

## Original Research Article

# The knowledge of osteoporosis risk factors and preventive practices among women of reproductive age in the state of Qatar: a cross-sectional survey

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## ABSTRACT

**Background:** Osteoporosis is a global health problem and its prevalence is rapidly increasing worldwide. Misunderstanding about osteoporosis and the lack of preventive action among women are still common, making primary prevention at an early age the preferable intervention. This study aims at assessing the knowledge of osteoporosis and preventive practices among women aged 20-44 years. Furthermore, the planning for osteoporosis prevention requires sufficient information about women's health beliefs, knowledge, and preventive practices as well as the cultural and socioeconomic features.

**Methods:** This is a cross-sectional study where participants were recruited using cluster sampling with proportionate allocation. The sample (N=766) consisted of eligible women, attending the primary health care centers in Qatar during 2010, and they were interviewed using the modified Osteoporosis Knowledge Assessment Tool (OKAT). The period of this study was between January 2010 and December 2011.

**Results:** The overall knowledge score was 61.4%, with the risk factors knowledge component being the lowest at 50%. A statistically significant relation was noted between the overall knowledge score and age, the level of education, marital status, and positive family history of osteoporosis. About 79% of the participants reported being exposed to direct sun rays for > 30 minutes /week, while only 33.6% of them were engaging in proper weight bearing exercise. Finally, the food consumption score was low at 45.4%, especially when it came to fruits and vegetables (39.6%).

**Conclusions:** The knowledge of osteoporosis risk factors, the practice of weight bearing exercise, and the consumption of calcium and vitamin D rich diet were low. Thus, it is necessary to integrate the different components of osteoporosis prevention into a comprehensive women health program.

**Keywords:** Knowledge, Osteoporosis, Primary care, Prevention, Women

## INTRODUCTION

Osteoporosis knowledge is one of several factors that are associated with osteoporosis preventive behavior. Moreover, the educational level of individuals has the

potential to change the perception of health and illness to a much better level. Thus, highly educated people usually seek knowledge and have an opportunity to learn about health preventive behavior more than those with a lower educational level.<sup>1</sup> Similarly, elderly women who, during

their young adult period, had good lifestyles, appropriate calcium intake, and weight-bearing exercise grew into the postmenopausal period with stronger bone mass and less bone loss.<sup>2</sup>

A study conducted on rural Turkish women in 2008, between 40-70 years old, found that osteoporosis knowledge was low at a mean score of 27.5%, with only 44.9% of women defining osteoporosis correctly. Furthermore, younger and more educated women had higher knowledge scores and greater awareness of osteoporosis than older women did. Low calcium in diet and menopause were the first two risk factors chosen by participants and the majority of them were unaware of the actual risk factors and consequences for osteoporosis.<sup>3</sup>

An Iranian household survey 2007 found that 80 % of participants heard about osteoporosis, 51% confirmed that consuming corticosteroids is a risk factor for osteoporosis, however only 3.8% had knowledge about the adequate consumption of calcium.<sup>4</sup> Another hospital-based cross-sectional study also conducted in Tehran in 2007, revealed that 15 to 30% of participants didn't know what osteoporosis is.<sup>5</sup>

Worldwide, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds.<sup>6</sup> It is estimated to affect some 200 million women globally - approximately one-tenth of them aged 60, one-fifth aged 70, two-fifths aged 80, and two-thirds aged 90.<sup>7</sup> Also, one in every three women over the age of 50 years will experience osteoporotic fractures, as will one in every five men of the same age group.<sup>8-10</sup>

An International Osteoporosis Foundation (IOF) survey, conducted in 11 countries, revealed that the denial of personal risk by postmenopausal women, the lack of dialogue about osteoporosis with their doctor, and the restricted access to diagnosis and treatment before the first fracture resulted in delayed diagnosis and treatment of the disease.<sup>11</sup>

Thus, to implement effective osteoporosis prevention programs, one requires sufficient information about women's health beliefs, knowledge, and preventive practices as well as the cultural and socioeconomic features.

## METHODS

### Study design

This is a cross-sectional study where participants were recruited using cluster sampling with proportionate allocation.

### Study sample

The study sample composed of Arab women, aged 20-44 years old, attending primary health care centers in Qatar,

during the year of 2010. Also, the researchers excluded women already diagnosed with osteoporosis, as verified by both clinical examination and laboratory investigations. The study's statistical analysis was conducted in the year of 2011.

### Measures

The Institutional Review Board approval at Hamad Medical Corporation granted ethical approval for this study. The investigators had no potential conflicts of interest to disclose to the study participants. Moreover, free and informed consent was obtained verbally from participants using verbal consent form of IRB at HMC. The data collected throughout the study was kept anonymous and confidential. Furthermore, it was stored in a password-locked computer with access restricted to research team members.

This is a cross-sectional study, where researchers employed cluster sampling with proportionate allocation to select 766 eligible women who gave consent to be interviewed using the Arabic version of the "Osteoporosis Knowledge Assessment Tool-OKAT" questionnaire. First, a simple random sampling method through a random number generator was utilized to include seven health centers out of 15 available centers in the State of Qatar; then, each of the chosen health center was designated as a cluster. After that, the distribution of the sample among the clusters depended proportionately on the size of the catchment area of each of the chosen health center.

The "Osteoporosis Knowledge Assessment Tool-OKAT" was used as a guide to phrase statements about the participants' knowledge.<sup>12</sup> There were 22 statements on knowledge that were categorized into 3 fields: general knowledge such as "osteoporosis is decreased bone density"; knowledge of risk factors for osteoporosis, and knowledge of preventive practices such as exposure to sun, physical exercise, calcium rich diet, and possibility of prevention and treatment. The participants' knowledge of osteoporosis was assessed under the aforementioned fields using 22 statements. Each statement had three possible answers: true, false, or I don't know. The investigator reviewed and graded the responses, scoring "1" to the correct answers and "zero" to incorrect ones. Therefore, the maximum and minimum knowledge scores were 22 and zero respectively.

The investigators pre-tested the questionnaire on 10% women of the study population before conducting the study to ensure clarity and understanding. Refinements were made accordingly and those women were excluded from the study.

### Statistical analysis

The sample size calculation had taken into consideration the known prevalence of positive attitude (50%), 95%

level of confidence (CI), error rate 5%, and design effect equivalent to 2 for clustering. The statistical analysis of the collected data was pursued using the Statistical Package for the Social Science (SPSS) version 17, where frequency tables, pie, and bar charts were constructed. Moreover, the mean and standard deviation were used to describe continuous variables. In addition, the researchers utilized a t-test analysis as well as an analysis of variance (ANOVA) to study the difference in total scores for different groups of continuous variables. Finally, a chi-square test of significance was performed to assess relations between proportions. A *p* value of <0.05 was considered to be statistically significant.

## RESULTS

The response rate was high at 91.4% among Arab women who were approached for participation in the study. Most of the participants included in this study were in the age category of 30 to less than 40 years old, Qatari, educated up to high school, employed, and ever married.

One of this study's objectives was to assess the knowledge of osteoporosis among Arab women (20-44 years old) attending primary health care centers in Qatar, in the year of 2010. We found that the majority of women (85.9%) correctly identified osteoporosis as decreased bone density and 92.4% of them recognized that osteoporosis leads to an increased risk of bone fracture, while 87.1% of women were unaware that osteoporosis is an asymptomatic disease.

About one third (32.4%) of the participating women were unaware that aging and early menopause are risk factors for developing osteoporosis. In addition, more than one fourth (31.1%) of participants incorrectly identified osteoporosis as being more common in men. Furthermore, almost two thirds (64%) of participating women were unaware that the risk of developing osteoporosis is higher if there was a positive family history. Moreover, more than half of the interviewed women were unaware that frequent falls (55.1%), higher salt intake (64.4%), excessive intake of coffee, carbonated beverages and alcohol (56%), presence of chronic diseases and conditions (58%) e.g. thyroid diseases and hysterectomy, as well as some medications (58.4%) are risk factors for osteoporosis.

Table 1 reveals that the overall mean knowledge score was  $13.5 \pm 3.7$ . In addition to that, the mean knowledge of risk factors was  $5.0 \pm 2.5$  while that of preventive practices was  $5.9 \pm 1.6$ .

The relation between the overall knowledge score and the socio-demographic characteristics reveals statistically significant differences when it came to: age, level of education, marital status, and positive family history of osteoporosis; where the lowest level of knowledge was among younger, less educated women who never

married and don't have a family history of osteoporosis (Table 2).

**Table 1: Mean knowledge scores of osteoporosis among participants, PHCCs, 2010, N=766.**

Osteoporosis knowledge	Scores	
	Mean( $\pm$ SD)	Maximum possible score
Overall knowledge	$13.5 \pm 3.7$	22.0
General knowledge	$2.6 \pm 0.8$	4.0
Knowledge of risk factors	$5.0 \pm 2.5$	10.0
Knowledge of preventive practices	$5.9 \pm 1.6$	8.0

**Table 2: Osteoporosis overall knowledge score according to socio-demographic characteristics of participants, PHCCs, 2010, N=766.**

Characteristics	Mean (±SD)	P value
Age		
20-29	13.3±(3.6)	0.044
30-39	13.5 ±(3.9)	
40-44	14.2± (3.5)	
Nationality		
Qatari	13.5 ±(3.8)	0.584
non Qatari	13.6 ±(3.6)	
Level of education*		
Up to high school	12.9 ±(4.1)	<0.001
University education and above	14.3±(3.1)	
Employment status		
Employed	13.5±(3.6)	0.962
Un- employed	13.6±(3.9)	
Marital status*		
Ever married	13.7±(3.7)	0.011
Never married	12.8±(3.6)	
Income		
<10,000	13.3±(4.0)	0.167
10,000 - 20,000	13.8 ±(3.7)	
>20,000	13.7 ±(3.4)	
Positive Family history of osteoporosis *		
Yes	14.1±(3.1)	0.005
No	13.3±(4.0)	
History of early menopause *		
Yes	14.2±(4.3)	0.160
No	13±(3.7)	

Finally, the study participants were asked to identify their sources of knowledge regarding osteoporosis and it was found that mass media (TV and Radio) was the most common source (64.5%) followed by friends and relatives (52.7%); only about one third (35.4%) of them reported health care teams as their source of knowledge. On the other hand, sources such as books, internet,

schools, and brochures were the least frequently reported (8.1%).

## DISCUSSION

Osteoporosis is a serious health concern that affects millions of people worldwide. As life expectancy continues to increase through the demographic transition, osteoporosis is becoming a major global health issue with clinical, economic and social impacts.<sup>13</sup> Despite many emerging therapies for osteoporosis, it remains essentially incurable and prevention is still preferable for controlling the disease. Thus, to plan for osteoporosis prevention, sufficient information about women's knowledge and health beliefs is necessary to adjust the health behaviors related to modifiable risk factors. It is necessary to be familiar with the individual practice in case of prevention and also their cultural and socio-economical features.<sup>14</sup>

This study was well received by women, who were willing to participate, even women who did not meet the eligibility criteria were requesting to be enrolled because the topic was interesting and important to them as they desired to be familiar with osteoporosis.

### *Knowledge about osteoporosis*

Osteoporosis knowledge is one of the factors associated with osteoporosis preventive behavior.<sup>15</sup> Thus, insufficient knowledge regarding osteoporosis makes women assume that the symptoms were simply a part of the normal aging process. In all cited cases, the obtained scores indicated that knowledge about osteoporosis is poor or limited among surveyed subjects so health educational programs and health services regarding osteoporosis are necessary for women living in Qatar.

Osteoporosis is generally asymptomatic and patients typically become aware of their condition when they sustain a fracture. Hence, empowering women with knowledge about behaviors facilitating good bone health and encouraging them to adopt those behaviors is essential. In the current study the majority of women (85.9%) were aware of the definition of osteoporosis; which is much higher than what was found by Juby A and Davis P in Canada during 2000, where only 67% of participants were aware of osteoporosis definition, but less than the results obtained by Ungan M et al during 1996-1997 in Turkey (90%).<sup>16,17</sup>

This study revealed a statistically significantly relationship between age, level of education, and marital status on one hand and the overall knowledge score on the other. Similarly, a hospital-based cross-sectional study in Pakistan in 2006 by Riaz M et al revealed that the knowledge on osteoporosis in younger women was very poor compared to relatively older females. Furthermore, women belonging to higher socioeconomic classes with better education had slightly more

knowledge about osteoporosis compared to those with a low education level, regardless of age.<sup>18</sup> On the other hand, a Greek population study by Alexandrakis K et al during 2007 was employed to assess the knowledge of osteoporosis among females found that women of older age had deficient knowledge. Nonetheless, a higher level of education was associated with increased knowledge;<sup>(19)</sup> this is explained by the fact that young adults perceive osteoporosis as a disease of elderly.

However, an overall knowledge about osteoporosis may not lead to an improvement in lifestyle, thus necessitating more knowledge about osteoporosis risk factors and protective healthy habits.

The results of this study showed that more than half of women correctly recognized ageing, female gender, early menopause, and cigarette smoking as risk factors for osteoporosis. However, most of them were not aware about other risk factors such as excessive dietary intake of coffee and salt. Given that coffee drinking and salt intake are quite prevalent among Arab women; indicating a priority area for prevention and control programs. Similarly, Turkish women aged 40-70 years old were unable to identify significant osteoporosis risk factors (40%).<sup>20</sup>

In addition to that, participants showed a lack of awareness that family history is a risk factor for osteoporosis (36.0%), although 31% of them reported a family history of the disease. Similarly, Saw et al found that only 30.5% of women recognize this factor as risky for developing osteoporosis. In contrast, both Ziccardi et al and Von Hurst and Wham found that at least 79% of women in their studies recognized family history as a risk factor.<sup>21,22</sup>

Although many participants knew the importance of sun exposure, a calcium-rich diet, and exercise to prevent osteoporosis, only few knew the benefit of sardines, tuna, and broccoli as good sources of calcium for lactose-intolerant individuals.

In contrary, a study conducted by Hurst P et al in New Zealand during 2006 among women aged 20-49 years revealed that over half of them correctly identified broccoli as a good source of dietary calcium, while more than 67.0% of participants in Ziccardi et al study correctly identified canned sardines as a source of dietary calcium.<sup>21,22</sup> Therefore, increasing the level of knowledge about non-dairy sources of calcium may increase dietary calcium intake among women, particularly those who are lactose intolerant or simply dislike the taste of dairy products.

Finally, the majority of the participants in our study communicated that three glasses of milk a day would provide an adult with the recommended amount of dietary calcium. This is in contrary to what has been reported in a study among South Asian women in New

Zealand by Tsai M during 2008, where the majority of did not realize that two or more glasses of milk a day would provide an adult with the recommended daily allowance of calcium.<sup>23</sup> Therefore, it is possible that these women were unaware of their inadequate dietary calcium intakes and therefore, did not attempt to increase it through calcium supplementation.

Even though media sources as the television and radio may not be a credible source of information, they were the main source of information in this study. Similar results were attained in African-American, Canadian and Chinese women, with whom television and radio were the most important sources.<sup>24-26</sup> Thus, it is vital that health professionals at the primary healthcare level provide women with relevant effective health education programs, enabling them to recognize the vague and non-specific symptoms of osteoporosis as well as learn more about the risk factors of osteoporosis to avoid them. Moreover, health professionals have a responsibility to identify high-risk patients to achieve the goals of prevention, early detection, and appropriate treatment. Most importantly, young women should be encouraged to adopt healthy life habits including sun exposure, dietary habits, and weight bearing exercise. Finally, to effectively influence women's health beliefs, knowledge, and preventive practices a comprehensive women health program must be implemented and include osteoporosis prevention, physical activity, nutrition education, healthcare policy and guidelines to identify women at risk, and training of healthcare professionals.

### Limitations

This study was conducted at primary health care centers in Qatar, thus limiting the generalizability of the results. However, women of different age groups attend primary health care centers in Qatar where, they receive comprehensive, free of charge care; thus making the sample representative of the community. Moreover, since the data collected depends on self-reporting, then it is liable to recall bias and participants may over/under report.

### CONCLUSION

The overall knowledge of osteoporosis among participants was moderate (61.4%); however, there was a lacking of specific knowledge of osteoporosis risk factors (50.0%). Furthermore, the study documented high levels of osteoporosis knowledge among old, highly educated, and ever married women with a family history of osteoporosis. Finally, the media was the most common source of information about osteoporosis; making it a key player in any future interventions.

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