

## Impact Of Health Education Programme About Obesity For Obese Female Employee At Assiut University

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### Abstract

Egypt is one of the countries in the world where the problem of obesity has been nearing an epidemic level. Currently, nearly 70% of adult women and 48% of men in Egypt are overweight or obese. This study aimed to evaluate the impact of the health education programme to control obesity among female employees at Assiut University. A quiz-experimental design was used to apply health education intervention. A convenient sampling technique was utilized. Data was collected using *two tools*, the *first tool*, self administered questionnaire it cover two parts, *part one* included socio-demographic. *Part two* consisted female employees' knowledge about nutrition and obesity) the *second tool* Anthropometric measurements (waist circumference weight, height, and BMI). The mean age was  $45.60 \pm 9.65$ . The results illustrated that about three quarters (74.0%) of the studied sample has poor knowledge in pre-test compares to only (12.0%) in post-test had poor knowledge. Also more than one quarter (26.0%) of the studied sample had satisfactory level of knowledge in pre-test, while in post-test more than half (54.0%) of them have the satisfactory level of knowledge. There is a significant difference in pre/post tests of female employees' knowledge. Conclusion the health education program has an effective role in improvement of knowledge about balanced diet and obesity. Also, recommended that Booklets of Arabic language about obesity and management of body weight should be available in library of faculties. Increase public awareness about balanced diet, nutritional needs in every age group.

**Key Words:** *Obesity, Body Mass Index and Health Education Programme*

### Introduction

Overweight and obesity are defined by the World Health Organization as abnormal or excessive fat accumulation that may impair health. WHO projects that by 2015, approximately 2.3 billion adults will be overweight and more than 700 million adults will be obese. Obesity is a chronic disease, and is the most common disorder of lipid metabolism in humans. The incidence and development of obesity is affected by different factors such as social, behavioral, cultural, physiological, metabolic and genetic factors. Although, its history goes back to the Stone Age, overweight and obesity were considered as one of the main problems of health systems of countries after the industrialization of societies (IOT, 2010, Rezazadeh et al., 2010 and WHO, 2012).

Excess body weight is a major public health problem affecting over 1.5 billion people worldwide. Fundamentally, excess body weight results from long-term positive energy balance, i.e. when energy intake persistently exceeds energy expenditure. Multifarious factors impact a person's ability to successfully achieve and maintain energy balance consistent with a healthy body weight (Megan and Wayne, 2011).

In Egypt the problem of obesity and overweight are increasing gradually from 1995-2001, with higher

prevalence of overweight among men (41.1%) than women (36.4%) and higher prevalence of obesity among women (50.4%) than men (21.1%) (National Nutrition Institute of Egypt, 2004). Obesity is a chronic multi-faceted disorder associated with an increased frequency of a number of diseases as hypertension, diabetes mellitus, arthritis, gout and gall bladder diseases (AL Qauhiz, 2010).

Body Mass Index (BMI), a measure of weight adjusted for height is often used as an indicator of overall adiposity. BMI is influenced by genes, diet and other aspects of lifestyle such as alcohol consumption, smoking habits, physical activity and other socio-demographic factors such as educational level or marital status (Fang and Lee, 2009).

Obesity can be divided into general and "regional". There are 2 main types of regional obesity in terms of fat distribution and the risk for development of disease, gynoid and android. The gynoid type of fat distribution is common in women. The "pear" shape indicates that heavier deposits of fat occur around the thigh and buttocks. The main function of this fat is as energy reserves to support pregnancy and lactation. Individuals with this type of distribution typically do not develop impairment of glucose metabolism. On the other hand, the android type of fat distribution or "apple" shape is typical of men and features fat

around the waist and upper abdomen (Abolfotouh, 2008).

The community health nurse works with adults at all age groups using the three levels of prevention-primary, secondary and tertiary – as a guide. Primary prevention activities focus on education to promote a healthy lifestyle. Much of the community health nurse's time is spent in the educator role. At other times, the nurse works with small groups of adults who could benefit from making healthy choices in diet, relaxation, and physical activity (Allender et al, 2010).

Secondary prevention focuses on screening for early detection and prompt treatment of diseases. Examples of secondary prevention program include conducting blood pressure, blood glucose, BMI and cholesterol screening. Tertiary prevention attempts to reduce the extent and severity of a health problem to its lowest possible level, so as to minimize disability and restore or preserve function (Allender et al, 2010).

#### **Significance of the study:**

Obesity among adults, particularly women, has reached very high proportions in Egypt in the last few years. According to the WHO estimate more than half of the adults are overweight or obese (WHO, 2006). The lifestyles changes and urbanization has occurred rapidly and has been accompanied by new technologies that promote sedentary lifestyles. Due to accessibility of private cars, television, and household appliances, the population as a whole is engaging in less physical activity. The rise in caloric and fat intake in a region where exercise is not defining part of the culture has added to the overall increased percentages of overweight and obese populations. In addition, women are more likely to be overweight or obese due to cultural norms and perceptions of appropriate female behavior and occupations inside and outside of the home (Ginter & Simko, 2008).

#### **Aim of the study:**

- Implement and evaluate the effect of health education program for female employees about healthy nutrition to control obesity.

#### **Subjects and methods:**

##### **Study Design**

A Quiz experimental design was used in carrying out this study with pre and posttest.

##### **Study Settings:**

The study was conducted in 16 faculties, which are affiliated to Assiut University; namely faculty of science, faculty of agriculture, faculty of engineering, faculty of medicine, faculty of pharmacy, faculty of veterinary medicine, faculty of education, faculty of art, faculty of commerce, faculty of law, faculty of

physical education, faculty of social work, faculty of nursing, faculty of specific education, faculty of computers & information, and technical nursing institute.

#### **Sample:**

Convenient sample was used in this study. The total number of obese female employee was 554 female. Around ten percent (10%) of the obese females were randomly chosen out of 554 (50 females). The health education program was implemented for fifty females (50 females) through pre and post test the study results were done.

#### **Exclusion criteria**

Pregnant and lactating females and BMI more than 40

#### **Study tools:**

Self administered Structured Questionnaire was designed and developed by the researcher. It covers two parts:

##### **Part I:**

- *Socio demographic characteristics* such as : age, marital status, residence, level of education.

**Part II:** It includes the following knowledge related to nutrition and obesity as; important of nutrition, food guide pyramid, health consequences related to nutrition, complete and balanced diet, factors affecting nutrition, component of balanced diet. Knowledge related to obesity as definition, types, causes, health consequences, food leading to obesity, prevention of it, relation between drinking water and healthy nutrition and the best time for drinking water. Using scoring system for knowledge in pre and post test, a correct response was scored 1 grade and incorrect zero. The score of each item summed-up and then converted into percent score. (< 50% Poor, 50 – 70% Satisfactory and 70% Good (Hasnain & Sheikh, 2009).

##### **Pilot study:**

A pilot study was conducted before starting data collection on ten percent from female employees who were excluded from the sample. The aim of pilot study is to test the clarity of the tools and to estimate the time required to fill the sheets. Based on the result of pilot study, the necessary modification in the sheets was done.

##### **Procedures:**

An official permission was obtained from administrative personnel to carry out the study the researcher introduced her self to the females and explain the purpose of the study in order to obtain their oral acceptance to be recruited in this study as well as to gain their cooperation. The researchers develop an educational program through four stages (assessment, planning, implementation and evaluation phase).

#### **Description of the nursing intervention (educational program):**

This nursing intervention has been developed by the researcher based on review of relevant literature, available resources, and revision from professor of community health nursing and assistant professor in nursing science at Assiut University. According to the opinions of experts necessary modifications was made to ensure validity and reliability of the program.

#### General objectives of the nursing intervention:

- 1) To assess the female employee's knowledge about obesity and health problems related to poor nutrition.
- 2) To provide the female employee with right knowledge about obesity and the different method for treatment of obesity.

Specific objectives of the nursing intervention: After completing this nursing intervention; the female employees will be able to: Define, list the types and enumerate signs of obesity, explain the causes and predisposing factor of obesity it includes:- genetic, psychological and environmental factor, list the various methods for diagnosis of obesity, enumerate the complication of obesity on different body system which includes: stroke, cardio vascular disease, lung and liver disease, female abnormalities (irregular menstruation and infertility), pancreatitis, enumerate the importance of food, mention the factors which help in food choice, define and describe healthy food, describe essential characteristics of balanced meal, explain essential steps in treatment of obesity, list types of daily activity and calories need in each one, illustrate character of safe diet, mention side effect of unsafe weight loss regimen and indicate the healthy diet according to your need.

#### Assessment phase:

The researcher developed this program to improve female employee's knowledge and life style related to obesity based on pretest assessment of female employee's knowledge toward obesity which denotes knowledge deficit so the program, media were prepared.

#### Planning phase:

The arrangement of conducting the program done during this phase; the sessions and time of the program decided. The chosen employees were divided into 10 groups, each group ranged from 3-5 employees. Other facilities were checked and arranged during this phase as the teaching place, audiovisual aids, handout etc.....

#### Implementation phase:

The educational program continued for 5days to complete the program content. The total number

of session was (8). Implement the program for the employee at two places in the same time and then repeated for other groups..

#### Evaluation phase:

After implementing the nursing intervention for university females' employees, reassessment has done by the Post test which done immediately after implementing and completing the course to assess participant's knowledge and practice. The same tools refilled by the same employee and the differences were examined.

#### Field work:

The teaching program conducted during the period from end of September 2012 until end of November 2012. The educational program continued for 5days to complete the program content. The total number of session was (8). Before beginning of the first session, an orientation to the programme and its purpose was done and the employees were informed about time and place of session taken.

#### Results:

**Table (1): Distribution of the studied sample regarding to their socio- demographic characteristics at Assiut University**

Socio-demographic characteristics	No. (n= 50)	%
<b>Age: (years)</b>		
• < 30 years	4	8.0
• 30 - < 40 years	9	18.0
• 40 - < 50 years	16	32.0
• ≥ 50 years	21	42.0
Mean ± SD (Range)	45.60 ± 9.65 (26 – 59)	
<b>Marital status:</b>		
• Single	6	12.0
• Married	40	80.0
• Divorced	0	0.0
• Widow	4	8.0
<b>Residence:</b>		
• Rural	1	2.0
• Urban	49	98.0
<b>Level of education:</b>		
• Secondary	31	62.0
• University	19	38.0
• Postgraduate	0	0.0

**Table (2): Relation between pre/post tests of the studied sample according to the knowledge about nutrition at Assiut University (n= 50).**

Knowledge	Pre-test (n= 50)		Immediate post-test (n= 50)		P-value	Chi- value
	No.	%	No.	%		
<b>Importance of food for human:#</b>						
Provide energy	10	20.0	35	70.0	0.000*	25.25
Build and repair tissue	5	10.0	32	64.0	0.000*	31.27
Regulate body metabolism	0	0.0	19	38.0	0.000*	23.46
Provide protection	10	20.0	25	50.0	0.002*	9.89
Don't know	27	54.0	0	0.0	0.000*	36.99
<b>Description of food guide pyramid:</b>						
Known	7	14.0	32	64.0	0.000*	26.27
Unknown	43	86.0	18	36.0		
<b>Health problems related to food:#</b>						
Malnutrition (e.g., overweight or underweight)	6	12.0	45	90.0	0.000*	60.86
Anemia	6	12.0	34	68.0	0.000*	32.67
Low immunity	3	6.0	33	66.0	0.000*	39.06
Gout	3	6.0	12	24.0	0.012*	6.35
Don't know	35	70.0	0	0.0	0.000*	53.85

#More than one answer

\* Significance level at  $P = < 0.05$ **Table (3): Relation between pre/post tests of the studied sample according to the knowledge about component of balanced and its determinant factors at Assiut University (n= 50).**

Knowledge	Pre-test (n= 50)		Immediate post-test (n= 50)		P-value	Chivalue
	No.	%	No.	%		
<b>Definition of balanced meal:</b>						
Correct	12	24.0	48	96.0	0.000*	54.00
Incorrect	38	76.0	2	4.0		
<b>Factors determined meal:#</b>						
Age	6	12.0	47	94.0	0.000*	67.48
Sex	6	12.0	50	100.0	0.000*	78.57
Physiological status as (pregnancy and lactation)	3	6.0	31	62.0	0.000*	34.94
Physical activity	3	6.0	34	68.0	0.000*	41.23
Don't know	37	74.0	0	0.0	0.000*	58.73
<b>Essential components of balanced meal:#</b>						
Carbohydrates	20	40.0	50	100.0	0.000*	42.86
Protein	17	34.0	50	100.0	0.000*	49.25
Fats	12	24.0	45	90.0	0.000*	44.43
Vitamins	6	12.0	31	62.0	0.000*	26.81
Minerals	3	6.0	34	68.0	0.000*	41.23
Water	3	6.0	47	94.0	0.000*	77.44
Don't know	22	44.0	0	0.0	0.000*	28.21
<b>Relation between overweight or underweight and type of food:</b>						
Yes	21	42.0	50	100.0	0.000*	40.85
No	15	30.0	0	0.0		
Don't know	14	28.0	0	0.0		

**Table (4): Relation between pre/post tests of the studied sample according to the knowledge about obesity at Assiut University, (n= 50)**

Knowledge	Pre-test		Immediate post-test		P-value	Chi-value
	No.	%	No.	%		
<b>Definition of obesity:</b>						
Correct	15	30.0	48	96.0	0.000*	46.72
Incorrect	35	70.0	2	4.0		
<b>Types of obesity:#</b>						
Upper part obesity	12	24.0	50	100.0	0.000*	61.29
Lower part obesity	15	30.0	50	100.0	0.000*	53.85
Don't know	26	52.0	0	0.0	0.000*	35.14
<b>Causes of obesity:#</b>						
Inactivity	8	16.0	47	94.0	0.000*	61.46
Increase calories (overeating)	19	38.0	50	100.0	0.000*	44.93
Genetic	10	20.0	34	68.0	0.000*	23.38
Psychological factors	2	4.0	34	68.0	0.000*	44.44
Social factors	0	0.0	26	52.0	0.000*	35.14
Physiological status	0	0.0	31	62.0	0.000*	44.93
Changes related to age and sex	0	0.0	33	66.0	0.000*	49.25
Medications	3	6.0	36	72.0	0.000*	45.78
Repeated pregnancy and delivery	0	0.0	19	38.0	0.000*	23.46
Don't know	24	48.0	1	2.0	0.000*	28.21

#More than one answer

\* Significance level at  $P = < 0.05$ **Table (5): Relation between pre/post tests of the studied sample according to the knowledge about complications of obesity and foods lead to obesity at Assiut University (n= 50)**

Knowledge	Pre-test		Immediate post-test		P-value	Chi-value
	(n= 50)		(n= 50)			
	No.	%	No.	%		
Complications of obesity:#						
Stroke	0	0.0	19	38.0	0.000*	23.45
Heart disease	12	24.0	24	48.0	0.012*	6.25
Pulmonary disease	0	0.0	15	30.0	0.000*	17.65
Atherosclerosis	4	8.0	37	74.0	0.000*	45.02
Hypertension	19	38.0	50	100.0	0.000*	44.93
Formation of stone	0	0.0	24	48.0	0.000*	31.58
Diabetes mellitus	17	34.0	50	100.0	0.000*	49.25
Infertility	2	4.0	33	66.0	0.000*	42.24
Gout	0	0.0	26	52.0	0.000*	35.14
Joint problems	3	6.0	35	70.0	0.000*	43.46
Cancer	0	0.0	15	30.0	0.000*	17.65
Don't know	17	34.0	0	0.0	0.000*	20.48
Foods lead to obesity:#						
Fast food	12	24.0	45	90.0	0.000*	44.43
High fat diet	18	36.0	47	94.0	0.000*	36.97
High sugar diet	6	12.0	34	68.0	0.000*	32.67
Carbohydrate	30	60.0	50	100.0	0.000*	25.00

#More than one answer

\* Significance level at  $P = < 0.05$

**Table (6): Relation between pre/post tests of the studied sample according to the knowledge about methods used in control & treatment of obesity and factors affecting food choices at Assiut University (n= 50)**

Knowledge	Pre-test (n= 50)		Immediate post-test (n= 50)		P-value	Chi- value
	No.	%	No.	%		
<b>Methods used in control and treatment of obesity:#</b>						
Natural method by diet	10	20.0	44	88.0	0.000*	46.54
Exercises	7	14.0	37	74.0	0.000*	36.53
Medications	3	6.0	14	28.0	0.003*	8.58
Acupuncture	0	0.0	19	38.0	0.000*	23.46
Thermal treatment (sauna)	0	0.0	26	52.0	0.000*	35.14
Surgical treatments	3	6.0	22	44.0	0.000*	19.25
Don't know	35	70.0	1	2.0	0.000*	50.17
<b>Factors affecting food choices:#</b>						
Preferences	8	16.0	50	100.0	0.000*	72.41
Religious, culture and tradition	0	0.0	16	32.0	0.000*	19.05
Cost	10	20.0	50	100.0	0.000*	66.67
Awareness	5	10.0	36	72.0	0.000*	39.73
Age and sex	3	6.0	9	18.0	0.065	3.41
Mass media	2	4.0	14	28.0	0.001*	10.71
Time for shopping and preparation of food	2	4.0	19	38.0	0.000*	17.42
Don't know	37	74.0	0	0.0	0.000*	58.73

#More than one answer

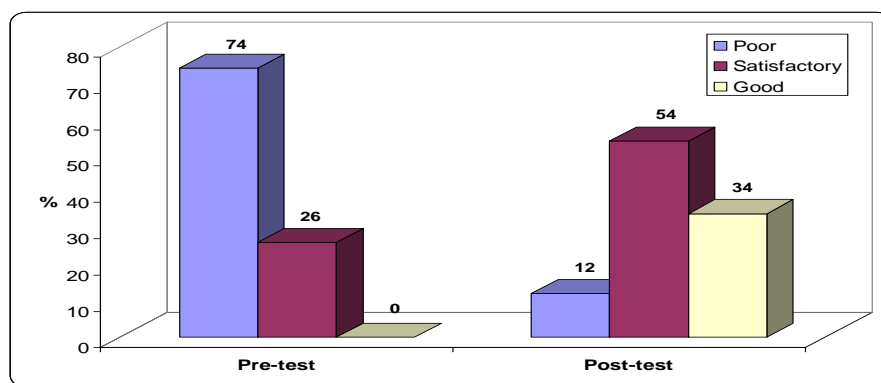
\* Significance level at  $P = < 0.05$ **Table (7): Relation between pre/post tests of the studied sample according to the knowledge about causes of overeating and the best time for drinking water at Assiut University (n= 50)**

Knowledge	Pre-test (n= 50)		Immediate post-test (n= 50)		P-value	Chi-value
	No.	%	No.	%		
<b>Causes of overeating:#</b>						
Psychological status	7	14.0	47	94.0	0.000*	64.41
Social factors	5	10.0	17	34.0	0.004*	8.39
Economic status	7	14.0	34	68.0	0.000*	30.14
Don't know	38	76.0	0	0.0	0.000*	61.29
<b>Relation between drinking water and healthy nutrition:</b>						
Correct	15	30.0	50	100.0	0.000*	53.85
Incorrect	35	70.0	0	0.0		
<b>The best time for drinking water:#</b>						
At morning	7	14.0	46	92.0	0.000*	61.06
Before meal	5	10.0	14	28.0	0.022*	5.26
During meal at small amount	0	0.0	9	18.0	0.005*	7.81
After meal at small amount	7	14.0	26	52.0	0.000*	16.33
Don't know	33	66.0	3	6.0	0.000*	39.06

#More than one answer

\* Significance level at  $P = < 0.05$ .





Distribution of the studied sample according to their knowledge in pre and post-test

**Table (8): Relation between level of education of the studied sample and scoring of knowledge at Assiut University (n=50).**

Scoring of knowledge	Level of education				P-value ( $X^2$ )
	Secondary (n= 31)		University (n= 19)		
	No.	%	No.	%	
Pre-test:					0.042* (4.13)
Poor	26	83.9	11	57.9	
Satisfactory	5	16.1	8	42.1	
Post-test:					0.000* (16.19)
Poor	5	16.1	1	5.3	
Satisfactory	22	71.0	5	26.3	
Good	4	12.9	13	68.4	

\* Significance level at  $P = < 0.05$ .

**Table (1):** shows that distribution of the study sample regarding to socio-demographic characteristic. It clears that about one third (32%) of the studied sample aged years ranged from forty to less than fifty years. According to marital status most (80%) of the studied sample are married and the fast majority of them (98%) from urban area. Also this table reveals that less than two third (62%) of the studied sample has secondary education.

**Table (2):** revealed that general lack of the studied samples' knowledge related to importance of food, description of food guide pyramid and health problems related to food. It was found that high significant differences between pre/post tests for the knowledge regarding importance of food and also food health problems.

**Table (3):** indicated that (76.0%, 74.0% and 44.0%) of the studied sample have poor knowledge regarding to definition of balanced meal, factors which affect meal and essential component of balanced meal respectively. It was found that high significant difference between pre/post tests for the knowledge regarding component of balanced and its determinant factors.

**Table (4):** illustrated that lack of the studied samples' knowledge in pre test in item related to definition of obesity, types and causes while this knowledge were improved in post test.

**Table (5):** shows that more than one third (34.0%) of the studied sample don't know complications of obesity, while less than two fifth (38.0%) of them identifies hypertension and more than one third (34.0%) identifies D.M in pre-test. But in post-test all studied sample identifies complications of obesity and nearly two third (66.0%) identifies infertility compares to only (4.0%) identifies infertility in pre-test. Regarding to studied sample's knowledge about food which leads to obesity more than half (60.0%) of them identifies carbohydrate while only (12.0%) identifies high sugar diet in pre-test. Moreover, in post-test all studied sample identifies carbohydrate and more than two third (68.0%) identifies high sugar diet. It was found that highly significant difference between pre/post tests for the knowledge regarding knowledge complication of obesity and its leading food.

**Table (6):** indicated that there is a statistical significant difference between pre/post tests for the

knowledge regarding methods used in treatment & control of obesity and factors determinant food choices.

**Table (7):** reveals that more than three quarter of the studied sample doesn't know causes of overeating in pre-test. However, in post-test all studied sample knows causes of overeating. As regard to the studied sample's knowledge about the best time for drinking water less than half of them mention at morning and only (16.0%) of the studied sample mentions after meal at small amount in pre-test. Also the table clears that there is a statistical significant difference between pre/post tests for the knowledge regarding causes of overeating and the best time for drinking water.

**Table (8):** clears that there is a statistical significant difference between level of education of the studied sample and the scoring of knowledge in pre and post test.

**Figure (1):** clears that there is a statically significant differences between scoring of knowledge in pre and post test ( $P= 000.0^*$ )

### Discussion:

Obesity prevails in various communities of the world. Its prevalence is escalating at an alarming rate to epidemic proportions throughout the developed world. Furthermore, obesity is no longer just a concern for developed countries, but is also becoming an increasing problem in many developing countries. Overweight and obesity are major public health problems and the most common nutritional disorders (**Jahangeer et al., 2010**).

Concerning to socio demographic characteristics of the studied sample as presented in table (1) the current study showed that; more than two fifth (42.0%) of them had age more than fifty years old also the result of the current study revealed that; females employee from the age 50 and above had higher prevalence of obesity compared to respondents of less than 30 years. These finding supported by finding of the National Health and Morbidity survey 2, conducted by the Malaysian Ministry of Health in 1996 and 1997, also found that BMI increases with age **Lim et al., (2000)**.

Also this result is consistent with the study carried out by **Abdeen, (2011)** who conducted study at Palestinian and found that Adults aged 45–54 years old were significantly more likely to be obese. The increase in body weight with age has been attributed to increasing sedentary lifestyle. Also **Zaki et al., (2013)** found that older obese females had a significantly higher values of waist to hip ratio, fat mass (FM) and body fat mass percentage (FM%) than younger obese females.

Concerning to marital status the findings of the present study showed that; most of the studied sample are married (80.0%). The prevalence of overweight and obesity is highly significant among married women This finding is agree with **Al Qauhiz, (2010)** who conducted study in Saudi and reported that married females showed significant higher value of overweight and obesity than single females. **Fouad et al., (2006)** and **Khader et al., (2008)**. They reported that the prevalence of obesity in married adults was 54% (compared to 37% in unmarried adults).

From the researcher point of view the higher prevalence of obesity among married females may be attributed to the influence of marriage on inducement to eat (e.g., shared meals) with other family member. Also married females are less active and have lack time to practice exercises. This interpretation supported by **Schoenborn, (2004)** and **Khan & Kraemer, (2009)** they reveal that marital status could place a heavy burden on those individuals to adjust their physiological rhythms for sleeping and eating, combined with having less time for physical activity along with exposure to other environmental factors.

Regarding the place of residence the present study revealed that; the fast majority (98.0%) of the studied sample was living in urban areas and the rest of them were living in rural areas. Also the findings of the present study indicate that there is a statistically significant difference between residence and obesity. This finding similar to study conducted by **Janghorbani et al., (2007)** at Iranian about prevalence of overweight, underweight, and abdominal obesity among adults who found that urban residents generally have a higher BMI and abdominal obesity than those living in rural areas. This may be attributed to urban residents are more likely to eat more Western-style food and less likely to be physically active. In most countries, urban residents consume a greater proportion of protein and fat and a smaller proportion of carbohydrates and have generally higher availability of calories. Also **Veghari et al., (2013)** found that prevalence of obesity high in urban than rural support the findings of the current study.

In this study , the pre-test results showed that female employees' had poor knowledge about elements of nutrition, the food guide pyramid, good balanced diet, health problem related to food, definition, types, causes, complications and methods of control and prevention of obesity. This result agreed with **Sharkawy, (2007)** who conducted study in Assiut about assessment of an educational program concerning nutritional status among the elderly and care givers in rural area and reported that participants had poor knowledge related to knowledge mentioned above.



The result of the current study indicated that there is a statistical significant difference in female employees' knowledge related to importance of food for human ( $p=0.000$ ) this finding in the same line with **Theron and Egal, (2012)**, they reported that there is improved in respondents' knowledge after intervention of nutritional educational program ( $p=0.001$ ).

As regard to female employees' knowledge about essential component of balanced meal, the finding of the present study revealed that there is a statically significant difference between pre/post tests of female employees' knowledge. This finding similar to results presented by **Theron and Egal, (2012)** they stated that nutritional educational program resulted in a significant improvement in knowledge.

In pre test only 30.0% of female employees knew the meaning of obesity. This result improved to 96.0% after intervention with highly statistical significantly difference ( $p=0.000$ ). This result similar to study conducted by **Theron and Egal, (2012)**, they revealed that there is significant improvement in respondents' knowledge related to definition ( $p=0.002$ ).

Regarding to effectiveness of the health education program the finding of the present study indicated that there is a statistical significant difference between pre/post tests in all items of knowledge. These results are supported by **Ostad et al., (2010)** who implemented study about effect of nutrition education intervention on nutritional knowledge, attitude and practice among female employees of Tabriz University of medical sciences and found that before the intervention 82.7%, 16.5% and 0.8% of the subjects had good, moderate and poor nutritional knowledge respectively. After the intervention the rate of good, moderate and poor knowledge changed to 89%, 10.5% and 0.5% respectively.

Also the finding of the current study in the same line with **Madeni et al., (2011)** they concluded that the mean score in the knowledge pre-test was 5.9, and 6.8 in post-test, which increased significantly ( $p=0.000$ ). The findings indicated an increase in knowledge and behavior that showed a statistically significant difference between pre-test and post-test. As well as the results of the present study similar with **Siwach (2009)** who conducted study about impact of health education programme on the knowledge and practices of school children regarding personal hygiene in rural panipat and revealed that after the intervention of health education programme the results showed an impact of the programme as the scores of the children after post-testing improved in the experimental group.

The same result was found by **Bas et al., (2003)** who revealed that the percentage of correct answers of

knowledge regarding balanced diet and obesity increased from 30% to 42.0% after implementing of health education program. At the same line **Abd El-Rahman et al., (2005)** they implementing study about the impact of educational program for secondary school girls in Zagazig City about some aspects of health promoting and protecting life style and **El-Sayed, (2007)** who conducted study about a health education intervention for management of overweight and obesity among students of secondary schools in Zagazig city found a lack in students' knowledge as regards balanced diet, definition of a calorie, seriousness of obesity, and types of food leading to obesity, which improved after implementation of a health education program.

Also the finding of the present study in the same line with **Majumdar et al., (2012)** who implemented the study about impact of education intervention on the nutrition and health knowledge of elderly residents and staff of old age care institutions at India and reported that gain in knowledge was significant in all the areas of nutrition.

Regarding to total score of knowledge the finding of the present study showed that (74.0%, 26.0% and 0.0%) of the female employees have poor, satisfactory and good knowledge respectively in pre test while in post test only (12.0%) of them have poor knowledge. This results disagree with **Theron and Egal, (2012)**, they found that none of the respondents indicated fair or poor nutrition knowledge after the intervention, compared to 31.6% ( $p=0.010$ ) and 0.0% before the intervention respectively.

Improvement of the female employees' knowledge depends on the consistency of program contents and female employees who are interested to acquire knowledge. Also it may be related to concise presentation of each unit using simple language, method used in teaching the program's contents to individuals and small group bases which help to interest and understand information deeply. This explanation supported by **Makuch & Reschke., (2001)** they concluded that Fun and interesting health and nutrition education activities will increase the attention and motivation to learn and consequently change the health and dietary practices.

As well as by **Hoelscher et al., (2002)** who reported that successful nutrition intervention should include appropriated development of the content and teaching strategies. Also improvement in the female employees' knowledge may be attributed to health education program was designed in accordance with specifically needed and might be due to freshness of instruction, enthusiasm and willingness of female employees to improve themselves.

**Conclusion:** At the pre test of health education program, this study revealed that, female employees

were having poor knowledge. After implementation of the health educational program, the female employees' knowledge was improved.

### Recommendations:

Increase public awareness about balanced diet, nutritional needs in every age group. Booklets of Arabic language about obesity and management of body weight should be available in library of faculties. Future studies could follow long-term effect of an obesity prevention program to reflect sustained change in the reduction of risk behavior.

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