

Section **Orthopaedics**

Original Article

A Prospective Study on Postmenopausal Type 2-Diabetic Women Suffering from Knee Osteoarthritis in a Tertiary Care Teaching Hospital

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ABSTRACT

Background: Knee osteoarthritis is the most common form of joint disorder and a leading cause of pain and functional disability among elderly female population. Type 2-diabetes is frequently reported comorbidity in elderly female patients with knee osteoarthritis. Therefore, the aim of this study is to assess the role of various blood biochemical parameters in cases of knee osteoarthritis among type 2 diabetic postmenopausal women. **Methods:** The present study conducted in the Department of Orthopaedics, Pacific Medical College and Hospital, Udaipur, Rajasthan. 55 type 2-diabetic female subjects of age above 50 years were enrolled as cases and 55 normal healthy female age matched individuals as controls. Osteoarthritis of knee was ascertained using the American college of rheumatology classification criteria. **Results:** The mean levels of fasting blood sugar, HbA1c, total cholesterol, TG, LDL-C and VLDL-C were also found significantly increased while HDL-C was found

significantly decreased in cases as compared to controls. **Conclusions:** We concluded that there is a positive correlation with increased levels of HbA1c and FBS ($p < 0.001$) in diabetic postmenopausal women and knee osteoarthritis.

Key words: Knee osteoarthritis, Type 2 diabetes Mellitus, Postmenopausal women

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INTRODUCTION


Knee pain is a standout amongst the most widely recognized musculoskeletal complaint in the elderly patients and the most common cause of knee pain is osteoarthritis.^[1] If we compare gender-wise knee pain affects female than male and also leading cause of mobility impairment.^[2,3] Nearly, 45% of women over the age of 65 years have symptomatic findings of knee osteoarthritis while radiological evidence is found in 70% of those over 65 years.^[2-4] In India, average menopausal age in women is 46.3 years as compared to 54 years in western countries.^[5-6] Therefore, Indian women at higher risk of developing osteoarthritis in earlier age as

compared to their western counterparts. It could be due to loss of estrogen especially close to menopausal years at this time.^[7,8]

Diabetes mellitus is a multi-system disease characterized by persistent hyperglycemia that has both acute and chronic biochemical and anatomical sequel which may cause irreversible damage to many organs and organ systems.^[9] This disease affects connective tissues in many ways and causes different alterations in periarticular and musculoskeletal system.^[10] Many studies have reported a correlation of osteoarthritis with duration of diabetes mellitus and poor glycaemic control.^[11-15]

METHODS

The present study has been carried out in the Department of Department of Orthopaedics, Pacific Medical College and

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Hospital, Udaipur, Rajasthan. Total 110 human subjects were taken in the study. Out of which 55 type 2-diabetic postmenopausal women of age 50 years or above having clinical symptoms of knee osteoarthritis were considered as cases and 55 normal healthy individuals of same age as control. Postmenopausal women suffering from type 2 diabetes mellitus with complain of knee pain lasting longer than 1 month in addition to at least 3 of the following 6 criteria according to ACR guideline: age>50 years, morning stiffness more than 30 minutes, crepitus, bony enlargement, bony tenderness and absence of palpable warmth were included in our study. Written informed consent was taken from the patients. Levels of Fasting blood sugar, total cholesterol, triglycerides, HDL-C were measured by standard biochemical kits (Erba) using BS 400 fully automated analyser (Mindray). EDTA tube was used for estimation of HbA1c (estimated by turbidimetric immunoassay). LDL and VLDL were calculated by using Friedewald formula.

Statistical analysis

The results were expressed as Mean \pm Standard Deviation. The statistical differences between cases and control were determined by student independent t-test. Data analyses were performed with the Statistical Package for the Social Sciences, version 21.0 (SPSS, Chicago, Illinois, USA. The p value less than 0.05 were considered as significant.

RESULTS

The descriptive statistics of glycemic status, lipid profile are shown in (Table). The mean value of FBS, HbA1c and lipid profile such as TG, TC, LDL-C and VLDL-C were highly significantly increased while HDL-C was significantly decreased ($p<0.001$) in cases as compared to control.

DISCUSSION

Knee osteoarthritis is a major public health problem especially in postmenopausal women. Type 2 diabetic postmenopausal women are at higher risk of incidence, severity and earlier onset of knee osteoarthritis than nondiabetic postmenopausal women. In diabetes hyperglycemia plays a role for joint degradation and may induce osteoarthritis.^[16] In this study, we found highly significant increased levels of HbA1c and FBS ($p<0.001$) in diabetic postmenopausal women with knee osteoarthritis compared to controls. Which is same as Cimmino et al who reported that mean fasting plasma glucose was significantly higher in women with osteoarthritis as compared to controls and out of which 5.5 percent women had type 2 diabetes.^[17] Rouen et al reported that in postmenopausal women having type 2 diabetes glucose control is associated with the severity of those symptoms commonly attributed to menopause such as joint pain.^[18] Hart et al also reported that in women of age 45-64 years blood glucose was associated with unilateral and bilateral knee osteoarthritis.^[19] The possible explanation of link between hyperglycemia and osteoarthritis that hyperglycemia can induce an inflammatory state, and that an inflammatory state might

predispose cartilage to damage that leads to osteoarthritis.^[16] The level of TG, TC, LDL-C, VLDL-C were also found significantly increased while HDL-C was found significantly decreased in diabetic postmenopausal women with knee osteoarthritis as compared to controls. The alteration of lipid profile i.e. dyslipidemia, observed in our study may be due to deposition of lipids, particularly in chondrocytes, which aggravates lipid metabolism disorders in degenerative articular cells and promotes the development of osteoarthritis which is consistent with the study of Hart et al.^[19]

Table: The changes of blood sugar, lipid profile in control group and diabetic postmenopausal women cases

Variable	Control (55)	Cases (55)
FBS (mg/dl)	89.8 \pm 8.66	152.21 \pm 36.54**
HbA1c	4.92 \pm 0.38	8.3 \pm 2.14**
Triglyceride (mg/dl)	125.38 \pm 17.56	195.74 \pm 33.67**
Total cholesterol	186.30 \pm 18.82	267.62 \pm 28.19**
HDL-C (mg/dl)	41.22 \pm 2.13	29.16 \pm 6.22**
LDL-C (mg/dl)	112.31 \pm 14.21	205.16 \pm 42.28**
VLDL-C (mg/dl)	24.22 \pm 3.47	38.31 \pm 8.15**

Results are presented in r value. *Significant at $p<0.05$. **Significant at $p<0.01$. NS Non-Significant

CONCLUSION

This study concluded that significant increased levels of biochemical parameters like HbA1c and FBS ($p<0.001$) in diabetic postmenopausal women with knee osteoarthritis compared to controls.

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