The purpose of the study was to find out the effects of 12 weeks equal-volume resistance training with different workout frequency on testosterone among college men students. The selected subjects were divided into Group I (3days in a week), Group II (5days in a week) and control group. The group I and group II named as experimental groups underwent resistance training program for 12 weeks as well as control group did not underwent any specific training program. The dependent variable testosterone was measured with the help of blood test before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance. The findings of the present study have shown that the degree and concentration of testosterone were significantly improved in the experimental group than in the control group. However, there were less or no significant differences in testosterone levels between the 5days in a week resistance training and 3days in a week resistance training group after the 12 weeks of training.

Objective of the study
The main objective of the study was to investigate the effects of 12 weeks equal-volume resistance training with different workout frequency on testosterone among college men students.

Methodology
The purpose of the study was to find out the effects of 12 weeks equal-volume resistance training with different workout frequency on testosterone among college men students. 45 men students were randomly selected and aged between 18-21 years. The selected subjects were divided into Group I (3days in a week), Group II (5days in a week) and control group. The group I and group II named as experimental group underwent resistance training program for three days per week especially on Mondays-Tuesday-Thursday-Friday-Saturdays for 12 weeks of resistance training as well as the control group did not underwent any training program. The training programme consists of whole body workout that trained the entire muscle group. The number of exercises, intensity, repetition, and set were manipulated every four weeks as the training progressed. The dependent variable testosterone was measured with the help of blood test before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance.

HYPOTHESES
It is hypothesis that there would be a significant difference among three days in week resistance training, five days in week resistance training and control groups on testosterone.

Table 1. Analysis of covariance for testosterone of the 3 days/week resistance training, 5 days/week resistance training and control groups

<table>
<thead>
<tr>
<th>Source of Variance</th>
<th>df</th>
<th>Mean square</th>
<th>F ratio</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control Group</td>
<td>2</td>
<td>215.33</td>
<td>107.661</td>
</tr>
<tr>
<td>Sum of squares</td>
<td>2</td>
<td>6897.73</td>
<td>373.71</td>
</tr>
<tr>
<td>3 days/week RT</td>
<td>1</td>
<td>709704.68</td>
<td>378.79</td>
</tr>
<tr>
<td>5 days/week RT</td>
<td>1</td>
<td>134.85</td>
<td>70.97</td>
</tr>
<tr>
<td>Pre-test mean SD</td>
<td>1</td>
<td>774.77</td>
<td>0.0</td>
</tr>
</tbody>
</table>

KEYWORDS
ABSTRACT

Introduction
The National Strength and Conditioning Association assert that a large number of people in society are suffering from obesity and diabetes due to sedentary lifestyle. Human diseases namely coronary artery disease, cancer, hypertension and chronic low back pain are strongly associated with obesity and diabetes (Wilmore et al., 2008). Therefore, people are largely acquainted with personalized exercise programs to lead a healthy lifestyle (France, 2008). However, studies are very limited on hormonal response among the younger age group in sports and physical education. In this scenario, the present study attempts to examine the effects of 12 weeks equal-volume resistance training with different workout frequency on testosterone among college men students.

Resistance training is also known as strength training or weight training. It is the capacity to overcome resistance or to perform against resistance and it is a product of voluntary muscle contractions caused by the muscles, bones, joints, heart, circulatory system, metabolism and nervous system (Hooper & Perrin, 1999). Specifically, resistance training is part and parcel of all motor components, skills and tactics. It enhances the performance of athletes in terms of muscular mass, strength, endurance and tone (Singh, 1991).

Hormone is defined as the chemical messenger of the human body that controls and coordinates the activities of the various parts of the body. It facilitates muscle development, growth, maturation and immune response irrespective of age. It is secreted by the endocrine glands in the human body and its substances regulate the functions of body cells, tissues, organs and systems (Hall, 2015). Further, hormones are not only produced from the pituitary, but also from the heart, kidney, liver and adipose tissue. However, there are differences that exists with regard to reproductive hormones like testosterone, estrogens and progesterone (Marín-García, 2011).

Testosterone is a steroid hormone produced in the Leydig cells of the testes that has anabolic effects on muscle tissue. Testicular secretion accounts for 95% of the circulating testosterone present in men. However, the majority of testosterone in the blood derives from metabolism of androstenedione. Due to the androgen anabolic activity within the muscle, it influences strength development and muscle hypertrophy (Kraemer et al., 2003). The quantity of testosterone secreted naturally varies depending on heredity among human beings. However, people with higher levels of testosterone are likely to become natural athletes, whereas people with lower levels of testosterone face challenges in gaining muscle and strength (Collins, 2002). Moreover, testosterone level naturally increases for the people those who are engaged in physical activity irrespective of age. In particular, people in sports and games have high levels of testosterone secretion naturally.

Objective of the study
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Methodology
The purpose of the study was to find out the effects of 12 weeks equal-volume resistance training with different workout frequency on testosterone among college men students. 45 men students were randomly selected and aged between 18-21 years. The selected subjects were divided into Group I (3days in a week), Group II (5days in a week) and control group. The group I and group II named as experimental group underwent resistance training program for three days per week especially on Mondays-Tuesday-Thursday-Friday-Saturdays for 12 weeks of resistance training as well as the control group did not underwent any training program. The training programme consists of whole body workout that trained the entire muscle group. The number of exercises, intensity, repetition, and set were manipulated every four weeks as the training progressed. The dependent variable testosterone was measured with the help of blood test before and after the training period. The collected data was analyzed by using (ANCOVA) analysis of covariance.
The above table shows the Scheffe's post hoc test results for the two experimental groups: the 3-day-a-week resistance training, 5-day-a-week resistance training and control groups are 408.29, 410.82 and 378.54, respectively. The obtained F ratio 43.73 is greater than the required table value of 3.22 for 2 & 41 degrees of freedom at 0.05 level of significance. Therefore, there is a significant change in testosterone as a result of the training program.

The adjusted post-test means of the 3-day-a-week resistance training, 5-day-a-week resistance training and control groups are 408.29, 410.82 and 378.54, respectively. The obtained F ratio 43.73 is greater than the required table value of 3.22 for 2 & 41 degrees of freedom at 0.05 level of significance. This result reveals that there is no significant change between the experimental and control groups after the training program.

The adjusted post-test means of the 3-day-a-week resistance training, 5-day-a-week resistance training and control groups are 407.28, 408.72 and 381.65, respectively. The obtained F ratio 0.19 is lesser than the required table 3.22 for 2 & 42 degrees of freedom at 0.05 level of significance. This result shows that there is no significant change in testosterone between the control and experimental groups before the training program.

Line diagram I. showing the mean values of testosterone of the 3 days/week resistance training, 5 days/week resistance training and control groups

DISCUSSION

The present study has shown that the degree and concentration of testosterone were significantly improved in the experimental group than in the control group. However, there were less or no significant differences in testosterone levels between the 5days in a week resistance training and 3days in a week resistance training group after the 12 weeks of training. This study reveals that the testosterone levels have a slight positive change in the experimental groups due to the vital factors of strength development and muscle hypertrophy. Moreover, testosterone response is necessarily dependent upon the frequency, volume and duration of training received. Resistance training increases the muscular strength through increased protein synthesis, functional adaptation, neuromuscular adaptation, increased dilation of blood vessels, lactate accumulation, blood flow in the testes and LH production. Elevated levels of testosterone have a direct stimulatory role in the above functions. In addition, the findings are observed while performing large muscle group exercises through dead lift, leg press and bench press with moderate to high frequency of exercises involving multiple sets. The results in the performance of resistance training are associated with the increased anabolic process. The above finding is substantiated by earlier findings (Taipale et al., 2014; Shakeri et al., 2012; Krüger et al., 2011; Ahtiainen et al., 2003; Volek et al., 1997; Mulligan et al., 1996; Potteiger et al., 1995; Craig et al., 1989).

REFERENCES