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ORIGINAL RESEARCH ARTICLE

Prevalence of Osteoporosis among Middle Aged Women in Chitwan District of Nepal

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ABSTRACT

Osteoporosis is a disease characterized by low bone mass and micro-architectural deterioration of bone tissue. This leads to increased bone fragility and risk of fracture, particularly of the hip, spine and wrist. Osteoporosis is a global problem which is increasing in significance as the population of the world both grows and ages. Hence, the present study aims to investigate the prevalence of osteoporosis in Nepalese women of chitwan district and to find out the correlation between bone mass density (BMD) and demographic variables like age, body mass index (BMI) and menopause. The study was conducted at orthopedic department of chitwan medical college teaching hospital and study population consisted of 200 premenopausal and postmenopausal women with ages 40 years and above who were residences of chitwan district. Finding showed that 52.5% of the respondents were between the ages of 40 to 50 years and 11.5% of respondents were between the ages of 60 to 70 years. Also, there is significant correlation between bone mineral density and age (p=0.000), which showed that osteoporosis increased with advancing age. Furthermore, there is significant association between osteoporosis and bone mineral density (p=0.008). As BMD increases, risk of developing osteoporosis is high. Similarly there is significant correlation between bone mineral density and menopause (p=0.0002). In conclusion, risk of developing osteoporosis is high in menopausal women than non menopausal and it is therefore necessary to create awareness among women from Nepalese subcontinent, irrespective of their geographic location, about the risk of osteoporosis.

Key words: premenopausal, postmenopausal, body mass density and osteoporosis.

INTRODUCTION

Osteoporosis is a disease characterized by low bone mass and micro-architectural deterioration of bone tissue [1]. This leads to increased bone fragility and risk of fracture, particularly of the hip, spine and wrist [2]. Osteoporosis is a global problem which is increasing in significance as the population of the world both grows and ages. Worldwide, lifetime risk for osteoporotic fractures in women is 30-50%. In men risk is 15-30% [3]. With socio-economic development in many Asian countries and rapid ageing of the Asian population, osteoporosis has become one of the most prevalent and costly health problems in the region [4]. Asia is the region expecting the most dramatic increase in hip fractures during coming decades; by 2050 one out of every two hip fractures worldwide will occur in Asia [5]. In India, 1 out of 8 males and 1 out of 3 females suffers from osteoporosis, making India one of the largest affected countries in the world [6]. It affects both sexes and all ages, osteoporosis is twice to three times more prevalent in women than in men and its incidence increases with age. Osteoporosis affects one in four women and at least one in eight men over the age of 50; [7] however, the disease can strike at any age. The cardinal features of osteoporosis are pain, fracture and deformity. Key risk factors for fracture are low bone mineral density (BMD), prior fragility fracture, age and family history of osteoporosis [8].

Osteoporosis can be prevented and treated if diagnosed early and accurately. Unfortunately, it is often undiagnosed until a fracture occurs. Therefore, the number of people who are screened for this disease must be increased. Measuring bone mineral density (BMD) is the most important tool in the diagnosis of osteoporosis in the early stage of osteoporosis and provides a numerical estimate of an individual's bone mass.[9] Bone mineral density was measured using Mini Omni™

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quantitative ultrasound technology, which has been proven to deliver highly accurate and safe multi-site measurement of bone density.Quantitative ultrasound is a convenient and inexpensive method well suited to community-based research in countries with limited resources.[10] Multiple studies have demonstrated that BMD accounts for less than one-third of the reduction in fracture risk by anti-resorptive agents for both vertebral and non-vertebral fractures [11-16].

Thus, for the prevention and control of osteoporosis, there is a great need in conducting epidemiologic surveys of the prevalence of osteoporosis and related risk factors in communities. Very limited studies were conducted regarding osteoporosis in our setting. Therefore researcher would like to explore the prevalence of osteoporosis among Nepalese women of Chitwan District. Hence, the present study aims to investigate the prevalence of osteoporosis in Nepalese women and to find out the correlation between BMD and selected demographic variables.

MATERIALS AND METHODS

This study was carried out at orthopedic OPD of Chitwan Medical College Teaching Hospital, Chitwan. The ethical clearance for research was obtained from Institutional Review Committee (*IRC)* of Chitwan Medical College. All women aged 40 years and above who were residences of the Chitwan district were asked to participate in the study at different dates between July 2011 to December 2011. A total 200 women participated in the study. Informed consent was obtained from each subject. All historical information was obtained by interview and client's case sheet. Those women, who are pregnant or had breastfed in the previous year, have an illness or use medications were excluded from the study. Women taking anticonvulsants, systemic corticosteroids, drugs for hypothyroidism, hyperthyroidism, or parathyroidism, thiazide diuretics, or calcium supplements for more than 6 months in the last 5 years were also excluded from the study.

Measurement of BMI

Height and weight were measured after the removal of shoes and with the patients wearing light clothing. BMI was calculated as weight (kg)/height (m^2).

Measurement of Bone Mineral Density (BMD)

Osteoporosis was determined by assessing the bone mineral density. Bone mineral density was measured twice on wrist of non dominant hands by using Mini Omni™ quantitative ultrasound technology and the mean of the two closest measurements was calculated. The WHO diagnostic criteria for osteoporosis were used for defining osteoporosis. According to WHO diagnostic criteria for osteoporosis, osteoporosis is defined in terms of a T-score below -2.5, osteopenia when T-score is between -2.5 and -1 and T- score > -1 is considered as normal.

Statistical Analysis

The statistical software SPSS (version 15) was used for data analysis. The mean value of BMD was determined. Correlations between the BMD and BMI, and BMD and age and BMD and sex were examined using the Pearson correlation coefficients keep statistical significance at 95% confidence interval of mean (P=0.05).

RESULTS

Characteristics of Participants

The study population consisted of 200 premenopausal and postmenopausal women with ages 40 years and above who were residences of Chitwan district was taken as study population. Finding showed that 52.5% of the respondents were between the ages of 40 to 50 years, similarly 11.5% of respondents were between the ages of 60 to 70 years. Table 1 shows the respondents' demographic characteristics and the risk factors of osteoporosis. From the (**Table 1**), it was observed that the mean age of respondents was 51.327±12.65. Furthermore, the mean weight, height, BMI and BMD were found to be 55.688±13.225, 151.032±8.211, 24.381± 5.95 and-1.18±1.90 respectively.

Table 1: Socio-demographic Characteristics of the Respondents

Parameters	X±SD
Age (Yrs)	51.327 ± 12.65
Weight (Kg)	55.688 ±13.225
Height (CM)	151.032 ± 8.211
BMD(T-Score)	-1.18 ±1.90
BMI	24.381±5.95
Age of menopause (Yrs)	46.114±5.431

Table 2: Prevalence of osteoporosis according to their Bone Mineral Density

BMD	Percentage
Normal	34.4
Osteopenia	39.3
Osteoporosis	26.2

Table 3: Correlation between Bone Mineral Density and Selected Demographic Variables

		Age	BMI	Menopause
BMD	R	0.521	0.123	0.245
	p-value	0.000	0.004	0.0002

(**Table 2**) shows the prevalence of osteoporosis. Out of 200 respondents, 65.5 percents respondents had low bone mineral density (osteopenia and

osteoporosis). According to WHO criteria 26.2% were identified as having osteoporosis, 39.3% were osteopenia, and 34.4.0% had normal BMD at wrist site. Similarly, (**Table 3**) shows the correlation between BMD and selected demographic variables (age, body mass index and menopause). There is significant correlation between bone mineral density and age (p=0.000). It means osteoporosis increased with advancing age. Furthermore there is significant association between osteoporosis and bone mineral density (p=0.008). As BMD increases, risk of developing osteoporosis is high. Similarly there is significant correlation between bone mineral density and menopause (p=0.0002). Risk of developing osteoporosis is high in menopausal women than non menopausal.

DISCUSSION

There has been a great interest in conducting epidemiologic surveys of the prevalence of osteoporosis and related risk factors in communities. [11, 12] In chitwan, the precise figures on the prevalence of osteoporosis are not available at present. However, osteoporosis is common in Nepalese women but official record is not available yet. An age-dependent decline in BMD was seen in women over the age of 50 years in a study to establish the normative database for BMD in population using Mini Omni™ quantitative ultrasound technology. Ours was a cross-sectional study to assess the prevalence of osteoporosis in a selected population of the chitwan. Almost 66% of the women in peri- and postmenopausal age group were found to have low BMD. Other high-risk factors associated with low BMD were found to be low BMI, low dietary calcium intake, lack of exercise, and increasing age. One of the important determinants of bone health is BMI which is again significantly lower in Nepalese women when compared to their western counterparts. Literature review reveals extensive studies of factors affecting osteoporosis. Increasing age, especially when women become postmenopausal, low education level, low socioeconomic status, frequent childbirth, and poor dietary intake have been associated with higher prevalence of osteoporosis. Patients are identified opportunistically using a case-finding strategy on the finding of a previous fragility fracture or the presence of significant clinical risk factors. Some of the risk factors act independently of BMD to increase fracture risk, whereas others increase fracture risk through their association with low BMD. [13] In large community-based studies, the prevalence of osteoporosis was comparatively lower in western countries when compared to Asian population.[14,15] In pre-menopausal Dutch women, the prevalence of osteopenia was 27.3% and 4.1% of the women were osteoporotic; and in Canadian women, the prevalence of osteoporosis was 20%. [15] In Vietnamese adult women, the prevalence of osteoporosis was found to be relatively higher compared with that in nearby countries. High osteoporosis in the age group 50–70 years was comparable to Japanese women and this was postulated to be due to pre–World War exposure and poor nutrition at that time [16]. 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 [12,16]. In our study it was found that there is the correlation between BMD and selected demographic variables (age, body mass index and menopause). There is significant correlation between bone mineral density and age (p=0.000). It means osteoporosis increased with advancing age. Furthermore there is significant association between osteoporosis and bone mineral density (p=0.008). As BMD increases, risk of developing osteoporosis is high. Similarly there is significant correlation between bone mineral density and menopause (p=0.0002). Risk of developing osteoporosis is high in menopausal women than non menopausal.

We seek to identify a large problem for aging Nepalese women and as a consequence a challenge for public health planners. It is therefore necessary to create awareness among women from Nepalese subcontinent, irrespective of their geographic location, about the risk of osteoporosis and educate those regarding preventive measures to avoid future fractures secondary to osteoporosis. There is also a need for large community-based studies so that high-risk population can be picked up and early interventions like adequate calcium intake, vitamin D supplementation, and other life style changes can be instituted if there is delay in implementing national or international health strategies to tackle this increasing global health problem.

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