

## Original Research Article

# Community based cross sectional study: to assess the prevalence of arthritic symptoms in an army garrison in large city of North India

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## ABSTRACT

**Background:** Arthritis affects almost 350 million people globally and is one of the leading causes of disability in the world. The prevalence in India is like that in developed countries. Symptoms of arthritis have been found to be influenced by alcohol intake, smoking, obesity and type of diet which lead to aggravation in pain, exacerbation in disease activity and deterioration in general health.

**Methods:** Present community-based cross-sectional study was conducted in a large military station in North India over a period of one month. Armed Forces personnel and their family members aged 18 yrs and above residing in military station and consenting to the study were included. A sample of 1475 was studied.

**Results:** The age of participants ranged from 18 to 70 yrs (median 32±7.4 yrs) with 20.54% females and 79.46% males. The prevalence of symptoms suggestive of Gout, RA, OA and Spondyloarthritis was 8.95% (95% CI, 7.54, 10.52), 3.25% (2.41, 4.29), 11.32% (9.75, 13.05) and 14.17% (12.43, 16.05), respectively. Symptoms suggestive of RA were found to be significantly associated with female gender, those of Gout and Spondyloarthritis with male gender, while OA did not have any gender predisposition.

**Conclusions:** The population with symptoms of arthritis needs to be identified early by early symptomatic diagnosis and measures instituted for appropriate management to prevent future complications and associated morbidity.

**Keywords:** Gender, Gout, Rheumatoid arthritis, Spondyloarthritis, Osteoarthritis

## INTRODUCTION

Arthritis refers to swelling or inflammation of the one or more joints in the body. It encompasses several conditions and belongs to the class of Connective tissue diseases which affect joints, tissues around the joints and other connective tissues of the body.<sup>1</sup> It mainly causes symptoms of pain and stiffness in the joints. Different types of arthritis are: Osteoarthritis (OA)- most common type of arthritis related to ageing or injury; Rheumatoid Arthritis (RA)- most common form of autoimmune

arthritis in which the body's immune system attacks the healthy cells; Juvenile Arthritis (JA) occurs in children; Gout- occurs when excess uric acid in the body gets deposited in the joints and leads to painful swelling usually starting from the big toe; Spondyloarthropathy-group of joint diseases affecting the vertebral column.<sup>2,3</sup>

Arthritis affects almost 350 million people globally and is one of the leading causes of disability in the world.<sup>4</sup> According to the 2010 Global Burden of Disease (GBD) study, 19.2% of all years lived with disabilities (YLDs) in

Low-middle income countries were accounted for by musculoskeletal diseases.<sup>5</sup> This leads to further financial burden in such countries affecting the ability of the people to be productive and also seek medical care for this disease.

A study done to assess the effects of arthritis and gender on pain estimated 72% more average daily pain in women as compared to men. It further revealed that RA patients, regardless of gender reported more daily pain.<sup>6</sup>

Symptoms of arthritis have been found to be influenced by alcohol intake, smoking, obesity and type of diet which lead to aggravation in pain, exacerbation in disease activity and deterioration in general health.<sup>7-10</sup>

A COPCORD (Community oriented program from control of rheumatic diseases) survey in India revealed that a significantly large population of rural India was suffering from RMSD (rheumatic-musculoskeletal symptoms/diseases).<sup>11</sup>

The prevalence of RA in India is similar to that in developed countries and higher than that reported from China, Indonesia, Philippines and rural Africa. These findings are based on the fact that the north Indian population is genetically closer to the Caucasians than to other ethnic groups.<sup>12</sup>

Since this disease is associated with social and personal disadvantage and affects the socio-economic condition of the patient, it is pertinent to identify early the people who complain of early signs of various types of arthritis so that adequate preventive and curative measures can be taken to avoid worsening of this condition. Thus, this study was conducted to assess the prevalence of arthritic symptoms in the community with a simple to administer tool with the objectives to estimate the prevalence of arthritic symptoms in an Army garrison and to assess the epidemiological determinants associated with arthritic symptoms.

## METHODS

Study setting - Present community-based cross-sectional study was conducted in a large military station in North India over a period of one month i.e. between October 2017 to November 2017.

### Inclusion criteria

- Armed Forces personnel and their family members aged 18 yrs and above residing in military station and consenting to the study were included.

### Exclusion criteria

- Those with documented debilitating diseases and psychiatric problems were excluded from the study.

Sample size based on an expected prevalence of joint pain as 75%, a sample size of 1300 with precision between 2-3% and 95% CI was calculated using N masters sample size calculator. A sample of 1475 was studied.

### Data collection

An abbreviated questionnaire validated by clinical experts in the field of immunology was pilot tested in the same community with a sample of 30 and then administered to the community via interview technique after informed consent. Confidentiality of participants was maintained.

### Statistical analysis

SPSS 20 Statistical Software was used for analysis of data. Data were presented as frequency (percentage). Chi-square test was used to test the association of symptoms with demographic and lifestyle factors and Chi square trend analysis was done for age and symptoms of arthritis. A p value of <0.05 was considered as statistically significant.

## RESULTS

### Demographic profile of participants

The age of participants ranged from 18 to 70 yrs (median 32±7.4 yrs) out of which maximum number of subjects belonged to the age group 28-38 yrs. Among the 1475 respondents, 303 were females (20.54%) and 1172 (79.46%) males. Majority of the participants (68.4%) were consuming non-vegetarian diet, 77.63% were not consuming alcohol and about 10.24% were smokers. (Table 1).

**Table 1: Demographic profile of participants.**

Attributes	Response	Frequency	Percentage
Age groups	18-28	397	26.92
	29-38	778	52.75
	39-48	264	17.90
	49-58	22	1.49
	>58	14	0.95
Gender	Female	303	20.54
	Male	1172	79.46
Diet	Non-veg	1005	68.14
	Veg	470	31.86
Alcoholic	No	1145	77.63
	Yes	330	22.37
Smoker	No	1324	89.76
	Yes	151	10.24

### Frequency of suggestive symptomatology of arthritis

8.95% (95% CI, 7.54, 10.52) had symptoms of pain and swelling in multiple joints in their body suggestive of

gouty arthritis and 51.52% of these suffered from severe pain, which affected their physical functions. 3.25% (95% CI, 2.41, 4.29) respondents provided history of pain in the joints of their hands suggestive of symptoms of RA and 77.08% of these claimed this swelling to be most pronounced during the morning hours. Pain in their knees while walking was experienced by 11.32% (95% CI, 9.75, 13.05) complained of having pain in their knees while walking suggestive of osteoarthritis, and 31.14% of

these said that this pain was also associated with swelling in their knee joints. History of low back ache was provided by 14.17% (95% CI, 12.43, 16.05) and 64.11% among them also said that they had at least one male member in their family who also suffered from similar pain in the lower back. This symptomatology along with such specific family history is suggestive of Spondyloarthritis.

**Table 2: Association between gender and suggestive symptoms of arthritis.**

Symptoms of arthritis				
<b>Gout</b>				
Gender	Pain and swelling in joints (n=1475)	p	Pain very severe (n=132)	p
Female	41	0.002	23	0.480
Male	91		45	
Total	132		68	
<b>Rheumatoid arthritis</b>				
Gender	Pain and swelling in hands (n=1475)	p	Swelling in morning? (n=48)	p
	YES	0.000	Yes	0.001
Female	26		15	
Male	22		22	
Total	48		37	
<b>Osteoarthritis</b>				
Gender	Pain in knees while walking (n=1475)	p	Pain accompanied with swelling (n=167)	p
	Yes	0.665	Yes	0.000
Female	38		24	
Male	129		28	
Total	167		52	
<b>Spondyloarthritis</b>				
Gender	Pain in low back (back pocket pain) (n=1475)	p	Any other male member has this type of pain in the family? (n=209)	p
	Yes	0.000	Yes	0.000
Female	70		30	
Male	139		104	
Total	209		134	

**Table 3: Association between gender and suggestive symptoms of arthritis.**

Disease/age group	Gout	Rheumatoid arthritis	Osteoarthritis	Spondyloarthritis
18-28	19	10	29	42
29-38	77	29	96	119
39-48	27	6	33	35
49-58	3	0	5	6
>58	6	3	4	7
Total	132	48	167	209
Chi sq for trend; p value	18.45; 0.001	1.55; 0.213	11.18; 0.001	10.03; 0.001

#### **Association between gender and suggestive symptoms of arthritis**

Symptoms of pain and swelling in joints suggestive of Gouty arthritis were found to be more amongst males as

compared to females (p=0.002) though the severity of pain had no significant association with either gender. The symptoms of pain and swelling in the hands (suggestive of RA) were found to be more amongst females as compared to males (p=0.000), while the occurrence of this swelling

during the morning time was found more in males ( $p=0.001$ ). Symptoms suggestive of OA were not found to be significantly associated with either gender. Symptoms of low back ache suggestive of Spondyloarthritis were higher in males ( $p=0.000$ ) with significant association between this and family history of similar symptoms in a male family member ( $p=0.000$ ) (Table 2).

#### **Association between Age and suggestive symptoms of arthritis**

Chi square for trend showed that all conditions showed an increasing trend with age ( $p=0.001$ ) except Rheumatoid arthritis ( $p=0.213$ ) (Table 3).

#### **Association between suggestive symptoms of spondyloarthritis and smoking**

It was found that smokers were more likely to have symptoms of low back ache and this association was statistically significant ( $p=0.001$ ). No suggestive symptoms of arthritis were found to be significantly associated with smoking.

**Table 4: Risk of developing arthritis.**

<b>Risk factors</b>			
<b>Gout</b>			
Pain and swelling in joints	Pain very severe		p
	No	Yes	
No	1338	5	0.000
Yes	69	63	
<b>Rheumatoid arthritis</b>			
Pain and swelling in hands	Swelling in the morning?		p
	No	Yes	
No	1418	9	0.000
Yes	20	28	
<b>Osteoarthritis</b>			
Pain in knees while walking	Pain accompanied with swelling		p
	No	Yes	
No	1302	6	0.000
Yes	121	46	
<b>Spondyloarthropathy</b>			
Pain in low back (back pocket pain)	Any other male member in family with this type of pain		p
	No	Yes	
No	1182	84	0.000
Yes	159	50	

#### **Risk of developing arthritis**

Out of the total respondents, 63 gave history of having pain and swelling in their joints with the severity of pain being very high. These individuals were found to have significantly higher possibility of developing and being diagnosed with Gout. Among the participants, 28 gave

history of having pain in their hands which was associated with swelling in the morning.

These individuals were found to have significantly higher possibility of developing and being diagnosed with RA. Out of 1475 participants, 46 gave history of having pain in knees while walking which was associated with swelling. These individuals were found to have significantly higher chance of developing and being diagnosed with OA.

About 50 respondents complained of having low back ache as well as a male member in the family who had similar complaints. These individuals were found to have significantly higher chance of developing and being diagnosed with Spondyloarthritis (Table 4).

## **DISCUSSION**

This study finding of symptoms suggestive of Gouty arthritis significantly associated with the male gender were also observed while analysing the findings of the Framingham study and it was found that about 2.8% men and 0.4% women gave history of attacks of gouty arthritis.<sup>13</sup> Another population-based study conducted in Minnesota found incidence of gout in males almost three times more than that in females.<sup>14</sup> A study done to assess the prevalence and incidence of the diagnosis of gout in Great Britain also found greater prevalence of gout in men in comparison to women.<sup>15</sup>

These study finding of higher prevalence of symptoms suggestive of RA among females as compared to males is similar to a study conducted on the patients from the BARFOT (for "Better Anti-Rheumatic Pharmacotherapy"), which found that even though the extent of joint destruction was same at the radiographic level, women had greater sense of pain and had worse Disease Activity Score-28 (DAS28).<sup>16</sup> Another study found that women were more likely to develop RA due to genetic, environmental and hormonal factors because they possessed higher disease activity markers such as Disease Activity Score-28 (DAS28) which put them at higher risk of having RA.<sup>17</sup> Another study shows that there is faster deterioration in disease activity in women as per the Health Assessment Questionnaire (HAQ) and a generally lower rate of remission in early RA affected women.<sup>18</sup>

It was also observed in the present study that symptoms suggestive of OA were significantly associated with the male gender. This was however in contrast to findings in other studies. A narrative review to assess the gender influence on OA patients found that women had more severe symptoms, a more advanced stage and a greater disability.<sup>19</sup> Another study done in USA revealed that women with OA suffered from greater physical disability and pain in comparison to men.<sup>20</sup> Another research conducted to find the gender differences in the prevalence of OA in North America found that women were more

likely to suffer from severe knee arthritis in comparison to men, even though there may be no variation in the presentation of the disease among both the genders.<sup>21</sup> A meta-analysis of sex differences of OA showed that men had significantly lower risk of developing RA in comparison to women, and the risk in women significantly increased further post-menopausally.<sup>22</sup>

In addition to this, the present study found that symptoms suggestive of Spondyloarthritis were significantly associated with the male gender. Spondyloarthritis has been known to be a male predominant disease. A study conducted on the Spondyloarthritis Caught Early Cohort showed that men were more likely to develop it at a younger age in comparison to women and also were at a higher risk of being diagnosed with Spondyloarthritis.<sup>23</sup> Another study conducted in China showed that men were more likely to develop Spondyloarthritis at a younger age and have more morning stiffness due to Spondyloarthritis.<sup>24</sup> However, many newer studies are coming up with evidence of more females being afflicted with this disease, such as the study done on a multicenter French cohort of patients which revealed that in comparison to men, women had worse disease activity and physical functioning in spite of having lesser radiological deformity.<sup>25</sup> These differences in manifestations may be due to different genetic, hormonal and immunological responses in females.<sup>26</sup>

The present study found prevalence of smoking as 10.24%. In particular, smoking was found to be significantly associated with symptoms suggestive of Spondyloarthritis. Many studies show a deleterious effect of smoking on arthritis. A study conducted on the early RA cohort of subjects enrolled in the EIRA in which participants were started on methotrexate therapy on inclusion in the study. It was observed that active smokers had achieved less than desirable response to treatment after 3 months. The inverse relationship between smoking and good response to treatment was found to be significant.<sup>10</sup>

In the present study, authors found that 22.37% of respondents accepted to consumption of alcohol, although no significant association was found between various symptoms and consumption of alcohol in this study. This is in conjunction with another study conducted among 1244 participants from the EAC cohort in Netherlands, which confirmed that consumption of alcohol had no association with the severity of inflammation in hand and foot joints of patients with RA as seen on MRI.<sup>7</sup>

Authors found that majority (68.14%) of the respondents in this study were non-vegetarians, though no significant association was found between diet and arthritic symptoms in this study. However, it was observed that high adherence to plant-based diet decreased the odds of developing RA by about 21%. This was even more

pronounced in males whereas no significant association was found among females.<sup>9</sup>

This study findings of an increasing trend by age for gout, osteoarthritis and spondyloarthritis are in consonance with a statistic from USA which shows that from 2013-2015 people who were  $\geq 65$  yrs of age had maximum (49.6%) prevalence of arthritis.<sup>27</sup>

## CONCLUSION

The symptoms suggestive of Gout and Spondyloarthritis were found to be significantly associated with the male gender and symptoms suggestive of RA were significantly associated with the female gender.

Since authors have studied the symptoms that are suggestive of different types of arthritis in this study, it is suggested that on the basis of this, early symptomatic diagnosis can be done for these diseases in the community which may help in treating these patients on time and preventing future complications and morbidity.

The data from this study are a small representation of the population. Therefore, a larger representative population is needed to draw conclusions about the prevalence of various forms of arthritis, the factors which influence them and ways to prevent their onset.

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