

## Knowledge and Awareness about Risk Factors of Osteoporosis among Young College Women at a University in Riyadh, KSA

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### Abstract

**Objectives:** To measure the knowledge and awareness about risk factors of osteoporosis among young females in King Abdullah Female City at Al-Imam Mohammed ibn Saud Islamic University.

**Methods:** This was cross-sectional study based on the self-administered questionnaire. Osteoporosis Knowledge Assessment Tool (OKAT) was used for data collection, OKAT will assess the understanding of symptoms and risk of fractures, knowledge of risk factors for osteoporosis and the preventive factors such as physical activity, diet and treatment availability. The study participants were all female students at Al-Imam Mohammed ibn Saud Islamic University which was 39774 until the academic year of 2017-2018.

**Results:** Participants knowledge about osteoporosis found 79.4% of the 1012 subjects questioned did not have sufficient amount of knowledge about the disease. Our study explored the possible impact of sufficient knowledge and awareness in preventing the occurrence of osteoporosis in young Saudi female college students, using OKAT with cut-off score less than 60%.

**Conclusion:** According to OKAT, young Saudi female college students do not have sufficient amount of knowledge about osteoporosis, which plays a major role in preventing the disease, therefore, an effort should be made to promote health awareness regarding osteoporosis.

**Keywords** Osteoporosis; Orthopedic; Physical activity

### Background

Osteoporosis is a common health problem in the world that can reflect on the individuals' lifestyle. It is a progressive disorder of the skeletal system characterized by bone fragility due to the decrease in bone mineral density that compromises bone strength and increases the susceptibility to fractures. [1] According to the National Osteoporosis Foundation, 50% of white women and 20% of men had a fracture related to osteoporosis in their lifetime, and its risk increases with age [2].

The risk factors for osteoporosis are Excessive alcohol intake (>4 drinks per day for men; >2 drinks per day for women), caffeine intake (>2.5 units [e.g., cups of coffee] per day), and tobacco use (any smoking), Family history of osteoporotic fracture, Gonadal hormone deficiency, Immobilization and inadequate activity, Increasing age, Low body weight (< 58 kg [128 lb]), Low calcium or vitamin D intake, Low level of physical activity, Personal history of fracture, and White or Asian race [3].

The management of osteoporotic complications may consume a huge portion of a nation's health-care resources in the future as the number of females represents half of the population. The fundamental requirement for managing any health disorder begins with the assessment of the existing awareness of the disorder within the target

subjects residing in a region. Knowledge and awareness about the risk factors for osteoporosis are important for the prevention and management of the disease as there is evidence suggesting that knowledge and awareness is a contributor to osteoporosis prevention [4]. Also, healthy behaviors and lifestyle are associated with decreased risk of osteoporosis and its fracture risk as many studies suggested [4].

In Saudi Arabia bone health is becoming a major issue with a high prevalence of osteoporosis, as an analysis showed that 34% of healthy Saudi women and 30.7% of men, 50-79 years of age are osteoporotic, and the prevalence is expected to increase as the life expectancy in the kingdom is increased [5]. To assess the knowledge and awareness of osteoporosis among young females in King Abdullah Female City at Al-Imam Mohammed Ibn Saud Islamic University, we conducted the current study with a standard questionnaire-Osteoporosis Knowledge Assessment Tool (OKAT). In this study, we attempted to find out the connection between several components of the OKAT that are indicators of knowledge and awareness of osteoporosis. By this means, we attempted to evaluate whether there are any variations in the knowledge and awareness level of young females in King Abdullah Female City from different colleges who were aware or not aware, expecting to evaluate that women who were aware may have better knowledge and awareness than women who were not aware.

## Methods

This was cross-sectional study based on the self-administered questionnaire. Osteoporosis Knowledge Assessment Tool (OKAT) was used for data collection, OKAT will assess the understanding of symptoms and risk of fractures, knowledge of risk factors for osteoporosis and the preventive factors such as physical activity and diet, and treatment availability.

The inclusion criteria for the study participants were all female students at Al-Imam Mohammed ibn Saud Islamic University which was 39774 until the academic year of 2017-2018, People from outside the university or missing data were excluded. The calculated sample size was 665 with a confidence interval CI=99%.

Demographic data about gender, age, marital state, and nationality were collected. Information about occupation, the collage, educational level was recorded. Also the questionnaire included questions about socio-economic state, residence, and source of knowledge

The OKAT survey is a valid measurement of knowledge of risk factors for osteoporosis, [6] it consist of 20 statements, the first 12 assess the knowledge of osteoporosis, 4 questions assess the attitude towards osteoporosis and the last 4 questions assess the preventive factors of osteoporosis. Each statement has three choices true, false, and I don't know. The OKAT survey was translated into Arabic language which is found to be reliable and acceptable according to Sayed-Hassan et al. [6].

Once data gathered, researchers verified the completeness of the questionnaires. Therefore, it coded, loaded, and analyzed by using SPSS \* program version (24.0). The data and returns treated by using the various statistical models to perform statistical analysis. The descriptive statistics used to compute means, variances, and STDs. It utilized T-test, Analysis of variance (ANOVA), and Mann-Whitney test tests to measure the differences between groups, where P-value less than 0.05 was considered as a significance level.

The approval of ethic and research committee of Al-Imam Mohammed ibn Saud Islamic University, college of medicine was obtained.

## Results

A total of 1012 female students participated in the study. Socio-demographic characteristics of participants were illustrated in (Table 1), where most of the participants were ranged between 18 to 30 years old (98%), and 87.1% were unmarried. 97.7% were undergraduate level distributed into 5 faculties classification, with the highest percentage from humanities faculties (49.3%), then 27.4% from Islamic and Arabic language faculties and the rest were from science, medical and preparatory programs faculties. About 67.5% were living in their own villa, with 55.2% that have less than 5000SR as monthly income.

Reliability Statistics	
Cronbach's Alpha	N of Items
0.765	20

**Table 1:** Reliability measurement test

A reliability test was performed for OKAT instrument, where number of items was 20, and Cronbach's alpha value was 0.765, which indicate that the instrument was reliable to perform such a study.

Table 2 shows that social media is the most used source of information among participant (55.4%). While other undetermined sources accounted for 22.1%, relatives as a source of information accounted for 9%, educational programs 8.2%, and least one was related to Leaflets\stickers\promotional materials sources with 5.2%.

	C	%	
Age	18 to 30 years old	992	98.00%
	More than 30 years old	20	2.00%
Social status	Married	131	12.90%
	Unmarried	881	87.10%
Educational level	Undergraduate	989	97.70%
	Postgraduate	23	2.30%
Monthly Income	Less than 5000 SR	559	55.20%
	10000 to 15000 SR	89	8.80%
	More than 15000 SR	63	6.20%
	I do not know	301	29.70%
Accommodation	Rented Apartment	130	12.80%
	Own Apartment	58	5.70%
	Rented Villa	94	9.30%
	Own Villa	683	67.50%
	Other	47	4.60%
Faculty	Preparatory programs	105	10.40%
	Science	87	8.60%
	Medical	44	4.30%
	Humanities	499	49.30%
	Islamic and Arabic language	277	27.40%

**Table 2:** Socio-demographic characteristics of participants (n=1012).

Table 3, shows the results of OKAT. In item 1: 95.4% of participants answered correctly concerning that osteoporosis increases the risk of fractures. And in item 2: It seems that only 6.1% of participants answered correctly regarding symptoms of osteoporosis and its occurrence before causing fractures.

	C	%
Relative with osteoporosis	91	9.00%
Educational programs	83	8.20%
Leaflets/stickers/ promotional materials	53	5.20%
Social websites	561	55.40%
Others	224	22.10%

**Table 3:** Participants source of information about Osteoporosis (n=1012).

Furthermore, Item 3: Knowledge about peak bone mass level and we found that only 37.4% answered correctly. Item 4: Concerning men being more at risk of being affected by osteoporosis only 56.2% answered correctly.

Item 5: cigarette smoking and its contribution in increasing the risk of osteoporosis, 58.1% answered correctly.

Regarding item 6: that white women have a higher risk of fractures, only 17% answered correctly.

While knowledge results showed that 50.1% and 77% of participants answered correctly that item 7: falls are just as important as low bone strength in causing fractures, and item 8: the majority of women have osteoporosis disease with age greater than 80 years, respectively.

However, 28% answered correctly in item 9: about women whom age is 50 are expected to have at least one fracture before they die, and in item 10: only 17% correctly think that not all types of physical activity are beneficial for osteoporosis disease. On the other hand, participants answered correctly with only 32% regarding item 11: easiness to tell whether participant at risk of osteoporosis disease by clinical risk factors and 50% of the participants answered correctly item 12: that family history of osteoporosis strongly predisposes a person to osteoporosis disease.

Items 13-15: Regarding food intake and supplements questions, participants answered correctly with 68.1%, 57.3%, and 58.2% that adequate calcium intake can be achieved by drinking two glasses of

milk a day, Sardines and broccoli are good sources of calcium for people who are not able to have dairy products and the fact that calcium supplements alone can prevent bone loss. About item 16: 53% are aware that alcohol in moderation has little effect on osteoporosis, and in item 17: only 32.2% were aware of high salt intake being a risk factor for osteoporosis.

Items 18-19: Hormonal effect and therapy questions revealed that only 6.9% of all participants answered correctly that small amount of bone loss will not occur in the 10 years following the onset of menopause, and 23.3% are aware that hormone therapy prevents further bone loss at any age after menopause.

Finally, item 20: About participants knowledge about osteoporosis treatment effectiveness and availability in Saudi Arabia was seen in low percentage with 30.1%. Therefore, results showed the mean result for overall osteoporosis knowledge assessment test of  $9.00 \pm 2.81$  out of 20. Whereas the mean of correct answers as a percentage was 45.04% out of  $100 \pm 14.1$ , and only 20.6% from total participants scored higher than 60%.

Socio-demographic factors affecting knowledge toward osteoporosis disease were tested in (Table 4) which showed that there are no differences between age groups ( $P= 0.188$ ) and different educational levels ( $P=0.337$ ) in their knowledge toward osteoporosis disease. On the other hand, in (Table 5) no differences were noticed between social statuses (married or unmarried) in their knowledge toward osteoporosis disease ( $P= 0.154$ ).

Items	Yes		No		I do not know	
	C	%	C	%	C	%
1. Osteoporosis leads to an increased risk of bone fractures (correct answer: yes)	965	95.40%	15	1.50%	32	3.20%
2. Osteoporosis usually causes symptoms (e.g., pain) before fractures occur (correct answer: No)	807	79.70%	62	6.10%	143	14.10%
3. Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life (correct answer: yes)	378	37.40%	225	22.20%	409	40.40%
4. Osteoporosis is more common in men (correct answer: No)	66	6.50%	569	56.20%	377	37.30%
5. Cigarette smoking can contribute to osteoporosis (correct answer: yes)	588	58.10%	97	9.60%	327	32.30%
6. White women are at highest risk of fracture as compared to other races (correct answer: yes)	172	17.00%	217	21.40%	623	61.60%
7. A fall is just as important as low bone strength in causing fractures (correct answer: yes)	507	50.10%	185	18.30%	320	31.60%
8. By age 80, the majority of women have osteoporosis (correct answer: yes)	780	77.10%	67	6.60%	165	16.30%
9. From age 50, most women can expect at least one fracture before they die (correct answer: yes)	288	28.50%	371	36.70%	353	34.90%
10. Any type of physical activity is beneficial for osteoporosis (correct answer: No)	605	59.80%	177	17.50%	230	22.70%
11. It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors (correct answer: yes)	324	32.00%	129	12.70%	559	55.20%
12. Family history of osteoporosis strongly predisposes a person to osteoporosis (correct answer: yes)	506	50.00%	267	26.40%	239	23.60%

13. An adequate calcium intake can be achieved from two glasses of milk a day (correct answer: yes)	689	68.10%	159		15.70%	164	16.20%
14. Sardines and broccoli are good sources of calcium for people who cannot take dairy products (correct answer: yes)	580	57.30%	37		3.70%	395	39.00%
15. Calcium supplements alone can prevent bone loss (correct answer: No)	211	20.80%	589		58.20%	212	20.90%
16. Alcohol in moderation has little effect on osteoporosis (correct answer: yes)	536	53.00%	116		11.50%	360	35.60%
17. A high salt intake is a risk factor for osteoporosis (correct answer: yes)	326	32.20%	141		13.90%	545	53.90%
18. There is a small amount of bone loss in the 10 years following the onset of menopause (correct answer: No)	497	49.10%	70		6.90%	445	44.00%
19. Hormone therapy prevents further bone loss at any age after menopause (correct answer: yes)	236	23.30%	113		11.20%	663	65.50%
20. There are no effective treatments for osteoporosis available in "Saudi" (correct answer: No)	237	23.40%	305		30.10%	470	46.40%
Osteoporosis Knowledge Assessment Test (Mean ± STD)	9.00 out of 20 ± 2.81						
Osteoporosis Knowledge Assessment Test as % (Mean ± STD)	45.04 out of 100 ± 14.1						
Osteoporosis Knowledge Assessment Test results (based on cutoff point 60%) (C, %)	<60% correct answer			804 (79.4%)			
	≥60% correct answer			208 (20.6%)			

**Table 4:** Frequencies, percentages of participants respondents toward OKAT (n=1012).

Factors		N	Mean Rank	P-value*
Age	18 to 30 years old	992	504.79	0.188
	More than 30 years old	20	591.25	
Educational level	Undergraduate	989	505.16	0.337
	Postgraduate	23	563.98	

**Table 5:** Differences between age, and educational level groups toward OKAT (n=1012).

Factors		Mean	STD	P-value*
Social status	Married	9.33	3.03	0.154
	Unmarried	8.96	2.78	

**Table 6:** Differences between social status groups toward Okat (N=1012)

Factors		N	Mean	STD	P-value
Faculty	Preparatory programs	105	8.96	2.93	0.144
	Science	87	8.97	3.22	
	Medical	44	10.09	3.13	

	Humanities	499	8.93	2.72	
	Islamic and Arabic language	277	8.98	2.73	
Monthly income	Less than 5000 SAR	559	9.07 d	2.82	0.009
	10000 to 15000 SAR	89	9.44 d	2.58	
	More than 15000 SAR	63	9.65 d	2.62	
	I do not know	301	8.61 a, b, c	2.85	
Accommodation	Rented Apartment	130	8.41 b, c, d	3.02	0.001
	Own Apartment	58	10.29 a, c, d	2.6	
	Rented Villa	94	9.15 a, b	2.72	
	Own Villa	683	8.96 a, b	2.73	
	Other	47	9.34	3.33	
Source of information	Relative with osteoporosis	91	9.19	2.73	0.074
	Educational programs	83	9.65	2.67	
	Leaflets/stickers/ promotional materials	53	9.35	2.52	
	Social media	561	8.81	2.86	
	Others	224	9.1	2.82	

**Table 7:** Differences between faculty, monthly income, accommodation, and source of information groups toward OKAT (n=1012).

## Discussion

Our study explored the possible impact of sufficient knowledge and awareness in preventing the occurrence of osteoporosis in young Saudi female college students, using OKAT with a cut-off score of less than 60% [7]. We found 79.4% of the 1012 subjects questioned did not have a sufficient amount of knowledge about the disease. Our result is consistent with a study conducted in different regions in the Kingdom of Saudi Arabia in which 78% of the participant never heard of osteoporosis [8]. Furthermore, a study conducted in Turkey assessing the women's knowledge of osteoporosis nearly 90% of them thought they were somewhat familiar with osteoporosis regardless of the level of education [9].

Although it is known that awareness about osteoporosis is affected and positively correlated to the level of education [8]. However, our results show an insignificant difference between undergraduate and postgraduate females being at a different level of education (P value =0.337). It has been reported that increasing age is positively correlated with increasing knowledge about the disease [10]. In the present study we divided the participants into two age groups, the first is between 18 to 30 years and the second above 30 years of age. Our results show that age is not significantly related to the knowledge about osteoporosis (P value = 0.188) which is similar to what has been reported in a study conducted in Iran [11].

Regarding the level of education, a study was done in Qassim region in Saudi Arabia showed that awareness about osteoporosis is positively correlated with the level of education [10]. In our study, we divided the participants regarding the level of education into two groups, undergraduates and postgraduates, however, our study shows insignificant correlations. This finding is in line with a study that was

done by Habib Khan et al. Which states that there wasn't a significant difference between knowledge, attitude and practice of undergraduates and postgraduates [12,13].

The accommodation status was used as a proxy for the socioeconomic status of the participant and was found to be a significant variable in determining the level of awareness about osteoporosis (P value of 0.001); when comparing the middle income (those who live in rented villa or self-owned apartments) with low income (those who live in rented apartments). Those who live in an owned villa (higher income), were similar to the middle category. These results are compatible with a study was conducted in Riyadh [14] and two other studies in Greek and Iran [15,16].

Our results showed no significant correlation between students from different colleges and awareness of osteoporosis (P value of 0.144), though medical students scored higher than other students of other colleges with a mean of 10.09 which was not statistically significant.

## Conclusion

According to OKAT, young Saudi female college students do not have enough knowledge about osteoporosis, which plays a major role in preventing the disease, therefore, efforts should be made to promote health awareness regarding osteoporosis.

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