fortune Journals

Research Article

JOURNAL OF SURGERY AND RESEARCH

ISSN: 2640-1002

Frequency and Clinical Correlates of Low Bone Mineral Density among Adults Attending a Tertiary Care Diagnostic Center

Araf Reshad[1*], Md. Moklesur Rahman[2], Nafisur Rahman[3], Jannatul Ferdaus[4]

Abstract

Background: Osteoporosis is a major global public health concern that primarily affects older populations and postmenopausal women. Reduced bone mineral density (BMD), which raises the risk of fracture, is the condition's defining feature. This study aimed to ascertain the prevalence of low bone mineral density (BMD) and its clinical correlates among adults having their BMD evaluated at a tertiary care diagnostic center.

Methods: A cross-sectional study was conducted at Square Hospitals Ltd., Dhaka, Bangladesh, from June 2022 to February 2023 among 826 adults who underwent dual-energy X-ray absorptiometry (DXA) scanning. BMD measurements were taken at the lumbar spine (L1-L4) and femoral neck. The participants were categorized as normal, osteopenia, or osteoporosis based on WHO criteria. Age, sex, and body mass index (BMI) were among the demographic information recorded. Data were analyzed using SPSS version 26, including Chi-square tests, correlation analyses, and multivariable logistic regression.

Results: 90.8% of the population was female, and the mean age was 63.2±9.4 years. Osteoporosis was found in 30.9% of cases, and osteopenia in 50.6% of cases. 66.1% of participants had low bone mineral density at the femoral neck. While higher BMI demonstrated protective effects with a 12% reduction per unit increase (AOR=0.88, 95% CI: 0.85-0.92, $p<0.001$), advanced age independently increased osteoporosis odds by 5% annually (AOR=1.05, 95% CI: 1.03-1.07, $p<0.001$). There was no significant predictor of sex. Age-BMD correlations were negligible, and correlation analyses showed a weak positive relationship between BMI and lumbar spine BMD ($r = +0.148$).

Conclusion: With more than 80% of the population having either osteopenia or osteoporosis, the study shows a high burden of low BMD. In tertiary care settings, age and BMI were found to be significant independent predictors, highlighting the necessity of focused screening and early intervention techniques.

Keywords: Low bone mineral density; Osteoporosis; Skeletal disorder

Introduction

Reduced bone mineral density (BMD), microarchitectural deterioration, and weakened bones are the hallmarks of osteoporosis, a progressive systemic skeletal disorder that puts people at risk for fragility fractures [1]. Due mostly to population aging and longer life expectancies, the prevalence of osteoporosis is estimated to be over 200 million worldwide [2]. Due to fracture-related complications that primarily affect the spine, hip, and distal radius, the condition

Affiliation:

[1]Faculty of Health Sciences, Queen's University, Kingston, Ontario, Canada

[2]Division of Orthopedics, Department of Surgery, Square Hospitals Ltd., Dhaka, Bangladesh

[3,4]Department of Radiology, Square Hospitals Ltd., Dhaka, Bangladesh

***Corresponding author:**
Araf Reshad, Faculty of Health Sciences, Queen's University, Kingston, Ontario, Canada

Citation: Araf Reshad, Md. Moklesur Rahman, Nafisur Rahman, Jannatul Ferdaus. Frequency and Clinical Correlates of Low Bone Mineral Density among Adults Attending a Tertiary Care Diagnostic Center. Journal of Surgery and Research. 9 (2026): 92-97.

Received: February 09, 2026
Accepted: February 16, 2026
Published: February 19, 2026

Reshad A, et al., J Surg Res 2026
DOI:10.26502/jsr.10020492

imposes significant morbidity, mortality, and economic costs [3]. Because estrogen deficiency after menopause accelerates bone resorption and upsets the balance of bone remodeling, postmenopausal women are the demographic group most at risk for osteoporosis [4]. Research shows that the prevalence of osteopenia and osteoporosis rises sharply with age, especially in postmenopausal women compared to men, and that BMD has a major impact on the risk of long-term complications [5]. Osteoporosis does, however, also affect men, particularly those over 70, though it is often underdiagnosed in this group. Measurements are usually taken at the lumbar spine, total hip, and femoral neck using dual-energy X-ray absorptiometry (DXA), which is still the gold standard diagnostic technique for BMD assessment [6]. T-scores are used by the World Health Organization to determine diagnostic thresholds: normal (T-score ≥ -1.0), osteopenia (-2.5 < T-score < -1.0), and osteoporosis (T-score ≤ -2.5) [7]. Clinical management decisions about pharmacological interventions are guided by these standardized criteria, which also make international comparisons easier. Osteoporosis is caused by several risk factors, such as advanced age, female sex, low body mass index (BMI), hormonal deficiencies, insufficient intake of calcium and vitamin D, sedentary lifestyle, smoking, excessive alcohol consumption, and certain medications like glucocorticoids [8]. The relationship between body mass index and bone mineral density (BMD) is complicated; research indicates that higher BMI categories may offer protective effects against bone loss, although this association seems to be site-dependent and age-specific [9]. Developing focused prevention and treatment plans requires an understanding of these modifiable and non-modifiable risk factors. Osteoporosis is still largely underdiagnosed and undertreated worldwide, despite increased awareness; many people have their first fracture without a diagnosis or treatment [10]. Tertiary care diagnostic centers, which offer specialized BMD evaluation services for symptomatic individuals and those with identified risk factors, are essential in case finding and risk assessment. However, little is known about the clinical correlates and prevalence patterns of low BMD in these contexts, especially in diverse geographic areas with different dietary habits and access to healthcare. This study assessed the prevalence of osteoporosis and low BMD in adults who visited a tertiary care diagnostic facility. Characterizing the demographic profile of those impacted, looking at site-specific patterns of bone loss, assessing the connections between BMD and clinical factors like age and BMI, and using multivariable analysis to find independent predictors of osteoporosis were secondary goals. These results will support evidence-based screening guidelines and guide public health initiatives for managing and preventing osteoporosis in tertiary care settings.

Methods

This cross-sectional observational study was conducted at Square Hospitals Ltd., Dhaka, Bangladesh, from June 2022 to February 2023. The study population comprised 826 adults who were referred for BMD testing due to clinical indications, established risk factors, or routine screening. All individuals 30 years of age and older who had complete, technically adequate DXA scans and had access to demographic data, such as age, sex, height, weight, and BMI, were included. Patients under 30 years old, those with incomplete or subpar scans (poor quality/below standard), those with conditions that could skew the interpretation of BMD (such as severe osteoarthritis, fractures at measurement sites, or metallic implants), those taking drugs that significantly affect bone metabolism (such as bisphosphonates, denosumab, teriparatide, or systemic corticosteroids), and those with secondary causes of osteoporosis (such as endocrine disorders, chronic kidney disease, or malabsorption syndromes) were also disqualified. Standardized dual-energy X-ray absorptiometry (DXA) protocols were used to measure BMD at the femoral neck (left and right), total hip (left and right), and lumbar spine (L1-L4). All scans were carried out by qualified technicians following daily calibration protocols, and BMI was computed using recorded height and weight. The lowest T-score from the femoral neck or lumbar spine was used to classify bone mineral density according to World Health Organization criteria [11], classifying people as having normal bone density (T-score ≥ -1.0), osteopenia (-2.5 < T-score < -1.0), or osteoporosis (T-score ≤ -2.5). Statistical analysis was performed on SPSS version 26, including descriptive summaries of demographic and clinical characteristics, with continuous variables expressed as means and standard deviations and categorical variables presented as frequencies and percentages. Chi-square tests evaluated associations between BMD categories and demographic factors, Pearson correlation coefficients assessed relationships between age, BMI, and site-specific BMD values, and multivariable logistic regression identified independent predictors of osteoporosis, with adjusted odds ratios and 95% confidence intervals. Statistical significance was set at $p < 0.05$.

Results

Table 1 represents the baseline characteristics of the study population. The mean age of the study was 63.2±9.4 years. There were only 76 men (9.2%), and the great majority (90.8%) were women. The age distribution revealed that the majority of participants were between the ages of 60-69 (41.9%), followed by those between the ages of 50-59 (28.1%) and ≥70 (24.7%). In terms of body mass index, just 1.7% of people were underweight, 29.9% were obese, and 45.2% were overweight. The majority of the population was overweight, as indicated by the mean BMI of 28.0±5.9 kg/m².

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DOI:10.26502/jsr.10020492

Table 1: Baseline characteristics of the study population (n = 826)

Variable	Category	(n)	(%)
Age groups (years)	<30	0	0%
	30-39	1	0.10%
	40-49	43	5.20%
	50-59	232	28.10%
	60-69	346	41.90%
	≥70	204	24.70%
Age (Mean, SD)	-	63.2 ± 9.4	-
Sex	Female	750	90.80%
	Male	76	9.20%
BMI categories	Underweight (<18.5)	14	1.70%
	Normal (18.5-24.9)	192	23.20%
	Overweight (25.0-29.9)	373	45.20%
	Obese (≥30.0)	247	29.90%
BMI (Mean, SD)	-	28.0 ± 5.9	-

Table 2 shows the bone mineral density assessment of the study population. The femoral neck (78.3% on the left side) and total hip (79.3% on the left side) were the most common locations for BMD measurements. However, all participants had lumbar spine BMD measurements (100%).

Table 2: Bone mineral density assessment profile (n = 826)

Parameter	(n)	(%)
Femoral Neck BMD measured (left)	647	78.3%
Lumbar Spine (L1-L4) BMD measured	826	100%
Total Hip BMD measured (left)	655	79.3%

Table 3 depicts the BMD classification based on WHO criteria and site-specific low BMD prevalence. Only 18.4% of participants had normal bone density in the combined measurements of the lumbar spine and femoral neck. Over 80% of the study population had compromised bone health, as evidenced by the 50.6% prevalence of osteopenia and the 30.9% who met the criteria for osteoporosis. Only 15.5% of patients had low BMD at the lumbar spine, compared to 66.1% at the femoral neck, while 33.9% had normal BMD at the femoral neck and 84.5% had normal BMD at the lumbar spine.

Table 4 reveals the BDM classification across age, sex, and BMI. Age-stratified analysis demonstrated progressive deterioration in bone health with advancing age. The percentage of people over 70 who had osteoporosis rose from 16.3% in the 40-49 age group to 40.9%. Males had a higher percentage of normal BMD (35.5%) than females (16.6%), but they also had a significant prevalence of osteoporosis (35.5%). Higher body weight has a protective effect, according to BMI analysis, with 85.7% of underweight participants having osteoporosis and only 17.8% of obese participants. On the other hand, 24.7% of obese participants and 0% of underweight participants had normal BMD.

The mean BMD and T-score values at the main skeletal sites are shown in table 5. The lumbar spine had the highest mean BMD values (0.962 g/cm²), while the femoral neck had the lowest (0.791 g/cm² on the left and 0.810 g/cm² on the right). The BMD values for the entire hip were intermediate (0.889 g/cm² on the left and 0.878 g/cm² on the right). All measured sites showed osteopenia, as indicated by corresponding T-scores, lumbar spine (-1.87), femoral neck left (-1.82), and femoral neck right (-1.69).

- A T-score between -1.0 and -2.5 indicates Osteopenia (WHO)
- A T-score of <-2.5 indicates Osteoporosis (WHO)

Table 3: Bone mineral density classification and prevalence.

Category		(n)	(%)
WHO classification (combined FN + LS)		-	-
Normal		152	18.40%
Osteopenia		418	50.60%
Osteoporosis		256	30.90%
BMD prevalence	Low BMD - Femoral Neck	546	66.10%
	Normal BMD - Femoral Neck	280	33.90%
	Low BMD - Lumbar Spine	128	15.50%
	Normal BMD - Lumbar Spine	698	84.50%

Table 4: BMD classification across age, sex, and BMI.

Category	Normal %	Osteopenia %	Osteoporosis %
Age group	-	-	-
30-39 (n=1)	100%	0%	0%
40-49 (n=43)	30.20%	53.50%	16.30%
50-59 (n=232)	23.30%	56%	20.70%
60-69 (n=345)	13.60%	52.50%	33.90%
≥70 (n=203)	17.70%	41.40%	40.90%
Sex	-	-	-
Female (n=748)	16.60%	52.90%	30.50%
Male (n=76)	35.50%	28.90%	35.50%
BMI category	-	-	-
Underweight (n=14)	0%	14.30%	85.70%
Normal (n=192)	10.90%	46.40%	42.70%
Overweight (n=373)	18.60%	49.90%	31.50%
Obese (n=247)	24.70%	57.50%	17.80%

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DOI:10.26502/jsr.10020492

Table 5: Mean BMD and T-score values at major skeletal sites.

Parameter	Mean / T-score
Femoral Neck BMD (Left)	0.7907 g/cm² (Mean)
Femoral Neck BMD (Right)	0.8098 g/cm² (Mean)
Total Hip BMD (Left)	0.889 g/cm² (Mean)
Total Hip BMD (Right)	0.878 g/cm² (Mean)
Lumbar Spine BMD (L1-L4)	0.962 g/cm² (Mean)
Femoral Neck T-score (Left)	-1.82 (T-score)
Femoral Neck T-score (Right)	-1.69 (T-score)
Lumbar Spine T-score (L1-L4)	-1.87 (T-score)

Correlation analysis in Table 6 showed weak linear correlations between BMD, age, and BMI at various locations. Age did not significantly correlate with lumbar spine BMD (r = +0.055) or femoral neck BMD (r=+0.027), indicating that age-related bone loss in this clinical population does not follow a straightforward linear pattern. BMI showed almost no correlation with femoral neck BMD (r = -0.001) but a weak positive correlation with lumbar spine BMD (r = +0.148).

Table 7 demonstrates a multivariable logistic regression model predicting osteoporosis. Age was found to be a significant independent predictor after controlling for potential confounders. The odds of developing osteoporosis increased by about 5% for every extra year (AOR=1.05, 95% CI: 1.03-1.07, p<0.001). The odds of osteoporosis decreased by about 12% for every unit increase in BMI (AOR=0.88, 95% CI: 0.85-0.92, p<0.001). It's interesting to note that after controlling for age and BMI, sex was not a statistically significant predictor (AOR=0.64, 95% CI: 0.37-1.11, p=0.115). This suggests that age and body composition differences, rather than sex per se, may account for a large portion of the higher osteoporosis rates in females.

Discussion

This cross-sectional study revealed a substantial burden of low bone mineral density, with 81.5% of participants exhibiting either osteopenia or osteoporosis. Our study population's 30.9% osteoporosis prevalence is significantly higher than rates found in a number of recent studies [12-14]. Only 10.4% of postmenopausal women had osteoporosis, according to Pinar et al. [12], and even lower rates have been reported in general populations. This disparity probably reflects the clinical features of our tertiary care population, which is a higher-risk cohort than community-based screening programs since patients are specifically referred for BMD evaluation based on risk factors or symptoms. Because osteopenia and osteoporosis are significantly more common in women than in men, especially among postmenopausal women, the study's 90.8% female predominance is consistent with a study by Khurmah et al. [13]. The critical postmenopausal period, when estrogen deficiency causes accelerated bone loss, is represented by the mean age of 63.2 years. Our age-stratified analysis showed that the prevalence of osteoporosis increased with age, rising from 16.3% in people aged 40-49 to 40.9% in people aged ≥70. The established pathophysiology of bone remodeling imbalance and the cumulative effects of risk factors over time are consistent with Zhang et al. [14]. Our study's positive correlation between BMI and BMD supports results from nationally representative samples that indicate an increase in femoral neck BMD is correlated with every unit increase in BMI [15]. The framework of mechanical loading effects on bone metabolism was supported by our multivariable analysis, which showed that every unit increase in BMI decreased the odds of osteoporosis by 12%. Although adipose tissue endocrine functions through leptin and other adipokines may also contribute to bone-fat interactions, the protective mechanism most likely involves increased

Table 6: Correlation Matrix (Age, BMI vs BMD at FN & LS).

Variable pair	Correlation (r)	Interpretation of the analysis
Age vs LS-BMD	0.055	Essentially no meaningful linear correlation
BMI vs LS-BMD	0.148	Weak positive correlation: higher BMI is very slightly associated with higher LS BMD
Age vs FN-BMD (Left)	0.027	No meaningful correlation
BMI vs FN-BMD (Left)	–0.001	No correlation (effectively zero)

Table 7: Multivariable Logistic Regression Model Predicting Osteoporosis (Outcome: Osteoporosis vs non-osteoporosis vs Predictors).

Predictor	Adjusted OR (AOR)	95% CI	p-value	Interpretation of the analysis
Age (per 1-year increase)	1.05	1.03 - 1.07	< 0.001	Each additional year of age increases the odds of osteoporosis by about 5%, independent of BMI and sex
BMI (per 1 kg/m² increase)	0.88	0.85 - 0.92	< 0.001	Each unit increase in BMI reduces the odds of osteoporosis by about 12%, adjusting for age and sex
Male vs female	0.64	0.37 - 1.11	0.115	Sex is not a significant independent predictor

mechanical strain from higher body weight [16]. The lumbar spine's weak linear correlations (r=+0.148) indicate that this relationship is complicated and influenced by a variety of factors, such as muscle mass, metabolic status, and fat distribution. With 66.1% showing low BMD at the femoral neck and only 15.5% at the lumbar spine, the site-specific patterns provided significant clinical insights. This disparity is a result of both real biological variation in bone loss patterns and variations in measurement frequency. Because the femoral neck is primarily composed of cortical bone, which reacts differently to aging and hormonal changes than the trabecular-rich lumbar spine, it is a notable site for fracture prediction and diagnosis [17]. Furthermore, degenerative changes, osteophytes, and vascular calcifications may cause lumbar spine measurements in older populations to be artificially elevated, potentially underestimating actual trabecular bone loss [18]. Conventional wisdom regarding sex-specific risk is challenged by our analysis, that sex was not an independent predictor of osteoporosis after controlling for age and BMI. Although osteoporosis rates were higher in females (30.5% vs. 35.5% in males) in crude comparisons, this difference was not significant in multivariable models. This implies that, rather than sex, age-related factors and body composition may play a major role in mediating the well-documented female predominance in osteoporosis. One of the best indicators of future fractures is past fracture history, with a study by Singer et al. showing a five-fold increased risk in the year after an initial fracture [19]. Despite increased awareness over the past 20 years, there are still gaps in osteoporosis screening, diagnosis, and treatment, as our study's significant burden highlights [20]. There is a great deal of potential for focused interventions, such as lifestyle changes, calcium and vitamin D supplementation, fall prevention techniques, and pharmaceutical therapy, when necessary, given that more than 80% of our tertiary care population has impaired bone health. Many at-risk individuals do not get screened until after their first fracture, despite current guidelines recommending BMD testing for all women ≥65 years and men ≥70 years [21]. Despite being statistically significant, the protective effect of higher BMI poses a clinical conundrum because obesity is known to have negative health effects, such as diabetes, cardiovascular disease, and some types of cancer. To maximize both bone and general health, clinical focus should prioritize adequate nutrition, muscle-strengthening exercises, and weight-bearing physical activity rather than advocating weight gain as an osteoporosis prevention strategy. Lifestyle changes, medication, and new technologies, such as artificial intelligence applications for fracture risk assessment, are all part of modern management protocols [22]. This study provides valuable observational data from a tertiary care setting, where specialized knowledge of bone health assessment enables thorough evaluation and management planning. The results highlight the urgent need for systematic screening programs, especially for older people with additional risk factors and postmenopausal women. The significant morbidity and mortality linked to osteoporotic fractures may be avoided if standardized protocols are implemented at the primary care level.

Limitations of the study

The results may not be as broadly applicable as they could be because this study was limited to a single tertiary care diagnostic center and relied on a referral-based population. Furthermore, the lack of comprehensive clinical histories, such as menopausal status, medication use, and comorbidities, may have affected the evaluation of osteoporosis risk, and the cross-sectional design makes it impossible to establish causal relationships.

Conclusion

According to this study, over four-fifths of adults who visit a tertiary care diagnostic center have either osteopenia or osteoporosis, indicating an alarmingly high prevalence of low bone mineral density. Higher body mass index provided protective effects, while advanced age emerged as a significant independent risk factor. These results highlight the critical need for improved screening techniques, early detection initiatives, and all-encompassing management strategies to address the significant burden of impaired bone health in this population.

Recommendations

To determine temporal relationships and assess the efficacy of interventions, longitudinal cohort studies should monitor bone density trajectories and fracture outcomes. Comprehensive risk factor assessments, including lifestyle factors, nutritional status, comorbidities, and genetic predisposition, should be included in future studies.

References

1. Özmen S, Kurt S, Timur HT, et al. Prevalence and risk factors of osteoporosis: a cross-sectional study in a tertiary center. Medicina 60 (2024): 2109.
2. Fan Y, Li Q, Liu Y, et al. Sex-and age-specific prevalence of osteopenia and osteoporosis: sampling survey. JMIR public health and surveillance 10 (2024): e48947.
3. Sabri SA, Chavarria JC, Ackert-Bicknell C, et al. Osteoporosis: an update on screening, diagnosis, evaluation, and treatment. Orthopedics 46 (2023): e20-e26.
4. Ji MX, Yu Q. Primary osteoporosis in postmenopausal women. Chronic diseases and translational medicine 1 (2015): 9-13.
5. Lloyd JT, Alley DE, Hochberg MC, et al. Changes in Bone Mineral Density Over Time by Body Mass Index in

the Health ABC Study. Osteoporos Int 27 (2016): 2109-2116.

6. Schwartz AV, Sellmeyer DE, Vittinghoff E, et al. Thiazolidinedione use and bone loss in older diabetic adults. The Journal of Clinical Endocrinology & Metabolism 91 (2006): 3349-3354.
7. Kanis JA, Cooper C, Rizzoli R, et al. Scientific Advisory Board of the European Society for Clinical and Economic Aspects of Osteoporosis (ESCEO) and the Committees of Scientific Advisors and National Societies of the International Osteoporosis Foundation (IOF). European guidance for the diagnosis and management of osteoporosis in postmenopausal women. Osteoporosis international 30 (2019): 3-44.
8. Cosman F, De Beur SJ, LeBoff MS, et al. Clinician's guide to prevention and treatment of osteoporosis. Osteoporosis international 25 (2014): 2359-2381.
9. Kilic BS, Yildirim A, Atakul N. The effect of body mass index on bone density by age distribution in women. Medicine 103 (2024): e40129.
10. Salminen H, Piispanen P, Toth-Pal E. Primary care physicians' views on osteoporosis management: a qualitative study. Archives of osteoporosis 14 (2019): 48.
11. Lu Y, Genant HK, Shepherd J, et al. Classification of osteoporosis based on bone mineral densities. Journal of Bone and Mineral Research 16 (2001): 901-910.
12. Pinar G, Kaplan S, Pinar T, et al. The prevalence and risk factors for osteoporosis among 18-to 49-year-old Turkish women. Women & health 57 (2017): 1080-1097.
13. Khurmah MH, Alkhatatbeh MJ, Alshogran OY, et al. Prevalence and risk factors of osteopenia and osteoporosis among postmenopausal women: A cross-sectional study from Jordan. Public Health Nursing 41 (2024): 996-1005.
14. Zhang X, Wang Z, Zhang D, et al. The prevalence and treatment rate trends of osteoporosis in postmenopausal women. Plos one 18 (2023): e0290289.
15. Cherukuri L, Kinninger A, Birudaraju D, et al. Effect of body mass index on bone mineral density is age-specific. Nutrition, Metabolism and Cardiovascular Diseases 31 (2021): 1767-1773.
16. Cao G, Hu S, Ning Y, et al. Traditional Chinese medicine in osteoporosis: from pathogenesis to potential activity. Frontiers in Pharmacology 15 (2024): 1370900.
17. Krueger D, Tanner SB, Szalat A, et al. DXA reporting updates: 2023 official positions of the International Society for Clinical Densitometry. Journal of Clinical Densitometry 27 (2024): 101437.
18. Albert SG, Reddy S. Clinical evaluation of cost efficacy of drugs for treatment of osteoporosis: a meta-analysis. Endocrine Practice 23 (2017): 841-856.
19. Singer AJ, Sharma A, Deignan C, et al. Closing the gap in osteoporosis management: the critical role of primary care in bone health. Curr Med Res Opin 39 (2023): 387-398.
20. Sabri SA, Chavarria JC, Ackert-Bicknell C, et al. Osteoporosis: an update on screening, diagnosis, evaluation, and treatment. Orthopedics 46 (2023): e20-e26.
21. Curry SJ, Krist AH, Owens DK, et al. Screening for osteoporosis to prevent fractures: US preventive services task force recommendation statement. Jama 319 (2018): 2521-2531.
22. Anish RJ, Nair A. Osteoporosis management-current and future perspectives–A systemic review. Journal of orthopaedics 53 (2024): 101-113.

Citation: Araf Reshad, Md. Moklesur Rahman, Nafisur Rahman, Jannatul Ferdaus. Frequency and Clinical Correlates of Low Bone Mineral Density among Adults Attending a Tertiary Care Diagnostic Center. Journal of Surgery and Research. 9 (2026): 92-97.