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Risk factors associated with osteoarthritis: A study in an Upazilla health complex of Bangladesh

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Abstract
Introduction: Osteoarthritis is the most common form of arthritis, affecting millions of people worldwide year after year. It occurs when the protective cartilage that cushions the ends of your bones wears down over time. Although Osteoarthritis can damage any joint, the disorder most commonly affects joints in your hands, knees, hips and spine. As there had been very few studies in Bangladesh we have conducted this study to know more about Osteoarthritis.
Objective: The main objective of this prospective observational study was to evaluate the risk factors associated with Osteoarthritis (OA).
Methodology: This was a retrospective study which was conducted in Upazilla Health Complex, Sadar, Mymensingh, Bangladesh during the period from January 2018 to December 2018. Data were collected by a pre-designed questioner and analyzed by computer program, SPSS Version 20. Incomplete data-sheets were rejected before analysis and finally total study population was fixed to 182 with Osteoarthritis (OA).
Result: Among the total 182 study people, the highest number of patients with Osteoarthritis was found in 51 to 60 years' age group. This number was 66 and it was 36.26% of total study population. In the comparison of sample data regarding risk factors like DM, Hypertension, previously operated, history of injury, and family history it was found that against K and L Score and VAS Score the significant values were associated where p values were 0.447 and 0.392 respectively.
Conclusion: Osteoarthritis is one of the leading causes of disability. It occurs in similar proportions in all cultures, interferes with quality of life and work performance and is the most common reason for medical consultations. More studies regarding OA are necessary to get the clear concepts about this issue.

Keywords: osteoarthritis, overweight, risk factors, Bangladesh, cartilage

1. Introduction

Osteoarthritis is the most common form of arthritis, affecting millions of people worldwide year after year. It occurs when the protective cartilage that cushions the ends of your bones wears down over time. Although Osteoarthritis can damage any joint, the disorder most commonly affects joints in your hands, knees, hips and spine. Reflecting the impact of osteoarthritis on our lives, numerous studies have set out to know about the risk factors of the disease [1]. However, studies have shown somewhat inconsistent or often conflicting results in terms of body mass index (BMI), activity, and the involved anatomic structures [2]. Furthermore, there is little known about the contributing factors to current joint-related pain in patients with osteoarthritis, which is the most important symptom caused by osteoarthritis. Joint-related pain usually triggers those with osteoarthritis to seek medical or surgical treatment. Therefore, we need to focus on investigating the contributing factors related to joint-related pain, along with associated factors in osteoarthritis. Osteoarthritis is characterized by loss of articular cartilage, hypertrophy of bone at the margins, subchondral sclerosis and range of biochemical and morphological alterations of the synovial membrane and joint capsuleand is caused due to chronic degeneration of the articulating surfaces of the joint [3]. Late stage changes of OA include softening, ulceration of the articular cartilage, synovial inflammation also may occur. Patients usually present with symptoms of pain, particularly after prolonged activity and weight bearing; whereas stiffness is experienced after inactivity [4]. Most patients with Osteoarthritis have no known cause. This is known as Primary osteoarthritis. Primary osteoarthritis is mostly related to aging. It can be localized, generalized or as erosive osteoarthritis. Secondary osteoarthritis is caused by another disease or condition. Osteoarthritis (OA) is a common degenerative disease of joints. The major clinical features are pain and stiffness, leading to a decline in physical function. Considerable pain and disability result from large joint OA, which is the major cause of joint replacement surgery and cost to the community. The focus of current medical intervention is on symptomatic relief, given that no cure for the disease exists. As curative intervention is unlikely in the near future, both the prevention of disease onset and progression of the disease are of great importance. OA of the knee is a common form of arthritis in the elderly. It is a complex multifactorial disease. Risk factors are broadly divisible into those that are constitutional or genetic and those that are local and driven by biomechanical elements, such as joint usage. As incidence of knee OA is expected to rise as the proportion of elderly population continues to increase and

knee OA has a substantial impact on activities of daily living, several epidemiological studies in Western and Oriental countries [1–4] have investigated risk factors of knee OA, finding a consistent association between the incidence or progression of knee OA and age, obesity, history of knee injury, occupational physical demands, physical activity, and regular sport activities. However, no data exist from countries of the south bank of the Mediterranean Sea. Thus, we aimed in this study to look for risk factors for OA of the knee in a sample of symptomatic patients from the Moroccan population.

2. Material and Methods

This prospective observational study was conducted in Upazilla Health Complex, Sadar, Mymen Singh, Bangladesh during the period from January 2017 to December 2018. In total 182 patients attended with Osteoarthritis (Diagnosed) was the total Study population. Proper written consent in language understood by the patient was taken. Personal data, clinical findings, radiological findings, biochemical reports and related medical records of all patients were obtained. A pre-tested semi structured questionnaire was administered to all patients. Through the questionnaire we collected the data regarding the patient's socio-demographic details, the possible risk factors for developing OA, age, gender, occupation, family history of OA, physical activity, history of injury. X-ray, weight and height measurement along with all necessary investigations according to standard protocol were done. On basic evaluation, patients having symptoms suggestive of OA were sent for X-rays. On X-ray, Grade 2 patients were excluded from the study and Grade 0 and Grade 1 patients were taken in the study. Baseline biochemical parameters of these patients were recorded, and patients were followed up after 3 and 6 months. Simultaneously, patients were started on medication and physiotherapy. The inclusion criteria were: a) Early OA knee – Kellgren and Lawrence (K and L) Grade 0 and 1, b) Qualitative C - reactive protein – Negative, c) Erythrocyte Sedimentation Rate- <20 mm/1 hr, d) Serum Uric Acid level < 6 mg/dl, e) Total Leucocyte count < 10000/ Cu.mm. On the other hand the exclusion criteria were: a) Advanced OA knee with Kellgren And Lawrence (K and L)> Grade 2, b) Joints pain due to Rheumatological or Systemic diseases, c) Malalignment of Weight Bearing Axis and d) Internal Knee derangement causing knee pain. Statistical analysis was conducted by using SPSS Version 20 software. An unpaired t test was used to test the null hypothesis. The procedure calculates the difference between the observed means in two independent samples. A significance value (P-value) and 95% Confidence Interval (CI) of the difference is reported. The P- value is the probability of obtaining the observed difference between the samples if the null hypothesis were true. The null hypothesis is the hypothesis that the difference is 0. P value less than 0.05 is considered significant.

3. Result

In our study among total 182 participants 85 were male which was 46.70% and 97 were female which 53.30% of the total study population. So here female are dominating. In this study the age range of our participants was from 21 to 80 years. The highest number of patients was from 51-60 years' age group. It was 66 in number which was more than one third of the total population (36.26%). Then from 41-50 years' age group it was 51 (28.02), from 61-70 years' age group 29 (15.93%) from 31-40 years' age group it was 15 (8.24%), from 71-80 years' age group it was 12 (6.59%) and from 21-30 years' age group it was found 9 (6.59%). According to the socioeconomic status and monthly family income in this study all the responded were divided into three classes: lower class, middle class, and upper class. The 'per month family income' of the respondents of lower class, middle class, and upper class were defined as ≤9000.00 BDT, 9000-20000 BDT and ≥80000 BDT respectively. The highest numbers of patients of our study come from lower class. This number was 98 which were 61.54% of the total study population. Then it followed by 70 (38.46%) from middle class and only 14 (7.69%) from upper class. The highest number patient's BMI Score was 25-30 who were over weighted. This number was 94 which were 51.65%. Then it followed by normal weighted, BMI <18.5-24.9: 66 (36.26%); obese, BMI >30: 16 (8.79%) and under weighted, BMI Score: <18.5: 6 (3.30%). On evaluating relation of posture and habits with Osteoarthritis, it was found that most of the patients were associated with some posture and habits which may associate with Osteoarthritis. We found only 15.38% patients with normal posture and habits. 29.67% patients were engaged with stair climbing which was the highest ratio. Then it was followed by several occupational hazards: 24.73%, habitual squatting: 17.03% and frequent weight lifting: 13.19%. Risk factor, family history was associated with 42 (23.08%) patients. It was the highest engagement and it was followed by Diabetes Mellitus: 31 (17.03%), history of injury: 16 (8.79%), Hypertension: 13 (7.14%) and previously operated: 8 (4.40%). In Table IV the comparison of sample data regarding overweight have been displayed. Here against K and L Score and VAS Score we got the significant values where the p values were 0.4083 and 0.3971 respectively. In Table V the comparison of sample data regarding menstruating stages have been displayed. Here against ACR Score and VAS Score we got the significant values where the p values were 0.375 and 0.428 respectively. In Table VI the comparison of sample data regarding risk factors have been displayed. Here against K and L Score and VAS Score we got the significant values where the p values were 0.447 and 0.392 respectively.

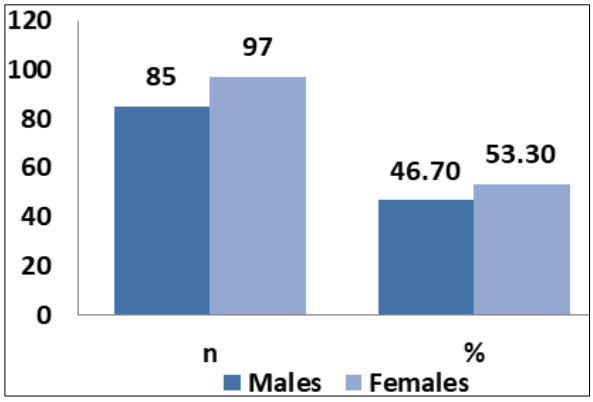

Fig 1: Male- female ratio of the participants (n=182)

Table 1: Age distribution of the participants (n=182)

Age Group	Number	%
21-30	9	4.95
31-40	15	8.24
41-50	51	28.02
51-60	66	36.26
61-70	29	15.93
71-80	12	6.59
Total	182	100.00

Table 2: Monthly family income status of the participants (n=182)

Status	n	%
Lower Class	98	53.85
Middle Class	70	38.46
Upper Class	14	7.69
Total	182	100

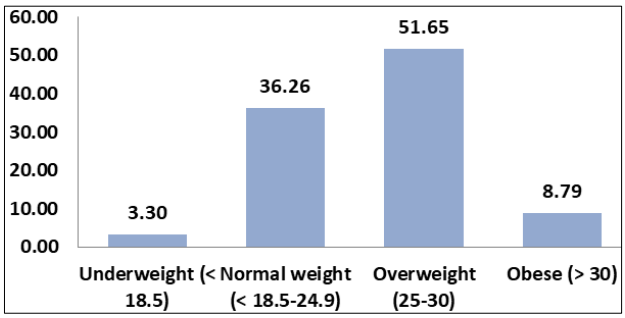

Fig 2: Ratio of participants according to BMI Scores (n=182)

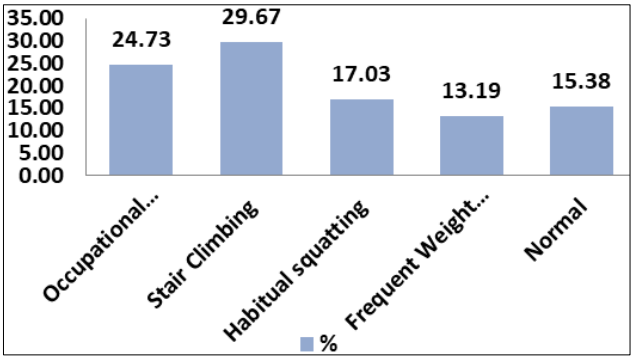

Fig 3: Posture and habits of the participants (n=182)

Table 3: Risk factors associated with Osteoarthritis

Particulars	Number	%
Diabetes Mellitus	31	17.03
Hypertension	13	7.14
Previously operated	8	4.40
History of injury	16	8.79
Family History	42	23.08

Table 4: Comparison of sample data regarding overweight

Scale	Non Obese n=16	Obese n=16	P value
	Mean Difference	Mean Difference	
ACR	0.791±0.982	0.792±0.897	0.7629
LEFS	(-)14.928±13.807	(-)14.961±9.917	0.8081
K and L	0.892±0.673	0.897±0.8167	0.4083
VAS	2.013±0.617	1.827±0.616	0.3971

Table 5: Comparison of sample data regarding Menstruating stages

Scale	Menstruating Females n=16	Post-menopausal Females n=20	P value
	MEAN Difference	MEAN Difference	
ACR	1±0.892	0.0971±0.893	0.375
LEFS	(-)14.369±17.932	(-)28.797±12.003	0.885
K and L	0.719±0.564	0.975±0.680	0.761
VAS	2.017±0.683	1.075±0.984	0.428

Table 6: Comparison of sample data regarding risk factors

Scale	With Risk Factors n=40	Without Risk Factors n=40	P value
	MEAN Difference	MEAN Difference	
ACR	0.814±0.895	0.913±0.816	0.558
LEFS	(-) 14.921±0.826	(-) 14.771±7.917	0.687
K and L	0.714±0.825	0.919±0.736	0.447
VAS	1.736±0.696	1.808±0.733	0.392

4. Discussion

The main objective of our study was to evaluate the risk factors associated with Osteoarthritis (OA) in both male as well as female. During the study we found some risk factors like Diabetes Mellitus, hypertension, previously operated cases, history of injury and family history. Besides those, some factors like obesity, postures age and gender also attracted our concentration. In our study an almost equal proportion of males and females was seen, which suggests that early OA changes need not be gender specific either, as supposed to the late changes, which are predominantly seen in females [5]. Socio economic factor seems to play a key role, as 53.85% of the study population belonged to the lower and 38.46% middle classes. This should be ought to the possibility that most population belonging to this demographic usually engage in occupations that require more physical activity. This leads to more biomechanical stress to the knee joint, and hence possibly a higher prevalence. Another contributing factor might be the lifestyle habits of people in this population, such as use of Indian toilet, walking as a mode of transport due to lack of vehicles etc. Higher BMI was another significant factor associated with osteoarthritis and a contributing factor to current arthritic pain at the same time. Overweight is thought to cause osteoarthritis by increasing the load exerted on the joints [6, 7]. However, it is also known to be associated with hand osteoarthritis, where being overweight does not necessarily cause increased joint load [8, 9]. Previous studies have suggested that systemic and metabolic factors associated with overweight might play a role in inflammatory processes [10]. Studies have suggested that nutrition plays a role in osteoarthritis [11]. For example, antioxidants were found to re- duce the progression of osteoarthritis, although they did not significantly reduce the initiation of osteoarthritis.12 In addition, some nutritional factors have been found to exhibit a relationship with the inflammatory process and modulating chronic pain.13 However, this study failed to reveal the role of nutrition intake in current arthritis pain among older adults with osteoarthritis. Our data on nutritional intake were based on the recall of food intake during the past day. A more intensive and detailed study design would be needed to investigate the relationship between osteoarthritis and nutritional state. The fact that approximately 58% of the population had a BMI belonging to the overweight or obese category further cements the fact that BMI is a strong contributing risk factor to

OA Knee [14]. In this study, we also aimed to investigate whether risk factors can alter the degree of improvement in patients that present with early changes of OA. Hence, ACR, LEFS K and L and VAS scoring of patients were compared in different groups at the beginning and end of the study. These were compared for menstruating and post-menopausal women, obese and non-obese patients, patients with daily activities considered as risk factors and those without, and patients with and without family history. Although in our study we could not concentrate on Osteoporosis but Osteoporosis was another factor associated with osteoarthritis. The relationship between Osteoarthritis and Osteoporosis has been somewhat controversial. There is a clinical implication that osteoarthritis and osteoporosis might have opposite effects on each other [15], as an increased physical load on the skeletal structure is thought to be a risk factor for osteoarthritis, while also a protective factor for osteoporosis [16]. On the other hand, age and female gender are concurrent risk factors for both osteoarthritis and osteoporosis. Our logistic regression model showed that osteoporosis is an associated factor for osteoarthritis, when adjusted for age and gender, which concurred with previous studies [17]. A recent trial showed that osteoporosis medication improved arthritic pain but failed to prevent structural progression of hip osteoarthritis [18]. Therefore, this issue is still inconclusive and needs further investigation.

5. Conclusion & Recommendation

There were some limitations in our study. Basically it was a single cantered study. The sample size was also smaller. So the findings of this study may not reflect the exact scenario of the whole country. The findings may be helpful for farther study and in the treatment procedure of Osteoarthritis (OA). We would like to recommend for conducting more study related to Osteoarthritis for getting more clear concepts.

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