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Prevalence and Risk Factors in a Single Center Study of Female Patients with Osteoporotic Fracture

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Abstract **Original Research Article**

Background: The prevalence of osteoporotic fracture, its sociodemographic associations, and its associated complications among Bangladeshi women are little known. The National Institutes of Health (NIH) defines osteoporosis as a skeletal disease characterized by decreased bone mass and a deterioration of the micro-architectural bones that causes reduced bone strength and an increased risk of fragility fractures of the hip, spine, and wrist. ***Objective:*** We determined the prevalence and risk factors according to fracture site and evaluated the associated risk factors in female patients with osteoporotic fractures. ***Methods:*** A cross-sectional and community-based study was conducted among the Bangladeshi females aged from 20-65 years in Dhaka and Munshiganj. Between July 2020 and June 2021, we evaluated 50 patients who were diagnosed with hip (femoral neck or intertrochanteric), spine (vertebrae) or wrist (distal radius fractures) and who underwent surgery or conservative treatment. The assessment was conducted using questionnaire. Statistical analyses were conducted with SPSS for Windows statistical package, version 24.0 (SPSS Inc., Chicago, IL, USA). This study was approved by the Institutional Review Board of each hospital, which waived informed consent. ***Results:*** In this study 41.5% (17/41) had hip fractures, 35% (14/40) had spine fractures, and 29.6% (8/27) had distal radius fractures. Body mass index (BMI; P=0.036) and prevalence of chronic kidney disease (CKD; P=0.046) and rheumatoid arthritis (P=0.051) were significantly different between the groups. In multivariable analysis, BMI (odds ratio [OR], 0.76; 95% confidence interval [CI], 0.55-1.05, P=0.098) and CKD (OR 2.51; 95% CI, 0.38-16.2; P=0.233) were associated with an increased risk of factors; however, this was not statistically significant. ***Conclusion:*** In patients with osteoporotic fractures, this study evaluated the prevalence according to the fracture area and found associated risk factors.

Keywords: Osteoporosis, Osteoporotic fractures, Risk factors.

INTRODUCTION

Osteoporosis and its fractures are considered a major public health burden worldwide. Currently, it is estimated that over 200 million people in the world have osteoporosis, which is causing more than 8.9 million fractures each year [1]. In Bangladesh, Overall, 43.6% and 5.5% of 16-45 year old women, and 40.7% and 41.8 % of 20-65 year old women had osteopenia and osteoporosis based on T scores from either of the two sites (lumbar spine or femoral neck), respectively. Body mass index was negatively associated with osteopenia/osteoporosis at both lumbar spine and femoral neck, while age was positively associated [2]. Even though osteoporosis and its fractures are of great importance to the public health, they usually go unrecognized [3, 4], thus early detection and appropriate approach are important to avoid further consequences [5]. There are many risk factors associated with osteoporosis. These can be classified into unpreventable risk factors and preventable risk factors [6]. Secondary osteoporosis is the presence of osteoporosis due to underlying comorbidities or medications [7]. The presence of co-existing conditions, like diabetes mellitus, hyperthyroidism, chronic liver disease, chronic malnutrition or malabsorption can increase the risk of bone loss and fractures and reduce the quality of life [8]. However, treating the underlying cause is enough to decrease the risk of osteoporotic fractures [9]. Most studies have assessed the prevalence

or effect of risk factors in osteoporotic fracture patients, but they have not identified related risk factors. Moreover, most have assessed the incidence of osteoporotic fractures in the hip, vertebrae, and distal radius; however, the prevalence and risk factors in and across these fracture sites have not been evaluated. The purpose of the present study was to determine the incidence of risk factors in three major osteoporotic fracture patients and determine the risk factor of risk factors in these patients.

OBJECTIVE

We determined the prevalence and risk factors according to fracture site and evaluated the associated risk factors in female patients with osteoporotic fractures.

METHODS

A cross-sectional and community-based study was conducted among the Bangladeshi females aged from 18-65 years in Dhaka and Munshiganj. Between July 2020 and June 2021, we evaluated 50 patients who were diagnosed with hip (femoral neck or intertrochanteric), spine (vertebrae) or wrist (distal radius fractures) and who underwent surgery or conservative treatment. The orthopedic surgeons reviewed medical records to identify the medical history, current occupation, activities of daily life, medication history, previous falls, and incidence of fractures of each patient. The age; sex; body mass index (BMI); and incidence of diabetes, hypertension, chronic obstructive pulmonary disease, cardiovascular disease (angina, myocardial infarction), neuromuscular disease (Parkinson's disease), thyroid disease (hyper or hypothyroidism), site of fracture (hip and spine and distal radius), chronic kidney disease (CKD), and RA, were assessed to determine the relationship between these variables. The assessment was conducted using questionnaire. Statistical analyses were conducted with SPSS for Windows statistical package, version 24.0 (SPSS Inc., Chicago, IL, USA). This study was approved by the Institutional Review Board of each hospital, which waived informed consent.

RESULTS

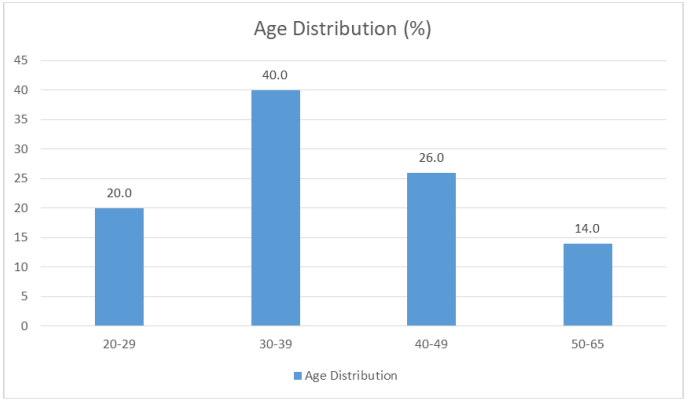


Figure I: The demonstrate and distribution of the study according to age

The age group were classified into 4 categories; age between 20-29 years (*n* = 10, 20.0%), age between 30-39 years (*n* = 20, 40.0%), age between 40-49 years (*n* = 13, 26.0%), and age between 50-65 years (*n* = 7, 14.0%).

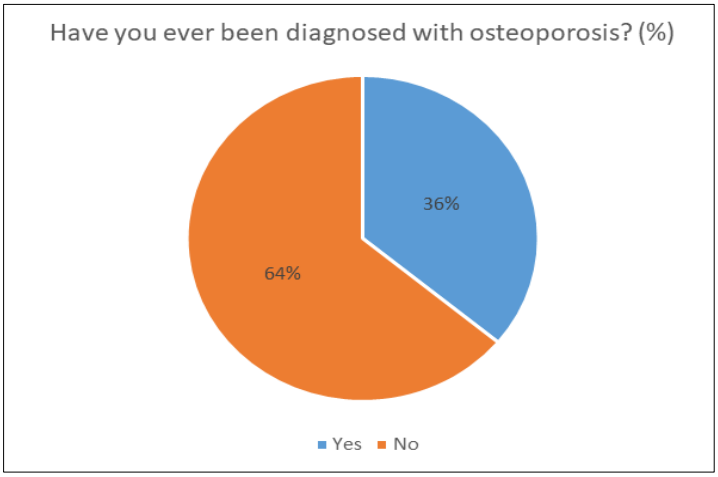


Table 1: Distribution of severity of risk of osteoporotic fractures with sociodemographic characteristics

Socio-demographic characteristics		Mild	Moderate	Severe	p-value
Age group	20-29	23	7	0	0.000
	30-39	15	5	1	
	40-49	5	2	0	
	50-65	7	3	1	
BMI	Underweight	1	0	1	0.000
	Normal	44	7	0	
	Overweight	3	6	0	
	Obesity	2	4	1	

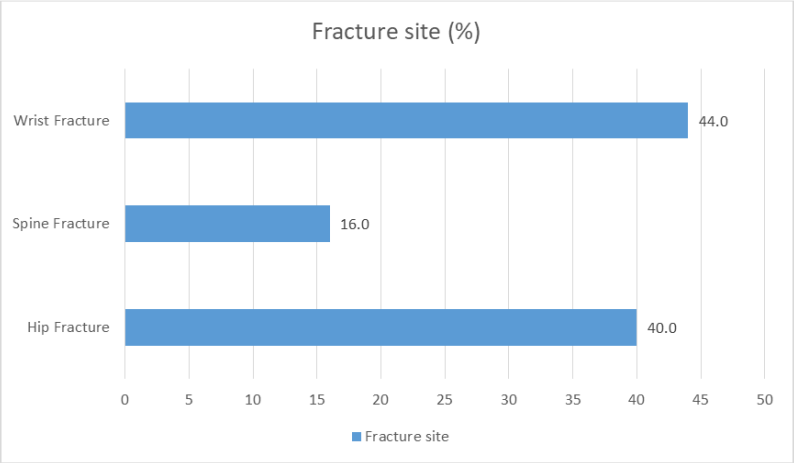
The total study population was 50 patients aged 20-65 years, in 20-36 years mild 23, moderate 7 and severe 0, 3(30.0%). Mild 15, moderate 5 and severe 0 in age between 30-39. In 40-49 years mild 5, moderate 2 and severe 0. In 50- 65 years mild 7, moderate 3 and severe 1. Table 1 demonstrated the distribution of studied population according to age and p-value 0.000.

Table 1 also show the total study population of patients with BMI based on underweight mild 1, moderate 0, severe 1. When normal mild 44, moderate 7, severe 0. According to overweight mild 3, moderate 6, severe 0. And based on obesity mild 1, moderate 0, severe 1. Table 1 demonstrated the distribution of studied population according to BMI and p-value 0.000.

Table 2: Risk factor of included patients

Variable	n	%
COPD	2	4.0
Hypertension	25	50.0
Cardiovascular disease	14	28.0
Diabetes	17	34.0
Thyroid disease	3	6.0
Rheumatoid arthritis	6	12.0
CKD	10	5

Table 2 show the total study population was 20 patients with risk factor, 2(4.0%) were COPD, 25(50.0%) were Hypertension, 14(28.0%) were cardiovascular disease, 17(34.0%) were Diabetes, 3(6.0%) were Thyroid disease, 6(12.0%) were Rheumatoid arthritis and 10(5.0%) were CKD. Table 2 demonstrated the distribution of studied population according to Risk factor.



DISCUSSION

In our study, the total study population was 50 patients aged 20-65 years, in 20-36 years mild 23, moderate 7 and severe 0, 3(30.0%). Mild 15, moderate 5 and severe 0 in age between 30-39. In 40-49 years mild 5, moderate 2 and severe 0. In 50-65 years mild 7, moderate 3 and severe 1. Table 1 demonstrated the distribution of studied population according to age. And p-value 0.000. Research studies have consistently demonstrated that the incidence of osteoporosis and osteoporotic fractures is higher in women than in men, and it tends to increase steeply with advancing age [10, 11]. The role of age and gender in osteoporotic fractures are evident in this study as women showed an increased risk of osteoporosis and osteoporotic fractures compared to men, as well as the risk of osteoporosis and osteoporotic fractures positively correlated with age. In the current analysis, women with age of menopause before 45 years had a higher risk for osteoporotic fractures compared to those with menopause at older ages. These findings agree well with what has been shown by other studies, which found that early natural menopause emerged as a significant independent predictor of osteoporosis, regardless intervention with hormonal therapy and calcium and vitamin D supplementation [12-14].

Our present study also shows the total study population of patients with BMI based on underweight mild 1, moderate 0, severe 1. When normal mild 44, moderate 7, severe 0. According to overweight mild 3, moderate 6, severe 0. And based on obesity mild 1, moderate 0, severe 1. Table 1 demonstrated the distribution of studied population according to BMI and p-value 0.000. In the previous study, both alcohol and smoking were significantly correlated with osteoporotic fracture risk. Inconclusive results have also been found in studies assessing the relationship between osteoporosis and body weight. In some studies, lower BMI was correlated with reduced osteoporosis and fracture risk, which is what we found in the present study [15, 16].

Our study, show the total study population was 20 patients with risk factor, 2(4.0%) were COPD, 25(50.0%) were Hypertension, 14(28.0%) were cardiovascular disease, 17(34.0%) were Diabetes, 3(6.0%) were Thyroid disease, 6(12.0%) were Rheumatoid arthritis and 10(5.0%) were CKD. Table 2 demonstrated the distribution of studied population according to Risk factor. In this study, the risk of osteoporotic fractures was higher among individuals with family history than among those without a family history of osteoporosis. Similar findings have been reported by other studies that found family history to be an independent risk factor for osteoporosis [17-20].

Limitation of the Study

This study has several limitations. First, this was a retrospective single-center study, and selection bias may have been introduced when we chose the hip fracture patient subjects. Second, function and gait speed were not evaluated in this study.

CONCLUSION

The first study that evaluated the risk factors associated in patients with osteoporotic fractures. The prevalence according to fracture site was 44% (hip), 16% (spine), and 40% (wrist), with low BMI, RA, CKD being possible risk factors.

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