A Cross Sectional Study of Prevalance and Determinants of Osteoporosis in Women Aged 25-45 Years

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Abstract

Introduction: Osteoporosis is defined as a progressive, systemic, skeletal disease characterized by low bone mass and micro architectural deterioration of bone tissues with a consequent increase in bone fragility and susceptibility to fracture.[1] Studies have shown that bone loss starts from the age of 20–40 years in both men and women. In women, it has been postulated that menopause is followed by an immediate decrease in bone mass and density within a year.

Materials and methods: This was a cross sectional study done over a period of 12 months at M.G.M Medical College, Jamshedpur, Jharkhand. A sample size was calculated statistically and 600 women in 25 to 45 years group were included in this study. A structured proforma and QUS were the study tools. The bone mineral density of the calcaneum on the right foot was measured. The t-score values were obtained using quantitative ultrasound and individuals with the score values less than -2.5 were categorized as osteoporotic.

Results: In this hospital, prevalence of osteoporosis is 18.32 % and findings suggest a significant positive correlation between age, time since menopause, sunlight exposure, family history of osteoporosis and Bone mineral density.

Conclusion: Osteoporosis is an important public health problem leading to an increased risk of developing spontaneous and traumatic fractures. Because of the morbid consequences of osteoporosis, the prevention of this disease and its associated fractures is considered essential to the maintenance of health, quality of life, and independence in the elderly population.

Key words: QUS, Osteoporosis, menopause

I. Introduction

Bone is a living, dynamic tissue that undergoes constant remodeling throughout life. This is necessary to allow the skeleton to increase in size during growth, respond to the physical stresses placed on it, and repair structural damage due to structural fatigue or fracture. This process requires a range of proteins and minerals, which are absorbed from the bloodstream1. In childhood, bones grow and repair very quickly, but this process slows down as you get older. Bones stop growing in length between the ages of 16 and 18, but continue to increase in density until late 20s. From about the age of 35, gradually lose bone density.

This is a normal part of ageing, but for some people it can lead to osteoporosis and osteoporosis is a condition that affects the bones, causing them to become weak and fragile and more likely to break2. Before a woman reaches 30 years of age her body gains more bone than it loses. Around age 30, this process balances out. However, the onset of menopause around 50 years of age may speed up the rate of bone loss. If bone loss becomes severe, a woman may develop osteoporosis. The condition can be prevented by exercising regularly and making some other lifestyle changes3. Osteoporosis has been operationally defined on the basis of bone mineral density (BMD) assessment.

According to the WHO criteria, osteoporosis is defined as a BMD that lies 2.5 standard deviations or more below the average value for young healthy women (a T-score of <-2.5 SD) S(1,6)". It is often referred as a "silent theif" disease because the first visible clinical sign of osteoporosis is often the fracture of the hip, spine or forearm. Osteoporosis ranks as one of the costliest diseases of aging after diabetes, hyperlipidemia, hypertension and heart diseases. In India it is highly prevalent women are reported to be affected. Recent data indicate that Indians have lower bone density than north-American and European women and also it is reported that osteoporotic fractures occur 10-20 years earlier in Indian women as compared to Caucasians4.

Osteoporosis is characterized by low bone mass with micro architectural deterioration of bone tissue leading to enhance bone fragility, thus increasing the susceptibility to fracture.

II. Materials And Methods

A cross sectional study was conducted at Department of Obstetrics and Gynaecology, M.G.M Medical College, Jamshedpur, Jharkhand during period of 12 months.

Inclusion criteria
* Patients attending gynecology OPD(Pregnant women) in the age group of 25-45 yrs.
* Patients who are willing to participate.

Exclusion criteria
* Patients with already diagnosed Systemic diseases like renal and hepatic disorders, rheumatoid arthritis, thyrotoxicosis, Addisons disease and Cushings syndrome.
* Patients on long term steroids, heparin, warfarin, thyroxine, hydrocortisone, phenytoin, hormone replacement.
* Patients who are not willing to participate in the study.

Patients who reported to the OPD of Gynaecology in the age group of 25-45 yrs were included in the study. Informed consent and a proforma to record the patient's personal and demographic details were obtained. The bone mineral density of the calcaneum on right foot was measured with the patient in sitting position by a trained technician in the OPD using quantitative ultrasound. The t –score values were obtained using quantitative ultrasound. Individuals with t score values less than -2.5 were categorized as osteoporotic. Those with t score between -2.5 and -1 were considered osteopenic and those with values more than -1 were considered to be normal.

III. Results

Age group	Total number of women	Percentage
35-39 years	205	34.16
40-44 years	127	21.16
45-49 years	86	14.33
50-54 years	65	10.83
55-59 years	67	11.16
60-65 years	50	8.33
Total	600	100

Table 1: Age Distribution

34.16 % of study sample were in the age group of 35–39 years, 21.16% were between 40-44 years, 14.33% were between 45-49 years, 10.83% women were between 50-54 years, 11.16 % women were between 55-59 years, 8.33% women were between 60-65 years.

Primary out come	Total number of women	Prevalence of disease	95 % confidence interval
Osteoporosis	210	35 %	13.78-20.17 %
Osteopenia	180	30 %	35.26-45.26 %
Normal BMD	210	35 %	34.42-40.76%

Table 2: Primary outcome

Age group	Normal	Osteoporosis	Total no of women	Women with osteoporosis (%)
40-44	90	12	159	10.6 %
45-49	50	21	156	16.2 %
50-54	32	15	145	14.78 %
55-60	18	29	140	36.67%

Table 3: Comparison between normal and osteoporotic women with respect to age.

IV. Discussion

Osteoporosis is an age related disease of bone that leads to an increased risk of fracture. In osteoporosis, the bone mineral density (BMD) is reduced, bone micro architecture is disrupted and the amount and variety of protein in bone is altered14. Osteoporosis is one of the major disorders of our time and is increasing at an alarming rate. It affects over 10 million women in the United States and is expected to affect 14 million by the year 2020[15].

The number of osteoporosis patients reported in India is approximately 26 million; the numbers projected to increase is 36 million by 2013. It is revealed that 4,895 patients in various cities of India, 80% of women and 50% of men of them, suffer from low bone mass, 73.9% of women and 26.2% of men of above 60

years of age among them have been suffering from osteoporosis. Almost all osteoporosis fractures the person's risk of death doubles compared to that of a non-osteoporosis person of the same age and similar circumstances. So the current situation is alarming16.

There was a statistically significant rise in older age group (p=0.0001). Both postmenopausal state, as well as years since menopause showed statistical significance .Though age of menarche, regularity of menstrual cycle and marital status did not reveal statistical significance, years since last childbirth, had a significant correlation (p=0.0001) The calcium intake of our study population was only 350±50 mg/day as compared to the RDA of 800–1,000 mg/day, which is accepted worldwide. However, the RDA for calcium has not been established for menopausal women in India subsisting on a cereal-pulse diet, and therefore 400 mg/day of RDA for calcium is indicated.12 The major part of this calcium intake came from plant sources, which are known to have low bioavailability. The foods rich in calcium such as milk, spices and dry fruits are expensive and not well available for majority of this population. The intake of other nutrients except fats was also substantially low, resulting in multiple nutrient deficiencies.

Nutritional factors like calorie, protein, calcium intake of women involved in this study does not show significant correlation with osteoporosis. Intake of calcium supplements also does not show statistical significance. This may be because all the women studied, were from low socioeconomic group with inadequate dietary intake. History of sunlight exposure is statistically significant (p value-0.0216) though duration was not. Exercise and passive smoking did not have statistical significance. Presence of diabetes has significant correlation with osteoporosis. (P value =0.0023).[13] Other chronic illnesses like hypertension, ischaemic heart disease, chronic lung disease, did not show statistical significance. Anthropometric measurements and BMI did not show statistical significance.

V. Conclusion

In this hospital, prevalence of osteoporosis is 18.32 % and findings suggest a significant positive correlation between age, time since menopause, sunlight exposure, family history of osteoporosis and BMD. Differences in the prevalence of osteoporosis exist on the basis of socioeconomic strata. The results of this study did not reveal a statistically significant difference in BMD for many of the other accepted risk factors such as age at menarche, regularity of menstrual cycle, exercise, nutritional factors and smoking. It appears that more studies with larger numbers may be needed to establish their role. The International Osteoporosis Foundation suggests screening of women after age of 65 years.

However, changing life style in young people (dieting, smoking, and lack of exercise) has made them vulnerable to osteoporosis at an earlier age. Further in India, there is a higher prevalence of other risk factors such as low socioeconomic strata, low calcium in the diet, Vitamin D deficiency, low education level, premature menopause, multiparty, resulting in higher risk for osteopenia and osteoporosis. Quantitative Ultrasound conclusively confirms or rules out osteoporosis or osteopenia in any population and can be used as a screening tool.

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