ORIGINAL ARTICLE

Epidemiology of rheumatic diseases in Iran from analysis of four COPCORD studies

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Abstract

Aim: To calculate the epidemiology of Rheumatic Diseases in Iran.

Materials and Methods: The data of Tehran, Zahedan, Sanandaj (urban) and Tuyserkan (rural) stage Community Oriented Program for the Control of Rheumatic Diseases (COPCORD) studies were gathered. The data were adjusted to the population number of the studied areas to represent Iran.

Results: The population of Iran is 75 149 669 (71.5% urban areas, males 50.4%) and of the mentioned area were respectively 10 000 000, 580 071, 311 444 and 109 262. The interviewed subjects were 10 291, 1565, 2100 and 5830. Male/female ratio was 0.9/1, 0.8/1, 08/1 and 0.8/1.

Musculoskeletal complaints during the past 7 days (people aged ≥ 15 years) were detected in 44.7% of subjects. They were: shoulder 15.6%, wrist 10.4%, hands and fingers 10.2%, hip 8.3%, knee 27.4%, ankle 12.3%, toes 6.2%, cervical spine 14.2% and dorsolumbar spine 23.7%. Osteoarthritis (OA) was detected in 16.9%: knee 15.5%, hands 2.9% and hip 0.32%. Low back pain was found in 15.7%, sciatica in 0.94%, and soft tissue rheumatism in 4.6% (shoulder tenosynovitis 2.5%, frozen shoulder 0.56%, tennis elbow 1.2%, golf elbow 0.48%, de Quervain tenosynovitis 0.24%, trigger finger 0.2%, carpal tunnel syndrome 1.3%). Rheumatoid arthritis was detected in 0.37%, seronegative spondyloarthropathy in 0.24%, ankylosing spondylitis in 0.12%, systemic lupus erythematosus in 0.06%, Behcet's disease in 0.08%, fibromyalgia in 0.79% and gout in 0.13%.

Conclusion: Compared to other COPCORD reports (17 countries), Iran gets the following rank: musculoskeletal complaints second, low back pain fourth, osteoarthritis second, knee osteoarthritis third, soft tissue rheumatism sixth, rheumatoid arthritis tenth, seronegative spondyloarthropathies fifth, gout eleventh and fibromyalgia fifth.

Key words: COPCORD, epidemiology of rheumatic diseases, general epidemiology studies, osteoarthritis, soft tissue rheumatism.

INTRODUCTION

COPCORD, standing for the Community Oriented Program for Control Of Rheumatic Diseases, was created in 1983 by the WHO (World Health Organization) with the collaboration of ILAR (International League of Association for Rheumatology). The program was created for the recognition, prevention and the control of rheumatic disorders in developing countries. The program was designed for countries with small monetary and material resources. COPCORD has three stages: (I) prevalence of rheumatic disorders and identification of risk factors; (II) education of primary health care physicians, paramedical professionals and the community;

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and (III) improved health care and environmental etiologic research of the rheumatic diseases.[1]

A pilot COPCORD study started in Iran on 3 October, 2003 and gathered randomly the data of 129 patients.[2] The first real COPCORD study[1] started in Tehran (stage I, urban study) on 27 February, 2004, following a pilot study. On 27 February, 2007, the next study, a rural study (stage I),[3] started in the northwest of Iran, in five villages of the Tuyserkan county. The study was done in 2009. The third study was done in the southeast of Iran, in the city of Zahedan[4] (stage I, urban study) in 2009. The fourth study was done in Sanandaj[5], in the northwest of Iran (stage I, urban study) in 2012. A fifth study has just been finished, in the Center of Iran. The study is in Zoroastrian ethnicity, which are solely of Caucasian race. The study is at the stage of statistical calculations, and not yet ready for publication.

Twenty countries have participated up to now in the COPCORD project. They are, alphabetically, Australia,[6,7] Bangladesh,[8–10] Brazil,[11,12] Brazil, Chile and Mexico,[13] China,[14–18] Cuba,[19] Guatemala,[20] India,[21–24] Indonesia,[25–28] Iran[1–5,10,29–36] Kuwait,[37] Lebanon,[38] Malaysia,[39] Mexico,[40,41] Pakistan,[42] Philippines,[43–45] Taiwan,[46] Thailand,[47] Venezuela[48] and Vietnam.[49]

The aim of this study is to foresee the prevalence of rheumatic diseases in Iran by calculating and adjusting the available COPCORD data of Iran from Tehran, Tuyserkan, Zahedan and Sanadaj.

MATERIALS AND METHODS

The population of Iran is 75 149 669. The urban population is 71.5%, which totals 53 732 034. The rural population is 28.5%, which totals 21 417 634. Tehran, the site of the first study, is growing quickly and is much larger than three decades ago. Many rural sites have been integrated into the city during these years. Therefore, Tehran has a population going from 8.4 million in the city to 11.4 million for the wider metropolitan area. Among the 50 clusters (from 22 districts of Tehran) that were studied, nine were from the wider metropolitan area. We based our calculations on a number of 10 million inhabitants, taking in account those clusters from the wider metropolitan area. The number of interviews was 10 291. The population of the second site, villages of the Tuyserkan province, was 109 262. Five villages were selected randomly and 1565 interviews were done. The third site, Zahedan, had a population of 580 071, from which 2100 interviews were done. The fourth site, Sanandaj, had a

population of 311 444 and 5830 interviews were done. In all areas, households were randomly selected. The total population of the studied cities and villages was 11 000 777, which is 14.961% of the total population of Iran.

Questionnaire

COPCORD Core Questionnaire (CCQ) was used for the screening. The original CCQ comprised seven main sections: background information (A), work history (B), pain/tenderness/swelling/stiffness during the last week (c1) and in the past (C2), functional disability (D), difficulty in performing specific tasks (E), treatment (F) and evaluation (G). We added another section for extra-articular symptoms of some rheumatic diseases (aphthous ulcers, blurred vision, etc.) (H). The original CCQ was translated from English into Farsi and back-translated to English. The Farsi version was validated in 50 subjects. The Farsi CCQ was administered to all subjets. The COPCORD questionnaire can be found on the COPCORD website at http://www.copcord.org/ Once on the site, click on "Tools/Qs".

Training of field data collectors

Interviewers were selected among certified nurses or nurse-midwives. Physical examination was done by a rheumatologist. Blood sampling was done by lab technicians. The head of the team (general practitioner physician) supervised the management of the data collection. Monitoring and quality control of the data was done by specially trained physicians. All team personnel were trained in specialized workshops, of which there were five. The interviewers had to pass an exam by interviewing a selected number of subjects.

Data collection

The three phases of stage 1 were done on the same day, in parallel, like the fast-track COPCORD. The CCQ had different parts. The first part (rheumatic problems in the past week) was administered to all. It was administered by a trained interviewer. A human mannequin figure was used to mark the pain sites by the interviewed person. Laboratory workup and X-rays were performed ar the rheumatologist's request.

Quality control and monitoring

All the interviewers, lab technicians and rheumatology fellows received regular quality control visits from the project. CCQs and examination sheets were checked by the team head in the field. All of the questionnaires were checked again during the enumeration process.

Ethical issues

The study proposal was approved by the National Ethics Committee on Medical Research of the Ministry of Health and Medical Education. All subjects were informed about the study goal and the method. They were enrolled in the study after their informed consent. Participants could withdraw from the study at any stage (interview, physical exam, paraclinical tests).

Data analysis

Five percent of the data, at the end of each day of data entry, were controlled for quality control.

To adjust the data to represent the Iranian data for the whole country, in each site (Tehran, Tuyserkan, Zahedan and Sanandaj), the data was adjusted to the population number of that site. Then the four new figures were added and adjusted to the whole population of Iran.

RESULTS

Study period

The first COPCORD study started in Iran on the 27 February, 2004 and the fourth COPCORD study ended in June 2012.

Ethnic distribution

The field

The city of Tehran, the capital of Iran, was selected as the field for the COPCORD study. The rational for this selection was ethnic distribution. Iran is situated in the middle of the Silk Road, and was long known as the crossroad between East and West. The population of Iran is of mixed origin. Caucasians form the main ethnic group, 75.4% of the population. They are subdivided into Fars, Kurd, Lor, Belouch and Armen (Armenians). Turks form 22% of the population. They are of East Asian origin, coming from the northern part of China and are divided into two subgroups, Turk and Turcoman. The third ethnic group are Semites, who form only 2.6% of the population. They are subdivided into Arabs, Jews and Assyrians. Each part of Iran contains mainly one of the two major ethnic groups, Caucasians or Turks. Tehran is an exception to the rule, as it contains one-ninth of Iran's population. The population is of mixed origin and represents all ethnic groups. Tehran is relatively a young city. Most of its population is composed of immigrants who came after the 1979 revolution, coming from all parts of Iran. No other city is as representative of all Iran as is Tehran. In Tehran, Caucasians were 71.4%, Turks

(East Asian race) were 23.1%, Semites (Arabs, Jews, Assyrians) 0.3%, and mixture of different ethnicities 5.2%. In Tuyserkan province they were Caucasians, in Zahedan Caucasians (Belouch sub-ethnic group), and in Sanandaj Caucasians (Kurd sub-ethnic group).

General data

In Tehran, the first and the main COPCORD study, 4096 houses were selected randomly from 22 districts of Tehran, and 13 741 subjects were selected for interview. From them, 582 refused and 2868 were absent the day of their interview and the next two consecutive weeks. We were able to complete 10 291 questionnaires, and 44% needed a rheumatology examination in the Tehran study. For the Tuyserkan rural area, we opted for 1500 subjects. We interviewed 1565 subjects (the minimum COPRD interview being 1500), and 76% needed the rheumatology examination. In Zahedan (urban) we interviewed 2100 persons (57% were examined) and in Sanandaje (urban study) 5830 persons with 44% having the rheumatology examination.

Age distribution

The ages of the interviewed persons were divided into six groups: 15–29 years, 30–39, 40–49, 50–59, 60–69 and 70 or higher. The distribution in Iran, after adjustment was, respectively, 40.7%, 20.8%, 16.9%, 10%, 6.8% and 4.8% (Table 1).

Gender

The male-to-female ratio of the interviewed persons in Tehran was 0.9–1 (0.9/1), in Tuyserkan 0.8/1, in Zahedan 0.8/1, and in Sanandaj 0.8/1.

Ethnic distribution

Iran has two main ethnic groups (Caucasians and Turks) and one minority group, the Semites. Caucasians form 74.5% of the populations in Iran. Turks form 22% and Semites 2.6%. Tehran has the three ethnic groups, while the three other sites were only Caucasians.

Table 1 Age distribution: in percentages

Site	Age group (years)					
	15–29	30–39	40–49	50–59	60–69	≥ 70
Tehran	40	21	17	10	7	5
Tuyserkan	42.5	16	13	12	9.5	7
Zahedan	52	17	15	10	3.5	2.5
Sanandaj	40.5	22	18	10	6	3.5
Iran	40.7	20.8	16.9	10	6.8	4.8

Educational level

In Tehran, the illiterate were rare, 7.1%. Study at university level was 19.9%. In Tuyserkan villages, 25.2% were illiterate and at the university level only 2%, in Zahedan, 17.1% were illiterate and at the university level they were 16.9%. In Sanandaj 24.3% were illiterate and at the university level 21.5%.

Musculoskeletal complaints during the past 7 days

Overall complaints in the past 7 days in Tehran were found in 41.9% of the interviewed persons (males 35.5%, females 52%). In Tuyserkan, it was in 66.6% (males 52%, females 72%), in Zahedan in 54.1% (males 40%, females 66%), and in Sanandaj in 42.8% of the interviewed persons (males 36%, females 48%). After adjustment, overall complaints in the past 7 days in Iran were found in 44.7% of the interviewed persons (males 35.9%, females 52.8%).

Joint distribution

Joint distribution was as follows: shoulder 15.6%, elbow 7.2%, wrist 10.4%, hands 10.2%, hip 8.3%, knee 27.4%, ankle 12.3%, toes 6.2%, cervical spine 14.2% and dorso-lumbar spine 23.7% (Table 2).

Diagnosed diseases

Degenerative joint diseases (Table 3) were detected in 16.9% of subjects: knees 15.5%, hand 2.9% and hip 0.3%.

Other mechanical disorders (Table 3) were low back pain 15.7%, sciatica 0.94% and chondromalacia patellae 3.5%. Soft tissue rheumatism was found in 4.6% of the interviewed persons. Shoulder rotator cuff tendonitis was found in 2.5%, frozen shoulder 5.6%, tennis elbow 1.2%, golf elbow 0.48%, De Quervain tenosynovitis 0.24%, trigger finger 0.2% and carpal tunnel syndrome 1.3%.

Inflammatory disorders (Table 4) were rheumatoid arthritis 0.37%, seronegative spondylarthropathies 0.24%, ankylosing spondylitis 0.12%, systemic lupus erythematosus 0.06% and Behcet's disease 0.08%. Gout was discovered in 0.13% and fibromyalgia in 0.79% of the studied population.

DISCUSSION

It is interesting to note that patients' complaints were always more frequent in females than in males. The adjusted data for Iran showed 35.9% males against 52.8% females. Tehran had the lowest rate of illiterate

Table 2 Musculoskeletal (MSK) complaints during the past 7 days

MSK complaints	%	95% CI
Total	44.7	44.0–45.4
Shoulder	15.6	15.1–16.1
Elbow	7.2	6.8–7.6
Wrist	10.4	10.0–10.8
Hand	10.2	9.8–10.6
Hip	8.3	7.9–8.7
Knee	27.4	26.8–28.0
Ankle	12.3	11.8–12.8
Toes	6.2	5.9–6.5
Cervical spine	14.2	13.7–14.7
Dorsolumbar	23.7	23.1–24.3

Table 3 Mechanical diseases and soft tissue rheumatisms

	%	95% CI
Osteoarthritis (total)	16.9	16.4–17.4
Knee	15.5	15.0–16.0
Hands	2.9	2.7–3.1
Hip	0.3	0.23–0.39
Low back pain	15.7	15.2–16.2
Sciatica	0.94	0.81–1.09
Chondromalacia patella	3.5	3.2–3.8
Soft tissue rheumatism (total)	4.6	4.3–4.9
Shoulder tenosynovitis	2.5	2.3–2.7
Frozen shoulder	0.56	0.47–0.68
Tennis elbow	1.2	1.1–1.4
Golf elbow	0.48	0.39–0.59
De Quervain tenosynovitis	0.24	0.18–0.32
Trigger finger	0.2	0.15–0.28
Carpal tunnel syndrome	1.3	1.1–1.5

Table 4 Inflammatory and other disease

	%	95% CI
Rheumatoid arthritis	0.37	0.29–0.46
Seronegative spondyloarthritis	0.24	0.18–0.32
Ankylosing spondylitis	0.12	0.08–0.18
Systemic lupus erythematosus	0.06	0.03–0.11
Behcet's disease	0.08	0.05–0.13
Gout	0.13	0.09–0.19
Fibromyalgia	0.79	0.67–0.92

subjects, while the level of university studies was higher in urban areas, but very low in the villages of Tuyserkan.

The highest rate of musculoskeletal complaints was from the rural area (Tuyserkan), but lower in the urban areas. Surprisingly, mechanical disorders were not much higher in rural than in urban areas.

The first study, the largest one (10 269 interviews in a population of 10 million inhabitants) was done in 2004, while the last study was done in 2012 (5830 interviews in a population of 311 444 inhabitants). As the studies were not done on the same dates, one may suppose that the results may have changed in the newer studies. However, as the time difference between the first and the last study is only 8 years, even if some changes occurred, they must not have been so important to change significantly the final results. It is very interesting to compare the results of the two extrems,[1,5] the 2004 and 2012. The majority of percentages, from the two sites, are extremely near to each other (Table 5), while studies 3 and 4 with a difference in time of 3 years, have wider differences of their percentages.

Comparison of Iran's results to other countries with COPCORD studies (Table 5), shows the following. The highest percentage of complaints go to Cuba with 43.9%, followed shortly by Iran (42.8%). The highest rate of low back pain goes to China (Beijing) with 35%. Iran gets the fourth rank with 15.7%. Osteoarthritis has the first rank in Guatemala with 20.4%, Iran gets the second rank with 16.9%. Knee osteoarthritis (in countries having calculated it) were the highest in China, Beijing (30%). Iran got the third rank (after Vietnam) with 15.5%. Soft tissue rheumatism had the highest rank in Vietnam with 15.4%, while Iran had the sixth

Table 5 Comparison to other COPCORD studies

	No.	Pain (%)	LBP (%)	OA (%)	Knee OA (%)	STR (%)	FM (%)	RA (%)	SPA (%)	CTD (%)	Gout (%)
Australia	1437	34	22	8.2	15	5.8		0.70	0.21		1.5
Australia Aboriginal	847	33	12.5	5.5	11.2	7.4		0	0.5	0	4
Bangladesh rural	2635	26.9	6.6		7.5	2.7	4.4				
Bangladesh urban slum	1317	24.9	9.9		9.2	2.5	3.2				
Bangladesh urban affluent	1259	27.9	9.2		11.5	3.3	3.3				
Brazil	3038	30.9		4.1				0.46			
China – Shanghai	6584		5.6		4.1	3.4		0.47	0.11	0.06	0.22
China – Beijing	4192	40.3	35		30			0.34	0.26	0.01	
China – Shantou	5057		13.1		2.6			0.32	0.26	0.02	
China – Chenghai	2040		10.2		6.5						
Cuba	3155	43.9	11.6	20.4		6.4	0.22	1.2	0.19		0.38
Guatemala (rural)	4000	14.4		3.9		2.1		0.85			0.02
Guatemala (urban)	4000	9.3		1.6		1.0		0.5			
Indonesia U	1071		23.3					0.3			
Indonesia R	4683		15.1					0.2			0.81
India Bhigwan	4092	18.2	11.4	5.6	3.9	5.5		0.5			0.12
India Calicut (rural)	4992	24.9		4.6		2.5		0.20	0.62		
Iran (Pilot study)	**284**	**34.5**	**22.2**	**14.5**	**26.1**	**2.4**					
Iran – Tehran (urban)	**10 291**	**41.9**	**15.4**	**16.6**	**15.3**	**4.6**	**0.7**	**0.33**	**0.23**		**0.13**
Iran – Tuyserkan (rural)	**1565**	**66.6**	**23.4**	**20.5**	**19.3**	**2.2**	**0.06**	**0.19**	**1.10**		
Iran – Zahedan (urban)	**2100**	**54.1**	**19.0**	**20.7**	**17.0**	**4.8**	**2.7**	**1.00**	**0.23**		**0.09**
Iran – Sanandaj (urban)	**5830**	**42.8**	**16.5**	**19.4**	**18.8**	**5.5**	**0.6**	**0.51**	**0.22**	**0.08**	**0.12**
Iran – adjusted data	**19 786**	**42.8**	**15.7**	**16.9**	**15.5**	**4.6**	**0.8**	**0.37**	**0.24**		**0.13**
Kuwait	7670	26.8									
Lebanon	3530	32.9		4.0	3.0	5.8		1.0	0.3		0.01
Malaysia	2594	21.1	11.6					0.15	0.12		
Mexico	19 213	25.5		10.2		3.8		1.5	0.1		0.35
Pakistan	2090	14.8	1.9	3.7	1.8	1.9	2.1	0.55	0.10	0.05	0.14
Philippines rural	846	14.5	11.3		3			0.2			0.6
Philippines urban	3006		2.1	4.1	1.4	3.8	0.2	0.17	0.03		0.13
Thailand	2463	17.6	4	11.3	5.7	1.5		0.12	0.12	0.08	0.16
Vietnam	2119		11.2	4.1	18.2	15.4		0.28		0.09	0.14

CTD, connective tissue diseases; FM, fibromyalgia; LBP, low back pain; No., interviewed persons; OA, osteoarthritis; RA, rheumatoid arthritis; SPA, seronegative spondyloarthropathies; STR, soft tissue rheumatism. Bold items are the data from Iran.

rank with 4.6%. Fibromyalgia was first in Bangladesh, the rural area, with 4.4%, and got the fifth rank in Iran with 0.8%. Rheumatoid arthritis got the first rank in the Mexico study with 1.5% of the population of 15 years and higher, while Iran got the 10th rank with 0.37%. Seronegative spondyloarthropathies was highest in India (Calicut) with 0.62% and fifth in Iran with 0.24%. Finally, gout had the highest rate in Australia, among the Indigenous peoples, with 4%, while it was rare in Iran (0.13%) and was ranked 11th.

CONFLICT OF INTEREST

The authors declare they have no conflicts of interest.

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