

Awareness of osteoporosis among medical and health-related students of Umm Al-Qura University, Saudi Arabia

To Cite:

Bakry S, Alqurashi WAH, Alasmari IAH, Fintyana MG, Albagami SNS, Alharbi YA, Alzubaidi FM, Alhayli MR, Elhefny MA. Awareness of osteoporosis among medical and health-related students of Umm Al-Qura University, Saudi Arabia. *Medical Science*, 2022, 26, ms141e2116. doi: <https://doi.org/10.54905/diss/v26i122/ms141e2116>

Authors' Affiliation:

¹Faculty of Medicine, Umm Al-Qura University, Makkah, Saudi Arabia

²Faculty of Medicine, Umm Al-Qura University, Al Qunfudah, Saudi Arabia

³Consultant of Pediatrics and Neonatal ICU, Head of pediatric department, ministry of health at South Qunfudah General hospital, Ministry of health, Kingdom of Saudi Arabia

⁴Department of Medical Genetics, Faculty of Medicine, Umm Al-Qura University, Al-Qunfudah, Saudi Arabia

ORCID

Salah Bakry <https://orcid.org/0000-0002-2389-7952>

Saad Naif Saad Albagami <https://orcid.org/0000-0002-0739-2073>

Mohamed A. Elhefny <https://orcid.org/0000-0002-1034-0354>

Peer-Review History

Received: 11 February 2022

Reviewed & Revised: 14/February/2022 to 15/April/2022

Accepted: 18 April 2022

Published: 21 April 2022

Peer-review Method

External peer-review was done through double-blind method.

URL: <https://www.discoveryjournals.org/medicallscience>



This work is licensed under a Creative Commons Attribution 4.0 International License.

Salah Bakry¹, Wael Abdullah Hamed Alqurashi¹, Ibrahim Ali Hasan Alasmari¹, Mohammad Ghazi Fintyana¹, Saad Naif Saad Albagami¹, Younis Abdulrahman Alharbi¹, Fawaz Mohammed Alzubaidi², Mohammed R Alhayli³, Mohamed A Elhefny⁴

ABSTRACT

Background: Osteoporosis still encompasses a health problem worldwide that can lead to critical complications if not managed properly. *Aim:* The current study aimed to explore the awareness and knowledge of osteoporosis among medical and health-related students of Umm Al-Qura University (UQU), Saudi Arabia. *Methodology:* A cross-sectional survey, based on a self-administered questionnaire was conducted using a google form during December 2021. All students of medical and health-related colleges of UQU were targeted in this survey to investigate their Awareness of osteoporosis. *Results:* The number of participants in this study was 351. Their mean age was 22.01 ± 1.77 years. Overall, 67% of students were males, and 33% were females. The majority were 6th-year students. College of medicine represents the highest responding among all colleges 84%. Importantly, about 94.02% of the students had good knowledge regarding osteoporosis with no significant variation among students of different colleges. *Conclusions:* Medical and health-related students of UQU had a good awareness regarding osteoporosis. However, studies targeting the non- medical students are necessary to evaluate the degree of knowledge of osteoporosis in order to ensure early recognizing and prevention of its serious consequences.

Keywords: Osteoporosis, knowledge, awareness, medical and health-related students, Saudi Arabia

1. INTRODUCTION

Osteoporosis (OP) is defined as a bone disease that is described by loss of bone mass and process of weakening and deterioration of the bone tissue' microstructure, increasing the risk of fracture (Alghamdi & Mohammed, 2018; Wright et al., 2014). It is a significant health issue that present in both developed and developing countries (Alghamdi & Mohammed, 2018; Pande,

2002) and is considered the second most crucial health problem in developed countries after heart disease (Alghamdi & Mohammed, 2018; Kanis, 2007). It is among the most critical health problems with high prevalence worldwide, affecting approximately 75 million people (Shahi et al., 2019; Amin & Mukti, 2017; Bilal et al., 2017). According to some studies, osteoporosis in Saudi Arabia is stronger than in other parts of the world (Shahi et al., 2019; Sadat-Ali et al., 2012; Hassan & Hassan, 2017). However, the incidence of OP in Saudi Arabia is similar to that of high prevalence countries such as the United States and Europe (Shahi et al., 2019; El-Desouki, 2003).

Osteoporosis is a disease of skeletal system that progresses slowly and silently and causes decreased bone density and fractures (Shahi et al., 2019; Weppner & Lo, 2017). Osteoporosis-related fractures (ORFs) are significant morbidity, mortality, and expenditure (Shahi et al., 2019; Chapurlat, 2017). Many influential and uncontrollable risk factors can lead to osteoporosis. B. Especially postmenopausal vitamin D consumption, low calcium intake, female gender (Shahi et al., 2019; Edmonds et al., 2012; Ahmad et al., 2014; Abukhelaif et al., 2021). However, people with osteoporosis-related fractures lack secondary prevention of fractures (Shahi et al., 2019; Leslie et al., 2012). Primary prevention and early detection are essential factors in reducing the burden of illness (Shahi et al., 2019; Amin & Mukti, 2017). Therefore, people's awareness, attitudes, and practices regarding help significantly to primary prevention and early detection of disease (Shahi et al., 2019; Toh et al., 2015; von Hurst & Wham, 2007).

Several studies from multiple countries have noted the insufficient awareness of OP among the general population and physicians (Alghamdi & Mohammed, 2018; Shams et al., 2011; Oh et al., 2016; Hassan et al., 2021). Thus, increasing knowledge and awareness level of osteoporosis are important factors warranting better care of osteoporosis, which results in improvement of quality of life and decreased disease burden. Furthermore, a recent study showed that physicians' level of knowledge improve patient care and outcome (Alghamdi & Mohammed, 2018; Goelz et al., 2011). Consequently, health professionals and health-related students' adequate and updated knowledge of osteoporosis will be the future mediators and counselors to patient care. Accordingly, more research is required to investigate the knowledge and awareness of health-related students at Saudi's universities. Therefore, this study aimed to estimate the level of knowledge and awareness of osteoporosis among health-related students at Umm Al-Qura University.

2. METHODOLOGY AND SUBJECTS

A self-administered questionnaire was made in this cross-sectional investigation at UQU, Makkah, Saudi Arabia. The study was done out during December 2021. Ethical approval was received from UQU's research ethics committee. Random sampling was used to classify students according to their collages. Stat Calc of Open Epi software of Rollin School of Public Health, Emory University, USA (Sullivan et al., 2009) was used for sample size estimation. The least sample size to achieve a precision of 5% with a 95% confidence interval is 350.

The survey was consist of two main parts; we firstly gathering students' demography. Then, the second parts aim to assessing students' osteoporosis knowledge and awareness by closed-end questions that are driven from previous survey (Shahi et al., 2019). Modified Bloom's criteria with cut off value of 75% was utilized in estimation of the knowledge score in the second part of survey, whereas was used to classify participants' knowledge scores (Wildani et al., 2021). The SPSS software version 23 was used to in the data statistics. The frequency was computed for the categorical variables, which were then compared using the test of Chi-square, and the mean, the standard deviation was calculated for the continuous variables.

3. RESULT

A group of 351 students studying in the area of health that took part in this study. (Table 1) sets that students' gender allocation; two-thirds of the participants were male (235, 67.0 %), and only one-third were female (116, 33.0 %). The participants' mean age was 22.0 ± 1.77 years, and the 23 year –old age group was mostly represented (18.5 %) of the participants. Otherwise, the 26-year-old students were the smallest number of participants (0.6 %). All the ages are shown in (Table 1). The number of single participants (342, 97.4%) was more significant than the number of married participants. The college of medicine was the most considerable represented compared with other Colleges about (84.0 %); however, the faculty of public health and health informatics was the smallest, representing about (0.9%). Furthermore, the 6th year students were the most, they were about (97, 27.6%) but the intern students were the smallest number; they were about (22, 6.3%).

Concerning students' awareness about Osteoporosis, most of the entrants have a reasonable level of awareness (94%). The students' awareness corresponds with students' knowledge score regarding Osteoporosis, in which (94.02%) of the participants have a good degree of knowledge. Most of the entrants have no osteoporosis in the family (65%), while (35.0 %) have a positive history (Table 1).

Table 1 Demographic data

Variable	Category	Frequency n. (%)
Age (mean [SD])	(22.01 [1.77])	
Age	19	26 (7.4)
	20	61 (17.4)
	21	64 (18.2)
	22	47 (13.4)
	23	65 (18.5)
	24	64 (18.2)
	25	22 (6.3)
	26	2 (0.6)
Gender	Male	235 (67.0)
	Female	116 (33.0)
Academic year	2 nd year	74 (21.1)
	3 rd year	50 (14.2)
	4 th year	60 (17.1)
	5 th year	48 (13.7)
	6 th year	97 (27.6)
	intern	22 (6.3)
Collage	College of medicine	295 (84.0)
	College of dentistry	11 (3.1)
	College of nursing	6 (1.7)
	College of pharmacy	19 (5.4)
	college of applied medical sciences	17 (4.8)
	College of health informatics and public health	3 (0.9)
Marital status	Single	342 (97.4)
	Married	9 (2.6)
Heard about osteoporosis	Yes	330 (94.0)
	No	21 (6.0)
Family member with Osteoporosis	yes	123 (35.0)
	No	228 (65.0)

The background knowledge scores of Osteoporosis got from 19 questions; the degree of the background knowledge in each question is seen in (Table 2 and figure 1). The students' answers showed that most of them have a good awareness of Osteoporosis knowledge. Additionally, the background knowledge about Osteoporosis differs between subgroups concerning respondents' demographic data, as shown in (Table 3).

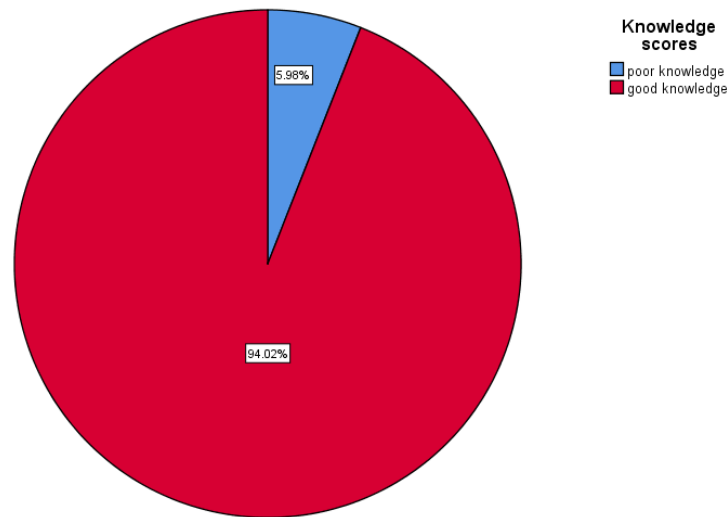


Figure 1 Participants' knowledge score

Table 2 Percentage of knowledge questions among participants

Question	True n. (%)	False n. (%)
OP results in bone fractures.	335 (95.4%)	16 (4.6%)
Symptoms before presentation	260 (74.1%)	91 (25.9%)
The relation between peak bone density in the end of childhood and the occurrence of osteoporosis.	144 (41.0%)	207 (59.0%)
Prevalence according to gender	65 (18.5%)	286 (81.5%)
Risk of smoking	281 (80.1%)	70 (19.9%)
White women are at highest risk of fracture compared to other races.	267 (76.1%)	84 (23.9%)
Risk of age	299 (85.2%)	52 (14.8%)
From age 50, most women can expect a minimal of one fracture before they die.	187 (53.3%)	164 (46.7%)
Beneficial of physical activity in osteoporosis.	190 (54.1%)	161 (45.9%)
It is easy to tell whether I am prone to having osteoporosis by my clinical risk factors.	255 (72.6%)	96 (27.4%)
Family history in osteoporosis	274 (78.1%)	77 (21.9%)
Calcium intake in osteoporosis	247 (70.4%)	104 (29.6%)

Sardines and broccoli for prevent osteoporosis	282 (80.3%)	69 (19.7%)
Calcium supplements for prevent osteoporosis	95 (27.1%)	256 (72.9%)
Alcohol in moderation has little effect on osteoporosis.	165 (47.0%)	186 (53.0%)
Risk of a high salt intake	162 (46.2%)	189 (53.8%)
There is a small amount of loss of bone in the ten years following the onset of menopause.	224 (63.8%)	127 (36.2%)
Hormone therapy in osteoporosis	252 (71.8%)	99 (28.2%)
Treatments of osteoporosis.	143 (40.7%)	208 (59.3%)

Table 3 Association between degree of awareness and Demographic data

Variable	Level of knowledge		P VALUE
	Good n. (%)	Poor n. (%)	
Age			
19	25 (96.2%)	1 (3.8%)	0.521
20	55 (90.2%)	6 (9.8%)	
21	62 (96.9%)	2 (3.1%)	
22	44 (93.6%)	3 (6.4%)	
23	63 (96.9%)	2 (3.1%)	
24	60 (93.8%)	4 (6.3%)	
25	19 (86.4%)	3 (13.6%)	
26	2 (100.0%)	0 (0.0%)	
Gender			
Male	219 (93.2%)	16 (6.8%)	0.475
Female	111 (95.7%)	5 (4.3%)	
Collage			
College of medicine	279 (94.6%)	16 (5.4%)	0.501
College of dentistry	9 (81.8%)	2 (18.2%)	
College of nursing	6 (100.0%)	0 (0.0%)	
College of pharmacy	17 (89.5%)	2 (10.5%)	
College of applied medical sciences	16 (94.1%)	1 (5.9%)	
College of health informatics and public health	3 (100.0%)	0 (0.0%)	
Marital status			
Single	322 (94.2%)	20 (5.8%)	0.430
Married	8 (88.9%)	1 (11.1%)	
Academic year			

2nd year	67 (90.5%)	7 (9.5%)	0.077
3rd year	49 (98.0%)	1 (2.0%)	
4th year	54 (90.0%)	6 (10.0%)	
5th year	46 (95.8%)	2 (4.2%)	
6th year	95 (97.9%)	2 (2.1%)	
Intern	19 (86.4%)	3 (13.6%)	

4. DISCUSSION

Osteoporosis has been among the most common disorders affecting the musculoskeletal system worldwide, and it is causing millions of fractures yearly. Good awareness about osteoporosis is among the things that helps control and prevent osteoporosis (Alghamdi & Mohammed, 2018; Sullivan et al., 2009). This study aimed to deduce the degree of knowledge among medical students in umm Al-Qura University about osteoporosis. This study has an adequate level of knowledge; however, it can be improved further. This study demonstrated that the participants mean age was 22 ± 1.77 years, which is comparable to the mean age of another Saudi study, which is an investigation has been conducted in King Faisal University among female medical students (Alghamdi & Mohammed, 2018). The current study results showed that 94.02% of the participants have good knowledge about osteoporosis, representing most of the population in this study, which is higher than what Shahi et al., (2019) reported (66.4%). On the contrary, Sarah Ali Alawi et al., (2020) showed in a study targeting the females of Saudi Arabia that 61% of the participants have a good knowledge about osteoporosis which is lower than our results. This could be interrupted by the knowledge and the education of the medical students rather than the general population (Sarah, 2020).

The current study reported that 95.4% of the respondents agreed that osteoporosis increases the tendency of bone fractures, which is similar to what Shahi et al., (2019) study reported, accounting for 98.9% (Alghamdi & Mohammed, 2018). On the contrary, Sarah Ali Alawi et al., (2020) study showed a lower percentage that accounts for 74.4%. The present study reported that 74.1% of the participants knew the symptoms that occurred before the bone fractures. In comparison, Shahi et al., (2019) study reported 64.2% of the participants, and Sarah Ali Alawi et al., (2020) study showed much lower, accounting for 55.8% of the participants.

The percentage of the participants who have good knowledge about the risk factors of osteoporosis in the study account for 72.6%, while what Shahi et al., (2019) study reported is lower, accounting for 59.1%. One of the top critical factors that may increase knowledge of the participants is osteoporosis in the family, which is accounted in the study for 35%. This may give the students a background of osteoporosis with the medical background.

Study limitations

Because the research was conducted at only one university, the findings are not representative of all Saudi Arabian universities. Furthermore, this work requires further inquiry among all Saudi Arabian health populations. Moreover, all responses are self-reported, and we lack the instruments necessary to assess the validity of the responses. Furthermore, both the nursing and public health colleges and health informatics represents the lowest responses among all colleges.

5. CONCLUSION

According to our findings, participants had a good degree of awareness and knowledge. Furthermore, there was no remarkable difference in osteoporosis awareness between students' age, gender, academic year, collages, or marital status. Furthermore, increased public and general population awareness strategies are required to preserve reliable information to identify, manage, and prevent serious consequences.

Acknowledgement

We thank the participants who contributed the samples to the study, we also thank our guides.

Ethical approval

This study was approved by UQU's research ethics committee 2021 with ethical number: (HAPO-02-K-012-2021-12-883). All procedures used in this study involving human subjects will comply with the bioethical committee of Umm Al-Qura University's ethical requirements and the 1964 Helsinki statement and its subsequent amendments.

Funding

This study has not received any external funding.

Conflicts of interest

The authors declare that there are no conflicts of interests.

Data and materials availability

All data associated with this study are present in the paper.

REFERENCES AND NOTES

- Abukhelaif AE, Alzahrani SA, Al-Thobaiti LY, Alharbi AA, Al-Shumrani KM, Alghamdi YS. Assessment level of awareness of Vitamin D deficiency among the public residents of Al-Baha region; Saudi Arabia. *Medical Science* 2021;25(116):2728-2736
- Ahmad MS, Mohamed IN, Mokhtar SA, Shuid AN. Review of the risk factor of osteoporosis in the Malaysian population. *RUMes* 2014; 3:77-82.
- Alghamdi MA, Mohammed AGA. Knowledge and Awareness of Osteoporosis among Saudi Physicians and Nurses: A Cross-Sectional Study. *Open access Macedonian J med sci* 2018; 6(5):913-6.
- Amin S, Mukti NA. Assessment of Knowledge Level on Osteoporosis among a Private University Students in Malaysia. *Imperial J Interdisciplinary Res* 2017; 3(3):141-5.
- Bilal M, Haseeb A, Merchant AZ, Rehman A, Arshad MH, Malik M, Rehman AHU, Rani P, Farhan E, Rehman TS. Knowledge, beliefs and practices regarding osteoporosis among female medical school entrants in Pakistan. *Asia Pacif family med* 2017; 16(1):1-7.
- Chapurlat RGH. Osteoporosis- ClinicalKey. In: *Endocrinology: Adult and Pediatric* 7 Aug 2017; Available From: <https://www.clinicalkey.com/> - !/content/book/3-s2.0-B978032318907100069X? scroll To=%23hl0000 534
- Danish SH, Ahmad F, Hassan F, Khan SA, Hashmi AA, Muhammad S, Ali S, Liaquat SH. Osteoporosis and its associated factors revisited: Case control study. *Pak J Med Dentist* 2014; 3(02):13.
- Edmonds E, Turner LW, Usdan SL. Osteoporosis knowledge, beliefs, and calcium intake of college students: Utilization of the health belief model. *Open J Preventive Med* 2012; 2(1):27-34.
- El-Desouki MI. Osteoporosis in postmenopausal Saudi women using dual x-ray bone densitometry. *Saudi Med J* 2003; 24(9):953-6.
- Goelz T, Wuensch A, Stubenrauch S, Ihorst G, de Figueiredo M, Bertz H, Wirsching M, Fritzsche K. Specific training program improves oncologists' palliative care communication skills in a randomized controlled trial. *J Clin Oncol* 2011; 29(25):3402-7.
- Hassan AOA, Alshammari KF, Bakrshoom YF, Alhamazani AF, Alsadun AS. Awareness of osteoporosis among general population in Ha'il city, Saudi Arabia. *Medical Science* 2021;25(109):689-695
- Hassan SSA, Hassan HS. Assessment of knowledge and practice toward osteoporosis in Riyadh, KSA. *Int J Adv Res* 2017; 5(7):2179-83.
- Kanis J. Assessment of osteoporosis at the primary health care level. WHO Collaborating Centre for Metabolic Bone Diseases. WHO Collaborating Centre for Metabolic Bone Diseases. 2007.
- Leslie W, Giangregorio L, Yogendran M, Azimae M, Morin S, Metge C, Caetano P, Lix L. A population-based analysis of the post-fracture care gap 1996-2008: the situation is not improving. *Osteopor Int* 2012; 23(5):1623-9.
- Oh SM, Song BM, Nam BH, Rhee Y, Moon SH, Kim DY, Kang DR, Kim HC. Development and validation of osteoporosis risk-assessment model for Korean men. *Yonsei med j* 2016; 57(1):187-96.
- Pande KC. Prevalence of low bone mass in healthy Indian population. *J Indian Med Ass* 2002; 100(10):598-600, 2.
- Sadat-Ali M, Al-Habdan IM, Al-Turki HA, Azam MQ. An epidemiological analysis of the incidence of osteoporosis and osteoporosis-related fractures among the Saudi Arabian population. *Ann Saudi med* 2012; 32(6):637-641.
- Sarah Ali Alatwi, Reaasa-Awmaahah. Osteoporosis Awareness and Knowledge Assessment among Saudi Female in Saudi Arabia. *Saudi Med J Students (SMJS)* 2020; 2(1).
- Shahi U, Al-Saleh M, Bokheder M, Albattat M, Al-Ali M, Alkishi T, Alshareet M, Al Shuhayb Z, Essa A. Assessment of Knowledge Regarding Osteoporosis Among Female Medical Students at King Faisal University, Saudi Arabia. *Int Healthcare Res J* 2019; 2(10).
- Shams J, Spitzer AB, Kennelly AM, Tosi LL. Bone quality: Educational tools for patients, physicians, and educators. *Clin Orthop Relat Res* 2011; 469(8):2248-59.
- Sullivan KM, Dean A, Soe MM. OpenEpi: a web-based epidemiologic and statistical calculator for public health. *Public Health Rep* 2009; 124(3):471-4.
- Toh LS, Lai PSM, Wu DB-C, Wong KT, Low BY, Anderson C. The development and validation of the Osteoporosis Prevention and Awareness Tool (OPAAT) in Malaysia. *PloS one* 2015; 10(5):e0124553.

23. Von Hurst PR, Wham CA. Attitudes and knowledge about osteoporosis risk prevention: a survey of New Zealand women. *Public Health Nutri* 2007; 10(7):747-3.
24. Weppner DAR, Lo P. Osteoporosis- Clinical Key. In: Ferri's Clinical Advisor 2018 7 Aug 2017, Available from: <https://www.clinicalkey.com/-!/content/book /3-s2 .0-B9780323280495005754>.
25. WHO. Assessment of osteoporosis at the primary health care level. Summary Report of a WHO Scientific Group. 2007. Geneva: World Health Organization.
26. Wildani MM, Triatmono VR, Yo EC, Yosia M, Wahidiyat PA. Study protocol for a cross-sectional study on knowledge, attitude, and practice towards thalassemia among Indonesian youth. *medRxiv* 2021; 11: 21255264.
27. Wright NC, Looker AC, Saag KG, Curtis JR, Delzell ES, Randall S, Dawson-Hughes B. The recent prevalence of osteoporosis and low bone mass in the United States based on bone mineral density at the femoral neck or lumbar spine. *J bone mineral res* 2014; 29(11):2520-6.