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Full Length Research Paper

Postural risk factors for Osteoarthritis in Pakistani Women

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Abstract

The aetiology and pathogenesis of osteoarthritis (OA) is not fully understood. However, it is known that several factors play a role. Environmental factors, stress from mechanical loading, predispose individuals to developing OA. Several risk factors for OA include: age, obesity, gender, genetics, diet and posture. To estimate the postural risk factors for developing osteoarthritis in Pakistani Women. Various diagnostic methods comprise of radiography, clinical presentation, a number of developed measurements and scales were used to collect data. Different joints area affected in different Postural risk factors. High prevalence of knee joint was observed in 36%. Hand and hip OA were found in 10% and 17% respectively. More than one joint were involved in 37% of participant. The frequency of OA also depends upon the posture. Assessment and modification of postural changes in relation to development and/or progression of (OA) can be made and by avoiding these postural changes, the OA can be prevented.

Key words: Osteoarthritis, Postural risk, Joints.

INTRODUCTION

Osteoarthritis is an ancient, mechanical and most common joint disorder. The central pathologic features of OA are the loss of hyaline articular cartilage and changes in the sub chondral bone (Alcaraz et al., 2010; Heinegard and Saxne, 2011). In addition to damage and loss of articular cartilage, there is remodelling of sub articular bone, osteophyte formation, ligamentous laxity, weakening of peri-articular muscles, and, in some cases, synovial inflammation. These changes may occur as a result of an imbalance in the equilibrium between the breakdown and repair of joint tissue. Primary symptoms of OA include joint pain, stiffness, and limitation of movement. Disease progression is usually slow but can ultimately lead to joint failure with pain and disability (Pereira et al., 2011). Studies have shown the prevalence of knee osteoarthritis (KOA) to be 7.50%, 10.9% and 13.6% in China. In India and Bangladesh it is reported to be 5.78% and 10.20% respectively. A study in Pakistan has shown that 28.00% of the urban and 25.00% of the rural population have knee osteoarthritis (KOA) (Haq, 2011).

It may affect any joint of the body, but commonly affected joints are knee and hip. There are many risk factors for this disease, like age, gender, sex hormones, obesity, bone density, ethnicity and nutritional status (Loeser, 2010; Blagojevic et al., 2010). This risk is increased by activity which entails prolonged bending of knee joints (Mounach et al., 2008). Several occupational risk factors are related to progress of knee joint disease. Disease has been linked with occupational physical activities (Klussmann et al., 2010).

Occupation is another risk factor that has been linked to OA. Studies have varied in their design, in both definition of OA and exposure to workload. The prevalence of knee pain, the associated clinical features and the impact of socio-economic status on its frequency were explored amongst population (Ker and Al Kawan, 2001).

The aim of the research was to find the different occupational factors (for example, kneeling and squatting activities, the lifting and carrying of loads, standing, jumping) and other influencing factors (for example, age, gender, constitutional factors, sports) to predict the frequency of these factors in knee OA in Pakistani population.

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MATERIALS AND METHODS

This is a cross sectional study conducted in a tertiary care hospital. The osteoarthritis patients were selected and the study was performed in accordance with ethics standards; permission is given by the hospitals. The history was recorded by asking questionnaire. Patients with jobs involving kneeling, squatting, lifting and climbing stairs are involved in order to get additional accurate information. The questionnaire comprises of their graphic factors, musculoskeletal health, duration of standing, sitting, walking, moving, climbing on stairs, frequency of lifting and jumping. OA was graded on the basis of X ray findings. Grade 1 included doubtful narrowing of joint space and possible osteophytic lipping. Grade 2 included definite osteophytes and possible narrowing of joint space. Grade 3 included moderate multiple osteophytes, definite narrowing of joint space, and some sclerosis and possible deformity of bone ends. Grade 4 was large osteophytes, marked narrowing of joint space, severe sclerosis, and definite deformity of bone ends (Adler and Stewart, 2011).Patients were selected, having symptoms of osteoarthritis, such as pain, stiffness, soreness, aching, discomfort, swelling and tenderness. Radiographs were taken for assessment of severity of disease. Patients taking any hormone replacement therapy (HRT), non steroidalanti inflammatory drugs (NSAID), having metabolic disease, rheumatoid arthritis (RA), joint, systemic lupus erythromatosis (SLE) were excluded from the study. Body mass index (BMI) was measured as the weight (in kg) divided by the height (in m2).Data was entered and analyzed in SPSS version 16.

RESULTS

Among 490 patients included in the study, two thirds were women (65.2%) with the mean age of 69.2 years (SD 9.5) (table 1). The OA diagnosis was confirmed with at least a plain x-ray examination in 90.2% of the patients. The average duration of OA was almost 8.3 years. The knee was the most affected joint found (35.6%) knee OA occurred in one third of patients complaint, which was double as many as any other joint like the hip or the hand (16.7% and 10.6% respectively). The last third represented as multiple joint involvements.

Figure 1 showed the distribution of prevalence of different joints affected. High prevalence of involvement of multiple joints (37.1%), the knee joint with osteoarthritis (36%), hand and hip OA are 10% and 17% respectively.

Table 2 showed associations of different postural position, like squatting, kneeling and climbing stairs when they were examined together in a single regression model which also included obesity and the presence or absence of Heberden's nodes. Odds ratios and CI values were mentioned in the table.

Odds ratios are derived from a single regression model incorporating all of the risk factors. Each activity was again associated with increased risk, but odds ratios were reduced and no longer statistically significant.

DISCUSSION

An individual's occupational postural position may predispose him/her to developing OA (Adler and Stewart, 2011). The findings of our study support by the hypothesis that prolonged or repetitive bending of knee joint is a cause of osteoarthritis (Bolm-Audorff et al., 2007). Regular heavy lifting during work, although not independently increasing risk, appears to augment the risks associated with kneeling and squatting. There are evidences that link knee osteoarthritis with occupational kneeling and squatting (Jensen, 2008). In an analysis of cross sectional data from the HANES I study, radiographic osteoarthritis of the knee at ages 55-64 was three times more common in people whose jobs were judged likely to entail knee bending.In Framingham study, the risk of radiographic knee osteoarthritis was highest in subjects whose earlier jobs were classed both as physically demanding and also as likely to involve bending of the knees.

There are at least two mechanisms whereby repetitive knee use might increase the risk of osteoarthritis (Roos et al., 2008). Occupations characterised by prolonged periods of kneeling and squatting might also increase the risk of meniscal or ligamentous damage to the knee, and such lesions are known risk factors for knee osteoarthritis (Davis et al., 1989; Cooper et al., 1992). Alternatively, repetitive loading might directly induce cartilage loss. Our observation that the risk of osteoarthritis from occupations involving with bad postural position, knee bending is independent of that from knee injury and meniscectomy, suggests its direct effect on the joint. Felson repetitive impulse loads appear to stimulate chondrocytes and increase production of proteoglycans (Kampen et al., 1985). The effects of these changes on the biomechanical properties of cartilage remain uncertain.

The agriculture sector has been historically one of the first to be identified in relation to osteoarthritis of the hip and more recently of the knee (Walker-Bone and Palmer, 2002). In a recent study, animal and dairy productions and working in a small size farm were particularly associated with the risk of hip osteoarthritis (Thelin et al., 2004). Women in the clothing industry combined a high prevalence rate (Cvijetic et al., 2004). The risk pointed toward disabling osteoarthritis of the hand in relation to exposure to repetitive movements.

Table 1. Percentage of Characteristics of OA patients.

Age, y (SD)	69.2 ± (9.5)
Diagnostic x ray (%)	90.2
Mean duration of OA, y (SD)	8.3 ± (5.6)
Joint involved (%)	
Hand	10.6
Hip	16.7
Knee	35.6
More than one	37.1

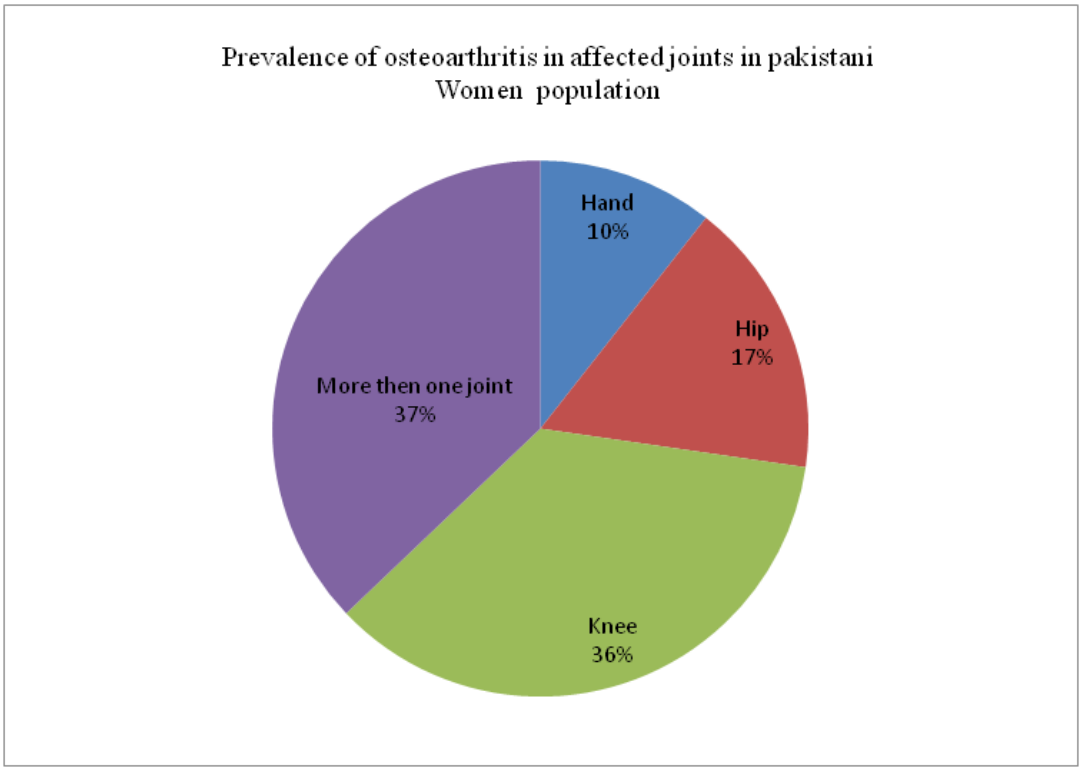

Figure 1. Distribution of Prevalence of osteoarthritis in affected joints in Pakistani women

Table 2. Association of knee osteoarthritis and occupational activities.

Risk factors	odds ratio	95%CI
BMI< 22.1	1.0	--
22.1-25.6	1.1	0.5-2.4
>25.6	3.2	1.5-7.0
Heberdan nodes	2.0	1.1-2.8
Squatting >3.0 minutes/day	3.7	1.0-15.2
Kneeling > 3.0minutes/day	1.5	0.7-4.7
Climbing stairs > 10 flights/day	2.4	0.8-3.0

The exact nature of hand osteoarthritis was not investigated in this population study. Hand osteoarthritis and occupation, including textile workers, has been investigated with mixed results (Caspi et al., 2001). Specific biomechanical stresses have been suggested for the study of hand symptoms in textile workers (Cvijetic et al., 2004). The greater prevalence rate in self-employed compared with salaried workers in our study indicated that working conditions, including regulation of working hours and other organisational

factors, may also play an important role in the development of hand osteoarthritis. Studies comparing salaried and self-employed workers in this sector would help identify these factors.

Masons and other construction workers topped the risk of osteoarthritis among male workers with high excess prevalence and a large number of workers affected. Construction workers have been identified as being at risk for osteoarthritis of various joints with results compatible to ours (Holmberg et al., 2004). We found that the prevalence rate was higher among the self employed; however, salaried workers showed a more premature onset of osteoarthritis. Different occupational risks can act independently on the frequency and severity of osteoarthritis. Precocious osteoarthritis was also observed among material handlers. The prematurity of the onset of occupational osteoarthritis has not yet been studied. It seems that the premature wearing out of the joints is not only associated with heavy labour but also with some of the characteristics that differentiate the salaried from the self-employed workersperhaps showing that less variety in tasks leads to a greater concentration of joint stresses. This finding deserves clinical and radiological screening studies to identify factors associated with early symptomatic osteoarthritis.

CONCLUSION

Primary osteoarthritis is related to acute postural changes in daily activities. Even though the aetiological link remains unclear, postural risks during active life may be involved in a large number of patients after the age of retirement. Occupational and non occupational postural risk factors play an important role in the aetiology of symptomatic knee OA. Preventive measures need to be developed in the workplace in order to reduce the burden of osteoarthritis in populations. With OA having several risk factors and various causes and contributing elements, it is important to elucidate the pathogenesis of OA and determine exactly how risk factors play a role in its development. Because of the contributions from several elements, diagnosis is best when it uses multiple methods. In turn, understanding OA and making better diagnoses could lead to improved management of the condition through both pharmacological and non-pharmacological interventions.

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