

# Prevalence of osteoporosis in adults aged 50 and over at Hue University of Medicine and Pharmacy Hospital in 2025

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## Abstract

**Background:** Osteoporosis is the most commonly occurring bone disease and represents a major public health challenge. Fractures related to osteoporosis that are especially common in the elderly are associated with significant morbidity and high health costs.

**Objectives:** Survey on the prevalence of osteoporosis in adults over 50 visiting the hospital of Hue University of Medicine and Pharmacy and some factors associated with osteoporosis.

**Materials and Methods:** A descriptive cross-sectional study including 957 adults aged 50 and over at Hue University of Medicine and Pharmacy Hospital from January 1, 2025 to July 1, 2025.

**Results:** Osteoporosis in the lumbar spine, femoral neck and any proportion had respectively 42.8%, 12.9%; osteopenia in the lumbar spine, femoral neck had proportion of 30.4%, 37.8%, respectively. The overall prevalence of osteoporosis was 44.1% and the overall rate of osteopenia was 33.4%. The study found an association between several factors with osteoporosis: the prevalence of osteoporosis increased with age and was consistently higher in females than males, regardless of skeletal sites ( $p < 0.05$ ).

**Conclusion:** In Vietnam, the overall rate of osteoporosis in adults over 50 is relatively high and the rate of osteoporosis in the lumbar spine is higher than that in the femoral neck. Osteoporosis was associated with age and sex.

**Key words:** bone mineral density, osteoporosis, adults.

## 1. BACKGROUND

Osteoporosis is defined as a skeletal disorder characterized by compromised bone strength predisposing to an increased risk of fracture. Bone strength reflects the integration of two main features: bone density and bone quality [1]. According to the International Osteoporosis Foundation, the disease affects approximately 500 million people, including 6.3% of men over the age of 50 and 21.2% of women over the same age range globally. Worldwide, up to 37 million fragility fractures occur annually in individuals aged over 55 and 1 in 3 women over age 50 will experience osteoporosis fractures, as will 1 in 5 men aged over 50 [2]. With the ageing of the global population, the annual number of osteoporosis-related hip fractures is projected to nearly double between 2018 and 2050. Osteoporosis is a disease of bone that progresses silently, and can cause bones to become so fragile that they break easily, even after a minor fall or bump. The majority of people with osteoporosis are not aware of the underlying condition until a fracture occurs. Without increased emphasis on prevention and treatment, and with populations ageing worldwide, the human and economic impact of osteoporosis will keep rising [3].

Therefore, this study aimed to identify the prevalence of osteoporosis in adults over 50 visiting the hospital of Hue University of Medicine and Pharmacy and some factors associated with osteoporosis.

## 2. MATERIALS AND METHODS

### 2.1. Participants

957 adults aged 50 years and older visited at the hospital of Hue University of Medicine and Pharmacy from January 1, 2025 to July 1, 2025.

*Inclusion criteria were as follows:* Patients agreed to participate in the study and had BMD results by DEXA at 2 locations (femoral neck and lumbar spine).

*Exclusion criteria were as follows:* Patients use some medications affecting bone turnover (bisphosphonate, corticosteroid,...) within 3 months.

### 2.2. Research design

Descriptive cross-sectional study.

The patients involved in the study were measured spine and hip bone mineral density and an investigation of risk factors was conducted. Bone mineral density (BMD) was measured using DEXA (Dual-energy X-ray Absorptionmetry).

The diagnostic criterion for osteoporosis is T-score lower than -2.5 at either site [4].

### 2.3. Statistical Analysis

Statistical analysis was performed using SPSS version 18.0. The analyzed factors included age, sex, and BMI. Descriptive data for categorical variables were presented in tables with counts and percentages. The chi-square test was used for comparisons of categorical variables.

### 2.4. Ethics Approval

Prior to the collection of data, this study was approved by the Ethics Committee in Biomedical Research, Hue University Of Medicine and Pharmacy, code H2025/459.

### 3. RESULTS

From January 2025 to July 2025, a total of 957 participants were included for the study with the general characteristics of the participants presented in Table 1 and Table 2.

Evaluation of osteoporosis rates by measurement site showed that osteoporosis in the lumbar spine, femoral neck and any proportion had respectively 42.8%, 12.9% (Table 3). The overall osteoporosis rate was 44.1%, the osteopenia rate was 33.4% (Table 4).

**Table 1.** Characteristics of study participants (N=957)

Variable		N	Percent (%)
Sex	Male	215	22.5
	Female	742	77.5
Age	50 - 64	389	40.6
	65 - 79	375	39.2
	≥ 80	193	20.2
BMI	Underweight	95	9.9
	Normal weight	638	66.7
	Overweight	203	21.2
	Obese	21	2.2

The male-to-female ratio was 1:3. Approximately 60% of the participants were aged 65 years or older. The overweight and obese group had a relatively high rate of 23.4% and the underweight rate was 9.9%.

**Table 2.** Characteristics of study participants

Variable	Median	Quartile
Age (y)	67	60 – 77
Weight (kg)	52	47 – 58
Height (cm)	152	147 – 158
BMI (kg/m <sup>2</sup> )	22.5	20.0 – 24.7
Lumbar spine BMD	0.753	0.647 – 0.891
Femoral neck BMD	0.698	0.602 – 0.799

The median age was 67 years, the median body mass index was 22.5 kg/m<sup>2</sup>. Median bone mineral density (BMD) for spine and femoral neck was 0.753 g/cm<sup>2</sup> and 0.698 g/cm<sup>2</sup> respectively.

**Table 3.** Osteoporosis rates by measurement site

Site	Osteoporosis		Osteopenia		Normal	
	N	%	n	%	n	%
Lumbar spine	410	42.8	291	30.4	256	26.8
Femoral neck	123	12.9	362	37.8	472	49.3

The prevalence of osteoporosis was higher in the lumbar spine (42.8%) than in the femoral neck (12.9%).

**Table 4.** General osteoporosis rate (WHO standard)

Classification	N	Percent (%)
Osteoporosis	422	44.1
Osteopenia	320	33.4
Normal	215	22.5
<b>All participants</b>	<b>957</b>	<b>100.0</b>

The overall rate of osteoporosis was 44.1% and the overall rate of osteopenia was 33.4%.

**Table 5.** Risk factors significantly correlated with osteoporosis

Variable	Lumbar spine Osteoporosis		Femoral neck osteoporosis		General osteoporosis		
	OR	P	OR	p	OR	P	
Sex	Male	1	1		1		
	Female	2.83 (2.01 - 3.99)	<b>0.000</b>	1.94 (1.14 - 3.32)	<b>0.014</b>	2.76 (1.97 - 3.87)	<b>0.000</b>
Age	50 - 64	1	1		1		
	65 - 79	3.19 (2.23 - 4.56)	<b>0.000</b>	9.29 (5.15 - 16.76)	<b>0.000</b>	3.47 (2.42 - 4.97)	<b>0.000</b>
	≥ 80	1.74 (1.22 - 2.47)	<b>0.002</b>	2.48 (1.61 - 3.80)	<b>0.000</b>	1.94 (1.36 - 2.77)	<b>0.000</b>
BMI	Normal	1	1		1		
	Under weight	0.96 (0.40 - 2.31)	0.925	0.85 (0.20 - 3.75)	0.834	0.93 (0.39 - 2.23)	0.869
	Over weight	0.46 (0.18 - 1.19)	0.110	0.21 (0.05-0.95)	<b>0.042</b>	0.40 (0.15 - 1.05)	0.061
	Obese	1.71 (0.68 - 4.26)	0.252	1.02 (0.22 - 4.72)	0.980	1.56 (0.63 - 3.88)	0.342

The survey data shows a statistically significant increase in the risk of osteoporosis for women compared to men at both measurement sites, with women having 2.76 times the overall rate of osteoporosis as men, a finding with  $p < 0.05$  significance.

This study revealed a statistically significant increase in osteoporosis rates with age, finding that the 65 - 79 and over 80 age groups had substantially higher rates than the under-65 group at both measurement sites. Specifically, the 65 - 79 age group had a 3.47-fold higher risk of osteoporosis, and the over 80 group had a 1.94-fold higher risk than the under-65 group, with all findings being statistically significant ( $p < 0.05$ ).

The result showed that a higher BMI was associated with a lower prevalence of osteoporosis in the femoral neck, a finding with  $p < 0.05$  significance.

## 5. DISCUSSION

The results of this study revealed that the overall prevalence of osteoporosis was 44.1%,

while osteopenia accounted for an additional 33.4% of cases. Consequently, nearly 80% of the study population exhibited some degree of bone abnormality. This combined prevalence is notably high and aligns closely with findings from previous domestic studies in Vietnam [5], [6]. Such a high burden of reduced bone mineral density highlights osteoporosis and osteopenia as major public health concerns within the studied population. Compared with foreign studies, many Vietnamese studies have reported a higher prevalence of osteoporosis. This discrepancy may be partly attributed to ethnic differences in bone density, skeletal size, and bone microarchitecture [7]. Asian populations, including Vietnamese individuals, generally have lower peak bone mass and smaller bone frames, which may predispose them to a higher risk of osteoporosis. In addition, age-related bone loss may occur earlier or progress more rapidly due to genetic and biological factors. Beyond ethnicity, several modifiable and non-modifiable factors likely contribute to the higher observed prevalence. Dietary habits, particularly

insufficient intake of calcium and vitamin D, are common in many Vietnamese populations and play a critical role in bone metabolism. Limited sunlight exposure in urban areas may further exacerbate vitamin D deficiency. Lifestyle factors such as low levels of physical activity, smoking, and alcohol consumption have also been shown to negatively affect bone health. Moreover, socioeconomic conditions—including income level, access to healthcare services, and health awareness—can influence early detection, prevention, and management of osteoporosis, thereby affecting reported prevalence rates.

The present study also demonstrated a significant association between gender and osteoporosis risk. Women were found to have a 2.76-fold higher risk of osteoporosis compared to men (OR = 2.76; 95% CI: 1.97 - 3.87;  $p < 0.001$ ). This finding is consistent with global literature and can be explained by both biological and hormonal factors. Women generally have lower peak bone mass than men and experience accelerated bone loss following menopause due to the decline in estrogen levels, a hormone that plays a crucial protective role in maintaining bone density. As a result, postmenopausal women represent a particularly high-risk group for osteoporosis and related fractures. Age was another significant determinant, with the risk of osteoporosis increasing progressively with advancing age ( $p < 0.001$ ). Aging is associated with reduced osteoblast activity, increased osteoclast-mediated bone resorption, and impaired calcium absorption, all of which contribute to a negative bone remodeling balance. Additionally, older individuals are more likely to have comorbidities and reduced mobility, further accelerating bone loss and fracture risk.

Regarding Body Mass Index (BMI), the study found that higher BMI, particularly in the overweight and obese categories, was associated with a lower risk of osteoporosis, including at the femoral neck. This protective effect may be explained by greater mechanical loading on the skeleton, which stimulates bone formation, as well as higher levels of estrogen produced by adipose tissue. However, while higher BMI appears protective against low bone mineral density, it is important to note that obesity carries other health risks and does not eliminate the risk of fractures, especially those related to falls and poor muscle strength. Overall, these findings underscore the multifactorial nature of osteoporosis and highlight the importance of targeted screening and preventive strategies, particularly for older

adults, women, and individuals with low BMI. Public health interventions focusing on improving nutrition, promoting physical activity, and increasing awareness of osteoporosis risk factors are essential to reduce the growing burden of bone diseases in Vietnam.

## 6. CONCLUSION

In a study of 957 adults over 50, high rates of osteoporosis and osteopenia were found. The risk of osteoporosis is higher in women and increases with age, with BMI status also linked to risk. Routine bone mineral density screening using DEXA is recommended for adults aged 50 years and older to detect osteoporosis and osteopenia (according to WHO's recommendation), with interventions like nutrition education, exercise, and medication used to improve bone health and prevent osteoporosis-related fractures.

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