Journal of Biology, Agriculture and Healthcare
ISSN 2224-3208 (Paper) ISSN 2225-093X (Online)
Vol.3, No.1, 2013

Program to Reduce Overweight and Obesity among School Age Females.

Maha Dawad
College of Applied Medical Science, King Khalid University, KSA
E-mail: maha_highsky@yahoo.com

The research is financed by the Deanship of the scientific research of the King Khalid University

Abstract:
Obesity is a medical condition in which excess body fat has accumulated to the extent that it may have an adverse effect on health, leading to reduced life expectancy and/or increased health problems. The aim of this study was reduce weight among overweight and obese female students. Experimental design was conducted at this study at the First Secondary School of Girls at Mohyeil Asser. All girl students of the First Secondary School at Mohyeil Asser (361students) were included at the first stage of this study to detect the obesity and overweight prevalence, then 62 students who matched the selective criteria were taken. The tools of the study contained an Interview questionnaire sheet included three parts: Part 1 about socio-demographic data of the students, Part 2 included dietary knowledge and habits questions, and Part 3 included obesity and weight-loss quality of life and weight related symptoms measures, Diet and exercise plans, and Health education booklet constructed by the researcher. Results revealed that; more than one quarter (28.5%) of the female students were underweight (BMI less than 25) while overweight students were (13.6%), mild obese students were (9.4%), and morbid obese students were (1.7%). No one of the students had normal BMI before the program and overweight and obese students were (48.4% & 51.6% respectively) but after the program students who had normal BMI became (22.5%) while overweight and obese became (47.5% & 30.0% respectively).The current study recommend that regular physical activity and exercise have to be a part from students' school day and to be generalized at all schools and colleges to reduce the obesity prevalence.
Key wards: overweight; obesity; Body Mass Index; Health education; physical activity.

1. Introduction

Obesity is a state of excess adipose tissue mass (WHO 2000). The clinical definition of obesity is a Body Mass Index (BMI) of 30 or higher. Obesity results when a person ingests more calories than burn off, if this happens regularly over a period of time, the body will store the extra calories as fat. (Garry 2011). Obesity is relatively common in European and Western Pacific countries, the average prevalence among these countries ranged from 10% to 25% indicated that obesity is a significant problem in these regions. Also the prevalence in the United State of America (USA) is 10-20% in men and 10% -25% in women. In Egypt, study conducted on school girls students in (2008) found 19.6% were overweight and 8.4%were obese. (National center of health statistics 2001), and (Abd-Elaziz 2008). Economically, Saudi Arabia is one of the growing countries, the owner of this growth lead to a significant change in people life patterns and habits , in particular the change in the nature of the food and physical activity level . It's noticeable that the quantity and quality of food consumed has increased clearly, especially fast food and soft drinks with high calories. Studies have shown that the rate of obesity in Saudi society has increased alarming, as the 23.6% of girls suffer from obesity while the percentage increased in overweight to 28.4%. (Research obesity center 2011).

Many predisposing factors may lead to overweight and obesity such as; 1- Genetic factors, environmental, over-consumption, eating too many high-fat or refined sugary foods, reduced energy expenditure, and family influence, 2- demographic factors such as age: gender, and ethnicity. 3- Socio-cultural factors such as educational level, income, and marital status. 4- Biological factors such as: parity. 5- Behavioral factors such as: dietary intake, smoking, alcohol consumption, and physical activity. (Morgan 2002) Children and adolescents are especial groups influenced by many factors in their eating behavior which may lead to overweight and obesity such as: family, life style, lack of time, peers and conformity to group norms, school food environment, fast food restaurant, and vending machines (French 2001). World Health Organization (WHO) stated that the classifications of overweight and obesity according to body mass index are; < 18.5 kg/m2 underweight, 18.5-24.9 kg/rn2 normal or 'acceptable' weight, 25.0-29.9 kg/m2 grade 1 overweight, 30.0-39.9 kg/m2 grade 2 overweight obesity, and > 40.0 kg/m2 grade 3 overweight morbid obesity (Jennifer 2008).

Overweight and obesity are important risk factors of cardiovascular diseases, which is the major cause of death for over 17 million deaths every year. Raised body mass index is a major risk factor of heart disease, stroke, type 2

diabetes and other chronic diseases. People who are obese are at a much higher risk for serious medical conditions such as high blood pressure, gallbladder disease, and different types of cancers than people who have a normal weight (Jacob and Katherine 2011). Obesity is a highly stigmatized physical state, both in terms of the undesirable body appearance, and in generalized attitude as being lazy, weak-willed, and unhygienic in personal habits. Also obesity is associated with lower educational attainment, household income, and rates of marriage, so obese individuals in particular children and adolescents suffer from deep psychological consequences. (Haslam 2005).The main treatment of obesity consists of dieting and physical exercise (Yanovski, and Nguyen 2002) Diet programs may produce weight loss over the short term, (Lau 2007) but maintaining this weight loss is frequently difficult and often requires making exercise and a lower calorie diet as a permanent part of a person's lifestyle (Rucker 2007).

2. Aim of the study

Reduce weight among overweight and obese female students.

2.1. **Objectives:**

- Identify the prevalence of obesity among school-age females
- Assess the dietary knowledge and habits among school-age female
- Discover the health and psychological problems associated with obesity
- Plan and implement diet and physical activity plans to reduce weight.

3. Subjects & Methods:

3.1. Study design and setting: Experimental design was conducted at the First Secondary School of Girls at Mohyeil Asser**.**

3.1.1. Sample: All girl students of the First Secondary School at Mohyeil Asser (361students) were included at the first stage of this study to detect the obesity and overweight prevalence, then 62 students who matching the selective criteria were taken.

3.1.1.2. Selective criteria of sample:

- Body Mass Index 25-39.9.
- Accept to participate in the study, and fill the consent of father's agreement.
- Free from hormonal or chronic diseases
- Doesn't take any medication especially hormonal drugs.
- Have no diet or exercise plan to reduce weight.

3.1.1.1. Tools of the study:

3.1.1.1.2. An Interview questionnaire sheet contained three parts:

- **Part 1** included socio-demographic data of the students such as: age, academic year, social class, economic state, marital state…etc. Also this part contained students' medical history, record of weight, height and body mass index, HGB, blood sugar, blood pressure, and hormones as: thyroid and Cortisol hormone.
- **Part 2** included dietary knowledge and habits questions.
- **Part 3** included obesity and weight-loss quality of life and weight related symptoms measures.

3.1.1.1.3. Diet and exercise plans.

3.1.1.1.4. Health education booklet constructed by the researcher.

3.1.1.1.5. Procedures:

- The researcher measured weight and height of all girl students of the school and calculate the body mass index of them to detect overweight and obese students. After detection of the overweight and obese students, the researcher obtained the sample according to: 1. The selective criteria, 2. Results of hormones investigation and Hgb.3. Consultation of medical consultant. The sample was 62 girl students.
- Written agreement of participants' fathers was taken from the students after explanation of the study aim and objectives. The students after that were given an opportunity to refuse participation, and withdraw at any phase of research if they want. Also they were assured that the information will remain confidential and will be used for the research purposes only.
- A pre-test questionnaire sheet was distributed to collect data before the program. This questionnaire contained many parts: The first part contained questions that cover socio-demographic data of the students, measurements as (weight, height, BMI, blood pressure), investigations as (HGB, blood sugar, hormones) and medical history. The second part of the questionnaire contained 13 questions asked about eating habits of the students, and 8 questions asked about the students' knowledge about obesity and balanced diet. The third part

of the questionnaire assessed the effect of obesity on physical health and quality of life through 8 questions assessed effect of obesity on body image and self trust, 5 questions assessed the social stigma because of obesity, 3 questions asked about feeling during trying of body weight reduction, and 17 questions assessed the physical health problems.

- Exercise and diet plans after that were explained to the participants and performed for three months; diet plan based on low caloric diet (1000 calories per day) and exercise plan based on using of (Motorized treadmill, machines to strength abdominal muscles like AB-coaster, AB-king brow, Elliptical, speed bike) for 20-30 minutes per day for 3-5 days per week. The researcher measured students' body weight regularly every 2 weeks and recorded it to follow the program progress.
- Also health education booklet contained knowledge about obesity, balanced diet, and schedules of food calories was distributed to the students. The researcher divided the students into small groups and explained this knowledge on sessions to improve their health awareness.
- A post-test questionnaire sheet was distributed to collect data after the program, this data was about the students' body weight, knowledge about obesity and balanced diet, and eating habits.

3.1.1.1.6. Statistical design:

Data was collected , coded, and entered to the SPSS program by which analysis was conducted through applying frequency tables with percentage and cross tabulation. The tests of significant were t test and chi square. Statistical significant was considered at p-≤0.05

4. Discussion:

The current study revealed that overweight students were (13.6%), mild obese students were (9.4%), and morbid obese students were (1.7%), these results are in agreement with (Al Junaibi et 2012) who found (14.7%) of the students were overweight, and (18.9%) of them were obese in the study conducted in the United Arab Emirates. Also the current study stated that the majority of the students had high income and (17.7%) of them had obese mothers. These results are in consistence with (Leal et al 2012) who found that the overweight adolescents in the study conducted in Brazil had high income, and maternal overweight associated with overweight children and adolescents. Also these finding is in consistence with (Sharp 2007) who reported that by the time off-spring of overweight mothers are 15 times more likely to be obese compared with lean mothers.

High percentage of obese students had housewife mothers in the current study, this result is in agreement with (El-Sayed 2007) who observed the increase of overweight and obesity among students whose mothers were not working. More than one quarter of the students had irregular menstrual cycle in the present study. This is may be attributed to disturbances in hormonal, nutritional, or psychological state. This result is in same line with (Pasquali et al 2007) who noticed that obesity can cause menstrual period problems because it significantly associated with a condition called polycystic ovaries(PCO) and recommended reducing weight among obese females to improve the state of menstrual irregularity.

The current study stated that the majority of the students had disturbed mood and need support when trying to lose weight, also more than two thirds of them had unsatisfying degree of self trust because of obesity. These findings are in accordance with (Abd-Elaziz 2008) who found more than half of the obese students had unsatisfying self image and self esteem. Also Abd-Elaziz found more than half of the obese students had disturbed mood when trying to lose their weight and need encouragement and support from others to continue weight lose program. The current study revealed that nearly all students had poor knowledge about obesity and balanced diet before the program which improved after the program as a result of health education. This result is in consistence with (Abd-Elaziz 2008) who found lack of knowledge among obese students before health education intervention which improved after health education intervention.

Nearly all students had unsatisfying eating habits before the program, especially in the areas of escaping their breakfast, didn't eat vegetables and fruits. This result is in agreement with (Vaezghasemi et al 2012) who found overweight/obesity was associated with skipping breakfast. The present study revealed that one quarter of the overweight and obese students had low HGB value. This result is in consistence with (Ursula et al 2012) who found overweight girls presented lower Hb levels than those who were not overweight in their study.

All students were physically inactive before the program which improved after the program and affect on their BMI in form of nearly one quarter of the students had normal BMI. This result is in accordance with (Vaezghasemi et al 2012) who found overweight/obese boys and girls in their study were often physically inactive. Also this finding is in agreement with (Al-Nakeeb et al 2012) who founded significant associations between Body Mass Index (BMI),

physical activity and sedentary behaviors; the youth with higher BMI reported lower levels of physical activity and higher amounts of sedentary time. At the same line the current study is in agreement with (Salcedo et al 2010) who found the physical activity program lowered the frequency of overweight in girls and reduced total cholesterol in both girls and boys in their study.

5. Conclusion:

Based on the study findings, it can be concluded that regular physical activity under supervision have effect on obese persons and reduce their overweight. Also health education can improve the students' health awareness.

6. Recommendation:

- Regular physical activity and exercise have to be a part from students' school day and to be generalized at all schools and faculties to reduce the obesity prevalence.
- Students' curriculum should contain parts about human health, nutrition, obesity, diseases their improve their health awareness.

References:

World Health Organization (WHO) (2000): definition of obesity. p6 www.who.net

Garry Crystal (2011): what is the clinical definition of obesity? Available at www.wisegeek.com

National center of health statistics, (2001)

Abd-Elaziz M, Abass S, and Koura S, (2008): The impact of health education intervention to control obesity among faculty of nursing students at Zagazig University.MD thesis, Faculty of Nursing. Zagazig University.

Research obesity center, (2011): www.obesitycenter.edu.sa

Morgan cm, Yanovski SZ, & Nguyen TT, (2002): Psychopathology in overweight children. Int J Eat Disorders.31:430-441

French SA, et al, (2001): Pricing and promotion effects on low fat vending snack purchases: the CIII P S study. Am J public health. 91:112-117

Jennifer R. Scott (2008): Obesity FAQ: What Causes Obesity? www.About.com Guide

Jacob C Seidell and Katherine M Flegal (2011): Downloaded from bmb.oxfordjournals.org by guest on April 28, Britijh M.dical Bulletin 1997; 53 (No. 2):23&-252

Haslam DW, James WP (2005): "Obesity": Lancet 366 (9492): 1197–209.

Yanovski, and Nguyen, (2002).

Lau DC, Douketis JD, Morrison KM, Hramiak IM, Sharma AM, Ur E (2007): Canadian clinical practice guidelines on the management and prevention of obesity in adults and children. CMAJ 176 (8): S1–13.

Rucker D, Padwal R, Li SK, Curioni C, Lau DC (2007): "Long term pharmacotherapy for obesity and overweight: Updated meta-analysis". BMJ 335 (7631): 1194–99. d

Al Junaibi A, Abdulle A, Sabri S, Hag-Ali M, Nagelkerke N (2012): The prevalence and potential determinants of obesity among school children and adolescents in Abu Dhabi, United Arab Emirates. Int J Obes (London). 2012 Aug 14.doi: 10.1038\ijo.2012. 131.

Leal VS, de Lira PI, Oliveira JS, de Menezes RC, Sequeira LA,de Arruda Neto MA, de Andrade SL, Batista Filho M (2012): Overweight in children and adolescents in Pernambuco State, Brazil: prevalence and determinants. Cad Saude Publica, 2012 Jun;28(6):1175-82

Sharp A, (2007): Mothers linked to children's obesity. Located at: www.theage.com.au\news\national\mothers-linked-to children.

El-Sayed EE, (2007): A health education intervention for management of overweight and obesity among students of secondary schools in Zagazig city. MSc thesis. Faculty of medicine Zagazig University.

Pasquali R, Patton L, and Gambineri A,(2007): Obesity and infertility current opin endocrinal diabetes obes. Dec; 14(6):4827.

Vaezghasemi M, Lindkvist M, Ivarsson A, Eurenius E, (2012): Overweight and lifestyle among 13-15 year olds: a cross-sectional study in northern Sweden. Scand J Public Health. 2012 May;40(3):221-8. Department of Public Health and Clinical Medicine, Epidemiology and Global Health, Umeå University, Umeå, Sweden.

Ursula Viana Bagnia, Ronir Raggio Luizb, Gloria Valeria da Veigaa, (2012): Overweight is associated with low hemoglobin levels in adolescent girls. Asian Oceania Association for the Study of Obesity. Published by Asia Oceania Assoc.

Al-Nakeeb Y, Lyons M, Collins P, Al-Nuaim A, Al-Hazzaa H, Duncan MJ, Nevill A.(2012): Obesity, physical activity and sedentary behavior amongst British and Saudi youth: a cross-cultural study.Int J Environ Res Public Health. 2012 Apr;9(4):1490-506. Epub 2012 Apr 16.
Salcedo Aguilar F, Martínez-Vizcaíno V, Sánchez López M, Solera Martínez M, Franquelo Gutiérrez R, Serrano Martínez S, López-García E, Rodríguez-Artalejo F. (2010): Impact of an after-school physical activity program on obesity in children.J Pediatr. 2010 Jul;157(1):36-42.e3. Epub 2010 Mar 15.Source, Family & Community Medicine Teaching Unit, Servicio de Salud de Castilla-La Mancha, Cuenca, Spain

Figure 1: Prevalence of obesity among secondary female students

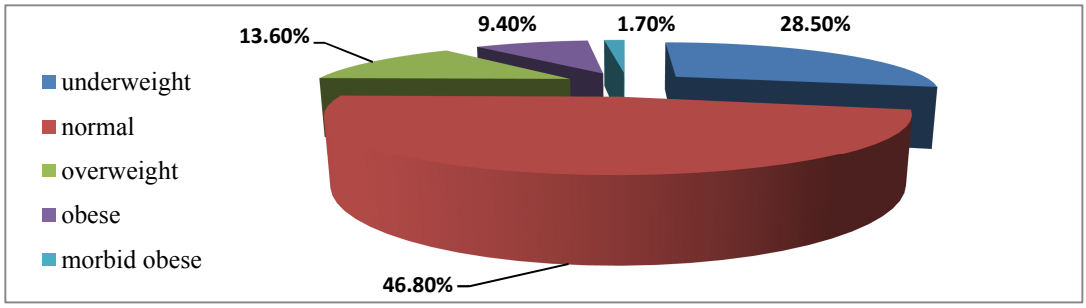


Figure 1 portrays that more than one quarter (28.5%) of the female students were underweight (BMI less than 25) while overweight students were (13.6%), mild obese students were (9.4%), and morbid obese students were (1.7%).

Table 1: Family medical history of the female students.

Family History	Frequency Total n=62	Percentage 100%
Family member had obesity:		
• No one	27	43.5
• Father		
• Mother	4	6.5
• Parents		
• Others	11	17.7
	6	9.7
	14	22.6
Family member had Diabetes Mellitus:		
• No one	26	41.9
• Father		
• Mother	22	35.5
• Parents		
• Others	8	12.9
	1	1.6
	5	8.1

Table 1 shows that, (6.5%) of the students' had obese fathers, while (17.7%) of them had obese mothers, and (9.7%) of them had obese parents. Regarding the family member had Diabetes Mellitus, more than one third of the students had diabetic fathers (35.5%) and (12.9%) of them had diabetic mothers.

Figure 2: The effects of obesity on the students' quality of life

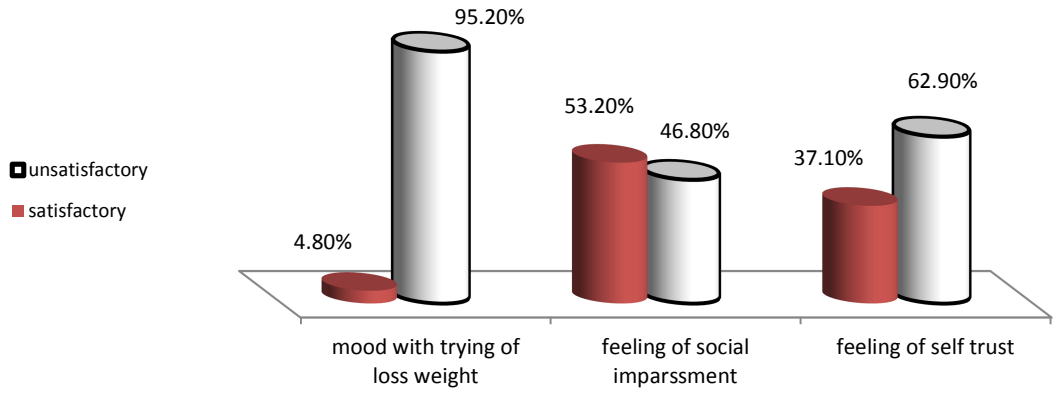


Figure 2 illustrates that, nearly two thirds (62.9%) of the students had unsatisfactory degree of self-trust, and the majority of them (95.2%) had disturbed mood and need support when trying to loss their weight.

Figure 3: Students' Body Mass Index before and after the program

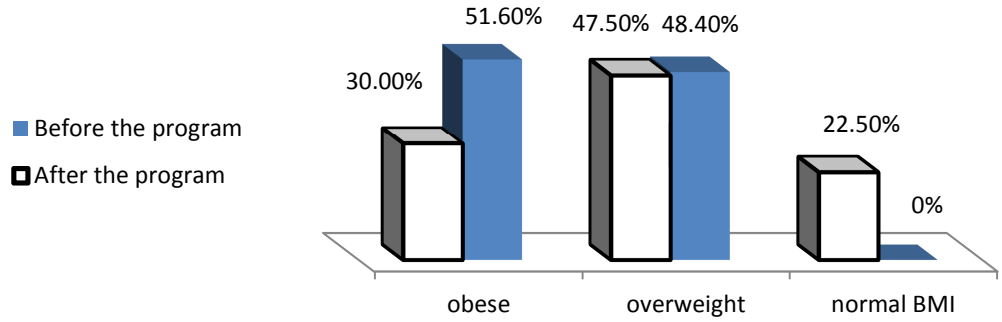


Figure 3 portrays that, no one of the students had normal BMI before the program and overweight and obese students were (48.4% & 51.6% respectively) but after the program students who had normal BMI became (22.5%) while overweight and obese became (47.5% & 30.0% respectively).

Table 2: Socio-demographic characteristics of the female students

Socio-demographic characteristics	Frequency Total number=62	Percentage 100%
Age:		
15-17	40	64.5
18-20	22	35.5
Grade :		
First year	15	24.2
Second year	31	50.0
Third year	16	25.8
Nationality:		
Saudi Arabia	57	91.9
Other	5	8.1
Marital status:		
Single	57	91.9
Married	4	6.5
Other	1	1.6
Family income:		
sufficient with store	26	41.9
sufficient only	32	51.6
not sufficient	4	6.5
Mother education:		
High	6	9.7
Middle	32	51.6
Illiterate	24	38.7
Mother working:		
Working	6	9.7
Not working	56	90.3

This table shows that nearly two thirds of the female students were aged from 15-17 years old and belonged to the second year of the secondary education (64.5%, 50.0% respectively). Concerning the nationality, and marital status, the majority of the students were single , and from Saudi Arabia (91.9%,). Also the majority of the students had not-working mothers but had sufficient income or sufficient with store (90.3%, 93.5% respectively).

Table 3: Health measurements and investigations of the female students

Measurements	Mean		Std. deviation
HGB	11.7		1.3
	Hgb value		
	Normal	Abnormal	
	74.2%	25.8%	
Random Blood sugar	101.2		11.3
Systolic blood pressure	114.4		15.5
Diastolic blood pressure	72.7		11.6
Body weight	72.4		8.6
Body height	1.5		4.9
Hormones investigation: Cortisol	297.4		141.3
E2	92.7		102.5
FRT4	13.5		3.7
FRT3	5.0		0.4
TSH	2.9		4.8
hFSH	5.9		2.8
hLH	10.0		9.4

This table shows that, regarding the random blood sugar, hormones investigation, systolic, and diastolic blood pressure; students' results were normal but more than one quarter of them had low HGB value (25.8%).

Table 4: Relationship between Body Mass Index and socio-demographic data of the female students

Elements	Categories of BMI						X	P value
	Overweight		Mild obese		Moderate obese			
	N	%	N	%	N	%		
Age:								
15-17	17	27.4	20	32.3	3	4.8	0.22	0.8
More than 17	10	16.1	11	17.7	1	1.6		
Nationality:								
Saudi Arabia	24	38.7	29	46.8	4	6.5	0.79	0.67
Other	3	4.8	2	3.2	0	0.0		
Father education:								
Low	5	8.1	5	8.1	0	0.0	0.91	0.92
Middle	12	19.4	14	22.6	2	3.2		
High	10	16.1	12	19.4	2	3.2		
Mother education:								
Low	8	12.9	14	22.6	2	3.2	4.71	0.31
Middle	15	24.2	16	25.8	1	1.6		
High	4	6.5	1	1.6	1	1.6		
Mother work:								
Housewife:	23	37.1	29	46.8	4	6.5	1.61	0.44
Working	4	6.5	2	3.2	0	0.0		
Family income:								
Insufficient	1	1.6	2	3.2	1	1.6	5.59	0.23
Sufficient	12	19.4	17	27.4	3	4.8		
Sufficient and store	14	22.6	12	19.4	0	0.0		

This table shows that, high percent of obesity categories was founded among students had housewife mothers than students had working mothers (37.1% overweight, 46.8% mild obese, and 6.5% moderate obese) compared to (6.5%, 3.2%, 0.0%) but these differences were statistically insignificant. Also high percent of obesity categories was founded among students who had sufficient or sufficient with store income (42.0% overweight, 46.8% mild obese, and 4.8% moderate obese) compared to (1.6%, 3.2%, 1.6%) of low income students. However these differences were statistically insignificant.

Table 5: Relationship between the students' Body Mass Index and their health complains

Health complains	Categories of BMI						X^2	P value
	Overweight		Mild obese		Moderate obese			
	N	%	N	%	N	%		
Regularity of menstrual cycle:								
• Regular	22	35.5	20	32.3	3	4.8		
• Irregular	5	8.1	11	17.7	1	1.6	2.10	0.35
Difficult of breathing :								
• Yes	5	8.1	8	12.9	2	3.2		
• Sometimes	11	17.7	17	27.4	2	3.2	5.66	0.22
• No	11	17.7	6	9.7	0	0.0		
Tiredness:								
• Yes	5	8.1	8	12.9	0	0.0		
• Sometimes	13	21.0	14	22.6	3	4.8		
• No	9	14.5	9	14.5	1	1.6	2.04	0.72
Knee and joint pain:								
• Yes	10	16.1	8	12.9	0	0.0		
• Sometimes	6	9.7	10	16.1	3	4.8		
• No	11	17.7	13	21.0	1	1.6	5.34	0.25
Headache:								
• Yes	7	11.3	0	0.0	2	3.2		
• Sometimes	8	12.9	17	27.4	0	0.0		
• No	12	19.4	14	22.6	2	3.2	14.4	0.006*

This table shows that (8.1% of overweight, 17.7% of mild obese, and 1.6% of moderate obese) students had irregular menstrual cycle compared to (35.5% of overweight, 32.3% of mild obese, and 4.8% of moderate obese) students had regular menstrual cycle but these differences were statistically insignificant. Also students who had difficulty with breathing ranged from yes to sometimes were (25.8% of overweight, 40.3% of mild obese, and 6.4% of moderate obese) compared to (17.7% of overweight, 9.7% of mild obese, 0.0% of moderate obese) those who had normal breathing. However these differences were statistically insignificant**.**

At the same line students had tiredness ranged from yes to sometimes were (29.1% of overweight, 35.5% of mild obese, and 4.8% of moderate obese) compared to (14.5% of overweight, 14.5% of mild obese, 1.6% of moderate obese) those who had no complain. However these differences were statistically insignificant**.** Also students who had headache ranged from yes to sometimes were (24.2% of overweight, 27.4% of mild obese, and 3.2% of moderate obese) compared to (19.4% of overweight, 22.6% of mild obese, 3.2% of moderate obese) those who had no complain, and these differences were statistically highly significant **(p = 0.006).**

Table 6: Students' body weight before and after the program

Body weight	Mean	Std. deviation	T test	P value
Before the program	73.112	8.801	7.43	0.000*
After the program	67.850	9.678		
Percentage of weight reduction	7.261	5.832		

table 6 shows that, statistically significant differences (p = 0.000) were founded between the students' body weight before and after the program with percentage of weight reduction = mean 7.261&St 5.832.

Table 7: Students' eating habits before and after the program

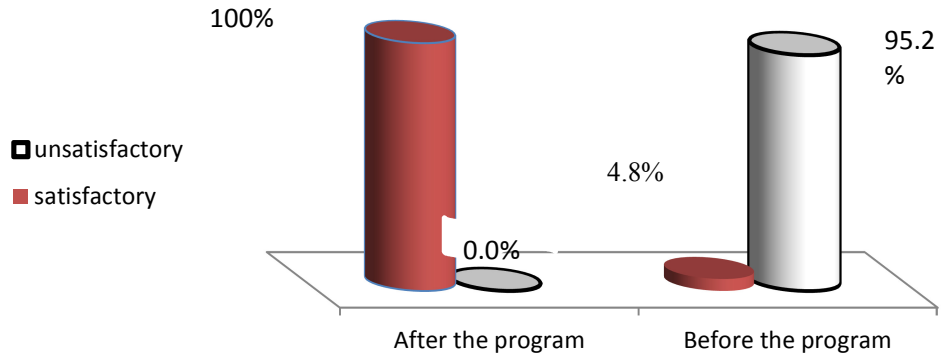
Eating habits	Before the program		After the program		Z test	P value
	Frequency N =62	Percentage 100%	Frequency N =40	Percentage 100%		
Daily eating of breakfast:						
No	52	83.9	34	85.0	*.000[a]*	*1.000*
Yes	10	16.1	6	15.5		
Daily drinking of milk:						
No	51	82.3	35	87.5	*-.707[b]*	*.480*
Yes	11	17.7	5	12.5		
Eating three meals per day:						
No	50	80.6	34	85.0	*-.302[b]*	*.763*
Yes	12	19.4	6	15.0		
Eating low fat diet:						
No	14	22.6	6	15.0	*-1.213[c]*	*.225*
Yes	48	77.4	34	85.0		
Drinking of soft drinks daily:						
No	33	53.2	17	42.5	*-.243[c]*	*.808*
Yes	29	46.8	23	57.5		
Participate in physical activity:						
No	47	75.8	0	0.0	*-5.196[c]*	*.000*
Yes	15	24.2	40	100		
Eating vegetables and fruits regularly:						
No	51	82.3	22	55.0	*-2.183[c]*	*.029*
Yes	11	17.7	18	45.0		

This table shows that, the majority of the students before and after the program didn't eat daily breakfast, or drink daily milk, and didn't eat three meals per-day (before the program 83.9%, 82.3%, and 80. 6%) respectively and (after the program, 85.0%, 87.5%, 85.0% respectively) however these differences were statistically insignificant. (p=1.000, 0.48, and 0.76)

Also (17.7%) of the students before the program were eating vegetables and fruits regularly, this percentage improved to (45.0%) after the program, compared to (82.3%) students didn't eat it before the program which

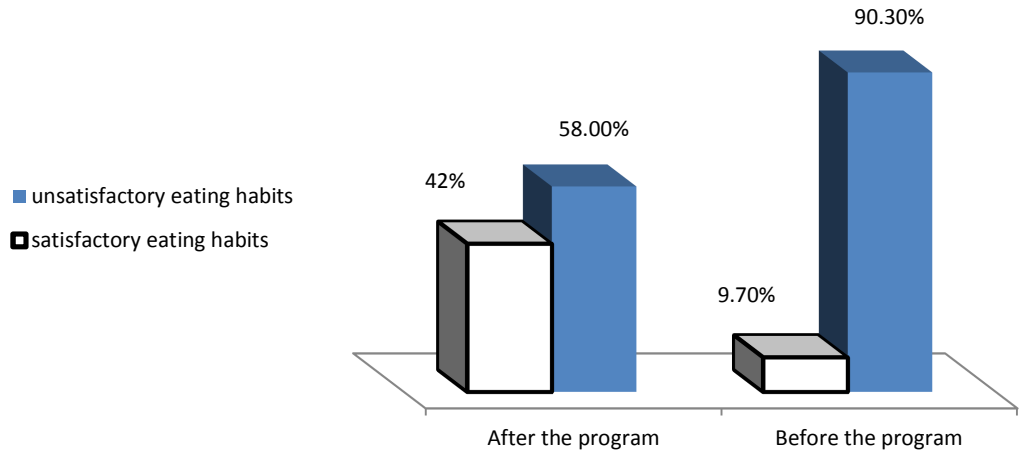
became (55.9%) after the program and these differences were statistically significant.(p=0.02)
Statistically Significant improvement occurred among students after the program regarding to participation in physical activity, only (24.2%) of the students were participating in physical activity before the program became (100%) after the program.

Figure 4: students' knowledge about obesity before and after the program



This figure illustrates that, students who had satisfactory knowledge about obesity before the program were (4.8%) but this percentage improved and became (100%) after the program.

Figure 5: Students' Eating habits before and after the program



This figure clarifies that, students who had satisfactory eating habits before the program were (9.7%) but this percentage improved and became (58.0%) after the program.

This academic article was published by The International Institute for Science, Technology and Education (IISTE). The IISTE is a pioneer in the Open Access Publishing service based in the U.S. and Europe. The aim of the institute is Accelerating Global Knowledge Sharing.

More information about the publisher can be found in the IISTE's homepage: http://www.iiste.org

CALL FOR PAPERS

The IISTE is currently hosting more than 30 peer-reviewed academic journals and collaborating with academic institutions around the world. There's no deadline for submission. **Prospective authors of IISTE journals can find the submission instruction on the following page:** http://www.iiste.org/Journals/

The IISTE editorial team promises to the review and publish all the qualified submissions in a **fast** manner. All the journals articles are available online to the readers all over the world without financial, legal, or technical barriers other than those inseparable from gaining access to the internet itself. Printed version of the journals is also available upon request of readers and authors.

IISTE Knowledge Sharing Partners

EBSCO, Index Copernicus, Ulrich's Periodicals Directory, JournalTOCS, PKP Open Archives Harvester, Bielefeld Academic Search Engine, Elektronische Zeitschriftenbibliothek EZB, Open J-Gate, OCLC WorldCat, Universe Digtial Library , NewJour, Google Scholar