Prevalence and Correlates of Osteoarthritis in Indian Older Persons- LASI Findings

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Abstract

It is impossible to make successful policy decisions in India without estimates of arthritis in older persons from a nationally representative population. In order to determine the prevalence of arthritis and look into its risk factors in Indian older persons, this study used secondary data from the Longitudinal Aging Study of India (LASI).

We used information from the LASI's first wave, a national and state-level study of ageing and health in India. The prevalence of arthritis was calculated using weighted confidence intervals for various age groups (CI). To find arthritic risk variables, we created unadjusted and adjusted logistic regression models. We also looked at the connection between functional reliance and arthritis using a multivariable regression model.

9.36 percent of Indian adults aged 45 and above have arthritis. The prevalence of men was 7.49 percent, compared to the prevalence of women, which was 11.03 percent. With an odds ratio of 1.59, women are more likely than men to get arthritis (95 percent CI: 1.50, 1.69). Age was another important risk factor, with an adjusted odd ratio of 1.41. (95 percent CI: 1.31, 1.52). With AORs of 1.86 (95 percent CI: 1.68, 2.07) and 2.48 (95 percent CI: 2.19, 2.81), respectively, obesity and overweight were associated with greater riks.

The risk of arthritis was 1.54 (95% CI: 1.43, 1.67) greater in diabetics than in non-diabetics. Physical reliance was more prevalent in arthritic patients, although the risk was cut in half, from 1.56 in unadjusted models to 1.13 (95 percent CI: 1.02, 1.25). (95 percent CI: 1.05, 1.28).

We learned that arthritis is a significant issue for senior people. Being over 45, living in an urban area, having a higher socioeconomic class, being a woman, being obese, and having diabetes have all been associated to an increased risk of arthritis. Older persons with arthritis also have considerably and independently worse functional abilities.

Keywords: Osteoarthritis, Lasi, Older Persons, Osteoarthritis, Prevalence.

Background

Disorders of the joints and the connective tissue around them are collectively referred to as arthritis. While there are more than 100 distinct varieties of arthritis, osteoarthritis, a degenerative condition that most frequently affects the hands, hips, and knees, is the most prevalent. [1] This kind of arthritis causes pain, stiffness, loss of flexibility, and edoema. [2] Despite the fact that data on burden are not consistently accessible from all over the world, imaging has shown that more than a third of Americans suffer from arthritis. [3] Knee osteoarthritis is thought to affect 19% to 30% of persons over the age of 45, with the remaining 27% also suffering from hand and hip osteoarthritis. At some time in their life, 47% of women and 40% of men will have osteoarthritis.[3] Lower but still substantial, osteoarthritis prevalence was reported to be 16% in low-middle income nations. [4]

The results of arthritis rely on a variety of risk factors and range widely. In addition to physical restrictions, the pain and deformity associated with arthritis lead to functional reliance and a bad quality of life in patients. Age is a significant element that affects the adverse effects of arthritis. The pathogenesis and natural history of arthritis include a number of major risk factors, including past trauma, occupation, exercise, gender and ethnicity, obesity, and food. [5]

In systematic reviews that summarised osteoarthritis estimates, only 34 papers from the entire block of low- and middle-income countries were found, but relatively few studies explicitly addressed the incidence in India. [4,6] According to the Indian government, osteoarthritis affects 22–39% of the population and is a serious public health concern. [7]Even though earlier research on multimorbidity in certain communities indicated the frequency of arthritis in India, it was sparse and the risk factors were not examined. [8] India lacks estimates of arthritis in older individuals from a nationally representative population, creating a sizable vacuum in the available data that must be filled in order for policy to be successful. So, this study was created to assess the prevalence of arthritis and explore its causes using secondary data from the Longitudinal Aging Study of India.

Methodology

Data

We used information from the Longitudinal Ageing Study in India (LASI), a national and state-level study of ageing and health in India. The only facility of its sort in India, LASI is the biggest in the whole globe. Its main objective is to gather precise, reliable, and continuous scientific data on the health, social, mental, and economic well-being of older persons in India. The Government of India's Ministry of Health and Family Welfare (MoHFW) is in charge of LASI. The International Institute for Population Sciences (IIPS) in Mumbai acts as the main institution for LASI implementation in cooperation with the Harvard T.H.Chan School of Public Health (HSPH) and the University of Southern California (USC). The study's initial wave contained a multi-stage Stratified Cluster Sample of persons that is nationally representative. There were 59764 participants in this study who were 45 years of age or older.

Variables & Statistical Analysis

Arthritis (Yes/No) was the outcome variable that determined whether or not a person had received a diagnosis of arthritis from a medical expert (self-reported). Physical reliance is also considered to be a factor in outcomes. Another factor that was identified is gender (male and female), followed by age (45-54 years, 55-64 years, and 65 or more years), place of living (rural vs. urban), and religion (Hindu, Christian, Muslim & Others), Education level (four categories: no education, primary school, middle school completed, and higher secondary and above), occupation (currently

working or not), wealth status (poor, middle class, and rich), marital status (currently married or not), and physical activity (physically active or not); it is defined by those who engaged in moderate (at least 150 minutes per week) or vigorous physical activity (at least 75 minutes throughout the week). Body Mass Index (BMI) was calculated by measured weight (Kg)/squared measured height (metres) and classified by underweight (18.5 or less), normal (18.5 - 24.9), overweight (25.0 - 29.9), and obese (30.0 or more), waist circumference (less than 0.85m & 0.58 m or more), smoking status (Yes/No), and alcohol consumption (Yes/No). Diabetes (Yes/No); those who were diagnosed by health professionals - self-reported.   In our descriptive analysis, we evaluated the weighted prevalence and 95% confidence intervals (CI) of arthritis in various age groups using all the demographic, socioeconomic, and health status factors. Using both unadjusted and adjusted logistic regression models, we computed the odds ratio with 95 percent confidence intervals for the arthritis outcome variable.

The unadjusted regression analysis considered gender, age, financial situation, level of physical activity, type 2 diabetes, BMI, smoking status, and alcohol use. The multivariate logistic regression analysis includes the variables having a statistically significant connection to arthritis.

For the outcome variable physical dependency, a regression analysis with no adjustments, age-gender adjustments, and complete adjustments was then run. For statistical analysis, R programme was utilised (V.4.1.2)

Results

Arthritis affected 9.36 percent of the Indian population aged 45 and up. Figure 1 shows that the prevalence was 7.49 percent in males and 11.03 percent in females.
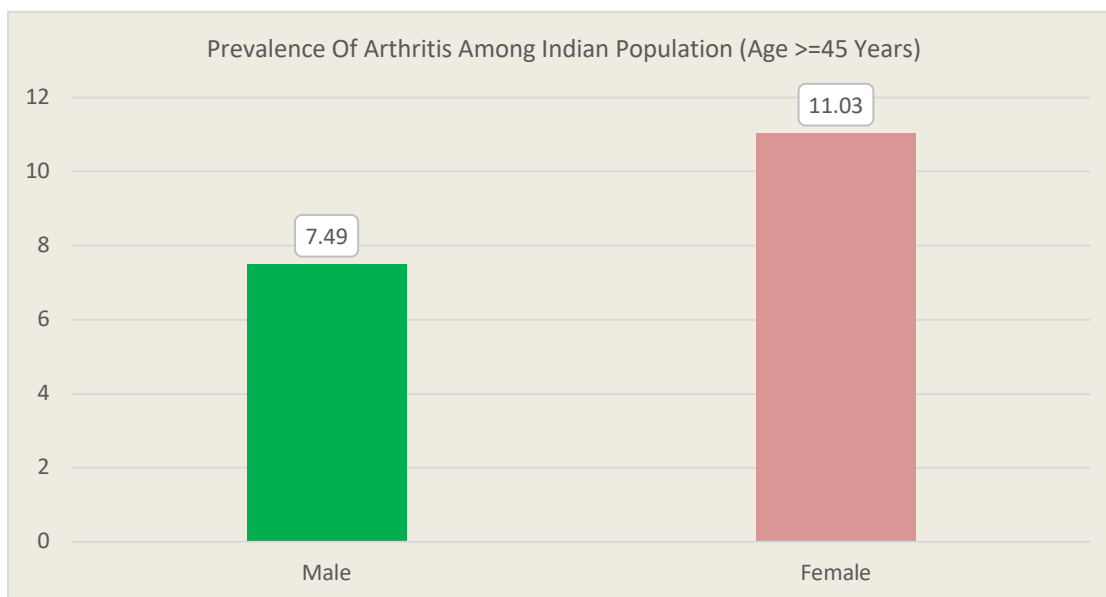
Figure 1: Prevalence of Arthritis among Indian population (age >=45 years old)

With increasing age, there was an increasing trend of prevalence in both genders. Table 1 shows that individuals who identified as urban residents, currently not working, relatively well-off economically, and currently not married had a higher prevalence of Arthritis. Arthritis was also more common in people with diabetes and those with a larger waist circumference or obesity. Smoking and alcohol consumption were less likely to be associated with arthritis.

Table 1: Prevalence of Arthritis and its predictors among Indian population with age above 45 years old

Variables	Age group (in years)			
	45 – 54	55 - 64	65 & above	Total
Gender				
Male	4.76 (4.04, 5.48)	8.38 (5.33, 11.43)	9.02 (8.17, 9.87)	7.39 (6.39, 8.40)
Female	8.23 (7.26, 9.21)	10.31 (9.24, 11.39)	14.64 (11.55, 17.73)	11.06 (9.90, 12.15)
Residence				
Rural	6.64 (5.96, 7.31)	8.64 (7.86, 9.43)	10.47 (9.61,11.32)	8.61 (8.13, 9.09)
Urban	6.80 (5.39, 8.21)	11.41 (6.72, 16.11)	15.53 (10.22, 20.88)	11.10 (8.88, 13.33)
Religion				
Hindu	6.63 (5.90, 7.36)	9.50 (7.72, 11.28)	12.20 (10.15, 14.25)	9.44 (8.54, 10.36)
Muslim	8.00 (6.45, 9.55)	9.17 (7.43, 10.90)	12.52 (10.36, 14.68)	9.91 (8.75, 11.06)
Christian	5.30 (2.45, 8.15)	8.63 (5.96, 11.30)	10.54 (7.31, 13.77)	8.01 (6.07, 9.96)
Others	5.25 (1.90, 8.60)	9.76 (5.63, 13.89)	5.97 (3.19, 8.75)	6.76 (4.81, 8.72)
Level of education				
No Education	7.12 (6.05, 8.20)	8.44 (7.54, 9.34)	10.95 (9.97, 11.92)	9.07 (8.47, 9.66)
Up to primary	7.30 (6.22, 8.38)	9.51 (8.20, 10.82)	11.61 (10.15, 13.08)	9.44 (8.68, 10.19)
Middle school completed	6.14 (4.72, 7.56)	9.23 (7.08, 11.39)	18.72 (1.4, 36.04)	10.17 (5.40, 14.95)
Higher secondary and above	5.48 (4.11, 6.86)	12.60 (4.60, 20.60)	13.95 (5.46, 22.45)	9.73 (6.51,12.96)
Occupation				
Currently working	6.18 (5.34, 7.02)	8.91 (6.22, 11.59)	8.20 (7.07, 9.35)	7.47 (6.45, 8.49)
Not working	9.99 (7.64, 12.34)	10.68 (9.25, 12.11)	11.68 (10.67, 12.69)	11.21 (10.42,12.00)
Wealth				
Poor	6.05 (5.10, 7.00)	7.82 (6.82, 8.82)	10.54 (9.43, 11.62)	8.18 (7.55, 8.81)
Middle	7.06 (5.18, 8.93)	8.90 (7.47, 10.32)	10.99 (9.44, 12.54)	9.00 (8.02, 9.98)
Rich	7.19 (6.31, 8.07)	11.62 (7.92, 15.32)	14.18 (9.81, 18.55)	10.91 (9.03, 12.79)
Marital Status				
Currently married	6.34	9.50	10.24	8.41

	(5.75, 6.94)	(7.67, 11.34)	(9.26, 11.23)	(7.68, 9.13)
Never married/Widowed/Divorced/separated	8.91 (6.04, 11.77)	9.22 (7.86, 10.59)	14.08 (10.50, 17.67)	12.04 (9.79, 14.28)
Physical activity				
Physically active	6.57 (5.59, 7.56)	7.71 (6.80, 8.62)	11.80 (6.87, 16.74)	8.09 (6.84, 9.35)
Physically not active	5.50 (4.17, 6.82)	13.45 (3.49, 23.41)	7.99 (6.13, 9.86)	8.74 (5.22, 12.27)
Physically dependent				
Yes	11.29 (7.95, 14.62)	14.02 (10.74, 17.30)	19.26 (11.77, 26.74)	17.02 (12.01, 22.03)
No	11.88 (10.30, 13.45)	12.23 (10.79, 13.67)	14.15 (11.28, 17.02)	13.01 (11.55, 14.46)
Diabetes				
Yes	8.87 (6.88, 10.86)	11.75 (8.76, 14.74)	20.27 (10.46, 30.09)	14.73 (10.11, 19.35)
No	6.50 (5.82, 7.17)	9.10 (7.44, 10.76)	10.52 (9.74, 13.30)	8.64 (8.00, 9.27)
BMI				
Underweight (<18.5)	3.86 (2.81, 4.90)	6.18 (4.83, 7.53)	8.04 (6.66, 9.42)	6.55 (5.67, 7.43)
Normal (18.5 – 24.9)	6.01 (5.29, 6.74)	8.84 (6.30, 11.39)	10.34 (9.40, 11.29)	8.37 (7.48, 9.25)
Overweight (25.0 – 29.9)	8.55 (6.78, 10.32)	10.57 (9.15, 12.00)	18.60 (11.47, 25.73)	11.81 (9.86, 13.76)
Obese (30 & above)	9.83 (7.68, 11.97)	18.16 (12.88, 23.43)	26.86 (7.35, 46.38)	16.84 (11.00, 22.68)
Waist Circumference				
Normal (<0.85)	4.97 (4.34, 5.60)	6.79 (6.00, 7.57)	9.00 (8.07, 9.33)	7.02 (6.52, 7.52)
Increased (>=0.85)	8.35 (7.26, 9.44)	12.12 (9.31, 14.93)	15.44 (11.78, 19.09)	11.76 (10.33, 13.20)
Tobacco				
Yes	4.77 (3.71, 5.82)	7.12 (5.87, 8.37)	9.29 (7.87, 10.71)	6.97 (6.25, 7.68)
No	7.06 (6.32, 7.79)	9.87 (8.13, 11.61)	12.34 (10.35, 14.33)	9.78 (8.89, 10.66)
Alcohol				
Yes	5.13 (4.36, 5.90)	8.10 (7.09, 9.11)	10.13 (9.11, 11.14)	7.94 (7.37, 8.50)
No	7.50 (6.62, 8.38)	10.27 (7.95, 12.60)	13.14 (10.36, 15.92)	10.20 (9.05, 11.36)

Table 2 displays the unadjusted and adjusted logistic regression results. The findings revealed that females are 1.59 times more likely than males to develop arthritis (95 percent CI: 1.50, 1.69). In

the uncorrected model, age was also a significant risk factor, with odds ranging from 1.41 (95 percent CI: 1.31, 1.52) to 1.73 (95 percent CI: 1.61, 1.86). Similarly, the ORs for the unadjusted and adjusted wealth index models ranged from 1.09 (95 percent CI: 1.01, 1.18) to 1.24. (95 percent CI: 1.16, 1.33).The elevated risks in the normal, overweight, and obese groups were 1.25 (95 percent CI: 1.33, 1.38), 1.86 (95 percent CI: 1.68, 2.07), and 2.48 (95 percent CI: 2.19, 2.81), respectively. Diabetics had a 1.54 (95% CI: 1.43, 1.67) higher risk of arthritis than non-diabetics. In the unadjusted model, physical activity had no statistically significant association. In an unadjusted model, smoking and alcohol use were associated with a lower risk of arthritis; however, after model adjustment, the odds were raised with a non-statistically significant relationship.

Table 2: Logistic regression with different risk factors among the Indian population with age above 45 years old

Variables	Un–adjusted OR (95% CI)	Adjusted OR (95% CI
Gender		
Male	Ref	Ref
Female	1.59 (1.50, 1.69)	1.58 (1.47, 1.69)
Age (in years)		
45 – 54	Ref	Ref
55– 64	1.41 (1.31, 1.52)	1.43 (1.32, 1.54)
65 & above	1.73 (1.61, 1.86)	1.89 (1.75, 2.03)
Wealth		
Poor	Ref	Ref
Middle	1.09 (1.01, 1.18)	1.05 (0.96, 1.14)
Rich	1.24 (1.16, 1.33)	1.13 (1.06, 1.21)
Physical activity		
Physically active	Ref	
Physically not active	0.96 (0.86, 1.07)	
Diabetes		
No	Ref	Ref
Yes	1.54 (1.43, 1.67)	1.26 (1.16, 1.36)
BMI		
Underweight (<18.5)	Ref	Ref
Normal (18.5 – 24.9)	1.25 (1.33, 1.38)	1.33 (1.21, 1.47)
Overweight (25.0 – 29.9)	1.86 (1.68, 2.07)	1.93 (1.73, 2.15)
Obese (30 & above)	2.48 (2.19, 2.81)	2.43 (2.13, 2.77)
Tobacco		
No	Ref	Ref
Yes	0.77 (0.71, 0.83)	1.06 (0.96, 1.16)
Alcohol		
No	Ref	Ref
Yes	0.79 (0.74, 0.84)	1.04 (0.97, 1.17)

Physical dependence was more common in arthritis patients, but the risk was reduced in age-gender adjusted models to 1.13 (95 percent CI: 1.02, 1.25) compared to 1.56 (95 percent CI: 1.05, 1.28) in unadjusted models, as shown in table-3.

Table 3: Unadjusted, Age – Gender Adjusted & Fully Adjusted regression analysis of physical dependence with Arthritis and other covariates among Indian population with age >=45 years old

Variables	Unadjusted OR (95% CI)	Age – Gender Adjusted OR (95% CI)	Fully adjusted OR (95% CI)
Arthritis			
No	Ref	Ref	Ref
Yes	1.56 (1.05, 1.28)	1.13 (1.02, 1.25)	1.12 (1.01, 1.24)
Wealth			
Poor	Ref	Ref	Ref
Middle	1.07 (0.97, 1.17)	1.06 (0.97, 1.17)	1.07 (0.95, 1.18)
Rich	1.13 (1.15, 1.22)	1.15 (1.06, 1.24)	1.15 (1.06, 1.25)
Physical activity			
Physically active	Ref		
Physically not active	1.04 (0.90, 1.21)		
Diabetes			
No	Ref	Ref	Ref
Yes	1.37 (1.26, 1.51)	1.31 (1.20, 1.44)	1.31 (1.18, 1.44)
BMI			
Underweight (<18.5)	Ref	Ref	Ref
Normal (18.5 – 24.9)	0.85 (0.77, 0.93)	0.91 (0.84, 1.01)	0.90 (0.82, 0.98)
Overweight (25.0 – 29.9)	0.73 (0.65, 0.82)	0.82 (0.73, 0.93)	0.77 (0.68, 0.87)
Obese (30 & above)	1.00 (0.87, 1.16)	1.17 (1.01, 1.36)	1.08 (0.92, 1.26)
Tobacco			
No	Ref		
Yes	0.97 (0.88, 1.06)		
Alcohol			
No	Ref	Ref	Ref
Yes	1.15 (1.07, 1.24)	1.16 (1.08, 1.25)	1.20 (1.18, 1.44)

Discussion

In order to establish the prevalence and risk factors for osteoarthritis among older Indians, this study analysed secondary data from over 60000 of them. As prior data came from small, locally focused research with little generalizability to the vast and diverse nation of India, this is one of the biggest groups of persons over 45 years old from that country that have been studied for this objective. Among the Indian population over 45, we found that the prevalence of arthritis was roughly 9%. This was significantly lower than the prevalence, which varied from 20% to 40% in some cross-sectional surveys of localised populations in India. [6,9–11] Moreover, this is less than the 22 to 39 percent prevalence range that the Government of India predicted. [7] Additionally, older persons have a greater prevalence of arthritis, according to worldwide data. While one Iranian research discovered a frequency of about 20%, a Framingham cohort study discovered a prevalence of over 30% in comparable age groups. [12,13] The self-reporting nature of the arthritis diagnoses employed in the LASI research, as opposed to syndromic and/or radiographic examinations used by other studies, may be the cause of this discrepancy. In our study, we found that the prevalence of arthritis was much greater in females (11%) than in males (7 percent). While the likelihood of developing arthritis is higher in women, the difference has fluctuated

among research. Women are more prevalent than males by a little margin to as much as twice as frequently, according to a number of studies. [4,6,11–13] Under the age of 50, men have a higher prevalence and incidence than women, but this trend changes once they turn 50, and it becomes less pronounced once they hit 80. [5] Oestrogen withdrawal during menopause might be one such mechanism. [5] After adjusting for age, we found that women were 1.5 times more likely than men to develop arthritis.

Without regard to gender, we also found that prevalence tended to rise with participant age. This is in line with earlier studies by other writers from situations in both India and other countries. [4,6,10,12,13] One of the biggest, if not the biggest, risk factors for arthritis is age. Increased joint laxity and other pathophysiological changes brought on by normal ageing raise the risk of osteoarthritis. [5] The Framingham Study found that the prevalence of knee arthritis rose from 27 percent in people ages 63 to 70 to 44 percent in people over 80. [13] In our study, we discovered that people who live in cities, are currently unemployed, or are financially well off had a higher prevalence of Arthritis. We also discovered that arthritis is more common in people with diabetes, as well as those with a larger waist circumference and obesity. Obesity has been linked to an increased risk of knee osteoarthritis and, to a lesser extent, hip and hand osteoarthritis.[14] Similarly, there has previously been evidence that diabetes is linked to osteoarthritis.[15] Type 2 diabetes is a significant predictor of severe osteoarthritis, regardless of age or BMI, according to cohort studies.[16] Our findings support the idea that a strong metabolic component is involved in the pathogenesis of osteoarthritis. Surprisingly, our study discovered a link between smoking and alcohol consumption and arthritis. Previous research has suggested that smokers have a lower prevalence of osteoarthritis than nonsmokers.[17] This may be due to underreporting of such behavioural

factors in our study because they are associated with social taboo in the Indian population. This subject merits further investigation.

Physical dependence was more common among arthritis patients in our study. However, compared to unadjusted models, this risk was reduced in age-gender adjusted models. It stands to reason that arthritis would limit mobility and activity, resulting in function dependency. A variety of research designs have established an unequivocal role for osteoarthritis in functional limitations and disability.[18] While our study's large sample size and comprehensive assessment of risk factors are key strengths, it does have some limitations. Because the study relied on a self-reported measure of arthritis, findings may have been underreported. Because the study was observational in nature, cause and effect interpretations were not possible.

Finally, we discovered that arthritis is a major concern in older Indians, with a community-based prevalence of around 9%. Urban residence, higher socioeconomic status, female gender, increasing age, obesity, and diabetes were all linked to an increased risk of arthritis in people over the age of 45. Arthritis is also associated with decreased functional ability in older adults, both independently and significantly.

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