Risk Factors of Knee Osteoarthritis in Women > 50 years

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Abstract:

Background: Osteoarthritis is one of the most disabling disease affecting middle age population specially knee osteoarthritis in women >50 years old, high parity had not been investigated thoroughly in western researches probably because it is not frequent in western societies, and hence it is very common in our locality, this research sheds lights on this important factor in the development of osteoarthritis in our patients.

Aim: To determine risk factors in the development of knee osteoarthritis in our society's women aged > 50 years

Patients & methods: A case-control design was adopted for this study**,** where 110 women >50 years with osteoarthritis of knee joints were allocated as cases, and another 110 women > 50 years without osteoarthritis of knee or other joints , were allocated as controls. Study period extended from 15 October 2005 to 1st. April 2006.Questionnaire forms were including, family history, parity status, history of previous abortion , history of previous trauma to knee joints and history of presence of one or more of chronic-non communicable diseases as Hypertension, ischemic heart disease, obesity and diabetes. Examination for assessing weight in kg and height in cm to obtain body mass index, also was undertaken by the researcher.

Results: Obesity measured by body mass index (≥ 25) in this study appeared to be highly associated in the development of knee osteoarthritis (OR= 7.48, 95% C.I.= 3.66-15.29) and also positive family history was highly correlated with the development of knee osteoarthritis (OR= 3.47, 95% C.I.= 2.01-6.00). This study also, indicated that high parity (>4) is an important risk factors for over 50 years women in the development of knee osteoarthritis (OR= 6.97, 95% C.I.= 3.55-13.70) , where 90 % of women with knee osteoarthritis were in high parity status compared to 56% of women with the same character , but without knee OA. Previous history of trauma to knee joints, past history of abortion and the presence of one or more of chronic non-communicable diseases, all appeared in this study not to be associated with the development of knee osteoarthritis.

Conclusion: Obesity, positive family history and high parity are established risk factors for the development of knee osteoarthritis in women more that 50 years old.

Key words: Knee osteoarthritis, risk factors, women > 50 years.

Introduction:

Osteoarthritis (OA) is a condition affecting joints and their constituent parts, including muscle, bone and cartilage[1]. Also, OA leads to increase bone stiffness, increase mineralization of bony tissue around the joint in the form of osteophytes, and loss of cartilage from the joint space[2]. This joint degradation results in pain, loss of mobility, disability and the increasing need for joint replacement [3,4].

Osteoarthritis is the most common joint disorder in the world. Indeed OA is second only to cardiovascular diseases in the frequency with which it produces severe chronic disability[5]. Epidemiological observations showed that women are affected more than men, specially after age of 50 years and in whom knee joints are more frequently affected [1,6,7] .

The real pathogenesis of OA in not fully clear, but recently it appeared to result from an imbalance between osteoclasts and osteoblasts in favor of increase bone destruction especially at weight bearing joints. There was no clear and definite etiology till now that can be claimed in the causation of OA, but certain risk factors appeared to be associated with the occurrence of this disease, as old age, female gender, positive family history, being overweight, history of previous injury to the joint, certain metabolic disease as gout, heavy and/or overuse of the joint and lastly certain hormones imbalance [8,9].

Osteoarthritis is usually diagnosed by careful history, thorough physical examination and X-ray of the affected joint. There are no definitive laboratory blood tests to make an absolute diagnosis of OA. The X-ray examination of an affected joint by OA will show decrease and in severe cases even loss of joint space indicating degeneration or loss of cartilage that is forming it. There may be tiny new bits of bone (bone spurs) visible at the end of the bones and osteophytes in advanced cases [10,11] .

There is now an increasing evidence to include OA within chronic non- communicable diseases (CNCD) that appeared to be greatly related and associated with certain life styles[5,12]. In our locality there were very few focus on this important subject that affect large no. of our population (namely women after age of 50 years) and hence the fertility rate in our country is very high, this study was conducted to observe the established risk factors of OA and to study the effect of previous parity status in the development of OA in women more than 50 years of age.

Subject & Methods:

In order to achieve the aim of the present study, a case-control study design was adopted. 110

women with OA were enrolled in this study according to the following inclusion criteria:

-History of pain in one or both knee joint at least for the last month with or without morning stiffness and crepitus.

-X-ray revealing: decrease or loss of the joint space, with or without bony spurs or osteophytes plus report from X-ray specialist suggesting the diagnosis of OA.

Another 110 women were chosen as control for this study with the following inclusion criteria:

-Negative history for pain in the knee joint.

-X-ray report from specialist for both knee joints indicating normality of both knee.

Every women in both groups was interviewed and examined by the researcher himself and relative information were obtained about the subject of concern, as , positive family history of OA, no. of parity and no. of abortion, no. of life births , age of first pregnancy, previous history of trauma or fracture to knee joints.

Anthropometric measurement for participants in this study was also obtained by the researcher, height in cm and body weight in kg, and body mass index was calculated according to equation:

BMI= weight in kg/ height in m^2 .

Then the Odd ratio was calculated for every risk factors of concern in this study.

Results:

The mean age group for cases was 55.5 years and for control, was 57.2 years, but the difference was statistically not significant.

Table (1), showed that obesity as indicated by BMI $\geq$ 25 was highly associated with the development of knee osteoarthritis (OR = 7.48, 95% C.I.= 3.66-15.29), where about 92 % of women with knee osteoarthritis were obese (BMI $\geq$ 25), compared to 60 % only of the control women, this great difference was statistically highly significant (P-value=0.0001).

Table (2), indicated the importance of high parity in the development of knee osteoarthritis in women > 50 years, 90% of cases were found to have had more than 4 life births compared to only 56 % for controls, high parity found to be highly associated with development of knee osteoarthritis, and this difference was statistically significant(OR=6.97, 95% C.I.= 3.55-13.70).

Table (1): Distribution of the study population according to BMI

Body Mass Index (BMI)	Cases		Controls	
	Number	%	Number	%
≥ 25	101	91.81	66	60
< 25	9	8.19	44	40
	110	100.00	110	100.00

X^2 = 30.449 DF= 1 P-value<0.0001 OR= 7.48 95% C.I. = 3.66-15.29

Table (2): Distribution of the study population according to high parity

Parity	Cases		Controls	
	Number	%	Number	%
> 4	99	90	62	56.36
≤ 4	11	10	48	43.64
	110	100.00	110	100.00

X^2 = 31.706 DF=1 P-value<0.0001 OR= 6.97 95% C.I. = 3.55-13.70

Table(3) indicated that , there was a highly significant differences between cases and controls regarding mean no. of life birth (mean no. of life births for cases was 7.13 ± 3.56, and for controls was 4.48 ± 3.00, p-value = 0.0001).

Family history also, appeared from table (4) , to be significant risk factor in the development of knee osteoarthritis in women > 50 years, where about 62% of cases gave positive family history for knee osteoarthritis compared to only 32% for that of controls, again this difference was significant (OR= 3.47, 95% C.I.= 2.01-6.00).

Table (5) indicated that past history of trauma to the knee joint is not associated with the development of knee OA in this study, also previous history of abortion in women appeared not be related to the occurrence of knee OA in the future and lastly, the presence of one or more of CNCD, in this study revealed not significant association with the development of knee OA.

Table (3): Distribution of the study population according to number of life births:

No. of life births	Cases ± SD	Controls ± SD	P-value
	7.13 ± 3.56	4.48 ± 3.00	0.0001

Table (4): Distribution of the study population according to family history of osteoarthritis

Family history	Cases		Controls	
	Number	%	Number	%
+	68	61.81	35	31.81
_	42	38.19	75	68.19
	110	100.00	110	100.00

X^2 =19.881 DF=1 P-value< 0.001 OR= 3.47 95% C.I. = 2.01-6.00

Table (5): Distribution of the study population according to past history of trauma to knee joints, past history of abortion and the presence of one or more of CNCD

Factor	cases		controls		OR	P-value	95%C.I.	X^2
	No.	%	No.	%				
Trauma	4	3.63	5	4.54	0.79	0.734	0.20-3.07	0.116
Abortion	16	14.45	13	11.81	1.27	0.550	0.58-2.78	0.357
CNCD	85	77.27	82	74.54	1.16	0.636	0.63-2.14	0.224

Discussion:

Osteoarthritis is a chronic condition, and although it may develop acutely its evolution usually takes years. Current knowledge is primarily based on observation made at a single time in the evolution of this disorder. In humans short term follow up studies are few and long term studies exceptional [1,12] .

Regarding epidemiology, osteoarthritis is the most common disease affecting humans and a common cause of disability. The prevalence of OA is expected to increase dramatically during the next 20 years as the population ages. The gender susceptibility appeared that female are more prone to this disease specially after age of 50 years and the most frequent joint affected by this disorder was the knee. OA account for about more than 20 % of visits to general practitioner in UK, and more than 60% of all non steroidal anti-inflammatory drugs prescription. Also, OA is second only to ischemic heart disease as a cause of disability in over 50 years old and despite all its public health impact, this disease continues to be a relatively unaddressed health issue [1,2,7].

The main risk factors for OA were age, female gender, obesity and positive family history, and hence all these risk factors are present in women > 50 years in our locality, this study aims to explore risk factors for OA in our society and to study the effect of high parity on the development of OA. The BMI in this study appeared to be highly associated with the development of this disease and this agrees with many studies with relatively same estimates [2,3]. Regarding family history, study results go in consistence with other studies disclosing the importance of this factor as a risk for this disabling disease and that genetic susceptibility is one of important non- modifiable risk factor as age in this issue [4,9]. High parity , is alarming in this study, expresses itself as an extra-important factor in the development of knee OA in women more than 50 years, women with high parity (> 4) appeared to carry high risk for the development of knee OA, this probably can be explained as the following:

-Excessive pregnancies, as a fact, can lead abnormally to increase body weight for women and this (obesity) is an established risk factor for Knee OA.

-In any pregnancy, women body weight increases by about 15-20 % of her normal weight (products of pregnancy), for a long period regarded as overuse for weight bearing joints (knee joint one of them) which is (overuse) also an established risk factor for knee OA.

-Repeated pregnancies can lead and accelerate osteoporosis, which are again an established secondary causes for OA.

-Probably, other hormonal involvement may play a role in this issue.

Previous history of trauma to knee joints, in this study appeared not to be associated with the development of knee OA. The same thing is true regarding past history of abortion, where it is found to be not associated with the occurrence of knee OA, the same results were also obtained from other studies [3,9]. The presence of one or more of CNCD, appeared in this study to be not associated with the development of knee OA, the same results was found by Felson *et al.* [6] in their prospective cohort study.

One of the limitation of this study, from epidemiological point of view, is that this results can not be generalizable, actually because one of the main limitation of case-control study is that it is not representative to the whole population of concern, but it is important to shed lights on this probable association between high parity and the development of knee OA in over 50 years women. The study recommended that, further studies as retrospective and prospective cohort studies are important in the future in order to confirm this association.

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