The Efficacy of a Health Ball Program in Reducing the Body Fat Ratio and Improvement Some Physical Fitness Elements among Teenagers Girls from Age of 15-18 Years

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Abstract: The aim of the research is studying the efficacy of a health ball program in reducing the body fat ratio and improvement some physical fitness elements among teenage girls from the age of 15-18 years. 32 teenager girls participated in health ball program of 12 weeks, 4 units a week. The time of the daily training unit in the start of the program is 30 minutes. The extension of the exercise is from 60-69% from the maximum capacity of the teenage to perform the exercise. The program for exercises by using health ball led to improving waist circle, thigh circle and the body fat ratio that led to raising the physical and functional efficacy for the research sample. The program for exercises by using health ball led to improvement in legs muscular strength; general muscular endurance; muscular endurance of legs; agility and dynamic balance. Data of the present work help to develop strategies to fight high body fat ratio with improvement of physical fitness among teenage girls.

Key words: Health ball %Muscular endurance of legs %Agility %Dynamic balance %Strength %Body fat ratio

INTRODUCTION

The natural approach of man towards happiness and welfare must go through the gates of health and well-being and without them, life would be difficult. Ill health makes life troublesome and this confirms the saying that health is a crown on the heads and those who are deprived from health and well-being knows their value greatly [1].

Obesity is serious problem that may cause several health problems at all ages, especially teenage phase. Obesity causes dangerous psychological problems so, girls of excessive weight face many annoyances due to their appearance and weight and this causes self-distrust and the feeling of lowness and it leads also to memory weakness, inability to concentrate and low academic achievement, therefore, they resort to non-mixing with community, being far away from occasions and they may also suffer from tension and depression [2].

The common causes of obesity among the children and the teenagers include bad nutrition system, non-practicing exercises. The most common type of obesity is the abdominal fat which are found in both men and women and it becomes difficult to get rid of them not only because they affect the individual's appearance but they also cause many health problems such as increasing the level of cholesterol, the second type of diabetes and high blood pressure that may lead to heart diseases or head stroke or triglycerides.

Fats loss is not an easy matter and it was found that jumping exercises aid in losing fats faster especially by using circular training. Exercises can be practiced safety and in a funny way in any place especially at home. On using jumping exercises, all the body moves and gets rid of wastes that accumulate inside and around the fat cells and cause distension. The force generated from jumping aids the lymphatic system to get rid of fats and drive them outside the body. Jumping exercises, at the same time, strengthen the bones, improve the quantity of oxygen brought to the body's cells and tissues, increase the production of the white blood cells and the red blood cells and improve the blood circulation and motivation the rate of metabolism in the body. Jumping exercises also help in the improvement some of physical fitness elements such as motion balance and harmony and help in decreasing the ratio of cholesterol in the blood [3].

Owing to the increasing of the obesity problem among the teenagers and the increasing in weight with
obesity harms. The present search was designed to evaluate the efficacy of a health ball program in reducing the body fat ratio and improvement of some physical fitness elements among teenagers girls from the age 15-18 years.

The Purpose of the Study:

C This study aims to design and implement a program of exercises with a Health ball and to identify its effectiveness on: reduce the body fat ratio.

MATERIALS AND METHODS

Research Sample: 32 teenage girls were selected for the present study from among the participants in the physical fitness unit in the Faculty of Physical Education, Zagazig University. Table 1 shows the means±SD for age (years), height (cm) and body weight (kg) with their Skew co-efficient (homogeneity of study sample).

Study design:
This study used experimental method by using pre - post measurement of one experimental group.

Methods

Recording Physical Tests Were Done Just Pre and Post Health Ball Exercises as Follows:

C The researcher used the following tests for the physical fitness elements:
C Measuring the strength of the legs muscles by the dynamometer.
C Measuring the strength of the back muscles by the dynamometer.
C Squat Thrusts or Burpee Test to measure the general muscular endurance.
C Half – Squat Jump Test for measuring the muscular endurance the legs.
C Zig Zag – run Test to measure agility [4, 5].

The Program of Exercises by Using the Health Ball:
The selected teenagers were subjected to health ball exercises for 12 weeks (4units weekly).

<table>
<thead>
<tr>
<th>Variables</th>
<th>SD±Mean</th>
<th>Skew co-efficient</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age (years)</td>
<td>1.09±16.34</td>
<td>0.348</td>
</tr>
<tr>
<td>Height (cm)</td>
<td>3.45±155.87</td>
<td>0.328</td>
</tr>
<tr>
<td>Weight (kg)</td>
<td>4.03±66.37</td>
<td>0.195</td>
</tr>
</tbody>
</table>

Description of Health Ball: PVC (ball) +PP (plate)
Shap: oval
Load bearing: 180Kg
Size: 40cmX26cm- It can be inflatable
Diameter of ball: 170-180mm
Characteristics: abrasion resistance, impact resistant and cold resistance.

The researcher set a training program by using the health ball. The total period time of the program is 12 weeks. There are 4 units a week. The time of the daily training unit in the start of the program is 30 minutes. The extension of the exercise is from 60- 69% from the maximum capacity of the teenage to perform the exercise. The daily exercises start with the part of warm up and general physical preparation during 5 minutes at the beginning of each training unit this part of the module aim to prepare and initialize the various organs of the body in an orderly and gradual to prevent various injuries, including general exercises for the body and to be difficult gradually take into account the exercises help all the body and performed between 55%-75% from the maximum of repetitions the right performance.

The Main Part: This part is the most important parts of the module daily because it will lead to achieving the goal of the program, beginning period is 20 minutes and gradually increase it to 35 minutes at the end of the program and contain such period on a set of exercises using Health ball is divided as follows:

1st, 2nd weeks: performing exercises with the bar support in the training hall to keep the balance among teenager.
3rd and 4th weeks: performing exercises with the bar support and the change of directions.
5th and 6th weeks: performing exercises in the middle of the training hall without use using arms during the performance.
7th and 8th weeks: performing exercises with the use of multiple formations to allow teenagers to exploit the available space with the change in direction within the training hall.
9th and 10th weeks: The Change in the form of exercises using arm exercise during performance jumping.

11th and 12th weeks: progress in the performance of exercises by adding exercises for the arms, head and Trunk in order to provide the level of compatibility during the performance. The intensity of exercises is from 60% to 69% of the maximum heart rate.

Statistical Analysis: Data were examined using a computerized statistical package (SPSS) Differences between measuring group were analyzed using paired samples T-Test. And Correlation between variables was assessed by a Pearson’s correlation coefficients. Significance was accepted at the p < 0.05 level.

RESULTS AND DISCUSSION

Table 2 and Fig.1 show that there are significant differences between pre and post- measurements for the experimental group in selected variables under discussion.

Calming Exercises: final part includes relax and rest exercises about 5 minutes. This part aims to return the body to the normal heart rate and body systems.

Table 2: Differences of physical fitness elements and measuring the body fat ratio between pre- post measurements (N= 20)

<table>
<thead>
<tr>
<th>Variables</th>
<th>Pre</th>
<th>Post</th>
<th>T test</th>
<th>Improvement Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>M±SD</td>
<td>M±SD</td>
<td></td>
<td></td>
</tr>
<tr>
<td>The strength of the legs muscles</td>
<td>49.50±1.27</td>
<td>60.25±1.20</td>
<td>*49.73</td>
<td>21.71</td>
</tr>
<tr>
<td>The strength of the back muscles</td>
<td>41.25±1.91</td>
<td>50.60±1.98</td>
<td>*71.23</td>
<td>22.66</td>
</tr>
<tr>
<td>General muscular endurance</td>
<td>16.90±1.41</td>
<td>27.85±1.63</td>
<td>*49.03</td>
<td>64.79</td>
</tr>
<tr>
<td>Muscular endurance the legs</td>
<td>6.95±0.99</td>
<td>17.35±0.93</td>
<td>*52.69</td>
<td>149.64</td>
</tr>
<tr>
<td>Agility</td>
<td>11.16±0.76</td>
<td>7.90±0.77</td>
<td>*20.25</td>
<td>29.21</td>
</tr>
<tr>
<td>Dynamic Balance</td>
<td>10.61±1.04</td>
<td>5.58±0.94</td>
<td>*50.82</td>
<td>47.40</td>
</tr>
<tr>
<td>Waist circumference</td>
<td>73.35±3.15</td>
<td>61.95±3.23</td>
<td>*17.20</td>
<td>15.54</td>
</tr>
<tr>
<td>Hip circumference</td>
<td>55.35±2.08</td>
<td>44.40±2.64</td>
<td>*16.72</td>
<td>19.78</td>
</tr>
<tr>
<td>The body fat ratio</td>
<td>31.07±1.15</td>
<td>25.83±1.11</td>
<td>*23.96</td>
<td>16.86</td>
</tr>
</tbody>
</table>

Value of (T) at the level of 0.05 = 2.093

* Significantly different from Pre- post training

Fig. 1: Significant differences between pre and post- measurements for the experimental group in selected variables under discussion
Table 3: Correlation coefficients results between the body fat ratio and some of physical fitness elements

<table>
<thead>
<tr>
<th>Variables</th>
<th>Correlate</th>
</tr>
</thead>
<tbody>
<tr>
<td>The strength of the legs muscles x body fat ratio</td>
<td>*0.587</td>
</tr>
<tr>
<td>The strength of the back muscles x body fat ratio</td>
<td>*0.495</td>
</tr>
<tr>
<td>The general muscular endurance x body fat ratio</td>
<td>*0.515</td>
</tr>
<tr>
<td>The muscular endurance of the legs x body fat ratio</td>
<td>*0.593</td>
</tr>
<tr>
<td>Agility x body fat ratio</td>
<td>*0.584</td>
</tr>
<tr>
<td>Dynamic Balance x body fat ratio</td>
<td>*0.599</td>
</tr>
</tbody>
</table>

Correlation is significant at the level 0.05 = 0.444

Table 3 shows that there is statistical correlation between the body fat ratio and the strength of the legs muscles, the strength of the back muscles, the general muscular endurance, the general muscular endurance and agility.

DISCUSSION

Table 2 shows significant increase in the post measurements in all physical elements (the strength of the legs muscles, the strength of the back muscles, general muscular endurance, the muscular endurance of the legs, agility, dynamic balance, waist circumference, hip circumference, and the body fat ratio). The highest ratio in improvement was the muscular endurance of the legs (149.24%) and the lowest was in the favor of the body fat ratio (16.86%).

Data reveal that the exercise program by the health ball which constantly uses the regressed jumps and has the greatest impact in decreasing the weight, waist circumference, hip circumference and the body fat ratio. It was found that by using jump exercises, all the body moves and gets rid of wastes that accumulate inside and around the fat cells. The strength generated from jumping helps the lymphatic system in getting rid of fats and driving them outside the body. This agrees with previous studies [6-9].

It has been reported that exercise training program improved lipid utilization and increases insulin sensitivity and reduce body fat. Also has been reported that chronic exercise that improves physical fitness, increases insulin sensitivity and reduce body fat [10].

The researcher sees that the differences and the improvement ratio of the muscular strength of (legs-back) due to the training program that depends mainly on jumping by the feet continually and that leads to developing and strengthening the muscles of the legs and the back. This improvement may be due to changing in the length of the muscles fibers. The continuing physical performance makes changes and adaptation of which the increasing of the number of fibers working in the muscle and the cross section of it or the size of the trained muscle and also its strength [11]. Our data show that the training program induced significant reduction in body weight subsequently improve the performance. Furthermore, this is related to the absolute muscular strength of the teenagers with obesity [12-14].

There are Other factors related to decreased muscle performance may be weakened force production, caused by increased mechanical work and increased moment of inertia due to higher trunk mass. Moreover, gravity may pull the trunk down, thus decreasing strength for abdominally obese individuals [15].

The researcher sees that the differences and the improvement ratio of the general muscular endurance and the muscular endurance of the legs may due to the continuity in doing the program exercises by using the health ball for 12 weeks that caused great effect on the muscular endurance element because the program includes trainings leading to make the big muscular groups in the body work regularly and related following up and in mild speed which have effective role on the muscular strength and also on the muscular endurance. This is consistent with prior study [16] which pointed out that developing the muscular strength is an important and essential element in developing and improving the muscular endurance that leads to the ability to work for a long time without feeling fatigue.

The researcher sees that the appeared improvement in the element of the motion balance is due to performing training in jumping, keeping balancing, changing directions continually, fusing several skills, all lead to developing balance and making the proper and suitable position on performing. The good balancing plays an important role in many of sport activities where the improvement in performing balance is considered an important form for the motion performance and its improvement is related to the improvement in several elements such as agility and coordination [17].
The results of this study accord with other studies [18-23] which confirm the influence of the different programs on the vestibular apparatus improvement and its efficacy on the stable and the dynamic balance, which is reflected in turn on improving several of the physical fitness elements such as agility and coordination. The program contributed also in improving agility through performing exercises on the health ball, changing the body positions in the air, doing exercises at the same time and fusing them such as turning and changing direction by doing several movements with hands and head.

Table 3 shows Correlation coefficients results between the body fat ratio and some of physical fitness elements, getting rid of the extra weight increase agility because the excessive weight reduces agility because it increases the inertia of the body and its parts and also reduces the speed of the muscles contraction and so, the speed of changing the positions of the body is reduced. The program aids to develop the muscular strength, increases the lean body weight and reduces body fat.

Overweight in a sample of 15–16-year-old teenagers was negatively associated with cardiorespiratory fitness, abdominal muscle endurance, explosive power, speed and agility. Motor skills were less related to weight status and flexibility was not affected at all by weight status. Self-reported physical activity was positively related to all components of physical fitness. However, in most tests, even highly active overweight individuals could not reach better than average fitness levels (compared with normal-weight individuals), because of the negative association between overweight status and fitness [24].

In summary the present work revealed that the health ball program improves the physical fitness and reduce the body fat ratio. Data of the present work may help to develop strategies to fight high body fat ratio with low physical fitness of teenage girls.

**CONCLUSION**

The program for exercises by using health ball led to improvement in measuring waist circumference, hip circumference and the body fat ratio that led to raising the physical and functional efficacy for the research sample.

The program for exercises by using health ball led to improvement in measuring legs muscular strength, muscular endurance of legs, agility and the dynamic balance.
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