# Prevalence of Osteopenia and Osteoporosis in the Kyrgyz Republic

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## Abstract

**Objectives:** To study the prevalence of osteopenia and osteoporosis (OP) among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years), Give a comparative assessment of the prevalence of osteopenia and OP depending on gender and Based on the results, make proposals for the identification and diagnosis of osteopenia and OP in the Kyrgyz Republic.

**Materials and Methods:** An Ultrasound bone densitometry (USBD) studied the Bone mineral density (BMD) in a total of 1200 people with 691 women and 509 men of 3 different age categories (18-39 years, 40-59 years, 60-79 years).

**Results:** In the first group from 18-39 years, normal values found in 55.6% of people, osteopenia in 38.9% of people and OP in 5.5% of people. In the second group, from 40-59 years old, normal values found in 30.9% people, osteopenia in 60.2% people and OP in 8.9% people. Moreover, in the third group, from 60-79 years, normal values were found in 9.5%, osteopenia is seen in 50.2% and OP in 40.3% of older people.

**Conclusion:** Osteopenia and OP are quite common not only in the older age but even affect people of a younger age. The frequency of detection of osteopenia and OP is the highest recorded in older age groups. Women mostly exposed to OP that has pronounced degrees of BMD affection.

***Keywords:*** *Bone mineral density, Ultrasound bone densitometer, Ultrasound bone densitometry Osteopenia, Osteoporosis.*

## Introduction

Osteoporosis (OP) is a systemic disease of the skeleton, in which bone strength decreases, which leads to an increased risk of fractures[1]. Osteoporosis is characterized by a low bone mineral density (BMD) and microarchitectural changes in bones, leading to increased bone fragility[2]. When fractures occur because of OP, the quality of life decreased[3]. The World Health Organization (WHO) has proposed bone mineral density (BMD) measurements for diagnosing osteoporosis[4]. OP is three times more common in women than men[5,6]. WHO experts attributed OP to one of the most common diseases, which, along with myocardial infarction, cancer and sudden death, occupies a leading place in the structure of morbidity and mortality[7,8].

OP is an health burden in both developed and developing countries[9].According to the International

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Fund for Osteoporosis, every three seconds in the world, there is one fracture caused by OP. A modern strategy for organizing care for patients with OP is an early diagnosis with identification of a high risk of fractures and the early appointment of pathogenetic treatment[10].

The problem of OP in the Kyrgyz Republic remains unsolved and not studied at all. Being in most cases an asymptomatic disease that cannot suspect in the absence of fractures, OP often remains undiagnosed. There are no unified approaches to prevention and treatment, due to the lack of the necessary medical equipment, and there are misconceptions on various aspects of diagnosis.

**Aim:** To perform ultrasound bone densitometry (USBD) in 3 different age categories of people (18-39 years, 40-59 years, and 60-79 years), to identify and study the prevalence of osteopenia and OP.

**Objectives:** To study the prevalence of osteopenia and OP among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years), to give a comparative assessment of the prevalence of osteopenia and OP depending on gender and based on the results, make proposals for the identification and diagnosis of osteopenia and OP in the Kyrgyz Republic.

## Materials and Method

The study was conducted by the Rheumatology Faculty of the Department of Hospital Internal medicine, Occupational Pathology with a Course of Hematology, based in the City Clinical Hospital No. 1, Bishkek, Kyrgyz republic. Ethical clearance taken from Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy. The survey included 1200 people, residents of the Kyrgyz republic. Of these, 691 women and 509 men of different age groups (Table 1).

**Table 1. Characteristics of the examined people**

| Age groups | Age of people | The number of people | Total women | Total men |
|---|---|---|---|---|
| First group | 18-39 years old | 524 (43,7%) | 285 (54,4%) | 239 (45,6%) |
| Second group | 40-59 years old | 391 (32,6%) | 227 (58,0%) | 164 (42,0%) |
| Third group | 60-79 years old | 285 (23,7%) | 179 (55,8%) | 106 (44,2%) |
| **Total:** | | **1200** | **691 (62,8%)** | **509 (37,2%)** |

As can be seen from the table 1, the first group consisted of people aged 18-39 years, and the average age was 28.1 ± 1.93 years, the ratio of women to men was 1.1: 1.0. The second group includes people aged 40-59 years, and the average age is 51.2 ± 2.47 years, the ratio of women to men is 1.3: 1.0. Moreover, the third group consisted of older people aged 60-79 years, and the average age was 76.8 ± 2.81 years; the ratio of women to men 1.6: 1.0.

For screening, our study used the SONOST-3000 portable ultrasound bone densitometer, which measures bone mineral density (BMD). This study conducted among university students, medical staff and residents of Bishkek (Chuy region), Karakol (Issyk-Kul region) and Naryn (Naryn region). Senior age groups also recruited among the wards of Bishkek and Nizhne-Serafimovsky social inpatient facilities for the older people and people with disabilities (Chuy region, Kyrgyz Republic).

## Statistical Analysis

Statistical data analysis and mathematical processing carried out using the Microsoft Excel program, the Statistica Excel application software package, and the Statistica 8.0 application software package. Parametric and nonparametric analysis methods, descriptive statistics with the calculation of the median, 25% and 75% quartiles used. Mutual influence of indicators is determined by, Spearman's correlation analysis was

used (to determine the relationship between qualitative and quantitative indicators, the Spearman's correlation coefficient) and Pearson (to determine the mutual influence between the quantitative indicators). Mann-Whitney criteria used to assess the significance of differences between groups. Differences were considered statistically significant at an error level of $p < 0.05$.

## Results

In our study, the diagnosis of OP carried out based on a decrease in BMD detected by ultrasound bone densitometer, and the following classification used to interpret the results.

USBD in the first group from 18-39 years showed (Table 2) that, in 291 individuals, the T and Z scores were within normal values to -1.0. In 204 people, the T and Z scores ranged from -1.1 to -2.5, and in 29 people, the T score was 2.9, and the Z score was 3.2. Thus, in the first age group, normal values were found in 55.6% of people, osteopenia in 38.9% of people, and OP in 5.5% of people.

**Table 2. Data of bone ultrasound densitometry examination of different age groups**

| **Bone densitometry Normal Values** | **Normal T and Z scores to -1.0 (people No.)** | **Osteopenia T and Z scores from -1.1 to -2.5 (people No.)** | **Osteoporosis T and Z scores below -2.5 (people No.)** | **Total (people No.)** |
|---|---|---|---|---|
| First group (18-39 years old) | 291 (55,6%) | 204 (38,9%) | 29 (5,5%) | 524 |
| Second group (40-59 years old) | 121 * (30,9%) | 235 * (60,2%) | 35 * (8,9%) | 391 |
| Third group (60-79 years) | 27 ** (9,5%) | 143 ** (50,2%) | 115 ** (40,3%) | 285 |
| Total: | 439 (36,6%) | 582 (48,5%) | 179 (14,9%) | 1200 |

Note:
* - $p < 0.05$ - differences are statistically significant compared with the indicators of the first group
** - $p < 0.05$ - differences are statistically significant compared with the first and second groups

The second age group included people from 40-59 years old. In this study group of 121 people, indicators of the T and Z scores were within normal limits to -1.0. In 235 people, the T and Z scores ranged from -1.1 to -2.5. For the remaining 35 people, the T and Z scores were below -2.5. In this study group, normal values found in 30.9% of people, osteopenia in 60.2% of people and OP in 8.9% of people, which is significantly higher than in the first group of the study (Table 2). This shows that, with ageing, osteopenia worsens and the number of people with OP increases.

In the third age group from 60-79 years, as can be seen from table 3, in 27 people the indicators of the level of T and Z scores were within normal limits to -1.0; 143 people had T and Z scores ranging from -1.1 to -2.5, and 115 people had T and Z scores below -2.5. Thus, the USBD detected osteopenia in 50.2% and OP in 40.3% of the older age group. Normal values found in 27 (9.5%) people. Moreover, the normal values of USBD found regardless of the increase in age.

We also analyzed the data of USBD depending on gender (Figure 1). So, out of 691 women, normal values of BMD were in 253 (36.6%) women, osteopenia observed in 331 (47.9%) and OP in 107 (15.5%) of them. Of the 509 men, bone mineral density indicators were normal in 241 (47.3%) people, osteopenia diagnosed in 203 (39.9%) of them, and OP in 65 (12.8%) people.

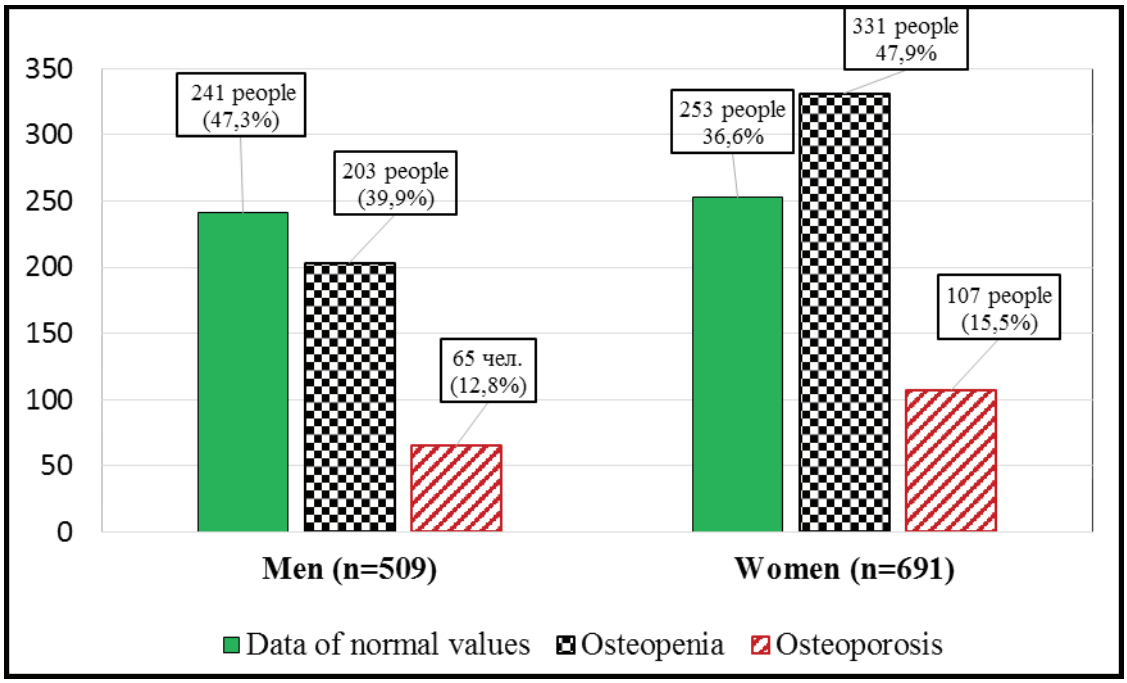


**Figure 1. Ultrasound bone densitometry data depending on gender.**

As can be seen from the figure, the results obtained indicate that the prevalence of osteopenic syndrome and OP in our study is significantly higher in women ($p < 0.05$) than in men.

## Discussion

Our primary objective was to study the prevalence of osteopenia and OP among residents of the Kyrgyz Republic in 3 different age categories (18-39 years, 40-59 years, and 60-79 years). By USBD, the frequency of detection of osteopenia and OP is the highest recorded in older age groups. At the age of 40-59 years (II group), osteopenia detected in 60.2%, OP in 8.9%, and in the III group of 60-79 years, osteopenia detected in 50.2%, OP in 40.3%.

Our secondary objective was to give a comparative assessment of the prevalence of osteopenia and OP depending on gender. Osteopenia in women was 47.9%, and in men, it was 39.9%; OP in women was 15.5% and in men was 12.8%. By this study, it's clear that women majorly effected to OP that has pronounced degrees of BMD affection. This type of studies conducted by the Kazakh Academy of Nutrition and S.D. Asfendiyarov Kazakh National Medical University in 2011 (The prevalence of osteoporosis among the population of older age groups according to sonographic screening studies in the Republic of Kazakhstan), but their results differ from our data. So, in their study, both women and men are equally affected by a decrease in the mineral density of bone tissue, whereas in our case, significantly higher numbers in women. The severity of osteopenia in the work of Kazakh colleagues amounted to 74.4%, of which OP was 22.2%, in our study, this indicator is significantly lower.

Our studies clearly showed that with ageing, the situation of osteopenia and OP only worsens. At the same time, osteopenia and OP are quite common not only in the older age, regardless of age, they also affect people of a younger age. In real life, we faced with the fact that often not only society itself, but also the medical community accepts osteopenia and OP as an age-related disease, the lot of older people, and this is the most profound error and mistake that only relaxes vigilance.

The advantages of study are we included all age groups for study, included people from many regions, received good results which may pave the way for future studies. Only one limitation of our study is the sample size; further studies with higher samples required to validate our results and receiving precise results are essential.

## Conclusion

1. According to USBD, the frequency of detection of osteopenia and OP is the highest recorded in older

age groups. At the age of 40-59, osteopenia detected in 60.2%, OP in 8.9%, and in the age group of >60 years, osteopenia detected in 50.2%, OP in 40.3%.

2. Women most exposed to OP that has pronounced degrees of BMD affection. So, osteopenia in women was 47.9%, on the contrary, in men - 39.9%; OP in women was 15.5%, while in men it was 12.8%.

3. It is necessary to develop and approve a detailed plan and strategy for the prevention of osteopenia and OP acceptable for use by regions of the Kyrgyz Republic, taking into account the study of specific disease risk factors.

**Conflict of Interest:** The authors declare no conflict of interest.

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**Ethical Clearance:** Taken from the Committee on Bioethics, I.K. Akhunbaev Kyrgyz State Medical Academy.

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