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Original Article

Assessing health beliefs about osteoporosis among women attending primary health care centres in Qatar

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الملخص

أهداف البحث: هشاشة العظام مشكلة صحية عالمية ويزداد انتشارها في جميع أنحاء العالم. لا يزال سوء الفهم حول هشاشة العظام وعدم وجود إجراءات وقائية بين النساء أمرا شائعا مما يؤكد الحاجة للوقاية الأولية في سن مبكر. إن عملية التخطيط لبرنامج فعال يهدف لمنع هشاشة العظام تتطلب معلومات كافية عن معتقدات النساء الصحية عن هشاشة العظام. وتهدف هذه الدراسة إلى تقييم المعتقدات الصحية لنساء عربيات، تتراوح أعمارهن بين ٢٠- ٤٤عاما عن هشاشة العظام في مراكز الرعاية الصحية الأولية في دولة قطر.

طرق البحث: استخدم الباحثون تصميم الدراسة المستعرضة، حيث تم اختيار عينة عنقودية مع توزيع متناسب لتسجيل ٧٦٦ سيدة مؤهلة تمت مقابلتهم باستخدام استبانة باللغة العربية.

النتائج: أظهرت غالبية النساء المشاركات وعيا منخفضا للإصابة بهشاشة العظام (٧١,٧٪)، في حين أظهر غالبيتهن وعيا مرتفعا بالفوائد المرجوة للممارسات الوقائية (٩١,٧٪).

الاستنتاجات: على الرغم من الوعي المنخفض للإصابة بهشاشة العظام، لدى النساء حافز قوي لرعاية صحتهم مع إيمانهن بفوائد الغذاء الغني بالكالسيوم والرياضة المنتظمة. نوصي بدمج الوقاية من هشاشة العظام ضمن برامج صحة المرأة على مستوى الرعاية الصحية الأولية بالإضافة إلى النشاط البدني وبرامج التغذية.

الكلمات المفتاحية: هشاشة العظام؛ الكالسيوم؛ الرياضة؛ المعتقدات الصحية؛ برنامج التغذية

Abstract

Objective: Osteoporosis is a global health problem, and its prevalence is rapidly increasing worldwide. Misconceptions about osteoporosis and the lack of preventive measures among women are still common, emphasizing the need for primary prevention at an early age. The process of planning an effective osteoporosis prevention programme requires sufficient information about women's osteoporosis health beliefs. The objective of this study is to assess the health beliefs of 20—44 year-old Arab women about osteoporosis at primary health care centres in the State of Qatar.

Methods: The researchers utilized a cross-sectional study design, where cluster sampling with proportionate allocation was employed to enrol 766 eligible women who were interviewed using a structured Arabic questionnaire.

Results: The majority of the participating women showed lower perceived susceptibility to osteoporosis (71.7%) but higher perceived benefits of preventive practices (91.7%).

Conclusion: Despite lower perception of susceptibility to osteoporosis, women were highly motivated to take care of their health and believed in the benefits of a calcium-rich diet and regular exercise. The integration of osteoporosis prevention into women's health programmes at the primary health care level, as well as physical activity and nutritional programs, are recommended.

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Introduction

Osteoporosis is a serious health concern that affects millions of people around the world. As the globe's population is ageing rapidly, osteoporosis is expected to become a major public health issue from a clinical, economic, and social point of view.[1] First of all, osteoporosis is a systemic skeletal disease characterized by low bone density and micro-architectural deterioration of the bone tissue, with a consequent increase in bone fragility as well as susceptibility to fracture.[2] Until recently, osteoporosis was an under-recognized disease and considered an inevitable ageing consequence. However, perceptions have changed, as epidemiological studies have highlighted the heavy burden of the disease and its costs on society and the health care system.[3,4] The International Osteoporosis Foundation (IOF) estimates that 200 million women suffer from osteoporosis around the world,[5] affecting more than 75 million people in Europe, Japan, Australia and North America.[6]

In the gulf region, multiple studies have sought to determine the prevalence of the disease as well as its burden on the community. A recent study was conducted in KSA during 2015 and revealed that 34% of females between the ages of 50 and 79 years suffer from osteoporosis.[7] Another study reported that the bone mineral density among Saudi women was lower than that of their American counterparts, possibly due to a higher prevalence of vitamin D deficiency as well as multiple pregnancies.[8]

Osteoporosis is a multi-factorial disease involving multiple risk factors. Some of these risk factors are non-modifiable, such as gender, advancing age, heredity, and race, while others are considered modifiable.[9] Modifiable factors, such as knowledge and health beliefs, offer an opportunity for women to engage in behaviours that delay the onset or progression of osteoporosis.[10]

In Qatar, there is a scarcity of information on women's health beliefs about osteoporosis. Furthermore, no research on the topic has been pursued in the primary health care setting which constitutes the first line of interaction between the community and the health care system in Qatar. Considering this gap of information, which is vital in any intervention to halt the rise in osteoporosis and raise community awareness about it, this study was devised to bridge this gap by utilizing the Osteoporosis Health Belief Scale (OHBS).

This scale is based on the Health belief Model (HBM), where the perception of the seriousness of osteoporosis and susceptibility to it must be high before an individual will engage in osteoporosis preventive behaviours. On the other hand, perceived benefits refer to the positive outcomes that individuals expect when engaging in a health-promoting behaviours. Moreover, perceived barriers refer to the negative aspects of participating in a health-promoting behaviour.[11]

The OHBS was established in 1991 by Kim et al. to evaluate the health beliefs related to osteoporosis and determine the relationship between osteoporosis preventive health behaviours and health beliefs. Since then, several studies have utilized the OHBS on men and women of variable age groups. Furthermore, a systematic review conducted on the OHBS by McLeod and Johnson in 2011 revealed the usefulness of tackling health beliefs when designing and implementing education interventions for osteoporosis prevention and management.[12]

Another study, by Sayed-Hassan and Bashour in 2013, assessed the reliability of the Arabic version of the OBHS tool by recruiting one hundred Syrian women. The results revealed that the tool in its Arabic version is both reliable and linguistically acceptable.[13] In addition, another study, by Abdulameer et al. in 2014, assessed the content validity and the internal consistency of the OHBS tool in its Malay version (OHBS-M). The study found the OHBS-M to be a valid and reliable instrument for measuring osteoporosis health beliefs among diabetics.[14]

Thus, there is a need for intensive action at both the international and national levels to develop a coordinated strategy to deal with osteoporosis and reduce its burden on society. However, there is also a need for information for action, especially in Qatar, to adequately plan an osteoporosis prevention and control strategy. Thus, the objective of this study is to assess the health beliefs of 20–44 year-old Arab women regarding osteoporosis at the primary health care centres in the State of Qatar in 2010.

Materials and Methods

The researchers utilized a cross-sectional study design, where cluster sampling with proportionate allocation was employed to enrol 766 eligible women who gave their consent to be interviewed using a structured interview-administered Arabic-version questionnaire. Simple random sampling using a random number generator programme was employed to include seven health care centres out of 15 available health care centres; then, each health care centre was considered as a cluster. After that, the sample distribution between the clusters was determined in proportion to the size of each cluster, based on the size of the registered population in each health care centre. Accordingly, the total sample size of eligible women was divided among seven clusters and all eligible participants were enrolled during the data collection period until the required sample size was fulfilled.

Sample size calculation

Sample size calculation took into consideration the known prevalence of osteoporosis (50%),[1] a 95% level of confidence (CI), an error rate of 5%, and a design effect equivalent to 2 for cluster design. The investigator calculated the sample size through Software Open Epi Version 2.3, using the following equation.[15]

Sample size $n = [DEFF*Np (1 - p)]/[(d2/Z21 - \alpha/2*(N - 1) + p*(1 - p)]$.

where $n' =$ sample size, $N =$ Population size $Z = Z$ statistic for a level of confidence 95% $P =$ Expected proportion DEFF = Design Effect for cluster design. Sample size calculated was 766 eligible Arab women.

Inclusion criteria

○ Arab women
○ 20–44 years of age

Exclusion criteria

Women diagnosed with osteoporosis as verified by both clinical examination and laboratory investigation were excluded.

Furthermore, a structured interview-administered questionnaire was used for data collection. This questionnaire was established through extensive literature review in collaboration with experts in the field, including Qatar university staff, consultant physicians in primary health care centres, and consultant trainers of Community Medicine. The questionnaire was divided into two sections:

First section: background characteristics: This section consisted of 10 questions about age, nationality, level of education and employment status, marital status, number of children, family monthly income, menopausal history, and positive family history of osteoporosis and smoking history.

Second section: health beliefs towards osteoporosis and preventive practices: This section was developed by the investigator based on the main components of the Health Belief Model (HBM), which are: perceived susceptibility, perceived severity of the disease, perceived benefits of preventive practices against osteoporosis (physical exercise, and calcium rich diet), and the perceived barriers towards preventive practices and health motivation. There were 18 statements assessing HBM components, each utilizing a three-point Likert scale (agree, uncertain, disagree), such as:

☐ Women's perceived susceptibility to osteoporosis was assessed using **two** statements (e.g., I might be susceptible to develop osteoporosis in my lifetime).
☐ The perceived severity of the disease was measured using **four** statements (e.g., I think osteoporosis is a serious disease).
☐ **Two** statements were used to assess the perceived benefits of preventive practices (e.g., I feel better when I exercise every day).
☐ **Seven** statements were used to assess potential barriers towards preventive practices (e.g., I have no place to exercise).
☐ Health motivation was assessed using **three** statements (e.g., I am interested in discussing osteoporosis with my physician).

The investigator corrected the responses and for each statement "3" points were given for positive responses while "2" and "1" points were given for uncertain and negative responses, respectively. Therefore, the maximum and minimum scores were 54 and 18, respectively.

In addition, the interview was conducted by the investigator and social workers employed in the selected health care centres and with previous experience in health research. Prior to the data collection process, the investigator approached the social workers' supervisors to explain the aim of the study and its importance, as well as to nominate the most enthusiastic social workers for the data collection process. After which the investigator conducted training sessions with the social workers about the questionnaire, the standard ways of interviewing as well as answering any query about the questionnaire. Then, the trained interviewers underwent mock interviews among themselves through role-playing to help further sharpen their skills and amend any pitfalls.

Quality control measures

The content and face validity of the questionnaire were assured through extensive literature review and by consulting experts in the field. In addition, the investigator pre-tested the questionnaire on 10% of the study population before conducting the study to ensure clarity and understanding; refinements were made accordingly. Additionally, those women were excluded from the study. Finally, the investigator revised the completed questionnaires and double-checked the data entry.

Data management and statistical analysis

The data were coded and each questionnaire was assigned a serial identifier number, after which the data were entered by the investigator into a computer using Statistical Package for the Social Sciences (SPSS) version 17 (SPSS Inc: Chicago, USA).

The following analysis plan was used:

☐ Frequency tables and bar charts were constructed.
☐ Means and standard deviations were used to describe continuous variables.
☐ A t-test analysis and analysis of variance (ANOVA) were used to study differences in total scores for different groups of continuous variables.
☐ A chi-squared test of significance was performed to assess relations between proportions.
☐ A p value of <0.05 was considered to be statistically significant.

Ethical considerations

Verbal consent was elicited from participants using the verbal consent form of Hamad Medical Corporation's institutional review board. Additionally, the collected data were kept anonymous and confidential by storage in a password-protected computer, with access limited to research team members only.

Results

The objective of the current study was to identify the health beliefs towards osteoporosis among Arab women attending primary health care centres in the State of Qatar during 2010. Furthermore, the participating women rated

their levels of agreement for a series of statements regarding osteoporosis. Thus, it was found that over 40% of interviewees did not consider themselves susceptible to osteoporosis. On the other hand, more than half of them were concerned about developing osteoporosis. Additionally, there was a high level of agreement about the seriousness of osteoporosis, fears about osteoporosis-related fractures or disability, and a concern about the impact of osteoporosis on their life and career (65.9%, 86.4%, 77.5%, and 79.8%, respectively). Moreover, more than three quarters of the participating women believed that regular physical exercise and a calcium-rich diet have a protective effect (Table 1).

Regarding the perceived barriers towards a calcium-rich diet and physical exercise as well as health motivation, more than three-fourths of the participants did not consider calcium-rich food to be expensive and rather liked its taste. However, more than one fourth of them agreed with the statement "Calcium-rich foods have too much cholesterol". Regarding physical exercise, only one fourth of participating women reported perceived barriers to exercise, such as no place for exercise and spouse/family member discourages them from exercising. Additionally, approximately 42% of the interviewees considered that physical exercise would require starting a new habit, which is difficult, and almost half of them thought that they were not strong enough to exercise regularly. On the other hand, the participating women demonstrated a high level of health motivation. Approximately 86% and 79% of women agreed that they are interested in discussing osteoporosis and participating in a seminar or lecture about osteoporosis, respectively (Table 2).

For the purpose of comparison, we estimated the mean percentage of the scores and obtained the following results: the overall mean health beliefs score for participants was 83.0%. Additionally, the lowest level of participant perception was demonstrated in the field of perceived susceptibility (71.7%), while the highest level was demonstrated in the perceived benefits field (91.7%) (Figure 1).

Finally, regarding the overall mean health beliefs score and the socio-demographic characteristics of the participating women, there were no statistically significant differences, except for the age groups and the level of education. Thus, the younger (under 30 years old) and educated (university and above) women showed the highest mean score,

and the findings were statistically significant at <0.001 (Table 3).

Discussion

Knowledge alone does not necessarily influence health behaviour; thus, the current study assessed the health beliefs of women towards osteoporosis as important factors in influencing behavioural change in disease-prevention programmes. The model used in the current study was the Health Belief Model (HBM) that represents a conceptual framework to help explain why individuals engage in health-promoting behaviours. The model asserts that to plan a successful educational intervention, there should be knowledge about the target group's perceptions regarding susceptibility, severity of the condition, benefits of taking certain actions to reduce the risk, barriers (e.g., costs of the advised action), and cues to action (strategies for activating the "readiness" to undertake health actions) are required.[16] Moreover, this model of behavioural change assists in determining which beliefs an individual must possess to make behavioural changes for the benefit of his/her health. Moreover, the perceived susceptibility is the understanding of the risk factors that can cause osteoporosis.[17] On the other hand, perceived seriousness focuses on the possibility of contracting an illness or the peril of leaving it untreated. Similarly, the perceived seriousness includes clinical consequences such as death, decreased functional ability, disability, distress, and the impact on work, family, and socialization.[17] In addition, the perceived benefits refer to positive outcomes that individuals anticipate from engaging in health-promoting behaviour. For example, a woman at risk of developing osteoporosis must recognize the benefit of a bone density scan for early detection and treatment of low bone density. Additionally, the perceived barriers refer to negative aspects of participating in a health-promoting behaviour. Thus, in the context of osteoporosis prevention, the perceived barriers will be the time and money spent on a bone density scan.[11] Furthermore, self-efficacy in osteoporosis prevention is defined as a belief in the ability to perform weight-bearing exercise and take dietary calcium to prevent osteoporosis.[17]

Table 1: Distribution of participants' levels of agreement regarding perception of osteoporosis and the benefits of preventive practices, PHCCs, 2010, N = 766.

Statements	Frequency (%)		
	Agree	Uncertain	Disagree
Perceived susceptibility			
I may be susceptible to develop osteoporosis in my lifetime	274 (35.8%)	179 (23.4%)	313 (40.9%)
I am concerned about getting osteoporosis	425 (55.5%)	105 (13.7%)	236 (30.8%)
Perceived severity			
I think osteoporosis is a serious disease	505 (65.9%)	82 (10.7%)	179 (23.4%)
If I get osteoporosis, I am concerned about getting fractures or disability	662 (86.4%)	43 (5.6%)	61 (8.0%)
In case I get osteoporosis my life will be affected	594 (77.5%)	60 (7.8%)	112 (14.6%)
In case I get osteoporosis my work (career) will be affected	611 (79.8%)	52 (6.8%)	103 (13.4%)
Perceived benefits of preventive practices			
I feel better when exercise every day	638 (83.3%)	96 (12.5%)	32 (4.2%)
I won't worry as much about osteoporosis if I take enough calcium-rich diet	610 (79.6%)	102 (13.3%)	54 (7.0%)

Table 2: Distribution of agreement levels of the participants perceived barriers towards osteoporosis preventive practices and health motivation, PHCCs, 2010, N = 766.

Statements	Frequency (%)		
	Agree	Uncertain	Disagree
Perceived barriers			
I have no place where I can exercise	189 (24.7%)	69 (9.0%)	508 (66.3%)
My spouse/family discourages me from exercising	195 (25.5%)	75 (9.8%)	496 (64.8%)
Engaging in physical exercise would require starting a new habit which is difficult	318 (41.5%)	74 (9.7%)	374 (48.8%)
Calcium-rich foods cost too much	96 (12.5%)	84 (11.0%)	586 (76.5%)
I do not like the taste of dairy products − main calcium source	96 (12.5%)	88 (11.5%)	582 (76.0%)
To eat more calcium-rich foods I have to give up other foods I like	77 (10.1%)	114 (14.9%)	575 (75.1%)
Calcium-rich foods have too much cholesterol	201 (26.2%)	239 (31.2%)	326 (42.6%)
Health motivation			
I would be interested in discussing osteoporosis with my physician	659 (86.0%)	87 (11.4%)	20 (2.6%)
I would be interested to attend a seminar or lecture about osteoporosis	602 (78.6%)	120 (15.7%)	44 (5.7%)
I feel that I'm not strong enough to exercise regularly	378 (49.3%)	72 (9.4%)	316 (41.3%)
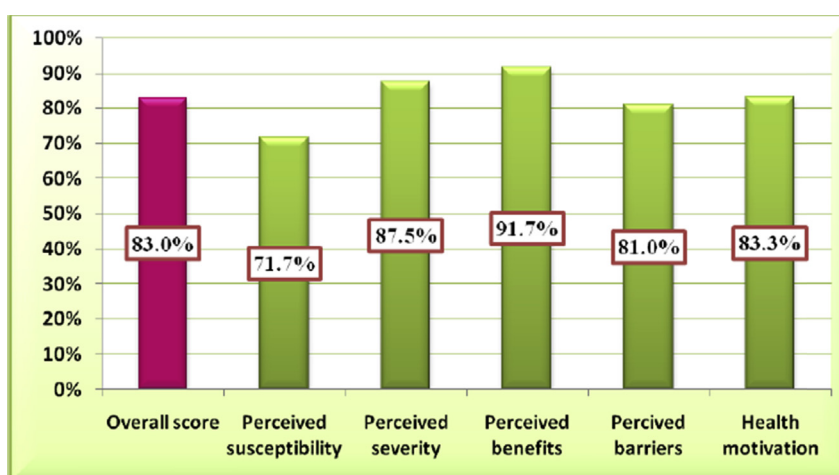
Figure 1: Mean percentage of osteoporosis health beliefs' scores among participants, PHCCs, 2010, N = 766.

A study conducted in New Zealand among women aged 20−49 years revealed a low level of perceived osteoporosis susceptibility, despite the fact that 64% of those women agreed that osteoporosis was a serious disease, and most of them realized the benefits of exercise and optimal calcium nutrition in preventing osteoporosis. The study also revealed that the older women (40−49 years) were more motivated to take care of their health than the younger ones.[18] A population-based cross-sectional study, conducted in Taiwan during 2003, revealed that the lowest attitude score was that of the perceived susceptibility.[19] Another cross-sectional study conducted among men and women of various age groups in Canada revealed that women over 30 years of age perceived a greater susceptibility to osteoporosis than younger women.[20]

A similar study revealed that health beliefs differ by menopausal status as well as different age cohorts, where premenopausal women perceived osteoporosis as being more serious than did postmenopausal women, while postmenopausal women perceived greater benefits from osteoporosis prevention. Furthermore, there was a low perception of susceptibility to osteoporosis in the younger age cohort, as this age cohort perceived osteoporosis as a disease that primarily afflicts older women.[21]

In this study, participants perceived a low susceptibility to osteoporosis with a mean score of 4.3 ± 0.9 (71.7%). Similarly, the perceived susceptibility in the cross-sectional study conducted in Taiwan[19] as well as that of another study conducted in New Zealand was low.[18] The possible explanation for this low level of perceived susceptibility could be the absence of any symptoms of osteoporosis, where most individuals do not perceive themselves at risk of a disease until they begin to experience the clinical picture of the disease. As osteoporosis is a silent disease and the prevalence of osteoporosis is much higher after menopause, it was not surprising that most of the women did not perceive they were at risk. Moreover, there was a high level of agreement about the seriousness of osteoporosis, the concern about osteoporosis-related fractures or disability, as well as the impact of osteoporosis on their life and career (65.9%, 86.4%, 77.5%, and 79.8%, respectively). In addition, the perceived severity score was 10.5 ± 2.2 (87.5%). Thus, these beliefs suggest that there is an opportunity to improve the effectiveness of osteoporosis

Table 3: Relation of mean overall score of health beliefs to-wards osteoporosis among participants and socio-demographic characteristics, PHCCs, 2010 N = 766.

Characteristics	Mean (±SD)	p-value
Age		
20–29	45.3 ± (4.4)	0.029
30–39	44.7 ± (4.8)	
40–44	44.0 ± (5.3)	
Nationality		
Qatari	44.9 ± (4.8)	0.394
Non-Qatari	44.6 ± (4.8)	
Level of education		
Up to high school	44.0 ± (5.0)	<0.001
University education and above	45.6 ± (4.4)	
Employment status		
Employed	44.7 ± (4.9)	0.818
Un-employed	44.8 ± (4.6)	
Marital status		
Ever married	44.8 ± (4.6)	0.457
Never married	44.5 ± (5.4)	
Income		
≤10,000	44.5 ± (4.8)	0.212
10,001–20,000	44.7 ± (5.0)	
>20,000	45.2 ± (4.5)	
Positive Family history of osteoporosis		
Yes	45.2 ± (4.7)	0.134
No	44.6 ± (4.8)	
History of early menopause		
Yes	44.0 ± (4.7)	0.166
No	44.8 ± (4.8)	

prevention programmes through initiatives that increase perceived susceptibility.

In contrast, Von Hurst and Wham found that 64% of women acknowledged the seriousness of osteoporosis and a quarter of them agreed that osteoporosis was a crippling disease.[18] It is evident that women generally perceive osteoporosis as a highly serious disease with severe consequences. Thus this perception may help in motivating women to increase their health-promoting behaviour and prevent osteoporosis.

Concerning the perceived benefits of dietary calcium and physical exercise among the study participants, 79.6% of them agreed that they would not worry about osteoporosis if they ate food rich in calcium and 83.3% of participants agreed that they feel better when they exercise every day.

Similarly, the aforementioned New Zealand study revealed that 91.3% of women agreed that an adequate calcium diet prevents osteoporosis and 77.9% agreed that they would not worry about osteoporosis if they ate food rich in calcium.[18]

As regards to the perceived benefits of preventive practices and the perceived barriers, the highest level of agreement (91.7%) among our participants was towards the perceived benefits and the highest level of disagreement (81.0%) was regarding the perceived barriers. This is in agreement with a study conducted on 40 to 95 year-old women in Philadelphia by Hsieh et al., where the perceived barriers showed fairly the lowest agreement.[22] Moreover, Ziccardi et al. explored the health beliefs of 194 college nursing students regarding osteoporosis and found that the

perceived benefits of osteoporosis-preventive behaviour (e.g., calcium intake and weight-bearing exercise) scored high; however, the perceived barriers scored low.[23]

Our study demonstrated a high level of health motivation among the participants. Approximately 86% and 79% of women agreed that they are interested in discussing osteoporosis and participating in seminars or lectures about the disease, respectively. Therefore, enhancing health motivation may be an important component of any public health promotion endeavour focused on increasing preventive practices such as dietary calcium intake and physical exercise. A study by Wallace found that self-efficacy, perceived barriers to exercise, and perceived susceptibility to osteoporosis were predictors of osteoporosis-preventive behaviours in college women.[24]

Limitations

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

Conclusions

Despite the lower perception of susceptibility to osteoporosis among women, participants were highly motivated to take care of their health and believed in the benefit of a calcium-rich diet and regular exercise. Thus, it is highly recommended to design and implement an osteoporosis prevention programme targeting young women, with special focuses on the perceived susceptibility, severity, and benefits of osteoporosis-preventive practices. Furthermore, it is vital to review women's health care programmes at the primary care level and promote a heath care policy and guidelines that identify women at risk through screening. Finally, it is also important to train health care professionals in utilizing the clinical visit as an opportunity to provide information about osteoporosis and its prevention.

Ethical approval

The Arab Board Scientific Committee and the Institutional Review Board (IRB) of HMC approved this study.

Author's contribution

HAM, NS, and HS conceived and designed the study, conducted research, and provided research materials. All authors contributed equally to data collection, analysis, and interpretation. HAM, NS, and HS wrote initial while MAC finalized the draft of article and provided logistic support. All authors have critically reviewed and approved the final draft and are responsible for the content and similarity index of the manuscript.

Conflicts of interest

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