

## Osteoporosis: a Common Health Problem in Senior Adult Population of Arar City, Saudi Arabia

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### ABSTRACT

**Background:** Osteoporosis is characterized by compromised bone strength predisposing to an increased risk of fracture, which has significant effects on human health, quality of life. **Objective:** To determine the prevalence and determinant factors of osteoporosis among elderly in Arar, KSA. **Methods:** The present cross sectional community based study was conducted in Arar city, the capital of Northern Borders Governorate on 229 adult people aged 60 years and more. Data were collected through personal interviews with the sampled population and filling the questionnaire which guided us to the data of socio-demographic status, smoking, chronic diseases, already previously diagnosed osteoporosis, after ensuring the diagnosis by reviewing the accompanied health reports and/or prescriptions and asking the accompanied caregivers about the case. **Results:** The mean age of the participants ( $\pm$  SD) was 70.5 ( $\pm$  9.4) years. Males were 48% and females were 52%. The overall prevalence rate of osteoporosis found in this study was 24.5%. There was significant relationship between osteoporosis and sex, presence of thyroid disease ( $P < 0.05$ ). While there was an insignificant relationship between osteoporosis and age group, BMI group, presence of diabetes mellitus and presence of hypertension ( $P > 0.05$ ). **Conclusion:** In conclusion, osteoporosis is a common health problem (24.5%) in the elderly population in Arar city, KSA. **Conclusion:** Osteoporosis is significantly higher in elderly females. Health education and preventive programs are highly recommended to protect and treat that vulnerable group.

**Keywords:** Osteoporosis; Elderly; Saudi Arabia

### INTRODUCTION

Osteoporosis is a progressive systemic non-communicable skeletal disorder that is associated with significant mortality, morbidity and costs of management. It is characterized by decreased bone mass due to an imbalance between bone formation and resorption and increased risk of fracture. The World Health Organization referred to osteoporosis as “an epidemic of the 21<sup>st</sup> century<sup>[1]</sup>.” Osteoporosis has a diagnostic criterion based on the measurement of bone mineral density (BMD)<sup>[2]</sup>, as it is the only test that can diagnose osteoporosis before a bone fracture occurs. Since the BMD distribution in young healthy individuals is normal and the bone loss occurs along with aging, the prevalence of osteoporosis increases with age. Trends on the prevalence of osteoporosis are published throughout time and are increasing as more focus and attention are paid towards such common diseases.

Since the world healthcare systems are aiming to increase the life expectancy of individuals, an increase in osteoporotic patients is expected. A study carried out in Sweden showing the prevalence of osteoporosis in men and women aged 50-84 using the WHO criterion to be 6.3%, and 21.2% of population, respectively<sup>[3]</sup>. Also,

according to the WHO, 55% of the population in the USA aged over 50 years suffer from osteoporosis<sup>[4]</sup>. Among women in Saudi Arabia, the incidence of post-menopausal osteoporosis (PMO) is higher in comparison with women in Western countries<sup>[5-7]</sup>. Among men, however, a study found that 24.3% of Al-Khobar (city in Saudi Arabia) subjects attending outpatient clinics at King Fahd Hospital University, aged 50-76 years were osteoporotic, based on hip scans, and 37.4%, based on scans on the lumbar spine<sup>[8]</sup>.

Early diagnosis and management of osteoporosis can prevent its complications, mainly, osteoporosis-related fractures (ORF), and decrease morbidity and mortality rates in those senile patients.

The aim of this prospective study was to assess the prevalence and determinant factors of osteoporosis in the senior adult population of Arar city, Saudi Arabia, based on the physicians' diagnoses and using a pre-designed questionnaire.

### STUDY OBJECTIVE

The aim of this study was to determine the prevalence and determinant factors of osteoporosis among elderly in Arar, KSA.

## PARTICIPANTS AND METHODS

The present cross sectional community based study was conducted in Arar city, the capital of Northern Borders Governorate on 229 adult people aged 60 years and more. The sample size was calculated using the sample size equation:  $n = z^2 p(1-p)/e^2$ , considering target population more than 1000, and study power 95%. Systematic random sampling technique was followed. After identifying the first house randomly in the selected area, every 9th house was visited to include all the adult subjects residing in those selected houses till the required sample was covered.

### Data collection:

Data were collected through personal interviews with the sampled population and filling the questionnaire which guided us to the data of socio-demographic characteristics such as age, sex, educational status and marital status. It also included smoking status and certain chronic diseases that may be prevalent among adults suggested to affect osteoporosis such as obesity, hypertension, diabetes mellitus and hyperlipidemia. The questionnaire included also questions regarding the already previously diagnosed osteoporosis and its determinants, after ensuring the diagnosis by reviewing the accompanied health records and prescriptions and asking the accompanied caregivers about the case.

### Ethical considerations

Data collector gave a brief introduction to the participants by explaining the aims and benefits of the study. Informed written consent was obtained from all participants. Anonymity and confidentiality of data were maintained throughout the study. There was no conflict of interest.

### Statistical analysis

We utilized the statistical package for social sciences, version 16 (SPSS Inc., Chicago, Illinois, USA) to analyze the study data. The results were displayed as counts and percentages. The X<sup>2</sup> test was used as a test of significance, and differences were considered significant at P value less than 0.05.

## RESULTS

Table (1) illustrates the sociodemographic characteristics and BMI status of the studied

elderly population. The mean age ( $\pm$  SD) was 70.5 ( $\pm$  9.4) years. Males were 48% and females were 52%. Married participants were the majority (60.3%) while 34.5% were widowed. Illiteracy constituted 45%, primary school literates were 19.7%. As regards working, 64.6% were not working and 19.7% were retired, while only 15.7% were shepherds.

Table (2) demonstrates the prevalence of osteoporosis and other related chronic diseases among the studied population. Hypertension was found in 43.7%, ischemic heart diseases in 17.9%, hypothyroidism in 12.2%, diabetes 62.9%, diabetic nephropathy in 4.8% and renal insufficiency in 6.1%. As regards the BMI, about half (43.7%) were obese, 27.9% overweight and only 24.9% had normal weight.

Figure (1) shows the percentage distribution of osteoporosis among the elderly population. The overall prevalence rate of osteoporosis found in this study was 24.5%.

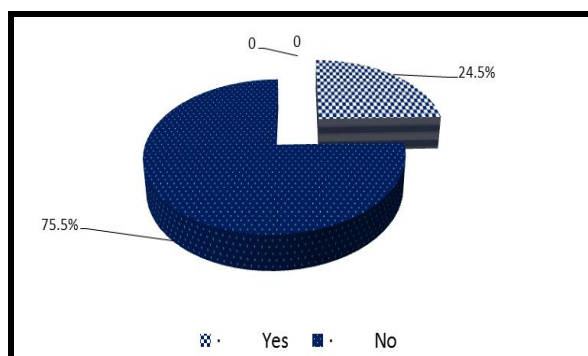
Table 3 displays the relationship between Osteoporosis and age group, sex, DM, BMI group, Thyroid disease and Hypertension in the studied elderly population. It is clear from the table that there was significant relationship between osteoporosis and sex, presence of thyroid disease ( $P < 0.05$ ). While there was an insignificant relationship between osteoporosis and age group, BMI group BMI group presence of diabetes mellitus and presence of hypertension ( $P > 0.05$ ).

**Table (1):** Socio-demographic characteristics and smoking among the studied elderly, Arar, 2017 (N=229).

Variables	Frequency (No.)	Percent (%)
Age group		
60-	142	62.0
70-	64	27.9
80+	23	10.0
Mean age ( $\pm$ SD)	70.5 $\pm$ 9.4	
Sex		
Female	119	52.0
Male	110	48.0
Education		
Illiterate	103	45.0
Primary	45	19.7
Secondary	22	9.6
University or more	41	17.9
Preparatory	18	7.9
Working status		
Shepherd	36	15.7
No work	148	64.6
Retired	45	19.7
Marital status		
Widow	79	34.5
Single	6	2.6
Married	138	60.3
Divorced	6	2.6

**Table (2):** Prevalence of osteoporosis and other related chronic diseases among the studied elderly population, Arar, 2017 (N=229)

Osteoporosis	No.	%
Yes	56	24.5
No	173	75.5
Cardiovascular diseases		
Hypertension	100	43.7
Ischemic heart diseases	41	17.9
Thyroid diseases		
Hyperthyroidism	12	5.2
Hypothyroidism	28	12.2
Diabetes		
Yes	144	62.9
No	44	19.2
Renal problems		
Diabetic nephropathy	11	4.8
Renal insufficiency	14	6.1
Body Mass Index (kg/m2) status		
Underweight	8	3.5
Normal	57	24.9
Overweight	64	27.9
Obese	100	43.7
Mean BMI ( $\pm$ SD)		30.1 $\pm$ 10.3
Smoking		
Non smoker	55	24.0
Smokers	16	7.0
Ex-Smoker	158	69.0



**Figure (1):** Prevalence of Osteoporosis among elderly population in Arar city, Northern Saudi Arabia, 2017.

**Table (3):** The relationship between Osteoporosis and age group, sex, DM, BMI group, Thyroid disease and Hypertension in the studied elderly population, Arar, 2017.

Variables	Osteoporosis		Total (N=229)	P value
	Yes (N=65)	No (N=173)		
<b>Age group</b>				
60-	35	107	142	0.961
	62.5%	61.8%	62.0%	
70-	15	49	64	
	26.8%	28.3%	27.9%	
80+	6	17	23	
	10.7%	9.8%	10.0%	
<b>Sex</b>				
Female	43	76	119	0.001
	76.8%	43.9%	52.0%	
Male	13	97	110	
	23.2%	56.1%	48.0%	
<b>Diabetes Mellitus</b>				
Yes	37	107	144	0.848
	66.1%	61.8%	62.9%	
No	10	34	44	
	17.9%	19.7%	19.2%	
<b>Thyroid disease</b>				
Hyperthyroidism	6	6	12	0.001
	10.7%	3.5%	5.2%	
Hypothyroidism	16	12	28	
	28.6%	6.9%	12.2%	
No thyroid disease	34	155	189	
	60.7%	89.6%	82.5%	
<b>BMI group</b>				
Underweight	4	4	8	0.068
	7.1%	2.3%	3.5%	
Normal	11	46	57	
	19.6%	26.6%	24.9%	
Overweight	11	53	64	
	19.6%	30.6%	27.9%	
Obese	30	70	100	
	53.6%	40.5%	43.7%	
<b>Hypertension</b>				
Yes	23	77	100	0.398
	41.1%	44.5%	43.7%	
No	33	96	129	
	58.9%	55.5%	56.3%	

## DISCUSSION

Osteoporosis is characterized by compromised bone strength predisposing to an increased risk of fracture, which has significant effects on human health, quality of life (QoL) [9, 10]. It was estimated in the year 2000 that there were about 9 million osteoporotic fractures, most of which were occurring in Europe [9]. Billions of dollars are spent by the Western nations on the complications of osteoporosis. It is necessary to run more studies concerning osteoporosis. In this study we found that 24.5% of the study population were suffering from osteoporosis.

The population of our study aged > 50 years with a mean age ( $\pm$  SD) of 70 ( $\pm$  9.4). Slightly more females contributed to the study as the male to female ratio was 12:13. Most of the participants do not work (64.6%), and are married (60.3%). More females (55.9%) than males were also found in **Al-Modeer et al.**<sup>[11]</sup> study in Southern Saudi Arabia, where the mean age ( $\pm$  SD) was 77.2 ( $\pm$  8.9).

Among our study population, 45% were illiterates. This was higher than the finding of **Khadervalli et al.**<sup>[12]</sup> who reported only 27% illiteracy in Kadappa region of South India.

A significant association between sex and Osteoporosis was markedly revealed in this study. Osteoporosis was more common in females than males (76.8% and 23.2%) respectively ( $P < 0.05$ ). The study of **Al-Modeer et al.** which was conducted in the south Saudi Arabia, has shown that osteoporosis was found in 17.4% and it was more prevalent among elderly females (29.5%) compared to males (14.5%)<sup>[11]</sup>. These findings also agree with those of **Hassan**<sup>[13]</sup>, in which 2.2% of females and 0.8% of males had the disease, although the figures were far less than our figures<sup>[13]</sup>. The sharp decrease in Estrogen hormone levels at the age of menopause, along with the physiology of female bones which makes them normally slightly thinner than males are main contributors to these findings observed in elderly females diseased with osteoporosis.

## CONCLUSION & RECOMMENDATIONS

In conclusion, osteoporosis is a relatively common disorder in the elderly population in Arar city, KSA. It is significantly higher in elderly females. We highly recommend preventive programs and health awareness campaigns to protect and treat those vulnerable groups.

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