

Effect of Educational Program regarding Prevention of Osteoporosis among Employees Women at South Valley University

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Abstract

Osteoporosis is a “silent” disease most common among women. Therefore, women need to provide them with enough amount of information about the prevention of this disease. **Aim of the study:** Evaluate the effect of educational program regarding prevention of osteoporosis among employees women at South Valley University. **Study design:** A quasi-experimental research design (pre posttest) was utilized in this study on a convenient sample of 227 employees women who worked at South Valley University. **Method:** Data were collected by using a self-administered questionnaire pre and post applying the educational program included osteoporosis knowledge assessment, osteoporosis health belief scale, and osteoporosis self-efficacy scale. **Results:** The mean age of the studied sample was 37.14±10.8 years. There was an improvement in women's total knowledge level after application of the educational program, as well as improvement in all items of the osteoporosis health belief scale. Also, there was an improvement in self-efficacy scale mean scores after application of the educational program. **Conclusion:** The study found that women's information improved after providing them with an education program on osteoporosis as well as self-efficacy and health belief. **Recommendations:** an educational program for women should be applied on a regular basis to improve knowledge and health beliefs regarding osteoporosis prevention.

Keywords: Educational program, health beliefs, knowledge, osteoporosis self-efficacy, prevention, women.

Introduction:

The World Health Organization (WHO) defines osteoporosis as a condition characterized by low bone mass and bone matrix degradation leading to increased fragility and fracture risk. Since osteoporosis is asymptomatic and people with osteoporosis go undiagnosed before a fracture happens, it is often referred to as the silent disorder (Omer et al., 2016).

Osteoporosis is a worldwide health problem that affects over two hundred million people. Because women have lower bone density than men, they are more susceptible to disease, and menopause causes a significant drop in estrogen levels, causing them to lose calcium more quickly than men (Pavone et al., 2015).

The risk of a woman fracturing her hip due to osteoporosis is the same as the combined risk of breast, uterine, and ovarian cancers. Genetics also plays a role. Women 35 years and more and who have a family history of osteoporosis are nearly double as likely to develop the disease as women without a family history. Several lifestyle factors contribute to bone loss and osteoporosis,

including a low-calcium diet, inadequate exercise, smoking, and alcohol consumption (Muhammad et al., 2018).

One in two Caucasian women will have osteoporosis fractures throughout her lifetime. Bone metabolism is a lifelong process that includes regular turnover cycles of osteoclasts breaking down the bone structure, (resorption) and osteoblast forming bone structure bone (remodeling). Estrogen is necessary to preserve a healthy balance of bone resorption and remodeling in women. Premenopausal women stay at a greater risk of bone loss because of hormonal fluctuation and low levels (Maria et al., 2017).

Osteopenia affects 53.9% of postmenopausal Egyptian women, while osteoporosis affects 28.4 percent (Taha, 2011). Among males over the age of twenty, 21.9% have osteoporosis (El-Tawab et al., 2016). Post-hip fracture mortality rates in the Middle East and Africa may be higher than individuals noted in western populations. While such rates range from 25 to 30% in the western populations, they are two to

three times higher in this area (**Baddoura et al., 2011**).

Previous research has revealed that several women of all ages are unaware of osteoporosis or do not consider themselves at risk for osteoporosis development (**Des Bordes et al., 2020**).

Health education is mainly important for improving patient self-efficacy which considers a fundamental component of self-management. Self-efficacy is founded on social cognitive theory, which explains how behavioral, personal, and environmental influences interact in health and chronic disease. According to the self-efficacy theory, patients' trust in their ability to execute health behaviors has an effect. Self-efficacy is an important term for bettering self-management. Self-efficacy has been shown to be essential for effective self-regulation of a variety of chronic illnesses, including osteoporosis (**Khalil et al., 2020**).

Significance of the study:

According to the National Osteoporosis Foundation (NOF), ten million people suffer from osteoporosis. About 34 million people have low bone mass, which puts them at a higher risk of osteoporosis (**National Osteoporosis Foundation, 2020**). In Egypt, osteoporosis is understood as a “medical problem, because the bone mineral density of Egyptian women is lower than women in Western countries (**Wahba et al., 2010**).

In Egypt, there are few studies on osteoporosis prevention through educational programs involving women in various age groups particularly young adults and middle-aged women with the disease's prevalence is expected to rise, and women are the main group in a preventive intervention. Therefore, this study examines the women's knowledge, health beliefs, and self-efficacy after providing them adequate education.

Aim of the study:

To evaluate the effect of educational program regarding prevention of osteoporosis among employees' women at South Valley University.

Specific objective:

- To evaluate the effect of educational program regarding osteoporosis prevention on employees' women knowledge, health belief, and self-efficacy.

Research Hypotheses:

- The women's knowledge will be improved after applying an educational program.
- The level of confidence in self-efficacy among employees' women will increase after applying an educational program
- Health beliefs among employees' women will be improved after applying an educational program.

Subjects and Method:

Research design:

A quasi-experimental research design (pre posttest) was utilized in this study.

The setting of the study:

This study was performed at South Valley University which is located in Qena Governorate; Egypt.

Study sample:

The sample size was estimated at 227 employees' women who worked at South Valley University. Use Epi Info for Windows (Atlanta, GA, USA) based on the following criteria: 95 percent level of confidence, 5 % margin of error, and 20% non-response rate who met the following inclusion criteria:

- Women ages ranged from 18 to 60 years.
- Accepted to take part in this study.
- Didn't participate in any osteoporosis education programs.

Exclusion criteria: absence of any osteoporosis symptoms or signs.

Tools of data collection:

Self-administered questionnaire this questionnaire included the following parts:

Part I: Employees' women characteristics; included age, marital status, occupation, level of education and residence, source of information, number of children, and income.

Part II: Osteoporosis Knowledge Assessment Tool (OKAT). OKAT was developed by **Winzenberg et al., (2003)**, and **Sayed and Bashour, (2013)**, validated the Arabic version with internal consistency ($= 0.824$). OKAT had 20 questions with three possible answers: correct, wrong, and don't know. Each correct answer obtained one point, while incorrect answers obtained zero points, as did "don't know" responses.

The overall OKAT score was 0 to 20, with 0 being the lowest and 20 being the highest. The total knowledge scores were divided into three categories: a score of lesser than 8 was reflected poor, 8 to 12 was reflected fair and a score of more than 12 reflected a good level of knowledge.

Part III: Osteoporosis Health Belief Scale (OHBS): It was adopted by **Kim et al., (1991)**. It was translated into the Arabic language. It includes 42 items with seven subscales related to susceptibility, seriousness, benefits to exercise, benefits to calcium intake, barriers to exercise, barriers to calcium intake, and health motivation. A Likert scale of five-point was used from "strongly disagree" to "strongly agree". The answers were formatted and graded by assigning 1 "for" strongly disagree answers and a "5" for "strongly agree" answers.

The overall health belief scores range from 42 to 210 and each subscale score range from 6 to 30. There are six questions in each subscale, with a potential score ranging from "6-30" for each subscale, the low score meaning low perception and a high score meaning high perception.

Part IV: Osteoporosis Self-Efficacy Scale (OSES): The OSES was adopted from **Horan et al., (1998)**. It is translated into Arabic. It used a twelve statement within two subscales, namely the osteoporosis self-efficacy exercise scale and the osteoporosis self-efficacy calcium scale. Each subscale includes six items. They are rated on a five-point Likert scale ranging from 1= strongly disagree, to 5 = strongly agree). The exercise and calcium score was determined by calculating the responses to each of the six relevant items

and multiplying them by 5 (range: 0-30) to be divided into two categories: low (6-18) and high (19-30).

Tools validity and reliability:

The validity of data collection tools was verified by three experts in medical-surgical and obstetric nursing at South Valley University and took into account their comments. Cronbach's coefficient alpha test was used to assess the tools' reliability statistically. With a Cronbach's coefficient alpha test of 0.968, the tools were found to be internally accurate.

A pilot study:

It was performed on 10% (22) women to evaluate the tools' applicability and clarity, and determine the time required for data collection. Following the analysis of pilot study findings, a slight modification was done accordingly. Those women were excluded from the study subjects.

Ethical considerations:

The study followed standard clinical research ethical principles. Verbal approval was obtained from every employee woman to take part in the study. The study maneuvers didn't entail any risk to employees' women at South Valley University. The participants have permitted to withdraw at any time. Confidentiality and anonymity of the subjects were assured.

Methods:

- Official endorsement and administration permission were adopted from the vice president for post-graduate studies and research at South Valley University.
- Data was collected from December 2019 to November 2020 from 20 faculties.
- The researcher introduced herself to the employees' women and explained the purpose of the study, as well as she, asked the participant about the possibility to join the study.
- The subjects were divided into small groups for interviews, each consisting of (5-15) participants who met the inclusion criteria.

- The researcher distributed the self-administered questionnaire to each subject and asked them to fill the questionnaire completely and honestly.
- After that, the researcher started making a plan to implement the program by creating groups for the employees' women in their workplaces.
- The researcher met the women after collecting the baseline data, then schedule the educational sessions (3 sessions) for 30 minutes to 45 minutes for each by using PowerPoint presentation, supported by pictures, video, and ended by open discussions.
- Each session began with an overview of the previous session and an explanation of the new sessions' goals. The sessions covered the following:
 - **The first session:** Contained the teaching women about the meaning of osteoporosis, risk factors, symptoms, complications, diagnosis.
 - **The second session:** Covered the benefits of a healthy diet in the prevention and management of osteoporosis, as well as food recommendations.
 - **The third session:** Included clarification regarding exercise and its importance for bone health. Each woman was provided with a copy of a colored and simple Arabic booklet on osteoporosis.
- At the end of each session the researcher distributed the questionnaire to each employee's women to obtain the retention knowledge and assess health beliefs and self-efficacy regarding the prevention of osteoporosis.

Statistical analysis:

Statistical Package for Social Sciences (SPSS) version 23 was used in managing data. The Shapiro test was used to check homogeneity and normal distribution of data. Numbers and percentages were used to represent qualitative variables where the mean and standard deviation are used to specify

continuous variables. Qualitative data were compared using Chi-square tests, and continuous data were compared using paired t-test is used to. The association of quantitative data was evaluated by Pearson Correlation. P-value < 0.05.

Results:

Table (1) showed that a large percentage of the studied women their age group was 30 to less than 40 years old with mean ages 37.14 ± 10.8 years old, more than half of them (63%) were married and the majority (87.3 %) had secondary and university education. More than three quarters (79.7%) were office working, one-third of the studied women (34.8%) had less than three children and slightly more than half (55.1%) of them had sufficient income.

Fig (1): Comparison between pre and post program women's total level of knowledge Score regarding osteoporosis (N=227).

Fig (2): distribution of the main source of information regarding osteoporosis (N=227).

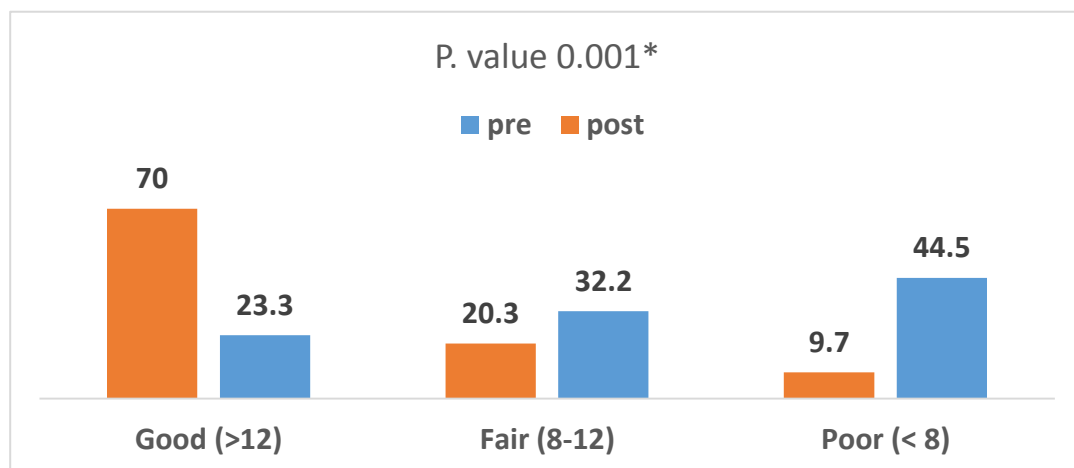
Table (2): showed that there was a statistically significant difference in the mean score of all elements of the Osteoporosis Health Belief Scale (OHBS) among the studied women after application the education program at $p < 0.001$.

Table (3): revealed that the mean score of the Osteoporosis Self-Efficacy Scale (OSES) among the studied women increased after application the education program compared to before program with a statistically significant difference between them at $p < 0.001$.

Table (4): reported that there was a significantly positive correlation between knowledge and susceptibility of osteoporosis, seriousness, and benefits of exercise, health motivation, self-efficacy exercise, and self-efficacy calcium in pre- and post-program. On the other hand, there was a negative correlation between knowledge and the barriers to exercise and barriers to calcium in pre- and post-program.

Table (1): Socio demographic Characteristics for the studied sample (N=227).

Socio demographic characteristics	No. (227)	%
Age (Years):		
Less than 30	63	27.8
30 to less than 40	70	30.8
40 to less than 50	53	23.3
50 and more	41	18.1
Range	20-59	
Mean±SD	37.14±10.8	
Marital status:		
Single	59	26.0
Married	143	63.0
Widow	15	6.6
Divorced	10	4.4
Level of education		
Basic education	14	6.2
Secondary school	105	46.3
University graduation	93	41.0
Post graduate	15	6.6
Residence:		
Urban	97	34.8
Rural	130	57.2
Occupation:		
Officer	181	79.7
Coworker	46	20.3
Number of children:		
Non	74	32.6
Less than 3child	79	34.8
4 to 6 child	64	28.2
More than7	10	4.4
Income:		
Sufficient	125	55.1
Insufficient	102	44.9

**Fig (1):** This figure reported that there was a statistically significant difference in women's total level of knowledge about osteoporosis before and after the program application.

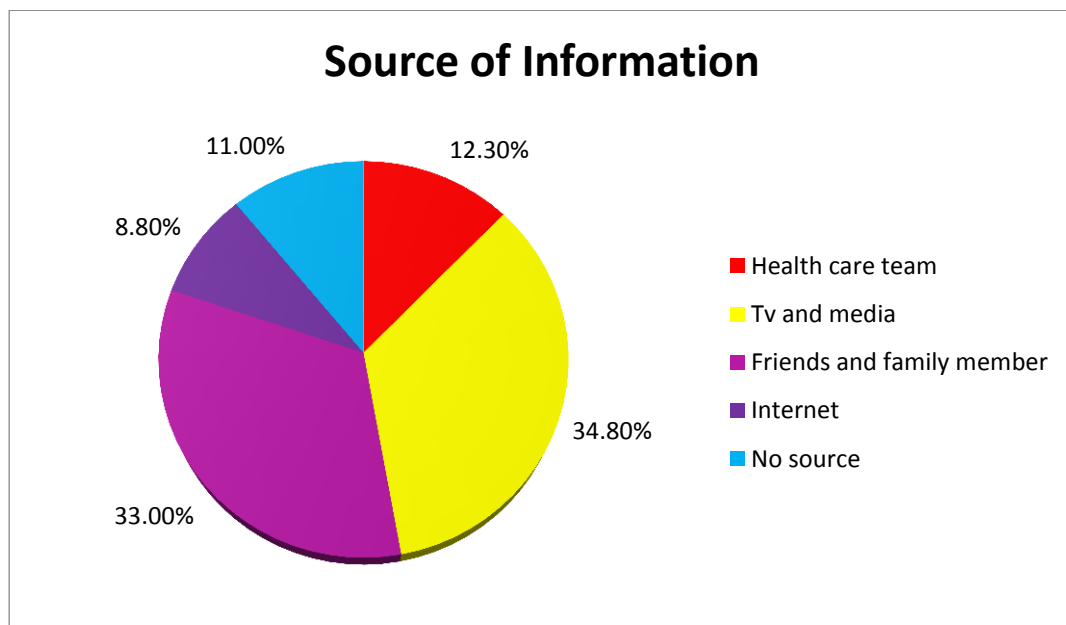


Fig (2): This figure showed that the main sources of knowledge were TV and media followed by friends and family members (34.8% and 33% respectively).

Table (2): Comparison of mean score of the Osteoporosis Health Belief Scale (OHBS) among the studied women pre& post program (N=227).

Items	Time		Paired sample t test Pre-post
	Pre	Post	
	Mean ± SD	Mean ± SD	
Perceived susceptibility.	16.6±3.2	19.2±2.1	14.42(<0.001*)
Perceived seriousness.	18.8±2.7	21.3±2.2	15.75(<0.001*)
Perceived benefits of exercise.	21.03±2.2	22.7±2.2	16.84(<0.001*)
Perceived barriers to exercise.	18.06±3.01	16.4±2.9	6.78 (<0.001*)
Perceived benefits of calcium.	20.7±2.1	22.05±2.9	8.79 (<0.001*)
Perceived barriers to calcium.	17.7±2.2	13.28±1.84	22.29(<0.001*)
Health motivation.	17.04±3	22.06±1.8	29.84(<0.001*)

(*) statistically significant <0.05

Table (3): Comparison between total mean score of the Osteoporosis Self-Efficacy Scale (OSES) among Studied Sample Pre & Post Program (N=227).

Items	Time		Paired sample t test Pre-post
	Pre	Post	
	Mean ± SD	Mean ± SD	
Self-efficacy of exercises.	13.5±2.6	20.77±3.4	24.5 (<0.001*)
Self-efficacy of calcium.	14.77±2.6	22.48±1.6	52.43(<0.001*)
Total Self-efficacy.	28.3±4.6	43.26±3.7	40.16(<0.001*)

(*) statistically significant <0.05

Table (4): Correlation between health belief score, self-efficacy score and knowledge among studied women (N=227)

Items	Total knowledge scores Pre	Total knowledge scores Post
Susceptibility	.270**	.245**
Seriousness	.369**	.196**
Benefits of exercise	.468**	.171**
Barriers to exercise	-.164*	-.308*
Benefits of calcium	.091	.177*
Barriers to calcium	-.131*	-.0168*
Health motivation	.174**	.202**
Self-efficacy exercise	.117	.133*
Self-efficacy calcium	.204**	.206**

*Significance at p value ≤ 0.05

r: Pearson Correlation

Discussion:

Osteoporosis is a common condition that increases the risk of fractures. It frequently develops without signs or pain, and it is affecting more females than males. Osteoporosis is often not detected before damaged bones cause painful fractures, which typically occur in the back or hips. Unfortunately, if a woman has a fractured bone as a result of osteoporosis, it is difficult to recover. (Menopause Health Center, 2015).

The present study found that the participant had a mean age of 37.14 ± 10.8 years. This contradicts with Sava et al., (2020) who reported that the average age of the studied group was 43.7 ± 8.3 years.

The existing study revealed that most of them were married. This finding may be attributed to the nature that marriage, since ancient times, has continuously been a fundamental social institution and played an imperative part in the lives of most people. Also, this results in line with Mahmoud and Sabry, (2017) who revealed that the most of the participant was married. This result disagrees with El-Masry et al., (2018) who reported that most of the participants were not currently married.

The present study found that approximately half of the studied women had low knowledge about osteoporosis. This may be due to the idea that the condition is known to affect people in their later years. Another explanation is that most female workers do not participate in health-related classes.

The present study findings presented that there was a statistically significant increase in overall knowledge amongst women regarding osteoporosis after the educational program education, while in post-program the minority had poor knowledge. This result supported by Senosy and Elareed, (2018) who found that the application of an educational program enhances participant's knowledge of osteoporosis.

The main sources of their knowledge were T.V and social media. This means that utilizing measures for knowledge enhancement, skills improvement, and building confidence can help women increase their OP knowledge and calcium intake.

The finding of this study revealed that after application of the program, the averages mean scores for osteoporosis susceptibility; seriousness, exercise benefits, calcium intake benefits, and health motivation were significantly improved than before the program implementation. This represents the fact that the majority of women believe osteoporosis can have a significant impact on individual lives, and the high score indicates that younger people are alert to the importance of calcium intake.

These results were consistent with the findings of Jeihooni et al. (2015), who found that intervention could have a substantial impact on females' beliefs toward osteoporosis in terms of susceptibility, and seriousness; the impact of the health behavior on osteoporosis

prevention was significantly improved, while barriers were significantly reduced.

People with high self-efficacy highly successful and healthy because they believe they can accomplish their goals **Lorentzon and Cummings, (2015)**. As a result, efficacy can play a critical role in assisting people in coping or preserving a healthy lifestyle. In this study, the women's reported moderate self-efficacy. This means the women are able to adjust their diet to include more calcium- rich foods.

Assessment of self-efficacy ought to be a fundamental part of the nursing practice. Furthermore, **Al-Otaibi, (2015)** reported that self-efficacy higher scores compare with higher personal expectations of her ability to start and conform to self-management.

The current study found that after implementing the program, there was a statistically significant rise in mean scores of osteoporosis self-efficacy associated with exercises and calcium as compared to before the program was implemented.

This finding is supported by **Rezaei et al., (2019)** who discovered that an empowerment program based on the health belief model could be an effective strategy for increasing osteoporosis self-efficacy amongst older adults. It was also reported that the intervention groups mean self-efficacy score, in both the subscales of exercise and calcium intake, was significantly higher than the control group's after the application of the empowerment program. This improvement had been continued one month later.

Other researchers have found that educational programs can improve osteoporosis self-efficacy in elderly populations **Park et al., (2017)**. It has been found that osteoporosis prevention education can increase self-efficacy related to calcium intake **Tussing and Chapman-Novakofsk., (2005)**. This result disagrees with **Sedlak et al., (2005)** who reported that interventions to enhance osteoporosis prevention did not have any effect on calcium intake in postmenopausal women. They also found that these interventions led to a decrease in weight-bearing exercises in these women. It has been shown that osteoporosis

preventive interventions have no effect on calcium intake and exercise subscales of self-efficacy in elderly women.

In addition, **Cavalli et al., (2016)** noticed that participants had low self-efficacy in relation to exercise and calcium intake. This finding indicates that the participants had the desire and good judgment to perform such modifications that can be used in health education to motivate them to modify osteoporosis-prevention behaviors through exercise and calcium intake.

The existing study reflected that; there was a significantly positive correlation between knowledge and susceptibility of osteoporosis, seriousness, benefits of exercise, health motivation, self-efficacy exercise, and self-efficacy calcium in pre and post-program. On the other hand, there was a negative correlation between knowledge and the barriers to exercise and barriers to calcium in pre and post-program. This result may be linked to improving their knowledge level, whereas these barriers are dependent on misconceptions which can be clarified it by education program that teach them to increase their calcium intake and perform physical activity regardless of the perceived barriers.

In this respect, **Tung and Lee, (2006)** found that health beliefs based on a person's understanding of the health problem. However, learning more about the disease can cause one's beliefs to change. Improvements in health beliefs are likely to have an impact on an individual's lifestyle behaviors. A good understanding of knowledge can contribute to lifestyle changes and disease prevention.

Furthermore, the current study findings agreed with those of **Chan et al., (2019)** who revealed that osteoporosis knowledge was correlated to health beliefs. It was also reported that participants who knew more about osteoporosis were more health-motivated, understanding of the advantages of exercise and calcium intake, and had fewer barriers to exercise and calcium intake. They also actively participated in osteo protective strategies, recognizing the role of education and a positive attitude in motivating individuals to follow osteoprotective strategies.

In this aspect, Akhtar et al., (2016) portrayed that is the imperative role for nurses to provide OP educational services for the studied women, as both health counselors and health care providers. It also recommended that public health strategies intended to increase calcium intake amongst women and enhancing healthier habits.

Conclusion:

The educational program significantly increased the level of knowledge, improved health beliefs and, positively improved osteoporosis self-efficacy regarding osteoporosis prevention amongst studied women.

Recommendations:

- Relevant information to facilitate educating women regarding osteoporosis ought to be accessible for employee women.
- Further studies are necessary to confirm the impacts of exercise interventions and long-run use of calcium-rich diets on OP prevention amongst employee women.
- Future research should focus on healthcare providers, particularly nurses in various health care facilities and nursing schools, in osteoporosis education efforts.

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