The Influence of Nutritional and Active Lifestyle Education on Body Mass

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Abstract: *Proper nutrition education is one of the most important issues in the whole life, particularly in childhood and adolescence. The present study aimed to determine the effect of nutrition and active lifestyle educationon physical fitness factors of high school students. Besides, the present study aims to teach people how to control their body weight for improving their general health. For this purpose, the influence of nutritional education on BMI and body fat percentage (BF %) among high school students is studied.*
Keywords: *nutrition education, lifestyle, high school students, body figure*

I.   Introduction

Human needs to have a healthy body and lifestyle as well as an ideal weight. This is accomplished by providing the body with nutrients necessary through healthy diet. Fat concentration up to 15 % is considered an ideal weight. Average body fat for males is between 12 and 17 percent while it is between 19 to 24 percent for females. If body fat exceeds these figures, the person will suffer from obesity. Obese teenagers are more likely to suffer from chronic diseases like heart diseases, cancer and diabetes. Ageing is accompanied by fewer physical activities and more chronic diseases. It seems that the improvement of nutrition along with physical exercise can prevent these diseases to a large extent. Balanced diet results in development, health and longevity. It also improves mental development.

Malkber et al.(2009) and Selora(2013) reported that one-period nutritional education showed a meaningful reduction in subjects' average body mass index. The results of our study are consistent with this finding [1, 2]. ShafiNiya et al.(2009) conducted an study on female students(aged 10-11) and reported that there was a significant difference between students' attitudes , nutritional knowledge, and their physical exercise, and BMI(3). Babaie et al.(2011), in a study on 330 high school students, found out that there's a positive and meaningful relationship between nutritional knowledge and students' height, weight, body mass and fat percentage[4]. Neoby (2007) showed that balanced diet has a positive effect on BMI and obesity. Obese children are more subject to diseases. One of the effects of malnutrition is higher BMI [5]. In a study conducted by Reyner and his colleagues and also Larson and his colleagues on children and adolescents, they found out that there was no meaningful relationship between nutritional knowledge and obesity. They believed that effective prevention from obesity requires that nutritional education be accompanied by behavioral interventions and corrections. According to some studies, although children and teenagers are aware of harms caused by malnutrition, they don't make correct food choices. Increased consumption of high fat diary, less physical exercise and more sitting activities are some effective main factors of obesity among children and teenagers. In addition to biological factors, cultural factors such as knowledge, nutritional attitudes and behaviors are known as major factors of obesity. Thus, the recognition of these factors can open the way for further studies on the prevention and control of obesity among teenagers [6].

Jay Charki (1994) reported that fatty foods or increased fat in blood triples the likelihood of heart disease[7]. Khalaj and his colleagues (2004) conducted a study on fifth graders and found out that there was a meaningful relationship between students' nutritional education and LDL level, and blood triglyceride. This finding is consistent with Haghdoust and Pour Rnajbar's study [8].Researchers have shown that nutritional knowledge, a balanced diet, increased nutrients' intake such as protein and fiber and decreased fat intake reduce body fat. Chen Hen and his colleagues (2012) reported that body fat decreases at higher ages since muscular and bone mass shrink [9]. Both muscular and bone shrinkage result from the lack of physical exercise and healthy lifestyle. Rajabi*et al., (*2002) reported that physical exercise increases muscular mass but decreases body fat. On the other hand, the lack of physical activity decreases muscular mass but increases body fat [10].

According to studies, there's a close relationship between obesity and the lack of exercise. Diet decreases both body fat and fat-free mass. Physical exercise combined with diet can decrease fat and increase fat-free mass [11]. One of the efficient methods for improving body structure is proper diet. Diet influences on lipolysis process through activating sympathetic nerves, changing the density of effective hormones in lipolysis and changing cell membrane and its fluid [12]. Fat concentration over 15% is considered normal. Average body

fat for males is 12%-17% whilst it's 19%-24% for females. Body fat percentage higher than these figures is abnormal and a symbol of obesity [13].

The present article is arranged as ensued: In part 1, we introduce the issue. In part 2, we demonstrate the methodology. In part 3, we presentstatistical analysis. In part4, we accomplish the results and discussion. For part 5, a brief conclusion is given.

II. Methodology

This investigation was a semi-experimental investigation. A sample of 286 high school students (aged 14-17 years) was compared before and after the test. They were first divided into an experimental group (n=139) and a control group (n=147) and were asked to pass a pre-test. All subjects were asked to present their consumption and intake calories. A week before educational sessions, the height and weight of subjects were measured and recorded by Sega scale. In addition, subjects' body fat was measured using Caliper Sihan in the three parts of body: brachial triceps, thigh, above the iliac. Then, resulting values were added. Next, the percentage of fat was determined by Jackson/ Polack homogram. In educational classes, the importance of a healthy lifestyle, the improvement of eating behaviors and quitting improper habits, nutrition, food pyramid, healthy snacks, advantages and disadvantages of food classes according to the quantity and quality of food, the importance of food labels, and the consumption of low fat diary were explained.

Based on collected information, a lifestyle and nutrition educational program was designed and implemented on the experimental group, while the control group continued their routine diet. Teaching sessions lasted 45-60 minutes twice a week for two months. Lectures, booklets, educational films, educational workshops, handouts and educational pamphlets were distributed in these sessions. At the end of two months, a final test was given to the subjects. After having collected data, Kolmogorov- Smirnov test was used for checking natural data. Statistical T-test (independent T and dependent T) was applied for data analysis.

III. Statistical Analysis

3.1: The assessment of normality of data distribution

We used Kalmvgrvf- Smirnov in order to assess the normality of data distribution in two experimental and control groups. Tables 1-4 show that data normality assumption is confirmed by significance level at each test.

Table 1: Results from Kalmvgrvf- Smirnov for control group before education.

Control	Mean	SD	Z	Sig
BMI	21.67	3.30	0.89	0.42
%BF	23.82	4.71	0.89	0.39

Table 2: Results from Kalmvgrvf- Smirnov for control group after education

Control	Mean	SD	Z	Sig
BMI	21.29	3.27	1.11	0.16
%BF	23.10	4.03	1.10	0.17

Table 3: Results from Kalmvgrvf- Smirnov for experimental group before education

Experimental	Mean	SD	Z	Sig
BMI	21.66	3.66	0.58	0.88
%BF	23.79	5.06	1.16	0.13

Table 4: Results from Kalmvgrvf- Smirnov for experimental group after education

Experimental	Mean	SD	Z	Sig
BMI	18.43	3.21	0.92	0.35
%BF	18.65	2.69	1.06	0.21

Based on tables 1-4, all variables are normally distributed both in experimental and control group before and after the test.
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3.2: Hypotheses test: In this section, the hypotheses of our research are analyzed using statistical methods at significant level $(P < 0.05)$and shown in tables and diagrams. Since data are normal, we use dependent and independent t statistical method.

Table 5: Results from BMI test in experimental and control groups before and after education

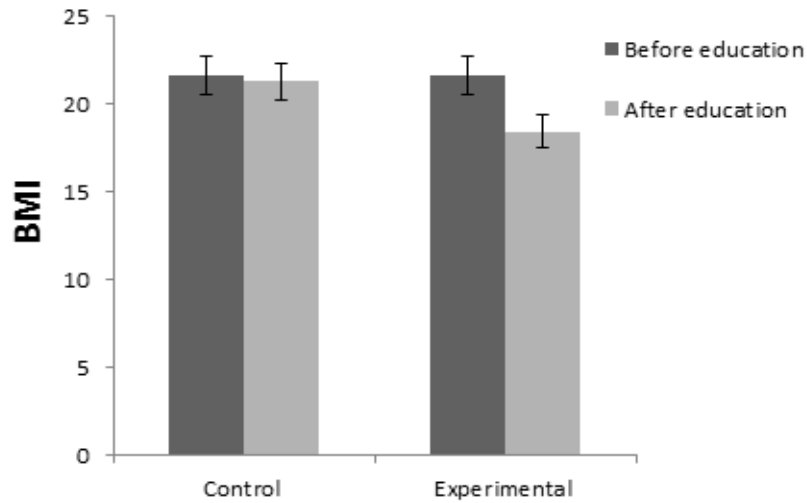|	Before education		After education		
Group	Mean	SD	Mean	SD	Sig
Experimental	21.66	3.66	18.43	3.21	0.000
Control	21.67	3.30	21.29	3.27	0.35

Intergroup significant difference $(P < 0.05)$

Table 6: Results from t independent test for the comparison of BMI between experimental and control groups

Group	Mean	Standard deviation	F (Loun) test	Significant level (Loun)	Mean	Sig
Experimental	3.23	2.02	1.83	0.17	2.86	0.000
Control	0.37	4.79				

t=4.82

Intergroup significant difference (P < 0.05)

Figure 1: BMI mean for experimental and control groups before and after education

Table 7: Results from BF % test for experimental and control groups before and after education
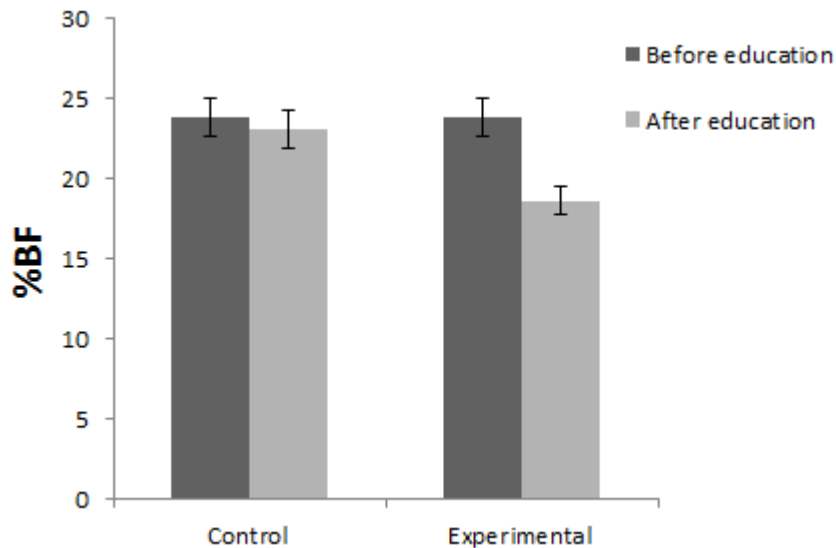
Group	Before education		After education		
	Mean	SD	Mean	SD	Sig
Experimental	23.79	5.06	18.65	2.69	0.000
Control	23.82	4.71	23.10	4.03	0.71

Intergroup significant difference(P < 0.05).

Table 8: Results from independent t test for the comparison of BF% between experimental and control groups

Group	Mean	Standard deviation	F (Loun) test	Significant level (loun)	Mean	Significant level
Experimental	5.14	3.51	0.001	0.97	4.42	0.000
Control	0.72	6.11				

Intergroup significant difference (P < 0.05)

Figure 2: %BF mean fat percentage for experimental and control groups (before and after education)

IV. Results And Discussion

Results from dependent t test indicated that there was a meaningful difference between BMI before and after education for the experimental group. However, no meaningful difference was discovered for the control group (Table 5). Given the changes in the average of t independent t test for the experimental and control group, we compared the differences between the experimental and control group (Table 6). According to the results, BMI was significantly different for the experimental group before and after the test.

Results from t dependent test showed that body fat decreased meaningfully in the experimental group after education. However, body fat remained constant for the control group (Table 7). Given the changes in the average of t independent test for the experimental and control groups, we compared the differences between the two groups (Table 8). According to the results, body fat reduced significantly for the experimental group after education, i.e. body fat was significantly lower in the end of final test compared with body fat in the pre-test.

V. Conclusions

It seems that the educational program can improve physical fitness and body composition of high school females. Thus, given the students' low awareness and the importance of proper nutritional attitude and performance for girls, it seems necessary to use a nutritional and active lifestyle educational program. It can be concluded that nutritional and healthy lifestyle education has a meaningful effect on female high school students' BMI and body fat (BF %).

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