

Prevalence of Rheumatic Symptoms, Rheumatoid Arthritis, Ankylosing Spondylitis, and Gout in Shanghai, China: A COPCORD Study

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ABSTRACT. Objective. To carry out a cross-sectional survey on prevalence of musculoskeletal symptoms, rheumatoid arthritis (RA), ankylosing spondylitis (AS), and gout.

Methods. In Shanghai, 4 communities comprising 7603 inhabitants over 15 years of age in an urban population were randomly selected from 13 communities. Interviews were conducted from September 1997 to March 1998 by trained physicians using the COPCORD Core Questionnaire. Physical and radiographic examinations and serologic tests were carried out when required to classify categories of rheumatic diseases. The diagnoses of RA, systemic lupus erythematosus (SLE), and gout were based on American Rheumatism Association criteria. The diagnosis of AS strictly followed the modified New York criteria of 1984. Crude prevalence rates were standardized according to a standard Chinese population for age and sex structure.

Results. A total of 6584 adults (3394 women, 3190 men) were interviewed, and response rate was 86.6%. The age and sex standardized prevalence rate of rheumatic symptoms at any site amounted to 13.3% (95% CI 12.5–14.1%). Symptoms occurred more frequently in the following sites: knee 7.0% (95% CI 6.4–7.6%), lower back 5.6% (95% CI 5.0–6.2%), shoulder 4.7% (95% CI 4.2–5.2%), and neck 2.4% (95% CI 2.0–2.8%). Women complained of rheumatic symptoms more frequently than men. The standardized rates of RA, AS, gout, symptomatic knee osteoarthritis, and soft tissue rheumatism were 0.28% (95% CI 0.15–0.41%), 0.11% (95% CI 0.03–0.19%), 0.22% (95% CI 0.11–0.33%), 4.1% (95% CI 3.6–4.6%), and 3.4% (95% CI 3.0–3.8%), respectively. Two cases of SLE, one case of dermatomyositis, and one case of systemic sclerosis were found.

Conclusion. Compared with rates in European and Western countries the prevalence rates of RA, AS, and gout are low in Shanghai, China, although the prevalence rates of rheumatic symptoms are high. (J Rheumatol 2003;30:2245–51)

Key Indexing Terms:

RHEUMATOID ARTHRITIS
RHEUMATIC DISEASES

ANKYLOSING SPONDYLITIS
COPCORD

GOUT
EPIDEMIOLOGY

The Community Oriented Program for Control of Rheumatic Diseases (COPCORD) was launched by the WHO–International League of Associations for Rheumatology (ILAR) in 1981. Its primary objective is to acquire data on the prevalence of rheumatic-musculoskeletal symptoms/disorders (RMS) and their related disability in rural communities in developing countries. The COPCORD epidemiological model, which is socioeconomically designed, targets the community RMS rather than

specific diseases. The COPCORD model advocates a low cost structure utilizing available local resources with minimal use of investigation (for diagnosis).

Arthritis and other rheumatic conditions are prevalent worldwide. However, there are regional and racial differences in the prevalence of different categories of rheumatic diseases^{1–3}. China is a country with a vast territory, multiple races, and the largest population in the world, but the available data on the prevalence rates of rheumatic diseases in the Chinese population, especially mainland China, are very limited. As summarized in Table 1, the limited data also show the differences of prevalence rates of rheumatic diseases among different areas and races in China. To further collect epidemiologic data on rheumatic diseases in different parts of China, we completed a COPCORD study in a metropolitan population in Shanghai.

MATERIALS AND METHODS

Population characteristics. Shanghai is a large industrialized city in eastern China, where there are annually 4 different seasons (ranging from hot summer to cold winter). Four communities were selected randomly from 13 communities within Shanghai, in the Wujiaochang area of the Yangpu

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Table 1. Epidemiological data on rheumatic diseases in China.

Study	Age of Population, yrs	Area	Prevalence Rate					Rheumatic Symptoms, %
			RA, %	AS, %	Gout, %	OA, %	SLE	
Beasley ⁴	> 17	Kinmen, Taiwan	0.3	0.2	—	—	—	—
Lau ⁵	> 16	Hong Kong	0.35	—	—	—	1/2000*	13.0
Wigley ⁶	> 15	Beijing (North)	0.34	0.26	—	—	3/4192*	Knee, 29.0; lower back, 35.0 Knee, 3.3; lower back, 11.5
		Shantou (South)	0.32	0.26	—	—	1/5057*	
Chou ⁷	> 20	Urban, Taiwan	0.93	0.4	0.67	5.1	1/3000*	26.3
		Suburban, Taiwan	0.78	0.19	0.67	5.8	0/3000*	18.4
		Rural, Taiwan	0.26	0.54	0.16	6.3	0/3000*	24.3
Chang ⁸	> 40	Aborigines, Taiwan	—	—	9.1	—	—	—
		Non-aborigines, Taiwan	—	—	0.3	—	—	—
Chou ⁹	> 18	Aborigines, Taiwan	—	—	11.7	—	—	—

* Case number was too low to estimate prevalence of SLE. RA: rheumatoid arthritis; AS: ankylosing spondylitis; OA: osteoarthritis; SLE: systemic lupus erythematosus. Blank indicates no data available.

district. All persons aged over 15 years in the selected communities were chosen as the target population.

Epidemiological survey. The questionnaire used in this survey was translated from the Standard English WHO-ILAR COPCORD Core Questionnaire with additional questions⁶. Households were informed by public meetings and notice sheets. A house-to-house and face-to-face interview and physical examination were performed with every eligible person by trained physicians using the same questionnaire during weekends between September 1997 and March 1998. Adults not at home at the time of the original interview were revisited later. Each group of the team was composed of one rheumatologist and 2 other physicians. Those who had current musculoskeletal "pain, tenderness, swelling or stiffness" within the last 7 days, or had experienced symptoms that lasted at least 7 days in the past, were reinterviewed and underwent physical examination by a rheumatologist (one of the authors) on the same day and occasion as the first interview. So the first 2 phases of the original COPCORD model were incorporated into a single screening phase for this study. Pain from a traumatic event was excluded from rheumatic symptoms. As required, laboratory tests such as rheumatoid factor (RF), antinuclear antibody (ANA), and uric acid, and radiographs of hands or lumbar spine and sacroiliac (SI) joints were arranged without charge. All radiographs were independently read by 2 radiologists who were unaware of the clinical data. For 98.5% of the radiographs the 2 radiologists agreed on whether definite arthritic changes were present. Radiographs with divergent results were then reexamined by a third radiologist.

Disability was defined as difficulty in performing specific tasks: dressing, getting in and out of bed, lifting a full cup to the mouth, walking on a level surface, combing hair, climbing up and down stairs, washing and drying the body, picking up something from the floor, turning faucets on/off, and getting in and out of a bus. A positive answer to one or more of the disability questions was scored as a positive answer. Disability attributed to a traumatic event was excluded.

Diagnostic criteria. Cases were defined according to the American Rheumatism Association (ARA) 1987 revised criteria for the classification of rheumatoid arthritis (RA)¹⁰, the ARA 1982 revised criteria for the classification of systemic lupus erythematosus (SLE)¹¹, ARA preliminary criteria for the classification of the acute arthritis of primary gout (1977)¹², and the 1984 revised New York criteria for definite ankylosing spondylitis (AS)¹³. Schöber's test was used to measure lumbar mobility and a finding of less than 4.5 cm was defined as abnormal. Measurements of total spinal mobility were determined with a spondylometer, and 40° flexion and 20° extension were used as the lower limits of normal mobility. Measurements of chest expansion followed standard procedures, with < 2.5 cm defined as restricted mobility.

Statistical analysis. Data were analyzed by SPSS® for Windows version 8.0 (SPSS Inc.). Significant differences of prevalence rates between age and sex groups were analyzed by chi-square test with significance level at 0.05. Crude prevalence rates were adjusted to a standard Chinese population for age and sex structure (nationwide census in 1990).

RESULTS

Population structure and response rate. The target population was 7603 adults, and 6584 were actually surveyed; thus the response rate was 86.6%. The age and sex structure of the population surveyed was not significantly different from our target population (Table 2). There were 3394 women and 3190 men for a sex ratio of 1.06; 99.6% of respondents were of the Han race. In positive responders, the response rate for a physical examination was 100%.

Prevalence of rheumatic symptoms. In the surveyed population more women complained of articular problems than men (Figure 1). The crude rate of rheumatic symptoms at any site in the total population was 21.2% (95% confidence interval 20.2–22.2%), and the adjusted rate was 13.3% (95% CI 12.5–14.1%). The different frequencies of rheumatic symptoms in different articular areas are shown in Table 3, and all were significantly higher in women than in men. Among the different areas, the highest frequencies were found in the knee, lower back, and shoulder. In men the frequency in the lower back was slightly higher than in knee, and the third site was the shoulder. In women the frequency was highest in the knee, in the shoulder second, and lower back third. In addition to knee, lower back, and shoulder, the frequency in the neck was also high compared with other sites. The frequencies of rheumatic symptoms in these 4 areas in different sex and age groups are shown in Table 4 and Figure 2. Consistent with the very low prevalence rate of hip osteoarthritis (OA) among Chinese¹⁴, the prevalence rate of hip problems in this study was also very low. In this survey, 16.5% of men and 15.1% of women had pain in a single site, whereas 2.3% of men and 11.2% of

Table 2. The sex and age components of the target population and the population surveyed.

Age Group, yrs	Target Population			Population Surveyed		
	Men n (%)	Women n (%)	Men + Women n (%)	Men n (%)	Women n (%)	Men + Women n (%)
~25	417 (11.2)	389 (10.0)	806 (10.6)	327 (10.3)	345 (10.2)	672 (10.2)
~35	585 (15.8)	562 (14.4)	1147 (15.1)	489 (15.3)	471 (13.9)	960 (14.6)
~45	1092 (29.4)	1075 (27.6)	2167 (28.5)	952 (29.8)	937 (27.6)	1889 (28.7)
~55	558 (15.0)	560 (14.4)	1118 (14.7)	479 (15.0)	472 (13.9)	951 (14.4)
~65	422 (11.4)	536 (13.8)	958 (12.6)	397 (12.5)	503 (14.8)	900 (13.7)
~75	491 (13.2)	513 (13.2)	1004 (13.2)	415 (13.0)	442 (13.0)	857 (13.0)
> 75	146 (3.9)	257 (6.6)	403 (5.3)	131 (4.1)	224 (6.6)	355 (5.4)
Total	3711 (100.0)	3892 (100.0)	7603 (100.0)	3190 (100.0)	3394 (100.0)	6584 (100.0)

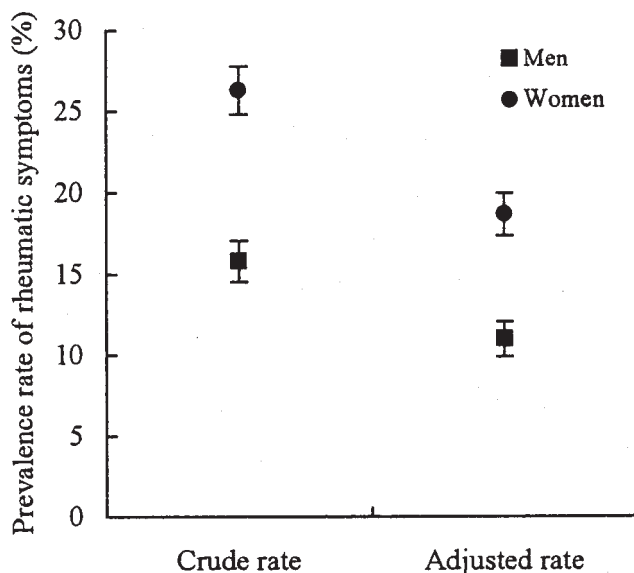


Figure 1. Prevalence rate of rheumatic symptoms at any site in men and women. Crude rate was calculated from the actual frequency in the population surveyed. Adjusted rate was calculated from the same frequency in each age and sex group in a standard Chinese population structure (nation-wide census 1990). Compared with men the crude rate in women was significantly higher ($p < 0.01$). Error bars show 95% confidence intervals.

women had pain in multiple sites. In men surveyed, 18.8% complained of rheumatic symptoms, but only 7.0% had a history of visiting a doctor for the symptoms. In women, 26.3% complained of rheumatic symptoms, but only 12.1% had seen a doctor for the symptoms. The rates of disability were much lower than for symptoms (Table 5), so no disability occurred in most of the subjects who had rheumatic symptoms.

Prevalence of RA. Definite RA was diagnosed in 24 women and 7 men. Thus the crude prevalence rates in women, men, and the total population were 0.71% (95% CI 0.43–0.99%), 0.22% (95% CI 0.057–0.38%), and 0.47% (95% CI 0.30–0.64%), respectively, and the adjusted rates in women, men, and the total population were 0.41% (95% CI 0.20–0.62%), 0.14% (95% CI 0.074–0.21%), and 0.28% (95% CI 0.15–0.41%), respectively. The ratio of women to men was 3.23:1 for crude rate and 2.93:1 adjusted rate. The rates increased with age (Table 6). According to the case histories, it was found that onset of RA began at middle age or later in most cases.

Prevalence of AS. Eight cases of definite AS were found. All the cases were men aged 18–67 years (mean 35.4); 5 cases were age less than 45 years. The average duration of disease was 18.3 years (0.5–41 yrs). Thus the crude rate for men and

Table 3. Frequencies of rheumatic symptoms in different articular areas.

	Crude Rate, % (95% CI)			Adjusted Rate, % (95% CI)		
	Men	Women	Both	Men	Women	Both
Shoulder	4.2 (3.5–4.9)	9.5** (8.5–10.5)	7.0 (6.4–7.6)	2.8 (2.2–3.4)	6.5 (5.7–7.3)	4.7 (4.2–5.2)
Elbow	0.9 (0.6–1.2)	2.9** (2.3–3.5)	1.9 (1.7–2.1)	0.6 (0.3–0.9)	1.9 (1.4–2.4)	1.3 (1.0–1.6)
Wrist	0.7 (0.4–1.0)	2.0** (1.5–2.5)	1.4 (1.1–1.7)	0.4 (0.2–0.6)	1.3 (0.9–1.7)	0.9 (0.7–1.1)
Hand	1.1 (0.7–1.5)	3.9** (3.2–4.6)	2.6 (2.2–3.0)	0.8 (0.5–1.1)	2.4 (1.9–2.9)	1.6 (1.3–1.9)
Knee	6.4 (5.6–7.2)	13.8** (12.6–15.0)	10.2 (9.5–10.9)	4.4 (3.7–5.1)	9.4 (8.4–10.4)	7.0 (6.4–7.6)
Ankle	0.7 (0.4–1.0)	1.7** (1.3–2.1)	1.2 (0.9–1.5)	0.4 (0.2–0.6)	1.0 (0.7–1.3)	0.8 (0.6–1.0)
Toe	0.6 (0.3–0.9)	1.2** (0.8–1.6)	0.9 (0.7–1.1)	0.5 (0.3–0.7)	0.8 (0.5–1.1)	0.6 (0.4–0.8)
Neck	2.1 (1.6–2.6)	4.8** (4.1–5.5)	3.5 (3.1–3.9)	1.5 (1.1–1.9)	3.4 (2.8–4.0)	2.4 (2.0–2.8)
Lower back	6.7 (5.8–7.6)	9.3** (8.3–10.3)	8.0 (7.3–8.7)	4.7 (4.0–5.4)	7.0 (6.1–7.9)	5.6 (5.0–6.2)
Chest wall	0.2 (0.04–0.4)	0.6** (0.3–0.9)	0.4 (0.2–0.6)	0.1 (0–0.2)	0.3 (0.1–0.5)	0.2 (0.1–0.3)
Hip	0.6 (0.3–0.9)	1.9** (1.4–2.4)	1.3 (1.0–1.6)	0.4 (0.2–0.6)	1.2 (0.8–1.6)	0.8 (0.6–1.0)

Compared with men, ** $p < 0.01$.

Table 4. Frequencies of rheumatic symptoms in knee, lower back, shoulder, and neck in different age groups.

Age Group, yrs	Knee, % (95% CI)		Lower Back, % (95% CI)		Shoulder, % (95% CI)		Neck, % (95% CI)	
	Men	Women	Men	Women	Men	Women	Men	Women
~25	0.9 (0-1.9)	1.7 (0.3-3.1)	0.3 (0-0.9)	1.2 (0.1-2.3)	0.3 (0-0.9)	0.9 (0-1.9)	0.3 (0-0.9)	0 (0)
~35	2.2 (0.9-3.5)	4.9* (3.0-6.8)	3.1 (1.6-4.6)	6.2* (4.0-8.4)	1.0 (0.1-1.9)	3.6** (1.9-5.3)	1.0 (0.1-1.9)	2.3 (0.9-3.7)
~45	3.2 (2.1-4.3)	9.2** (7.3-11.1)	7.2 (5.6-8.8)	8.8 (7.0-10.6)	2.3 (1.3-3.3)	6.7** (5.1-8.3)	1.7 (0.9-2.5)	6.1** (4.6-7.6)
~55	6.9 (4.6-9.2)	16.9** (13.5-20.3)	7.1 (4.8-9.4)	14.0** (10.9-17.1)	5.4 (3.4-7.4)	12.7** (9.7-15.7)	2.7 (1.2-4.2)	7.0** (4.7-9.3)
~65	13.9 (10.5-17.3)	26.0** (22.2-29.8)	13.7 (10.3-17.1)	11.5 (8.7-13.3)	8.6 (5.8-11.4)	17.7** (14.4-21.0)	3.3 (1.5-5.1)	6.7* (4.5-8.9)
~75	14.0 (10.7-17.3)	24.0** (20.0-28.0)	8.7 (6.0-11.4)	13.1* (10.0-16.2)	9.2 (6.4-12.0)	13.1 (10.0-16.2)	4.3 (2.3-6.3)	4.1 (2.3-5.9)
> 75	9.2 (4.3-14.1)	16.5 (11.6-21.4)	4.6 (1.0-8.2)	9.4 (5.6-13.2)	6.9 (2.6-11.2)	15.2* (10.5-19.9)	1.5 (0-3.6)	5.4 (2.4-8.4)

Compared with men, * p < 0.05, ** p < 0.01.

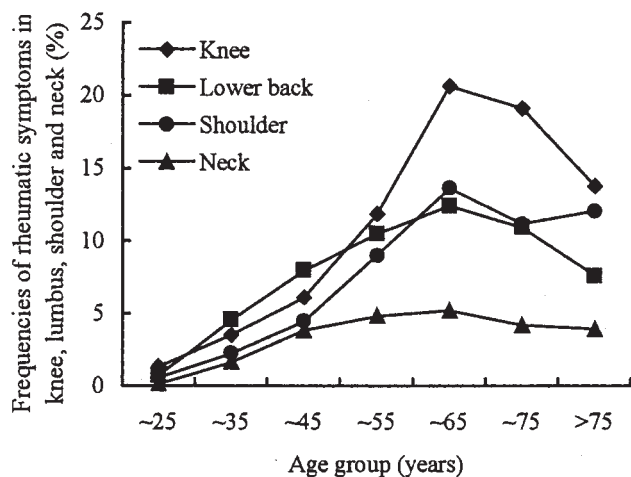


Figure 2. Changes with age in the frequencies of rheumatic symptoms in knee, lower back, shoulder, and neck, where the symptoms were reported most frequently in both men and women.

the total population was 0.25% (95% CI 0.077-0.42%) and 0.12% (95% CI 0.036-0.20%), respectively, and the adjusted rate for men and the total population was 0.23% (95% CI 0.064-0.40%) and 0.11% (95% CI 0.030-0.19%), respectively.

Prevalence of gout. Gout was confirmed in 22 subjects, and most were male (90.9%). The crude rate for men, women, and the total population was 0.63% (95% CI 0.36-0.90%), 0.059% (95% CI 0.023-0.14%), and 0.33% (95% CI 0.19-0.47%), respectively, and the adjusted rate was 0.44% (95% CI 0.21-0.67%), 0.03% (95% CI 0-0.088%), and 0.22% (95% CI 0.11-0.33%), respectively. The ratio of men to women was 10.5:1 crude rate and 14.7:1 for adjusted rate. Age and sex distribution for gout is shown in Table 7. Most of the male cases were initially affected by gout at middle age or later, and both the 2 female cases were initially affected by the disease after menopause. The highest rate was found in the group aged 56-65 years. The first metatarsophalangeal joint was found to be the joint affected first in 14 cases (63.6%), ankle in 5 cases (22.7%), and tarsometatarsal joint in 3 cases (13.6%). Gouty tophus on

Table 5. Prevalence rates of disability.

Activity	Men n (%)	Women n (%)	Both n (%)
Dressing	11 (0.3)	15 (0.4)	26 (0.4)
Get in and out of bed	9 (0.3)	19 (0.6)	28 (0.4)
Lift a full cup/glass to your mouth	10 (0.3)	17 (0.5)	27 (0.4)
Walk outside on level	17 (0.5)	28 (0.8)	45 (0.7)
Comb hair	8 (0.3)	14 (0.4)	22 (0.3)
Climb up and down stairs	27 (0.8)	41 (1.2)	68 (1.0)
Wash and dry body	15 (0.5)	21 (0.6)	36 (0.5)
Pick up something from floor	16 (0.5)	26 (0.8)	42 (0.6)
Turn water taps on/off	6 (0.2)	12 (0.4)	18 (0.3)
Get in and out of a bus	17 (0.5)	31 (0.9)	48 (0.7)

Table 6. Numbers of RA cases in different age and sex groups.

Age Groups, yrs	Men n (%)	Women n (%)	Both n (%)
~25	0 (0)	0 (0)	0 (0)
~35	0 (0)	1 (0.21)	1 (0.10)
~45	1 (0.11)	4 (0.43)	5 (0.26)
~55	2 (0.42)	3 (0.64)	5 (0.53)
~65	1 (0.25)	5 (0.99)	6 (0.67)
~75	2 (0.48)	6 (1.36)	8 (0.93)
> 75	1 (0.76)	5 (2.23)	6 (1.69)
Total	7 (0.22)	24 (0.71)	31 (0.47)

Table 7. Age and sex distribution in patients with gout.

Age Groups, yrs	Men n (%)	Women n (%)	Both n (%)
~25	0 (0)	0 (0)	0 (0)
~35	1 (0.20)	0 (0)	1 (0.10)
~45	3 (0.32)	0 (0)	3 (0.16)
~55	4 (0.84)	0 (0)	4 (0.42)
~65	7 (1.76)	1 (0.20)	8 (0.89)
~75	4 (0.96)	1 (0.23)	5 (0.58)
> 75	1 (0.76)	0 (0)	1 (0.28)
Total	20 (0.63)	2 (0.06)	22 (0.33)

auricle was found in only one case. Two cases had positive family history of gout.

Prevalence of symptomatic knee OA. Without radiographic evidence for all patients, preliminary diagnosis of knee OA was based on symptoms and positive findings on clinical signs including tenderness to palpation, swelling (but no palpable warmth), bony enlargement, pain on movement, palpable crepitus on motion, and/or limitation of joint motion¹⁵. We estimated the prevalence rate of symptomatic knee OA was 4.1% (95% CI 3.6–4.6%). It was more common in women (6.2%, 95% CI 5.4–7.0%) than in men (1.9%, 95% CI 1.4–2.4%).

Prevalence of soft tissue rheumatism. According to the preliminary diagnosis made by rheumatologists after interview and physical examination, the prevalence rate of soft tissue rheumatism was 3.4% (95% CI 3.0–3.8%) in the total population, 4.7% (95% CI 4.0–5.4%) in women and 2.1% (95% CI 1.8–2.4%) in men.

Other rheumatic conditions. In this survey, only 2 cases of SLE, one case of dermatomyositis, and one case of scleroderma were found. All the cases were female. Because of the limited number we could not calculate reliable prevalence rates of these diseases.

DISCUSSION

Population structure. When the people aged ≥ 60 years account for $\geq 10\%$ of the population, or the people aged ≥ 65 years account for $\geq 7\%$ of the population, it is defined as an aged population. According to the nationwide census in China in 1990, only 8.4% of the national population was age ≥ 60 years, and 5.85% were age ≥ 65 years. Shanghai being an industrialized city, its population has become an aged population. In order to compare the prevalence rates in Shanghai with those in other areas of China, we adjusted the crude rates by using the age and sex structure of the 1990 census. Because the incidences of RA and gout increase with increasing age, the crude rates of RA and gout were higher than adjusted rates.

Methodology. The sensitivity and specificity of the questionnaire translated from the Standard English WHO-ILAR COPCORD Core Questionnaire were tested in a previous survey⁶. Prof. Sun-le Chen, one member of the WHO-ILAR COPCORD International Team, and Prof. Qing-Yu Zeng⁶, who took part in a previous COPCORD study, offered their technical assistance to ensure the survey was performed correctly. The communities we surveyed are not far from our hospital; familiarity with the local culture and tradition and close relations with inhabitants facilitated the survey. Adults in the target population not at home at the time of the first interview were revisited at least 3 times before being given up. Because some adults were working outside of Shanghai or living with their families not in Shanghai during that time, only 6584 subjects of the target sample

(7603) were interviewed; thus the response rate was 86.6%. Each group of the team had one rheumatologist, so all the subjects who had rheumatic symptoms were reinterviewed and physically examined by a rheumatologist on the same day. Therefore, the response rate for examination was 100%. Because of budget restrictions, serum uric acid concentrations were not assayed in all subjects, and radiographs were not performed in all individuals with rheumatic symptoms.

Rheumatoid arthritis. RA affects all races, with variations in prevalence. The highest prevalence rates have been observed in American Indian tribes and in Alaskan Indians, the lowest in African and Asian countries, and rates are intermediate in Europe¹⁶. The prevalence rate of RA in this study was similar to that in the ILAR-China study (0.32% for south China and 0.34% for the north), and for Taiwan (0.3%)⁴, Hong Kong (0.35%)⁵, Indonesia (0.2% rural and 0.3% urban)¹⁷, Pakistan (0.14–0.3%)¹⁸, and Italy (0.33%)¹⁹, but was less than for Spain (0.5%)²⁰ and half the rate for Whites in the USA (1.0%)¹⁶. Overall, the prevalence rate of RA is clearly higher in women. Although the ratio varies widely among studies, it has been estimated to be $\sim 2.5:1$ ¹. An age associated increase in the prevalence of RA has been observed in both men and women. A US National Health Examination Survey (1960–62) reported a prevalence of only 0.3% in adults under the age of 35, but more than 10% in people older than 65¹.

Ankylosing spondylitis. Diagnostic criteria for AS were first proposed in 1961, and were subsequently revised in 1966 and 1984 with the aim of improving sensitivity. But it is still difficult to make a definite diagnosis for patients with mild to moderate AS. In this study 5 highly suspected female cases were ruled out by the criteria. Further, radiological examination of the SI joints was performed only on suspected cases, so we cannot exclude the possibility that persons with definite radiographic changes, but without clinical symptoms, were missed. These factors suggest the actual prevalence rate of AS may be higher than that reported by epidemiological study. Due to different criteria for AS and the different population structures applied in the studies, it is also difficult to compare the prevalence rates reported by different groups. However, predisposition to AS does exist in some races, notable in North American Indians and circumpolar Eskimos. Prevalence for AS in American Whites was 9.4 times that in Blacks, and it was estimated to be a range from 0.05% to 0.23% in Caucasian populations. In this study the rate of AS was slightly lower than that in the ILAR-China study⁶. Compared with other races, the prevalence of AS in Chinese is similar to that in The Netherlands (0.1–0.2%)²¹, but is much less than that in German Whites (0.86%)²², Norwegian Lapps (1.8%)², and Canadian Haida (6–10%)²³.

Gout. Compared with the result reported by Chen, *et al*²⁴, which showed the prevalence of gout was 0.2% in Shanghai nearly 10 years ago, the prevalence rate in this study

(0.33%) had increased slightly. The possible reason for this difference may be a greater number of older people and changes in lifestyle, such as increased daily intake of protein and calories, because of rapid economic improvement in recent years. An increased prevalence of gout (1.0%) was also reported in England in the 1990s compared with that (0.26%) in the 1970s^{25,26}. Filipinos in the USA had higher rates of gout and hyperuricemia than Filipinos in Philippines. One study in Taiwan showed the prevalence of gout of 0.16% in a rural population was lower than that in an urban population (0.67%)⁷. These data strongly suggest that environmental factors play pivotal roles in the etiology of gout. In addition, genetic and racial predisposition is also a key causative factor. In New Zealand the rate of gout in Maori people was 8%, while that in Whites was only 0.5%²⁷. The higher prevalence rate of gout (1.7%) in Java was also reported³. The prevalence rate of gout in aborigines (11.7%) was much higher than in non-aborigines in Taiwan⁹.

Rheumatic symptoms. In the ILAR-China study, a high prevalence rate for rheumatic pain was found. The most frequently affected joints/areas were lower back, shoulder, knee, and neck. Lower back pain was 5 times more frequent in the north than in the south (men 25% vs 5.3% and women 38% vs 6.5%) and knee problems were 10 times more frequent (men 24% vs 1.8% and women 36% vs 3.4%)⁶. A study in Pakistan reported that a significantly higher prevalence of joint pain was seen in the north compared with the south²⁸. Consistent with geography, the prevalence of knee complaints in our study was higher than that in the south but less than that in the north compared with the previous ILAR-China study⁶. Compared with the prevalence rate of musculoskeletal pain in rural Thailand (36.2%)²⁹, Indonesia (rural 23.6%, urban 31.3%)³⁰, and Yugoslavia (34.6%)³¹, the high prevalence of rheumatic symptoms in China is not surprising. All the data showed the prevalence of rheumatic symptoms increased with age and was more common in women. In this study and another⁶, the reason for the slight decrease of prevalence of rheumatic symptoms in the population aged over 65 years is not clear.

Rheumatic symptoms are largely subjective. It is worth mentioning that more than 55% of the men or women who complained of rheumatic symptoms had no history of seeing a doctor for the symptoms. With free medical care in Shanghai, we can exclude the possibility of financial difficulty. The major reason might be that the symptoms did not affect the respondents' daily lives and work at all, which is supported by the fact that the rate of disability due to rheumatic symptoms was very low. In clinical practice, we also found a lot of young people complained of rheumatic symptoms, commonly knee pain, especially when the weather became cold suddenly, but no clinical signs or abnormal laboratory tests for them were found.

In summary, compared with the rates in European and

Western countries the prevalence rates of RA, AS, and gout were low in Shanghai, China, although the prevalence rates of rheumatic symptoms were high.

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