Knee osteoarthritis in Al-Qaseem, Saudi Arabia

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ABSTRACT

Objectives: The aim of this study was to estimate the prevalence of clinical osteoarthritis (OA) of the knee in Al-Qaseem, a central province in the Kingdom of Saudi Arabia (KSA).

Methods: A house to house survey of randomly selected inhabitants of Al-Qaseem, KSA was conducted. A total of 10,406 persons were interviewed of whom 5,894 were above the age of 16 years. The study was carried out at King Khalid University Hospital and College of Medicine, Riyadh, KSA, from September 1993 to February 1995. They were questioned regarding musculoskeletal complaints, and those positively identified were interviewed further by a team of trained medical staff and later examined by trained doctors including rheumatologists.

Results: We found 766 (13%) cases of clinical OA of the knee in the 5,894 adult population (13%). The prevalence of OA increased with increasing age reaching 30.8% in those aged 46-55 years and 60.6% in the age group 66-75 years. The odds ratio (OR) for the association between clinical OA of the knee and age adjusted for sex and body mass index (BMI) was 1.0894 (95% CI, 1.08-1.09). The association of clinical OA of the knee with female sex was also significant [OR (adjused for age and BMI) was 1.261 (95% CI, 1.0456-1.5208)].

Conclusion: Clinical OA of the knee is common in this community, particularly in the older age groups.

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Osteoarthritis (OA) is the most common arthritic condition worldwide.[1,2] It has considerable social and economic impact with an estimated annual cost in medical care and lost work running into billions of dollars.[2] The prevalence varies in different regions of the world with prevalence rates ranging from 3.8-70% depending on the methodology of studies, whether clinical, radiographic, patient self-reporting or physician diagnosis.[3-6]

In the Kingdom of Saudi Arabia (KSA), previous studies described the pattern of OA of the knee in hospital and primary care settings.[7,8] However, no community wide study was available to address the prevalence of knee OA in the community. This study was undertaken to find out the prevalence of clinical OA in central KSA.

Methods. Al-Qaseem province is situated in the heart of KSA. It combines rural and urban centers. The 1992 population census put the population at 660,000, with an estimated yearly growth of 5%. This study was carried out at the King Khalid University Hospital and College of Medicine, Riyadh, KSA. For our purposes, the province was divided into 3 strata based on population size: Large (>20,000 population), medium (50,000-20,000) and small (<5,000 inhabitants). Random samples were selected from each of the large

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and medium sized strata. The 3rd strata comprising villages was sampled with probability proportionate to size. The sampling unit was taken as the household and a total of 1,000 households were selected for the house to house survey. The procedure was divided into 3 phases. Phase one involved administering a questionnaire by trained nurses and paramedical staff, to identify age, sex and musculoskeletal symptoms in general. In the 2nd phase, trained general practitioners questioned those individuals positively responding to the musculoskeletal symptoms in the first phase with regards to their symptoms and associated features. During the 3rd and final phase, rheumatologists interviewed and examined individuals identified in phase 2. A clinical diagnosis of OA was made according to ACR clinical criteria for diagnosing OA[9] which, are knee pain and at least 3 of 6 of the following: Age >50, stiffness <30 minutes, crepitus, bony tenderness, bone enlargement and no palpable warmth.

Results. Out of a total of 10,406 individuals surveyed, 5,894 were above 16 years. Their age groups and the number of OA cases in each group are presented in **Table 1**. The female to male distribution is shown in **Table 2**. From the table, 766 (13%) cases of OA were diagnosed among the whole sample. However, since most of the household members were young, this underestimates the prevalence. When we look at the different age groups, we found that the prevalence of clinic OA increased with age giving an estimated prevalence of 30.8% in those aged 46-55 years. In the age group 66-75 years, the prevalence is estimated at 60.6%. The correlation with age was significant (Spearman correlation coefficient of 0.478 (P<0.001). The smaller number of members in age groups above 80 years may have resulted in underestimation of clinical OA in these subjects **Table 1**. The odds ratio for OA with advancing age was [1.0898 (95% CI, 1.083-1.096)]. Controllong for BMI and sex did not change the risk [OR 1.0894 (95% CI, 1.08-1.09)]. We also found an increased percentage of clinical OA in certain occupations namely farmers, unskilled labor, small business proprietors, housewives, unemployed and soldiers. There was also significant correlation between diagnosis of OA and seeking medical help for musculoskeletal complaints (r=0.448, P<0.0001). Function was not unduly compromised in those with diagnosis of OA (r=0.292 P<0.001). We found also a significant positive correlation with systolic blood pressure (r=0.325), diastolic blood pressure (r=0.248) and small correlation with weight in kg (r=0.112) but neither with height nor incremental rise in BMI. The associated risk of OA with incremental rise in BMI was [OR 1.0009 (95 % CI, 0.99 –1.002). This non-significant association was not affected by controlling for age and sex. However, when we did a breakdown of BMI into quintiles, we found a small but significant correlation between BMI and clinical OA (r=0.178) (Pearson) (P<0.0001) and when comparing the heaviest quintile to the lightest, OR 1.486 (95% CI, 1.4002-1.5784). **Table 1** shows that age groups 16-40 included most of the cases surveyed, 4,364 (74%). Females were 2,535 (58.1%) among these. These factors may have lead to the lower number of OA cases among female (365) in comparison to male OA (401). **Table 2** shows higher total females in the whole group but OA cases were higher among males. This is most likely due to the fact that most females were in the lower age group (as seen in **Table 1)** leading to disproportional decrease in OA cases among females. This relationship is explored further by calculating the OR for the association. The association of clinic OA with female sex became apparent, only after controlling for age (Crude OR 0.7371 (95% CI, 0.6327-0.8587, age adjusted OR 1.2788 (95% CI, 1.0655-1.5348). This association was not affected much by controlling for BMI in addition to age [OR 1.261 (95% CI, 1.0456-1.5208)].

Discussion. In this community study, the overall prevalence of clinical OA in those age 16 years and

Table 1 - Diagnosis (Non-osteoarthritis and Osteoarthritis) and age group.

Diagnosis		Age Group* 1	2	3	4	5	6	7	8	Total
Non-OA	n	2051	1590	822	352	201	76	28	8	**5128**
	(%) within age group	(98.9)	(95.2)	(83.8)	(69.2)	(52.2)	(39.4)	(41.2)	(57.1)	**(87)**
Cases	**Total (%)**	**(40)**	**(31)**	**(16)**	**(6.9)**	**(3.9)**	**(1.5)**	**(0.5)**	**(0.2)**	**(87)**
OA	n	22	81	159	157	184	117	40	6	**766**
	(%) within age group	(1.1)	(4.8)	(16.2)	(30.8)	(47.8)	(60.6)	(58.8)	(42.9)	**(13)**
Cases	**Total (%)**	**(2.9)**	**(10.6)**	**(20.8)**	**(20.5)**	**(24)**	**(15.3)**	**(5.2)**	**(0.8)**	**(13)**
	n	2073	1671	981	509	385	193	68	14	**5894**
Total	(%) within age group	(100)	(100)	(100)	(100)	(100)	(100)	(100)	(100)	**(100)**
	Total (%)	**(35.2)**	**(28.4)**	**(16.6)**	**(8.6)**	**(6.5)**	**(3.3)**	**(1.2)**	**(0.2)**	**(100)**

OA - osteoarthritis, * Age group 1=16-25, 2=26-35, 3=36-45, 4=46-55, 5=56-65, 6=66-75, 7=76-85, 8=86-100 years

Table 2 - Osteoarthritis in relation to sex.

Diagnosis		Females	Males	Total
OA cases	n	365	401	**766**
	(%) within OA	(47.7)	(52.3)	**(100)**
	(%) within gender	(11.4)	(14.9)	**-**
	(%) within total	(6.2)	(6.8)	**(13)**
Non-OA cases	n	2831	2297	**5128**
	(%) within non-OA	(55.2)	(44.8)	**(100)**
	(%) within gender	(88.6)	(8.5)	**-**
	(%) within total	(48)	(39)	**(87)**
Total		**3196**	**2698**	**5894**

OA - osteoarthritis

above was 13%. However, since this community has a higher percentage of young people that was reflected in the age composition of our sample, this led to underestimation of prevalence OA. When those above 40 years were considered, the prevalence of OA was found to be (36%). It is even higher than this in older age groups reaching up to 60.6% in age group 66-75 years. Comparing our figures to those obtained in the Copcord surveys in the Philippines and India which had similar designs to ours, our figures are found to lie between the higher prevalence figure obtained in the Indian study (29%) and the lower figure seen in the Philippines (4.1%).[10,11] Our figure however is closer to the survey carried out in Cuba which gave a prevalence of OA, 19.6%.[12] The increased prevalence of clinical OA among male is most likely a reflection of the age composition of the surveyed sample which despite having a larger number of females, as a whole, the males constituted most of those aged 40 years and above, and since OA is age associated, this lead to the finding of a higher number of clinical OA among males. Another explanation is that this is a clinical study where radiographs were not obtained in all surveyed. A radiographic study may show a slightly different picture. However, despite the smaller number of OA in females, and controlling for age, the statistical analysis showed association with female sex [OR 1.3567 (95% CI, 1.16-1.58)]. The association of clinical OA with weight and BMI only came apparent when the BMI was broken into quintiles. The correlation between OA and systolic and diastolic blood pressure has been reported before.[13,14] The association of OA with lower income classes is in agreement with a previous study.[15]

In conclusion, clinical OA of the knee is prevalent in the Saudi population and increases with age.

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