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# Knee Osteoarthritis Prevalence, Risk Factors, Pathogenesis and Features

Haque SME[1], Rahman H[2], Karim AMN[3], Hossain ATJ[4], Mahmud S[5]
[1]*Dr. S. M. Ehteshamul Haque, Assistant Professor, Department of Orthopedics, CARe Medical College, Dhaka, Bangladesh*
[2]*Prof. Dr. Homayera Rahman, Professor, Department of Physiology, Greenlife Medical College, Dhaka, Bangladesh*
[3]*Dr. Abdul Masud Md. Nurul Karim, Assistant Professor, Department of Epidemiology, National Institute of Preventive and Social Medicine, Dhaka, Bangladesh*
[4]*Dr. Abu Taher Mohammad Jamal Hossain, Emergency medical officer, Department of Transfusion Medicine, National Institute of Cardiovascular Diseases and Hospital, Dhaka, Bangladesh,*
[5]*Dr. Saifuddin Mahmud, Junior Consultant, Department of Medicine, Dohazari 31 Beded Hospital, Chittagong, Bangladesh*
*Corresponding Author: Dr. Ehteshamul Haque.*

***Abstract***
***Background:*** *Knee Osteoarthritis (OA) is a common disease that affects the older population and is one of the primary causes of disability. The prevalence of knee OA is growing as the general population's average age rises. Age, weight, and joint damage from repetitive activities, particularly squatting and kneeling, are all prominent risk factors for knee OA. Knee OA is caused by a number of causes, including cytokines, leptin, and mechanical stresses. The attribution of pain to knee OA should be approached with care in individuals with knee osteoarthritis. Because a fraction of knee OA patients are asymptomatic, and because radiographic evaluation has a low sensitivity, identifying knee OA in a number of patients is not possible. Data on prevalence, causes, and risk factors are included in this review.* ***Objectives:*** *The aim of the study was to evaluate Knee Osteoarthritis Prevalence, Risk Factors, Pathogenesis and Features.* ***Methods:*** *A cross-sectional study was conducted in 101 patients at Prime General Hospital, Narsingdi, Bangladesh for Osteoarthritis management for a follow-up assessment, one year (October 2020 to September 2021) after having been prescribed a treatment. Subjects completed an interviewer-administered questionnaire, evaluating knee pain and associated disability, analgesia, use of health services, past medical history, walking, income, smoking, and use of oral contraceptives, and standardized weight-bearing knee radiographs were obtained. Patient demographic characteristics and biochemical parameters were recorded.* ***Results:*** *Age, overweight, central adiposity, high low-density lipoprotein cholesterol (LDLC), high total cholesterol (TC), high triglycerides (TG), dyslipidemia, hypertension, and low income were associated factors for female knee OA; age, high LDLC, hypertension, low income, and frequent walking were associated factors for male knee OA. In contrast to non-smokers, male heavy smokers were less likely to develop severe knee OA. Stepwise logistic regression analysis revealed that age and obesity were the most common risk variables for knee OA in all people. Although univariate analysis revealed that central adiposity, high LDLC, high TC, high TG, dyslipidemia, hypertension, and low income were associated with knee OA in females, these characteristics were not found in stepwise logistic regression analysis.* ***Conclusion:*** *The study's primary objective was to investigate the risk factors, prevalence, and treatment pattern for knee osteoarthritis. This study found that knee osteoarthritis is frequent in those aged 30 to 64, with women being affected at a higher rate than men.*
***Keywords:*** *Knee Osteoarthritis, Treatment pattern, Epidemiology, Prevalence.*

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## I. Introduction

Osteoarthritis is the most common form of arthritis in the knee. It is a degenerative, "wear-and-tear" type of arthritis that occurs most often in people 50 years of age and older, although it may occur in younger people, too. In osteoarthritis, the cartilage in the knee joint gradually wears away. More than 10 percent of the world populations have OA. As OA progresses, severe joint pain limits patients' physical activity [1]. To date, the majority of large population-based epidemiological studies assessing the disease prevalence of OA have been conducted in Europe or North America, regardless of the fact that it is estimated that by 2050, approximately four fifths of the world's older population (65 years and older) will be living in less-developed

regions [2]. To start to address this disparity, several reports on the prevalence of knee OA in Bangladesh have been conducted. One study reported that the prevalence of radiographic knee OA (42.8 %) and symptomatic knee OA (15.0 %) in elderly women over 60 years of age in the urban district of Bangladesh was higher than that in elderly American women of the same age group. In contrast the prevalence of radiographic knee OA and symptomatic knee OA in Bangladeshi males was similar to that in American males [2]. As a result, the prevalence might be unrepresentative [3, 4]. Obesity, hypertension, dyslipidemia, diabetes and insulin resistance tend to cluster into so-called metabolic syndrome (MS). There is growing evidence suggesting that metabolic syndrome (MS) is a risk factor for the development of OA [5–8]. Among the 1334 white patients in a study by Gandhi et al., 114 (8.5 %) had MS as compared with 3 of 36 (8.3 %) blacks and 18 of 90 (20 %) Asians. Adjusted analysis showed that those of Asian ethnicity had double the risk of MS compared with those of other ethnicities. MS is a risk factor for OA, and Asians demonstrate a greater prevalence of MS compared with whites and blacks in this population [9]. However, there are few publications which mention the associated factors, such as metabolic diseases, for knee OA in the Bangladeshi population. We performed a cross-sectional study in the Bangladeshi population above 40 years of age in the rural areas to investigate the prevalence of knee OA in males and females and its distribution in each age group. Relevant associated factors, including age, overweight, central adiposity, high low-density lipoprotein cholesterol (LDLC), high total cholesterol (TC), high triglycerides (TG), low high-density lipoprotein (HDL), dyslipidemia, hypertension, diabetes, hyperuricemia, income level, walking habit, smoking habit, and use of oral contraceptives were analyzed. We aimed to provide basic data on the epidemiological features of knee OA in a Bangladeshi population, thus providing a scientific basis for preventing and treating osteoarthritis.

## II. Methods

A cross-sectional study was conducted in 101 patients at Prime General Hospital, Narsingdi, Bangladesh for Osteoarthritis management for a follow-up assessment, one year (October 2020 to September 2021) after having been prescribed a treatment. Subjects completed an interviewer-administered questionnaire, evaluating knee pain and associated disability, analgesia, use of health services, past medical history, walking, income, smoking, and use of oral contraceptives, and standardized weight-bearing knee radiographs were obtained. Patient demographic characteristics and biochemical parameters were recorded. After obtaining an informed consent approved by each ethical committee, the patients were asked to complete a questionnaire. The data were then collected on a specific data collection form or directly on an electronic grid that allowed an initial automatic cleaning of the data by flagging any outliner value. The data were then sent electronically to a web center, which was accessible to all investigators throughout the study period and which is currently accessible to any qualified medical doctor. The patients' demographic and reproductive characteristics recorded at baseline were: age, weight, height, age at menopause, type of menopause (natural, surgical). The presence of concurrent diseases that may increase the risk of Osteoarthritis or falls was recorded. The following information was obtained on the Osteoarthritis treatment prescribed at the previous visit: type of drug, specialization of the prescribing doctor, degree of compliance, time and reasons of incidental discontinuation. Given the nature of the study, the data on treatment adherence were exclusively self-reported. The SPSS ver. 24.0 statistical software programme (SPSS) was used for all statistical analyses. The between-groups differences were analyzed by repeated measures analysis of variance (ANOVA) or by co-variance analyses and then by t-test, with the Bonferroni comparison test applied for multiple comparisons. Logistic regression analysis was used for analyzing the Relative Risk (RR) for treatment discontinuation. Analyses for categorical data related to treatment compliance was performed using the $\chi 2$-test.

## III. Result

From the survey conducted, there are some findings which may have vital implication which can show that is, some link among osteoarthritis with age, sex etc. From the Figure 1, it is observed that, majority of the survey population were female which contributes around 57% of the population. Here from Figure 2, we observed that, patients aged from 45 to 64, highly suffers from osteoarthritis and the prevalence is around 67.33%. The second highest group of patients was aged within 20-44 and the remaining 23.76% patient group came from the age above 65. Two hundred patients of knee OA were observed during this studied. Out of them, 42 (41.58%) were male and 58(57.42%) were female. The subjects were divided into four age groups period of this study. First age group is less than 20 years, and second age group is (20-44) years, third age group is (45-64) years and fourth group is more than 65 years. Among them more participants were into the age groups 45-64 years and less participants were into the aged group of >20 years. It indicates that overall 45-64 years are more vulnerable age group to be affected with osteoarthritis. Occupation of knee OA patients was an important focusing point of this study. A number of studies have considered the role of occupational factors in the development of knee OA. It has been suggested that repetitive use of specific joints by workers exceeds normal tolerances and might be conducive to degeneration of joints. In our study 39(38.61%) patients were house wife

that means housewife are mostly affected by knee OA, this may be due to long time activity in knee bending position according to our culture. In Bangladesh women constitute 48.6% of total population. In this study only (51%) participants aims of treatment is achieved in out of 101 participants. And remaining (13%) are not satisfied with the treatment.

**Table I:** Baseline distribution of the study of knee Osteoarthritis

| Variable | n=101 | % |
|---|---|---|
| **Age Distribution** | | |
| ≤ 20 | 2 | 1.98 |
| 20-44 | 24 | 23.76 |
| 45-64 | 68 | 67.33 |
| ≥65 | 7 | 6.93 |
| **Sex Distribution** | | |
| Male | 42 | 41.58 |
| Female | 58 | 57.42 |
| **Residence Area** | | |
| Urban | 61 | 60.39 |
| Rural | 39 | 39.61 |
| **Socio-economic Status** | | |
| Elite Class | 6 | 5.94 |
| High Middle Class | 7 | 6.93 |
| Middle Class | 79 | 78.21 |
| Low Middle Class | 7 | 6.93 |
| Poor Class | 2 | 1.98 |
| **Occupation** | | |
| Service | 17 | 16.83 |
| Business | 30 | 29.70 |
| Farmer | 3 | 2.97 |
| House wife | 39 | 38.61 |
| Nurse | 12 | 11.88 |

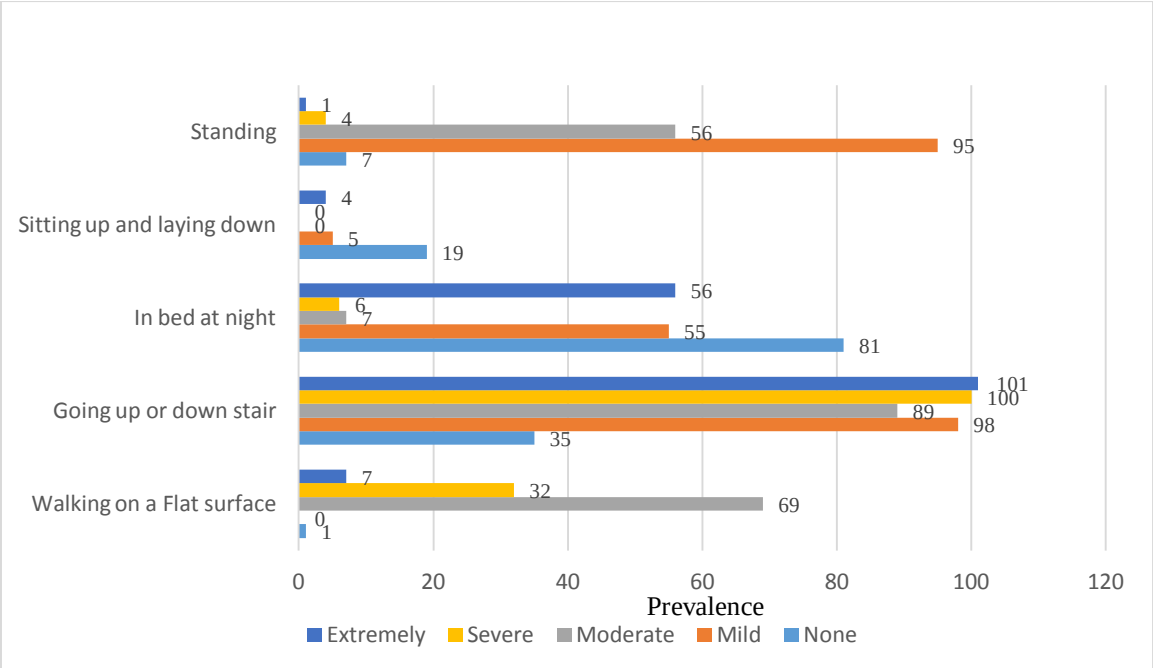


**Figure I:** Demonstrate and distribution of the study according to level of pain in knee Osteoarthritis patients

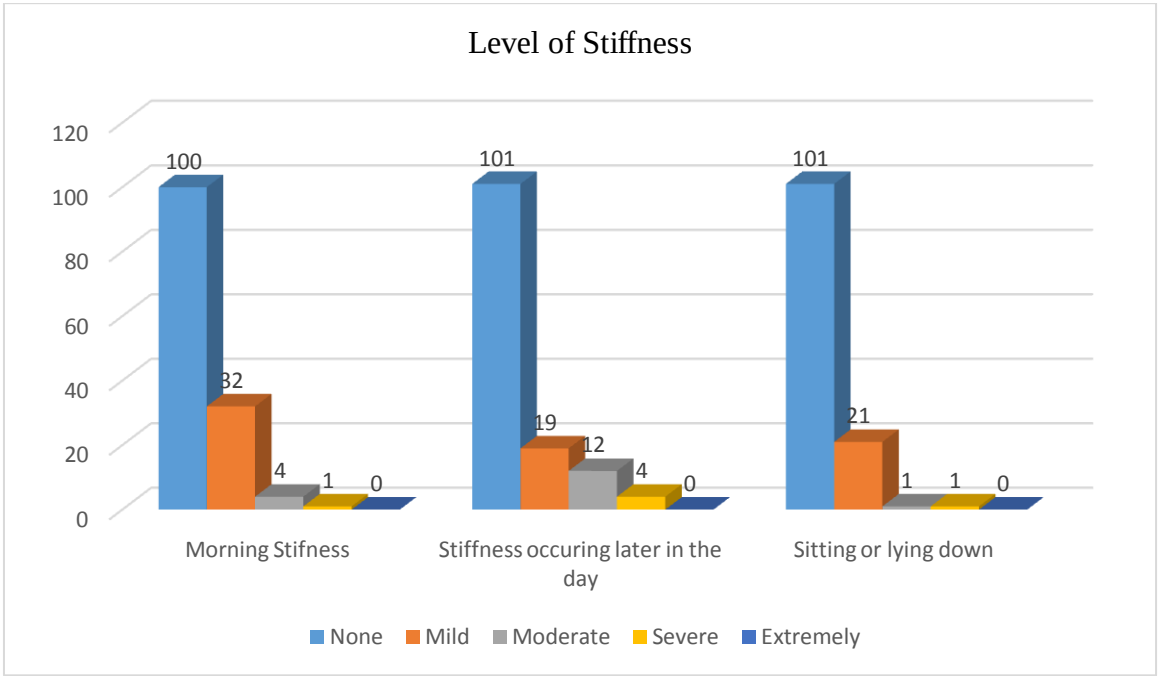


**Figure II:** Level of stiffness among the knee osteoarthritis patients

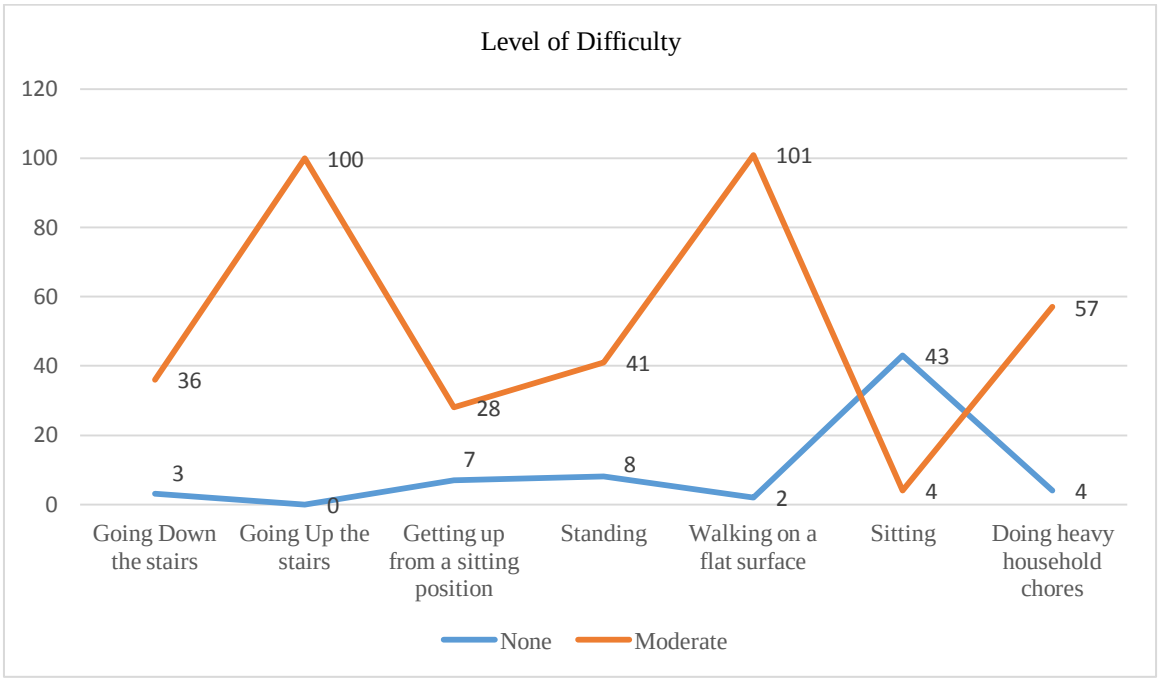


**Figure III:** Level of Difficulty among the knee osteoarthritis patients

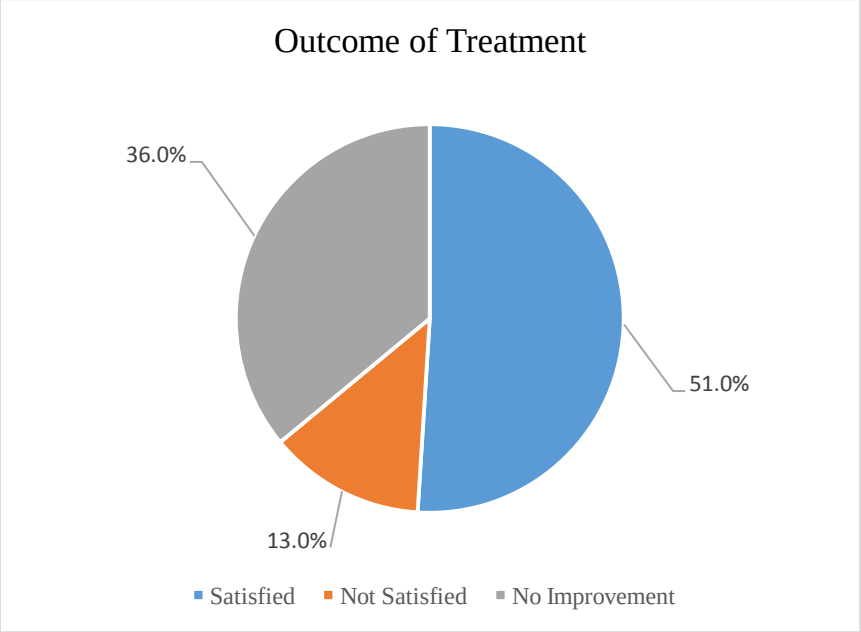


**Figure IV:** Outcome of Treatment

## IV. Discussions

Along with the development of the Bangladeshi economy and the associated changes in lifestyle, there is an increase in the aging population and the resulting burden on family and society caused by knee OA has attracted increasing attention. Extensive epidemiological surveys have indicated that the prevalence of knee OA varies greatly with region, race and socioeconomic conditions. Prevalence is also influenced by a variety of environmental and genetic factors. To date, the large-sample epidemiological surveys that have been carried out have mainly concentrated on North America and European regions. There have been few relevant surveys in Narsingdi District, especially in the middle and lower reaches of the Meghna river region which has a high population density. We carried out an epidemiological survey of knee OA in Bangladesh to address this gap in knowledge. The result indicates that age and weight are positively correlated with the prevalence of knee OA, which is in agreement with the results of most other epidemiological surveys [23, 24]. Lohmander et al. [15] carried out a largesample follow-up survey on discharged patients in Sweden over 10 years. They found that BMI, waist circumference, waist–hip ratio, weight and percentage body fat, which are all closely related to weight, showed a positive correlation with the prevalence of knee OA. Jiang et al. arrived at the conclusion that obesity is a risk factor for knee OA by systematically analyzing the correlation between BMI and knee OA in 21 independent reports [25]. Our result also indicated that the population with high BMI showed a significantly increased prevalence of knee OA, with the increase in waist circumference being closely related to the prevalence of knee OA in females. This may be because the pressure exerted on the articular cartilage increases, which accelerates degeneration. However, some studies have indicated that obesity is also positively correlated with the prevalence of OA in non-load-bearing joints such as in the hand [26]. This means that the load on the joint cannot completely explain the relationship between obesity and knee OA. Soran et al. [27] found that levels of serum high-density lipoprotein-cholesterol (HDL-C), total thiol (total free sulfhydryl groups, SH), paraoxonase and arylesterase activities were significantly lower in the OA patient group than in controls, while lipid hydroperoxide (LOOH) and low-density lipoprotein (LDL) levels were significantly higher. Dyslipidemia may result in the ectopic deposition of lipids in particular in chondrocytes, which aggravates lipid metabolism disorders in degenerative articular cells and promotes the development of OA. Thus obesity related metabolic factors, especially adipokines, can induce the expression and release of inflammatory factors and metabolic enzymes, inhibit the synthesis of articular cartilage and stimulate the remodeling of subchondral bone [5]. Singh et al. found that patients with OA are more likely to have hypertension (40 % vs. 25 %), diabetes (11 % vs. 6 %), high total cholesterol (32 % vs. 24 %), and renal impairment (37 % vs. 27 %) compared with the unaffected population [28]. The mechanism may involve ischemia below the cartilage of knee OA patients caused by hypertension. This type of ischemia can inhibit the metabolism of articular cartilage and trigger bone remodeling. Knee OA, so a questionnaire was the primary screening tool. Inevitably, there were likely to be some differences in the discrimination of information by investigation staff although they had all received the same training. Second, the survey data were epidemiological data from only one small area. More epidemiological data from different areas need to be collected and analyzed in future. Third, the causality

between OA and associated factors cannot be confirmed fully by the cross-sectional study method, the results need to be further confirmed by prospective studies.

## V. Conclusions

In this study, we didn't discuss about the surgical option of OA knee treatment. Actually in case of severe and advancing stage of osteoarthritis knee, Total Knee Replacement (TKR) is the only treatment option. The study's primary objective was to investigate the risk factors, prevalence, and treatment pattern for osteoarthritis. This study found that knee osteoarthritis is frequent in those aged 30 to 64, with women being affected at a higher rate than men.

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