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STUDY ON EVALUATION OF RISK FACOTRS FOR OSTEOPOROSIS IN POST MENOPAUSAL WOMEN

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ABSTRACT **Background:** Osteoporosis and low bone density are significant risk factors for morbidity and mortality in older adults. These conditions are characterized by poor bone strength and are associated with an increased risk of the fractures from even slightly traumatic events. **Objectives of the study:** The present study evaluated some risk factors which include coffee consumption, alcohol consumption, smoking and physical activity among cases and controls. **Methodology:** This study is a case-control study, case and controls are defined based on the measurement of BMD. The case group included postmenopausal Osteoporotic women who were identified as patients with bone density higher than 2.5 SD below average of young normal bone density (in L1–L4) spine region interest and/or total femoral region) by using DEXA method. The controls were chosen from post-menopausal women with normal bone density (BMD lesser than 1 SD below average of young's in L1–L4 spine and total femoral regions using DEXA method) frequency of matching in age groups was the strategy of choice. Risk factors were evaluated in both the groups. **Results:** The mean and SD of age in cases and controls were 48.96±6.23 and 50.76±4.23 respectively and the mean and SD of age at menopause in cases and controls were 49.96±5.23 and 48.96±6.23. It is evident that there was no statistically significant difference in mean age and mean age at menopause between the two groups. We evaluated body mass index (BMI) in cases and controls, we found that 30% of cases had BMI < 25 and 70% had BMI >2. Similarly, in control group 53.3% had BMI <25 and 46.6% had BMI >25. The comparisons of BMI between cases and controls were statistically significant. It is found that 15% cases had smoking habit and 85% did not had, similarly 2% of controls had smoking habit and 98% did not had smoking habit. There were statistically significant differences between the two groups w.r.t smoking. It is found that 13% of cases had physical activity <30 min/day, 2% had >30 minu/day and 85% had no physical activity, similarly 25% of controls had physical activity <30 min/day, 8% had >30 minu/day and 67% had no physical activity. There were statistically significant differences between the two groups w.r.t physical activity. **Discussion and Conclusion:** The findings of our study indicate that the smoking and reduced physical activity are important factors that can prevent osteoporosis in post-menopausal women. These are preventable risk factors. Through education and certain preventive measures, it should be stressed the importance of these factors on bone health from the earliest period.

INTRODUCTION

Osteoporosis and low bone density are significant risk factors for morbidity and mortality in older adults. These conditions are characterized by poor bone strength and are associated with an increased risk of the fractures from even slightly traumatic events. Several medications have recently been labelled for the treatment of osteoporosis, but their marginal benefits require careful consideration of their cost. Prevention is preferable to treatment since no therapy fully restores lost bone mass. It is also known that the prevalence of osteoporosis varies from country to country, and within countries [1].

Differences in race, nutritional status, physical activity, lifestyle and living conditions all contribute to its variability [2]. Several demographic factors may be considered as barriers to health prevention like high rate of illiteracy and low socioeconomic status in developing countries [3].

Other factors that may contribute to regional difference include water hardness, sunlight exposure, poverty levels and the proportional agricultural land. Further studies are needed to identify the environmental factors responsible for such marked regional difference [4].

Osteoporosis is an important public health problem in older adults. Not only does it give rise to morbidity but also markedly diminishes the quality of life of women after menopause, and of both women and men over 65 years of age [5].

In the twentieth century, the proportion of older persons started to rise and is expected to continue throughout this century. The number of individuals aged 60 and above is projected to grow to almost 2 billion by 2050, of who fifty-four percent live in Asia and the vast majority of who will be in the developing world. Such accelerated global population aging will increase economic and social demands on all countries [6].

On the other hand the estimated lifetime risk of osteoporotic fracture is as high as 50 percent, especially in white and Asian women. At present in India osteoporotic fractures usually occur 10 to 20 years earlier in men and women compared to Caucasian in the west. [7].

The attainment of a higher peak bone density has an important role in the prevention of osteoporosis later in life. Genetic factors and race/ethnicity have a strong influence on peak bone density. Physiological, environmental and modifiable lifestyle factors can also play a significant role. These factors include adequate nutrition and body weight, exposure to sex hormones at puberty and level of physical activity. They are not only important for the acquisition of maximal bone mass but also for its maintenance throughout life [8-12].

The present study evaluated some risk factors which include coffee consumption, alcohol consumption, smoking and physical activity among cases and controls.

METHODOLOGY

Study site: This study was conducted at the Department of

Orthopaedics.

Study population: We included post-menopausal women aged more than 45 years and less than 80 years based on inclusion and exclusion criteria.

Study design: We conducted a case-control study from January 2021 to December 2021.

Inclusion criteria
We included the post-menopausal women aged more than 45 years who were willing to give voluntary consent.

Exclusion criteria: we excluded the following subjects with
- Women not willing to participate.
- Documented cases of osteoporosis/osteopenia
- Nonambulatory women

Definition of case and control:
This study is a case-control study, case and controls are defined based on the measurement of BMD.

The case group included postmenopausal Osteoporotic women who were identified as patients with bone density higher than 2.5 SD below average of young normal bone density (in L1–L4) spine region interest and/or total femoral region) by using DEXA method.

The controls were chosen from post-menopausal women with normal bone density (BMD lesser than 1 SD below average of young's in L1–L4 spine and total femoral regions using DEXA method) frequency of matching in age groups was the strategy of choice.

Statistical Analysis:
Statistical analysis was done using Microsoft Excel spreadsheet, and statistical package for the social sciences (SPSS) version 20.0 software. The comparison between the two groups is done using student's t test and the p value <0.05 is considered statistically significant.

RESULTS
The present study included a total of 120 post-menopausal women. We divided them into two groups based on the measurement of Bone Mineral Density (BMD). Group 1 includes postmenopausal Osteoporotic women with bone density higher than 2.5 SD below average of young normal bone density (in L1–L4) spine region interest and/or total femoral region) by using DEXA method. Group II post-menopausal women with normal bone density (BMD lesser than 1 SD below average of young's in L1–L4 spine and total femoral regions using DEXA method) frequency of matching in age groups was the strategy of choice.

Table 1: Shows age-wise distribution of subjects included in the study.

Variables	Group I	Group II	p value
Mean age	48.96±6.23	50.76±4.23	NS
Age at menopause	49.96±5.23	48.96±6.23	NS
BMI			
<25	18 (30%)	32 (53.3%)	HS
>25	42 (70%)	28 (46.6%)	

Table 1 presents age-wise distribution of cases and controls. The mean and SD of age in cases and controls were 48.96±6.23 and 50.76±4.23 respectively and the mean and SD of age at menopause in cases and controls were 49.96±5.23 and 48.96±6.23. It is evident that there was no statistically significant difference in mean age and mean age at menopause between the two groups. We evaluated body mass index (BMI) in cases and controls, we found that 30% of cases had BMI < 25 and 70% had BMI >2. Similarly, in control

group 53.3% had BMI <25 and 46.6% had BMI >25. The comparisons of BMI between cases and controls were statistically significant.

Table 2: Shows risk factors for Osteoporosis

Variables	Group I	Group II	p value
Coffee			
1-3 cups/day	36%	38%	NS
>3 cups/day	32%	35%	
No	32%	27%	
Alcohol			NS
Yes	5%	3%	
No	95%	97%	
Physical activity			HS
Yes <30 min/day	13%	25%	
Yes >30 min/day	2%	8%	
No	85%	67%	
Smoking			HS
Yes	15%	2%	
No	85%	98%	

Table 2 presents various risk factors for osteoporosis, which include coffee consumption, alcohol, smoking and physical activity.

DISCUSSION
The present study included a total of 120 post-menopausal women. We divided them into two groups based on the measurement of Bone Mineral Density (BMD). Group 1 includes postmenopausal Osteoporotic women with bone density higher than 2.5 SD below average of young normal bone density (in L1–L4) spine region interest and/or total femoral region) by using DEXA method. Group II post-menopausal women with normal bone density (BMD lesser than 1 SD below average of young's in L1–L4 spine and total femoral regions using DEXA method) frequency of matching in age groups was the strategy of choice.

The mean and SD of age in cases and controls were 48.96±6.23 and 50.76±4.23 respectively and the mean and SD of age at menopause in cases and controls were 49.96±5.23 and 48.96±6.23. It is evident that there was no statistically significant difference in mean age and mean age at menopause between the two groups. We evaluated body mass index (BMI) in cases and controls, we found that 30% of cases had BMI < 25 and 70% had BMI >2. Similarly, in control group 53.3% had BMI <25 and 46.6% had BMI >25. The comparisons of BMI between cases and controls were statistically significant.

Table 2 presents various risk factors for osteoporosis, which include coffee consumption, alcohol, smoking and physical activity. It is found that the coffee consumption between cases and controls were 36% 1-3 cups/day, 32% >3 cups/day, 32% no consumption in cases and 38% 1-3 cups/day, 35% >3 cups/day and 27% no consumption among controls. There were no statistically significant differences between the two groups.

It is found that 5% of cases had alcohol habit and 95% of cases had no alcohol habit similarly, 3% of controls had alcohol habit and 97% had no alcohol habit. There were no statistically significant differences between the two groups w.r.t alcohol consumption.

It is found that 15% cases had smoking habit and 85% did not had, similarly 2% of controls had smoking habit and 98% did not had smoking habit. There were statistically significant differences between the two groups w.r.t smoking.

It is found that 13% of cases had physical activity <30 min/day, 2% had >30 minu/day and 85% had no physical activity,

similarly 25% of controls had physical activity <30 min/day, 8% had >30 minu/day and 67% had no physical activity. There were statistically significant differences between the two groups w.r.t physical activity.

Osteoporosis is a metabolic bone disease which in developed countries represent a very important social and medical problem and it is getting more and more a form of epidemic, as it has a steady increase in the number of cases. After age of 30 years the reduction of bone mass is an inevitable process, and consequently, changes in the bone remodelling cycle leading to bone fragility and increased risk of bone fractures. In osteoporosis are involved numerous factors which can be classified in the group of risk factors that cannot be influenced (unchangeable factors) and the risk factors that can be affected (variable or preventable factors).

Among the variable risk factors for osteoporosis, which are related to poor living habits, recent studies show that smoking has an important place because it leads to some changes in the level of microarchitecture of trabecular bone, which results in reduced bone resistance to mechanical stress and friction. Smokers, regardless of the gender have a higher risk of having osteoporotic fractures. Women who smoke are almost twice as likely affected by osteoporosis than women non-smokers. Our results are consistent with other scientific studies, in which the prevalence of osteoporosis was much higher in the group of smokers (31.3%) compared to former smokers (28.6%) or non-smokers (7.5%). The results of our study, in accordance with the previously imposed attitudes, have shown that smoking is a significant independent risk factor for osteoporosis ($p=0.000$, $OR=1.911$, 95% $CI=1.378$ to 2.648).

Scientific findings on the impact of alcohol on bone mineral density show different results. According to certain studies, non-hazardous alcohol use (1.0 drinks per day) has a slightly positive effect on bone density because alcohol contains certain substances that may have the oestrogen-like stimulatory effect on bone. Ilic and colleagues have found that a low intake of alcohol, mostly wine, is positively correlated with bone mineral density at the level of lumbar spine in postmenopausal women, while Berg and colleagues have shown that people who consume 0.5 to 1.0 drinks a day have a lower risk of hip fracture compared to abstainers or hazardous consumers. On the other hand, excessive alcohol consumption has a negative impact on the mechanism of bone remodelling, osteoblastic proliferation and activity, and therefore the direct negative effect on bone homeostasis.

Some studies have demonstrated the negative impact of high doses of caffeine to osteoporosis and fractures, particularly in postmenopausal women, which is a reflection of direct or indirect harmful effects of caffeine on osteoblastic activity. In fact, caffeine from coffee can lead to increased excretion of calcium in the urine, and that this loss cannot be fully compensated even 24 hours later. Caffeine intake leads to a decrease in interstitial absorption of calcium, and high doses of caffeine (>300 mg/g or ≥4 cups a day) can accelerate bone loss at the level of lumbar spine in older postmenopausal women. Our study did not acknowledge the fact that the coffee consumption of ≥3 cups a day is a risk factor for osteoporosis [13-15].

For healthy bone, it is necessary to regularly exercise and have physical activity, avoiding sedentary lifestyle, as if the bones are not energized and physical active, mechanoreceptors (osteocytes) do not receive signals about the need for remodelling, removal of damaged and synthesis of new bone, and so there is a gradual reduction of total bone mineral density. Physical activity or physical exercise in postmenopausal women must provide the necessary voltage essential for maintaining bone density. It was found that engaging in recreational sports or active walk (30-60 minutes) more than twice a week reduces the risk of osteoporosis and fractures in older postmenopausal women. Exercises by load of its own weight or exercise against resistance are effective for increasing bone density and aerobic exercises increase the balance and functional activity of muscles thus reducing the risks of falls. Data from other studies also suggest that physical activity is essential for bone health and the prevention of osteoporosis. In our study, the patients took a large percentage of cases were physically inactive, 74% in the group of cases versus 86% in the control group, which agrees with the results of other studies [15-19]. We found similar results in our study.

CONCLUSION:

The findings of our study indicate that the smoking and reduced physical activity are important factors that can prevent osteoporosis in post-menopausal women. These are preventable risk factors.

Through education and certain preventive measures, it should be stressed the importance of these factors on bone health from the earliest period.

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