

## Relationship of knowledge about osteoporosis with education level and life habits

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### Abstract

**AIM:** To assess possible relationships of knowledge and related factors with educational level and osteoporosis-related life habits.

**METHODS:** This was a cross sectional study conducted on 268 women ( $\geq 35$  years old) from June 2011 to August 2011. The sample collection was done in outpatient clinics in three university hospitals in Isfahan, Iran. We used a demographic questionnaire containing

questions that evaluated osteoporosis-related life habits, including exercise, smoking, intake of calcium and vitamin D supplements and so on. We also used the Osteoporosis Knowledge Assessment Tool to measure osteoporosis knowledge of women.

**RESULTS:** The mean level of knowledge about awareness of osteoporosis, its risk factors and preventive factors were 56, 55 and 22, respectively. The relationship of education level and awareness of osteoporosis, its risk factors and preventive factors was significant, with  $R = 0.76$ ,  $R = 0.73$  and  $R = 0.83$ , respectively ( $P < 0.001$ ). The relationship of education level and osteoporosis-related life habits was not significant ( $R = 0.03$  and  $P = 0.56$ ). The relationship of osteoporosis-related life habits and awareness of osteoporosis and its risk factors was significant, with  $R = 16\%$ ,  $P = 0.006$  and  $R = 16\%$ ,  $P = 0.008$ , respectively, but the relationship of osteoporosis-related life habits and preventive factors was not significant ( $R = 0$ ,  $P = 0.99$ ).

**CONCLUSION:** Iranian women with a higher education level have significantly better knowledge about osteoporosis than women with a lower educational level but they do not use this knowledge in their life.

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**Key words:** Osteoporosis; Knowledge; Education; Life habits; Relationship

**Core tip:** Osteoporosis, a serious health problem that diminishes quality of life, is a systemic skeletal disorder, characterized by reduction in bone mass, increasing bone fragility and fracture risk. Iranian women with a higher education level have significantly better knowledge about osteoporosis than women with a lower educational level but they do not use this knowledge in their life.

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## INTRODUCTION

Osteoporosis, a serious health problem that diminishes quality of life, is a systemic skeletal disorder, characterized by reduction in bone mass, increasing bone fragility and fracture risk<sup>[1,2]</sup>. It has often been viewed as a disease affecting women<sup>[3]</sup>. Approximately 40%-50% of women sustain osteoporotic fractures in their lifetime<sup>[1,2]</sup>. The progress of decrease in bone mass is typically asymptomatic but in many women is manifested with clinical presentations, including acute back pain, fragility fractures (hip, vertebra, proximal femur and tibia), compression of mid-thoracic and upper lumbar vertebrae and progressive deformation of the spinal column that leads to limited back mobility and reduction in height<sup>[4-7]</sup>. Based on bone mineral density (BMD) testing, the World Health Organization (WHO) clinically defines osteoporosis by a BMD T-score  $\geq 2.5$  SD below the mean bone mass density in healthy, young normal women<sup>[8,9]</sup>.

Many risk factors for osteoporosis have been identified: female sex, with a prevalence 4 times that of men; Asiatic and Caucasian races; old age, with a high percentage of osteoporosis among women over 70 years old; a family history of osteoporosis or fragility fractures; low body weight (less than 51.8 kg); premature menopause (menopause before 45 years of age); nulliparity; prolonged lactation; prolonged amenorrhea unrelated to menopause; inadequate consumption of a diet containing calcium and vitamin D; poor intestinal absorption of calcium; lactose intolerance; excessive caffeine and alcohol consumption; smoking; sedentary lifestyle; and prolonged treatment with thyroid hormones, glucocorticoids, anti-convulsants, aluminum antacids and anticoagulants<sup>[1,10]</sup>.

The most important preventive habits are weight-bearing exercises (*e.g.*, going up and down stairs, jogging, aerobics, swimming and isometrics, for at least 30 min daily), diet or supplements containing adequate levels of calcium and vitamin D, and absence or cessation of smoking and moderate or less alcohol and caffeine consumption<sup>[7,11]</sup>. A study in the United States revealed that a high proportion of women were unaware of the association between cigarette smoking and osteoporosis<sup>[12]</sup>.

Physical activities continue to stimulate increases in bone diameter throughout the lifespan. These exercise-stimulated increases in bone diameter diminish the risk of fractures by mechanically counteracting the thinning of bones and increases in bone porosity. Exercise should be dynamic, exceed a threshold intensity and strain frequency, be relatively brief but intermittent, and also be supported by unlimited nutrient energy and adequate cal-

cium and vitamin D3 supplements<sup>[13]</sup>.

A study of American women ( $\geq 25$  years) showed that knowledge about osteoporosis was limited<sup>[14]</sup>. Although calcium intake was sufficient in most cases, the amount and type of physical activity was not enough for their age. Other studies of Caucasian and African-American women found that most had heard about osteoporosis but few women had adequate exercise or the recommended intake of calcium per day<sup>[15,16]</sup>. Another study in Australia showed that Asian women living in Australia also had a low calcium intake ( $< 800$  mg/d) and their knowledge about osteoporosis was limited<sup>[17]</sup>. A study in Mexico of women aged 50-59 years showed that about 90% of subjects had knowledge about the relationship of menopause and osteoporosis but most subjects were not aware of other risk factors and incorporated life habits that increase the risk of osteoporosis<sup>[18]</sup>. Two studies of women of Hispanic origin in the United States have shown different results. One study found that more than 37% of women had habits preventing osteoporosis, including taking calcium supplements and getting enough physical exercise. It was mostly attributed to prior health education, knowledge about osteoporosis and bone-mass evaluations offered by healthcare services<sup>[19]</sup>. The other study of both Hispanic and African-American women found that most women in both groups had little knowledge of behaviors that increase and maintain bone mass, less than 50% of women had regular physical exercise, and less than 10% had adequate calcium intake<sup>[20]</sup>. Bisphosphonates are antiresorptive drugs widely used to treat osteoporosis. Denosumab 60 mg subcutaneously every 6 mo is an approved treatment for women with postmenopausal osteoporosis (PMO) who are at high risk for fracture<sup>[21,22]</sup>.

In this study, we aimed to assess the possible relationships of the level of knowledge and related factors with educational level and osteoporosis-related life habits (including exercise, calcium and vitamin D intake) among Iranian women aged  $\geq 35$  years.

## MATERIALS AND METHODS

### Ethics

This work was carried out in accordance with the Declaration of Helsinki (2000) of the World Medical Association and was approved ethically by Al-Zahra University Hospital Trust (988/1.786). All patients provided informed written consent.

### Patients and settings

This was a cross sectional study conducted on 268 women ( $\geq 35$  years old) from June 2011 to August 2011. The sample collection was done in outpatient clinics (except orthopedic and rheumatology) in three university hospitals in Isfahan, Iran.

We used a demographic questionnaire containing questions that evaluated osteoporosis-related life habits (including exercise, smoking, daily consumption of milk,

**Table 1 Relationship of level of knowledge about osteoporosis with education level and related life habits with a Persian version of the osteoporosis knowledge assessment tool**

	Awareness of osteoporosis	Risk factors	Preventive factors	Osteoporosis-related life habits
Education level	R = 0.76/ P < 0.001	R = 0.73/ P < 0.001	R = 0.83/ P < 0.001	R = 0.03/ P = 0.56
Osteoporosis-related life habits	R = 16/ P = 0.006	R = 16/ P = 0.008	R = 0/ P = 0.99	

intake of calcium and vitamin D supplements, usage of certain drugs such as contraceptives and exposure to sunlight) and the Osteoporosis Knowledge Assessment Tool (OKAT), an instrument to measure knowledge about osteoporosis of women<sup>[23]</sup>. The Persian version of the OKAT was tested in a pilot study and 10 adult women filled out a scale for “cognitive debriefing” which was evaluated by four orthopedic surgeons for a “clinician’s review”<sup>[24]</sup>.

### Statistical analysis

We used Cronbach’s alpha to evaluate the internal consistency of OKAT, which was 77%. To evaluate education level, Spearman’s correlation was used. Pearson’s correlation was applied to determine the relationship of the level of knowledge and osteoporosis-related life habits.  $P < 0.05$  was considered as significant. SPSS for Windows, Version 16.0, was used for statistical analyses.

## RESULTS

The study involved 268 adult women older than 35 years. Ninety seven percent were married and 94.8% of them did not have other diseases (4% had thyroid disease, 2.6% had diabetes and 2.2% had other diseases). Regarding the education level, 68.6%, 16.4% and 15% of participants had the education level below high school diploma, high school diploma, and academic education, respectively. Nonsmokers comprised 97.4% of the sample. Ninety five point nine percent of women did not exercise regularly. Among the women in the study, 41% had at least 30 min exposure to sunlight every day. Ninety seven point six percent and 98.2% of participants had no intake of calcium and vitamin D supplements, respectively. Only 19.8% regularly consumed daily milk. Forty percent of women were post-menopausal, of whom just 1.3% have received replacement hormone therapy. Ninety eight point five percent of women in our study did not undergo any assessments to evaluate osteoporosis. Sources of their information were television (40%), radio (27%), books (14%), newspapers (11%) and other people (8%).

The mean level of knowledge about osteoporosis, its risk factors and preventive factors were 56, 55 and 22, respectively. Thus, mean level of knowledge about osteoporosis was 44.3 in total. Means were calculated between

“0 to 100”. The relationship of education level and awareness of osteoporosis, its risk factors and preventive factors was significant with  $R = 0.76$ ,  $R = 0.73$  and  $R = 0.83$ , respectively ( $P < 0.001$ ). The relationship of education level and osteoporosis-related life habits was not significant ( $R = 0.03$  and  $P = 0.56$ ). The relationship of osteoporosis-related life habits and awareness of osteoporosis and its risk factors was significant with  $R = 16$ ,  $P = 0.006$  and  $R = 16$ ,  $P = 0.008$ , respectively, but the relationship of osteoporosis-related life habits and preventive factors was not significant ( $R = 0$ ,  $P = 0.99$ ) (Table 1).

## DISCUSSION

Women’s knowledge about osteoporosis was poor or limited among our subjects; therefore, health educational programs and health services regarding osteoporosis are necessary. This finding is consistent with previous studies in Taiwan, Brazil, Australia and the United States<sup>[14,23,25,26]</sup>. In contrast, a study in Sweden showed that performing a general intervention program concerning the knowledge of osteoporosis in participants is not effective<sup>[27]</sup>.

We found that there was a significant relationship of level of knowledge and education but the relationship of education level and osteoporosis-related life habits was not significant. The relationship of osteoporosis-related life habits and awareness of osteoporosis and its risk factors was significant but there was no significant relationship of osteoporosis-related life habits and preventive factors. The present results show that Iranian women with a higher education level have significantly better knowledge about osteoporosis than women with a lower educational level, similar to Chinese women in Singapore and Salvadoran women in Brazil<sup>[26,28]</sup>, but they do not use this knowledge in their life. For instance, among women of our study which included participants with a high education level, 95.9% did not exercise regularly, 97.6% and 98.2% did not have an adequate intake of calcium and vitamin D supplements and only 19.8% had regular daily milk. So, similar to studies in Australia and Brazil, intake of calcium in our study was low<sup>[17,26]</sup>. This was in contrast to the study of Terrio *et al*<sup>[14]</sup> in the United States in which the intake of calcium was sufficient in most cases.

It indicates the importance of skin sun exposure in order to raise serum vitamin D levels. We can conclude that Iranian women’s knowledge about osteoporosis does not lead to improving the preventive habits of osteoporosis and, with regards to the absence of a significant relationship between education level and osteoporosis-related life habits, in addition to increasing women’s knowledge, we must change osteoporosis-related life habits, together with women’s diet and behavior patterns. Therefore, we should provide better programs for the evaluation of osteoporosis, establish continuous teaching programs, and prepare more appropriate educational materials for osteoporosis and improve specific health messages in public media.

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## COMMENTS

### Background

Osteoporosis, a serious health problem that diminishes quality of life, is a systemic skeletal disorder, characterized by reduction in bone mass, increasing bone fragility and fracture risk.

### Research frontiers

Osteoporosis, a serious health problem that diminishes quality of life, is a systemic skeletal disorder, characterized by reduction in bone mass, increasing bone fragility and fracture risk. In this study, the authors assessed possible relationships of the level of knowledge and related factors with educational level and osteoporosis-related life habits (including exercise, calcium and vitamin D intake) among Iranian women aged  $\geq 35$  years.

### Innovations and breakthroughs

Iranian women's knowledge about osteoporosis does not lead to improving the preventive habits of osteoporosis and, with regards to the absence of a significant relationship between education level and osteoporosis-related life habits, in addition to increasing women's knowledge, osteoporosis-related life habits, together with women's diet and behavior patterns must change. Therefore, better programs for the evaluation of osteoporosis should be provided, continuous teaching programs established, and more appropriate educational materials for osteoporosis and improved specific health messages in public media should be prepared.

### Applications

By understanding how knowledge about osteoporosis leads to improving the preventive habits of osteoporosis, this study may represent a future strategy for improving women's knowledge about osteoporosis.

### Peer review

The authors examined women's knowledge about osteoporosis and demonstrated that it does not lead to improving the preventive habits of osteoporosis and, with regards to the absence of a significant relationship between education level and osteoporosis-related life habits, in addition to increasing women's knowledge, the authors must change osteoporosis-related life habits, together with women's diet and behavior patterns. Therefore, the authors should provide better programs for the evaluation of osteoporosis, establish continuous teaching programs, and prepare more appropriate educational materials for osteoporosis and improve specific health messages in public media.

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