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ORIGINAL ARTICLE

Prevalence of osteoarthritis in rural areas of Iran: a WHO-ILAR COPCORD study

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Abstract

Aim: To estimate the prevalence of osteoarthritis (OA) of different joints in rural areas of Iran.

Methods: From five villages of Tuyserkan County, 1565 individuals were randomly selected and were interviewed to complete the Community Oriented Programme for Control of the Rheumatic Diseases (COPCORD) Core Questionnaire. Among these cases 1192 cases with rheumatic complaints were examined by a rheumatologist and laboratory and radiology tests were performed if necessary for the diagnosis. Definition of OA in various joints, were based on American College of Rheumatology (ACR) criteria.

Results: About 20% of the study population had OA in at least one of their joints. Prevalence of OA in the knee joint was 19.34%, in hand joins was 2.66% and in the neck was 2.21%. The most common findings on physical examination of patients with knee OA, hand OA and neck OA were bony crepitus (88.9%), Heberden's nodes (73.2%) and pain on movement (59.9%), respectively.

Conclusions: This study revealed that OA in rural areas of Iran was more frequent in comparison with urban areas of Iran. Moreover, the prevalence of OA in rural areas of Iran was higher in comparison with prevalence of OA in rural areas of other Asian countries. Similar to previous studies OA was more frequently detected in the knee joint.

Key words: COPCORD, Iran, osteoarthritis, prevalence, rural area.

INTRODUCTION

Musculoskeletal disorders are major world-wide concerns in the healthcare system. These disorders enforce a heavy burden due to physical and functional disabilities and significantly affect quality of life.[1,2] In order to attract more attention to these conditions, the World Health Organization (WHO) named the first decade of the third millennium as the "Bone and Joint Decade".[3]

Osteoarthritis (OA) is the most common documented cause of disabilities in the elderly population.[4,5] Major risk factors for development of OA are age, gender, joint location, obesity, joint malalignment, trauma and genetic predisposition.[6–11] With regard to improved life expectancy and the increased number of elderly, OA has become an important medical challenge in both developed countries and developing regions.[12]

Community Oriented Programme for Control of the Rheumatic Diseases (COPCORD) is a cost-effective study designated by WHO-ILAR (international League Against Rheumatism) to be conducted in urban and rural areas in developing countries.[13] According to the first COPCORD study in urban areas of Iran, the prevalence of OA was 16.6%.[14]

Considering the different risk factors and life styles in rural and urban areas, a COPCORD study was conducted in rural areas of Tuyserkan County, Iran. The

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objective of the current study is to estimate the prevalence of OA in rural areas of Iran.

METHODS

The study was conducted in five villages of Tuyserkan County in September 2006. The study population comprised 1814 residents (15 years and older) who were randomly selected from the villages of Faryazan, Arikan, Mahmood-Abad, Karim-Abad and Sootlagh.

Data collection was performed by trained interviewers from the Iran COPCORD study team. Interviews were conducted in local primary health centers of each village. Rural health workers (Behvarz) informed study subjects and arranged their appointments. If individuals did not participate in their first and second appointment, the interviewer performed the interview in their house. Patients with musculoskeletal complaints, oral/genital aphthosis or a documented history of rheumatologic disease, underwent physical examination by a rheumatologist.

After physical examination, para-clinical investigations were performed if needed. In total, 1565 cases from 600 families were interviewed. Among these cases, 1214 individuals needed rheumatologic examinations, of which 1190 cases were examined by a rheumatologist (24 persons did not participate). The definitions applied in our study for OA of various joints were based on American College of Rheumatology (ACR) criteria.[15]

Data were recorded in Access program (Microsoft), and analyzed using Stata 8 software (StataCorp, College Station, TX, USA). Twenty-four individuals who did not participated in the physical examination phase, were excluded from the prevalence calculations of OA in different joints. If the number of cases in an age-sex category was less than 20, Poisson regression for survey data was applied. Details of sampling and analysis procedures have been explained in the article by Davatchi *et al.*[16]

RESULTS

The observed population comprised of 55.1% female and 44.9% male cases. Mean age of the observed population was 38.4 ± 18.5 years (mean ± SD). Approximately 54% of the observed population had an elementary school degree or lower educational level. Since a number of the population had more than one job at one time or their job changed on seasonal bases, their complete occupational history was accurately registered. Excluding housekeeping, 65.3% of the studied population mentioned farming and animal husbandry, 26% carpet making, and 18.3% working as laborers in their current or previous occupation.

Among the studied population, 316 cases (20.5%) had OA in at least one of their joints (Table 1). In 58 patients, more than one joint was involved. In all age categories the prevalence of OA was higher among the female population with the exception of the age group 15–29 years old.

OA in knee joint had the most frequent prevalence (19.34%). Hand OA (2.66%) and neck OA (2.21%) were in second and third ranks, respectively (Tables 2–4). In addition, two female patients had OA in the hip joint (0.13, 95%, CI: 0.01–1.33%).

Among patients with knee OA, the most common complaint was pain in the knee joint, which was observed in 85.6% of this group. Pain was also the most commonly mentioned complaint by patients with hand OA (53.7%) and neck OA (88.2%).

The most common findings in physical examination of knee OA patients were bony crepitus (88.9%), bony swelling (22.8%) and pain on movement (17.4%) (Fig. 1).

Table 1 Prevalence of osteoarthritis (at least in one joint) stratified by age and gender

Age category	Male		Female		Both genders	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
15–29	1.32	0.15–11.40	0.86	0.09–8.15	1.07	0.26–4.51
30–39	2.65	0.78–8.99	10.0	0.96–19.04	6.72	2.39–11.04
40–49	16.90	3.59–30.21	38.76	20.07–57.44	31	14.93–47.07
50–59	32.93	28.73–37.12	53.46	41.31–65.62	44.26	35.84–52.69
60–69	51.51	27.56–75.47	53.75	40.95–66.54	52.74	37.40–68.08
≥ 70	64.28	56.23–72.34	69.23	41.43–97.03	66.67	52.65–80.68
All ages	16.81	14.94–18.68	23.50	16.75–30.25	20.51	17.31–23.70

Table 2 Prevalence of knee osteoarthritis (unilateral or bilateral) stratified by age and gender

Age category	Male		Female		Both genders	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
15–29	0.66	0.11–3.90	0.86	0.09–8.15	0.77	0.22–2.70
30–39	1.77	0.21–14.83	7.86	0.33–15.38	5.14	1.49–8.79
40–49	15.49	5.64–58.42	37.98	18.32–57.65	30.0	12.67–47.33
50–59	29.27	24.84–33.70	53.46	41.31–65.62	42.61	34.24–51.01
60–69	45.45	23.90–67	52.5	38.50–66.50	49.31	35.02–63.61
≥ 70	62.5	54.13–70.87	67.31	37.94–96–67	64.81	49.01–80.61
All ages	15.07	13.70–16.44	22.80	16.01–29.59	19.34	16.17–22.51

Table 3 Prevalence of hand osteoarthritis stratified by age and gender

Age category	Male		Female		Both genders	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
15–29	0	–	0	–	0	–
30–39	0	–	0.71	0.08–6.53	0.39	0.04–3.46
40–49	0	–	1.55	0.31–7.62	1.0	0.22–4.55
50–59	3.66	1.32–6.0	10.89	6.64–15.14	7.65	4.59–10.71
60–69	4.54	1.48–13.94	12.5	4.41–35.46	8.90	3.13–25.28
≥ 70	10.71	2.34–49.13	9.61	3.08–29.98	10.18	2.83–36.67
All ages	1.74	0.49–6.11	3.41	0.69–6.12	2.66	0.28–5.04

Table 4 Prevalence of neck osteoarthritis stratified by age and gender

Age category	Male		Female		Both genders	
	Percent	95% CI	Percent	95% CI	Percent	95% CI
15–29	0.66	0.03–12.29	0	–	0.31	0.01–6.49
30–39	0.88	0.05–15.70	2.86	0.70–11.64	1.98	0.55–7.06
40–49	1.41	0.13–14.81	3.10	0.39–24.67	2.5	0.58–10.77
50–59	4.88	0.99–8.76	0.99	0.04–25.28	2.73	1.31–4.16
60–69	10.61	2.96–37.96	6.25	1.58–24.64	8.22	2.33–29.04
≥ 70	5.36	1.65–17.36	3.85	66.93–22.10	4.63	1.30–16.45
All ages	2.61	1.62–3.59	1.88	0.64–5.49	2.21	0.66–3.75

In patients with hand OA, clinical findings comprised of Heberden's nodes (73.2%), Bouchard's nodes (46.3%), bony enlargement (9.8%), pain on movement (7.3%) and hand deformity (4.9%) (Fig. 2).

In patients with neck OA, clinical findings included pain on movement (59.9%), extension limitation (26.5%), flexion limitation (11.8%), rotation limitation (14.7%), lateral flexion limitation (26.5%) and lordosis (2.9%) (Fig. 3).

DISCUSSION

Our results demonstrated the high prevalence of OA in the observed rural communities in Iran. Approximately 50% of females older than 50 years and 50% of males older than 60 years manifested OA. Comparison of current study results with those of a previous study in urban areas of Iran, demonstrated that the prevalence of OA in rural area residents was slightly higher than urban inhabitants (20.5% in Tuyserkan villages *vs.* 16.6% in Tehran). In general, it has been proposed that work load, nutritional status and longevity are three major factors responsible for different patterns of knee OA in urban and rural communities.[17] Moreover, in comparison with other COPCORD studies from the Asia-Pacific region, such as in Thailand (11.3%), Australia (8.2%), Bangladesh (7.5%), India (6.3%), Taiwan (10.9%), Pakistan (3.6%) and Philippines (2.8%),

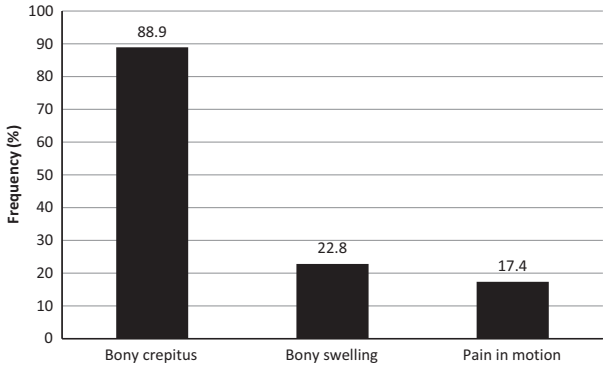

Figure 1 Frequency of different clinical findings in patients with knee osteoarthritis.

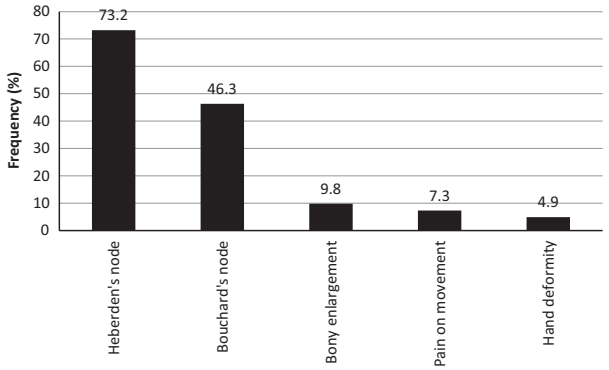

Figure 2 Frequency of different clinical findings in patients with hand osteoarthritis.

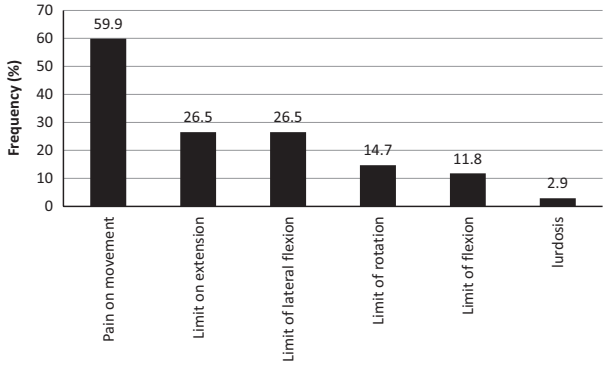

Figure 3 Frequency of different clinical findings in patients with neck osteoarthritis.

the prevalence of OA in the rural areas of Iran is noticeably higher.[18–22] Studies in Japan and Italy on rural inhabitants over 65 years old, found out OA in 33.4% and 38.3% of thepopulation, respectively.[23,24]

Our current study revealed that OA of knee joint in the Tuyserkan rural area was more frequent in comparison with the urban area of Tehran (19.34 *vs*. 15.34%).[14] The preponderance of OA in rural areas may be partly related to occupational profile and life style of inhabitants. Life in rural areas is more reliant on physical activity and dominant rural occupations such as carrying heavy loads and walking long distances every day. Similarly, Joshi *et al.*, revealed the higher rate of OA in rural versus urban inhabitants in India after adjusting their data for age and sex. According to Joshi *et al.*, this difference was related to the higher number of elderly population in the rural community.[18]

Furthermore, the current study revealed the higher prevalence of OA in women than men (23.5 *vs*. 16.81%). This pattern is compatible with some other surveys in other countries.[22,25] A body of evidence has addressed postmenopausal estrogen deficiency as the cause of higher prevalence of OA in female patients after age of 50.[26]

Our study aimed to investigate the status of OA among rural inhabitants of Iran. This study provides an estimate of this OA prevalence, although future studies are warranted to precisely determine the impact of OA in rural areas of this country.

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REFERENCES

1 Arden N, Nevitt MC (2006) Osteoarthritis: epidemiology. *Best Pract Res Clin Rheumatol* **20**, 3–25.
2 Kalla AA, Tikly M (2003) Rheumatoid arthritis in the developing world. *Best Pract Res Clin Rheumatol* **17**, 863–75.
3 Woolf AD (2000) The bone and joint decade 2000–2010. *Ann Rheum Dis* **59**, 81–2.
4 LaPlante MP (1991) The demographics of disability. *Milbank Q* **69** (Suppl. 1–2), 55–77.
5 Badley EM, Rasooly I, Webster GK (1994) Relative importance of musculoskeletal disorders as a cause of chronic health problems, disability, and health care utilization: findings from the 1990 Ontario Health Survey. *J Rheumatol* **21**, 505–14.

6 Martin JA, Buckwalter JA (2002) Aging, articular cartilage chondrocyte senescence and osteoarthritis. *Biogerontology* **3**, 257–64.
7 Anderson JJ, Felson DT (1988) Factors associated with osteoarthritis of the knee in the first national Health and Nutrition Examination Survey (HANES I). Evidence for an association with overweight, race, and physical demands of work. *Am J Epidemiol* **128**, 179–89.
8 Felson DT, Zhang Y, Hannan MT *et al.* (1995) The incidence and natural history of knee osteoarthritis in the elderly. The Framingham Osteoarthritis Study. *Arthritis Rheum* **38**, 1500–5.
9 MacGregor AJ, Antoniades L, Matson M, Andrew T, Spector TD (2000) The genetic contribution to radiographic hip osteoarthritis in women: results of a classic twin study. *Arthritis Rheum* **43**, 2410–6.
10 Loughlin J (2001) Genetic epidemiology of primary osteoarthritis. *Curr Opin Rheumatol* **13**, 111–6.
11 Fischer FM, Bellusci SM, Teixeira LR *et al.* (2002) Unveiling factors that contribute to functional aging among health care shiftworkers in Sao Paulo, Brazil. *Exp Aging Res* **28**, 73–86.
12 Laslett LL, Quinn SJ, Winzenberg TM *et al.* (2012) A prospective study of the impact of musculoskeletal pain and radiographic osteoarthritis on health related quality of life in community dwelling older people. *BMC Musculoskelet Disord* **13**, 168.
13 Chopra A (2004) COPCORD – an unrecognized fountainhead of community rheumatology in developing countries. *J Rheumatol* **31**, 2320–2.
14 Davatchi F, Jamshidi AR, Banihashemi AT *et al.* (2008) WHO-ILAR COPCORD study (stage 1, urban study) in Iran. *J Rheumatol* **35**, 1384.
15 Altman R, Alarcon G, Appelrouth D *et al.* (1991) The American College of Rheumatology criteria for the classification and reporting of osteoarthritis of the hip. *Arthritis Rheum* **34**, 505–14.
16 Davatchi F, Tehrani Banihashemi A, Gholami J *et al.* (2009) The prevalence of musculoskeletal complaints in a rural area in Iran: a WHO-ILAR COPCORD study (stage 1, rural study) in Iran. *Clin Rheumatol* **28**, 1267–74.
17 Haq SA, Davatchi F (2011) Osteoarthritis of the knees in the COPCORD world. *Int J Rheum Dis* **14**, 122–9.
18 Joshi VL, Chopra A (2009) Is there an urban-rural divide? Population surveys of rheumatic musculoskeletal disorders in the Pune region of India using the COPCORD Bhigwan model. *J Rheumatol* **36**, 614–22.
19 Zang CH, Zeng QY, Li XF *et al.* (2006) A cross-sectional population survey of knee osteoarthritis in Taiyuan region. *Zhonghua Nei Ke Za Zhi* **45**, 533–6.
20 Farooqi A, Gibson T (1998) Prevalence of the major rheumatic disorders in the adult population of north Pakistan. *Br J Rheumatol* **37**, 491–5.
21 Wigley R, Manahan L, Muirden KD *et al.* (1991) Rheumatic disease in a Philippine village. II: a WHO-ILAR-APLAR COPCORD study, phases II and III. *Rheumatol Int* **11**, 157–61.
22 Haq SA, Darmawan J, Islam MN *et al.* (2005) Prevalence of rheumatic diseases and associated outcomes in rural and urban communities in Bangladesh: a COPCORD study. *J Rheumatol* **32**, 348–53.
23 Mannoni A, Briganti MP, Di Bari M *et al.* (2003) Epidemiological profile of symptomatic osteoarthritis in older adults: a population based study in Dicomano, Italy. *Ann Rheum Dis* **62**, 576–8.
24 Horikawa K, Kasai Y, Yamakawa T, Sudo A, Uchida A (2006) Prevalence of osteoarthritis, osteoporotic vertebral fractures, and spondylolisthesis among the elderly in a Japanese village. *J Orthop Surg (Hong Kong)* **14**, 9–12.
25 Anagnostopoulos I, Zinzaras E, Alexiou I *et al.* (2010) The prevalence of rheumatic diseases in central Greece: a population survey. *BMC Musculoskelet Disord* **11**, 98.
26 Wluka AE, Cicuttini FM, Spector TD (2000) Menopause, oestrogens and arthritis. *Maturitas* **35**, 183–99.