Original Research Article

Study of relationship between age and body mass index on knee osteoarthritis in advanced aged females in a divisional city of Bangladesh

Malay K. Roy[1]*, M. Zakir Hossain[1], A. H. M. Tanvir Hasan Siddiquee[1], M. Alauddin[1], Mohammad K. Islam[1], A. K. M. Mustafizur Rahman Minto[1], Tapas K. Sarkar[2]

[1]Department of Ortho-Surgery, Mymensingh Medical College, Mymensingh, Bangladesh
[2]Department of Anaesthesia, Faridpur Medical College (Bangobandhu Sheikh Mujib Medical College), Faridpur, Bangladesh

*Correspondence:
Dr. Malay K. Roy,
E-mail: roymalay25@yahoo.com

ABSTRACT

Background: Knee osteoarthritis is a notable issue in senior citizens and is a burning problem worldwide. There are so many risk factors related to knee osteoarthritis but women's sex, age, and obesity are significant. The aim and objective of this study were to estimate the prevalence of knee osteoarthritis among women in the age group of 46 to 65 years and the effect of age and body mass index (BMI) on knee osteoarthritis.
Methods: Cross-sectional study was conducted at outpatient department (OPD) in Mymensingh Medical College Hospital, a tertiary level hospital, among females of Mymensingh, a divisional city of Bangladesh in the age group of 46 to 65 years. Purposive sampling technique used to select study subjects. A total of 100 females participated in this study in one month (July 2019-August 2019).
Results: 100 participants were enlisted in the study, in the age group of 46 to 55 years 39 (39%) and 56 to 65 years 61 (61%). Total 65 (65%) participants were affected with knee osteoarthritis. Among them, 19 (29.2%) participants were in the age group of 46-55 years and 46 (70.8%) participants were in the age group of 55-65 years, thus in the advanced age group, knee osteoarthritis is remarkably more. Participants affected with knee osteoarthritis with BMI ≥25 were significantly more affected 45 (69.2%) compared with participants with normal BMI 20 (30.2%).
Conclusions: Knee osteoarthritis is significantly associated with advanced age and obesity. Advanced age and overweight were strongly associated with osteoarthritis in our population. Therefore, weight reduction and preventive measures can decrease the burden and will help in minimizing morbidity associated with OA.

Keywords: Knee osteoarthritis, Females, Age, Obesity, BMI

INTRODUCTION

Ageing is natural and irreversible process. Due to notable development in medical science life expectancy has increased significantly. Thus increase in life expectancy has brought more morbidity among the senior citizens. Osteoarthritis (OA) is one of the major problems with significant morbidity. It is a chronic degenerative disorder of bone joints characterized by loss of articular cartilage, hypertrophy of bone at the margins and subchondral sclerosis. OA has multi factorial etiologies. Customarily it affects joints of extremities and spine particularly of weight bearing joints. OA of knee is a common cause of pain and disability especially in senior citizens.[1] Prevalence of the disease is more in women compared to men in advanced life. In Britain, hospital data suggests that

1.5% of people undergo knee surgery (TKA) at some stage in their lives.[2] In case-control studies have demonstrated a strong relationship between knee OA and obesity.[3] In Framingham longitudinal study high body mass index (BMI) predicted outcome of the disease in advanced age.[4] Analysis of women in the same cohort has shown that incidence is downgrade in overweight women who lose weight than in those who do not.[5] In India prevalence of OA is around 22 to 39%.[8] In Indian population almost 65% of cases of OA are within the age group of 51-65 years.[9]

The two most important factors for determining the onset of the OA are female sex and age. Study among perimenopausal women prevalence of osteoarthritis was found to be 47.3% and as age increases prevalence also was increased.[10] Other causes of knee OA include legal disposition to OA in multiple joints and trauma or surgical intervention to the knee.[6] As per the report of United Nations about 130 million people by 2050 will have OA worldwide and out of that 40 million will suffer from severe disease.[12]

Study by Fransen et al it was found that prevalence of knee pain or symptomatic knee OA is high among older people in Asian region.[13] Particularly females in the age group of 45 to 65 years were having complaint of knee pain. Many studies have suggested that gender also a significant factor in osteoarthritis and females are more prone than males and onset of the osteoarthritis earlier than male counterpart. Thus increases the morbidity among females significantly. Gender and age are the major non modifiable risk factors but exercise, diet and trauma are the modifiable risk factors. Symptomatic management is the only option in majority of the cases as there is no definitive treatment. Above data suggest that regulating obesity can reduce risk. Risk is increased many folds when obesity in combination with one or more other risk factors then weight control would be appropriate. Only prevention can reduce the burden of the disease. The objective of the study was to estimate of the prevalence of knee OA among females in age group of 46 to 65 years and to assess the relationship between age and BMI of patient with knee OA.

METHODS

This cross sectional study was conducted in Mymensingh Medical College Hospital, Mymensingh, Bangladesh. Total 100 female participants were in age group of 46 to 65 years. Purposive sampling technique used to select study subjects. Informed written consent were taken from all study participants. Study duration was one month (July 2019-August 2019). The study method involved was x-ray of knee and measurement of BMI and personal interviews of participants. Inclusion criteria were non traumatic knee pain, age within the range mentioned above and willingness to participation. Exclusion criteria were secondary OA, patients not willing to give consent. Statistical analysis was done with percentages and chi square test. Data were analyzed using statistical package for the social sciences (SPSS) software v.23.0.

Figure 1. Osteoarthritis of left knee.

Figure 2: Osteoarthritis of right knee.

Figure 3: Osteoarthritis of both knees.

RESULTS

Total 100 participants were enrolled in this study. Mean age of the participants was 56.24±6.34. In 100 participants 39 (39%) participants were in age group of 46 to 55 years

and 61 (61%) were in age group of 56 to 65 years. Total 65 (65%) participants were affected by knee osteoarthritis. Among them 29.2% were younger age group and 78.2% were in advanced age. BMI of knee osteoarthritis patients, ranged from 15.4% (≤18.5), 15.4% (18.51-24.99) and 69.2 % (≥25) respectively.

Table 1: Demographics characteristics of patients (n=100).

Demographics characteristics	Mean±SD/%
Age (in years)	56.24±6.34
BMI	25.41±5.0
Age group (in years)	
46-55	39 (39)
56-65	61 (61)
Osteoarthritis affected	65 (65)
Not affected	35 (35)
Osteoarthritis affected (n=65)	
46-55	19 (29.2)
56-65	46 (70.8)
BMI (n=65)	
≤18.50	10 (15.4)
18.51-24.99	10 (15.4)
≥25	45 (69.2)

Table 2 shows the significant relationship between osteoarthritis patients and age. In advanced age prevalence of knee OA significantly increases i.e. (70.8% versus 29.2%, p=0.006).

Table 2: Association between knee osteoarthritis patients and age (n=100).

Age group (years)	No. participants affected	No. participants not affected	P value
46-55	19 (29.2)	20 (57.1)	0.006
56-65	46 (70.8)	15 (42.9)	

P after χ2

Compared to normal weight subjects being overweight increased the risk of OA. Participants with BMI (≥25) out of 55, 56 (81.8%) participants were affected by knee osteoarthritis which is significantly more (81.8% versus 18.2%; p=0.000) as given in Table 3.

Table 3: Association between knee osteoarthritis patients and BMI (n=100).

BMI	No. participants affected	No. participants not affected	P value
≤18.5	10 (41.7)	14 (58.3)	0.000
18.5-24.99	10 (47.6)	11 (52.4)	
≥25	45 (81.8)	10 (18.2)	

Table 4 shows the relationship between older age and obese with knee OA patients. Knee OA older age patients had significantly higher BMI than normal age patients (p=0.012).

Table 4: Relationship between BMI and age of the OA patients (n=65).

BMI	Age mean (SD)	P value
≤18.5	54.30±6.5	
18.6-24.99	55.90±5.30	0.002
≥25	60.04±4.77	

P after ANOVA

DISCUSSION

In present study it was found that females in the age group of 56-65 years of age were having more significant prevalence 46 (70.8%) of knee OA compared to 46-55 years age group where 19 (29.2%) participants were affected. Out of 65 affected participants 45(69.2%) were overweight and remaining participants were having normal or BMI within the range of (≤18.5 to 24.99). Overweight is a major risk factor for knee OA. Compared with the other studies, study conducted by Sharma et al in Chandigarh UT, prevalence was found 56.6%. In Sharma et al study it was observed that increased BMI was significantly associated with the osteoarthritis.[14] Other study conducted by Radha et al in Mysore city prevalence among females was found 63.33% and overweight with obese patients were 37.33%, who were diagnosed with osteoarthritis.[15] Another study conducted in Maharashtra by Kamble et al, 24.1% participants in study reported knee osteoarthritis and among them 29% females were having knee osteoarthritis.[16] According to Bhandarkar et al study in Mumbai age specific prevalence among females was 63%.[17] Other study conducted by Ganvir et al concluded that female sex and age are the risk factors for knee osteoarthritis along with obesity and physically demanding job.[18]

Limitations

This was a single center study with small sample size. So, the findings might not reflect the scenarios of the whole country.

CONCLUSION

Due to increase in life expectancy in worldwide osteoarthritis will become one of the commonest diseases of advanced age with large burden on public health services. Over weight and older age were strongly associated with OA in our population. Weight reduction can reduce the disease. Due to absence of definitive treatment and high cost of surgical interventions preventive measures are necessary to reduce the prevalence of disease. Findings of this study will encourage the public health initiatives aimed at reducing

obesity and identify certain groups thus decrease the future requirements for replacement surgery.

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