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Original Article

EFFECTS OF POWER TRAINING ON BLOOD SUGAR AMONG COLLEGE STUDENTS

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Abstract

The aim of this study was to find out whether improvements in glucose tolerance could be observed after power training in female under graduate students. Forty female students of teacher training college (n=40) were randomly selected as subjects and their age ranged between 21 and 25 years. The selected subjects were randomly assigned into two equal groups such as experimental group (EG) and control group (CG) with twenty subjects each (n=20). The experimental groups underwent their respective experimental treatment for twelve weeks three days per week and a session on each day. Control group was not exposed to any specific training apart from their curriculum. Fasting blood sugar level was taken as variable for this investigation. Analysis of covariance (ANCOVA) was used to analyze the collected data. The results revealed that the experimental group (EG) produced significant reduction ($p \leq 0.05$) due to power training on fasting blood sugar level when compared to control group (CG).

Key Words: Power training, fasting blood sugar, diabetes

Introduction

Power training is an exercise programme whether free or stationary weights are used for the purpose of increasing muscular strength, muscular endurance and power through which skills can be improved (Moran & McGlynn, 1997). The resistance is an attempt to bring about adaptation in tension dependent neural mechanisms that inhibit the excitation of motor neurons in voluntary maximal contradictions. Resistance training refers to strength training performed primarily to enhance a person’s appearance, symmetry, strength and well being (Bean, 1997). It is an anaerobic form of exercise (Teng et al. 2008). It is caused to enhance the ability of the body to perform at very high force or power for a very short period of time (Baechle, 1994). While the literature supports the efficiency of resistance training two or three times per week (Ramsay et al., 1990).

Blood sugar is a test for the levels of glucose in blood. Glucose is the primary source of energy for the body's cells, and blood lipids (in the form of fats and oils) are primarily a compact energy store (Hayashi et al., 1997). Glucose is transported from the intestines or liver to body cells via the bloodstream, and is made available for cell absorption via the hormone insulin, produced by the body primarily in the pancreas. Its measurement is important to the diagnosis of diabetes mellitus. The prime source of energy human cells is glucose which is a kind of sugar which passes through the blood system. When eat carbohydrates, glucose goes through body. The levels of glucose are kept normal by glucagon and insulin. Insulin is the hormone which is generated in the pancreas and discharged into the blood system when levels of glucose rise. Resistance training helps to improve the level of insulin generation (Miller et al., 1994; Anderson et al., 2003 & Henriksson, 1995). The “fasting blood glucose” test must have the individual fasting for at least 8 - 12 hours. Normal levels for this test are 70 to 100 mg/dl. Levels of blood sugar consistently higher than 150 mg/dl are a sign of high blood sugar also known as hyperglycemia. When the blood sugar level persistently falls to 70 are lower this is a sign of low blood sugar also know as hypoglycemia. Continual hyperglycemia causes diabetes mellitus, which is the most frequent disease connected to the regulation of blood sugar. Diabetes is a disease which can cause kidney, nerve and eye damage. Physical exercise helps to normalise blood sugar level and maintain health (WHO, 2008 & Craig et al., 1989). Gymnasium training is helps to normalize the level of blood sugar (Jason et al., 2008).

Materials and method

The aim of this study was to find out the impact of moderate intensity power training on fasting blood sugar
level of female college students. Forty (n=40) students from SNM Training College, Moothakunnam, Kerala, India were selected as subjects and the age of students were between 20 and 25 years. The selected subjects were randomly divided into two equal groups of twenty subjects each (n=20). The groups were one experimental group (EG) and one control (CG). During the training period, the experimental groups underwent their respective training programme for twelve weeks 3 days per week and a session on each day apart from their curriculum. Control group (CG), who did not participate in any specific training. Moderate intensity (60-70%) of resistance was used in this experimentation. Fasting blood sugar was selected as dependent variable for this study. It was measured by enzymatic glucose oxidase peroxidase (GOD-POD) method using Boehringer Mannheim kit. These are the exercise used as a resistance, bench press, squat, push press, heel raises, arm curl, leg curl, leg press, military press and sit ups.

Data analysis
Mean and standard deviation were calculated for fasting blood sugar for training group. And the data were analyzed by using analysis of covariance (ANCOVA). Statistical significance was set to priority at 0.01 and 0.05.

Table 1: Analysis of Covariance on Fasting Blood Sugar of Experimental Group and the Control Group

<table>
<thead>
<tr>
<th>Test</th>
<th>Experimental Group</th>
<th>Control Group</th>
<th>SOV</th>
<th>SS</th>
<th>df</th>
<th>MS</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pretest Mean</td>
<td>80.02</td>
<td>78.68</td>
<td>B</td>
<td>17.84</td>
<td>1</td>
<td>17.84</td>
<td>1.36</td>
</tr>
<tr>
<td>Post test Mean</td>
<td>71.19</td>
<td>78.29</td>
<td>B</td>
<td>504.88</td>
<td>1</td>
<td>504.88</td>
<td>24.27*</td>
</tr>
<tr>
<td>Adjusted Post test Mean</td>
<td>71.06</td>
<td>78.39</td>
<td>B</td>
<td>513.25</td>
<td>1</td>
<td>513.25</td>
<td>24.31*</td>
</tr>
</tbody>
</table>

F = (df 1, 38) (0.05) = 4.10 & (0.01) = 7.35; (p ≤ 0.05) & (p ≤ 0.01), F = (df 1, 37) (0.05) = 4.11 & (0.01) = 7.37; (p ≤ 0.05) & (p ≤ 0.01).

Results
Table I shows that the pre test mean of experimental and control groups are 80.02 and 78.68 respectively. The obtained F ratio of 1.36 for pre test mean is less than the table value 4.10 for df 1 and 38 required for significance at 0.05 level and table value 7.35 for df 1 and 38 required for significant at 0.01 level. The post tests mean of experimental and control groups are 71.19 and 78.29 respectively. The obtained F ratio of 24.27 for post test mean is higher than the table value 4.10 for df 1 and 38 required for significance at 0.05 and also higher than the table value 7.35 for df 1 and 38 required for significant at 0.01 level. The post tests mean of experimental and control groups are 71.06 and 78.39 respectively. The obtained F ratio of 24.31 for adjusted post test mean is higher than the required table value 4.11 for df 1 and 37 required for significant at 0.05 and 7.37 for 0.01 level. The result of the study indicated that there was a significant difference between the post test and adjusted post tests mean of gymnasium training group and control group on fasting blood sugar at 0.05 and 0.01 levels. The pre, post and adjusted post test mean values of experimental groups and control group on blood sugar level was graphically represented in the figure 1

Discussion
Power training has been shown to increase insulin sensitivity, decrease glucose intolerance (Sundell, 2011 & Neil et al., 2006). High blood glucose and high insulin levels can also have a deleterious effect on hypertension and blood lipids (Hurley, 1994). Mark et al., (2009) reported that strength training significantly reduced basal insulin levels and area under the insulin response curve following glucose ingestion. The decrease in insulin was significantly correlated with increase in lean body mass. Hurley et al. (1988) reported that insulin response to an oral glucose tolerance test was significantly lower following 16 weeks of resistance training. Improvements in glucose metabolism with strength training, independent of alterations in aerobic capacity or percent body fat, have been shown (Hurley et al., 1988). Interestingly, Smutok et al. (1993) and Irvin & Taylor (2009) concluded that strength training and aerobic training improved glucose tolerance and reduced insulin responses to oral glucose similarly. Miller et al., 1984 and Anson et al., 2008 point out that the resistance training differentially affects weight loss and glucose metabolism.

Conclusion
Now a day, strength training has been shown to be beneficial in improving many factors associated with good health. These factors include increased function and prevention of falls, decreased pain in chronic low back pain patients, improved glucose tolerance and insulin sensitivity, increased BMD, increased basal metabolic rate (weight control), and improved quality of life. It is concluded that the fasting blood sugar level can be decreased during the age between 20 and 25years of female students and favour the prescription of moderate intensity gymnasium training during the initial adaptation period. Finally, the studies presented in this review demonstrate that there was a significant difference on blood sugar due to moderate...
power training as compared to control group.

References