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Prevalence of knee osteoarthritis in patients visiting NIUM hospital Bangalore

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ABSTRACT
Osteoarthritis (OA) is the most common type of arthritis and knee OA, being highly prevalent, accounts for as much or more lower extremity disability in community-dwelling older adults than any other disease. As a larger proportion of the elderly population in developed countries increasingly lives to an extreme old age, OA will be more prevalent and will be an important cause of disability in the future. The study is carried out to measure the prevalence of disease in the adult population of Bangalore. A cross-sectional study was conducted in the NIUM, Hospital, for a period of 1 year. A total of 507 patients were included. A predesigned and pre-tested semi structured schedule, was used to estimate the prevalence of disease. The collected data was evaluated and presented in the form of tables in accordance to the purpose of study. The overall prevalence of knee osteoarthritis in the study population was 83.23%. The prevalence in females was higher in comparison to males. According to Kellgren-Lawrence grading system of osteoarthritis based on radiographic findings. Maximum patients were of Grade II i.e. 40.82% (207) followed by 25.64% (130) in Grade I, 15.78% (80) in Grade III and 5(0.99%) patients in Grade IV. The present study showed that knee osteoarthritis is one of the most common problems in Bangalore. Female predisposition was seen. The risk factors of the disease are advancing age, obesity and low socioeconomic status.

Keywords: Knee Osteoarthritis; Prevalence; Bangalore; Unani Medicine

1. Introduction
OA is a degenerative disease characterized by gradual development of joint pain, stiffness, swelling and limitation of movements. OA causes chronic disability; the degree of disability depends on the site involved and varies greatly between individuals [1]. Knee OA is more common in all types of arthritic conditions. A recent WHO report on the worldwide burden of disease indicates that knee OA alone is likely to become the 4th most important cause of disability in women and the 8th in men. Knee OA is much more prevalent in India than in west and accounts as much more disability as any of other chronic conditions. The prevalence is high, especially among the elderly. With the increase in population of elderly it has become the major health problem nowadays [2]. Osteoarthritis is multifactorial in aetiology. Both systemic factors (e.g. age, sex, genes) and local factors (e.g. muscle weakness, joint deformity) appear to influence the risk of individual joints developing the disease. The specific aetiological factors are unknown, but may include mechanical overloading, failure of the chondrocyte-controlled internal remodelling system and extra cartilaginous factors such as synovial or vascular changes [3]. As there is increase burden of disease in India, there is an urgent need and demand of proper health care services in the community to maintain the maximal range of skeletal mobility, to avoid the development of deformities and to improve the quality of life. Keeping in view the greater burden of disease and disability in the form of compromised functions and loss of independence due to knee osteoarthritis, the present study was conducted to know the disease burden in the society, to make the people aware more about this disease.

2. Methodology
The study was conducted in NIUM Hospital, Bangalore after obtaining ethical clearance from institutional ethical committee. The present study was a cross sectional study and the duration was one year. 507 patients were enrolled in the study. Sample size was calculated by using the formula; $N=4\ pq/L^2$. Patients with knee joint pain of either sex and above the age of 40 years were included. Patients below 40 years and H/o recent injury or accident within 6 months were excluded. The data were collected from under study population.

Reasons for the study were explained to patient; prior to interview, a written consent was taken. A pretested semi structured schedule based on different standardized questionnaires adopted in most cross sectional studies designed in such a manner that the information regarding demographic profile (age, sex, religion, occupation etc.), dietary habit, addiction and detailed information of the knee joint is collected.

Schedule was divided in to six parts. First Part: it was based on socio-demographic profile. It contains information regarding age, gender, marital status, family type, habitat, weight, height, religion, education, occupation and annual income. Body mass index was calculated and classified according to the WHO classification for Body mass index. Socioeconomic status was assessed by using Kuppaswamy scale. Second Part: It contained information regarding the personal habits like smoking, alcohol intake and other specific habits**.** Third Part: It contained the information regarding the dietary habits and language spoken. Fourth Part: It was designed to obtain the information about the history and physical examination of knee joint such as h/o injury or accident, joint pain, duration of pain, swelling, crepitations, disability, aggravating and relieving factors related to joint pain any disability, deformity and lastly the investigations i.e. X-ray results already revealed by patients or taken from radiology department of hospital of the NIUM. Fifth Part: It contained the information about the diagnosis, i.e. Patients having OA of knee or not. If yes, then either unilateral or bilateral and to find out in which grade (I, II, III, IV) by using Kellgren Lawrens Grading System of Knee OA. Sixth Part: It was based on the final assessment.

The collected data and results were evaluated and presented in the form of tables in accordance to the purpose of study.

3. Results and Discussion

In the present study, 507 patients of either gender visited the hospital of NIUM were included. The data revealed that the number of subjects enrolled rose with increase in age (Table 1), because as the age advances, morbidity also increases. The higher incidence in older age group (>60 years) substantiate the claims made by Reddy SV *et al* [4]**,** Ajit NE *et al* [5]**,** Patil PS *et al* [6]**,** Vrezas I *et al* [7]**,** Kasper *et al* [8]**,** Kumar and Clark [9]**.** The study revealed that Females 61.54 %(312) outnumbered the males 38.46 % (195) (Table No.1). The probable reason for higher incidence among female patients may be due to their postmenopausal status and habit of constant squatting, which coincides with the findings observed by Reddy *et al* [4]**,** Patil PS *et al* [6]**,** Goldman *et al* [10]**,** Kaspar *et al* [8]**,** Russel RCG *et al* [11]**,** Spector *et al* [12]**,** Warrel DA *et* al [13]**.**

The data showed the higher prevalence among Muslims and considerable percentage of Hindus (Table 1). Religion wise distribution has no relevance to the study.

According to dietary habits, 94.67% were on mixed diet (non-vegetarian)) and 5.33% patients were Vegetarians (Table 1). There is relationship between dietary habits and precipitation of this disease according to *Razi,* [14] *Ibn Sina* [15] and *Majusi* [16] as they have restricted non-vegetarian foods in patients of *Waja'al-Mafaṣil*. Therefore it may be inferred that non-vegetarian diet which is usually not easily digestible and affects the digestion may act as an aggravating factors for *Waja'al-Mafaṣil* (OA).

The data revealed higher prevalence of Knee OA among lower income group which is in accordance with the findings of Ajit NE *et al* [5] and Salve *et al* [17] they stated that OA was found to be higher in low socioeconomic class as compared to middle (Table 1).

Table 1: Baseline characteristics of study population (N=507)

Variables		No. of patients	%
Total no. of subjects = 507			
Gender	Male	195	38.46
	Female	312	61.54
Age Group	40-45 years	72	14.20
	46-50 years	72	14.20
	51-55 years	86	16.96
	56-60 years	78	15.39
	>60 years	199	39.25
Ethnicity	Muslim	270	53.25
	Hindu	235	46.35
	Christian	2	0.40
Dietary Habits	Vegetarian	27	5.33
	Mixed	480	94.67
BMI	Underweight	4	0.79
	Normal	167	32.94
	Overweight	238	46.94
	Obese	98	19.33
Socioeconomic status	Upper (I)	2	0.40
	Upper Middle (II)	66	13.01
	Lower Middle (III)	86	16.96
	Upper Lower (IV)	353	69.63

The data revealed high prevalence of *Waja'al-Rukba* (Knee OA) in patients of high BMI which was in accordance with the statements of Vrezas I *et al* [7]**,** Patil PS *et al* [6]**,** Ledingham JGG *et al* [18]**,** Tierney LM *et al* [19]**,** and Shah SN *et al* [1]**.** The present study affirmed that obesity and overweight are considered to be the potential risk factor for the development of Knee OA.

It was observed that 292(57.59%) were house wives followed by 36(7.1%) workers, 32(6.31%) unemployed, 31(6.11%) businessmen, 23(4.54%) auto drivers, 19(3.75%) farmers, 18(3.55%) shopkeepers, 12(2.37%) retired servicemen, 11(2.17%) labourers, 7(1.38%) teachers, 7(1.38%) tailors, 5(0.99%) carpenters, 5(0.99%) cooks and 9(1.77%) others respectively (Table 2) The highest prevalence found among the housewives and the reason due to sex factor and sedentary life style i.e they used to their household works in the knee bent position and this is in accordance with the statement of Shakoor MA *et al* [20]**,** Warrel DA *et al* [13]**,** *Raban tabri* [21] *Majusi* [16]**,** *Ibn Sina* [15]**,** and *Ismail Jurjani* [22]**.**

It is evident from Table 3 that all the patients (100%) had complaint of knee joint pain, of which maximum 88.76 % (450) patients had bilateral and 11.24% (57) patients had unilateral involvements (right knee comparatively more affected than left knee). On examination of Knee joint 42.60% (216) had crepitations in both knee joints followed by 18.93% (96) patients had in left knee while 82 (16.17%) had in right

knee. 52.07% (264) of the patients had swelling, out of which, 26.82% (136) had unilateral and 25.24% (128) had bilateral involvement. 97.63% (495) of the patients had complaint of disability, of which 74.34% (377) had disability in both knee joints and 23.27% (118) had unilateral involvement. Only 4 patients had unilateral deformity. Presence of all these symptoms in majority of the patients suggests that registered patients were of Knee OA as cited by Ehsan S *et al* [23], Shakoor MA *et al* [20], Kumar and Clarke *et al* [9], Halverson PB *et al* [24], Shah SN *et al* [1], Goldman and Ausilo [10], Warrel DA *et* al [13] and Wall and Melzeck [26] as Indians (especially women) are more prone to Knee OA due to their squatting habits in daily activities.

Table 2: Distribution of Patients according to Occupation (N=507)

Occupation	No. of Patients	Percentage (%)
House wife	292	57.59
Worker	36	7.1
Unemployed	32	6.31
Businessman	31	6.11
Auto driver	23	4.54
Farmer	19	3.75
Shopkeeper	18	3.55
Retired service man	12	2.37
Labourer	11	2.17
Teacher	7	1.38
Tailor	7	1.38
Carpenter	5	0.99
Cook	5	0.99
Others	9	1.77
Total	**507**	**100**

Table 3: Distribution of Patients according to Signs and Symptoms

Signs and Symptoms		No. of Patients	Percentage (%)
Knee Joint Pain n=507(100%)	Unilateral	57	11.24
	Bilateral	450	88.76
Joint Swelling n=264(52.07%)	Unilateral	136	26.82
	Bilateral	128	25.25
Crepitations n=394(77.71%)	Unilateral	178	35.11
	Bilateral	216	42.60
Disability of Joint n=495(97.63%)	Unilateral	118	23.27
	Bilateral	377	74.36
Any Other Deformity (n=4(0.79%)	Unilateral	4	0.79

Table 4: Distribution of Patients according to Kellgren-Lawrence Radiographic Grading System of Osteoarthritis

Radiographic Findings	No. of Patients		Percentage (%)
Grade I n=130 (25.64%)	Unilateral	86	16.96
	Bilateral	44	8.68
Grade II n=207 (40.82%)	Unilateral	87	17.15
	Bilateral	120	23.67
Grade III n=80 (15.78%)	Unilateral	4	0.79
	Bilateral	76	14.99
Grade IV n=5 (0.99%)	Unilateral	1	0.20
	Bilateral	4	0.79
Normal	85		16.77
Total	**507**		**100**

Local swelling and pain is generally due to extravasation of fluid and cells from the blood stream into intercellular space. The abnormal accumulation of fluids in the joint cavity is responsible for the swelling, pain and restriction of movements. This finding is coinciding with the statements of *Ibn Sina*. According to him, restriction of movements is directly related with the pain and swelling. Swelling in the joints is due to the accumulation of *Akhlate Fasida* (Diversion of Morbid Matters) and this may be the reason of restriction of movements.

Pain in *Waja'al-Rukba* may originate in different ways. It may be inflammatory in nature and may also develop due to change in local pH or may arise because some ions can stimulate nerve endings. Similarly, release of certain chemicals like histamine, 5HT, K^+ and plasma kinin can stimulate the local sensory nerves. In addition, synovial fluid can indirectly cause pain by serving as transport medium, distending the joint capsule and limiting the joint functions. The synovial fluid shuttles inflammatory mediators back and forth between the cartilage and synovium. Synovial fluid also serves as reservoir for inflammatory products, cells and crystals Furthermore, synovial fluid distends the joints, potentially compressing blood vessels, leading to the stimulation of pressure receptors in capsule. Joint distension also compromises the transport of nutrition and oxygen from the synovium to the cartilage and waste products from cartilage to synovium [26], [27], [28].

The present study revealed that 83.23% (422) were diagnosed with Knee OA as confirmed by Kellgren and Lawrens grading system of OA based on radiographic findings. Maximum patients were of Grade II i.e. 40.82% (207) followed by 25.64% (130) in Grade I, 15.78% (80) in Grade III and 5(0.99%) patients in Grade IV (Table No.4).

4. Conclusion

This study concluded that the Knee OA is a major public health issue especially in elderly dependent population in this country. The risk of disability increases with the presence of knee pain in the community. It will be more prevalent and will be an important cause of disability in the future. There is a need of immediate attention toward this issue in the form of estimation of problem of OA and various risk factors responsible for its development. There is a need to take appropriate steps regarding Knee OA in order to increase awareness of modifiable factors like importance of daily exercise, proper positioning of the knee joint during daily activities and also control over the other modifiable known factors such as dietary habits, obesity, adequate treatment and rehabilitative services in the form of physiotherapy and

advanced therapy.

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