ORIGINAL ARTICLE

A Descriptive Cross-Sectional Study on the Incidence of Osteoporosis among Adults

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ABSTRACT

Introduction: Osteoporosis is a communal metabolic bone disease categorized by augmented bone fragility, although it has not been properly diagnosed or treated. As the life expectancy of the population increases, it becomes aserious and urgentuniversal epidemic. It is anavoidableconditionand has no clinical symptoms tilloccurrence of fracture. Primary treatment and diagnosis are very important. Therefore,our study aim was to determine the osteoporosisincidence in adults admitted to the Rheumatology department.

Study Design: A descriptive cross-sectional study.

Place and Duration: In the Medicine and Rheumatology departments of Jinnah Hospital Lahore, Mayo hospital Lahore and Niazi Medical Complex Teaching hospital Sargodha for one-year duration from August 2020 July 2021.

Methods: Afterconsent from the Ethical board appropriate sampling had been performed. The collection of data and input was performed in Microsoft Excel; point estimation was calculated with confidence interval of 95% along with coefficient and frequency for binary data.All the patients aged 20 years with or without orthopedic problems were recruited. We excluded all the patients with diagnosed calcaneum fracture and any other pathology especially osteomyelitis of the right calcaneum. Initially, a sample size of 400 patients was taken however after convenient sampling this sample size was reduced to 245 patients for final analysis.

Results: The total osteoporosisincidenceamong245 participants was diagnosed in26 (10.6%) with the confidence interval of 95%(5.8-11.2%). Among the patients, 102 (41.6%) are men and 143 (58.4%) are women. The participants mean age was 40.40 ± 15.20 years.

Conclusions: The osteoporosisincidence in this analysis is high and is constant with various studies in South Asia. Primaryrecognition of osteoporosis with quantifiable ultrasound of the calcaneus can be a virtuous tool of screening.

INTRODUCTION

In an advanced era of technology, osteoporosis is still a challenging issue in many regions due to the risk of fractures[1-2]. Lack of distinct symptoms causes hurdles in early diagnosis; however, this disease is categorized by less bone mass, worsening the bone tissue, and retardation of bone microarchitecture[3-4]. Along with this; osteoporosis is highly associated with weakness of bones and enhanced the risk of fractures even with trivial trauma. These fractures reported high mortality and morbidity ratio[5]. Management of osteoporosis required a significant amount of human and financial capitals which can be a problem for many nations[6]. We designed this study to examine the osteoporosis ratio among adults attending the territory care hospital.

METHODOLOGY

We conducted this multicenter descriptive cross-sectional study in the Medicine and Rheumatology department of Jinnah Hospital Lahore, Mayo hospital Lahore and Niazi Medical Complex Teaching hospital Sargodha for one-year duration from August 2020 July 2021. Ethical approval was obtained from the institution review of the committee and written consent wastaken. All the patients aged 20 years with or without orthopedic problems were recruited. We excluded all the patients with diagnosed calcaneum fracture and any other pathology especially osteomyelitis of the right calcaneum. Initially, a sample size of 400 patients

was taken however after convenient sampling this sample size was reduced to 245 patients for final analysis. The possibility of errors was minimized much as possible. Chances of error were selected as 5.8 to 11.2% at a confidence interval of 95% with the frequency of binary data. We used predesigned performed for collecting information. Trained nurses of the hospital were assigned to take weight and height measurements of all patients with light clothes and without shoes. An electronic digital scale and portable stadiometer were used for measuring weight and height. We calculated BMI as weight divided by height in meter square. BMI was used for the categorization of patients into groups. Patients with BMI 15-19.9 were categorized under the category of underweight while normal weight category was assigned to those whose BMI was observed as 20-24.9. Overweight patients were identified when BMI was observed as 25-29.9 and the obese category was assigned to those who reported 30-40 BMI. Demographic information of all patients was recorded for final analysis. The broadband ultrasound attenuation (BUA) and ultrasound waves were used for scanning mid calcaneum. Patients were asked to be seated in a chair easily. We apply jell on the lateral and medial aspects of the right heel. Later on, we asked to placed heels on the Furono CM-200 machine for scanning. The single trained physicians performed quality assurance tests of the machine on each day of screening. Later on, values of BUA and SOS were combined by machine which was expressed

in the T score. T score was defined as a young adult mean BMD / 1 SD of adult mean BMD at calcaneum. Assessment of BMD which we attained by calcaneal QUS of was categorised into 3 groups. Patients with T score ≥-1.0 were identified as normal, patients with T scores between -1.0 and -2.5 were considered as Osteopenia and the category of osteoporosis was assigned to those who had a T score ≤ -2.5. SPSS version 23 was used for statistical analysis.

RESULTS

A total of 245 patients were recruited for assessment and the incidence of osteoporosis was reported as 10.6% (26 patients) with a range of 5.8% to 11.2% at a confidence interval of 95%. In this analysis; 41.6% were male and 58.4% were females (102 and 143 respectively). Among the 26 cases of osteoporosis, we reported that six of them were male and 21 were females (19.23% and 80.80% respectively). We analyzed that 54 patients were of aged 20-29 years, 69 patients aged 30-39 years, 45 patients were above 40-49 years old, 39 cases were reported in the age group of 50-59 years and 38 cases were ≥60 years.

Table 1: Gender distribution in osteoporosis.

Gender	n (%)
Male 5 (19.23)	
Female	21 (80.80)
Total 26 (100)	

In table 2 we represented the data according to categories of patients with osteoporosis.

Table 2: Age distribution in osteoporosis.

Age	n (%)
20-29	0 (0)
30-39	3 (11.5)
40-49	2 (7.69)
50-49	8 (30.76)
≥60	13 (50)
Total	26 (100)

In 26 cases of osteoporosis, we found no case in the 20-29 years age group, 3 cases (11.5%) in the age group of 30-39 years, 2 case (7.69%) in 40-49 years. We observed 8 cases (30.76%) and 13 cases (50%) in the age group of 50-59 years and 60 years, correspondingly. Analyzing the BMI of patients, we reported 33 (13.5%) cases of underweight, 97 (39.6%) normal weight cases, 87 (35.5%) Overweight patients and 28 (11.4%) cases of obese patients. In 26 cases of osteoporosis, we observed that 5 (19.2%)cases were under weight, 7 (26.9%) were normal, 9 (34.6%) were overweight and 19.2% were obese(Table 3).

Table 3: BMI distribution in osteoporosis.

BMI	n (%)
Under Weight	5 (19.2)
Normal Weight	7 (26.9)
Over Weight	9 (34.6)
Obese	5 (19.2)
Total	26 (100)

DISCUSSION

We reported an10.6% pervasiveness of osteoporosis in our study. These results are comparable with the previous study of Vaishya R in which he observed an 8.99% prevalence of osteoporosis in New Delhi, India[7-8]. However, in the northernIndia study on osteoporosis by Kumar et al in 2017; prevalence was observed as 9%[9-10]. However, in Karachi Pakistan study reported a 30.7% prevalence osteoporosis in young adults. These results are in contradiction to our study. On the other hand, a study of Wright N.C reported 10.3% prevelance among 50 years old) population of United States[11]. Osteoporosis is challenging issue in many regions of the world due to significant morbidity ratio ad socio-economic burden[12]. In our study we reported mean age of 40.40 ± 15.20years ranging from 20 years to 80 years old population. We observed that maximum patients (28.2%) were from age group 30 to 39 years old. Furthermore, we reported that out of 26 osteoporosis cases 50% were reported from patients aged 60 or above. These results depicted that elder age population has more vulnerability towards osteoporosis and need early management in order need avoid risk of fractures[13-14]. These results had way more high prevalence when comparing with the previous study of Wright et al., in which he reported 3.4% osteoporosis among patients aged 50-59 years and 10.9% in above 80-year age group[15-16]. In our study we observed alarming situation of osteoporosis among female population. Our study revealed that 80.80% women and 19.2% males were affected with osteoporosis. Comparing these results with Srilankan study they revealed overall 27% osteoporosis cases among female population and 7% in men in aged above 50 years old and 9% women and 3% men affected osteoporosis in less than 50 years of their timespan[17-18]. Initially, osteoporosis is labeled with a female population but our study unfolds the vulnerability of the male population towards osteoporosis. However, in previous years studies reported that bone changesstart from 35 to 40 years in both men and women[19]. In men, a small longitudinal bone mass loss is observed throughout life, whereas during pre-menopausal and post menopausal duration women reported additional bone loss with estrogen insufficiency[20]. A study by Hernlund E, et al conducted in Swedan reported 21% female osteoporosis cases and 6% males. Our study reported 3–4-time high prevalence of osteoporosis in female population. Comparing results with the neighbouring country India they reported 8.6% osteoporosis cases among men and only 5% in female population[21]. These results are in contradiction to ours. Obesity and osteoporosis are highly interlinked with each other. In United States researchers reported less cases of osteoporosis in overweight (increase in BMI) population among older women however they concluded on a note that obesity may be a causative factor for osteoporosis. Analyzing the BMI of patients, we reported 33 (13.5%) cases of underweight, 97 (39.6%) normal weight cases, 87 (35.5%) Overweight patients, and 28 (11.4%) cases of obese patients. In 26 cases of osteoporosis, we observed that 5 (19.2%) cases were under weight, 7 (26.9%) were normal, 9 (34.6%) were overweight and 19.2% were obese. We observed the high frequency of osteoporosis among normal and overweight participants (26.9% and 34.6% respectively). These results are in accordance to the previous study of Harris, et al. Dual energy X-ray absorptiometry (DEXA) machine is considered as the golden standard for diagnosing

osteoporosis but its availability is limited to certain big cities due to high cost and radiation hazard[22]. Previously, study of Rajouria A et al, conducted in Nepal utilize quantitative ultrasound (QUS) and DEXA scan for comparing bone density and revealed positive correlation in t- score of QUS scan after analyzing bone mass. An increase in thoracic kyphosis or diminished height is the markers of clinical diagnosis over 50 years of age[23]. However, these methods required confirmation from DEXA or calcaneal QUS scan. Delayed management of osteoporosis resulted in bone fragility and fractures of the vertebra, hip, and distal forearm (Colle's). Once the fractures are encountered it enhances the socio-economic burden and enhanced the complications in terms of low self-esteem, depression, poor quality of life, etc[24]. Calcium intake and vitamin D can adequate intake can manage the risk of osteoporosis in the elderly age population[25].

Our study has some limitations in terms of small sample size and convenient sampling technique so these results would not be applied to the general population. Our study did not reveal the cause and risk factors of osteoporosis so there is a need for further research by using random sampling techniques to explore the prevalence of osteoporosis in Pakistan.

CONCLUSION
We observed that females are more vulnerable to osteoporosis. Our results concluded that osteoporosis can be a manageable disease identified at an early stage. Regular screening and effective management can reduce the morbidity ratio of osteoporosis.

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