

Knowledge, attitude, and practices toward osteoporosis among Jordanian nurses



Original Article

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Received: 26 September 2022; Accepted: 21 December 2022; Published: 20 September 2023

Abstract: **Objective:** To identify the level of knowledge, attitude, and practice (KAP) toward osteoporosis among Jordanian nurses.

Methods: A cross-sectional design was adopted in this study. A convenience sample of 443 Jordanian nurses were recruited from the public and private healthcare settings in Jordan. The assessment tool used in the current study contained 35 items, measuring KAP among Jordanian nurses toward osteoporosis. The correlation Pearson test and regression test were used to analyze data using Statistical Package for Social Sciences, version 21.

Results: The total KAP scores were 33.53, 37.65, and 22.7, respectively. These results revealed that Jordanian nurses have a moderate level of KAP toward osteoporosis.

Conclusions: Jordanian nurses showed a moderate KAP toward osteoporosis, which should be improved as an effective step to reducing the growing incidences of osteoporosis. The lack of KAP holds a serious and growing impact on the Jordanian health sector and patients' health in terms of cost, healthcare resources, and social life. Nurses can play a valuable role in educating patients on bone fracture causes, perceived percentage, risks, and prevention, as well as in helping them with nutrition and lifestyle recommendations.

Keywords: knowledge • attitude • practice • osteoporosis • health belief model

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1. Introduction

Osteoporosis is a chronic bone disease that affects many people. It reduces bone density and strength, making patients prone to skeletal fracture, especially in the hip, wrist, and spine.¹ It is also known as “the silent thief” as it affects people without showing any symptoms until a fracture occurs. Besides, osteoporosis can occur when osteoblasts increase bone resorption, rather than bone production.² To date, studies have found no cure yet.³

According to the World Health Organization (WHO), osteoporosis causes 8.9 million fractures per year, with a fracture occurring every 3 s. One in every 3 women and 1 in every 5 men worldwide have osteoporosis, indicating that women are much more likely to develop osteoporosis than men due to hormonal changes.⁴ Besides that, osteoporosis is considered the second leading cause of disability, affecting approximately 1.7 billion people worldwide, which had increased around

How to cite this article: Zaid A, Eyad AA, Hamzeh AN. Knowledge, attitude, and practices toward osteoporosis among Jordanian nurses. *Front Nurs.* 2023;3:327–334.

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45% between 1990 and 2010.⁵ Regionally, in the Middle East and North Africa, the prevalence of osteoporosis ranges from 10.3% to 30%.⁶ In Jordan, the prevalence of osteoporosis ranges from 13% to 44%.⁷ According to the Jordanian Osteoporosis Prevention Society (JOPS), osteoporosis is one of Jordan's major health problems.⁷ Moreover, it was found that around 1008 hip fractures occur per year, and this number is expected to quadruple by 2050.⁷

Nurses are the first-line forces in the management of such chronic diseases through health education and promotion provided for patients about its evaluation and management at early stages. However, previous studies have showed that most nurses have low levels of knowledge and awareness in regard to osteoporosis.¹ Nurses need to be more involved in planning the care of osteoporosis patients including screening, assessing patients' knowledge, and providing proper education about osteoporosis such as dietary intake and lifestyle modifications.⁸

In Jordan, knowledge, attitude, and practice (KAP) data toward osteoporosis are not adequate. There have been no enough records of these data, and until recently, there was no known guideline to direct nurses in dealing with high-risk and osteoporosis patients. Nurses' inadequate knowledge, attitude, and practice could impact the prevalence of osteoporosis within the Jordanian community. Hence, it is necessary to shed light on the importance of exploring and examining nurses' KAP toward osteoporosis management and prevention, making this study the first of its kind in Jordan. This study aimed to identify the level of KAP toward osteoporosis among Jordanian nurses.

2. Methods

2.1. Study design

In this study, a cross-sectional design was utilized. The information was gathered from various locations in Jordan, including nurses at all educational levels working in major Jordanian public and private hospitals. The inclusion criteria for this study were as follows: registered or licensed nurses currently working in either a private or a public hospital with a minimum of 1 year of professional nursing experience. Nurses with <1 year of experience in nursing practice were excluded from the study.

To calculate the sample size, the confidence level was set at 95%, and a variance value was set at 0.5 to ensure that sample is large enough.⁹ Epi Info, a free software package developed by the United States of America Centers for Disease Control (CDC), was

used for determining the final sample size.¹⁰ The study needed 384 participants. However, the overall number of participants in this study was 443 Jordanian nurses.

2.2. Research gathering tool

This study's data gathering tool was initially developed by Nabilah Ramli, who conducted a previous study exploring KAP among Malaysian medical, allied students. It is worth noting that experts tested the questionnaire's content and face validity in the original Malaysian study in 2018.¹¹ A self-administered questionnaire in English language was circulated among Jordanian nurses electronically containing approval for participation before filling the questionnaire. Part 1 of the questionnaire contains sociodemographic details such as gender, age, length of experience, job title, and qualification. Participants were also asked if they had taken any osteoporosis classes or services at their university.

Part 2 of the questionnaire was designed to measure osteoporosis knowledge among participants through 15 questions on general knowledge about osteoporosis. Answer choices for this section were varied between true, false, and do not know, with a maximum score of 45.¹¹ Part 3 of the questionnaire included 11 questions on a Likert scale, which measure participants' attitudes that prescribe their beliefs and expectations of being affected by osteoporosis, in addition to questions on the compliance and commitment regarding osteoporosis prevention. Scores for this part ranged from (1) strongly disagree to (5) strongly agree, with a maximum score of 55.¹¹ Part 4 included 9 questions using a Likert scale, measuring participants' practice and describing their habitual and daily activities, such as diet and exercise, and their effect on developing and preventing osteoporosis. Scores were ranged from (1) never to (4) everyday, with a maximum score of 36.

2.3. Ethical considerations

This study was approved by the Ethics Committee of the Ministry of Health (MOH) of Jordan (reference number MBA/IRB/11479).

All participating hospitals provided approval to conduct this study. The researcher arranged online meetings with the nursing directors of the participating hospitals to explain the purpose of the study and the data collection process to them. An information sheet explaining the purpose of the study, implications for participation, potential risks and benefits involved, and measures to ensure their confidentiality was provided to the participants. All participants consented to participate in this study.

2.4. Data collection

Nurses who agreed to participate in the study were provided with an electronic link of the questionnaire, through the central administrative team at the selected hospitals. Anonymity and confidentiality were assured throughout the questionnaire. The data were collected and gathered electronically due to Corona Virus Disease 2019 (COVID-19) restrictions and social distancing in Jordan.

2.5. Data analysis

The collected data were reviewed for completeness, and the responses of the participants were coded and entered into an Excel sheet version 2016, which was then exported to SPSS version 22 for review.¹² Descriptive figures were used to interpret demographic variables. To summarize and explain quantitative variables, mean values, standard deviation (SD), frequencies, and percentages were also used. Furthermore, correlation and regression tests were used to assess the relation-ship between the variables of interest in this study.

3. Results

3.1. Demographic data and overall KAP

Four hundred forty-three Jordanian nurses from public and private hospitals completed the study questionnaire. Table 1 illustrates the sociodemographic characteristics of the participants. There were 233 (52.6%) male participants and 210 (47.4%) female participants. The mean age of the participants was 30.72 years (SD = 5.99), ranging from 19 to 55 years. Among the participants, 334 (75.4%) were direct care registered nurses, 326 (73.6%) had a clinical experience of 10 years and less, and only 106 (23.9%) were trained on osteoporosis (Table 1).

The overall mean score on self-reporting knowledge of osteoporosis was 33.53, suggesting a moderate degree of knowledge. Item 2 "Osteoporosis can increase the risk of fractures" (M = 2.94, SD = 0.31) had the highest mean score, followed by item 1 "Osteoporosis is more common in women" (M = 2.90, SD = 0.35) (Table 2).

The overall mean score reported for attitude toward osteoporosis among Jordanian nurses was 37.65, indicating a moderate degree. Item 8 "I believe that healthy food can prevent osteoporosis" (M = 4.23, SD = 0.96) and item 7 "I believe that vitamin D supplements are good for maintaining my bone health" (M = 4.22, SD = 0.98) had the highest mean scores, while item 1 "I have a high chance of developing osteoporosis" (M = 2.77, SD = 1.20) and

item 2 "If my parents had weak bones, I will too" (M = 2.76, SD = 1.25) (Table 3) had the lowest mean scores.

The total mean score for self-reported practices toward osteoporosis was 22.57, revealing a moderate degree of practice toward osteoporosis. Item 1 "Do you take vegetables in your diet?" (M = 3.29, SD = 0.77) and item 2 "Do you take fruit in your diet?" (M = 3.06, SD = 0.78) had the highest mean scores, while item 3 "Do you take vitamin D supplements?" (M = 2.18, SD = 0.99) and item 7 "Do you drink alcohol?" (M = 1.27, SD = 0.70) (Table 4) had the lowest mean scores.

3.2. Summary of KAP scores

Table 5 summarizes the frequency of the total scores of KAP among Jordanian nurses toward osteoporosis. It was found that 83.97% of the participants had a moderate level of knowledge about osteoporosis, 9.03% had a good level of knowledge, and only 7% had a poor level of knowledge. On the other hand, 58.47% of the participants showed a moderate level of attitude toward osteoporosis, 19.69% had a good level of attitude, and

Variable	Number and percentage (n, %)
<i>Gender</i>	
Male	233 (52.6)
Female	210 (47.4)
<i>Experience(years)</i>	
<5	147 (33.2)
5–10	179 (40.4)
10–15	69 (15.6)
15–20	30 (6.8)
>20	18 (4.1)
<i>Job title</i>	
L.P.N	40 (9)
R.N	334 (75.4)
Charge nurse	17 (3.8)
Head nurse	20 (4.5)
Manager	32 (7.2)
<i>Qualification</i>	
Diploma	41 (9.3)
B.S.N	327 (73.8)
MS	69 (15.6)
PHD	6 (1.4)
<i>Training program</i>	
No	337 (76.1)
Yes	106 (23.9)

Table 1. Frequency, percentage, means (SD), and range for categorical demographic variables, N = 443.

No.	Item	Mean (SD)
1	Osteoporosis is more common in women	2.90 (0.3)
2	Osteoporosis can lead to an increase risk of fractures	2.94 (0.3)
3	Osteoporosis is more common in elderly	2.81 (0.5)
4	A sedentary lifestyle increases the risk of getting osteoporosis	2.68 (0.6)
5	Asians are at greater risk of getting osteoporosis	2.27 (0.6)
6	Smoking can lead to osteoporosis	2.40 (0.8)
7	Most people gain bone mass after the age of 30	1.82 (0.8)
8	Walking has great effects toward bone health status	2.79 (0.5)
9	Measurement of bone mineral density (BMD) is used to diagnose osteoporosis	2.74 (0.5)
10	The most important time to build bone strength is at the age of 17	2.21 (0.8)
11	Osteoporosis can lead to blindness	1.61 (0.7)
12	Lifetime intake of calcium and vitamin D does not reduce the risk of osteoporosis	1.58 (0.8)
13	Only overweight adults get osteoporosis	1.29 (0.6)
14	Hormone replacing therapy cannot slow down the progression of bone loss	1.83 (0.8)
15	Osteoporosis also is known as osteoarthritis	1.60 (0.8)
Total of mean		33.53

Table 2. Knowledge level regarding osteoporosis among Jordanian nurses, N = 443.

21.90% showed a poor level of attitude. Finally, 55.98% of the Jordanian nurses showed a moderate level of practice, 40.41% showed a poor level, and 3.61% showed a good level of practice toward osteoporosis. In conclusion, the participants were found to have an overall moderate level of KAP toward osteoporosis (Table 5).

3.3. Association between Jordanian nurses KAP and demographic data

The association between the Jordanian nurses' knowledge score and their demographic variables including age, experience, qualification, employment, and training program was examined. The findings showed that knowledge was not significantly correlated with age, experience, qualification, or job. The training program variable,

No.	Item	Mean (SD)
1	I have a high chance of developing osteoporosis	2.77 (1.20)
2	If my parents had weak bones, I will too.	2.76 (1.25)
3	I would willingly go for the checking of osteoporosis.	3.43 (1.19)
4	I would go for medical counselling to prevent bone fractures	3.43 (1.25)
5	The thought of having osteoporosis scares me.	3.20 (1.32)
6	If I had osteoporosis, I would be crippled	2.90 (1.13)
7	I believe that vitamin D supplements are good for maintaining my bone health.	4.22 (0.98)
8	I believe that healthy food can prevent osteoporosis.	4.23 (0.96)
9	When I think about osteoporosis, I will get stressed.	3.21 (1.29)
10	I can do exercises at least three times a week.	3.65 (1.21)
11	I can do exercise for about 20 to 30 min.	3.81 (1.19)
Grand mean		37.65

Table 3. Attitude level regarding osteoporosis among Jordanian nurses, N = 443.

No.	Item	Mean (SD)
1	Do you take vegetables in your diet?	3.29 (0.77)
2	Do you take fruit in your diet?	3.06 (0.78)
3	Do you take vitamin supplements?	2.18 (0.99)
4	Do you drink milk?	2.55 (0.98)
5	Do you eat a well -balanced diet according to the food pyramid?	2.63 (0.85)
6	Do you smoke?	2.23 (1.33)
7	Do you drink alcohol?	1.27 (0.70)
8	Do you spend an average of 15 min per day outside in the sunlight?	2.72 (0.92)
9	Do you exercise for at least 20 min?	2.60 (0.97)
Total of mean		22.7

Table 4. Practice level regarding osteoporosis among Jordanian nurses, N = 443.

Category	Good	Moderate	Poor
Knowledge	40 (9.03%)	372 (83.97%)	31 (7%)
Attitude	87 (19.69%)	259 (58.47%)	97 (21.90%)
Practice	16 (3.61%)	248 (55.98%)	179 (40.41%)

Table 5. Summary of total scores of knowledge, attitude, and practice toward osteoporosis among Jordanian nurses, N = 443 (n, %).

on the other hand, had a statistically significant association with the knowledge score ($r(441) = 0.23$, $P < 0.05$).

This research also analyzed the association between the total attitude score and demographic

variables including age, experience, qualification, job, and training program. The findings showed that attitude was not significantly associated with age, qualification, job, and training program; however, there was a statistically significant difference in the experience variable ($r(441) = 0.10$, $P \leq 0.05$). None of these demographic factors, however, were found to be significantly associated with practice.

Predictor variables of KAP toward osteoporosis were examined. The only predictor variable for the knowledge part was the training program. The variance accounted for $R^2 = 0.054$ (adjusted $R^2 = 0.047$), and it was significant with $F = 8.307$, $P \leq 0.05$. As for attitude, the results indicated that only experience was a significant predictor variable for attitude ($R = 0.103$, $R^2 = 0.011$). None of the demographic variables was found to be a significant predictor for practices regarding osteoporosis.

4. Discussion

This study has focused on the Jordanian nurses' knowledge, attitudes, and practices about osteoporosis, examined their association with demographical variables, and predicting variables. The findings showed that Jordanian nurses have a moderate knowledge, attitude, and practices toward osteoporosis, and the variable osteoporosis training program has an impact on the Jordanian nurses' knowledge, while the variable experience plays a positive role in the Jordanian nurses' attitudes.

It is important to recognize osteoporosis as a global chronic disease because its rate continues to rise and also because the frequency of bone disease is anticipated to increase with the growth of the elderly population. Osteoporosis has negative impacts on patients and their families, as well as the healthcare sector. The cost of its treatment is also increasing along with the social burden. Moreover, osteoporosis may lead to psychological consequences and other serious illnesses. Hence, this requires more qualified health personnel, institutions, and equipment for early diagnosis and appropriate treatment to decrease the damaging impact of bone disease and other chronic diseases.

In this study, many of the Jordanian nurses recognized that osteoporosis can increase the risk of fractures and that it is more common in women than in men. On the other hand, many of them were not aware that calcium and vitamin D intake do not reduce the risk of osteoporosis. At the same time, most of them believed that only overweight adults are affected by osteoporosis. As a result, the study showed that most Jordanian nurses have a moderate level of knowledge of osteoporosis. Simultaneously, they lacked knowledge related to calcium and vitamin D benefits. This lack of knowledge

toward osteoporosis will dramatically affect patients' health and condition, leading to severe complications in some cases. Moreover, the cost of bone disease treatment is expensive, adding significantly to the burden on healthcare systems.

It was evident from this study that many Jordanian nurses believe that healthy food can prevent osteoporosis and that vitamin D supplements are good for maintaining bone health. The findings revealed that most Jordanian nurses have moderate levels of attitude toward osteoporosis, indicating that they did not perceive osteoporosis's susceptibility. This also shows the lack of compliance to performing annual check-ups when the susceptibility for osteoporosis exists.

A low level of attitude among Jordanian nurses will negatively affect patients as they lack the proper information to educate patients about the necessary habits and daily activities to treat and prevent osteoporosis. Also, the negative attitude toward osteoporosis will eventually lead to bone fracture among nurses and patients alike.

It was evident from this study that most Jordanian nurses consume vegetables and fruits every day, while many of them do not take any vitamin D supplement but consume alcohol. The current study revealed that Jordanian nurses have a moderate level of practice toward osteoporosis, as a low vitamin D level will decrease bone density and strength and develop a sudden fracture. Furthermore, vitamin D is known as an anti-osteoporotic agent, and alcohol will affect the bone density and increase the risk of fracture.

Similarly, a study, conducted in Malaysia among allied health science students, found a poor level of practice toward osteoporosis among participants because they believed there was no osteoporosis perceived susceptibility. Moreover, it was evident that participants did not pay attention nor any concern regarding osteoporosis.¹¹ A similar study conducted in a medical college in Lahore among female medical students showed a low level of practice toward osteoporosis.¹³ By comparison, the results of another study conducted in the United Arab Emirates among medical and non-medical students showed a satisfactory level of practice among participants toward osteoporosis.¹⁴

The current study showed that there is a relationship between knowledge and training program, and also between experience and attitude. In contrast, no relation was found between sociodemographic variables and practice. Therefore, the predictor variables in this study are training programs and experience.

The next and most critical step is to develop educational programs and courses in all medical and health sectors for nurses during their orientation period and rotate them to allocated areas that are mainly concerned

about osteoporosis cases. This is a necessary step toward promoting bone health and preventing fractures, which will eventually be transferred to the general population. Nurses can make significant improvements in bone health by proactively assessing, diagnosing, and treating at-risk patients and helping them apply this knowledge in their everyday lives.

Of 443 nurses who participated in this study, only 106 had taken training courses about osteoporosis, and if all 443 nurses experienced such programs, the results would have increased considerably. Therefore, it is recommended to direct all registered nurses to a one-month rotational training program during their probation period, providing them with the necessary tools and methods of treatments and prevention in special sections with trained dedicated nurses and doctors. The gap-filling approach will be reflected effectively on the level of KAP among Jordanian nurses, thus increasing their quality levels from moderate to good, significantly contributing to patients' care and health.

4.1. Limitation

Because of the limitations imposed on Jordan as a result of the COVID-19 epidemic and the social distancing measures, the questionnaires for data collection were disseminated using online platforms, rather than personally. Furthermore, since this study used a convenience sampling approach, it was challenging to generalize the findings. In addition, a few hospitals participated in the study, which reduced the number of potential individuals we could recruit.

4.2. Recommendations

It is recommended that a similar study be re-conducted with additional registered nurses from different parts of Jordan to generate a more comprehensive picture about KAPs regarding osteoporosis. This can be accomplished by providing participants with self-administered questionnaires in both English and Arabic. In addition, a mixed method design could be used to investigate, in more depth, the Jordanian nurses' perspectives on

osteoporosis and the relevant tactics that have to be taken into consideration in the context of associated expanding training programs.

5. Conclusions

Jordanian nurses showed moderate KAPs toward osteoporosis. The lack of awareness and knowledge toward the perceived susceptibility of osteoporosis and compliance to perform annual check-ups when the susceptibility for osteoporosis exists will negatively reflect patients' status and attitude. Furthermore, the lack of osteoporosis knowledge might affect nurses' ability to educate patients about the necessary habits and daily activities and practices to treat and prevent osteoporosis and other bone fractures.

This holds a serious and growing impact on the health sector and patients' health alike regarding cost, healthcare resources, and social life. Nurses have an important role in educating patients on bone fracture causes, risks, and prevention and helping them with nutrition and lifestyle recommendations; this study will help promote bone health and prevent fracture practices among Jordanian nurses. Improving nurses' KAP toward their bone health will reflect the quality of care provided to osteoporosis patients, achieve better control, delay complications, and improve their quality of life.

It is essential to develop proper actions to deal with this detrimental chronic illness to prevent any complications. Nurses are the first-line forces in managing chronic disease through health education and promotion for patients about its evaluation and management at the early stages.

Ethical approval

This study was approved by the Ethics Committee of the Ministry of Health (MOH) in Jordan (reference number MBA/IRB/11479).

Conflicts of interest

All contributing authors declare no conflicts of interest.

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