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## Knowledge Regarding Osteoporosis and Its Prevention among Non-Medical Academic Females

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**Abstract: Background:** Osteoporosis is a growing health problem in countries with a rapidly expanding aging population especially among women. Satisfactory knowledge and practices regarding osteoporosis will encourage women to adopt measures to protect their bone health. A quasi-experimental one group pre-test post-test study aimed to assess the effectiveness of awareness program on knowledge and practices regarding osteoporosis and its prevention among non-medical academic females Fayoum University. The sample was consisting of 120 premenopausal female by using purposeful sampling technique. The tool was used as structured knowledge questionnaire. The pretest was conducted, and the planned teaching program was administered. The posttest was conducted after one week. The data obtained were analyzed by using differential and inferential statistics. The mean score of post-test knowledge  $31.9 \pm 3.9$  (58.3%) was apparently higher than the mean score of pre-test knowledge  $17.5 \pm 5.5$  (31.3%) (83.3%) which ensures that the planned teaching program was effective in increasing the knowledge of the non-medical academic females regarding osteoporosis and its prevention. Moreover, the mean difference between pre-test and post-test knowledge score was found to be highly significant.

**Key words:** Knowledge -Osteoporosis and Its Prevention - Non-Medical Academic Females

### INTRODUCTION

Osteoporosis (OP) is a debilitating chronic disease affecting females, where bones mass and quality are reduced. Bones become porous and brittle weaken the skeleton, and the risk of fractures increases significantly. Bone loss occurs "silently" gradually, often asymptomatic until the first fracture occurs, which is most common in the wrist, spine or groin [1].

Fractures of osteoporosis negatively affect woman's quality of life and often result in pain, loss of function, inability to take care of self and others and to accomplish tasks and, in the worst case, death. In addition to the burden added to other family members and the poor state of the impact of the disease on relatives, where they must devote time and energy to help a family member lacking autonomy [2].

National osteoporosis awareness and prevention month is celebrating each May, and becomes a chance for becoming more familiar with the effects of this disease, and about the preventable steps that can reduce the lifetime risk of any osteoporotic fracture for about 40% to 50% for females and 13% to 22% for men worldwide. As well as in Egypt, based on different studies, it has been calculated that 53.9% of postmenopausal females have osteopenia and 28.4% have OP[3, 4]. On the other hand, 26% of men have osteopenia and 21.9% have OP[5, 6].

Being a woman is increasing risk for developing osteoporosis and broken bones, for a multiple reasons; why females are tending to have smaller, thinner bones than men.

In addition, sharply decreases estrogen hormone, which protects the bone when females reach menopause. If premenopausal bone loss can be reduced, or potentially reversed, then this has important implications for the long-term prevention of osteoporosis and fracture. A decrease of only 10% in non-menopausal bone loss is predicted to delay the onset of osteoporosis by approximately 2 years.[7,8]

For many years, females reaching menopause have been advised to take Estrogen Replacement Therapy (ERT) or Estrogen with Progestin which called Hormone Replacement Therapy (HRT) to prevent this disease. However, this meant taking hormones for 20-30 years, which also has risks, including uterine cancer (with ERT alone), blood clots, gallstones, and possibly breast cancer.[9]

Osteoporosis is widely recognized as a preventable and treatable disease; therefore, an appropriate detection and management system that includes lifestyle modifications may minimize the burden on public health resources worldwide. Moreover, clinical guidelines recommend cessation of tobacco use, avoidance of excessive alcohol intake, participation in regular exercise, and an adequate intake of calcium and vitamin D for maintaining bone health[10]. Nursing professionals are the key link in the chain of multidisciplinary approach to the management of this potentially preventable disease, and in educating females about the various aspects of its evaluation and management[11].

### **Significant of the study:**

The prevalence of osteoporosis is increasing and becoming one of the most prevalent and costly health problems among females. Although screening tests for osteoporosis are easily accessible, this condition remains undertreated. Females are four time more likely than men to develop this disease. According to the National Osteoporosis Foundation (NOF)[12], primary defense is important before the age of 30. It is evident in most of the cases that between the age of 30 and 40, one should start taking care to avoid osteoporosis.

In current situation, working females especially academic teachers will not give much attention to their health due to lack of time and other overload activities in their daily life (long standing or sitting, transportation, improper body mechanics through using teaching tools)[13]. Most often, they rely on junk or processed food instead of regular balanced diet, which has calcium, vitamin D and other minerals. As well as a way of sun as working inside institution for almost the day hours. For all these reasons, academic females are exposed to one of the most important causes of disability, pains, and burden of life cost. Osteoporosis awareness, recognizing risk factors and taking appropriate action can have enormous positive impact on bone health in later years.[14]

Pre-menopausal females should strive to maintain their bone health by adopting good lifestyle choices and monitoring their secondary risk factors. Therefore, the current study aimed to assess the effectiveness of planned teaching program on knowledge regarding osteoporosis and its prevention among non-medical academic females, Fayoum University

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

**The present study was conducted to fulfill the following aim:**

Assess the effectiveness of planned teaching program on knowledge regarding osteoporosis and its prevention among non-medical academic females, Fayoum University **through the following:**

1. Assess the pretest knowledge score of the non-medical academic females about osteoporosis and its prevention.
2. Administer planned teaching program for non-medical academic females about osteoporosis and its prevention.
3. Determine the effectiveness of planned teaching program on osteoporosis and its prevention.

### **Research Hypothesis:**

The current study hypothesized that :  
There is significant difference between the pre-test and post-test knowledge scores regarding osteoporosis and its prevention among non-medical academic females.

## **SUBJECTS AND METHODS**

### **Research Design:**

Aquasi-experimental research design (one group pre-test post-test research design) was used to achieve the aim of the current study.

### **Setting:**

The study was conducted at four of non-medical faculties at Fayoum University.

**Subject:** A purposeful sample of 120 Pre-menopausal non-medical academic females, according to North American Menopause Society (NAMS) [15] most females experience menopause between ages 40 and 58. The average age is 51. Physical changes begin years before the final menstrual period. This transition phase is called per- menopause and may last for 4 to 8 years.

### **Tools for data collection:**

**The structured knowledge questionnaire:** it developed by researcher and consisted of two parts.

**Part -I :**It consisted of 13 items on personal and socio-demographic characteristics such as age, marital status, number of children ,out of door activities, residence, educational qualification, years of working experience, working hours per day, body mass index , family history for osteoporosis, menstrual problems and source of information.

**Part -II:** it consisted of 30 knowledge items regarding OP definition, risk factors, complications and preventive measures guided by Facts on Osteoporosis Quiz (FOOQ) [16, 17]. This quiz (FOOQ) was generated based on the OP consensus conference of the National Institutes of Health in 2000.

### **Scoring:**

The knowledge regarding the outcomes of program regarding osteoporosis and its prevention was scored as follows, one mark for each correct answer and zero marks for incorrect answer .The maximum score was 35, to interpret level of knowledge the score was distributed as follows; Interpretation of knowledge as:

**Unsatisfactory knowledge (0-50 %), fair knowledge (51-75 %) and satisfactory knowledge (76-100 %)**

### **Tool Validity and Reliability:**

The validity of the tool was tested by offered to 5 academic expertise of adult and maternity from the faculty of nursing. To determine relevance, clarity, completeness and comprehensiveness of the tool, experts responses were either agree or disagree for the face validity. Then their opinions are reviewed and final tools were prepared and used. The reliability of the tools was measured through computation of internal consistency using Cronbach's alpha co-efficient as a measure of agreement between items and subscales

### **Pilot Study:**

Pilot study was performed on 10% of nurses who met the selection criteria to investigate and ensure the feasibility, objectivity and applicability of the study, in addition to clarity, adequacy and internal consistency of the study tool to determine possible problems in the methodological approach or instruments. The tools were completed without difficulty and with no modification. Academic females who were involved in the pilot study were not excluded from the main study sample.

### **Field Work and Procedure:**

**Administrative Design:** To carry out the study, an official permission obtained from the nursing faculty committee and

deans of selected faculties at Fayoum University. The study was carried out with full cooperation from academic staff of the different levels of authority (head of departments & classes organizer) after official letters were issued and explanation of the purpose and the method of the data collection for the study.

**Field Work:**

After obtaining official permission to carry out the study, the researchers were introduced themselves to the selected academic females who followed the criteria of premenopausal age and explained the purpose of the study. The oral consent was obtained from the participants. Each faculty alone. All enrolled academic females were asked to complete the self-administered questionnaire given to them after being provided with all information regarding the research and they were informed that participation in the study was totally voluntary. Privacy and confidentiality of data were assured through the research work. The data collection of the study was covered a period of four months from beginning of February 2019 and to the end of May 2019 in the previously mentioned settings. The aim of this study was achieved through the following phases: **1. Assessment phase**, the researchers explain the aim of the study and collect data to preprogram knowledge and practice regarding osteoporosis and its prevention. **2. Design educational materials phase**, the program was a lecture by

using power point presentation and self-instructional brochures to raise the awareness towards osteoporosis prevention in Arabic language after reviewing recent related literature and revise it based on assessment phase. **3. Implementation phase**, the educational lecture and hand out materials were distributed and discussed with participants within groups according their faculty schedule each group about 10-12. **4. Evaluation phase**, this phase accomplished by interviewing each participant to assess post program knowledge and practice almost about one week after completing the program.

**Statistical Design:**

The collected data were analyzed using (SPSS) version 20. Qualitative data was presented as number and percent, paired sample t-test. Relations between different qualitative variables were tested using correlation coefficient (person correlation). Probability (p-value) ≤ 0.05 was considered significant and < 0.001 was considered highly significant. While, > 0.05 was considered non-significant

**RESULTS**

The data was presented according to (description of socio-demographic variables of the respondents and findings related to knowledge scores of respondents on osteoporosis and its prevention

**Table (1) Personal and socio-demographic characteristics of the studied group (N=120)**

Characteristics	Frequency	%
<b>Age</b>		
- 35-39 years	12	10.0
- >39- 44 years	60	50.0
- >44-48 years	30	25.0
- >48-51 years	18	15.0
<b>Marital Status</b>		
- Single	10	8.3
- Married	100	83.3
- Divorced	6	5.0
- Widow	4	1.6
<b>Number of Children</b>		
- No Children	16	13.3
- 1- 2	74	61.7
- 3- 5	25	20.8
- >5	5	4.2
<b>Educational Qualification</b>		
- Assistant Lecturer	13	10.8
- Lecturer	61	50.8
- Assistant Professor	32	26.7
- Professor	14	11.7
<b>Family Income/Month</b>		
- Enough and spared	22	18.3
- Enough and not spared	71	59.2
- Not enough	27	22.5
<b>Body Mass Index</b>		
- Underweight	7	5.8
- Normal Weight	76	63.3
- Overweight	14	11.7
- Obese	23	19.2
<b>Weekly Out Door Activity</b>		
- Yes	22	18.3
- No	57	47.5
- In Frequent	41	34.2
<b>Family History of Osteoporosis</b>		
- Yes	38	31.7
- No	82	68.3
<b>Working Years</b>		
- 8 years	20	16.7
- >8- 12 years	52	43.3
- >12 years	48	40.0

<b>Daily work hours</b>		
- >8 hours	120	100.0
<b>Menstrual problems</b>		
- Yes	32	26.7
- No	88	73.3
<b>Residence in relation to university</b>		
- At Fayoum	76	63.3
- Another Governorate	44	36.6

Table (1): showed that 50.0% of participants aged from >39-44 years old, and the majority of them were married. More than half of them have one to two child. About fifty percent of participant were lecturers, and all of them have more than eight daily hours working. A third of the participants have more than 12 years working at the university. About 73.3%

of participant have no menstrual problems and about one third have family history for oestoporosis. 63.3% were from El- Fayoum the university governorate and 59.2% of them reported that their family income was enough and not spared. Nearly half of them have no outdoor activities. And 63.3% of them have normal body weight.

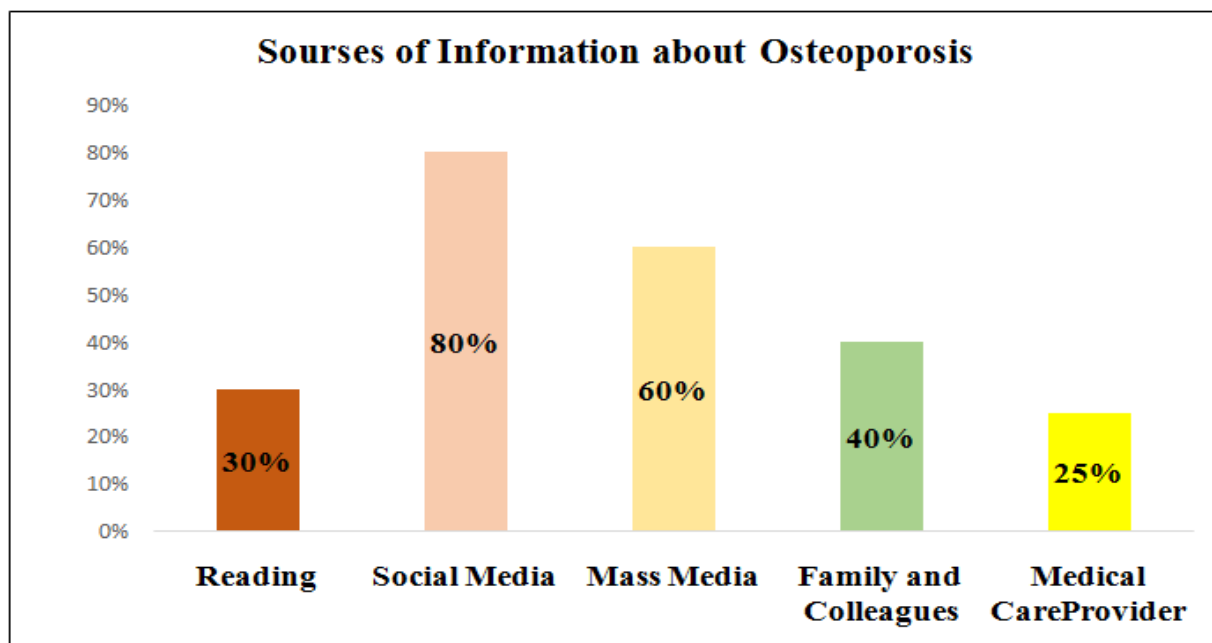


Figure (1): Participants' Sources of Information about Osteoporosis

Fig. (1) Illustrates the studied group previous sources of information regarding OP. The study showed that the majority of participants 80% had information from social media as well as more than half get their information from

mass media. While the minority of them get their information from family, colleagues, and reading respectively (40.0, 30.0) and the lowest percentage their knowledge were from medical care provider.

Table (2) Participants' Pre/Post Test Correct knowledge regarding Risk Factors of Osteoporosis (N=120)

Risk Factors	Pre test		Posttest	
	N	%	N	%
- Advanced aging	81	67.5	120	100.0
- Women more than men	49	40.8	120	100.0
- Being a white woman with fair skin	17	14.2	93	77.5
- Having family history	64	53.3	120	100.0
- Being menopausal before 45 years or absence of period for 3 months	63	52.5	120	100.0
- Having big bones.	32	26.7	94	78.3
- Over Eating.	41	34.2	93	77.5
- Having milk products	70	58.3	120	100.0
- Having calcium supplement	33	27.5	120	100.0
- Having vitamin D supplement	12	10.0	120	100.0
- Excessive exercise	10	8.3	79	65.8
- Eating dark green leafy vegetables	40	33.4	92	76.7
- Smoking	78	65.0	120	100.0
- Excessive drink soft drinks and cola	95	79.2	120	100.0
- Excessive caffeine consumption	48	40.0	120	100.0

- Away of sun exposure	81	67.5	120	100.0
- Getting regular exercise	50	41.7	120	100.0
- History of previous fracture	39	32.5	99	82.5
- Having ovaries surgically removed	32	26.7	88	88.0
- Taking steroids	32	26.7	99	73.3

Table (2) revealed the results regarding to participants' pre/posttest correct knowledge regarding risk factors of osteoporosis, the participants had some correct knowledge before the program as excessive drink soft drinks and cola, to be away of sun exposure, advanced aging and smoking

(67.5-65.0-79.2-67.5) respectively as preventive strategies for osteoporosis. More over their correct knowledge were improved from the majority to all of them regarding all aspects of preventing and controlling about risk factors.

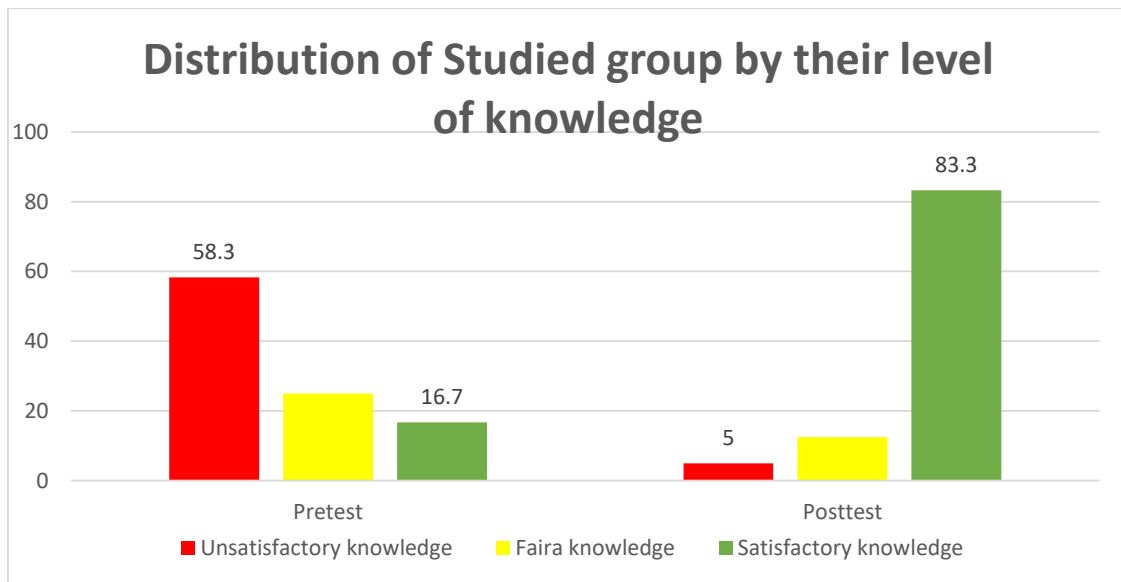
**Table (3) Participants'Pre/Post Test Knowledge Score Regarding Osteoporosis and Its Prevention (N=120)**

Area of Knowledge	Max. Score	Pretest	Posttest	F	P
		Mean ± SD	Mean ± SD		
- Introduction and Definition of OP	3	1.5 ± 0.2	2.6 ± 0.3	23.8	0.00*
- Causes and Risk Factors.	7	4.1 ± 1.4	6.2 ± 0.5	27.1	0.00*
- Signs and Symptoms	2	1.2 ± 0.3	1.5 ± 0.5	38.0	0.00*
- Diagnostic Examinations	3	1.5 ± 0.6	2.5 ± 0.2	41.8	0.00*
- Pathophysiology	2	1.6 ± 0.3	1.4 ± 0.5	13.4	0.00*
- Complications	3	0.5 ± 0.5	2.3 ± 0.7	41.1	0.00*
- Preventive Measures	17	7.1 ± 2.2	15.4 ± 1.2	26.86	0.00*
<b>Total</b>	<b>37</b>	<b>17.5 ± 5.5</b>	<b>31.9 ± 3.9</b>	<b>27.1</b>	<b>0.001*</b>

\*Probability (p-value) ≤ 0.05 was considered significant and < 0.001 was considered highly significant.

Table (3) summarized the participants' pre/posttest knowledge score regarding osteoporosis and its prevention this table is representing the effectiveness of the program and highly significant difference in comparing the pre-test

mean score obtained by the respondents as 17.5 ± 5.5 with posttest mean score obtained by 31.9 ± 3.9 in all aspect of osteoporosis knowledge and preventive measures.



**Figure 2: Distribution of Studied group by their level of knowledge**

Fig. (2) Clarifies the effectiveness of planned teaching program regarding osteoporosis and its prevention by comparing pre-test and post-test knowledge score of respondents. The result showed that nearly about 60 % of the respondents had unsatisfactory knowledge compared with 83.3% of the respondents had satisfactory knowledge regarding osteoporosis

**DISCUSSION**

The ability to recognize and control risk factors has become a corner stone of modern medicine. Adopted exercise, healthier diets, and in some cases, prescription medication; Osteoporosis can be fought. Osteoporosis is widely recognized as a preventable and treatable disease; therefore, an appropriate detection and management system that includes lifestyle modifications may minimize the burden on public health resources worldwide.

The current study aimed to assess the effectiveness of planned teaching program on knowledge regarding osteoporosis and its prevention among non-medical academic females, Fayoum. As regarding the socio-demographic characteristics and personal data, the half of participant in middle age and the majority of them were married and have children which moreover they faculty members working more than eight hours daily. This indicates that this group is vulnerable to osteoporosis because of their functional and family burdens, as well as the distance from the sun, as known it is the main source of vitamin D in addition to that their daily preoccupation for more than 8 hours may lead to eating fast, incomplete or unhealthy meals.

When studying the residential area of some of the participants, it was found that they live in a province that is not the same as their place of work. This means that they suffer from the hardship of traveling, in addition to that, some of them have some problems of the menstrual cycle and one-thirds of the participants have a family history of osteoporosis. All of these characteristics of the participants made them keen in attending the program regularly and their responses to the data collection tool was complete credibility. This explains their utmost need to be a warned regarding OP.

The researchers agree on this study with [15], who studied the effect of osteoporosis health education program based on health belief model towards osteoporosis among Jordanian female teachers, and found that the majority of the teachers as their work conditions and away from sun, as well as their personal characteristics' had "low perceived risk of OP before the program". Which is completely different after the program.

Concerning the current study results' regarding the knowledge of OP risk factors, the participants had some correct knowledge before the program as excessive drink soft drinks and cola, to be away of sun exposure, advanced aging and smoking. In compared with post program result of the vast majority have more information about all aspects as family risk, body mass index, exercise, causative medication, supplementations, and ovarian surgery.

Similar to the results of this study, other studies [16, 17&18] have seen that the sensitivity perceptions to osteoporosis among women in advanced age groups, away from sunlight, and more having soft drinks such as cola and caffeine put them on high risk for OP. In contrary to the results of this study, there were studies in which there was no difference in sensitivity perception [19, 20]. The researchers noticed that sharing information on the disease in the education program and follow-up discussion about cases, and providing information and counseling on individual risks not raised the women's sensitivity perceptions regarding OP.

Regarding the effectiveness of the program in raising awareness regarding OP among female faculty members the current study revealed a highly significance difference between mean score of knowledge in comparing the pre-test mean score obtained by the respondents as  $17.5 \pm 5.5$  with

posttest mean score obtained by  $31.9 \pm 3.9$  in all aspect of osteoporosis knowledge and preventive measures.

This result is indicating that lectures, discussion and distributed self-instructional materials were effective in raising the awareness to importance of exercise, outdoor activists, Vitamin D&Ca supplementations, dairy components, sun light and early screening very important to bone health. Especially with high risky women by advanced age, menstrual and family history of OP.

The program results were in contrast with [21] who found in his research regarding osteoporosis awareness among teachers as statistically significant increase among the intervention group with the majority of the teachers in the intervention group agreeing that their susceptibility to osteoporosis are high. This reflects that the majority of the intervention group believed that osteoporosis would significantly affect their lives. In addition, It is similar to with other studies suggested that education program increased perceptive susceptibility to osteoporosis.

On the other hand, the researches interpreted that personal characteristic' of the study group as academics staff enhanced achievements as the effectiveness when comparing the results regarding definitions, complications, investigations and preventive measures when comparing percentages of satisfactory knowledge level before and after the program .

Regarding the previous program information among participant the current study revealed improper medical care provide (nurses and physicians) role in health education as they less source for participants to get their needed information regarding OP compared with social and mass media. Therefore, researchers considered interest in spreading health awareness through social media pages since it is the most used method. In addition medical care provider especially nurses should enhanced their role in health education.

The current study in contrast with the same finding reported by [22, 23] as they signifies the importance of television and social media as a universal source of health education regarding osteoporosis prevention knowledge by the participants.

## CONCLUSION

This study concludes that there is improvement in the level of knowledge of non-medical academic females that indicates that the planned teaching programme was effective. The demographic variables of non-medical academic females significantly associated with the pretest knowledge score. The Current study results answered the hypothesis of development of planned teaching programme will help the non-medical academic females to enhance their knowledge.

## RECOMMENDATIONS

The findings of current study recommended the need to raising women awareness toward osteoporosis including extent of the problem, risk factors, signs, complications,

diagnosis, bone building and preventive awareness especially for young, middle aged and elderly women. Further studies need to emphasize more strongly on the role of medical care provider (physicians and nurses) in health awareness regarding osteoporosis. As well as useful using of social media as it is preferable awareness tools among participants.

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