>46 - 55</th>
<th>56 - 65</th>
<th>&gt;65</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
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<td>F</td>
<td>M</td>
<td>F</td>
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</tr>
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<td>17</td>
<td>13</td>
</tr>
<tr>
<td>40</td>
<td>15</td>
<td>18</td>
<td>14</td>
<td>17</td>
<td>13</td>
<td>16</td>
<td>11</td>
</tr>
<tr>
<td>30</td>
<td>14</td>
<td>17</td>
<td>14</td>
<td>17</td>
<td>13</td>
<td>15</td>
<td>10</td>
</tr>
<tr>
<td>20</td>
<td>13</td>
<td>16</td>
<td>11</td>
<td>15</td>
<td>11</td>
<td>14</td>
<td>09</td>
</tr>
<tr>
<td>10</td>
<td>11</td>
<td>14</td>
<td>09</td>
<td>13</td>
<td>00</td>
<td>12</td>
<td>06</td>
</tr>
</tbody>
</table>

Based on data from YMCA of the USA the following may be used as descriptors for the percentile rankings. Well above average 90, above average 70, average 50, below average 30 and well below average 10.

**Presentation and Interpretation of Data:**

According to YMCA Sit and Reach test norms table, Average age group of the players is 18 to 25 years and well above average is 22 so the study shows that average trunk flexibility of all four University Kho-Kho teams are well above average.
Table 1. Average Trunk Flexibility Score of Intervarsity Kho-Kho players.

<table>
<thead>
<tr>
<th>Name of the University</th>
<th>Average Age</th>
<th>Average Score</th>
<th>Well Above Average</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangalore University</td>
<td>21</td>
<td>35.83</td>
<td>22</td>
</tr>
<tr>
<td>Mysore University</td>
<td>20.42</td>
<td>34.75</td>
<td>22</td>
</tr>
<tr>
<td>Kuvempu University</td>
<td>21.92</td>
<td>32.66</td>
<td>22</td>
</tr>
<tr>
<td>Calicut University</td>
<td>19.83</td>
<td>35.75</td>
<td>22</td>
</tr>
</tbody>
</table>

Table 1 shows that, the average flexibility of the players from all four universities are well above average. According to YMCA Sit and Reach test norms table, the Average age is 21, 20.42, 21.92 and 19.83. For this age group the well above average is 22, so all the universities have well above average flexibility level.

Table 2. Comparative Trunk flexibility score of south intervarsity Kho-Kho players.

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Mangalore University</th>
<th>Mysore University</th>
<th>Kuvempu University</th>
<th>Calicut University</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Age</td>
<td>Performance</td>
<td>Age</td>
<td>Performance</td>
</tr>
<tr>
<td>1</td>
<td>20</td>
<td>44</td>
<td>19</td>
<td>29</td>
</tr>
<tr>
<td>2</td>
<td>20</td>
<td>36</td>
<td>19</td>
<td>35</td>
</tr>
<tr>
<td>3</td>
<td>21</td>
<td>26</td>
<td>20</td>
<td>32</td>
</tr>
</tbody>
</table>
Table 2 shows that the Mangalore University players have comparatively better with 35.8333 score. The Calicut University players have performed very close to Mangalore University with 35.75 score and the Mysore University Players Scored 34.75 and the Kuvempu University players have performed 32.6667.

Table 3. Minimum & Maximum Trunk flexibility score of south intervarsity Kho-Kho players.

<table>
<thead>
<tr>
<th>University</th>
<th>Number of subjects</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean</th>
<th>Std. Deviation</th>
<th>C.V (in percent)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mangalore</td>
<td>12</td>
<td>26</td>
<td>44</td>
<td>35.8333</td>
<td>6.422</td>
<td>17.92</td>
</tr>
<tr>
<td>Mysore</td>
<td>12</td>
<td>29</td>
<td>40</td>
<td>34.75</td>
<td>3.768</td>
<td>10.843</td>
</tr>
<tr>
<td>Kuvempu</td>
<td>12</td>
<td>16</td>
<td>45</td>
<td>32.6667</td>
<td>8.161</td>
<td>24.983</td>
</tr>
<tr>
<td>Calicut</td>
<td>12</td>
<td>26</td>
<td>46</td>
<td>35.75</td>
<td>6.397</td>
<td>17.893</td>
</tr>
</tbody>
</table>
Table 3 shows the minimum and maximum level of flexibility performed by the players from all four universities. The Standard deviation shows that the variations of the flexibility level among the players in Mangalore University have 6.42 levels of variation Mysore University players have 3.768 level of variation, Kuvempu University players have 8.161 level of variation and the Calicut University players have 6.397 level of variation among them. The variability among the players from Kuvempu University is found to be maximum followed by Mangalore University and Calicut University. Variations in the trunk flexibility among the players from Mysore University are found minimum. Coefficient of Variation calculated and also suggest that players from Mysore University shown the highest consistency. (C.V= 10.843). One way Anova is carried out and found that, there is no significant difference in the mean scores obtained from the players of the deferent universities studied. (P=0.594).

**CONCLUSION**

In each and every team event the fitness level of the players should be equal. If there is a lack of consistency or variation between the players we cannot expect the good result in performance. One of the important findings of this study is, in trunk flexibility Mysore university players have very good consistency among them. The Calicut and Mangalore University players have almost same level of variation between the players and Kuvempu University players have maximum level of variation among them.

**REFERENCE**

1. American college of sports medicine.ACSM’s health related physical fitness Assessment manualLippincott Wilkins.