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# OSTEOARTHRITIS OF KNEE JOINT AMONG DIABETES IN SELECTED HOSPITALS OF DHAKA CITY

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***Abstract:*** *Knee joint osteoarthritis (OA) is a common disease which causes serious joint inflammation and strictly limits patients' usual mobility. Indeed a significant proportion of diabetic patients are victims of this knee joint OA. Concerning the effect of knee OA, present study was carried out, (i) to assess the proportion of osteoarthritis of knee joint among diabetic patients; and (ii) to investigate the effect of various risk factors (e.g. blood glucose level, duration of diabetes, effect of exercise) which are strictly associated with osteoarthritis. 150 diabetic patients (33.3% male and 60.7% female) of mid age were enrolled for this purpose. It has revealed from the present investigation that out of 150 diabetic patients 74% had osteoarthritis. On the other hand depending on the associated risk factors, percentage of knee joint osteoarthritis varies among the respondents. Nevertheless, it has been concluded from the present study that osteoarthritis is a distressing problem in people suffering from type 2 diabetes mellitus.*

***Keywords:*** *Osteoarthritis, knee joint, diabetes mellitus, socio-demographic.*

## Introduction

Diabetes mellitus is a group of metabolic diseases characterized by hyperglycemia and leads to long-term damage, malfunction and failure of various organs, especially the eyes, kidney, nerves, heart and blood vessels. Type 1 diabetes is an auto-immune disease where the body's immune system destroys the insulin-producing beta cells in the pancreas. This type of diabetes, also known as juvenile-onset diabetes, accounts for 10-15% of all people with the disease. It can appear at any age and is triggered by environmental factors such as viruses, diet or chemicals in people genetically predisposed.

Osteoarthritis is not a single disease rather it is the end result of a variety of patterns of joint failure. To a greater or lesser extent it is always characterized by both degeneration of new bone cartilage and connective tissue. The proliferate response in some degree of remodeling of the joint contour. Inflammatory changes in the synovium are usually minor and secondary [1]. Osteoarthritis is the most common type of arthritis especially among older people sometimes it is called degenerative joint disease. It is joint disease that mostly affects the cartilage; cartilage is the slippery tissue that covers the ends of bones

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in a joint .Healthy cartilage allows bones to glide over one another. It also absorbs energy from the shock of physical movement. This allows bones under the cartilage to rub together, covering pain swelling and loss of motion of the joint.

Type 2 diabetes is more common in certain groups; estimates are of up to six times more common in people of South Asian descent, three times more common in those of African and African-Caribbean descent [2]. In recent years, diabetes has become a fast expanding public health problem with an epidemic proportion in both developed and developing countries. The prevalence of type 2 diabetes is increasing dramatically and type I diabetes moderately in both Bangladesh and globally [3]. Due to hyperglycemia in OA cartilage leading to matrix stiffness, becoming more sensitive to mechanical stress. Type I diabetes, cartilage becomes resistant to the anabolic action of insulin. There are intense remodeling and collagen deposition in the synovium. Motor and sensory malfunction of muscle may be important factors in the pathogenesis of articular damage. Diabetic neuropathy could be one of the suggested alterations of the peripheral nervous system seen in patients with OA leading to muscle weaknesses and joint laxity. Indeed, osteoarthritis and diabetes are related to each other and numerous studies have already been conducted on this topic in many other countries while in our country very few studies are available.

The exact reason why osteoarthritis occurs is not known. However, a number of factors (obesity, overweight, joint injury or stress, muscle weakness, heredity) are known to be responsible for the increasing risk of osteoarthritis with uncontrolled diabetes mellitus. However, concerning the effect of osteoarthritis among diabetic patients, an attempt has been made to investigate osteoarthritis as well as to provide recommendations for increasing consciousness among diabetic patients.

**Materials and methods**

This was a cross sectional type of descriptive study done among the diabetic patient attending at selective diabetic hospitals of Dhaka city. A total number of 150 patients were enrolled and interviewed to assess the proportion of osteoarthritis in knee joint. The duration of the study was six months commencing from August 2013 to February 2014.

Data were collected by face to face interview using semi- structured questionnaires which was prepared and evaluated in advance by the research team. Selective set criteria of the questionnaire included:

(a) Present level of blood glucose
(b) Duration of diabetics
(c) Oral hypoglycemic drug
(d) Body mass index (BMI)
(e) Psychological stress and regular exercise,
(f) Regular diet chart and hypoglycemic agent etc.

The data was analyzed by Statistical Package for Social Science (SPSS) software version 16 while Chi-square tests and Fisher exact test were considered as tests of significance.

## Results

In this study among 150 diabetic patients 39.3% were male while 60.7% were female and 74% had osteoarthritis. 48% respondents' age was <54.57 years and 52% respondents were >/=54.57 years. The scenario of the socio-demographic factors related with knee joint osteoarthritis among diabetic patients is summarized in Table 1.

Table 1 clearly shows that osteoarthritis suffering is more in female patients than the male patients. It is also revealed from this Table that age is a factor for higher rate of OA and respondents of >/=54.57 years age are suffering more.

**Table 1: Cross tabulation between the socio-demographic factors of diabetic in osteoarthritis of the knee joint among the diabetic patients (n=150)**

| Variable | Class | Osteoarthritis | | Chi-square | p-value | Significant/ Non Significant | *df* |
|---|---|---|---|---|---|---|---|
| | | Present | Absent | | | | |
| *Gender* | Male | 37 (24.7%) | 22 (14.7%) | 6.441 | 0.011 | Not Significant | 1 |
| | Female | 74 (49.3%) | 17 (11.3%) | | | | |
| *Age of responded* | <54.57 | 46 (30.7%) | 26 (17.3%) | 7.357 | 0.007 | Not Significant | 1 |
| | >/=54.57 | 65 (43.3%) | 13 (8.7%) | | | | |

**Table 2: Cross tabulation between diabetic related factors associated with the osteoarthritis of knee joint**

| Variable | Class | Osteoarthritis | | | | Chi-square | p-value |
|---|---|---|---|---|---|---|---|
| | | Present | | Absent | | | |
| | | N | % | N | % | | |
| Present level of blood glucose in blood | <10.24mm/dl | 73 | 48.7 | 28 | 18.7 | | |
| | >/=10.24mm/dl | 38 | 25.3 | 11 | 7.3 | 0.477 | 0.490 |
| Duration of diabetes | <7.19 years | 61 | 40.7 | 28 | 18.7 | 3.392 | 0.066 |
| | >/=7.19 years | 50 | 33.3 | 11 | 7.3 | | |
| Regular exercise | Yes | 81 | 54.0 | 33 | 22.0 | 2.145 | 0.143 |
| | No | 30 | 20.0 | 6 | 4.0 | | |
| Diet regularly | Yes | 85 | 56.7 | 29 | 19.13 | 0.078 | 0.780 |
| | No | 26 | 17.3 | 10 | 6.7 | | |
| Hypoglycemic agent | Insulin | 35 | 23.3 | 9 | 6.0 | | |
| | Oral hypoglycemic drug | 71 | 47.3 | 25 | 16.7 | 6.946 | 0.074 |
| | Insulin and oral hypoglycemic drug | 0 | -- | 2 | 1.3 | | |
| | No hypoglycemic agent use | 5 | 3.3 | 3 | 2.0 | | |

Table 2 shows that out of 73 respondents who have blood glucose level <10.24mm/dl, 48.7% suffers from osteoarthritis but when blood glucose level is >/=10.24mm/dl this

percentage reduces to 25.3. On the other hand ratio of osteoarthritis also varies with duration of diabetes, regular exercise, maintained diet chart etc.

Impacts of other risk factors (BMI, physiological stress etc.) are tabulated in Table 3. It is clear from this Table that in case of underweight patients osteoarthritis percentage is very low but it increases with physiological stress of the patients.

**Table 3: Cross tabulation between other risk factors of diabetic in the osteoarthritis of knee joint among the diabetic patients (n=150)**

| Variable | Class | Osteoarthritis | | Chi-square | p-value | Significant/ Non Significant | *df* |
|---|---|---|---|---|---|---|---|
| | | Present | Absent | | | | |
| BMI level ($kg/m^2$) | Under weight (=/<18.5) | 4 (2.7%) | 1 (0.7%) | 0.401 | 0.818 | Not significant | 2 |
| | Normal weight (18.5-24.9) | 65 (43.3%) | 15 (16.7%) | | | | |
| | Over weight (25-30) | 42 (28%) | 13 (8.7%) | | | | |
| Psychological stress | Yes | 78 (52%) | 24 (16%) | 1.011 | 0.315 | Not significant | 1 |
| | No | 33 (22%) | 15 (10%) | | | | |

## Discussion

This cross-section study showed that out of 150 patients (male 39.3% and female 60.7%) of mid age 74% patients suffer from OA. All participants were patients with type 2 diabetes and insured by one large statutory regional health care found called Allgemeine Ortskrankenkasse (AOK) which covers about 40% of the population. Among them 97 patients declare to have osteoarthritis as only co morbid condition [4]. The prevalence of diabetes was 30% in the OA population versus 13% in the population of controlled diabetics [1]. This study also revealed 14.7% osteoarthritis in controlled diabetes. Cross-sectional study in 809 patients with knee or hip joint replacement due to OA according to the presence of non-insulin-dependent diabetes. Patients with non-insulin-dependent diabetes more frequently had bilateral OA (adjusted OR 2.2; 95% CI 0.8 to 6.4**)** [1] ·The clinical, pathological and epidemiological relationships between fasting plasma glucose concentrations (FPG) and the sites of lesion in OA were evaluated in 1026 patients. The mean FPG (99±22.2 mg/dl) was significantly higher in OA ($p<0.01$) than in the normal controls (88±19.9 mg/dl), In 918 diabetes patients increased prevalence of non-insulin diabetes patients was seen in the group of patients who had joint replacement (18.3% vs 6.3%) but this difference was not statistically significant ($p=0.06$) [5] . Here 150 diabetes patients in this study were 67.3% OA in non-insulin-dependent diabetes and p=0.000, were higher in patients with non-insulin-dependent diabetes. In all, 1003 women aged 45–64 from the Chingford population study for knee OA in either knee, the variable significantly associated were raised blood glucose OR 1.95 (95% CI 1.08 to 3.59) and moderately raised serum cholesterol OR 2.06 (95% CI 1.06 to 3.98) [5].In this study founded about 49.3% woman have osteoarthritis in 150 diabetes patients, but statistically was not significant (p=0.011 Although the 2 groups were similar with respect to the frequency and severity of joint space narrowing, sub chondral sclerosis, and geodes, osteophytes were less common in the patients with diabetes (P = 0.044), and spurring, when present, tended to be "marked" less often in the diabetic patients than in the

controls [2]. Here in this study 59.3% uncontrolled diabetes patients have osteoarthritis, which was statistically not significant (p=0.160) and who were on oral hypoglycemic agent 47.3% presented with osteoarthritis, but p value was 0.074 (not significant). Other 382 diabetic patients followed in PHC, 88.7% were type 2 diabetics, and according to WHO classification of obesity 0.7% were underweight. Only 21.8% of type 2 diabetic patients were in their ideal range of body weight. While 31.2% were overweight (BMI in the range of 25.0-29.9 kg/$m^2$), 39.9% of the type 2 diabetic patients were found to be obese (BMI= 30 - 39.9 kg / $m^2$), and 6.3% had morbid obesity (BMI $\geq$ 40 kg / $m^2$) showed a statistical significance (p=<0.05). While there was no difference between obese diabetics Type 2 and Type 1 (46.2% and 43.3% respectively). More than one quarter of the male patients and 16.3% of the females were in the normal BMI range while overweight males had a higher percentage (35.2%) than females (28.7%) and p=<0,05 From the data it appears that in all obesity classes, the percentage of female patients was higher than males [6]. Another study showed that that elderly people, defined as individuals >65 years of age have 50–90% of type 2 diabetic patients exhibit BMI values >25 kg/m2 [7]. Here in this study have 43.3% osteoarthritis of normal weight (18.5-24.9) and p=0.315 (not significant), which mean value of BMI was 23.64.

## Conclusions

Hyperglycemia can trigger a low grade systemic inflammation which is associated with cartilage loss. Osteoarthritis in the knee joint is presented more than half among the diabetes patients. This study concludes that people are suffering from osteoarthritis in the knee joint for diabetes mellitus. Practically, the result of this study would help in preventing injury associated with the factors of osteoarthritis, which can use of treatment and promote diabetes patients.

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