Osteoporosis knowledge and Health Beliefs among Employees of Tanta University

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Abstract

Background: Osteoporosis is a foremost and rising public health problem affecting both sexes but predominantly women. It constitutes a major rationale of fractures in elderly, resulting in pain, disability, pricey rehabilitation, reduced quality of life, and untimely death**. Purpose:** to assess the knowledge and identifying the most common osteoporosis health beliefs among employees in Tanta University. **Methods:** This is a cross-sectional study conducted during the period from January to March 2015 among employees working at Tanta University. **Results:** The study included 391 employees of Tanta University; most of them were females and married with mean age and Body Mass Index were(43.03±10.08 and 29.52 ± 5.77 respectively). More than one-half of the employees (60.1%) were highly educated, 53.2% had enough but not saving income and more than two-thirds (65.7%) were living in urban areas. The core source of information was TV and mass media (56.50%) while friends as a source of knowledge represent 14.60% and health team 12%. The mean of the score of the Osteoporosis Knowledge Assessment Tool (OKAT) was 8.54 ± 2.58 so as to reveal poor knowledge as the total knowledge score equals 20. For the Osteoporosis Health Belief Scale (OHBS); there was good belief about seriousness of osteoporosis as its mean score was 24.79 ± 4.89, followed by benefit of calcium intake (mean score 22.83 ± 3.84) nevertheless there was low belief of perceived susceptibility (mean score 17.50 ± 4.73) as the total score equals 30. **Analysis:** Data analyzed using SPSS version 20. Chi-square test was used and p-value < 0.05 was considered as significant. **Conclusion:** The majority of our participants had low knowledge on osteoporosis. While they had moderate health beliefs regards the disease.

Keywords: Osteoporosis, Knowledge, Health Belief, Employee

{Citation: Hala M. Elsabagh, Abdelaziz F. Aldeib, Salwa A. Atlam, Shimaa M. Saied. Osteoporosis knowledge and health beliefs among employees of Tanta University. American Journal of Research Communication, 2015, 3(12): 62-77} www.usa-journals.com, ISSN: 2325-4076.

Introduction

Osteoporosis was defined by National Institute of Health (NIH), as a skeletal disorder characterized by compromised bone strength predisposing to an augmented hazard of fracture. This disorder is one of the most widespread metabolic diseases that demonstrate their clinical manifestations merely following adequate harm has been completed[1].

According to The International Osteoporosis Foundation, This disease and fractures secondary to it are an essential reason of mortality and morbidity. About 1.6 million hip fractures occur every year worldwide; the incidence is set to increase to 6.3 million by 2050 [2].

Globally, osteoporosis causes more than 8.9 million fractures annually, resulting in an osteoporotic fracture every 3 seconds [3]. Even with plenty of the sunshine, the Middle East and Africa registered the uppermost rates of rickets worldwide and low levels of vitamin D are prevailing all through the region [4].

In Egypt, 53.9% of postmenopausal women have osteopenia while 28.4% have osteoporosis [5]. Among males aged above twenty, 21.9% have osteoporosis [4]. The mortality rates post-hip fracture may be higher in The Middle East and Africa region than those reported from western populations. whereas such rates vary between 25-30% in western populations, they are 2-3 folds higher in populations from this region [6]. Osteoporosis no longer considered to be due to age alone. Lifestyle choices, certain diseases, and medications can cause this condition yet in children, adults, men and premenopausal women [7]. In view of the fact that osteoporosis can occur at any age, it is particularly vital to attaining utmost peak bone mass during adolescence [8].

Risk factors of osteoporosis include female gender, Asian or Caucasian race, advancing age, family history of osteoporosis or fragility fractures. In addition to a low body mass index,

menopause before age 45 years, prolonged amenorrhea unconnected to menopause, and nulliparity, or prolonged lactation. Furthermore, a diet low in calcium and vitamin D, or poor intestinal absorption of calcium, and lactose intolerance. Special habits like excessive caffeine or alcohol consumption, smoking, and sedentary lifestyle. Certain conditions as prolonged treatment with thyroid hormones, glucocorticoids, anticonvulsants, aluminum antacids, and use of anticoagulants [9, 10,11].

Osteoporosis is not curable, but it can be prevented in part by ever-increasing the level of physical activity at all ages, together with adequate dietary calcium and vitamin D intake, and fall prevention. Cessation of smoking and reduction of alcohol consumption may play a role. Among most important preventive measures are weight-bearing exercises e.g. going up and down stairs, jogging, aerobics, swimming, and isometrics; at least 30 minutes daily [12, 13].

There is a good support suggestive that osteoporosis knowledge is one contributor to osteoporosis preventive behavior [14-15]. Previous studies have shown that persons of all ages lack knowledge about osteoporosis or do not recognize themselves as being at risk for developing bone loss and osteoporosis [16–17]. Also Ediriweera de Silva et al. (2014) reported that the majority of participants in his study had a modest level of knowledge on osteoporosis, there were gaps in their knowledge in relation to risk factors, protective factors, and the insidious nature of osteoporosis. Perceived vulnerability for osteoporosis was low. Practices aiming at preventing Osteoporosis were inadequate [18]. The rationale behind this study was to assess the knowledge and identifying the most common osteoporosis health beliefs among employees in Tanta University due to conflicting results of obtainable studies and lack of studies among both genders.

Methods

Study design and sampling

This cross-sectional study was conducted during the period from January to March 2015 among employees working at Tanta University through a convenience sample. The total number of employees included in the study was 391 with age ranged between 24 up to 60 years. We

estimated that a sample size of 384 would be required to estimate an assumed prevalence of 0.5 of various aspects knowledge about osteoporosis at a confidence interval of 95% with an error bound of 0.05 (precision). A total of 450 questionnaires were distributed and 410 returned, with 19 questionnaires were excluded because of incomplete data.

Data collection and instruments

A pre-tested self-administered valid and reliable questionnaire was used to assess knowledge and beliefs towards osteoporosis. Employees were provided the questionnaire by researchers and requested to fill it after briefly explaining to them the purpose of the study and taking their verbal consent. The Osteoporosis Knowledge Assessment Tool (OKAT) developed by Winzenberg and co-authors in 2003; is a twenty-item questionnaire, each item having “true", "false” and “don’t know” options. Each item is coded "0" if an incorrect answer or a “don’t know” answer is given and "1" if the correct answer was given, with a total potential score of twenty. OKAT focuses on four basic themes: understanding (symptoms and risk of fracture) of osteoporosis, the knowledge of risk factors for osteoporosis, knowledge of preventive factors as physical activity and diet relating to osteoporosis and treatment availability [15, 17].

Kim and colleagues invented The Osteoporosis Health Belief Scale (OHBS) to appraise health beliefs connected to osteoporosis [19]. It is a 42-item self-reported questionnaire that was particularly premeditated to assess beliefs linked to calcium intake and physical activities practice. Furthermore, the instrument consists of seven subscales that measure the perceived vulnerability to osteoporosis, the seriousness of osteoporosis, benefits of exercise, and benefits of calcium intake. Also barriers which may interfere with physical practice, calcium intake, and health motivation. The OHBS uses a 5-point Likert scale to rate the items from strong disagreement "1" to strong agreement "5" [20]. The probable range of scores for each subscale is 6 to 30 with a possible total score ranges from 42 to 210. For the five subscales, higher scores indicating extremely healthy beliefs. But for the two subscales concerning barriers, higher scores indicate more negative health beliefs. Age was categorized into three age groups 20-35, 35-50 and > 50. The knowledge on osteoporosis scores were divided into three main categories as follows: 0-8 ranked poor, 8- 12 ranked average, > 12 considered good. The variables were grouped into blocks of knowledge and the seven domains of beliefs.

Statistical analysis

For analysis of data, Statistical Package for Social Sciences software, version 21.0 (SPSS Inc., Chicago, IL) was used. Means and standard deviations were calculated for continuous variables and frequencies for categorical variables. Pearson's correlation was applied to determine the relationship of the level of knowledge and osteoporosis-related life habits. Chi-square was used for categorical data. For each test, a p-value of less than 0.05 was considered statistically significant.

Ethical considerations

The purpose of the study was explained to all participants. Oral consents of all participants were essential for their recruitment and confidentiality was guaranteed. Approval of Ethical Committee of The Scientific Research in Tanta Faculty of Medicine was obtained before starting the study.

Results

The study incorporated 391 employees at Tanta University; most of them were females and married (71.60 and 86.70% respectively). More than one-third (42.5%) of interviewed persons aged between 35 -50 years with mean age 43.03±10.08 and their mean Body Mass Index was 29.52 ± 5.77. More than one-half (60.1%) were highly educated, 53.2% had enough but not saving income and more than two-thirds (65.7%) live in urban areas. The main source of information was TV and mass media (56.50%) while friends represent 14.60% and health team 12% (Table 1).

Concerning osteoporosis knowledge, 8.7% of participants were aware that osteoporosis is usually asymptomatic, 85.9% did not know that there is a high bone loss in the ten years after menopause and 85.2% did not know that weight bearing exercises were protective for osteoporosis. Most of the employees (81.1%) did not know that a higher peak bone mass is protective. Being old was not considered as a risk factor by 73.1%, at the same time 54.0% of the studied employees did not know that smoking also is a risk factor. The dietary sources of

calcium were not known by 45%. Only 44.2% recognized that a family history of osteoporosis is a risk factor. (Table 2).

Table 1. Socio-demographic characteristics of the study group and sources of information

Variable	No. (391)	%
Age group		
20-35	**91**	**23.30**
35-50	**166**	**42.50**
≥ 50	**134**	**34.30**
Gender		
Male	**111**	**28.40**
Female	**280**	**71.60**
Marital status		
Single	**52**	**13.30**
Married	**339**	**86.70**
Education		
Illiterate	5	1.30
Primary	10	2.60
Secondary	141	36.10
High	235	60.10
Residence		
Urban	**257**	**65.70**
Rural	**134**	**34.30**
Source of information:		
Health care team	**47**	**12.00**
Family member	**43**	**11.00**
Friends	**57**	**14.60**
TV &Media	**221**	**56.50**
Others	**23**	**5.9**
Family income		
Not enough	**101**	**25.80**
Enough- not saving	**208**	**53.20**
Enough and saving	**82**	**21.00**
Age (mean ± SD)	**43.03±10.08**	
BMI (mean ± SD)	**29.52 ± 5.77**	

BMI = Body Mass Index SD= standard deviation

Table 2: knowledge assessment according to employees' answers

Question	Correct answer		False answer	
	No	%	No	%
1. Osteoporosis leads to an increased risk of bone fractures. True	350	89.5	41	10.5
2. Osteoporosis usually causes symptoms (e.g. pain) before fractures occur. False	34	8.7	357	91.3
3. Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life. False	74	18.9	317	81.1
4. Osteoporosis is more common in men. False	247	63.2	144	36.8
5. Cigarette smoking can contribute to osteoporosis. True	180	46.0	211	54.0
6. White women are at highest risk of fracture as compared to other races. True	123	31.5	268	68.5
7. A fall is just as important as low bone strength in causing fractures. False	239	61.1	152	38.9
8. By age 80, the majority of women have osteoporosis. True	286	73.1	105	26.9
9. From age 50, most women can expect at least one fracture before they die. True	202	51.7	189	48.3
10. Any type of physical activity is beneficial for osteoporosis. False	58	14.8	333	85.2
11. It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors. True	216	55.2	175	44.8
12. Family history of osteoporosis strongly predisposes a person to osteoporosis. True	173	44.2	218	55.8
13. An adequate calcium intake can be achieved from two glasses of milk a day. True	274	70.1	117	29.9
14. Sardines and broccoli are good sources of calcium for people who cannot take dairy products. True	176	45.0	215	55.0
15. Calcium supplements alone can prevent bone loss. False	135	34.5	256	65.5
16. Alcohol in moderation has little effect on osteoporosis. True	117	29.9	274	70.1
17. A high salt intake is a risk factor for osteoporosis. True	142	36.3	249	63.7
18. There is a small amount of bone loss in the ten years following the onset of menopause. False	55	14.1	336	85.9
19. Hormone therapy prevents further bone loss at any age after menopause. False	153	39.1	238	60.9
20. There are no effective treatments for osteoporosis available in Egypt. False	106	27.1	285	72.9

*** Correct answers underlined**

Table 3: knowledge distribution according to demography

Variable	Knowledge						Total		P
	Good knowledge		Average knowledge		Poor knowledge				
	No	%	No	%	No	%			
Age group									
20-35	8	15.7	58	28.3	25	18.5	91	23.3%	
35-50	28	54.9	87	42.4	51	37.8	166	42.5%	0.013*
≥ 50	15	29.4	60	29.3	59	43.7	134	34.3%	
	51	100%	205	100%	135	100%	391	100%	
Gender									
Male	16	31.4	57	27.8	38	28.1	111	28.4%	0.877
Female	35	68.6	148	72.2	97	71.9	280	71.6%	
	51	100	205	100%	135	100%	391	100%	
Marital status									
Single	3	5.9	33	16.1	16	11.9	52	13.3%	0.131
Married	48	94.1	172	83.9	119	88.1	339	86.7%	
	51	100	205	100	135	100	391	100%	
Education									
Illiterate	0	0.0	4	2.0	1	0.7	5	1.3%	
Primary	2	3.9	6	2.9	2	1.50	10	2.6%	0.086
Secondary	14	27.5	65	31.7	62	45.9	141	36.1%	
High	35	68.6	130	63.4	70	51.9	235	60.1%	
	51	100	205	100	135	100	391	100%	
Residence									
Urban	34	66.70	125	61.0	98	72.6	257	65.7%	
Rural	17	33.30	80	39.0	37	27.4	134	34.3%	0.086
	51	100%	205	100%	135	100%	391	100%	
Source of information:									
Health care team	12	23.5	23	11.2	12	8.9	47	12.0%	
Family member	10	19.6	13	6.30	20	14.8	43	11.0%	0.007*
Friends	5	9.8	33	16.1	19	14.1	57	14.6%	
TV &Media	23	45.1	124	60.5	74	54.8	221	56.5%	
Others	1	2.0	12	5.9	10	7.4	23	5.9%	
	51	100	205	100	135	100	391	100%	
Family income									
Not enough	14	27.5	46	22.4	41	30.4	101	25.8%	
Enough but not saving	21	41.2	115	56.1	72	53.3	208	53.2%	0.099
Enough and saving	16	31.4	44	21.5	22	16.3	82	21.0%	
	51	100%	205	100%	135	100%	391	100%	

A significantly higher level of knowledge was found among the group aged 35-50 years (54.9%) while the frequency of poor knowledge among those above 50 years was 43.70%. There was also a significant effect of TV& media as sources of information on employees knowledge, as 45.10% and 60.50% of those had good and average knowledge respectively received their information from those sources. There was no significant effect of Gender, residence, family income and education on the employees' knowledge (Table 3). The mean score for the Osteoporosis Knowledge Assessment Tool (OKAT) was 8.54 ± 2.58 that revealed poor knowledge as the total knowledge score equals 20. For the Osteoporosis Health Belief Scale (OHBS); there was a good belief about the seriousness of osteoporosis as its mean score was 24.79 ± 4.89, followed by the benefit of calcium intake (mean score 22.83 ± 3.84). However, there was a low belief of perceived susceptibility (mean score 17.50 ± 4.73) as the total score equals 30. The mean of scores of barriers to exercise and calcium intake was low (18.65 ± 4.84 and 15.38 ± 4.31 respectively) since the total score equals 30. For Health Motivation, the mean of scores was relatively high (20.34± 4.85) (Table 4).

Table 4: Mean and Standard Deviation of Eight Major Variables of The Osteoporosis Knowledge Assessment Tool (OKAT) and Osteoporosis Health Belief Scale (OHBS).

Scale (total score)	Mean Scores	Standard Deviation
Knowledge (20)	8.54	2.58
Perceived Susceptibility (30)	17.50	4.73
Seriousness of osteoporosis(30)	24.79	4.89
Benefit of Exercise (30)	20.21	3.74
Benefit of calcium intake (30)	22.83	3.84
Barrier to Exercise (30)	18.65	4.84
Barrier to calcium intake (30)	15.38	4.31
Health Motivation (30)	20.34	4.85

Regarding the correlations between Health beliefs and Knowledge. There was a significantly negative correlation between knowledge and perceived susceptibility of osteoporosis (R= -0.11), barriers to calcium intake (R = -0.109) and barriers to exercise (R= -0.172). As good knowledge levels are associated with, decreased barriers to calcium intake and exercise, while perceived susceptibility for osteoporosis increased with lower levels of knowledge. On the other hand, there was a significant positive correlation between knowledge and the benefits of exercise because a higher knowledge level was connected to a good belief of exercise benefits (Table 5).

Table 5: Correlations between Health beliefs and Knowledge

Knowledge	Health Belief						
	Perceived susceptibility	**Seriousness of osteoporosis**	**Benefit Of exercise**	**Benefit of calcium intake**	**Barrier to calcium intake**	**Barrier to exercise**	**Health motivation**
Knowledge score Pearson Correlation	- 0.111*	- 0.019	0.165**	- 0.005	- 0.109*	-0.172**	0.025

*p < 0 .05; **p< 0.01

Discussion

Osteoporosis is a major and growing public health problem affecting both sexes but mostly women. It is the main reason for fractures in elderly. It leads to pain, disability, costly rehabilitation, poor quality of life, and premature death.

In the current study only 8.7% of the participants were aware that osteoporosis is usually asymptomatic; this was lower than other findings among females in a medical school that reported 18.3% [18]. In the present study, 85.2% did not know that weight bearing exercises were protective for osteoporosis and old age was not considered as a risk factor by 73.1% of the

participants. Better knowledge regarding weight bearing exercises to be protective from osteoporosis and aging as a risk factor for the disease were reported by Ediriweera de Silva et al. (2014) [18]. Furthermore in The USA, 88% of premenopausal women reported old age as a risk factor [21]. This difference from our study may be because other studies were done among females only who may be more aware of osteoporosis than males.

In the current study, most of the participants did not know that a higher peak bone mass is protective against osteoporosis. This was in agreement with other study findings. [18,21]

Regarding the smoking, in the present study, half of the participants knew that smoking was a risk factor, which is better than that in the Sri Lankan study [18] while it is lower than other studies as the majority of respondents reported smoking as a risk factor [21,22].

As regards the dietary sources of calcium, more than half of the participants in this study were aware of it, while 44.2% recognized that a family history of osteoporosis is a risk factor for the disease. This disagrees with the USA findings among premenopausal women where most of them know that family history of osteoporosis is a risk factor [21]. The difference between studies may be attributed to the better access to healthcare, better education of the public about general health and the prevention of diseases like osteoporosis among the USA women.

The present study shows a significantly higher level of knowledge among the group aged 35-50 years. This finding agrees with a study done in Saudi Arabia (KSA).[14] Also in a study carried out in Pakistan; the knowledge on osteoporosis in younger women was found to be very poor compared to relatively older females. [22] Mass media is the main source of information for employees' knowledge followed by friends and healthcare team. This was in agreement with a study on Mexican women [25]. This may be due to lack of time on the part of health care team, ignorance of the importance, magnitude and the seriousness of osteoporosis as a disease or even low level of knowledge among healthcare professionals. On the contrary, other studies reported that health care professionals were the sources of information by a majority of participants [23]. Another study showed that identified friends and relatives followed by television were the main sources of information [24]. The current study revealed that no significant association between gender, residence, family income or education level and the employees' knowledge. On the other hand, other findings in Malaysian and Korean females showed better knowledge on osteoporosis

than males [24,26,27]. Another study mentioned that women belonging to higher socioeconomic status and with better education level had slightly more knowledge about osteoporosis compared to those with a low education level [14]. Also, Awareness was linked to education in a study carried out in Vietnam [28].

In the present study The mean score for the Osteoporosis Knowledge Assessment Tool (OKAT) revealed poor knowledge, this finding agrees with other studies carried out among Pakistan, Taiwanese and American women [14, 29,30]. In all cited cases, the obtained scores indicate that knowledge about osteoporosis is poor or limited among surveyed subjects so health educational programs and health services regarding osteoporosis are necessary for Pakistanis women, as is also suggested for Taiwanese and American ones [14, 29,30] . In this study there was perceived low susceptibility, this perceived susceptibility negatively correlated to knowledge. T his was in agreement with those found in other studies [29,31]. This low perceived susceptibility may be due to low knowledge about osteoporosis. There was a good belief about the seriousness of osteoporosis in our study which is better than that reported by other previous studies [21,31,32] . So the present study revealed that workers perceived osteoporosis as a serious disease and there was good belief about benefit of calcium intake. This was in agreement with Estok PJ et al [33], Doheny et al [34] and Renée D. Endicott [21].

The barriers to calcium intake were low. This agrees with Midi Tasi 2008 finding in New Zealand and Renée D. Endicott 2013 in USA [31, 21]. This means that the employees have no barriers for calcium intake and this is a good point for prevention of osteoporosis. The barriers to doing physical exercises were low which are relatively higher than that recorded in USA 2013 [21]. These barriers to calcium intake and physical exercises negatively correlated to knowledge in our study in contrary with other previous studies who found that knowledge of osteoporosis does not correlate with the amount of physical activity or total calcium intake [30, 31, 32]. The employees perceived the barriers to physical exercise practicing and calcium intake were low and the benefits of exercise and calcium were high. These findings are also in consistent with findings in previous studies among young women and adolescent girls [34, 16]. For Health Motivation, the mean scores were relatively high which agreed with Midi Tasi 2008 finding in New Zealand [31] and Renée D. Endicott 2013 in the USA.[21] This high health motivation is an important trigger for implementation of relevant osteoporosis prevention program. Regarding

correlations between health beliefs and knowledge, There was a significantly negative correlation between knowledge and perceived susceptibility of osteoporosis, barriers to calcium intake and barriers to exercise. On the other hand, there was a significant positive correlation between knowledge and benefit of exercise. These findings disagree with Midi Tasi finding in New Zealand 2008 who reported that, there is no correlation between all domains of health belief scale and knowledge OKAT scale [31].

Study limitations

This cross-sectional study is not obliging in drawing cause-effect relations between the studied variables. The scales used in screening of osteoporosis knowledge and beliefs were a self-reporting subjective ones; consequently the scores can be easily exaggerated or minimized by the persons completing them. Therefore, it can be evaluated by further studies in depth by applying quantitative and qualitative methods and as well on a large scale of people.

Recommendations

The study finding highlights the need of setting up of primary health care programmes regarding osteoporosis for Egyptian specifically for women. Health education programmes for public in mass media is mandatory. Training of health care professionals, is also important with stresses on the importance of physical exercises, adequate intake of diet rich in calcium and vitamin D and how to suspect the disease. Integrate early detection and management of osteoporosis in orthopedic or rheumatology outpatient clinics in Tanta university hospital and other health facilities.

Conclusion

It is concluded that there is a lack of the knowledge regarding osteoporosis and its consequences among the participants. They did not consume the recommended daily amount of calcium. Moreover, there would be a deficiency in knowledge regarding calcium rich food sources and the preventive effect of physical activity.

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