International Journal of Medical and Health Research
ISSN: 2454-9142
Received: 06-11-2019; Accepted: 07-12-2019
www.medicalsciencejournal.com
Volume 6; Issue 1; January 2020; Page No. 16-19

The magnitude of osteoporosis among post-menopausal women in a tertiary care hospital, Dhaka, Bangladesh

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Abstract
Introduction: Osteoporosis is a heterogeneous group of abnormal processes characterized biologically by the net loss of bone, which results in a decreasing total mineralized bone without a decrease in the ratio of bone mineral to the organic matrix. In general, women lose about 1% of their bone density per year during and after menopause. However, nearly 35% of women lose bone at a faster rate during the late Perimenopause period.
Material & Methods: This was an analytical cross-sectional study conducted to find out the magnitude of osteoporosis among the post-menopausal women visited to National Institute of Traumatology and Orthopedic Rehabilitation, Dhaka, Bangladesh and to find the association with the risk factors of osteoporosis.
Results: The result conclude that among the 300 respondents, the mean age was 65.66±12.31. The study population comprised mostly Muslims (84%), followed by Hindus (13%) and the least numbers of respondents were the Buddhist (3%). The mean age at menopause (± SD) was 47.35(±3.78) years and mean weight was 61.76 (± 0.18) kg. According to WHO criteria, in our study out of 300 respondents, 89% of respondents had Osteoporosis, 7.66% were osteopenia and 3.33% had Normal BMD at wrist site. There was a significant positive correlation between increasing age, overweight, low calcium intake, lack of exercise, and low BMD. Thus, high prevalence of osteoporosis in periand postmenopausal women is a major health concern. Although no symptoms occur prior to fracture, BMD and other risk factors can be used to identify highrisk patients, and because effective interventions exist, many of these fractures are now preventable.
Conclusion: Due to the carelessness of people on their diet, habit, they are finally led to osteoporosis but yet they are still far from the prevention and treatment.

Keywords: osteoporosis, post-menopausal women, osteopenia, overweight, fracture

1. Introduction

Osteoporosis manifests when the rate of bone resorption exceeds that of bone formation, resulting in a loss of bone mass and disruption in bone quality, leading to reduced bone strength and increased propensity to fracture. Low trauma fractures are the most significant outcome of osteoporosis and occur most frequently at the hip, spine and distal forearm. Osteoporotic fractures occur as a consequence of a triad of factors: osteoporosis, falls and the interface/impact. Notably, the strongest single risk factor for fracture is falling [1]. Osteoporosis is often called a silent disease because bone loss occurs without symptoms. People may not know that they have osteoporosis until their bones become so weak that a sudden strain, bump, or fall causes a hip to fracture or a vertebra to collapse. Collapsed vertebrae may initially be felt or seen in the form of severe back pain, loss of height, or spinal deformities such as kyphosis [2]. Women are at increased osteoporosis risk related to estrogen levels if they: Experience irregular or infrequent periods, or began having their periods at a later than normal age, have had their ovaries removed (at any age), are going through menopause, with those undergoing menopause at an early age having an even higher risk, women loss bone mass much more quickly in the years immediately after menopause than they do at any other time in their lives [3]. Osteoporotic fractures are most commonly sustained at the hip, spine and wrist and are associated with both mortality and morbidity. Hip fractures in particular are associated with significant mortality and morbidity. Increasing age, co-morbidity, pre-fracture disability and time to surgery exceeding 48 hours have been identified as factors predictive of mortality within 6 months of incident fracture. Elderly individuals who sustain hip fractures are particularly susceptible to acute complications such as infections, pressure sores and bronchopneumonia which contribute to mortality and experience a significant deterioration in quality of life. Although not associated with mortality to the same extent as hip fractures, vertebral fractures are associated with significant functional disability, reduced quality of life and often chronic back pain. Risk factors that can be change as, sex hormones: Abnormal absence of menstrual periods, low estrogen level, and low testosterone level in men can bring on osteoporosis. Another disease called anorexia nervosa, which is mainly an irrational fear of weight gain, increases person's risk for osteoporosis. Also, low calcium and vitamin D intake in a lifetime diet makes more prone to bone loss. Long-term use of certain medications, such as glucocorticoids and some

anticonvulsants can lead to loss of bone density and fractures. Moreover, an inactive lifestyle or extended bed rest tends to weaken bones. Additionally, excessive consumption of alcohol increases the risk of bone loss and fractures [4]. A comprehensive osteoporosis treatment program includes focusing on proper nutrition, exercise, and safety issues to prevent falls that may result in fractures. In addition, doctor may prescribe a medication to slow or stop bone loss, increase bone density, and reduce fracture risk. Preventing falls is a special concern for women with osteoporosis, which can increase the likelihood of fracturing a bone in the hip, wrist, spine, or other part of the skeleton. It can also be caused by impaired vision or balance, chronic diseases that affect mental or physical functioning, and certain medications, such as sedatives and antidepressants. Individuals with osteoporosis be aware of any physical changes that affect their balance or gait is important, and they should discuss these changes with their health care provider [5]. So, the aim of this study is to find out the magnitude of osteoporosis among the post-menopausal women visited to National Institute of Traumatology and Orthopedic Rehabilitation, Dhaka, Bangladesh.

2. Objectives

a. General objective:

- To describe the magnitude of osteoporosis among the post-menopausal women

b. Specific Objectives:

- To describe the socio-demographic characteristics of post-menopausal women
- To describe the health-related factors associated with osteoporosis among post-menopausal women
- To describe the Life style related factors associated with the osteoporosis among post-menopausal women

3. Methodology and Materials

Three hundred (300) clinically suspected female patients aged between 45-85 attending the outpatient department of National Institute of Traumatology and Orthopedics Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka, were included in this study. It was conducted fromOctober 2014 to May 2015.

Inclusion Criteria

- Post-menopausal women who are willing to response

Exclusion Criteria

- Post-menopausal women who had experienced surgical or unnatural menopause, regardless of age

4. Results

This was a cross sectional and observational study that was conducted among the post-menopausal women attending the outpatient department of National Institute of Traumatology and Orthopedics Rehabilitation (NITOR), Sher-E-Bangla Nagar, Dhaka. The sample size was 300. It was a single centered, single blinded study. In (Table I) Out of 300 post-menopausal women the maximum number of respondents were from the age group of 45-55 years (42.33%) followed by 56-65 years (27.67%). The minimum number of respondents were from the age group of >85 years (4.33%). The mean age of the respondents was 65.66± 12.31 years and the mean age at menopause was 47.35± 3.78 years. (Table II) shows the religion distribution of the studied participants the maximum 84% patients were Muslims which was followed by 13% Hindus and 2.7% Buddhists. In (Table III) among 300 respondents, maximum respondents were from overweight (42.67%) whereas the least number of respondents were from underweight (1.67%). (Table IV) shows the maximum patients experienced menopause for last 6-10 years (63%) whereas the least number of patients experienced menopause for only 1-5 years (11%). (Table V) shows the t score of bone mineral density of the respondent's osteoporosis found in case of 267 women (89%), Osteopenia found in 23(7.6%) and normal density found in 10 (3.33%) women. (Table V) shows the distribution of the respondents by health-related characteristics 95.67% took no medication among our study population but only a few women took corticosteroids (3.33%) and anti-depressive drugs (1%). No women experienced any gastrointestinal surgery. (Table VI) shows the comparison of to the respondents BMI, respondents having overweight BMI have 0.0637 more likely to have osteoporosis than underweight BMI respondents, which is statistically significant at 5% level of significance (95% CI: 0.0068-0.5946, p=0.0017).

Table 1: Distribution of the respondents by Age (n=300).

Age of respondents	N=300	%	Mean ±SD years	Mean Age at menopause
45-55	127	42.33	65.66±12.31	47.35±3.78
56-65	83	27.67		
66-75	40	13.33		
76-85	37	1.33		
>85	13	4.33		

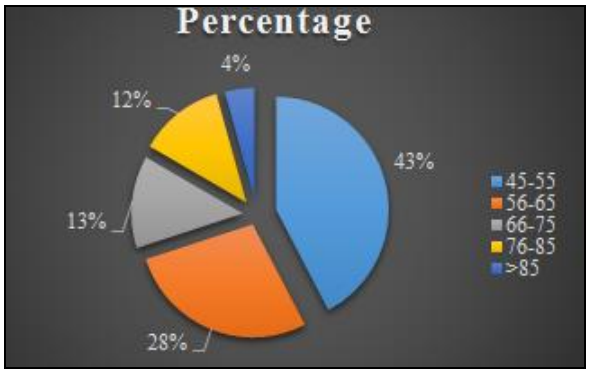

Fig 1: Distribution of the respondents by Age (n= 300).

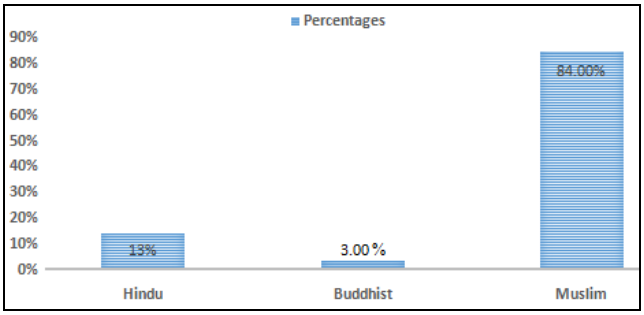

Fig 2: Distribution of the respondents by religion (n=300).

Table 2: Distribution of BMI of the respondents and Mean of BMI & Weight (n=300).

BMI of the respondents	N	%	Mean ±SD BMI	Mean ±SD weight
<18.5 (underweight)	5	1.67	27.39 ± 4.93	61.76 ± 0.18
18.5-24.9 (normal)	107	35.67		
25-29.9 (overweight)	128	42.67		
>30 (obesity)	60	20		

Table 3: Distribution of the respondents according to duration of menopause (n=300).

Duration (Years)	N	%
1-5	33	11
6-10	189	63
>10	78	26

Table 4: Distribution of BMD of the respondents (n=300)

BMD(t-score) of respondent	N	%	x ±BMD (t-score)
Osteoporosis	267	89%	-2.12±0.36
Osteopenia	23	7.67%	
Normal	10	3.33%	

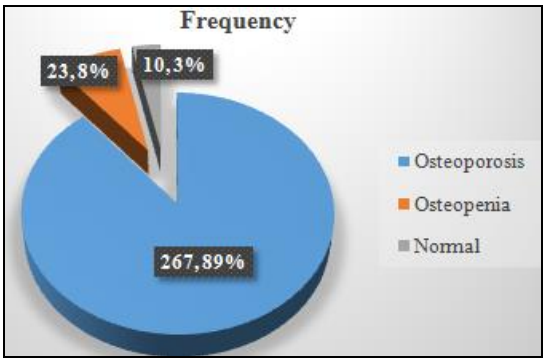

Fig 3: Distribution of BMD of the respondents (n=300)

Table 5: Distribution of the respondents by health-related characteristics(n=300).

Health related factors	N	%
Medication taken		
▪ Corticosteroid for three months	10	3.33%
▪ Anti-depressive drug	3	1%
▪ None	287	95.67%
Done gastro intestinal surgery		
▪ Yes	0	0%
▪ No	300	100

Table 6: Cross tabulation between BMI and BMD (n=300)

BMI	BMD		OR (95% CI)	P value
	Osteoporosis	Normal		
Underweight(ref)	1(20%)	4(80%)	0.0637 (0.0068-0.5946)	0.0017[S]
Overweight	102(79.68%)	26(20.31%)		

p=<0.05 (s=significant)

5. Discussion

Osteoporosis is a heterogeneous group of abnormal processes characterized biologically by the net loss of bone, which results in a decreasing total mineralized bone without a decrease in the ratio of bone mineral to the organic matrix. Thus, there is a decrease in the overall amount of bone [21]. In our study, among 300 postmenopausal women with ages 45-55 years attended 42.33% and 27.67% of respondents were between the ages of 56-65 years. Also, there is significant correlation between bone mineral density and age (p=<0.05), which showed that osteoporosis increased with advancing age [6]. Compared to respondent with age less than 65 respondents with age group more than 65 have 0.090 times more likely to have prevalence of osteoporosis. There is significant correlation between bone mineral density and age (p=0.05). It means that osteoporosis increases with Age. Our findings demonstrated a significant correlation between age and osteoporosis. As the age increases, osteoporotic cases increase, especially after 65 years, this is consistent with other studies where osteoporosis is prevalent in women after 60. Several reasons were reported age as a risk factor due to estrogen deficiency after menopause.[7]Among the 300 respondents, the mean age was 65.66±12.31. The study population comprised mostly Muslims (84%), followed by Hindus (13%) and the least numbers of respondents were the Buddhist (3%).Among the interviewed respondents, 42.67% were overweight with the BMI of >25. Though overweight was noticed, 35.67% of the respondents had normal BMI (18.5-24.9). And minority was underweight and that was about 1.67% only. The different study says that overweight BMI has high chance osteoporosis [8]. our study also shows that overweight has 0.06 37 times more likely to have osteoporosis than underweight and the result is statistically significant. Menopause is highly responsible for osteoporosis. Other high-risk factors associated with low BMD were found to be low BMI, low dietary calcium intake, lack of exercise, and increasing age. Indian Council of Medical Research (ICMR) recommendation for calcium and vitamin D for various populations in India is much lower when compared to the RDI of developed nations [9]. In this study, 98.61% of respondents had duration of menopause more than 10 years. Respondents having duration of menopause years less than or equal to 10 years have 84.21% less likely to have osteoporosis than respondents with menopause years more than 10 years (OR = 0.0751; 95% CI = 0.0101-0.5582; p = 0.0012). Similar to the study where bone loss was significantly related number of years since menopause.[10] Results from the National Osteoporosis Risk Assessment (NORA) reported that osteoporosis was associated with a fracture rate approximately four times that of normal BMD and osteopenia was associated with a 1.8-fold higher rate. The same study affirms the immediacy of risk posed by the finding of low BMD; the risk of fracture is not a decade or more in the future, but rather exists at the time of diagnosis [34]. The mean age at menopause (± SD) was 47.35(±3.78) years and mean weight was 61.76 (± 0.18)kg. According to WHO criteria, in our study out of 300 respondents, 89% of respondents had Osteoporosis, 7.66% were osteopenia and 3.33% had Normal BMD at wrist site. In women of Delhi India, prevalence of osteoporosis was 42.5% and osteopenia 44.9% [11]. In pre-menopausal Dutch women the prevalence of osteopenia was 27.3% and 4.1% of the women were osteoporotic [12]. In this study the distribution of the respondents by health-related characteristics 95.67% took no medication among our study population but only a few women took corticosteroids (3.33%) and anti-depressive drugs (1%). No women experienced any gastrointestinal surgery.Prevalence of osteoporosis in healthy ambulatory postmenopausal South Indian women was found to be 89%, and a significant positive correlation between BMI and BMD at the lumbar spine and femoral neck was established in this study (r=0.4; P=0.0001) [13]. In our study also, there was positive correlation between low BMI and low BMD.

6. Limitations of the study

This was a prospective type of study in a single community with comparatively small number of sample size. So, the study result may not reflect the exact scenarios of the whole country.

7. Conclusion and Recommendations

This study has revealed the magnitude of osteoporosis in post-menopausal women and attempted to increase the understanding the risk factors which are associated with the osteoporosis. There was a significant positive correlation between increasing age, low BMI, low calcium intake, lack of exercise, and low BMD. Though the study was conducted in a small scale, more in-depth study should be conducted with large sample size. In depth research on osteoporosis need to be conducted to find the prevalence of osteoporosis and related risk factors in the society.

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