

## The Effect of Learning Package on Knowledge and Practice of Women's Regarding Osteoporosis in Port Said City, Egypt.

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### ABSTRACT

Osteoporosis is a major and growing public health problem in both sexes but particularly in women which associated with fragility fractures at the hip, spine, and wrist. Hip fracture contributes to both morbidity and mortality in the elderly. Approximately 1.6 million hip fractures occur each year worldwide, the incidence is set to increase to 6.3 million by 2050. It is a systemic skeletal disorder, characterized by reduction of bone mass, deterioration of bone structure, increasing bone fragility, and increasing fracture risk. It is a major cause of fractures in elderly, resulting in pain, disability, costly rehabilitation, poor quality of life, and premature death .Data survey from the Egyptian national nutrition institute to determine bone mass density (BMD) among the elderly in 2001 and, among adolescents and adults in 2004 revealed that (16.7%) of 1190 Egyptian menopausal females had lumbar osteoporosis. **Aim:** The present research was designed to assess effect of learning package on knowledge and practice of women's regarding osteoporosis in Port Said City .This intervention study was at the gynecological and obstetric clinic at Port Said general hospital. **Study sample** composed of 129 women. **Tools:** Data were collect using interview questionnaire sheet contains 4 main parts based on literature review & modified tool to assess knowledge and practice of women's regarding osteoporosis in Port Said City. **Results:** The study found that the majority of studied women have poor knowledge regarding osteoporosis. Also, revealed a highly statistically significant difference between pre and post program in relation to knowledge about calcium p- value (0.003) and total knowledge score p- value (0.002).and there was statistically difference between pre and post program in relation to walk more than 10 min in sun daily and practice physical exercise p- value =(0.021 and 0.0007) respectively. And there was statistically difference between pre and post program in relation to walk more than 10 min in sun daily and practice physical exercise p- value =(0.021 and 0.0007) respectively **Conclusion:** The present study concluded that the family needs to improve their knowledge and practice regarding prevention osteoporosis **Recommendations:** It is recommended to design and implement educational trials to change and improve women lifestyle to prevent osteoporosis. Also long-term effects of such educational programs should be assessed. Women should also be aware of their risks factors for developing osteoporosis.

**Keywords:** learning package, knowledge, practice, women, osteoporosis

#### Introduction

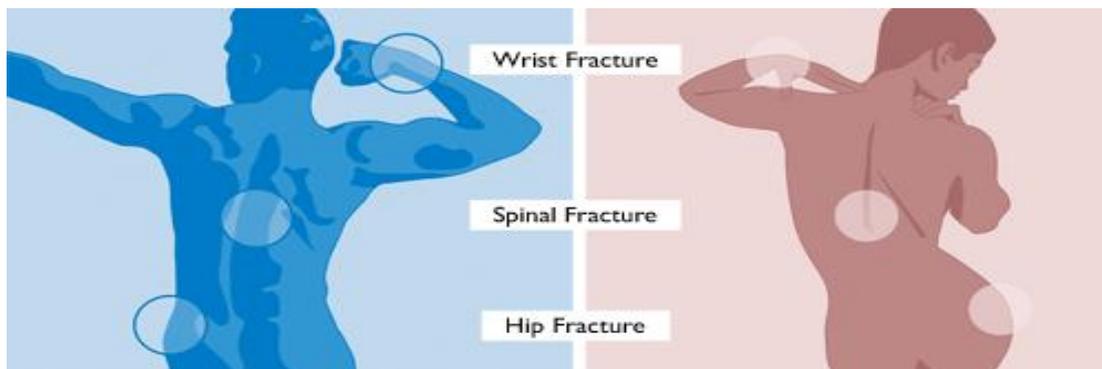
Osteoporosis is a common condition affecting over 1 million Australians in which bones become fragile and brittle leading to a higher risk of fractures, than in normal bone.

Osteoporosis occurs when bones lose minerals, such as calcium, more quickly than the body can replace them, leading to a loss of bone thickness (bone density or mass) (*Osteoporosis Australia 2013 and Malak & Toama 2015*)



As bones become thinner and less dense, even a minor bump or fall can cause serious fractures. These are known as 'minimal trauma' fractures. A 'fracture' is a complete or partial break in a bone. Any bone can be affected by osteoporosis, but the most common sites are the hip, spine, wrist, upper arm, ribs or forearm. Fractures in the spine due to osteoporosis can result in losing height or changes in posture (and in more serious

cases it can result in a Dowager's hump in the back). Osteoporosis usually has no symptoms until a fracture occurs - this is why osteoporosis is often called the 'silent disease'. In addition, Fractures can lead to chronic pain, disability, loss of independence and even premature death. So preventing fractures and managing bone health becomes a priority (*Osteoporosis Australia 2013 and Malak & Toama 2015*)



Osteoporosis prevention programs for young women and men have the potential to reduce osteoporosis risk and thus prevent or delay the development of the disease. The rationale for early primary intervention is that attaining and maintaining strong, dense bone as a young adult is a critical factor in the prevention of osteoporosis in later life (**KASPER, etal.2001**). It may be have its roots in childhood and adolescence, which is the period when body does the most bone

building. Women reach their peak bone mass at about age 18 while men reach theirs at 20. After that, both women and men continue to build small amounts of bone mass, but men add more than women. By 30, bones are fully stocked, and although body will continue to replace old bone cells, there will be no increase in bone mass past that point (**Kasper, 2007 and Yousry,etal.2012**).

In addition, osteoporosis is a disease characterized by low bone mass and loss of

bone tissue that may lead to weak and fragile bones. Many women experience a variety of symptoms as a result of the hormonal changes associated with the transition through menopause. Around the time of menopause, women often lose bone density and their blood cholesterol levels may worsen, increasing their risk of heart disease. On the other hand, little attention has been paid to the problem of male osteoporosis (**Sadat and MAIElq 2006**). Some of the most important treatments for preventing osteoporosis include diet, exercise, and not smoking. Osteoporosis is often thought of as a condition that only occurs in older women. However, men can get it, and younger people can, too. It is a disease that causes a thinning of the bones, which leaves them susceptible to fractures and can lead to problems at any age. The good news is that in some cases, osteoporosis can be prevented ( **Reginster and Burlet,2006**).

Osteoporosis occurs when estrogen levels in the body drop. Since estrogen works to protect the bones, a low level can lead to bone frailty. In older women, this occurs naturally with age. In younger women, this drop in estrogen production can occur if the menstrual cycle becomes irregular or if it stops completely, a condition called amenorrhea, states the National Osteoporosis Foundation ( 2014). The menstrual cycle can be interrupted due to over exercising, extreme dieting or maintaining a low body weight. Female athletes and those with anorexia nervosa or bulimia are at the highest risk. Surgically induced menopause can also cause this condition in younger females. (**Osteoporosis Australia 2013**).

According to the National Institutes of Health, when the diet is low in calcium, the body begins to break down the bones to get the calcium it needs. This can contribute to osteoporosis. This is especially critical in younger women who are still developing bone mass up until about age 30. If calcium is being taken from the bones before they

have reached their peak bone mass, complications can occur. A warning sign is frequent stress fractures or other breaks in a younger female. In addition to calcium, the body needs adequate amounts of vitamin D to help the body absorb calcium. If osteoporosis is suspected, a physician or registered dietitian can recommend the right amount of calcium and vitamin D based on age, activity level and general overall health ( **KASPER, etal.2001**).

Moreover the Creighton University Osteoporosis Research Center states that certain medical conditions that can occur in younger women and the medications that treat them may contribute to the development of osteoporosis. This includes cancer and cancer treatment, both of which can lead to frail bones. Conditions such as multiple sclerosis, lupus, emphysema, asthma and rheumatoid arthritis often require long-term use of corticosteroids, which can affect bone strength. Diabetes and thyroid disorders can also cause a loss of bone density. Medications to treat heart disease and seizures can interfere with calcium and vitamin D absorption. If any of these conditions exist or if any of the above medications are prescribed, regular bone density testing should be done (**Higdon , 2005 and Osteoporosis Australia 2013**).

In addition, in some cases, the cause of osteoporosis in a child occurs with no known cause, claims the National Institute of Arthritis and Musculoskeletal and Skin Diseases (2015). Osteoporosis can strike as early as age 7. However, just like in adults, certain behaviors can increase the risk in young females. Along with inadequate diet, a lack of weight-bearing exercise, smoking and heavy alcohol consumption can all rob the bones of strength. In children and teens, be on the lookout for pain in the lower back, hips and feet, a loss of height, frequent fractures, a rounded upper back and difficulty walking. In some cases, the condition improves on its own, while other cases

require treatment (**Ghaffari et al 2012 and Osteoporosis Australia 2013**).

On the other hand preventive treatments are available that can help to maintain or increase bone density. For those already affected by osteoporosis, prompt diagnosis of bone loss and assessment of fracture risk are essential because therapies are available that can slow further loss of bone or increase bone density. Taking steps to prevent osteoporosis early in life is vital. The best advice is to get enough calcium during childhood and adolescence. Youth age 8 -18 years old need 1300 mg calcium every day, according the National Academy of Sciences (2013). also build strong bones in early years by staying physically active. Load- or weight-bearing exercises like jogging, hiking; tennis, step aerobics, and stair-climbing can help build stronger, denser bones. Women should also be aware of their risks for developing the disease and, throughout life, make healthy lifestyle choices to maintain strong bones, including eating a healthy diet with enough calcium, doing weight-bearing exercise, and stopping smoking, and avoiding excessive alcohol. It's never too early to take care of bones, and it's never too late (**Osteoporosis Australia 2013 & Jeihooni et al 2015**).

Also, screening for osteoporosis, early detection of low bone mass (osteopenia) or osteoporosis is the most important step for prevention and treatment. Even after osteopenia or osteoporosis has occurred, actions can be taken to stop the progression of bone loss. effective treatment or prevention cannot take place if a man does not know he has osteoporosis or is at risk. The only way to accurately test the strength and solidness of the bones is with bone mineral density tests also called DEXA scan, which are performed like X-rays and measure the solidness and mass (bone density) of bones. National Osteoporosis Foundation recommends BMD testing for men over age 70, men aged 50-69 with risk factors, X-rays

showing fractures or bone loss, fractures over the age of 50, height loss of more than ½ inch in one year or 1 ½ inch from original height. The doctor will take a medical history, asking questions to identify risk factors. The doctor should conduct a complete physical exam, including measuring height and weight, obtaining X-rays, and testing urine and blood. Inform the doctor at once if a loss of height, change in posture, or sudden back pain is noticed because this can indicate a fracture of the spine (vertebral fracture) (**SHOBHA, et al.2010**).

### **Significant of the study**

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Osteoporosis is a major health problem in Egypt. More than one-quarter of females in the same age group were relatively osteopenic. The prevalence rates of relative osteoporosis were 16.7 and 0.9 percent for males and females, respectively, with no statistical difference between urban and rural areas. So we need to assess effect of learning package on knowledge and practice of women's regarding osteoporosis.

### **Aim of the study**

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Assess effect of learning package on knowledge and practice of women's regarding osteoporosis in Port Said City.

### **Research Questions**

1. Are study women have poor knowledge regarding osteoporosis?
2. Are study women have poor practice regarding osteoporosis prevention?
3. Are learning package enhancing women's knowledge and practice regarding osteoporosis?

### **Hypothesis**

**H1:** Study samples have poor knowledge regarding osteoporosis before implementing the program.

**H2:** Study samples have poor practice regarding osteoporosis prevention before implementing the program..

**H3:** The learning package will be enhancing women's knowledge and practice regarding osteoporosis.

## **SUBJECTS AND METHODS**

### **Study design**

A quasi-experimental research design was used in this study.

### **Technical Design**

The technical designs for this study were include research setting, subjects, tools and methods of data collection as the following:-

**Setting:** The study was implemented in the gynecological and obstetric clinic at Port Said general hospital.

**Sample:** Convenient sample of 120 women attending to gynecological and obstetric clinic at port said general hospital for six months (from January to June 2015).

**Exclusion criteria:** Women with cognitive, psychiatric impairment, hearing and speech problems were excluded from this study.

### **Tool of data collection:**

Data was collected using structure interview questioner tool developed by **(Kim et al., 1991)** and modified by researcher based on literature review. It contains four main parts:

**Part (I):** included questions regarding a sociodemographic characteristics of the study sample such as age, income, educational level, marital status.....etc ) and family medical history.

### **Part (II): Osteoporosis Knowledge Test**

It was developed by **Kim et al. (1991)** and it included a twenty-four items. Consisting of two subscales addressing exercise (16 items) e.g. one question addressing exercise is "how many days a week do you think a person should exercise to strengthen the bones? and calcium intake (17 items) e.g. what sources rich in calcium , and "how much milk must an adult drink to meet the recommended amount of calcium?" The OKT calcium and OKT exercise subscales both share 9 common items which are knowledge of overall osteoporosis risk factors. Each item is rated by the subject using ML = more likely, LL = less likely, NT = neutral, and DK = don't know. Scores for OKT exercise had a possible range of 0 to 16, and scores for OKT calcium had a possible range of 0 to 17. For items 1-9, responses 'neutral' and 'don't know' are incorrect. For items 10-24, 'don't know' is considered incorrect. Through preliminary testing of the instrument on a sample population of women, the test-retest reliability coefficient for OKT calcium was 0.72 and OKT exercise was 0.69 **(Kim, Horan, & Gendler, 1991)**.

### **Part III: Osteoporosis practice Test:**

It was developed by researchers based on literature review to assess practices related to osteoporosis included questions on positive and negative behaviors towards osteoporosis. The positive behaviors assessed were dietary calcium intake, physical activity and exposure to sun. The negative behaviors assessed were on smoking status and alcohol intake. The questionnaire included a modified validated 40 items food frequency questionnaire to assess the calcium intake.

The food frequency questionnaire also included local calcium dense food items, after wide literature review and expert opinion.

### **Method of data collection**

This research was covered in four phases:-

### **Ethical Consideration:**

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Written consent was obtained from hospital directors and head nurses of gynecological and obstetric clinic at Port Said general hospital after explaining the aim of the study to them.

A brief explanation of the purpose and importance of the study was given to the women and assured that the obtained information will be confidential and used only the purpose of the study. Confidentiality of the information was assured by the researcher .and the researcher clarify to the participated women their right to withdraw from the study at any time.

### **Operational Design:**

The operational design includes preparatory phase, content validity, reliability, pilot study and fieldwork.

### **A-Preparatory Phase:**

It includes reviewing of literature, different studies and theoretical knowledge of various aspects of the problems using books, articles, internet, periodicals and magazines.

### **B-Validity & reliability of tools:-**

Tools were developed based on the identified needs and demands of the study sample .Validated tools were used from Published sources as mentioned before . Also, it was done by expertise from medical surgical nursing & medical and nursing field

professor, Family and Community nursing professor in the field.

### **C -Pilot study: -**

Pilot study was carried out after the development of the tools on 10% of women to test the applicability of the study tools and to estimate any need for addition in the tool. Then necessary modifications were done according to the results of pilot study and expertise opinions. Otherwise, women included in the pilot study were then excluded from the study sample to avoid bias in the data.

### **Field work**

#### **I .Assessment phase:**

- In this stage, the researchers assessed women knowledge and practice using tool of data collection. The tool was filled in about 10 minutes to 30 minutes.

#### **II. Educational program development phase**

The training program was developed based on the identified needs and demands of women gathered in phase I, in the light of the most recent pertinent literature .This phase included the following; theoretical session were carried out with discussion (10 minutes) to assess women's feedback of knowledge and practice regarding osteoporosis then the researcher started the education time. After the session break time was given to them (10 minutes) followed with discussion to assess women's level of understanding (10 minutes) .The program consisted of two session which was outlined as the topic of osteoporosis definition , prevalence , complication , diagnosis and treatment , How osteoporosis occur with age ? , factors and causes of osteoporosis were addressed in the first session of the education program. The second session covered. Signs and symptoms of osteoporosis, preventive measures including

nutritional prevention, calcium-rich foods, exercise and the effect of prayer on the joints and bones. **Finally evaluation phase after three months assess** women knowledge and practice regarding osteoporosis with the same tool which was used at pretest phase.

**Administrative Design:** Written letter including the aims of the study were issued from the Dean of the Faculty of Nursing, to the director of gynecological and obstetric clinic at Port Said general hospital to seek their approval for carrying out the study.

### Statistical Design:

Data was collected and entered into a database file. Statistical analysis was performed by using the SPSS18 computer software statistical package. Data was described by summary tables and figures, Chi-2 or Fisher Exact test was used. Statistical significance was considered at P-value <0.05 and highly Significance at P-value <0.00. Graphs were done for data visualization and using Microsoft Excel.

## Results

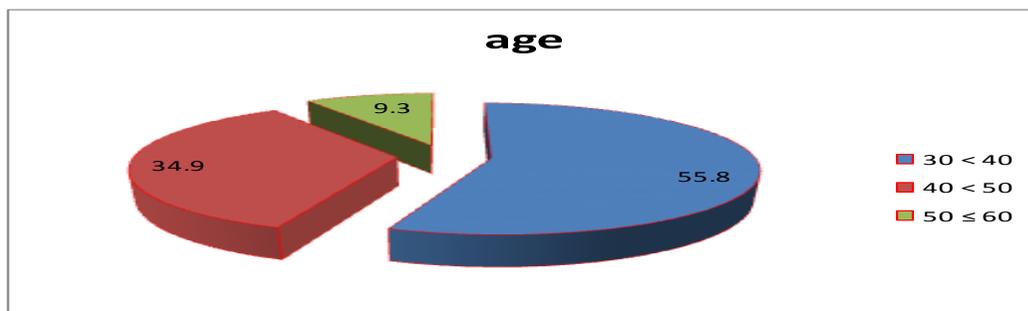


Figure 1: Age of the studied women

Figure (1) presents age of the studied women It clarifies that more than half (55.8%) of studied females were in the age group of 30 to less than 40 years.

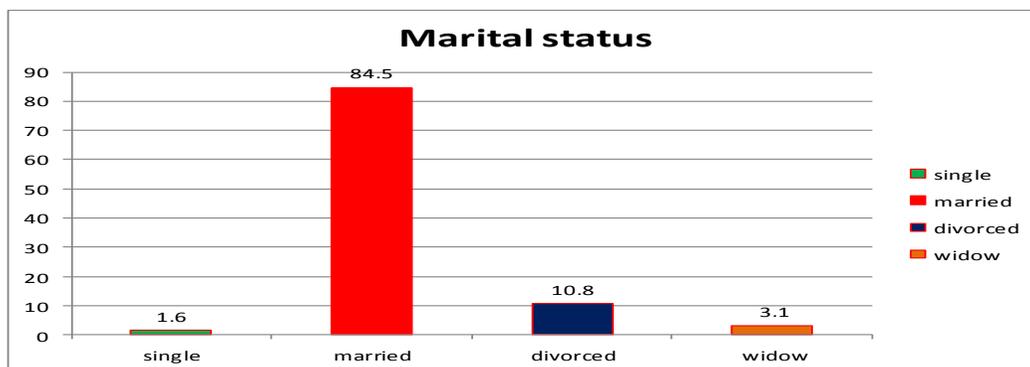


Figure 2: Marital status of the studied women

Figures (2): shows percentage distribution of the studied females according to their marital status. It displayed that most (84,5 %) of them were married

Table (1) obstetric history of the studied women

Menstrual, obstetric and gynecological history	Studied women (n=129)	
	No.	%
<b>Menopause women</b>		
Yes	23	17.8
No	106	82.2
<b>Have children</b>		
Yes	120	93.0
No	9	7.0
<b>Number of children [n=119]</b>		
1-2	44	37.0
3-4	66	55.6
5-6	10	8.4
<b>duration between pregnancies (years)</b>		
Min-Max	1.0-6.0	
Mean±SD	2.6±0.9	
<b>Number of children received breast feeding [n=120]</b>		
None	2	1.7
1-2	53	44.2
3-4	59	49.1
5-6	6	5.0

**Table (1)** :\_displays obstetric history of the studied females. It demonstrated that minorities of them were menopause (17.8%), majority of them have children (93%).Regarding number of children more than half of studied females (55.6%) have 3-4 child and Min-Max Shortest duration between pregnancies was 1.0-6.0 with Mean±SD= 2.6±0.9. finally about half of them (49.1%) have 3-4 children who received breast feeding.

**Table (2):** Medical and family history of the studied women

<b>Medical and family history</b>	<b>Studied women(n=129)</b>	
	<b>No.</b>	<b>%</b>
<b>Family history of fracture neck femur after age 45 years</b>		
Yes	28	21.7
No	90	69.8
Uncertain	11	8.5
<b>Family history of getting shorter</b>		
Yes	23	17.8
No	80	62.0
Uncertain	26	20.2
<b>Difficulty of walking</b>		
Yes	53	41.1
No	76	58.9
<b>Low back pain</b>		
Yes	85	65.9
No	44	34.1
<b>Muscle weakness</b>		
Yes	56	43.4
No	73	56.6

**Table (2)** : shows medical and family history of the studied women . clarifies that, most of studied females (69.8%) have no Family history of fracture of neck of femur after age 45 years and more than half of them have no family history of getting shorter, difficulty of walking and muscle weakness (62.0 % , 58.9% and56.6%)respectively. While most of them suffering from low back pain (65.9%).

**Table (3):** Total and subtotal score of knowledge about osteoporosis among the studied women before and after program

Scores of Knowledge about osteoporosis	Studied women (n=129)				Significance
	Before program		After program		
	No.	%	No.	%	
<b>Knowledge about risk factors and prevention</b>					<sup>MN</sup> X <sup>2</sup> =3.02 P=0.082
Low (<60%)	129	100.0	126	97.7	
Fair (60%-<75%)	0	0.0	3	2.3	
Min-Max (%)	0.0-50.0		0.0-50.0		
Mean±SD (%)	21.8±16.3		24.0±13.2		
<b>Knowledge about Calcium</b>					MH=11.73 P=0.003*
Low (<60%)	95	73.6	74	57.4	
Fair (60%-<75%)	21	16.3	45	34.9	
High (75%≤)	13	10.1	10	7.8	
Min-Max (%)	0.0-87.5		0.0-87.5		
Mean±SD (%)	40.1±22.2		41.6±19.0		
<b>Total knowledge score</b>					<sup>MN</sup> X <sup>2</sup> =13.69 P=0.0002*
Low (<60%)	129	100.0	116	89.9	
Fair (60%-<75%)	0	0.0	13	10.1	
Min-Max (%)	0.0-58.3		0.0-58.3		
Mean±SD (%)	27.9±15.6		29.9±12.3		

<sup>MN</sup>X<sup>2</sup>: Mac Nemar test

MH: Marginal Homogeneity test

\*significant at P≤0.05

**Table (3):** shows total and subtotal score of knowledge about osteoporosis among the studied women before and after program. It reveals that, there were statistically significant difference between pre and post program in relation to knowledge about calcium p- value (0.003) and total knowledge score p- value (0.002).

**The Effect of Learning Package on Knowledge and Practice of Women's Regarding Osteoporosis in Port Said City, Egypt.**

**Table (4):** Practices related to osteoporosis among the studied women before and after program

Practices related to osteoporosis	Studied women (n=129)				Significance
	Before program		After program		
	No.	%	No.	%	
<b>Eat cheese</b>					MH=6.17 P=0.104
No	9	7.0	3	2.3	
Rarely	10	7.8	19	14.7	
Sometimes	29	22.5	32	24.8	
Daily	81	62.7	75	58.1	
<b>Amount of cheese taken daily</b>					MH=2.82 P=0.728
0	15	11.6	8	6.2	
1	72	55.8	72	55.8	
2	32	24.9	39	30.2	
3	4	3.1	4	3.1	
4	3	2.3	3	2.3	
5	3	2.3	3	2.3	
<b>Eat salmon fish</b>					MH=2.5 P=0.475
No	32	24.8	22	17.1	
Rarely	25	19.4	25	19.4	
Sometimes	59	45.7	67	51.9	
Often	13	10.1	15	11.6	
<b>Walk more than 10 min in sun daily</b>					<sup>MN</sup> X <sup>2</sup> =5.35 P=0.021*
Yes	72	55.8	90	69.8	
No	57	44.2	39	30.2	
<b>Drink alcohol</b>					MH=0.34 P=0.845
Never	123	95.3	124	96.1	
Once/day	4	3.1	4	3.1	
Twice /day	2	1.6	1	0.8	
<b>Practice physical exercise</b>					<sup>MN</sup> X <sup>2</sup> =11.46 P=0.0007*
Yes	22	17.1	46	35.7	
No	107	82.9	83	64.3	
<b>Duration of practice exercise (mins)</b>	[n=22]		[n=46]		<sup>MN</sup> X <sup>2</sup> =3.81 P=0.051
Less than 30 minutes	8	36.4	7	15.2	
30-60 minutes	14	63.6	39	84.8	

<sup>MN</sup>X<sup>2</sup>: Mac Nemar test

MH: Marginal Homogeneity test

\*significant at P≤0.05

**Table (4):** shows practices related to osteoporosis among the studied women before and after program. It revealed that there were statistically difference between

pre and post program in relation to walk more than 10 min in sun daily and practice physical exercise p- value =(0.021 and 0.0007) respectively .

## Discussion

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Osteoporosis is the most common non-communicable and metabolic disease that causes disability and diminished quality of life. Women, as compared with men, are four times more likely to develop osteoporosis. The importance of theory-based interventions in prevention of osteoporosis has been shown in several studies (**KAVEH, et al.2014 & Jeihooni et al 2015**). The present research was designed to assess effect of learning package on knowledge and practice of women's regarding osteoporosis in Port Said City

The present study revealed that more than half of studied women were in the age group of 30 to less than 40 years and the majority of them were married. Also, most of them suffering from low back pain. From the researcher's point of view the low back pain may be due to most of them were obese and haven't knowledge about body mechanism. Regarding knowledge about osteoporosis among the studied women before and after program. It reveals that, there were statistically significant differences between pre and post program in relation to knowledge about calcium and total knowledge this result in the line with study in El- Mania done by **sma'il et al.(2015)** who found that, defective. Knowledge about preventive measures for osteoporosis was observed in this study as regards to eating diet rich in calcium and vitamin D and also regarding limitation of the intake of tea and coffee.

Also, similar results with **Alshammari, (2014)** The cumulative present knowledge scores regarding eight dimensions related to osteoporosis and its prevention among the studied women in both groups .As regard to smoking and Shisha, more than have were satisfying. However, about fifth of them obtained very good knowledge. Also, a similar result with **WHO, (2003)** Smoke reduces bone mineral density by decreasing

the amount of calcium absorbed from food. From the researcher's point of view these result may be due to the women of study sample affected by the culture of their society which the Egypt society characterizes by negative attitude toward phenomenon of women smoking

The present study results go against the study done by **Curry and Hogstel (2001)**, stated that the majority of women have identified lack of calcium and dairy products as a risk factor for osteoporosis while minority had identified genetics or family history as risk factor for osteoporosis. In addition **Meenskshi et al., (2015)**, their study findings revealed that majority had average knowledge regarding osteoporosis and its prevention. In preventive practices, majority had inadequate physical activity. All most were taking moderate diet. Regarding medical checkup and follow up majority had inadequate medical checkup and follow up. From the researcher's point of view The level of study sample knowledge more effective by their lifestyles and attitudes..

Regarding practices related to osteoporosis among the studied women before and after program. It revealed that there were statistically significant difference between pre and post program in relation to walk more than 10 min in sun daily and practice physical exercise respectively . From the researcher's point of view these result may be due to the walk and physical exercise is un expensive, easy to do and safe time

The present study is in agreement with **Alshammari, (2014)**, who stated that women practices to osteoporosis and its prevention and in this study were toward eight behaviors .Five behaviors considered positive actions such as eating food rich calcium "fish, milk and Broccoli", exercise and exposure to sunlight. While three activities considered negative practices that include coffee, smoking cigarettes and attitude and smoking

shisha. Overall practices scores were lower prevention across women in both groups in this study. From the researcher's point of view these result may be due to prevent osteoporosis effectively it is necessary to have the knowledge about the lifestyle risk factors, the positive attitudes towards them and to practice in a corresponding, suitable way. However, the practice does not have to correspond to the knowledge and attitudes

### **Conclusion**

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The findings of the present study confirmed the effectiveness of educational intervention in improving what write the changes behaviors or knowledge items. In addition, from the foregoing discussion, it can be seen that there are obvious needs for instructional scheme Offered on simple media to increase knowledge and practice of women's regarding osteoporosis.

### **Recommendation**

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Our study recommended that serious measures to be undertaken to prevent osteoporosis to stop any future epidemic of catastrophic osteoporosis-related fractures. It is recommended that design and implement educational trials to change and improve women lifestyle to prevent osteoporosis. Also long-term effects of such educational programs should be assessed. In addition, early detection and prevention of osteoporosis it is important to reduce the burden of osteoporosis in the community.

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