Effect of Educational Guidelines on knowledge and Self-Efficacy of Menopausal Women With Osteoporosis

Etab Hussein Mohamed Elsyad[1] & Reda Elsayed Elbadwy Ezzat[2]

[1.] Lecturer of Community Health Nursing Department, Faculty of Nursing, Zagazig University, Egypt.

[2.] Assistant Professor of Community Health Nursing Department, Faculty of Nursing, Zagazig University, Egypt.

Abstract

Background: Osteoporosis considered as the most common metabolic bone disorder which is common in menopausal women. Improving knowledge and self-efficacy about osteoporosis among menopausal women. **Aim:** To evaluate the effect of educational guidelines on improving knowledge and self-efficacy for menopausal women with osteoporosis. **Subjects and methods:** At the bone density measurement unit at Zagazig University hospitals, **A quasi-experimental design,** including pre-, and post-test, was used. **A purposive sample** composed of Seventy-five menopausal women. **Tools:** An interview questionnaire sheet and The Osteoporosis Self-Efficacy Scale were used. An interview questionnaire sheet consisted of (demographic characteristics, medical and family history, knowledge of osteoporosis). **Results:** 66.7% of married participants (4.7%) with age 52.40 ± 1.21 had totally unsatisfactory level of knowledge regarding osteoporosis at pre-intervention, while 82.7% of them had a satisfactory knowledge of post intervention at p value .000. only 18.7% of the women had strong levels of their total self-efficacy towards osteoporosis at pre-intervention, where changed to 52.0% at post intervention. There was a very strong link between how many women knew about osteoporosis and how confident they felt about what they knew ($P \leq 0.01$) before and after talking about the educational sessions. **Conclusions:** the applying of educational guidelines for menopausal women suffering from osteoporosis affected in improving their knowledge, and self-efficacy regarding osteoporosis. **Recommendations:** For greater improvements, more established interventions and programs should be implemented in the research context.

Keywords: Osteoporosis, Knowledge, Self-efficacy & Educational guidelines

Introduction:

Menopause is considered a unique time during a woman's life that often occurs nearly around of 50 years old and is a stage that all women would experience. Some women might have more severe signs and symptoms that might deeply affect their personal, social, performance, and quality of life and cause them to encounter multiple serious issues during life. The most common metabolic bone disorder that is common in menopausal women is osteoporosis, which is considered a universal health problem, making up a potentially serious disease besides, cancer, stroke, and cardiac diseases **(Taebi et al., 2018).**

Osteoporosis (OP) is considered a skeletal disease, which is recognized by reduced bone density that increases the potential for bone fracture. It's linked to low bone mineral density (BMD) and losing structural and bio-mechanical qualities that are necessary for bone homeostasis. Most of the suffering women often have pain, reduced social interaction, disabilities, and depression, which leads to an expensive long lengthy hospital stay and may be premature death **(Shawashi & Darawad, 2020).**

Osteoporosis is a serious global problem that affects more postmenopausal women than men. It has a varying onset depending on age, with older women being the most afflicted age group, with several osteoporotic fracture sites including the hip, forearm, spine, and proximal humors. According to the World Health Organization, osteoporosis affects 15% of females between the ages of 50 and 59, and 70% of women over of 80 years old. Osteoporosis is more common in Arabic countries (with rates ranging from 8% to 40%). 53.9% of postmenopausal Egyptian women have osteoporosis, while 28.4% have osteoporosis **(Miedany et al., 2021)**.

There are both modifiable and non-modifiable risk factors for osteoporosis. Modifiable risk factors include gender, ethnicity, age, and, in some cases, family history. Other modifiable risk factors include low vitamin D and calcium intake from diet or supplements, low body weight, falls, inactivity, smoking, and alcohol use, as well as prolonged use of corticosteroids and proton pump inhibitors. **(Lin et al., 2020)**

Two groups of osteoporosis were cleared: primary and secondary. The most frequent type of osteoporosis is **primary osteoporosis** (which

includes post-menopausal osteoporosis (Type 1) and senile osteoporosis (Type 2). Secondary osteoporosis is distinguished by a well-defined etiologic mechanism. Type 1 is typically linked with decreases of female sex hormones (estrogen and androgen), resulting in sped up bone turnover, bone desorption surpassing bone production, and trabecular bone loss predominating over cortical bone loss. Type 2, which is characterized by slow age-related bone loss in all sexes because of systemic aging, is normally caused by the loss of stem-cell precursors, with cortical bone loss being the most common **(Gasperini et al., 2021)**. Measuring bone mineral density (BMD) is regarded as an important clinical diagnostic marker for osteoporosis and is the most effective method for predicting osteoporotic fractures. BMD hip and spine examinations are used to diagnose and confirm osteoporosis, predict future fracture risk, and track patients. Bone mineral density can be easily evaluated to detect bone density; however degeneration of bone tissue, except for biochemical markers of bone tissue, cannot be measured in clinical settings. Fracture risk is directly proportional to bone strength, and it rises exponentially as BMD falls **(Hsu et al., 2020)**.

Self-efficacy is defined as a person's belief in his or her ability to carry out preventive measures despite various perceived barriers. Self-efficacy is also defined as confidence in one's ability to succeed in specific situations or complete tasks to deal with various life challenges **(Daia et al., 2021)**.

Community health nurses play a vital role in creating awareness about osteoporosis in the community by conducting osteoporosis screening camps, make sure of periodical appraisal of body mass index, calcium, vitamin and bone mineral density levels and deliver health education about life style change such as doing systematic aerobic exercise, exposure to sun light, sustain body weight, eating calcium rich foods, intake of calcium and vitamin D complements and to select the right drug in order to reduce osteoporosis and improves the quality of life of pre and post-menopausal women **(Cecily , 2020)**.

Osteoporosis knowledge is one of the factors associated with osteoporosis preventive behavior. Insufficient knowledge regarding osteoporosis makes women assume that the symptoms were simply a part of the normal aging process. In all study, the obtained scores indicated that knowledge about osteoporosis is poor or limited among surveyed subjects **(Al-Muraikhi et al.,2017)** .

So health educational guidelines regarding osteoporosis are necessary for women and considered one alternative method for promoting health and coping with menopausal symptoms **(Morowatisharifabad et al., 2020)**. Patients' knowledge and self-efficacy, which work together to

affect healthy behavioral modification, are critical components of successful preventative interventions. Eventually, growing evidence to suggests that changing people's health-related behavior may have a major impact on some chronic conditions **(Gasperini et al., 2021)**.

Significance of the research:

Osteoporosis (OP) is a worldwide issue and one of the most frequent bone diseases in humans, with an osteoporotic fracture occurring every three seconds **(Panta et al., 2020)**. The incidence of OP in the Egyptian demography is rather significant, and it is linked to a wide range of risk factors and medical problems **(Miedany et al.,2021)**. Women's bone loss accelerates during menopause and continues into old age. Knowledge and awareness of osteoporosis, as well as healthy eating habits and increased exercise, have been showed to reduce or prevent osteoporosis fractures **(Darout et al., 2017)**. Many studies have looked at the role of knowledge in preventing the development of osteoporosis and found that women have significant knowledge gaps, and educational interventions can help increase knowledge so that nurses can use guidelines and other interventions to prevent complications **(Lizneva et al., 2018)**.

Aim of the research: To evaluate the effect of educational guidelines on improving knowledge and self-efficacy for menopausal women with osteoporosis.

This was accomplished through the specific objectives:

1. Assess women's' knowledge, and self-efficacy prior and after the nursing educational guidelines toward management women's with osteoporosis
2. Plan, implement, and evaluate the effect of nursing educational guidelines on improving ' knowledge, and self-efficacy toward management women's with osteoporosis

Hypotheses:

Women's' knowledge, and self-efficacy scores toward management women's with osteoporosis will be improved after nursing educational guidelines.

Subjects and Methods:

Study design

A quasi-experimental interventional design, with pre-, post-, evaluations applied.

Setting:

The research was completed in Bone Density Measurement Unit at Zagazig University hospitals. This unit is composed of three rooms; one for waiting, and the other rooms for nursing staff and to measure bone mass density by the peripheral machine.

Sample:
A purposive sample consisted of 75 menopausal women who were having the following criteria:
Inclusion criteria:
- Age ≥ 40 years.
- Menopausal women.
- Can read and write.
- Diagnosed with osteoporosis.
- Not enrolled in any previous program course.
Tools used:
Tool No. 1: An interview questionnaire sheet: which was done by the researcher in simple Arabic language and composed of three components:
Part (A): women's demographic characteristics, for collecting data pertaining to the women's developed by the researchers as; age, residence, marital status, education, crowding index, income and source of information.
Part (B): covered the medical history of the women. It also involved questions about chronic diseases as hypertension, renal disease, gastrointestinal disease/hepatic, osteoporosis, hyperthyroidism, diabetes mellitus, tumors, respiratory, rheumatoid arthritis and others and family history regarding osteoporosis.
Part (C): Mothers' knowledge questionnaire, to assess mothers' knowledge toward management of women's with osteoporosis. It included two sections: one for collecting theoretical data about osteoporosis as definition, symptoms, and causes of osteoporosis…etc. It contained 14 questions, and the other to collect the point of view of the studied women regarding risk factors of osteoporosis such as smoking, drinking alcohol … etc., it included 8 questions)
Scoring system for this tool:
There were fourteen questions, with total scores ranging from zero to fourteen, that were responded as "Yes" or "No" responses. The following criteria were used to score the responses:
• **Yes,** scored as **one degree**.
• **No** scored as **zero degree.**
The total levels of knowledge about osteoporosis were estimated:
• Satisfactory knowledge: for more than or equal 70 % of total scores
• Unsatisfactory knowledge: of less than 70 % of total scores
Tool No. 2: Osteoporosis Self-Efficacy Scale (OSES): A scale which for determining the self-efficacy regarding exercise and diet calcium intake for preventing osteoporosis **(Horan et al., 1998)**. It was translated into Arabic by investigator and contained 12 Items.

Scoring system to (OSES):
The 12 items within total score ranging from zero to twenty-four. Answers were measured on 3 points according to Likert scale as:
• **Completely sure,** which scored with **two degrees**.
• **Sure,** which scored with **one degree**
• **Not sure,** which scored with **zero**
Total Osteoporosis Self-Efficacy Scale (OSES) score was estimated as:
• **High,** when total score over 70%
• **Moderate,** when the total score ranged between 50% to 70%
• **Low,** when the total score is less than 50%
Content validity and reliability of tools:
Three specialists evaluated the data collected for tools. Two professors from the Department of Community Health Nursing, one assistant professor from the Department of gernaontology Health Nursing at Zagazig University's Faculty of Nursing, and one professor with a specialty in bone density from Zagazig University's Faculty of Medicine evaluated the tools' clarity, relevance, application, and comprehension. All changes to the tools that were proposed have been implemented. Cronbach's Alpha was used to determine the reliability of the suggested tools.
Pilot study:
Before starting the main study, a pilot study was conducted on 7 women's (10%), who were excluded from the main study.
Field work:
Data collection took six months, beginning of from first of December 2020 to the end of May 2021.The study was carried out through 4-stages: assessment, planning, implementation, and evaluation.
Assessment phase:
This phase involved data collection prior to intervention to assess the baseline. The researchers first introduced themselves and explained the purpose of the research briefly to the directors of all Zagazig University hospitals' Bone Density Measurement Unit. The Director of each hospital appointed the Director of the hospital Bone Density Measurement Unit to facilitate the administration of the questionnaires.
All the women's were met and verbal agreements were obtained for participation. The pretest knowledge, and efficacy were distributed and the same questionnaire was used after the sessions' implementation for post assessment (post-test). Data were analyzed initially to provide the basis for the design of the intervention sessions.
Planning phase:
The researchers designed the intervention sessions' content. The learning booklet was prepared by the researchers and its content was validated and then

distributed to women's to be used as a guide for self-learning.

General objective:

The general objective of the women's sessions was to raise their knowledge and self-efficacy towards osteoporosis.

Specific objectives*:* By the end of the sessions, women's should be able to:

• Define the meaning of osteoporosis.

• Enumerate the causes of osteoporosis.

• List the symptoms of osteoporosis

• Describe the common age, periods of treatment, and referral of doctors of osteoporosis.

• Describe the risk factors of osteoporosis

• Discuss the diagnosis of osteoporosis.

• Illustrate the prevention measures of osteoporosis

• Describe the treatment of osteoporosis.

Implementation phase:

The intervention was implemented in the form of sessions; these were performed in a waiting room at Zagazig University hospitals' Bone Density Measurement Unit. The educational training methods were group discussions, role play, and demonstration. The sessions were supported using video, through lab top data show to facilitate and illustrate teaching. The total sessions of hospitals was 11 sessions. The number of women's in each session was 4-6 women's. The objectives of the sessions were as follows:

At the beginning of the first session an orientation to the session such as; the purpose of the subject, contents, time and location. The objective of the second session was the explanation the basic knowledge regarding osteoporosis as definition, nature, causes, symptoms/signs, and diagnosis, as well, the types of treatment and the precautions. The third session focused on applying the self-efficacy as well as dietary practice related to daily adequate intake and frequency of dietary calcium intake according to required daily allowances and some osteoporosis related habits as direct sun exposure in right time, and physical exercises, and how to care with their-self according to their menopause symptoms severity. global summarization and revision of the aim of the session and termination module sessions.

The last session was to evaluate the effect of health educational sessions on improving women's ' knowledge and self-efficacy regarding osteoporosis

Evaluation phase:

An evaluation of educational guidelines for nursing was carried out immediately after the implementation of the sessions. A follow-up evaluation was carried out after three months through the application of the same tools of the pretest.

Administrative and ethical considerations:

Permission to carry out the study was granted by submission of official letters from the Faculty of Nursing to the responsible authorities of the study settings to obtain their permission for data collection. All ethical issues were taken into consideration during all phases of the study.

Statistical Design

The SPSS statistical software program version 20.0 was used to enter data and conduct statistical analysis. For qualitative variables, data were presented using frequencies and percentages; for quantitative variables, data were presented using means, standard deviations, and medians. Chi-square test was used to compare qualitative category variables. Where anticipated values in one or more cells in a 2x2 table were less than 5, the Fisher exact test was utilized instead. The Spearman rank correlation coefficient was employed to analyze the correlations between quantitative and ranking variables. To discover independent determinants of knowledge, and self-efficacy scores

Statistical analysis:

For data entry and statistical analysis, the SPSS 20.0 statistical software was used. We calculated and evaluated the internal consistency of the developed tools using the Cronbach's alpha coefficient. Chi-square tests were used to compare qualitative categorical variables. Statistical significance was determined using a p-value of <0.05.

Results:

Table (1): Demographic Characteristics of studied women's in the Study Sample (n=75)

Demographic data	No.	%
Age (years)		
40< - 45	5	6.7
45-50	27	36
>50	43	57.3
Mean ±SD 52.40 ± 1.21		
level of education		
Read/ write, or primary education.	9	12
Elementary	40	53.3
High school	10	13.3
University	14	18.7
Postgraduate	2	2.7
Marital status		
Married	41	54.7
Single	2	2.7
Widow	19	25.3
Divorced	13	17.3
Family members' number		
2 persons	12	16
From 3 to 5	23	30.7
>5 persons	40	53.3
Residence:		
Rural	56	74.7
Urban	19	25.3
Occupation:		
Working	29	38.7
Housewife	46	61.3
Monthly income:		
Enough	48	64.0
Not enough	17	22.7
Enough and saved	10	13.3

Table (2): The Medical and family history of the studied sample (n = 75).

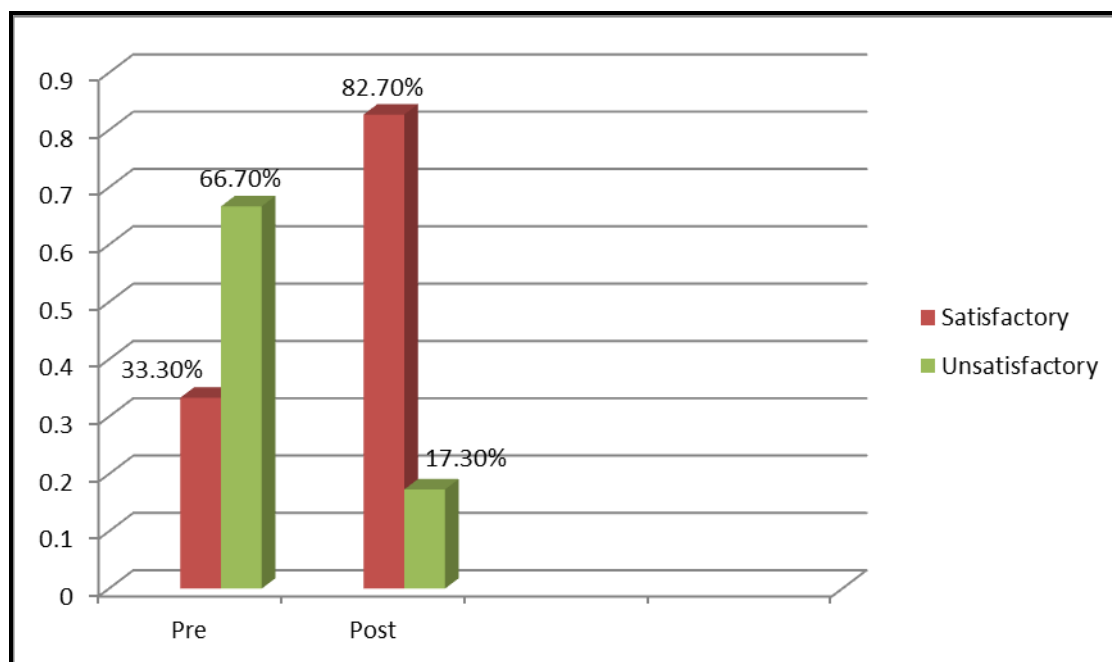| Medical history	No.	%
Suffered from any chronic diseases such as		
• Hypertension		
• Gastrointestinal disease/Hepatic	58	77.3
• Diabetes mellitus	29	38.5
• Others (respiratory disease- hyperthyroidism)	17	22.7
	18	24
• Tumors	14	18.7
• Renal	9	12
• Rheumatoid arthritis	9	12
Family history of osteoporosis		
Yes	58	77.3
No	17	22.7

Figure (1): Mothers total Knowledge throughout pre/ post educational guidelines (n = 75).

Table (3): Risk factors of osteoporosis of studied women's sample regarding their knowledge at pre- and post-educational guidelines (n = 75).

Risk factor for osteoporosis	Pre		Post		MH	P
	No	%	No	%		
Smoking:						0.000*
Yes	25	33.3	73	97.3	5.9	
No	50	66.7	2	2.7		
Passive smoking:						0.00*
Yes	19	25.3	65	86.7	8.2	
No	56	74.7	10	13.3		
Physical activity:					8.0	0.00*
Yes	11	14.7	55	73.3		
No	64	85.3	20	26.7		
Drink alcohol:					6.1	0.000**
Yes	33	44.0	72	96.0		
No	42	56.0	3	4.0		
Exposure directly to the sun:					8.4	0.02*
Yes						
No	14	18.7	53	70.7		
	61	81.3	22	29.3		
Eating imbalanced diet:					8.1	0.00*
Yes	9	12.0	45	60.0		
No	66	88.0	30	40.0		
Use Ca tablets regularly:					7.1	
Yes	21	28.0	45	60.0		
No	54	72.0	30	40.0		0.01*

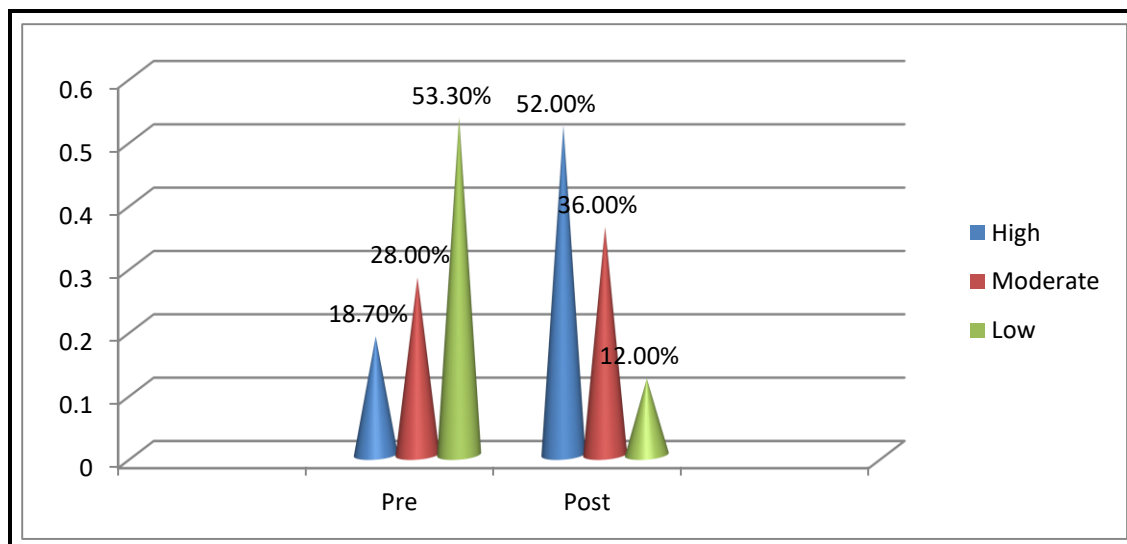*(*) Statistically significant at p<0.05*

Figure (2): Women's total self-efficacy towards osteoporosis at pre/post educational guidelines (n = 75).

Table (4): Correlation Matrix of Mothers' Knowledge, and self-efficacy Scores about osteoporosis at pre/ post educational guidelines (n = 75).

Variables	Knowledge in total	
	Pre	Post
Total self-efficacy (pre)	.305 .008**	.413 .003**
Total self-efficacy (post) **Post**	.512 .000**	.399 .006**

(**) Statistically significant at p<0.01

Table (5): Best Fitting Multiple Linear Regression Model for the Knowledge Score

	Unstandardized Co-efficient	Standardized Co-efficient	T	P. value
	B	Beta		
Educational level	.129	.079	2.417	.031*
Monthly income	.068	.075	2.105	.046*
Self-efficacy	.298	.154	6.135	.000**

a. *r-square=0.46*
b. *Model ANOVA: F=12.646, p<000***
c. *Predictors: (constant): educational level, monthly income, and self-efficacy*

Table (6): Best Fitting Multiple Linear Regression Model for self-efficacy

	Unstandardized Co-efficient	Standardized Co-efficient	T	P. value
	B	B		
Educational level	.199	.241	2.101	.031*
Marital status	.201	.273	1.870	.040*
Total knowledge	.399	.246	5.107	.001**

a. *r-square=0.42*
b. *Model ANOVA: F=11.433, p<000***
c. *Predictors: (constant): educational level, marital status, and total knowledge*

Table (1): Depicted the distribution of studied women based on demographic characteristics; it showed that, 57.3% of the studied women aged over 50, the mean age was ranged 52.40±1.21. Regarding to educational levels, 53.3% of women had elementary education.

Referring to marital status, 54.7% of them were married.

Table (2): Illustrated the most common chronic disease as mentioned by the studied menopausal women. According to the table, hypertension and

gastrointestinal/hepatic diseases were the most common chronic disease affecting 77.3% and 38.5%, respectively. Besides, 22.7% and 18.7% respectively complained of diabetes mellitus and tumors. While renal disease and rheumatoid arthritis represented equal proportion among the studied subjects 12%. There were 77.3% had family history for osteoporosis.

Figure (1): Showed that, 66.7% of the investigated subjects had a totally unsatisfactory level of knowledge about osteoporosis at predicational guidelines, while 82.7% of them had satisfactory knowledge of post educational guidelines at p value .000.

Figure (2): Displayed that, only 18.7% of the investigated subjects had a high level of total self-efficacy for osteoporosis at pre-educational guidelines, where this percentage changed to 52.0% at post intervention.

Table (3): Cleared the knowledge of studied womens regarding the major risk factors for osteoporosis according to the point of view of the studied sample at pre- and post-educational guidelines; it revealed that a highly statistical significance difference increase regarding their point of view for items (smoking, drink alcohol, passive smoking, don't having physical activity, and don't exposure to sun) with percentages (97.3 %, 96.0%, 86.7%, 73.3%, 70.7% respectively) at post program phase (P=0.000).

Table (4): Revealed a significant positive correlation between total women's knowledge and self-efficacy about osteoporosis before and after education (P≤ 0.01).

Table (5): In a multivariate analysis, Table 5 shows that the statistically significant independent positive predictors of the mothers' knowledge scores related to osteoporosis were educational level, monthly income and self-efficacy. The model explains 0.46% of the variation in this score, whereas none of the other mother's characteristics had a significant influence on it.

Table (6): In a multivariate analysis, Table 6 demonstrates that the statistically significant model independent positive predictors of the women's' self-efficacy scores related to osteoporosis were educational level, marital status and knowledge scores. The model explains 0.38% of the variation in this score, whereas none of the other women's characteristics

Discussion:

Low bone mass and micro-architectural degradation characterize osteoporosis, which is a major public health concern. It is estimated that around 200 million women are affected worldwide, with over 8.9 million fractures occurring each year; by the age of 50, one in every three women and one in every five males will

have suffered a fracture during their lifetime **(Oumer et al., 2020).**

For demographic status, the current research revealed that more than half 57.3% of the studied women their age was over 50, the age mean was 52.40 ± 1.21 year. This finding disagreed with **Elkordy et al., (2019)** in Egyptian study for improving Quality of Life among menopausal women as they displayed in their study that only 8.3% of their subjects were over 50 years and 65.8% of their studied menopausal women were 45<50 years. Furthermore, **Chaudhary et al., (2019)** reported that 43.3 percent of their participants in their study, which was conducted in the Vidarbha region of Maharashtra to learn about the epidemiology and effect of environmental factors on osteoporosis, were over 45 years old.

For educational level, the present study showed that slightly more than half 53.3% of the studied women had elementary education. This result contradicted a study conducted in Taiwan, where more than half of their subjects held college or higher degrees **(Lin et al., 2020).**

Regarding to the marital status; in the current research, over than half 54.7% of them were married. These results disagreed with **Hussein and Wahdan, (2020)** in their Egyptian study in which they revealed that most of their sample were married 67.1%. Also, it disagreed with **El-Masry et al., (2018)** in Egyptian study which was done in Mansoura governorate; as they cleared that most of their sample 64.4% were not currently married (single, widow, and divorced).

As regarding to the residence of the studied women; the current results displayed that most 74.7% of the studied women were lived in rural areas. That might be because of the natural of the setting of research that was in Sharqyia governorate where the most of its areas are rural areas. The current results agree with **Hussein and Wahdan (2021**) mentioned that the prevalence of OP was 28.4% in women postmenopausal women in rural areas In Egypt**,** in contrary with **El-Masry et al., (2018)** in Egyptian study which was done in Mansoura governorate as they reported that about 50.5% of their subjects were from urban areas**.**

As about the medical, family history of menopausal women; the current study cleared that most of the studied menopausal women had hypertension (77.3%). This might be because of their old age and because of their bad dietary habits, as mentioned in this current study that most of the subjects usually eat high salty diets. This explanation was supported by research on hypertension of **AbdAllah et al., (2021)** in Egypt.

This result contradicted with **Shanks et al., (2019)**; which was done in London about prevention and

treatment of osteoporosis in women; as they reported in their results that less than half of their subjects, 43.1% had hypertension as a chronic disease. The current findings agreed with **Subramaniam et al., (2019)** study in Klang Valley, Malaysia, which stated that only 20.2 percent of their participants had hypertension.

About family history, the study found that, 77.3 percent of women had family history for osteoporosis. This contradicted with **Fahmy et al., (2021)** in an Egyptian study in which they displayed that about two-thirds 60.0% of their studied older adults had a family history of osteoporosis. The result contradicted with **Shaki et al., (2018),** in Indian study, as they portrayed that only 6.6% of their participants had family history of osteoporosis.

Regarding the knowledge of the studied women regarding major risk factors for osteoporosis, according to the point of view of the studied sample at pre- and post-educational guidelines; the results reported that a highly statistical significance difference increase regarding their point of view for items (smoking, drink alcohol, passive smoking, don't having physical activity, and don't exposure to sun) with percentages (97.3 %, 96.0%, 86.7%, 73.3%, 70.7% respectively) at post educational guidelines phase (P=0.000).

The current findings support those of **Bijelic et al., (2017)**, who discovered that analyzing the significance of differences to smoke revealed that the analyzed groups are statistically significantly different to smoke ($\chi2 = 24.025$, p = 0.000).

This result disagreed with **Shawashi and Darawad, (2020)**; in which they reported a mean with 3.2 risk factors (SD = 1.2), with caffeine intake (75.4 percent, n = 196) being the most frequent risk factor, followed by "low intake of vitamin supplements" (65.8 percent, n = 171). The least reported risk factors were "low intake of meat and eggs" (11.5 percent, n = 30) and "low intake of dairy products" (12.3 percent, n = 32).

For total knowledge scores about osteoporosis for menopausal women (pre-educational guidelines sessions); The current findings revealed that over two-thirds (66.7 percent) of them had an overall unsatisfactory level of knowledge about osteoporosis; this could be due to the natural course of the disease, which usually manifests itself in the absence of symptoms until a fracture occurs, or it could be due to a lack of accurate information about the disease on media services that provide information and health education to the public; health services are primarily concerned with the prevention of fractures.

Those results were in agreement with **Nour et al. (2015),** who noted that the Egyptian women's incorrect or insufficient knowledge and their unfavorable attitude toward osteoporosis prevention

measures may be explained by the fact that medical professionals such as doctors, nurses, or representatives of the media like TV or newspapers, rarely explain the disease's causes in the clinic and instead focus on treating osteoporosis or other bone problems medically. It was also discovered that education enhances information about osteoporosis, which improves the habits of women who are at risk for developing the disease.

In contrary to **Saliva and pianto's (2017)** stated that assessment of patients' knowledge of osteoporosis in Qatar showed that 31.2% of participants had very good knowledge of osteoporosis and answered more than 85% of the questions. Most participants identified a lot of osteoporosis risk factors (smoking 63.4 percent , low dairy products consumption 96.7 percent , low calcium intake 96.7 percent).

After implementing the educational guidelines sessions, fortunately, the majority 82.7% of the studied subjects had improved their knowledge and had a satisfactory knowledge of post educational sessions (at p value .000). These significant changes in the participants' knowledge levels may explain the positive impact of the educational intervention and how engaged and cooperative the current subjects were with the researcher during the sessions.

Similarly to this improvement in the knowledge among the current studied menopausal women, **Fahmy et al., (2021)** in Egypt revealed that their intervention has led to an enhancement in level of knowledge for osteoporosis among their participants; as their total osteoporosis knowledge score in the pre-test was (M = 6.38, SD = 3.07) while the post-test score was (M = 16.89, SD = 5.11 among their studied older adults post doing the program, this difference was statistically significant (t = 40.16, p < .001).

Osteoporosis risk factors include lack of exercise, cigarette smoking, excessive consumption of caffeine, skeletal size, alcohol consumption, estrogen reduction, early menopause (before age 40), and physical inactivity. Insufficient calcium / vitamin D intake and family history for osteoporosis **(Salimi et al., 2019)**

As related to the studied menopausal women's self-efficacy towards osteoporosis at pre-educational guidelines sessions; present results stated that only about 18.7% of the studied samples were with a high level of self-efficacy totally about osteoporosis at pre-educational guidelines sessions. This finding was consistent with **Sahib's (2018)** assessment of Osteoporosis Self-Efficacy among the General Population in Iraq, as the results revealed low self-efficacy for all dimensions with less than 60% among most of the studied subjects.

After implementing the educational guidelines sessions, fortunately, that bad scores of the studied

menopausal women about their total scores for self-efficacy towards osteoporosis changed positively and became within high level for more than half 52.0% of them. These significant changes in the participants' self-efficacy may explain the beneficial effect of the instructional guidelines and how the research subjects were engaged and cooperative during sessions.

Similar to this improvement, **Rezaei et al., (2019)** discovered that after the empowerment intervention, the mean score of self-efficacy with both subscales of exercise and calcium intake was significantly higher in the studied group compared to the control group; however, there were no significant differences between the studied and control groups in osteoporosis self-efficacy (OSES) and its two subscales scores (OSE-Ex). They discovered that after the empowerment intervention, the mean score of exercise and calcium intake in the studied group was significantly higher than in the control group.

Sharifi & Sharifi (2018) reported in their educational intervention to prevent osteoporosis in Iran that their findings showed the effect of a self-empowerment model-based educational program in enhancing self-efficacy and, as a result, empowering females for osteoporosis prevention (P= 0.006).

As related to the correlation between women's knowledge, and their self-efficacy about osteoporosis at pre- and post-educational guidelines sessions; There was a strong positive correlation between total menopausal women's knowledge, and their self-efficacy about osteoporosis at pre- and post-educational sessions where (P≤0.01). This suggests that as total menopausal women's knowledge of osteoporosis increases, so will their self-efficacy about osteoporosis.

This current result was consistent with **Park & Park's (2019)** study in Korea for identifying relationships between knowledge of osteoporosis, exercise outcome expectations, and self-efficacy in older women with osteoporosis, in which they stated that knowledge of osteoporosis and self-efficacy for exercise had a positive correlation (P≤0.01).

Concerning Multiple Linear regression model for studied women's knowledge; that the statistically significant independent positive predictors of the mothers' knowledge scores related to osteoporosis were educational level, monthly income and self-efficacy. The model explains 0.46% of the variation in this score, This result agreed with **Sukhee, & Jiwon, (2018)** in the research which done in Korea in which they said that there were high frequency positive effect between osteoporosis and fall prevention knowledge (r = .37~.46, p<.001), self-efficacy (r = .50~.53, p<.001), and preventive behaviors (r = .50, p<.001).

Concerning Multiple Linear regression model for studied women's self-efficacy; demonstrates that the statistically significant model independent positive predictors of the women's' self-efficacy scores related to osteoporosis were educational level, marital status and knowledge scores. The model explains 0.38% of the variation in this score, This result disagreed with **Darawad, (2020),** in his descriptive study as he said that there were no significant differences, and no effect were noticed in participants' level of knowledge, beliefs, and self-efficacy of osteoporosis based on the demographic factors.

Conclusion:

The study findings led to answer the study hypothesis as there were significant improvements regarding the studied menopausal women having osteoporosis in total knowledge, self-efficacy about osteoporosis and regarding their bone mineral density at pre- and post-educational sessions at (P≤0.01). Besides that, there was a highly significant positive correlation among the total studied women's knowledge, and their self-efficacy about osteoporosis at pre- and post-educational sessions where (P≤0.01); that means when total studied women's knowledge, improved, their self-efficacy about osteoporosis will also improve.

Recommendation

- Educational sessions, an illustrated booklet and written leaflets about disease, causes, management, nutritional regimen, dietary risky habits, and exercise should be available in each health setting provided care for all risky women treatment, strategies to improve knowledge and self-efficacy of women with osteoporosis
- Educational nursing intervention about osteoporosis should be provided about important for periodically medical follow up to prevent any deterioration of health status for all women (pre/ post and menopausal).
- Further study should be carried out on a larger scale for generalization of results
- Using mass media to disseminate information about prevention of osteoporosis for community

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