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Original Research Article.

To Evaluate the Severity of Osteoarthritis in Post-Menopausal Women: An Institutional Based Study

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ABSTRACT

Background: The incidence of knee, hip, and hand OA is higher in women than men and in women increases dramatically around the time of menopause, prompting many investigations into the roles of estrogen and other hormones as possible explanatory factors. Results of clinical and epidemiologic studies have been conflicting. Hence, we evaluated the severity of osteoarthritis in post-menopausal women.

Materials and Methods: 50 postmenopausal women aged over 45 years were selected. It was made sure that the woman who participated in the study had undergone bone densitometry test of the hip or lumbar spine had BMD values consistent with osteoporosis. After the selection of the participants, we recorded age, height, and weight of the subjects. All the subjects were provided a questionnaire to be answered based on their signs and symptoms of the arthritic pain.

Results: A total of 50 subjects were included in the study. The mean age of the patients was 51.29 years. Mean T-score of the subjects who participated was -2.11. The majority of patients had two sites affected (n=26). We observed that 33 patients out of 50 patients had osteoarthritic pain and functional disability in the hip, knee, neck or hand. The most common severity of pain and disability in these regions was mild (n=14), followed by moderate (n=12), and severe (n=7).

Conclusion: The post-menopausal women with low BMD tend to have osteoarthritic pain and disability in neck, knee, hip, and hand region. The most common severity of pain and disability is mild.

Keywords: Osteoarthritis, Knee, Hip, Pain.

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INTRODUCTION

Sex differences have been noted in the prevalence, incidence, and severity of osteoarthritis (OA) for many years. The incidence of knee, hip, and hand OA is higher in women than men and in women increases dramatically around the time of menopause, prompting many investigations into the roles of estrogen and other hormones as possible explanatory factors. Results of clinical and epidemiologic studies have been conflicting,[1-3] with some showing a protective effect for estrogen or hormone replacement therapy (HRT) on radiographic knee and hip OA or progression to joint replacement but no effect on joint symptoms. The trabeculae in patients with OP have lower strength and are of poorer quality, whereas sclerotic subchondral trabecular bone is found in those with OA.[4,5] However, the increase of stiffness in OA does not mean higher strength. Dual-energy x-ray absorptiometry (DXA) studies have shown that patients with osteoarthritis have increased BMD and bone mineral content. Nevertheless, higher BMD does not translate into reduced risk of osteoporotic fracture because the structural benefits of reduced trabecular separation and increased number of trabeculae in the bone of osteoarthritic patients are counterbalanced by osteoarthritis related factors like postural instability and muscle weakening.[6] The present study was planned to evaluate the severity of osteoarthritis in post-menopausal women.

MATERIALS AND METHODS

The present study was conducted in the Department of Orthopaedics, S.P. Medical College, Bikaner, Rajasthan, India. A written informed consent was obtained from the patients prior to start of the study. For the study, we selected 50 postmenopausal women aged over 45 years. It was made sure that the woman who participated in the study had undergone bone densitometry test of the hip or lumbar spine had BMD values consistent with

osteoporosis. After the selection of the participants, we recorded age, height, and weight of the subjects. All the subjects were provided a questionnaire to be answered based on their signs and symptoms of the arthritic pain. Arthritis pain and function disability was marked as; mild, moderate and severe. The osteoarthritic pain and disability was categorized according to the site; i.e., hip, neck or hand. The data was compiled and subjected to statistical analysis.

The statistical analysis of the data was done using SPSS version 11.0 for windows. Chi-square and Student's t-test were used for checking the significance of the data. A p-value of 0.05 and lesser was defined to be statistical significant.

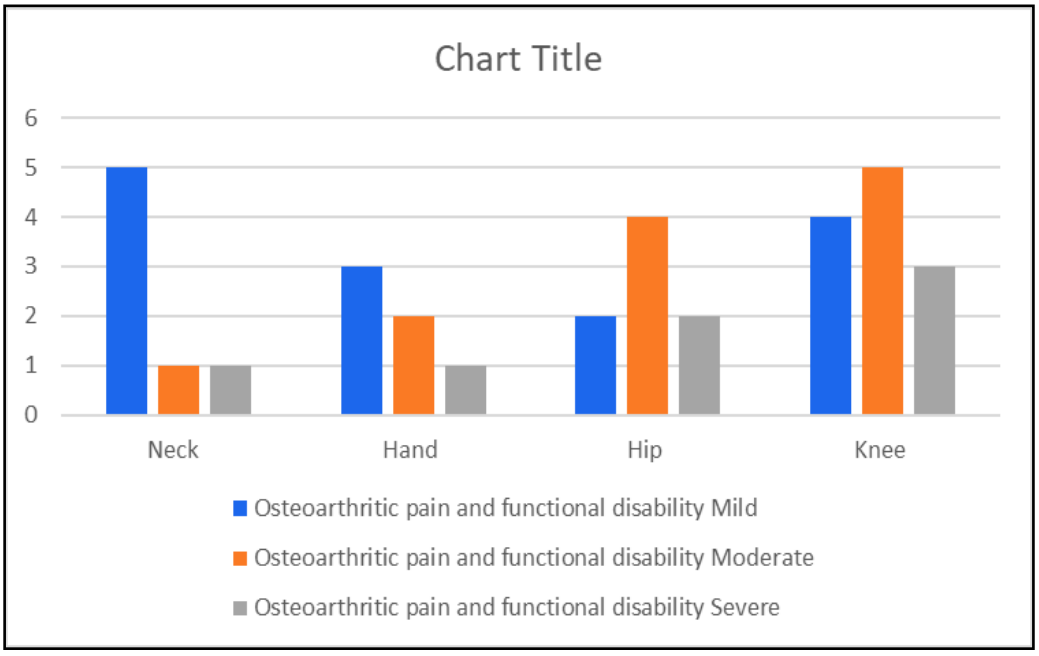
Table 1: Demographic data

Variables	Study group
Total number of subjects	50
Mean age (years)	51.29
Mean T-score	-2.11
Number of sites affected	Number of patients
• **1**	• 14
• **2**	• 26
• **≥3**	• 10

Table 2: Osteoarthritic pain and disability at the hip, knee, neck and hand

Site of pain/disability	Osteoarthritic pain and functional disability				p-value
	Mild	Moderate	Severe	All	
Neck	5	1	1	7	0.01
Hand	3	2	1	6	0.002
Hip	2	4	2	8	0.004
Knee	4	5	3	12	0.005
Total	14	12	7	33	

Fig 1: Osteoarthritic pain and disability at the hip, knee, neck and hand



RESULTS

Table 1 shows the demographic data of the subjects. A total of 50 subjects were included in the study. The mean age of the patients was 51.29 years. Mean T-score of the subjects who participated was -2.11. The majority of patients had two sites affected (n=26). Table 2 shows the osteoarthritic pain and functional disability of subjects. We observed that 33 patients out of 50 patients had osteoarthritic pain and functional disability in the hip, knee, neck or hand. The most common severity of pain and disability in these regions was mild (n=14), followed by moderate (n=12), and severe (n=7). The most common site involved was knee, followed by hip and hand. Neck was the least involved region. On comparing the results, we observed the results to be statistically significant.

DISCUSSION

In the present study, we evaluated the severity of osteoarthritis in post-menopausal women. We observed that 33 patients out of 50 patients had osteoarthritic pain and functional disability in the hip, knee, neck or hand region only. The most common severity of pain and disability in these regions was mild and the most common site involved was knee. The results were statistically significant. The results were compared with previous studies and were found to be statistically significant. Jiang LS et al compared bone metabolism between postmenopausal women with OA and OP. A total of 120 postmenopausal women with OA and OP (n = 60, respectively) were included in this comparative study. Anthropometric parameters and BMD at the spine and the proximal femur were measured. Postmenopausal women with OA had higher body weight, body mass index, fat mass, and percentage of fat than those suffered from OP. Compared with the patients in OP group, the patients in OA group had significantly higher BMD values at all sites measured. Higher serum leptin and FLI and lower OPG levels were shown in the OA group, whereas lower serum OC and higher urine DPD were noted in the OP group. Serum OPG levels negatively correlated with BMD at all sites assessed. However, no correlation was found between leptin and BMD. Only in the OA group di positive correlations exist between FLI and Z-score at the femoral neck and Ward's triangle region. Their study suggested that there are significant differences in bone metabolism between postmenopausal women with OA and OP and provides evidence for the inverse relationship between OA and OP. Shen Y et al compared the exact difference in bone tissue structure between osteoporosis and osteoarthritis, we observed the ultrastructure of trabecular bone from the femoral heads using scanning electron microscopy (SEM) and transmission electron microscopy (TEM). A total of 15 femoral head specimens from postmenopausal women were collected during the procedures of total or hemi hip replacement. The morphologic structure of the trabecular bone, collagen fibers, resorption lacuna and osteoblasts were observed. Under SEM, osteoporotic trabeculae appeared to be thinning, tapering, breaking and perforating. A number of resorption lacunae of various shapes were seen on the surface of the trabeculum. The collagen fibers of lacuna were resorbed. On occasion, naked granular bone crystals could be found. In the OA group, the trabecular bone looked thick with integrated structure. Reticular and granular new bone could be found. The trabeculum was covered by well-arranged collagen fibers around the resorption lacuna. In the OP group, under TEM, marginal collagen fibers were observed to be aligned loosely with enlarged spaces. A few inactive osteoblasts and no inflammatory cells were seen. In the OA group, the collagen fibers inside the trabeculum were arranged in a dense manner with many active osteoblasts and inflammatory cells infiltrating the matrix. Their findings supported the hypothesis that there is an inverse relationship between OP and OA.

Al-Shoumer KA et al measured bone mineral density (BMD) in Kuwaiti women residents in the largest province of Kuwait state to highlight the BMD changes with each age, in particular when they reach the postmenopausal stage. Kuwaiti female subjects of different age groups between 10 and 89 years, who were residents in the largest province of Kuwait (Hawalli), were included in the study. They were included if they had been healthy over the last 12 months, had no past history of bone disease, and are not taking any prescription medication that may affect bone density. Their bone mineral density of L2-L4 lumbar spine and femur (neck and total) was measured using dual-energy X-ray absorptiometry. Out of the studied 903 female subjects, 811 fulfilled the inclusion criteria and were included in the study. Their mean ± SEM age and body mass index (BMI) were respectively 47 ± 1 years and 30.8 ± 0.2 kg/m(2). When subjects were subdivided as per BMI, it was notable that overweight and obese postmenopausal women had significantly higher BMD of lumbar spine, femur neck, and femur total than normal weight postmenopausal women. Bone mineral densities of the spine, femur neck, and femur total demonstrated significant positive correlations with body weight and BMI, whereas they demonstrated significant negative correlations with age. It was concluded that the low BMD of the femur neck and spine, reflected by the combination of osteopenia and osteoporosis, seemed to occur in more than half of postmenopausal Kuwaiti women residents at the largest province of Kuwait. Atalar H et al investigated the relation between bone mineral density (BMD) in the femoral neck and lumbar vertebrae (L2-L4) and osteoarthritis in the knee. BMD was measured with dual X-ray absorptiometry. Osteoarthritis was evaluated with anterior-posterior weight-bearing radiographs with the knee in extension, and these were graded for severity on a 5-point scale according to the Kellgren-Lawrence criteria. We found no clear statistical relation between BMD in the femoral neck or lumbar vertebrae and osteoarthritis in the knee. Given that some studies have found BMD to be significantly higher in patients with osteoarthritis, the lack of such relation in our patients may be due to environmental and/or genetic factors.

CONCLUSION

From the results of the present study, we conclude that post-menopausal women with low BMD tend to have osteoarthritic pain and disability in neck, knee, hip, and hand region. The most common severity of pain and disability is mild.

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