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## OSTEOPOROSIS AWARENESS AND KNOWLEDGE ASSESSMENT AMONG SAUDI FEMALE IN SAUDI ARABIA

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### ABSTRACT

**Background:** Osteoporosis is a major and growing public health problem, particularly in women. It is defined as having decreased bone mineral density 2.5 standard deviations below the adult peak mean. It is estimated that osteoporosis affects 200 million women worldwide and causes more than 8.9 million fractures annually. The **aim** of this study is to assess the knowledge of women regarding risk factors and to measure the preventive measures of osteoporosis among Saudi females 18 years and more. **Methods:** A cross-sectional study was conducted among females in Saudi Arabia. An online questionnaire was designed according to the questionnaire of osteoporosis knowledge assessment tool (OKAT) questionnaire. **Results:** A total of 391 Saudi females responded to the questionnaire. In the current study, 74.4% answered correctly that Osteoporosis causes a bone fracture, 92.1% knew that both men and women can have osteoporosis, 69.3% knew that menopausal women are more prone to osteoporosis. While only 57.3% and 72.6% knew that family history, smoking, and excessive alcohol intake, respectively contributed to the risk of osteoporosis, 27.2% correctly answered that using the steroid drug can increase the risk of osteoporosis, 71.9% knew that lack of physical activity can increase the risk of osteoporosis. 54.2% answered that Osteoporosis have available and effective treatments. **Conclusion:** This study reveals deficient knowledge about risk factors, complications, and treatment of osteoporosis among female in Saudi Arabia, we recommend conducting health education of the adult female Saudi population to avoid smoking, excessive alcohol and to perform a muscular exercise. Also, we recommend conducting large-scale research to study more details about the causes and risk factors of osteoporosis with full investigations.

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## INTRODUCTION

Osteoporosis is a major and growing public health problem, particularly in women. It is defined as having decreased bone mineral density that is 2.5 standard deviations below the adult peak mean, which increase the risk of skeletal fractures. Osteoporotic fractures significantly reduce the quality of life and increase mortality and morbidity of those affected [1]. It is estimated that osteoporosis affects 200 million women worldwide and causes more than 8.9 million fractures annually [2]. According to the International Osteoporosis Foundation, nearly 10 million Americans have osteoporosis and more than 2 million osteoporosis-related fractures annually in the

The U.S., about 70% of these occur in women [3]. Osteoporosis may be classified as primary type 1, primary type 2, or secondary. The most common type in women after menopause is referred to as postmenopausal osteoporosis (primary type 1). Senile osteoporosis (primary type 2) occurs after age 75 and is seen in both females and males at a ratio of 2:1. The secondary type is usually related to certain diseases or the usage of specific drugs [4]. Female sex, aging, low levels of sex hormones, smoking, low concentrations of vitamin D, and menopause are risk factors for osteoporosis [5]. Osteoporosis screening recommended for all women aged 65 and younger women with fracture risk is equal to or greater than that of a 65-year-old woman. Osteoporosis diagnosed when the T-scores less than -2.5 in the lumbar spine, hip, femoral neck, and/or 33% radius, however, osteoporosis can be diagnosed clinically if there is a low-trauma (fragility) fracture in the absence of other metabolic bone diseases, independent of the T-scores [3]. There is evidence suggesting

that knowledge about osteoporosis is a contributor to osteoporosis preventive behavior, although this is not a clear-cut relationship. Preventive measures, such as adequate calcium and vitamin D intake, smoking cessation, sun exposure, and exercise are recommended [6]. A study conducted in Abha City, KSA to assess general knowledge of osteoporosis among the general female population reported that only 17% of individuals reported osteoporosis. Most respondents, 52% had overall greater understanding, 21% had an excellent understanding of the significance of physical exercise in osteoporosis prevention, and 60% of respondents had good knowledge about the risk factors of osteoporosis [7]. Another study in Riyadh City, KSA found that 79.4% of participants did not have a sufficient amount of knowledge about the disease [8]. This study aims to assess the knowledge of women regarding risk factors and to measure the preventive measures of osteoporosis among Saudi females 18 years and above.

## SUBJECTS AND METHODOLOGY

### Study design and setting:

This is a cross-sectional study was conducted among female in Saudi Arabia 18 years and more during the period from August 2018 to September 2018.

### Sample size and study population:

The minimum sample size by the Raosoft sample size calculator [9] using a confidence interval of 95% and a margin of error of 5% was 450. The response rate was 86.8%. All Saudi women aged 18 years old and more living in Saudi Arabia were included in the study. The exclusion criteria were non-Saudi females, age less than 18, and uncompleted data in the questionnaire.

### Study tools:

An online questionnaire was designed according to the osteoporosis knowledge assessment tool (OKAT) questionnaire. The OKAT survey is a valid measurement of knowledge of osteoporosis [10], the questionnaire was translated into the Arabic language which is reliable according to Sayed-Hassan et al [10]. Then published online. The questionnaire consists of two parts. The first part collect demographic information such as age, educational status, smoking history, family history of osteoporosis the second part asks about general knowledge of osteoporosis and it is a risk factors, one mark was given for each correct answer and 0 was given for the wrong answer, giving a total knowledge score of 15. A score of 10 and more was indicating an adequate level of knowledge and under 10 indicated an inadequate level of knowledge.

### Data analysis plan:

The data were coded and analysed by SPSS software package version 22.0 then tabulated. The results were summarized as frequency and percentage then the association between the knowledge and demographics of respondents was conducted using the chi-square test, level of significance was set at 0.05.

### Ethical consideration:

Ethical approval from the IRB institutional review board of the University of Tabuk was obtained on 29 November 2018, ref number 0013. The privacy of the participants was considered as we explained the purpose at the beginning of the questioner form and take their consent.

## RESULT

A total of 391 Saudi females responded to the questionnaire. About 28.9% of the northern

region, 25.3% of the middle region, 16.4% of the southern region, 21% of the western region, and 8.4% from the east region. The age of the included subjects was 18-25 old in 64.2% of subjects, 26-35 years old in 21.5%, 36-45 years old in 11%, and older than 46 years old in 3.3% of included subjects. The majority of subjects had a college degree, 78.3%, 16.9 % were high school and 2.3% were middle school while 2.6% of participants had an elementary school. Out of the included subjects, 35.3% were married, 64.7% were single (Table. 1). (Figure. 1) Illustrates the smoking history of the participant, it demonstrates that 96% of subjects were non-smokers, 3% smokers, and 1% ex-smoker. (Figure 2) illustrates that,

Table 1: Socio-demographic characteristics of the studied population

		No.	%
Region	Middle region	99	25.3
	North region	113	28.9
	South region	64	16.4
	West region	82	21.0
	East region	33	8.4
Age group	18-25	251	64.2
	25-35	84	21.5
	35-45	43	11.0
	>45	13	3.3
Marital status	Single	253	64.7
	Married	138	35.3
Education level	Elementary school	10	2.6
	Middle school	9	2.3
	High school	66	16.9
	College degree	306	78.3



Figure 1: Smoking history of the studied population

52% of the participants had no family history of osteoporosis, 20% have a positive family history of osteoporosis, and 28% don't know. In the current study, 74.4% of the participants answered correctly that Osteoporosis causes a bone fracture, 92.1% correctly responded that Both men and woman can have osteoporosis, 69.3% knows that Menopausal women are more prone to osteoporosis, while only 57.3% and 72.6% knew that family history, smoking and excessive alcohol contributed to the risk of osteoporosis, 27.2% correctly responded that Using a steroid drug can increase the risk of osteoporosis, 71.9% know that lack physical activity can increase the risk of osteoporosis .55.8% knows that pain is a symptom of osteoporosis preceding fracture, 15.3% loss of height is a sign of osteoporosis. Regarding prevention of the disease, 88.7% answered correctly that osteoporosis is a preventable disease, about 92.3% knew that calcium-rich diet & vitamin D can prevent osteoporosis, 32.5% think using hormonal therapy after menopause

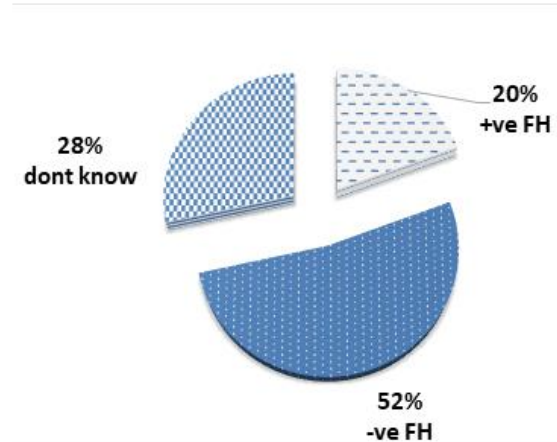


Figure 2: Family history of osteoporosis

protects from osteoporosis, 86.2% knew that exercise prevent osteoporosis, and 90.8% knew that sun exposure prevents the disease. Of the participants, 54.2% answered that osteoporosis have available and effective (Table 2). (Figure 3) Show knowledge of osteoporosis score. (Table 3) Illustrates the association between knowledge level and demographics characters of the participants. There was a significant ( $P < 0.05$ ) association between the score of knowledge of osteoporosis and educational level. But the association was insignificant ( $P > 0.05$ ) with the age group and marital status.

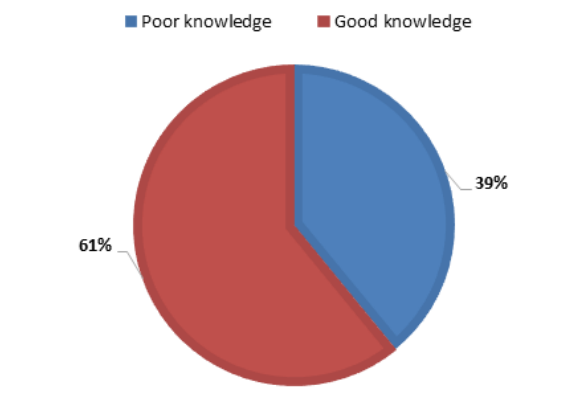
## DISCUSSION

Osteoporosis is a global public health problem, and it is more prevalent among postmenopausal women. It is estimated to affect 200 million women worldwide and causes more than 8.9 a million fractures annually [2]. Knowledge about osteoporosis primarily focuses upon the risk factors for the disease and the extent to which this knowledge is utilized to take preventative measures. This is a cross-sectional study was conducted among 391 females aims to assess the knowledge regarding risk factors and

Table 2: Knowledge of osteoporosis among the study population

	True %	False%	I don't know%
Osteoporosis cause bone fracture	74.4	14.1	11.5
Both man and woman can have osteoporosis	92.1	3.3	4.6
Menopausal women are more prone to osteoporosis?	69.3	4.3	26.3
Family history increases the risk of osteoporosis	57.3	14.3	28.4
Using steroid drug can increases the risk of osteoporosis	27.6	4.1	68.3
Smoking and excessive alcohol can increases risk of osteoporosis	72.6	3.8	23.5
Lack of physical activity can increase the risk of osteoporosis?	71.9	13.6	14.6
Do osteoporosis cause Bone pain?	55.8	22.3	22
osteoporosis cause loos of height?	15.3	48.6	36.1
Is osteoporosis preventable?	88.7	2.3	9
Calcium rich diet & vitamin D can prevent osteoporosis?	92.3	1.8	5.9
Using hormonal therapy after menopause prevent from osteoporosis?	32.5	5.1	62.4
Physical activities are helpful for prevention of osteoporosis?	86.2	1.8	12
Exposure to sun light can prevent osteoporosis	90.8	2.8	6.4
Osteoporosis have available and effective treatments	54.2	7.4	38.4

Figure 3: Knowledge of osteoporosis score



prevention approaches of osteoporosis among Saudi female above 18 years. According to the level of knowledge of osteoporosis, our study found a majority 61% had good knowledge and only 39% had poor knowledge. In comparisons to our results, in Jeddah, Saudi Arabia another study among female students at King Abdul-Aziz University reported that more than three quarters (77%) of university students showed a high osteoporosis knowledge level, and

only 23% show medium knowledge [11]. In Tabuk, a cross-sectional study was conducted among women in the Faculty of Medicine and a secondary high school; out of 150 females nearly two-thirds (62%) of the subjects had medium knowledge about osteoporosis, with more than quarter (25.3%) had poor knowledge and only 12.7% had good knowledge [12]. Another study enrolled 400 Bahraini women participants; The overall statistical analysis of knowledge score depicted that 73% of the study participants were having moderately adequate knowledge of osteoporosis-related aspects [13]. In contrast to our results, In Pakistan, another study found that only 8.0% of the participants had a good score pertaining to knowledge about osteoporosis, whereas the majority of the participants (49.0%) had a poor score [14]. This is indicative of regional disparity in knowledge about osteoporosis.

As regards knowledge of osteoporosis our study found that 74.4% of females correctly know that osteoporosis cause bone fracture,

Table 3: relation between score of knowledge of osteoporosis and sociodemographic data among the study population

Variables		Knowledge score		Total (n=391)	P value
		Good (n=238)	Poor (n=153)		
Age group	18-25	151	100	251	0.972
		60.2%	39.8%	100.0%	
	25-35	53	31	84	
		63.1%	36.9%	100.0%	
	35-45	26	17	43	0.001
		60.5%	39.5%	100.0%	
	>45	8	5	13	
		61.5%	38.5%	100.0%	
Educational level	Elementary school	7	3	10	0.001
		70.0%	30.0%	100.0%	
	Middle school	1	8	9	
		11.1%	88.9%	100.0%	
	High school	32	34	66	
		48.5%	51.5%	100.0%	
	College degree	198	108	306	
		64.7%	35.3%	100.0%	
Marital status	Single	160	93	253	0.117
		63.2%	36.8%	100.0%	
	Married	78	60	138	
		56.5%	43.5%	100.0%	

92.1% correctly responded that both men and woman can have osteoporosis, 69.3% knows that menopausal women are more prone to osteoporosis. Another study in Tabuk, Saudi Arabia reported; 97.3% know that osteoporosis cause bone fracture and 80% responded that females are more prone to osteoporosis [12]. In Egypt, another study reported; 95.1% of studied women reported that they are familiar with OP, more than three-quarters of them (77.1%) perceive it as a serious disease, only 62.8% of studied women were aware of different consequences

of OP and 65% of studied women were aware that fracture could occur due to OP when women older than 50 years do not take preventive measures for OP [15]. Regarding knowledge about risk factors of osteoporosis among Saudi female, we found that only 57.3% and 72.6% knew that family history, smoking, and excessive alcohol respectively contributed to the risk of osteoporosis, 27.2% correctly responded that using steroid drug can increase the risk of osteoporosis, 71.9% know that lack physical activity can increase the risk of osteoporosis. Another study found

that knowledge of smoking and family history of risk factors was poor 43%, and 39.3% respectively, other risk factors like; Delaying pregnancy can cause osteoporosis reported by 17.3% of subjects, 34% knew that early puberty/ menarche could cause osteoporosis and 43.3% answered correctly that late puberty/ menarche could cause osteoporosis [12]. Another study reported; family history of osteoporosis was considered as a risk factor by (36%) subjects. Surprisingly, old age as a risk factor was not appreciated by (37.5%) participants, whereas premature menopause and smoking was considered as a causative agent by (5.3%) and (15.0%) participants respectively [14]. Another study found that high caffeine intake and smoking were identified as risk factors for OP by a high percentage of participated women (72.6% and 53.4% respectively). However, positive family history and early menopause were identified as risk factors by only 41.4% and 32.3% respectively [15]. In Turkey, another study reported that 80.4%, 67.6%, 60.4%, 53%, and 52.6% of women, respectively knew that low calcium and vitamin D in the diet, premature menopause, family history of OP, lack of activity, and smoking are risk factors for OP [16]. Regarding prevention of the disease, there were 88.7% answered correctly that osteoporosis is a preventable disease. 92.3% Calcium-rich diet & vitamin D can prevent osteoporosis, 32.5% Using hormonal therapy after menopause prevent osteoporosis. 86.2% knew that exercise prevents osteoporosis, and 90.8% knew that sun exposure prevents the disease. 54.2% answered that Osteoporosis have available and effective treatments. Similar to our results another study reported that 84% of cases answered correctly that eating fish and calcium prevent osteoporosis,

64.7% knew that exercise prevent osteoporosis, and 58% knew that sun exposure prevents the disease this refers to good knowledge about the prevention of disease [12]. Another study reported; 75.9% and 73.3% of cases, respectively, were aware that OP is both a preventable and treatable disease and the beneficial effect of physical exercise in general and walking, in particular, was identified as true by 88.3% and 86.5% respectively [15]. According to knowledge about symptom of disease, 55.8% knows that pain is a symptom of osteoporosis preceding fracture, 15.3% loss of height is a sign of osteoporosis. Another study reported the majority (71.3%) knows that pain is a symptom of osteoporosis preceding fracture [12]. In Egypt, another study found that fracture of bone and humped spine were the common two symptoms identified by the participants (50.1% and 24.3% respectively), and only 16.8% reported a loss of height [17]. According to our results, there was a highly significant association between educational level and level of knowledge among participants ( $P=0.001$ ). This agreed with the results of the Saudi study in Riyadh, which found that education and young age were significantly correlated with higher levels of knowledge as it was also shown in other studies conducted in KSA [8,18,19].

## CONCLUSION

This study reveals deficient knowledge about risk factors, complications, and treatment of osteoporosis among female in Saudi Arabia, we recommend conducting health education of the adult female Saudi population to avoid smoking, excessive alcohol and to perform a muscular exercise. Also, we recommend conducting large-scale research to study

more details about the causes and risk factors of osteoporosis with full investigations.

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