

Knowledge about Symptoms and Risk Factors of Osteoporosis among Adult Women in Cairo, Egypt

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Abstract

Background: Osteoporosis (OP) is a bone condition that weakens bone over time, making it easier to break. **Objectives:** The study aimed to assess knowledge level about symptoms and risk factors for osteoporosis among adult women in Cairo, and to identify factors influencing their knowledge level. **Method:** Cross-sectional study was carried out among sample of Egyptian women aged 18 and more, living in Cairo who agree to participate and fulfill an online structured questionnaire using Osteoporosis Knowledge Assessment Tool (OKAT). **Results:** A sample of 414 adult women answered the on-line questionnaire with mean age (35.6 ± 10.6). All surveyed women were familiar with OP, the predominant source of information was mass media (48.3%), followed by friends (37%), academic study (32.9%), lastly from physicians (21.3%). Mean total OKAT score was 10.5 ± 3.4 (0.0 – 18.0); and the total knowledge percent score was 52.3 ± 17.1 (0.0 – 90.0). Less than half of the surveyed women (41.5%) scored a percentage score ($\geq 60\%$ correct answer). Knowledge level had a significant association with women working status and educational level which act also as a significant predictor for the OP knowledge level. More correct answers were recorded from that receiving information from mass media, followed by doctors, academic research, lastly friends. **Conclusion:** Poor knowledge about osteoporosis has been identified among adult studied women in Cairo. Developing successful health education campaigns may be beneficial in improving awareness about osteoporosis and its risk factors; and consequently, adopting healthy behavior that prevents or decreases bone loss.

Keywords: *Adult women, Knowledge, OKAT, Osteoporosis, Risk factors*

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Introduction

Osteoporosis (OP) is a skeletal condition that affects the mineral density of bone, deteriorates the bone fragility, and increases bone fracture risk.¹ Worldwide, there is a significant public health issue that affects 200 million women and causes more than 8.9 million fractures per year. It is estimated that worldwide an osteoporotic fracture occurs every 3 seconds. At 50 years of age, one in three women will suffer a fracture in their remaining

lifetime. For women this risk is higher than the risk of breast, ovarian and uterine cancer combined. In women over 45 years of age, osteoporosis accounts for more days spent in hospital than many other diseases, including diabetes, myocardial infarction and breast cancer.²

In Egypt, based on previous studies, the prevalence of OP was 28.4% in women, furthermore, the prevalence of OP in

postmenopausal women in rural areas of Upper Egypt was higher reaching 47.8%.^{3,4}

Table (1):Socio-demographic Characteristics of The Studied Adult Women (N= 414).

		N	%
Age [mean ± SD (Min – Max)]		35.6 ± 10.6 (18.0 – 85.0)	
Marital status	Single	113	27.3
	Married	278	67.1
	Divorced	16	3.9
	Widow	7	1.7
Children number [mean ± SD (Min – Max)]		2.1 ± 1.2 (0.0 – 5.0)	
Educational level	Secondary & below	25	6.0
	University	211	51.0
	postgraduate	178	43.0
Working status	Not working	138	33.3
	Working	276	66.7

Osteoporosis is a silent disease. But, in the same time it is a preventable and treatable illness. OP Prevention include early identification of risk factors.⁵ Risk factors of Osteoporosis include both Modifiable and nonmodifiable risk factors, the unmodifiable risk factors as being female, old age, ethnicity and in some conditions present of family history,⁶ modifiable risk factors include low dietary or supplementary intake of vitamin D and calcium, low body weight , falls, lack of physical activity, smoking and alcohol intake and prolonged intake of corticosteroids and proton pump inhibitors.²In a study conducted atZagazig District Egypt results showed adult women awareness about risk factors and preventative measures was very low, with about one-third having unsatisfactory levels of awareness and a significant association was found between levels of awareness and socio-demographic factors such as income, place of residence and type of occupation.⁶Another study conducted among a sample of adult Egyptian women to assess their awareness about nutritional risk factors and protective factors of OP results showed that awareness about the consumption of milk, milk products, leafy vegetables and about the harmful effect of

the carbonate beverages was very low and about half of the studied group were aware about the beneficial effect of the physical exercise.⁷ Another study conducted in China showed that the overall awareness score OP was 67.8% and Lower family income and education level were significantly associated with lower overall awareness score.⁸

Table (2):Previous Information about Osteoporosis and Its Sources (N = 414).

	N	%
Previous information about osteoporosis	414	100.0
Source of information		
• Mass media	200	48.3
• Friends	153	37.0
• Academic study	136	32.9
• Physicians	88	21.3

As the awareness about OP risk and protective factors plays the major role in OP prevention the International Osteoporosis Foundation (2011) creates preventive strategies which aimed to lessen the risk of osteoporotic fractures later. Named "Three stages to unbreakable bones" itsaim was to raise the awareness about the importance of maintaining sufficient daily levels of vitamin D, calcium, protein, and physical activity to maintain bone health, at all ages.⁹

Many researches in various populations used Osteoporosis Knowledge Assessment

Tool (OKAT) as a validated questionnaire towards OP, and its risk factors.^{10,11} But, as to evaluate the awareness and attitudes

Table (3): Responses of Studied Adult Women towards OKAT Items (N = 414).

OKAT items	No	Yes	Don't know
Osteoporosis leads to an increased risk of bone fractures (<i>correct answer: yes</i>)	1 (0.2)	375 (90.6)	38 (9.2)
Osteoporosis usually causes symptoms (e.g., pain) before fractures occur (<i>correct answer: No</i>)	13 (3.1)	329 (79.5)	72 (17.4)
Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life. (<i>correct answer: yes</i>)	55 (13.3)	287 (69.3)	72 (17.4)
Osteoporosis is more common in men (<i>correct answer: No</i>)	297 (71.7)	16 (3.9)	101 (24.4)
Cigarette smoking can contribute to osteoporosis (<i>correct answer: yes</i>)	33 (8)	203 (49)	178 (43)
White women are at highest risk of fracture as compared to other races (<i>correct answer: yes</i>)	84 (20.3)	60 (14.5)	270 (65.2)
A fall is just as important as low bone strength in causing fractures (<i>correct answer: yes</i>)	196 (47.3)	150 (36.2)	68 (16.4)
By age 80, the majority of women have osteoporosis (<i>correct answer: yes</i>)	18 (4.3)	283 (68.4)	113 (27.3)
From age 50, most women can expect at least one fracture before they die (<i>correct answer: yes</i>)	70 (16.9)	218 (52.7)	126 (30.4)
Physical activity is beneficial for osteoporosis (<i>correct answer: yes</i>)	17 (4.1)	316 (76.3)	81 (19.6)
It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors (<i>correct answer: yes</i>)	12 (2.9)	310 (74.9)	92 (22.2)
Family history of osteoporosis strongly predisposes a person to osteoporosis (<i>correct answer: yes</i>)	75 (18.1)	199 (48.1)	140 (33.8)
An adequate calcium intake can be achieved from two glasses of milk a day (<i>correct answer: yes</i>)	66 (15.9)	257 (62.1)	91 (22)
Sardines and broccoli are good sources of calcium for people who cannot take dairy products (<i>correct answer: yes</i>)	41 (9.9)	316 (76.3)	57 (13.8)
Calcium supplements alone can prevent bone loss (<i>correct answer: No</i>)	321 (77.5)	32 (7.7)	61 (14.7)
Alcohol in moderation has little effect on osteoporosis (<i>correct answer: yes</i>)	5 (1.2)	274 (66.2)	135 (32.6)
A high salt intake is a risk factor for osteoporosis. (<i>correct answer: yes</i>)	51 (12.3)	116 (28)	247 (59.7)
There is a small amount of bone loss in the 10 years following the onset of menopause (<i>correct answer: No</i>)	25 (6)	233 (56.3)	156 (37.7)
Hormone therapy prevents further bone loss at any age after menopause (<i>correct answer: yes</i>)	31 (7.5)	200 (48.3)	183 (44.2)
There are no effective treatments for osteoporosis available in "Egypt" (<i>correct answer: yes</i>)	80 (19.3)	112 (27.1)	222 (53.6)

far as we know, there are few studies in Egypt which have investigated this area.

In the current study we aimed to assess knowledge level about symptoms, risk, and protective factors for osteoporosis among adult women in Cairo, through using validated Tool (OKAT) and to identify key factors that influence their knowledge level.

Method

Our target population was adult (aged 18 year and more) Egyptian women living in Cairo. As we did not have a sample frame and in addition to the method used to data collection (online questionnaire),

we invited adult women to participate in our study. Thus, adult women who agreed to participate and fulfil the predefined criteria as Egyptian or aged 18 year and more were included in our study population.

Table (4): Distribution of OKAT Score, Percentages, and Categories among The Studied Women (N = 414).

		N	%
OKAT Score		10.5 ± 3.4	
[mean ± SD		(0.0 – 18.0)	
(Min – Max)]			
OKAT Score percent		52.3 ± 17.1	
[mean ± SD		(0.0 – 90.0)	
(Min – Max)]			
OKAT correct answer categories	Poor (<60%)	242	58.5
	Good (≥ 60%)	172	41.5

Using Epi Info 7 software for sample size calculation, using confidence level of 95 percent and error margin of 5 percent, and reviewing previous study results¹² showed that Osteoporosis Awareness Assessment results (based on cut-off point 60%) was 79.4%, based on these data, the minimum sample size required was 252 adult women. However, the total number of adult women responded to the on-line questionnaire were 414 women.

Data collection tool: Data were collected using Anonymous, self-administrated online questionnaire, delivered through different social media applications as (whatsapp, Facebook) to our study participants; *the questionnaire was composed of 3 sections:* (1) *Socio-demographic data* (e.g. age, occupation, education...etc.). (2) *Previous information and its source.* (3) *Knowledge about osteoporosis, symptoms and risk factors* through using *osteoporosis knowledge assessment test (OKAT) survey*, a valid tool for assessing of knowledge of osteoporosis risk factors,⁽¹¹⁾ it takes the

form of 20 sentences, the first 12 evaluate the knowledge of osteoporosis, next 4 sentences evaluate the attitude towards osteoporosis and the last 4 sentences evaluate factors of osteoporosis prevention. every sentence has three options (yes, no, and I do not know).

The scoring of responses was performed as follows: one point was assigned for each right answer and zero for each wrong answer as well as for “do not know” answers. The overall OKAT score ranges from zero to 20. Then the score transformed into OKAT percentage by dividing the attained participant’s score by 20. Then knowledge level was stratified into two categories according to cut off point of 60%, the selection of this cut-off point based on reviewing the most relevant studies that use the same cut-off point to permit comparison between the results of the different studies.^{13,14,15}

Arabic version According to Sayed-Hassan et al., the OKAT survey is acceptable and reliable.¹⁶

Ethical considerations: Approval was acquired from the ethical committee of the Faculty of Medicine, Ain Shams University, Egypt (*Approval number: FMASU R 30 / 2020*). Filling the questionnaire by women is considered an approval to participate in the study. Privacy and confidentiality were maintained through anonymity of the questionnaire.

Data management and analysis: Data had been revised, coded, inserted on the computer, and examined using the Statistical Package for the Social Sciences (version 20). The mean, standard deviation (SD), and range values of quantitative data were addressed. Independent t-test was used for comparing quantitative variables between groups. Qualitative data is stated in terms of frequencies (n) and percentage (%). For test the association

between qualitative variables, Chi-square and Fisher exact test were used. Binary logistic regression was used to explore the

effect of different Socio-demographic factors on the OP knowledge

Table (5): The association between Socio-demographic characteristics and knowledge level among the studied adult women (N = 414).

Variables	OKAT categories				P value	COR (95% CI)
	Poor OKAT (<60% correct answer)		Good OKAT (> 60% correct answer)			
	N	%	N	%		
Age						
less than 40 years	165	68.2	132	76.7	0.057	0.64 (0.42-1.01)
40 years and more	77	31.8	40	23.3		
Marital status						
Unmarried	81	33.5	55	32.0	0.75	1.07 (0.70-1.06)
Married	161	66.5	117	68.0		
Educational level #						
University level and lower	170	70.2	66	38.4	<0.001*	3.79 (2.50-5.73)
Above university level	72	29.8	106	61.6		
Working status[¶]						
Not working	96	39.7	42	24.4	0.001*	2.03 (1.32-3.13)
Working	146	60.3	130	75.6		
Source of information about osteoporosis						
Friends [¶]	120	78.40	33	21.60	.000*	
Academic studying [¶]	92	67.60	44	32.40	.008*	
Mass media [¶]	71	35.50	129	64.50	.000*	
Physician [¶]	59	67.00	29	33.00	0.065	

(¶) Chi-square test, (#) fisher exact test, (*) P value ≤ 0.05 is considered statistically significant.

level. A p-value less than 0.05 is considered statistically significant.

Results

The study included 414 adult women who agreed to answer the online questionnaire. The mean age was 35.6 ± 10.6 (18.0 – 85.0), most of them married (67.1%), about half of them had university education (51%), and most of them were working (66.7%) as shown in Table 1.

All the surveyed women reported being familiar with OP, the predominant source for information was from Mass media (48.3%), followed by friends (37%), academic study (32.9%), lastly from

physicians (21.3%) as described in Table 2.

Table 3 outlined the women's answers to the OKAT items with the percentage of right answers for each item. More than 50% of the respondents correctly answered 13 items. The most frequent right answer was about the item "Osteoporosis leads to an increased risk of bone fractures" and the most wrong answer was about the item "Osteoporosis usually causes symptoms (e.g., pain) before fractures occur". the most do not know answer was about the item "A high salt intake is a risk factor for osteoporosis".

The mean of OKAT overall score was 10.5 ± 3.4 , ranging from (0.0 – 18.0); and the

total knowledge percent score, 52.3 ± 17.1 (0.0 – 90.0). Less than half of studied women (41.5%) achieved a percentage score ($\geq 60\%$ correct answer) as in Table 4.

Table 5 demonstrates that the level of knowledge does not vary significantly with age. But it had a positive significant relation

Table 6: factors affecting the OP knowledge level among the studied women

Variables	P value	AOR	95% C.I.	
			Lower	Upper
Age categories				
< 40 years**	.305	.742	.420	1.312
≥ 40 years				
Marital status				
Unmarried**	.826	.920	.435	1.944
Married				
Number of children	.643	1.059	.831	1.350
Educational level				
\leq University level **	.000	4.591	2.587	8.146
>Above university level				
Working status				
Not working **	.646	.864	.463	1.612
Working				

(*) *P* value<0.001, **reference group

with the educational level of respondents (high in postgraduate), and with working women. The source of information for women was statistically significant in relation to the level of knowledge where more correct answers were reported from those received information from Mass media, followed by physicians, academic study, lastly friends.

To study factors affecting the OP knowledge level among the studied women, a Binary logistic regression was conducted with the following predictor variables: age, marital status, Number of children, education and working status. results showed that the overall regression model was significant X^2 (5,N=414)=41.87, *p* value <0.001, educational level was the only significant predictor, as having above university educational level associated with significant increase in the OP knowledge score (AOR=4.591. 95% CI (2.587-8.146), *p* value<0.001).

Discussion

The total number of women responding to the online questionnaire was 414 adult women living in Cairo with mean age of 35.6 ± 10.6 (18.0 – 85.0), most of them were married (67.1%), about half of them had university education (51%), and most of them were working (66.7%).

In the current research, all the women studied reported having previous knowledge of OP, this result was almost similar to what was described in other previous studies conducted among adult women in Alexandria, Egypt (95.1%), and another study in Canada (93%),^{17,18} this similarity could be due to the fact that over half of the woman studied in these studies had university education. Contrarily, our finding was higher than previously observed in a population-based study held outin Singapore and another in rural Turkish regions as OP awareness among the studied women were (57.9% and 60.8%, respectively).^{19,20}

The predominant source of OP information was mass media asit is reported by nearly half (48%) of the womensurveyed,

while physicians were stated to be a source of information by only (21.3%). This result exposed a gap in the role of physicians in health education in our society and raising awareness. Such results were consistent with a survey conducted among adult women in Saudi Arabia, Canada, American and Egypt^{3,4,21,22} where the mass media was the primary source of knowledge in (55.5%, 70%, 55% and 34% respectively) of the studied women.

Our study explored adult women's level of knowledge using valid and consistent OKAT questionnaires with strong psychometric properties, as it covers the core knowledge about osteoporosis.^{23,24} Results of various OKAT items showed that the most frequently correct answer (90.6%) was about the item "Osteoporosis leads to an increased risk of bone fractures" this result was almost close with what was stated in another study performed in Saudi Arabia where 95% of the woman studied correctly answered this question¹² and lower than what was reported in a study conducted among young female in Egypt as 50% of the participants mentioned that OP increased the risk of bone fractures, this dissimilarity could be due to that differences in age and educational level between the two studies.²² On the other hand, the most frequent incorrect answer (79.5%) was about the item "Osteoporosis usually causes symptoms (e.g., pain) before fractures occur", and this result was higher than what reported in previous studies in Egypt (33%), Saudi Arabia (32.4%).^{22, 24}

As noted in the current study results, several items received "don't know" answer from the women surveyed, where the response levels for this response ranged from 32.6% to 65.2%; and these items were "Alcohol in moderation has little effect on osteoporosis, Family history of osteoporosis strongly predisposes a

person to osteoporosis, high amount of bone loss in the 10 years following the onset of menopause, Cigarette smoking can contribute to osteoporosis, Hormone therapy prevents further bone loss at any age after menopause, There are no effective treatments for osteoporosis available, A high salt intake is a risk factor for osteoporosis, White women are at highest risk of fracture as compared to other race" most of these items mentioned as unknown by other studies conducted in Saudi Arabia and Egypt,^{22,24} this indicated that women with different age, educational level and residency are in essential need for improving their awareness about OP risk factors and the design of materials for health education should stress those items. Regarding the total OKAT score and percentage, the results revealed moderate average of OP knowledge (score = 10.5 ± 3.4 , percentage = 52.3 ± 17.1). This result was close to results of previous studies carried out in Alexandria governorate, Egypt (score = 11.3 ± 3.6),¹⁸ Mansoura, the capital of Dakahlia governorate, Egypt (10.8 ± 3.52),²⁵ another two studies in Saudi Arabia where the mean score percentage in one of these studies was (percentage = 53.4 ± 16.6)¹³ and the other study the mean score was (10.4 ± 3.2)²⁴. On the other hand, the current score result was higher than the score percentage recorded in a study held out among young college women in Riyadh, KSA as the total score percentage was (45.04 ± 14.1)¹² and another study conducted at Zagazig District Egypt as results showed that adult women awareness about risk factors and preventative measures was very low, with about one-third having unsatisfactory levels of awareness,⁶ and was lower than that reported in another study among Turkish women as the percentage of total score was (63.1 ± 18.7).¹⁴ This disparity may be explained by differences in age and

educational characteristics of the studied women.

The objective of this study was to evaluate the relationship between the various socio-demographic characteristics of the women surveyed and their total OKAT score. Our study results revealed that, good knowledge level was positively associated with highly educated and worked women, in agreement with previous studies among adult women in Alexandria and Mansoura governorates Egypt,^{18,24} and in Saudi Arabia.¹⁵ These results could be linked to the fact that women who are highly educated and working are more competent to have easier and better access to high quality medical information than the women who are less educated. Furthermore, the regression analysis revealed that above university educational level associated with significant increase in OKAT total score.

Our analysis showed that women's information source was statistically significant associated with their knowledge level where more correct answers were stated from those received information from mass media, followed by physicians, academic study, lastly friends. This finding is a strong starting point for comprehensive health education initiatives across mass media that adopted by the health sectors and planned based on evidence-based research, this will have a significant impact on raising understanding of OP and helping to reduce morbidity and mortality from it. Comparing our findings with other studies findings revealed disagreement between it and what was reported in another study undertaken among young college women in Saudi Arabia¹² as information sources was not associated with the OKAT score. This difference could be attributed to that the last-mentioned study carried out among a group of women similar in their age and educational level; however, in our

study, women have variation in their socio-demographic characteristics.

Conclusion and recommendations:

There was poor knowledge of osteoporosis among adult females studied in Cairo. Developing successful health education campaigns may be useful in increasing awareness about osteoporosis and its risk factors; thus, adopting healthy behaviors that avoid or reduce bone loss.

Limitations:

The research was performed only on volunteer adult women living in Cairo who accept filling out the online questionnaire; therefore, the results are not generalizable for all adult Egyptian women. Hence, further studies should be performed using a randomized sampling approach involving a large sample of adult women from various Governorates.

Consent for publication

“Not applicable”

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Disclosure statement

The authors announce that they do not have competing interests.

Data Availability Statement

The data sets that were created and examined during the current study are available on request from the corresponding author.

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