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Determinants of Knee Osteoarthritis in 30-60 Year Old Women Presenting at a Tertiary Care Hospital

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ABSTRACT

Background: Primarily affecting older people, primary osteoarthritis (OA) is one of the major causes of persistent pain and impairment. **Objective:** To find out the determinants of knee osteoarthritis (KOA) among women aged 30-60 years presenting at a tertiary care hospital. **Study Design:** A case-control study. **Settings:** Department of Orthopedics, Department of Orthopedic and Spine Surgery, Sahara Medical College (Sughra Shafi Medical Complex), Narowal Pakistan. **Duration:** February 16, 2022 to November 10, 2022. **Methods:** A total of 102 cases as women aged 30 to 60 years and presenting with KOA. The KOA was diagnosed as per "American College of Rheumatology" criteria. An equal number of controls (n=102) as healthy women aged 30 to 60 years accompanying patients coming to study institute's department of orthopedics were enrolled. Case and controls were compared for age, body mass index (BMI), educational status, marital status, occupation, socioeconomic status, lifestyle status and menopause status. **Results:** In a total of 204 women, mean age was 47.8 ± 8.1 years while 127 (62.3%) were aged between 51 to 60 years. Mean BMI was 27.4 ± 3.1 kg/m^2 while 84 (41.2%) women had BMI ≥ 30 kg/m^2. Marital status of 179 (87.7%) women was married. There were 60 (29.4%) women who were illiterate whereas 157 (77.0%) women were housewives. Socio-economic status of 98 (48.0%) women was low. Older age (P<0.0001), high BMI (p<0.0001), higher socio-economic status (p=0.0280), menopause (p<0.0001) and sedentary lifestyle (p<0.0001) were found to be significant determinants of KOA. **Conclusion:** Older age, high BMI, higher socio-economic status and sedentary lifestyle were found to be significant determinants of knee osteoarthritis.

Keywords: *Body mass index, Knee osteoarthritis, Lifestyle, Menopause.*

INTRODUCTION

The most frequently occurring arthritis being reported is osteoarthritis (OA). The OA is known to be the leading cause of joint disability globally.[1] OA is also named as degenerative arthritis or degenerative joint disease. A varied collection of conditions of OA advances to the combination of signs and symptoms related to defective integrity of articular cartilage and changes attached to it in the underlying bone at the joint margins.[2] According to an analysis of 291 health conditions evaluated by "The Global Burden of Disease Study", OA of the knee and hip turned out to be the 11th most frequent reason for some disability.[3] OA is considered to be a progressive disease that keeps advancing and cost of treatment escalates in many of the cases.[4] In 2011, a report on disability presented by the WHO said that around 1.9 million people are living with moderate to severe OA in high-income countries while this figure approaches to 8.1 million among individuals aged above or equal to 60 years.[5] On the other hand, data from low- or middle-income countries reported 14.1 million people to be living with moderate to severe OA below 60 years of age while this figure escalated up to 19.4 million among individuals

aged above or equal to 60 years.[5] Variations in different parts of the world regarding diagnostic criteria of OA, it is difficult to estimate the exact burden of the disease.

According to some studies the symptoms of symptomatic OA are not in accordance with radiographic OA. Many asymptomatic patients presented OA radiographically. Radiographic knee OA (KOA) was reported more frequently than symptomatic KOA.[6,7] Pain, stiffness and swelling are the conditions by which the patients suffering from symptomatic OA are very much annoyed of it and make it an important health issue among the people. OA affects the people of almost all age groups, but in males after 50 and in females after 40 the presentation of OA is considerably high. Particularly in women OA is considered to be the fourth largest health issue. Which means the risk of developing OA in women is much higher than men.[8,9] A study from India found prevalence of KOA as 21.6% among women aged 30-60 years.[10]

Among the OA patients KOA is reported very frequently. The people suffering from KOA are more immobile and dependent as compare to the other conditions of arthritis. Patients come to healthcare settings with initial complaint of pain along with some other signs and symptoms like stiffness which normally gets better in a short period of time, crepitus, swelling, bony tenderness, and limp.[6,7] As KOA progresses further, the joint of the patient becomes instable or valgum (knock knee) or (bow knee). The quality of the patient's life is affected by the disease significantly. Every part of the routine life of a person gets distressed extensively by KOA. The focus of KOA treatment is on the symptomatic relief of the patients to improving the movement of the joint. The severity of the condition brings the patients to be treated properly. No study is available analyzing determinants of KOA among middle aged women so the present study was planned. The objective of this study was to find out the determinants of KOA among women aged 30-60 years a tertiary care hospital.

METHODS

This case-control study was conducted at the Department of Orthopedics, Department of Orthopedic and Spine Surgery, Sahara Medical College (Sughra Shafi Medical Complex), Narowal from February 16, 2022 to November 10, 2022. Approval from institutional ethical committee was taken. Informed and written consents were obtained from all women. Considering 95% confidence level and expected prevalence of KOA among women aged 30 to 60 years as 21.6%[10] with 8% margin of error, sample size was calculated to be 102 cases. An equal number of controls were also enrolled.

Cases (n=102) consisted of women aged 30 to 60 years and presenting with KOA. The KOA was diagnosed as per "American College of Rheumatology" criteria as if the women were suffering from knee pain along with at minimum 3 of the following symptoms: Morning stiffness that lasted < 30 minutes, crepitus on motion, bony tenderness, bony enlargement, or no palpable warmth. For controls, 102 healthy women aged 30 to 60 years accompanying patients coming to study institute's department of orthopedics were enrolled.

At the time of enrollment, age, body mass index (BMI), educational status, marital status, occupation, socioeconomic status, lifestyle status and menopause status were noted. A special proforma was designed to record study information. For data entry and analysis, "Statistical Package for Social Sciences (SPSS)" version 26.0 was used. Categorical data were shown as frequency and percentages whereas continuous variables were represented as mean and standard deviation (SD). Data was compared using chi-square test considering $p<0.05$ as significant.

RESULTS

In a total of 204 women, mean age was 47.8±8.1 years while 127 (62.3%) were aged between 51 to 60 years. Mean BMI was 27.4±3.1 kg/m^2 while 84 (41.2%) women had BMI ≥ 30 kg/m^2. Marital status of 179 (87.7%) women was married. There were 60 (29.4%) women who were illiterate whereas 157 (77.0%) women were housewives. Socio-economic status of 98 (48.0%) women was low. Table-1 is showing characteristics of all women aged between 30-60 years studied.

Table 1: Characteristics of all women aged between 30-60 years (n=204)

Characteristics		Number (%)
Age (years)	30-40	27 (13.2%)
	41-50	50 (24.5%)
	51-60	127 (62.3%)
BMI (kg/m^2)	≤24.9	72 (35.3%)
	25-29.9	48 (23.5%)
	≥30	84 (41.2%)
Marital Status	Unmarried	25 (12.3%)
	Married	179 (87.7%)
Education	Illiterate	60 (29.4%)
	Literate	144 (70.6%)
Occupation	House Wife	157 (77.0%)
	Working	147 (72.1%)
Socio-Economic Status	Low	98 (48.0%)
	Middle	77 (37.7%)
	High	29 (14.2%)
Lifestyle	Sedentary	68 (33.3%)
	Moderate	91 (44.6%)
	Active	45 (22.1%)
Menopause		121 (59.3%)

Table 2 is showing comparison of characteristics of cases and controls and it was found that older age (P<0.0001), high BMI (p<0.0001), higher socio-economic status (p=0.0280), menopause (p<0.0001) and sedentary lifestyle (p<0.0001) were found to be significant determinants of KOA.

Table 2: Comparison of characteristics of cases and controls (N=204)

Characteristics		Cases (n=102)	Controls (n=102)	P-Value
Age (years)	30-40	4 (3.9%)	23 (22.5%)	<0.0001
	41-50	14 (13.7%)	36 (35.3%)	
	51-60	84 (82.3%)	43 (42.1%)	
BMI (kg/m²)	≤24.9	8 (7.8%)	64 (62.7%)	<0.0001
	25-29.9	26 (25.5%)	22 (21.6%)	
	≥30	68 (66.7%)	16 (15.7%)	
Marital Status	Unmarried	9 (8.8%)	16 (15.7%)	0.1350
		93 (91.2%)	86 (84.3%)	
Education	Illiterate	26 (25.5%)	34 (33.3%)	0.2190
	Literate	76 (74.5%)	68 (66.7%)	
Occupation	House Wife	83 (81.4%)	74 (72.5%)	0.1345
	Working	19 (18.6%)	28 (27.5%)	
Socio-Economic Status	Low	40 (39.2%)	58 (56.9%)	0.0280
	Middle	43 (42.2%)	34 (33.3%)	
	High	19 (18.6%)	10 (9.8%)	
Lifestyle	Sedentary	56 (54.9%)	12 (11.8%)	<0.0001
	Moderate	30 (29.4%)	61 (59.8%)	
	Active	16 (15.7%)	29 (28.4%)	
Menopause		78 (76.5%)	43 (42.2%)	<0.0001

DISCUSSION

In the present study, we noted an increasing trend of KOA presentations with the increasing age. The literature supports significant association of KOA with individuals aged more than 40 years.[11-13] It was also observed that age group of 50-60 years has the highest proportion of KOA. The KOA is prominently related to age and very much alike the studies completed by various other researchers.[14-16] Association of increasing age with progressive knee arthritis was primarily established by Framingham study.[17]

The people with higher BMI presenting KOA were significantly greater in number in this study. Similarly, we observed sedentary lifestyle to have significant association with KOA. Immobility may lead towards gaining the weight, resulting increase in BMI giving an inclination to KOA. Due to pain and immobility patients become more sedentary and results into further decrease in physical activities. Weight is gained due to this inability to move around and hence becomes an aggravating factor for the disease. On the other hand, according to another description, the activeness of the people lessens the risk of developing KOA as their BMI remains under control, when compared with the people who were not so much active.[18]

The association of menopause and inactive way of living to KOA was also established. A study from India reported menopause to have significant association with the presence of KOA among middle aged women which is in accordance to another regional study as well.[10,12] Due to the decrease in estrogen levels in this age puts the females at higher risk of developing OA, as seen in other trials.[19,20] In accordance with some longitudinal studies, less chances of getting radiographic OA were found in estrogen taking females.[21,22]

We noted higher socioeconomic status pointing towards significant association of KOA in this study. In contrary to our study, Dunlop *et al* (2001) and Dalstara *et al* (2004) related the increase in occurrence of KOA with the increase in poverty.[23,24] This contradiction might be due to the inactive way of living of the females belonging to higher class. Majority of such women could be housewives or attached to teaching profession. The housemaids are usually responsible to clean and mop up the house, to wash the clothes, and to take care of other things of the house. Such way of living may cause a gain in the weight becoming a potent risk factor to develop KOA. No any statistical relation of the educational status with the level of education of the contributors was visible in our study. Hence the results of our study present a contradiction to the studies showing an attachment of literacy level to KOA.

CONCLUSION

Older age, high BMI, higher socio-economic status, menopause and sedentary lifestyle were found to be significant determinants of knee osteoarthritis.

LIMITATIONS

This study has a limited scope and its findings cannot be readily applied to a broader population.

SUGGESTIONS / RECOMMENDATIONS

For a deeper understanding of the findings, this study needs to be conducted again in other health care settings.

CONFLICT OF INTEREST / DISCLOSURE

None.

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