

# The Level of Knowledge, Awareness, and Practice Regarding Osteoporosis among Female Adults in Hail city, Saudi Arabia

Ahmed Mohammed Mohialdin <sup>1</sup>, Salem Hmoud Alswayda <sup>2</sup>, Hammad Yousef Alomaim <sup>3</sup>, Motab Ali Alsulaiman <sup>4</sup>, Hamoud Ali Almatrood <sup>5</sup>, Hassan Salamah Alfuhaid <sup>6</sup>, Shamekh Rshaid Alshammari <sup>7</sup>, Ibrahim Abdullah Alnais <sup>8</sup>, Othman Mohammad Alassaf <sup>9</sup>

- (1) University of Hail Faculty of Medicine Hail, Saudi Arabia  
 (2) Orthopedic Surgery Department, King Saud Medical City, Riyadh, Saudi Arabia  
 (3) Orthopedic Surgery Department King Abdulaziz Medical City National Guard Hospital, Riyadh, Saudi Arabia  
 (4) General & Laparoscopic Surgery Department King Salman Specialist Hospital Hail, Saudi Arabia  
 (5) Emergency department King Salman Specialist Hail, Saudi Arabia  
 (6) Internal Medicine Department King Salman Specialist Hospital Hail, Saudi Arabia  
 (7) General & Laparoscopic Surgery Department King Salman Specialist Hospital Hail, Saudi Arabia  
 (8) Internal medicine department, Riyadh health second cluster, Riyadh, Saudi Arabia  
 (9) Department of ophthalmology, King Khalid general hospital, Hail, Saudi Arabia

## Corresponding author:

Dr. Othman Alassaf

Ophthalmology Department, King Khalid Hospital, Hail, Saudi Arabia.

**Email:** Othman7552@gmail.com

Received: December 2023. Accepted: December 2023; Published: January 1, 2024.

Citation: Ahmed Mohammed Mohialdin et al. The Level of Knowledge, Awareness, and Practice Regarding Osteoporosis among Female Adults in Hail city, Saudi Arabia. *World Family Medicine*. December 2024; 22(1): 37-43

DOI: 10.5742/MEWFM.2024.95257005

## Abstract

This is a cross-sectional study conducted on the adult female population of Hail city. Informed consent was obtained from the participants through the electronic survey. The sample size needed to enroll was 384, estimated from the total female population of Hail city 267,113 by Raosoft sample size calculator, with a 95% confidence interval and 5% margin of error (General Authority for statistics). All Saudi females in Hail city constituted the study population. However, all non-Saudi females and males, Saudi or otherwise, were excluded from the study population. We used the Osteoporosis Knowledge Assessment Tool (OKAT) which was pre-validated, translated to Arabic, and self-answered questionnaire. The OKAT survey is a valid measurement of knowledge of risk factors for osteoporosis, (Tania M Winzenberg et al, 2003). It consists 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 do not know.

The OKAT survey was translated into Arabic language which is found to be reliable and acceptable according to Sayed-Hassan et al.

The questionnaire was distributed randomly through social media platforms during the period from March to May 2020.

**Keywords:** Knowledge, awareness, practice, osteoporosis, Saudi Arabia

## Introduction

The Textbook of Orthopedics - Fifth Edition defines Osteoporosis as “a general term referring to a state of decreased mass per unit volume of a normally mineralized bone due to loss of bone proteins. It's called a silent epidemic and usually remains undetected till the patient sustains a hip, rib or spine fracture” (Textbook of orthopedics, 2017). Osteoporosis is one of the most common orthopedic illnesses that affect postmenopausal women globally (Juliana M. Kling et al, 2014). Osteoporosis is more common in females than in males in the general population and it is estimated to affect 200 million women worldwide - approximately 10% of women aged 60, 20% of women aged 70, 40% of women aged 80 and 66% of women aged more than 90 (Kanis JA, University of Sheffield 2007).

Two categories of osteoporosis have been recognized, primary and secondary. Primary osteoporosis is the most common form of the disease and includes postmenopausal osteoporosis (type I), and senile osteoporosis (type II) (Tümay Sözen et al, 2017). The core symptoms of osteoporosis impair bone integrity. In osteoporosis, there is a long latent period prior to clinical manifestations. Most prevalent complications are fractures of vertebral bodies, ribs, proximal femur, humerus, distal radius with minimal trauma (Textbook of Orthopedics ,2017).

Many studies have been conducted worldwide and in Saudi Arabia regarding this topic, however the most recent studies in Saudi Arabia (National level, Riyadh and Jazan), have concluded that the level of knowledge regarding osteoporosis among women is sufficient. (Basim K AlHarthi, 2017; Darout IA, 2017; Alamri FA, 2015) However, none of these studies were conducted exclusively in Hail city, Saudi Arabia. The study aims to evaluate the adult female population level of knowledge, awareness and practice regarding osteoporosis in Hail city, Kingdom of Saudi Arabia.

## Methods and Materials

This is a cross-sectional study conducted on the adult female population of Hail city. Informed consent was obtained from the participants through the electronic survey. The sample size needed to enroll was 384, estimated from the total female population of Hail city 267,113 by Raosoft sample size calculator, with a 95% confidence interval and 5% margin of error (General Authority for statistics). All Saudi females in Hail city constituted the study population. However, all non-Saudi females and males, Saudi or otherwise, were excluded from the study population. We used the Osteoporosis Knowledge Assessment Tool (OKAT) which was pre-validated, translated to Arabic, and self-answered questionnaire. The OKAT survey is a valid measurement of knowledge of risk factors for osteoporosis, (Tania M Winzenberg et al, 2003). It consists 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 do not know. The OKAT survey was translated into Arabic language which is found to be reliable and acceptable according to Sayed-Hassan et al.

The questionnaire was distributed randomly through social media platforms during the period from March to May 2020. Demographical data questionnaire was added, including age, marital status, current job, and education level. Two more questions were added regarding the source of knowledge and whether they were diagnosed with osteoporosis or not. Scoring system was processed in a way that overall score less than 60% was considered to be insufficient awareness, whereas more than 60% overall score was considered as sufficient awareness. We computed the scoring system in a way that correct answers received a score of “1” whereas, wrong or ‘do not know answers’ received a score of “0”. Total scores and score percentages were computed for each participant. We used the Statistical Package for the Social Sciences (SPSS) software (version 25; IBM, Armonk, New York) to perform all the statistical analyses. Any P value less than 0.05 was considered as statistically significant.

The study acquired the ethical approval from the ethical committee at the College of Medicine, University of Hail (approval number H-2020-179). Agreement to complete the anonymized online questionnaire was accepted as willingness to participate in the study.

## Result

**Demographics of the studied participants:**

In this study, 386 females participated in completing the questionnaire. Demographic characteristics of the population were demonstrated in Table 1, in which 24.4% were in the 18 to 29 years old bracket, 43.5% were in 30 to 44 years old bracket and 30.8% were in 45-59 years old bracket, and 75.9% of the participants were married. Regarding the occupations of the participants, 41.2% were employed, 40.9% were housewives with 14.5% of the participants students. In relation to the educational level of the participants, 53.9% have bachelor's degrees while 43.8% of the sample have a high school degree or lesser education.

**Table 1: Demographic characteristics of population**

Table 1		Count, percentage
<b>AGE group</b>	18-29	94, 24.4%
	30-44	168, 43.5%
	45-59	119, 30.8%
	>60	5, 1.3%
<b>MARITAL STATUS</b>	MARRIED	293, 75.9%
	NOT MARRIED	93, 24.1%
<b>OCCUPATION</b>	EMPLOYEE	159, 41.2%
	HOUSE WIFE	158, 40.9%
	STUDENT	56, 14.5%
	OTHERS	13, 3.4%
<b>EDUCATIONAL LEVEL</b>	HIGHSCHOOL	169, 43.8%
	BACHELOR`S	208, 53.9%
	MASTER`S	9, 2.3%
<b>PREVIOUSLY DIAGNOSED WITH OSTEOPOROSIS</b>	YES	54, 14.0%
	NO	332, 86.0%

Table 2 shows that social media is the most used source of information among participants (61.7%). While doctors as a source of information accounted for 17.6%, Pamphlets, posters and other distributable informative sources accounted for 10.6%. Friends and relatives as a source of information accounted for 10.6%.

**Table 2: Sources of information**

Table 2		Count, percentage
<b>SOURCE OF INFORMATION</b>	MEDIA	238, 61.7%
	DOCTORS	68, 17.6%
	FRIENDS AND RELATIVES	39, 10.1%
	OTHERS	41, 10.6%

**Prevalence of osteoporosis among the studied participants:**

14% of the participants stated that they had been previously diagnosed with osteoporosis, and 86% of the participants reported not having nor previously being diagnosed with osteoporosis.

**The level of knowledge, awareness, and practice of osteoporosis in the studied participants:**

Table 3 illustrates the results of the OKAT assessment in this study. Regarding the first 12 statements which assess the knowledge of osteoporosis, in question 1, 96.9% of participants answered correctly Osteoporosis leads to an increased risk of bone fractures. And 8.5% of participants answered correctly in question 2 regarding symptoms of osteoporosis before a fracture occurs.

In question 3 regarding having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life we found that only 27.5% answered correctly. However, question 4 pertaining to men being more at risk of being affected by osteoporosis, 77.2% answered correctly. Question 5 identifies awareness toward cigarette smoking contribution in increasing the risk of osteoporosis and 57% answered it correctly. For question 6, that white women are at highest risk of fracture as compared to other races, only 22.3% answered correctly. Falls are just as important as low bone strength in causing fractures; 65.5% answered it correctly in question 7, and in question 8, the majority of women have osteoporosis by age 80 years old or more, 83.9% answered correctly.

However, 33.2% answered correctly in question 9 about women whose age is 50 are likely to have at least one fracture before they die, and in question 10 only 20.2% correctly believe that not any type of physical activity is advantageous for osteoporosis. Furthermore, in question 11 whether it is easy to for the participant to assess her risk of osteoporosis by clinical risk factors 58.3% of the participants answered correctly. In question 12, 49.7% of the participants answered correctly, that family history of osteoporosis greatly predisposes a person to osteoporosis.

Regarding the questions which assess the attitude towards osteoporosis, in question 13, that an adequate calcium intake can be attained by drinking two glasses of milk a day, 69.2% agreed with this statement. In question 14, that Sardines and broccoli are good sources of calcium for individuals who are not able to have dairy products, 56.2% agreed with this statement. In question 15, that calcium supplements on their own can prevent bone loss, 58.5% agreed with that statement. However, in question 16, 18.4% of the participants were aware that alcohol in moderation has little effect on osteoporosis.

In the last 4 questions that assess the preventive factors of osteoporosis, In question 17, only 35.8% were aware that elevated salt intake is a risk factor for osteoporosis. Hormonal effect and therapy questions revealed that only 15.5% of all participants answered correctly that only a minor amount of bone loss will occur in the 10 years following the onset of menopause in question 18, and in question 19, 25.6% were aware that hormone therapy can prevents additional bone loss at any age after menopause. Question 20, which asked the participant whether there are effective treatments for osteoporosis available in Saudi Arabia, a low percentage of the participants (33.4%) answered no.

The results of the OKAT demonstrated a mean score of  $9.13 \pm 2.99$  out of 20 with the mean of score as a percentage was  $45.65\% \pm 14.95\%$  and revealing that 23.1% of participants scored higher than the cut-off point (60%).

The demographic factors that might affect the knowledge toward osteoporosis were tested in Table 4, which showed that there are no significant associations between age groups and OKAT score ( $P= 0.184$ ). Moreover, we found no significant difference between educational levels ( $P=0.808$ ) in their knowledge toward osteoporosis disease. Also, we found significant association between social status (married or unmarried) and OKAT score ( $P= 0.056$ ).

However, we found a statistically significant association between the occupations of the participant and knowledge toward osteoporosis ( $P= 0.015$ ). Furthermore, differences between participants who answered yes for being previously diagnosed with osteoporosis and those who answered no weren't observed ( $P= 0.352$ ). Lastly, the source of information was not a determinant factor for osteoporosis knowledge, with no statistically significant difference between such sources in relation to osteoporosis knowledge ( $P= 0.246$ ).

Table 3: The results of OKAT assessment

Table 3		
Statement	Correct answers	Correct answer (percentage, count)
<b>The knowledge of osteoporosis</b>		
1. Osteoporosis leads to an increased risk of bone fractures.	True	96.9%, 374
2. Osteoporosis usually causes symptoms (e.g., pain) before fractures occur.	False	8.5%, 33
3. Having a higher peak bone mass at the end of childhood gives no protection against the development of osteoporosis in later life.	True	27.5%, 106
4. Osteoporosis is more common in men.	False	77.2%, 298
5. Cigarette smoking can contribute to osteoporosis.	True	57%, 220
6. White women are at highest risk of fracture as compared to other races.	True	22.3%, 86
7. A fall is just as important as low bone strength in causing fractures.	True	65.5%, 253
8. By age 80, the majority of women have osteoporosis.	True	83.9%, 324
9. From age 50, most women can expect at least one fracture before they die.	True	33.2%, 128
10. Any type of physical activity is beneficial for osteoporosis.	False	20.2%, 78
11. It is easy to tell whether I am at risk of osteoporosis by my clinical risk factors.	True	58.3%, 225
12. Family history of osteoporosis strongly predisposes a person to osteoporosis.	True	49.7%, 192
<b>Attitude towards osteoporosis</b>		
13. An adequate calcium intake can be achieved from two glasses of milk a day.	True	69.2%, 267
14. Sardines and broccoli are good sources of calcium for people who cannot take dairy products.	True	56.2%, 217
15. Calcium supplements alone can prevent bone loss.	False	58.5%, 226
16. Alcohol in moderation has little effect on osteoporosis	True	18.4%, 71
<b>The preventive factors of osteoporosis</b>		
17. A high salt intake is a risk factor for osteoporosis.	True	35.8%, 138
18. There is a small amount of bone loss in the 10 years following the onset of menopause.	False	15.5%, 60
19. Hormone therapy prevents further bone loss at any age after menopause.	True	25.6%, 99
20. There are no effective treatments for osteoporosis available in "Saudi".	False	33.4%, 129
Osteoporosis Knowledge Assessment Test (Mean $\pm$ STD)	9.13 $\pm$ 2.99	
Osteoporosis Knowledge Assessment Test as % (Mean $\pm$ STD)	45.65% $\pm$ 14.95%	
Osteoporosis Knowledge Assessment Test results based on cutoff point 60% (% , count)	Equal or more than 60%	23.1%, 83
	Less than 60%	76.9%, 297

**Table 4: Differences age, marital status, occupation, educational level, source of information and diagnosis with osteoporosis groups toward OKAT**

Table 4		SCORE			ANOVA P value
		Count	Mean	Standard Deviation	
AGE group	18-29	94	9.11	2.90	0.184
	30-44	168	8.98	3.10	
	45-59	119	9.45	2.81	
	>60	5	6.80	4.55	
MARITAL STATUS	MARRIED	293	9.29	2.87	0.056
	NOT MARRIED	93	8.61	3.30	
OCCUPATION:	EMPLOYEE	159	9.24	2.81	0.015
	HOUSE WIFE	158	9.27	3.17	
	STUDENT	56	9.02	2.90	
	OTHERS	13	6.54	2.40	
EDUCATIONAL LEVEL:	HIGHSCHOOL	169	9.04	3.19	0.808
	BACHELOR`S	208	9.19	2.82	
	MASTER`S	9	9.56	3.24	
SOURCE OF INFORMATION	MEDIA	238	9.13	3.09	0.246
	DOCTOERS	68	8.90	2.90	
	FRIENDS AND RELATIVES	39	8.69	3.12	
	OTHERS	41	9.93	2.33	
PREVIOUSLY DIAGNOSED WITH OSTEOPOROSIS	YES	54	9.48	3.39	0.352
	NO	332	9.07	2.93	

## Discussion

Our study assessed knowledge and awareness and practice regarding osteoporosis in Adult Females in Hail city, using OKAT with a cut-off score of less than 60%. The results showed that 76.9% of the participants questioned did not have a sufficient level of knowledge about the osteoporosis. Our result is consistent with a study conducted in different regions in the Kingdom of Saudi Arabia in which 79.4% of the participants did not have sufficient amount of knowledge [Alshareef SH].

In the present study, the mean OKAT score of the population was  $9.13 \pm 2.99$ . Another study conducted on Female Students at Jeddah, Saudi Arabia reported a mean OKAT score of  $9.08 \pm 2.798$ , and another study on reported a similar results of a mean score of  $9.00$  out of  $20 \pm 2.81$ , and in another study in in Al-Hassa, Saudi Arabia reported a mean score of  $8.9 \pm 2.7$  [Althobiti ESA][Alshareef SH] [Al-Otaibi HH].

In the current study, we divided the population into four age groups, the first is between 18 to 29, then 30 to 44, 45 to 59, and 60 or more years of age. We found that age did not significantly associate with the knowledge about osteoporosis (P value = 0.184). However in two of

the previous studies done in Saudi Arabia they reported that age is significantly associated with the participant's knowledge about osteoporosis [Abdulmohsen A A][ Al-Otaibi HH].

Our results show an insignificant difference between the levels of education and the overall knowledge of osteoporosis (P value =0.808). In two of the studies mentioned above, they found no significant association between education levels which is consistent with our study [Al-Otaibi HH][Alshareef SH]. However, a previous study done in Saudi Arabia conflicts with our result in which they found significant association between knowledge about osteoporosis and the level of education, but this can be debated hence the previous study in question included younger participants (school-age students)[Abdulmohsen AA].

Our study showed that the media was the most common source of information regarding osteoporosis in this study population (61.7%), which is consistent with another previous study which also shows that the most common source of awareness is also the media (55.40%) [Alshareef SH]. However, an earlier study showed that their participants acquired their knowledge mostly from relatives who have osteoporosis (65%) [AlHarthi BK].

Most of the study participants were aware of the role of smoking as a risk factor for osteoporosis. 57% acknowledged that it could lead to the disease. In another study conducted among postmenopausal women in southern India, 33.4% of participants were aware of the role of smoking in osteoporosis [Asha H]. This reflects that a higher knowledge in our study population might be due to the fact that our study was conducted on a younger population.

The minority of our study participants (25.6%) answered correctly regarding hormone therapy and the fact that it prevents further bone loss after menopause. Also, the minority (33.4%) answered correctly regarding that there are effective treatments for osteoporosis available in Saudi Arabia. Another study w showed similar result where their participants answered correctly on both questions which were 23.30% and 23.40%, respectively [Alshareef SH]. This highlights the need for educational intervention regarding osteoporosis, particularly the treatment.

## Conclusion

It can be concluded Saudi female hail residents do not have enough knowledge about osteoporosis, which plays a major role in preventing the disease. Therefore there is a need to raise the awareness and knowledge of osteoporosis and its prevention measures in order to reduce the burden of disease on the community, as osteoporosis is a preventable disease.

## References

1. Abdulmohsen A A. Awareness of Osteoporosis Among Saudi Population In Saudi Arabia Especially Qassim Region [Internet]. Academia.edu. [cited 2021Jan3]. Available from: [https://www.academia.edu/34347568/AWARENESS\\_OF\\_OSTEOPOROSIS\\_AMONG\\_SAUDI\\_POPULATION\\_IN\\_SAUDI\\_ARABIA\\_ESPECIALLY\\_QASSIM\\_REGION](https://www.academia.edu/34347568/AWARENESS_OF_OSTEOPOROSIS_AMONG_SAUDI_POPULATION_IN_SAUDI_ARABIA_ESPECIALLY_QASSIM_REGION)
2. Alamri FA, Saeedi MY, Mohamed A, Barzanii A, Aldayel M, Ibrahim AK. Knowledge, attitude, and practice of osteoporosis among Saudis. *Journal of the Egyptian Public Health Association*. 2015;90(4):171–7.
3. Al-Otaibi HH. Osteoporosis Health Beliefs, Knowledge and Life Habits among Women in Saudi Arabia. *Open Journal of Preventive Medicine*. 2015;05(06):236–43.
4. Alshareef SH, Alwehaibi A, Alzahrani A, Fagihi A, Alkenani A, Alfentoukh M, et al. Knowledge and Awareness about Risk Factors of Osteoporosis among Young College Women at a University in Riyadh, KSA. *Journal of Bone Research*. 2018;06(02).
5. Althobiti ESA. Knowledge, Beliefs and Preventive Behaviours Regarding Osteoporosis Among Female Health Colleges' Students at King Abdulaziz University [Internet]. Available from: [https://www.researchgate.net/publication/344277666\\_Knowledge\\_Beliefs\\_and\\_Preventive\\_Behaviours\\_Regarding\\_Osteoporosis\\_Among\\_Female\\_Health\\_Colleges'\\_Students\\_at\\_King\\_Abdulaziz\\_University](https://www.researchgate.net/publication/344277666_Knowledge_Beliefs_and_Preventive_Behaviours_Regarding_Osteoporosis_Among_Female_Health_Colleges'_Students_at_King_Abdulaziz_University)
6. Asha H, Senthilraja M, Cherian K, Jebasingh F, Kapoor N, Paul T. Osteoporosis knowledge and beliefs among postmenopausal women: A cross-sectional study from a teaching hospital in southern India. *Journal of Family Medicine and Primary Care*. 2019;8(4):1374.
7. Darout IA, Alamir A, Sultana S. Osteoporosis Knowledge and Related Health Behavior among Women in Jazan Region, Kingdom of Saudi Arabia. *The Journal of Contemporary Dental Practice*. 2017;18(5):378–82.
8. Ebnezar J, John R. Osteoporosis. In: *Textbook of orthopedics*. New Delhi, : Jaypee; 2017.
9. General Authority for statistics. Demographic Research Bulletin 2016 [Internet]. 2016. Available from: <https://www.stats.gov.sa/en/852>
10. Harthi BKA, Alkhodair A, Elias AY. Assessment of Osteoporosis Knowledge among Saudi Females in Riyadh, KSA. *The Egyptian Journal of Hospital Medicine*. 2017;69(3):2088–92.
11. Kanis JA. ASSESSMENT OF OSTEOPOROSIS AT THE PRIMARY HEALTH CARE LEVEL. University of Sheffield 2007;.
12. Kling JM, Clarke BL, Sandhu NP. Osteoporosis Prevention, Screening, and Treatment: A Review. *Journal of Women's Health*. 2014;23(7):563–72.
13. Sayed-Hassan RM, Bashour HN. The reliability of the Arabic version of osteoporosis knowledge assessment tool (OKAT) and the osteoporosis health belief scale (OHBS). *BMC Research Notes*. 2013;6(1).
14. Sozen T, Ozisik L, Basaran NC. An overview and management of osteoporosis. *European Journal of Rheumatology*. 2017;4(1):46–56.
15. Winzenberg TM, Oldenburg B, Frendin S, Jones G. The design of a valid and reliable questionnaire to measure osteoporosis knowledge in women: the Osteoporosis Knowledge Assessment Tool (OKAT). *BMC Musculoskeletal Disorders*. 2003;4(1).