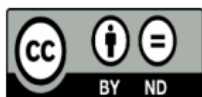


**RESEARCH ARTICLE****Female Employee's Knowledge of Osteoporosis at the University of Sulaimani /Old Campus****Gona Othman Faris<sup>1</sup>, A.L. Lana Abdul Hamed Muhamad Nury<sup>2</sup>, Dr. Mahabat Hassan Saeed<sup>3\*</sup>**<sup>1</sup>*Department of maternal neonate nursing, College of Nursing, University of Sulaimani, City of Sulaimani, Iraq;*<sup>2</sup>*Department of maternal neonate nursing, College of Nursing, University of Sulaimani, City of Sulaimani, Iraq.*<sup>3</sup>*Department of maternal neonate nursing, College of Nursing, University of Sulaimani, City of Sulaimani, Iraq.***Corresponding author: Dr. Gona Othman Faris****Email: [Gona.Faris@univsul.edu.iq](mailto:Gona.Faris@univsul.edu.iq)****ABSTRACT**

**Background:** Osteoporosis is one of the top five illnesses that lead to lengthy hospital stays and disability, but it is still underdiagnosed globally, particularly in developing nations. Consequently, this study aimed to ascertain the awareness of this condition among female employees in Sulaimani city. **Methods:** A cross-sectional study of female employees at the University of Sulaimani's old campus was done from October to December 2022. The convenience sample size was used to enrol 100 female workers in total. The Osteoporosis Knowledge Assessment Tool (OKAT) presented a self-administered structured questionnaire to gather information about sociodemographic factors and female awareness of osteoporosis. **Results:** The study's participants' age range was between 35 and 45 years old, with a mean age and a standard deviation of 35.1 and 12.9 years, respectively. Most (50 percent, 64 percent, and 58 percent) were unmarried, urban dwellers, barely surviving, and highly educated. According to the participant's knowledge score, 56% had fair awareness of osteoporosis, 38% had strong knowledge, and only 6% had poor knowledge. Age and economic level had a statistically significant relationship with knowledge of osteoporosis ( $p$ -value = 0.001), as did knowledge score. **Conclusions:** The majority of participants scored fairly well on knowledge about osteoporosis.

Nonetheless, there was a sizable knowledge gap concerning the same risk factors. In the current study, the good knowledge score was much lower than the global average. The quality and trustworthiness of information about osteoporosis must, therefore be improved through educational efforts.

**Keywords:** Osteoporosis, Knowledge, Employee, risk

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**INTRODUCTION**

Both men and women are susceptible to osteoporosis, which is a global public health issue (GH, 2017)(Danish et al., 2014)(Kanis, 2007). It is a significant health issue with a high prevalence (Amin, S., Mukti, 2017)(Bilal et al., 2017). Almost 75 million people have osteoporosis globally (Amin, S., Mukti, 2017). Ten million Americans over 50 in the US are affected by osteoporosis, with about 80% being women (GH, 2017).

A systemic skeletal condition called osteoporosis has been described as having a bone mineral density (BMD) that is 2.5 or more standard deviations (SD) below the mean for healthy young white women (T-score of 2.5 or less) (Lindsay & Cosman, 2020)(Anthony DW, 2003). Osteoporosis is among the top five illnesses, leading elderly individuals to become disabled and require extended hospital stays (Jalili et al., 2007).

Even if it cannot be cured, the sickness can be avoided.

Osteoporosis is a quiet, degenerative condition that damages the skeleton, depletes bone density, and increases the risk of fracture (Weppner DAR, 2018). Osteoporosis-related fractures (ORF) place a significant financial, morbidity, and death burden. According to estimates, 60% of osteoporotic women will experience one or more ORFs, and 70% will have osteoporosis in the hip, spine, or forearm by age 80. The expenses of osteoporosis-related fractures in the US were around \$1.9 billion (GH, 2017).

The sole cause of osteoporosis is no longer thought to be ageing. Although it can affect toddlers, adults, males, and premenopausal women, this syndrome can also be brought on by specific disorders and medications (Society, n.d.). Reaching your maximal bone mass during adolescence is extremely important because osteoporosis can strike at any age (HT, 2000). Ageing, Asian or Caucasian race, feminine gender, family history of osteoporosis, or fragility fractures are all risk factors for osteoporosis. Low body mass index, menopause before age 45, extended amenorrhea unrelated to menopause, nulliparity, or prolonged lactation are additional risk factors.

Moreover, a diet is low in calcium and vitamin D, lactose intolerance, and poor intestinal absorption of calcium. Exceptional behaviours include smoking, drinking too much alcohol or caffeine, and leading a sedentary lifestyle. Some circumstances, such as long-term use of anticoagulants, glucocorticoids, anticonvulsants, aluminium antacids, and thyroid hormone therapy (Sultan A, Khan DA, Mushtaq M, 2006)(Habiba U, Ahmad S, 2002)(Health, 2000).

Caucasians are more likely to have osteoporosis, and by 2050, it is predicted that Asia will account for more than half of all osteoporotic fractures (Lau, 2009). Compared to Western nations, BMD appears to be lower in most Middle Eastern nations (Maalouf et al., 2007)(Kanis, 2007). According to the National Institutes of Health (NIH), environmental factors may account for up to 25% of bone mass and hereditary factors for up to 75%. Therefore, it is crucial to comprehend what constitutes a risk factor and who may be more susceptible to bone

fragility ((NIAMS), 2009). Fractures characterize osteoporosis, and addressing this involves educating patients (Harmanjit S, Manoj G, 2013). These women will not be able to assess their risk of getting osteoporosis, ask for diagnostic testing, take preventative measures to fend off this disease, or understand that osteoporosis begins several years before menopause if they do not know. As a result, individuals might believe that prevention should wait until after menopause (Lane, 2006)(McLeod & Johnson, 2011)(20). As a result, raising both older and younger women's understanding of and beliefs about osteoporosis is urgently necessary.

Therefore, spreading awareness of osteoporosis should be a top goal for future intervention programs that encourage specific behavioural techniques for osteoporosis prevention, especially since it affects people of all ages and is not just a disease of older people. As a result, the current study was carried out to evaluate the female employees' understanding of osteoporosis at Sulamani University's old campus.

## METHOD

**Design:** A cross-sectional survey was done, which included other colleges outside the medical colleges, and was carried out among female employees at Sulaimani University's old campus between October and December 2022.

**Study sample:** Via a convenience sample, anybody working on the old campus of Sulaimani University who provided oral consent was eligible for this study. Thirteen surveys were removed due to insufficient data out of a total of 130 that were distributed and 113 that were returned.

**Data collection:** Disseminated a self-administered questionnaire with a list of inquiries about osteoporosis knowledge. The questionnaire had two parts. The first part asked about the participants' identification, including their age, marital status, economic situation, educational attainment level, place of residence, prior diagnosis of osteoporosis and other bone diseases, history of personal fractures, and family history of osteoporosis. The Osteoporosis Knowledge Assessment Tool (OKAT) questionnaire was used to

gauge the knowledge of the female participant in the second section. Twenty true and false questions about people's awareness of osteoporosis were included in the OKAT questionnaire (Winzenberg et al., 2003).

**Data analysis:** The data on osteoporosis knowledge was analyzed using SPSS (version 22.0), a statistical package for the social sciences. The significant correlation between knowledge of osteoporosis and risk factors was compared using Pearson's chi-square test. 0.05 was established as the threshold for significance. Participants' osteoporosis knowledge was graded using the following system: one point was awarded for each correct response and zero points for each wrong or unknowing response. The total number of correct answers received a score out of 20; the scores were divided into three categories: inadequate knowledge (scoring 10), fair knowledge (score > 15), and strong knowledge (score > 15). Scale dichotomous random variable scoring scales for reevaluation and scales according to the following intervals: Strong effect 0.66-1.00, Moderate effect 0.34-0.66, and Low effect 0.00-0.33.

## RESULTS

Table 1 shows the study's inclusion of 100 female workers at the former campus of Sulaimani University. Participants' ages ranged from under 35 to over 45, with a mean and standard deviation of 35.1 and 12.9 years, respectively. Moreover, one-third (40%) of those examined were under 35, 32% were over 45, and 28% were in the 35–45 age range. About half of the participants (50%) and (58%) were unmarried, highly educated, and living on just enough money. 64% of people (more than two-thirds) reside in cities. According to the study, 80% of the sample had no osteoporosis diagnosis, and just 14% of females had a personal fracture history. Table 2 examines the level of awareness regarding osteoporosis among the study sample's female employees. Nevertheless, the outcome indicated that the mean value of knowledge ranged from (0.08-0.94). Of the twenty knowledge items, eleven (11) had means between 0.66 and 1.00, indicating a high degree of knowledge. However, the remaining seven items, with averages of (0.42, 0.62, 0.66, 0.52, 0.58, 0.66, and 0.36) show a modest level of understanding. While just knowing (2) of the items, the respondents. The study sample's overall mean and standard deviation for knowledge of osteoporosis is (13.3±2.37).

**Table 1. Socio-demographic characteristics of respondents:**

Socio-demographic characteristics		Frequency	Percentage
<b>Age groups</b>	<35 years	40	40.0
	35-45 years	28	28.0
	>45years	32	32.0
<b>Mean ±SD 35.1± 12.9</b>			
<b>Marital status</b>	Married	48	48.0
	Single	50	50.0
	Divorced	2	2.0
<b>Economic status</b>	Sufficient	38	38.0
	Barely sufficient	58	58.0
	Insufficient	4	4.0
<b>Level Education</b>	Secondary school	16	16.0
	Institute graduated.	28	28.0
	College graduated	58	58.0
<b>Residency</b>	Urban	64	64.0
	Suburban	28	28.0
	Rural	8	8.0
<b>Prior diagnosis with osteoporosis and other bone diseases</b>	Yes	20	20.0
	No	80	80.0
<b>History of Personal fracture</b>	Yes	14	14.0
	No	86	86.0

<b>Family history of osteoporosis</b>	Yes	26	26.0
	No	74	74.0
<b>Total</b>		<b>100</b>	<b>100.0</b>

**Table 2. Percentage of correct responses to various questions regarding knowledge of osteoporosis among the respondents:**

Variable	Answer	N=100		MS	level
		F	%.		
A family history of osteoporosis strongly predisposes a person to osteoporosis. <b>True</b>	True	42	42.0	<b>0.42</b>	<b>M</b>
	False	58	58.0		
Vitamins prevent osteoporosis. <b>True</b>	True	88	88.0	<b>0.88</b>	<b>H</b>
	False	12	12.0		
Alcohol consumption and cigarette smoking contribute to osteoporosis. <b>True</b>	True	62	62.0	<b>0.62</b>	<b>M</b>
	False	38	38.0		
Hormone therapy prevents further bone loss at any age after menopause. <b>False</b>	True	66	66.0	<b>0.66</b>	<b>M</b>
	False	34	34.0		
A high salt intake is not a risk factor for osteoporosis. <b>False</b>	True	12	12.0	<b>0.12</b>	<b>L</b>
	False	88	88.0		
Sardines and broccoli are good sources of calcium for people who cannot take dairy products. <b>True</b>	True	82	82.0	<b>0.82</b>	<b>H</b>
	False	18	18.0		
Women with early menopause are more likely to get osteoporosis. <b>True</b>	True	68	68.0	<b>0.68</b>	<b>H</b>
	False	32	32.0		
Using certain medications for a long time, such as cortisone, increases the risk of osteoporosis. <b>True</b>	True	80	80.0	<b>0.80</b>	<b>H</b>
	False	20	20.0		
Higher (PBM) at the end of childhood gives protection against the development of osteoporosis in later life. <b>True</b>	True	68	68.0	<b>0.68</b>	<b>H</b>
	False	32	32.0		
More women than men are reported to have osteoporosis. <b>True</b>	True	78	78.0	<b>0.78</b>	<b>H</b>
	False	22	22.0		
Fragile or brittle bones characterize osteoporosis, which leads to an increased risk of bone fractures. <b>True</b>	True	76	76.0	<b>0.76</b>	<b>H</b>
	False	24	24.0		
Sunlight is a risk factor for osteoporosis. <b>False</b>	True	8	8.0	<b>0.08</b>	<b>L</b>
	False	92	92.0		
An adequate calcium intake can be achieved from two	True	94	94.0	<b>0.94</b>	<b>H</b>

glasses of milk daily to prevent bone loss. <b>True</b>	False	6	6.0	<b>4</b>	
One of the signs of osteoporosis disease is the shortening of height after age 65. <b>True</b>	True	52	52.0	<b>0.52</b>	<b>M</b>
	False	48	48.0		
By age 80, the majority of women have osteoporosis. <b>True</b>	True	58	58.0	<b>0.58</b>	<b>M</b>
	False	42	42.0		
From age 50, most women can expect at least one fracture. Before they die. <b>True</b>	True	66	66.0	<b>0.66</b>	<b>M</b>
	False	34	34.0		
It is easy to tell whether you are at risk of osteoporosis by your clinical risk factors. <b>True</b>	True	70	70.0	<b>0.70</b>	<b>H</b>
	False	30	30.0		
Osteoporosis usually causes symptoms (e.g., pain) before fractures occur. <b>False</b>	True	86	86.0	<b>0.86</b>	<b>H</b>
	False	14	14.0		
White women are at highest risk of fracture as compared to other races. <b>True</b>	True	36	36.0	<b>0.36</b>	<b>M</b>
	False	64	64.0		
Any type of physical activity is not beneficial for osteoporosis. <b>True</b>	True	84	84.0	<b>0.84</b>	<b>H</b>
	False	16	16.0		
<b>Total Mean ±SD</b>			<b>13.3±2.37</b>		

MS: Mean of score H: High effect 0.66-1.00;

M: Moderate effect 0.34- 0.66 L: Low effect 0.00-0.33

**Table3. Overall Knowledge score of female osteoporosis among employees**

Overall knowledge	N=100	
	Frequency	Percentage
Good knowledge	38	38.0
Fair knowledge	56	56.0
Poor knowledge	6	6.0

Table 4. Association between socio-demographic characteristics and overall knowledge of female employees regarding osteoporosis.

Variables	N=100							
	Good knowledge		Fair knowledge		Poor knowledge		Total	
	F	%	F	%	F	%	F	%
<b>Age groups &lt;35</b>								
35-45 years	0	0	34	85.0	6	15.0	40	40.0
>45 years	6	21.4	22	78.6	0	0	28	28.0
	32	100	0	0	0	0	32	32.0
<b>P. value &lt;0.001</b>	<b>Highly Significant</b>				<b>x<sup>2</sup>=5.069</b>			
<b>Marital Status Single</b>								
Married	17	35.4	28	58.3	3	6.3	48	48.0
Divorced	21	42.0	26	51.7	3	6.3	50	50.0
	0	0	2	100	0	0	2	2.0
<b>P. value 0.023</b>	<b>Significant</b>				<b>x<sup>2</sup>=2.061</b>			
<b>Economic status Sufficient</b>								
Barely sufficient	15	39.5	20	52.6	3	7.9	38	38.0
Insufficient	23	39.6	32	55.2	3	5.2	58	58.0
	0	0	4	100	0	0	4	4.0
<b>P. value &lt;0.001</b>	<b>Highly Significant</b>				<b>x<sup>2</sup>=3.584</b>			
<b>Level of education Secondary school Institute graduated College graduated.</b>								
	7	43.8	8	50.0	1	6.2	16	16.0
	10	38.5	14	53.8	2	7.7	26	26.0
	21	36.2	34	58.6	3	5.2	58	58.0
<b>P. value 0.305</b>	<b>Not Significant</b>				<b>x<sup>2</sup>=0.577</b>			
<b>Residency</b>								
Urban	24	37.5	34	53.1	6	9.4	64	64.0
Suburban	12	42.9	16	57.1	0	0	28	28.0
Rural	2	25.0	6	75.0	0	0	8	8.0
<b>P. value 0.337</b>	<b>Not Significant</b>				<b>x<sup>2</sup>=4.526</b>			
<b>x<sup>2</sup> = Chi-square</b>								

## DISCUSSION

Osteoporosis is a serious and spreading public health issue that primarily affects women but affects all sexes. For senior people, it is the leading cause of fractures. It results in suffering, incapacity, expensive rehabilitation, a lacklustre quality of life, and death. One of the most prevalent musculoskeletal conditions, osteoporosis, is highly prevalent globally. Hence, public awareness of osteoporosis determines the effectiveness of osteoporosis prevention and control. The current study aimed to determine how well female employees at the University of Sulaimani's old campus were informed about osteoporosis.

The participants in the current study had a mean age of 35.1 12.9 years; the participants in the Erbil study had a mean age of 35 8.24 years; the majority of them were married and had a family history of osteoporosis (Mohammed & Dauod, 2021). Similar to our study, which found that 50% of the studied sample were barely surviving in terms of their economic status, highly educated (58.0%), and living in urban areas (64.0%), a study conducted in Egypt found that the majority of the studied sample was barely surviving, highly educated, and lived in urban areas (Elsabagh et al., 2015).

People who do not believe they are at risk for osteoporosis do not maintain a healthy, proactive lifestyle. Compared to a study conducted in Saudi Arabia, where the results were 37%, 39%, and 23%, respectively, the current study's participants were more aware of the significance of female gender, alcohol intake, and smoking in osteoporosis (62%) (Al-Shahrani et al., 2010).

This result is similar to earlier research conducted in Turkey and Iran (Anthony DW, 2003)(Ungan & Tümer, 2001). This may be due to the general perception in our society that drinking and smoking are detrimental to a person's overall health, rather than knowledge of their specific effects on bone, especially as only 34% of people knew that hormone replacement treatment could stop further bone loss.

Most study participants were aware of the dietary sources of calcium, but only 42% understood that a family history of osteoporosis is a risk factor. This conclusion conflicts with those of women in the USA, the majority of whom are aware that a family

history of osteoporosis is a risk factor (Endicott, 2013). The greater healthcare access, public health education, and prevention of diseases like osteoporosis among American women may cause discrepancies across research.

The findings of our investigation revealed that 36% of the sample lacked sufficient knowledge of the white race. On the other hand, they are sufficiently aware of the effects of corticosteroids (80%), high salt intake (88%), and early menopause (68%). Nonetheless, half of them (52%) were aware that osteoporosis can cause a person's height to shorten as they age. According to the Abril study, there was a variance in the degree to which participants recognized early menopause (51.4%), female gender (59.5%), and smoking (53.4%) as risk factors for osteoporosis. However, they had insufficient knowledge about their race—being white (46.8%), their family history (40.8%), their high salt intake (46.8%), and their use of corticosteroids (10.6%) (Mohammed & Dauod, 2021).

In summary, the study found that most students (76%) thought osteoporosis was a fracture risk factor. At the same time, just 14% were aware of the osteoporosis symptoms that occur before bone fracture. This finding is consistent with a study conducted in Saudi Arabia, which notes that (98.9%) of participants' employees believed osteoporosis to be a risk factor for fractures and that (35.8%) of participants' employees were aware of osteoporosis symptoms prior to bone fracture (Utkarsh Shahi et al., 2019).

This finding is consistent with other studies that reported that most participants did not know that a higher peak bone mass protects against osteoporosis (Elsabagh et al., 2015)(De Silva et al., 2014). In the current study, most employees (68%) knew that having a higher peak bone mass is protective against osteoporosis (Endicott, 2013).

The majority of employees (56%) have a fair understanding of osteoporosis, (38%) have strong knowledge, and just (6%) have poor knowledge, according to the survey.

A study conducted in Saudi Arabia (Utkarsh Shahi et al., 2019) found 32.2% of participants' employees had bad knowledge scores on osteoporosis—in contrast to a study conducted in Malaysia that found

(79.4%) of participants had poor level knowledge—found the opposite of our findings (Amin, S., Mukti, 2017). Another study conducted in Pakistan among women revealed that 82.1% had a strong understanding of osteoporosis, while 17.9% had low knowledge (Tahir et al., 2016). Many studies found that women do not understand osteoporosis (Pande et al., 2005) (Ribeiro V, Blakeley J, 2000).

On the other hand, the current study revealed greater fair knowledge (56%), and the outcome is consistent with a study among female employees in Sri Lanka (51.6%) (De Silva et al., 2014).

Overall, the current survey results show that just 38% of people have an adequate understanding of osteoporosis. According to other studies, 8% of participants in Pakistan and Sri Lanka (Bilal et al., 2017) (De Silva et al., 2014) and 2.5% in Saudi Arabia demonstrated good knowledge (Utkarsh Shahi et al., 2019). As a result, there are differences in knowledge scores about osteoporosis around the globe. Education has a big impact on cognitive abilities, especially knowledge.

Our study showed a statistically significant correlation between age, socioeconomic status and knowledge of osteoporosis, with a p-value of 0.001. In contrast to our findings, a study conducted in Iran found no correlation between age and osteoporosis awareness levels (Amani et al., 2015).

On the other hand, there was no real correlation between osteoporosis knowledge score and residency or educational attainment. Other research conducted in the KSA, Iran, and Turkey that contradicted our findings indicated a strong correlation between educational attainment and awareness of osteoporosis (Ungan & Tümer, 2001)(Amani et al., 2015)(Alamri FA, Saeedi MY, Mohamed A, Barzanii A, Aldayel M, 2015).

## CONCLUSIONS

According to this study's findings, most participants were fairly aware of osteoporosis. Nonetheless, there was a sizable knowledge gap concerning the same risk factors. In the current study, the good knowledge score was much lower than globally. Age and financial state were statistically significantly correlated with knowledge of osteoporosis. In order to increase knowledge and the quality and reliability of information about osteoporosis targeted at female employees, the current

study advises better involvement of health authorities and higher educational authorities.

## Ethical Approval Statement

This research study, titled " **Female Employee's Knowledge of Osteoporosis at the University of Sulaimani /Old Campus** " conducted by [Dr. Gona Othman Faris<sup>1</sup>, A.L. Lana Abdul Hamed Muhamad Nury<sup>2</sup>, Dr. Mahabat Hassan Saeed<sup>3</sup>], has received ethical approval from the [The ethical committee of the College of medicine] at [ University of Sulaimani] under approval reference number [16-4/4/2023].

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## AUTHOR'S CONTRIBUTIONS

Study concept, Writing, and Review the final edition by all authors.

## DISCLOSURE STATEMENT:

The authors report no conflict of interest.

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