

ORIGINAL ARTICLE

Knowledge, Health Beliefs and Osteoporosis Preventive Behaviour Among Women of Reproductive Age in Egypt

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ABSTRACT

Introduction: Osteoporosis is an important, global public health issue that is expected to become an epidemic by 2050, and particularly affect an increasing number of elderly women worldwide. The current study was designed to measure the current osteoporosis knowledge level among a sample population of women, to assess osteoporosis health beliefs, and assess osteoporosis preventive measures and factors related to those taking preventive measures.

Methods: A cross-sectional study was conducted, using multistage sampling. A total of 265 women were randomly selected among those attending outpatient clinics in primary health care units. The study used a questionnaire to assess knowledge, health beliefs, in addition to osteoporosis preventive behaviour. **Results:** About 59% of the participants showed inadequate knowledge and 70.7% had inadequate osteoporosis preventive behaviour. Inadequate knowledge levels were more common among the younger participants, and those with a lower educational level, absence of osteoporosis in first degree relatives and no history of fractures. Significant differences were observed in the mean score of overall health beliefs and all its sub-scales, except for perceived exercise benefits and perceived health motivation. Sub-optimal calcium intake levels were noted, but were significantly higher among those with adequate osteoporosis preventive behaviour than among those with inadequate osteoporosis preventive behaviour (907.2 ± 187.6 and 810.7 ± 123.3 , respectively, $p < 0.001$). **Conclusions:** The sample of women under investigation showed unsatisfactory levels of knowledge regarding osteoporosis, substandard health beliefs and sub-optimal levels of calcium consumption. Community-based interventions should be conducted to overcome the barriers to adopting preventive behaviours.

Keywords: Osteoporosis, Knowledge, Motivation, Health beliefs, Preventive behaviour

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INTRODUCTION

Osteoporosis is an important, global public health issue, which is especially relevant with an increasing life expectancy and increasing number of elderly women worldwide (1), and which is expected to reach epidemic proportions by 2050 (2). In Egypt, 28.4% of postmenopausal women have osteoporosis (3). According to World Health Organization (WHO), osteoporosis is defined as “low bone mass and micro-architectural deterioration of bone tissue causing increased bone fragility and fracture” (4). It is also referred to as a “silent thief” because it usually remains asymptomatic until a fracture occurs (5). Hip fractures are associated with its morbidity, and mortality is the most serious consequence of osteoporosis (6). The negative outcomes of osteoporosis can be debilitating, and include reduced quality of life due to the limitation

of socialisation and poor self-esteem, physical pain, emotional suffering, fear of fractures, and depression about one’s independence (7).

Changing lifestyle habits and adopting healthy behaviours, such as engaging in physical activity from an early age, smoking cessation and adequate consumption of dietary calcium and vitamin D, have all been found to be strongly associated with decreasing the risk of osteoporosis. Understanding population knowledge about osteoporosis is one important factor in improving osteoporosis preventive behaviour and is a key component in developing successful prevention programmes (8). Moreover, the adoption of a healthy lifestyle and favourable beliefs among women may protect them against osteoporosis later in life; thus, measuring the beliefs held by women is important (9,10). The Health Belief Model (HBM) is a widely used conceptual framework that can predict health-related behaviours. It is mostly used in health education and promotion. This model can provide guidelines for the development of promotional programmes, and enable the planners of such programmes to understand health

behaviour and the possible reasons for non-compliance with the recommended health behaviour (11). The HBM includes subdomains related to the undertaking of health-related activities, such as perceived susceptibility, perceived severity, perceived benefits of taking a health-related action, perceived barriers to adopting an action, cues for performing an action and self-efficacy (12,13). The individual who perceives that susceptibility to a condition as high, the condition is serious enough, and the benefits of adopting a healthy action exceeds the associated barriers, will likely be motivated to adopt that particular healthy action (14).

Therefore, the current study was designed to test the hypothesis that osteoporosis preventive behaviour is affected by the level of knowledge about osteoporosis and the participants' health beliefs. The study aimed to fulfil the following objectives: firstly, to measure the current level of knowledge about osteoporosis among a sample population of women of reproductive age; then to assess osteoporosis health beliefs; assess osteoporosis preventive measures among the study participants; and determine the factors that are associated with the adoption of those preventive measures.

MATERIALS AND METHODS

Study design, setting and timing

A cross-sectional study was conducted from September 2016 to January 2017 in primary health care (PHC) units in Zagazig district, Egypt.

Study population and sampling

Women attending outpatient clinics in the PHC units in Zagazig district, Egypt were included in the study using the following inclusion criteria: literacy, of childbearing age, and agreement to participate in the study. A multistage systematic random sampling technique was used to select the participants. During the first stage, Zagazig district was randomly selected out of 17 districts of the Sharkia Governorate. During the second stage, "El-Zankalon" and "El-Tahrah" PHC units were randomly selected out of 38 PHC units in the Zagazig district. The total monthly flow through these two units is around 664 eligible participants. Thus, a sample of 265 women was calculated, based on findings from a pilot study on osteo-preventive behaviour (43%), at a 95% confidence interval and an expected 10% non-response rate. The third stage was conducted by using a systematic random technique, in which every third woman (664/265), who attended these units and met the inclusion criteria was selected. If any woman did not meet the sampling criteria and did not agree to participate (the response rate was 91%), the next third woman was selected and so on, until the required sample size was fulfilled. All women included in the sample were interviewed after completion of their clinical visit and invited to self-report using the study questionnaire.

Tools for data collection

The questionnaire used for data collection was developed after review of the literature and previously validated study tools. The final version was assessed several times. The questionnaire gathered the following information:

1- Personal information. Age, marital status, whether the participant had children, education level and employment status. In addition, questions that determined whether the participants had ever heard about osteoporosis, the source of their information, lifestyle habits, family history of osteoporosis or previous low trauma fracture and osteoporosis screening history were all included. Furthermore, questions on medication history, such as the use of hormonal therapy or non-hormonal therapy that affects bone density were also included on the questionnaire.

2- The Osteoporosis Preventing Behaviors Scale (OPBS). This was a 39-item validated, self-reported scale that was used to assess osteoporosis preventing behaviours. Osteoporosis preventing behaviours included physical exercise, daily exposure to sunlight (around midday for 15 min) without sunscreen, vitamin D and Ca supplementation and dietary consumption of calcium from milk, cheese or yogurt (14).

3- The Osteoporosis Knowledge Assessment Tool (OKAT). A valid and reliable questionnaire comprising 20 items, with four sub-scales; it covered basic knowledge about osteoporosis (symptoms and risk of fracture), risk factors of osteoporosis, preventive measures, and treatment availability (15).

4- The Osteoporosis Health Belief Scale (OHBS). A 42-item validated scale divided into seven sub-scales, including six items in each sub-scale (osteoporosis susceptibility, and perceived seriousness, benefits to both physical exercise and calcium intake, barriers to both physical exercise and calcium intake, and health motivation). Osteoporosis susceptibility measured the individual's risk perception and perceived chances of developing the disease based on family history. Perceived seriousness assessed the degree to which the intense effects of developing osteoporosis on the individual's health, and financial and social life were perceived. Benefits to exercise and calcium intake assessed the belief about the preventive role of exercise and calcium intake against fractures and osteoporosis. Barriers to exercise and calcium intake assessed the individual's ability to regularly engage in physical exercise, whether or not the individual had family support and the availability of sporting facilities. This sub-scale also assessed the ability to modify the dietary schedule and increase the intake of calcium-rich food. Lastly, health motivation evaluated the individual's readiness to adopt a healthier lifestyle, their requirement for early diagnosis of osteoporosis and new information about the condition (12, 16).

Questionnaire translation process. The questionnaires

were translated into Arabic using a forward-backward translation process by two expert translators. A comparison was then drawn to measure the level of agreement. The questionnaires were evaluated for reliability during pilot testing, in which Cronbach's alpha was 0.80 for OPBS; 0.75 for OKAT; and 0.77 for OHBS.

Pilot testing. The Arabic version of the questionnaires was tested on 14 women to determine acceptability and clarity, confirm its face validity, assure comprehension and ease of administration, as well as determine the time needed to complete. The questionnaires were then modified accordingly.

Ethical considerations

The researchers obtained the ethical approval from Zagazig University institutional review board (ZU-IRB, number 4097/ 2016). Participation in the study was voluntary, and participants were informed about the objectives and importance of the study and gave informed consent before the practical phase commenced. The confidentiality of the collected information was assured by maintaining the anonymity of each participant.

Data management and analysis

The data were analysed on the SPSS 19 software (17), using descriptive statistics such as frequency and percentage to present discrete quantitative data. The mean and standard deviation (SD) were used for continuous quantitative data. Analytical tests, such as the independent t-test, was used to determine the difference between mean scores, also chi-square test was used to find the association between different variables. Pearson's correlation coefficient was calculated to determine the associations between calcium consumption and OHBS.

Scoring. For the purposes of statistical analysis, the following scoring was used. For OKAT, the answer to each item was either "true", "false" or "do not know". A correct response was scored as "1", and an incorrect or "do not know" response was scored as "0". The mean knowledge score was computed by adding all correct answers. These scores were then converted to a percentage, derived from the total knowledge score of 20. The knowledge of osteoporosis was considered satisfactory if the percentage was 60% or more, and unsatisfactory if it was less than 60% (18).

OHBS. Using a five-point Likert scale, each statement had five levels of answers: "strongly disagree", "disagree", "uncertain", "agree" and "strongly agree", respectively scored from "1" to "5". This gave a total range of 42 to 210 for the total health belief score, and a range of 6 to 30 for each of the sub-scales (19).

OPBS. The total score was calculated by giving a score of "1" for the correct responses and "0" for incorrect

responses. This gave a response range of 0 to 39. The total score for each participant was then calculated and converted to a percentage. If this percentage was 60% or more, it was considered adequate osteo-preventive behaviour, and if less than 60%, it was considered a low level of behaviour (14).

Daily calcium intake. Dietary calcium intake was converted into mg per serving using the food guide for the WHO Eastern Mediterranean Region (20).

RESULTS

Personal characteristics of the sampled women are presented in Table I. The results showed that 35.5% of the women were 24–35 years of age, with a mean age of 41 ± 6.36 years, and the majority were married (59.6%), had children (92.8%), had a secondary educational level (52.5%) and were housewives (73.2%). Only 37.7% had previously heard about osteoporosis and 32.9% reported a positive family history. Although none of the participants had ever been diagnosed with osteoporosis, about 13.6% had been affected by fractures from minor trauma.

The findings regarding osteoporosis preventive behaviour among the participants are also presented in Table I. The majority of participants (95.1%) reported that they were engaged in physical exercise three or fewer times weekly, and 38.0% reported that they were exposed to sunlight daily. Only 27.5% reported calcium supplementation and 27.9% reported vitamin D supplementation. After the analysis was conducted, the daily calcium intake of the participants was found to be 836 ± 57.4 mg/day, which is lower than the recommended daily intake. Only 3.8% of the participants had been screened previously for osteoporosis.

Regarding the participants' knowledge about osteoporosis, 59% showed an inadequate level. The overall osteoporosis preventive behaviour of the participants was dichotomised for the purpose of the analysis into adequate and inadequate levels. The results showed that the majority (70.7%) showed inadequate osteoporosis preventive behaviour (Fig. 1).

After dividing the participants according to their knowledge level, those with an inadequate level of knowledge were found to be mostly of a younger age group, lower educational level, without any first degree relatives with osteoporosis, and without exposure to previous fractures from slight trauma. The differences between this group and those with adequate knowledge were significant ($p < 0.001$) (Table II).

After comparing the women with adequate and inadequate osteo-preventive behaviour, the mean knowledge score was found to be below average in both groups; yet, this score was significantly lower in the

Table I: classification of the sampled women, according to personal characteristics and level of osteo-preventive behavior (n= 265)

Characteristics	n	%
Age groups:		
- < 25	42	15.8
- 25-35	94	35.5
- 35-45	74	28.0
- ≥ 45	55	20.7
Educational level:		
- Low (preparatory)	26	9.8
- Intermediate (secondary)	139	52.5
- Higher (University)	100	37.7
Employment state:		
- Housewife	194	73.2
- Working	71	26.8
Marital state:		
- Single	12	4.5
- Married	158	59.6
- Divorced	22	8.4
- Widow	73	27.5
Have children:		
- No	19	7.2
- Yes	246	92.8
Heard about osteoporosis		
- No	165	62.3
- Yes	100	37.7
1st degree relative with osteoporosis		
- No	178	67.1
- Yes	87	32.9
Previously fracture from slight trauma		
- No	229	86.4
- Yes	36	13.6
Daily sunlight exposure:		
- No	45	17.0
- Yes	220	83.0
Practice exercise		
- < 3 times/ week	252	95.1
- ≥ 3 times/ week	13	4.9
Vitamin D supplements		
- No	191	72.1
- Yes	74	27.9
Screened for osteoporosis		
- No	255	96.2
- Yes	10	3.8
Calcium supplements		
- No	192	72.5
- Yes	73	27.5
Dietary Calcium (mg/day), mean±SD	836±57.4	
Total	265	100.0

Table II: Association between general characters of the studied women and their knowledge level about osteoporosis

Variables	Inadequate knowledge (n=157)	Adequate knowledge (n=108)	chi-square test	P value
	N. (%)	N. (%)		
Age group:				
< 25	33 (21.0)	9 (8.3)	37.55	<0.001*
25-35	72 (45.9)	22 (20.4)		
35-45	31 (19.7)	43 (39.8)		
≥ 45	21(13.4)	34 (31.5)		
Educational level:				
Low (preparatory)	22 (14.0)	4 (3.7)	50.38	<0.001*
Intermediate (secondary)	103 (65.6)	36 (33.3)		
Higher (University)	32 (20.4)	68 (63.0)		
Marital state:				
Single	7 (4.5)	5 (4.6)	1.84	0.606
Married	89 (56.7)	69 (64.0)		
Divorced	13 (8.3)	9 (8.3)		
Widow	48 (30.5)	25 (23.1)		
Having children:				
No	12 (7.6)	7 (6.5)	0.129	0.718
Yes	145 (92.4)	101 (93.5)		
1st degree relative with osteoporosis				
No	149 (94.9)	29 (26.9)	134.4	<0.001*
Yes	8 (5.1)	79 (73.1)		
Previous fracture from slight trauma:				
No	147 (93.6)	82 (76.0)	17.08	<0.001*
Yes	10 (6.4)	26 (24.0)		

*p<0.05 is significant

group exhibiting inadequate osteo-preventive behaviour (9.1 ± 2.6), p < 0.001. Significant differences were also observed between groups regarding the overall health beliefs mean score and its sub-scales, with the exception of perceived exercise benefits and perceived health motivation (p = 0.380 and 0.084, respectively). After evaluating each sub-scale, the mean scores of perceived severity and perceived benefits of calcium consumption were significantly higher in the group of women with adequate levels of osteo-preventive behaviour (15.6 ± 2.2 and 15.2 ± 1.6, respectively), as compared to those with inadequate levels of osteo-preventive behaviour (12.3 ± 1.9 and 13.7 ± 3.1, respectively) (p < 0.001).

On the other hand, the mean scores for perceived barriers to engaging in physical exercise and perceived barriers to calcium intake were significantly higher among the group of women with inadequate osteo-preventive behaviour (22.1 ± 2.6 and 17.8 ± 2.4, respectively), as compared to those with adequate osteo-preventive behaviour (17.3 ± 2.9 and 12.9 ± 1.6, respectively) (p < 0.001). Levels of calcium intake were sub-optimal in both groups, but significantly higher among those with adequate osteo-preventive behaviour (907.2 ± 187.6), as compared to those with inadequate osteo-preventive behaviour (810.7 ± 123.3) (Table III).

After assessing the correlations among calcium intake, knowledge level and all OHBS sub-scales, significant positive correlations were noted between calcium intake and osteoporosis knowledge level (r = 0.29, p < 0.050), perceived susceptibility (r = 0.126, p < 0.050),

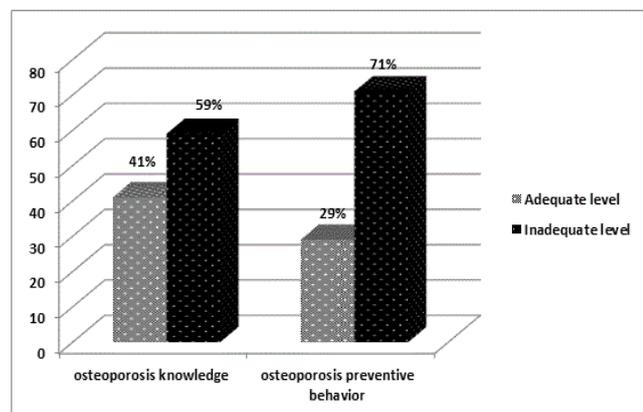


Figure 1: Level of osteoporosis knowledge and osteoporosis prevention behavior among the studied women

Table III: Comparing the mean knowledge, Ca consumption and health beliefs scores among women with adequate and inadequate osteoporosis preventive behavior.

Variables	Inadequate osteo-preventive behavior (n=188)	Adequate osteo- porosis preven- tive behavior (n=77)	T test	P value
	X±SD	X±SD		
Knowledge about osteoporosis	7.3 ± 1.3	9.1± 2.6	4.9	< 0.001*
Daily Ca consumption	810.7±123.3	907.2±187.6	114.9	< 0.001*
Perceived susceptibility	9.8 ± 2.6	10.6 ± 2.9	4.04	0.028*
Perceived severity	12.3 ± 1.9	15.6 ± 2.2	93.07	< 0.001*
Perceived benefits of exercise	11.9 ± 2.4	12.2 ± 2.8	0.61	0.380
Perceived benefits of calcium intake	13.7±3.1	15.2±1.6	14.31	< 0.001*
Perceived barriers to exercise	22.1 ± 2.6	17.3 ± 2.9	30.8	< 0.001*
Perceived barriers to calcium intake	17.8±2.4	12.9±1.6	145	< 0.001*
Perceived health motivation	13.5 ± 1.3	14.1 ± 2.9	3.66	0.084
Overall osteo- porosis health believes scale	136.4±17.6	149.2±19.2	154	< 0.001*

*Significance difference (p≤ 0.05)

perceived severity ($r = 0.07$, $p < 0.010$) and perceived benefits of calcium intake ($r = 0.82$, $p < 0.050$). However, a significant negative correlation was noted between calcium consumption and perceived barriers to calcium consumption ($r = -0.08$, $p < 0.050$) and engaging in exercise ($r = -0.22$, $p < 0.050$) (Table IV).

DISCUSSION

Bone strength throughout life is affected by several factors, including age, sex, family history, ethnicity, dietary habits, exercise and sun exposure (21–23). Knowledge and awareness about osteoporosis are important first steps to preventing the disease (24). The findings of the current study revealed that most of the study participants had an unsatisfactory level of knowledge regarding osteoporosis. This may be due to the lack of public promotion about this condition in Egypt, and a low emphasis in the mass media on the creation of public awareness campaigns about osteoporosis and its preventive measures. This finding is consistent with those of other studies that have been conducted to assess knowledge levels among women (25–28).

The inadequate knowledge level of the study participants was significantly higher among younger women than among older women. This could be attributed to the perception among most of population that osteoporosis is a disease affecting the older age groups (7); thus, the younger women are not interested in acquiring knowledge about the disease. This point is important and must be considered when implementing an awareness programme against the disease, as osteoporosis prevention should start from adolescence to ensure the attainment of maximum bone density (1). The present results are consistent with those of other studies conducted in Saudi Arabia and Egypt, which concluded that the level of knowledge about osteoporosis is poorer in younger participants (29, 30).

Regarding the association between osteoporosis knowledge and education level of the participants, less educated women (low and intermediate levels) showed significantly inadequate levels of knowledge

Table IV: Correlation between calcium consumption, knowledge and health belief model subscales among the studied women

	Calcium consumption	Knowledge	Perceived susceptibility	Perceived severity	Perceived benefits of exercise	Health motivation			
Calcium consumption	1								
Knowledge	0.293*	1							
Perceived susceptibility	0.126*	0.235*	1						
Perceived severity	0.13**	0.359**	0.839**	1					
Perceived benefits of exercise	0.082	0.047	0.179**	0.163**	1				
Perceived benefits of calcium intake	0.79	0.038	0.99**	0.188	0.793	1			
Perceived barriers to exercise	- 0.08*	0.389**	0.563**	0.587**	0.099**	0.067	1		
Perceived barriers to calcium intake	-0.217**	-0.332	0.415	0.921	0.378*	0.091**	0.358	1	
Perceived health motivation	0.55	-0.084	0.592**	0.515**	0.431	0.932	-0.366**	0.674	1

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level

in comparison to those with higher education levels. This could be attributed to the fact that women with higher levels of education have more chances to acquire knowledge from internet sources and educational materials. These results are similar to those of another study conducted in Turkey, which showed that the knowledge level about osteoporosis is low among the illiterate or those with a low level of education (28).

The participants who had first degree relatives with osteoporosis, and who were exposed to previous fractures showed an adequate level of knowledge in comparison to those who were not affected by these issues. Such women had more opportunities to access medical care and receive health education about the disease. In addition, affected relatives and previous fractures are assumed to increase the perception of susceptibility to the disease, which was reflected by a comparatively higher level of knowledge. These results were in agreement with another study in Turkey, which concluded that the incidence of osteoporosis within a family and perception of risk are important factors that affect the level of knowledge about the condition (28).

The majority of women in the present study showed inadequate levels of overall osteo-preventive behaviour. This was expected, as adequate behaviour is usually based on adequate awareness and knowledge, which was generally lacking among the study participants. One of the important preventive measures against osteoporosis is obtaining vitamin D through direct exposure to sunlight for 15 min every day. The majority of study participants reported that they were exposed to sunlight daily. Most of the study participants were housewives, engaged in routine outdoor activities that facilitated their exposure to sunlight, and thus, the fulfilment of their daily requirement for vitamin D. The results of the present study stand in contrast to those of a Saudi Arabian study (25), which revealed that women are generally not exposed to sunlight. In Saudi Arabia, the weather is warmer than it is in Egypt, which makes direct exposure to sunlight more difficult. Although many studies have documented that physical activity is essential for enhancing bony structure and decreasing the incidence of osteoporosis, the majority of study participants exercised three times or fewer each week. This may be due to socio-cultural factors, as regular exercise is not integrated into daily Egyptian life and is considered a leisure activity. This finding is consistent with a previous study, in which the majority of female participants reported a low level of physical activity (25). The nutritional and supplemental roles of calcium and vitamin D are very important in reducing bone loss and fractures in adults. However, only a relatively small proportion of study participants received calcium and vitamin D supplementation. Moreover, their daily dietary calcium intake was lower than the recommended daily intake (1000–1200 mg/day) (31). These facts put these women at greater risk of developing osteoporosis later in

life. We believe that the main cause behind these results is the lack of knowledge about the daily requirements of calcium and vitamin D, the nutritional sources of calcium and the importance of supplementation. The present results are consistent with those of previous studies (32, 33).

The findings of the current study regarding health beliefs about osteoporosis were consistent with those of previous studies (27–35), which reported low overall health beliefs among study participants. In the present study, although the participants in both groups (adequate and inadequate osteoporosis preventive behaviour) perceived that osteoporosis is a serious disease, the group exhibiting inadequate osteo-preventive behaviour had significantly lower scores in perceived severity. This finding is consistent with another study that documented low levels of perceived susceptibility and severity among healthy women (15). However, it contradicts the findings of another study, which reported a high level of perceived severity among public health nurses. This could be explained by the differences in the study populations, as nurses might be more aware of the risks associated with osteoporosis than the general population (25).

The participants of the present study agreed that an adequate daily intake of calcium was beneficial, which is consistent with the findings of previous studies (34,35). In comparison to the group showing adequate osteo-preventive, the perceived benefit of calcium intake was significantly lower in the group showing inadequate osteo-preventive behaviour. This could be attributed to their low level of knowledge about osteoporosis. Similarly, the mean score of health motivation for osteoporosis prevention was relatively low in both groups, which was consistent with the findings of previous studies (14,25).

The foregoing results were supported by significant positive correlations between the benefits of calcium intake and calcium consumption, knowledge level, perceived susceptibility and severity. In contrast, a significant negative correlation was observed between calcium consumption and perceived barriers to calcium intake and exercise. This could be attributed to a lack of knowledge and awareness about osteoporosis among the participants. These findings are consistent with those of previous studies (25,30).

Some of the limitations in this study includes the use of a cross-sectional design could not establish the cause and effect relationships among the variables under investigation. In the current study, we used the WHO food guide for the Eastern Mediterranean Region to assess daily dietary calcium intake. This was because of the lack of a specific food frequency questionnaire for Egyptian food. The use of self-reported questionnaires to assess knowledge and beliefs can lead to a greater tendency of participants to exaggerate or minimise

their responses, thereby affecting the scores obtained. Moreover, another limitation of the current study was the use of a subjective assessment tool of behaviour (such as a questionnaire), which can increase the tendency of participants to over-report a socially-acceptable, positive behaviour.

CONCLUSIONS

The findings revealed that women in the Zagazig district showed unsatisfactory levels of knowledge, beliefs, and osteo-protective behaviour and sub-optimal calcium consumption. These findings should be of concern to the health authority, because they make the women more vulnerable to osteoporosis. Inadequate levels of knowledge were mostly noted among younger participants, and those with a lower educational level, the absence of osteoporosis in first degree relatives and no history of fractures. Positive correlations were noted among calcium consumption, knowledge level, and perceived susceptibility, severity and benefits of calcium intake. In contrast, negative correlations were noted between calcium consumption and perceived barriers of both calcium intake and physical exercise.

Based on the foregoing findings we recommend the following: the Ministry of Health should encourage the promotion of osteoporosis preventive behaviour through community-based interventions to increase awareness and overcome barriers to healthy behaviour. Adequate training of physicians in the primary care units, in addition to health education campaigns, the use of mass media, early detection of the risk factors at a young age and mass screening will all be beneficial. Lastly, more in-depth studies should be conducted to evaluate all aspects of osteoporosis health behaviour among both sexes in the community.

ACKNOWLEDGEMENTS

We would like to express our appreciation to the primary health care units' administrator and the women who agreed to participate in the current study.

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