

Prevalence of self-reported peripheral joint pain and swelling in an Italian population: The Chiavari study

M.A. Cimmino, M. Parisi, G.L. Moggiana, T. Maio, G.S. Mela

Unità di Reumatologia, Dipartimento di Medicina Interna, Università di Genova, Italy

Abstract

Objective

To evaluate the prevalence of self-reported joint pain and swelling in the peripheral joints of subjects from an Italian general population. To correlate the result with demographic data and physical activity.

Methods

A total of 4,456 subjects aged 16 years or more listed in four general practices were invited to participate in the study and to fill out the ARC questionnaire. The 3,294 responders were asked to report: (a) any past occurrence of joint swelling lasting more than 4 weeks and the distribution of the swollen joints on a mannequin; (b) any joint pain lasting more than 4 weeks; (c) current joint pain or swelling; (d) morning stiffness; (e) whether they had been previously told by a doctor they had arthritis; and (f) their physical activity according to a three-class scale.

Results

Joint pain was reported by 889 (27%) subjects and joint swelling was reported by 463 (14%) subjects. Women reported joint pain and swelling more frequently than men, except for the younger age classes. The prevalence of joint pain and swelling increased with age in both sexes until age 55-64, when a plateau was observed. Age was involved in the determination of joint pain and swelling. Physical activity was involved only marginally.

Conclusions

We found high levels of prevalence of pain and swelling in the peripheral joints in a general Italian population. Prevalence was higher in Italian subjects than in subjects from China and Pakistan studied using the same questionnaire. These differences may reflect cultural and social diversity in the perception of disease, as well as true differences in the prevalence of rheumatic symptoms across the world.

Key words

Joint pain, joint swelling, peripheral joints, epidemiology, prevalence, Italy.

This work was supported in part by a grant of Regione Liguria (n.6463, 23.12.1993).

Please address correspondence and reprint requests: Dr. Marco A. Cimmino, Unità di Reumatologia, Dipartimento di Medicina Interna e Specialità Mediche, Viale Benedetto XV no. 6, 16132 Genova, Italy. E-mail: cimmino@csita.unige.it

Received on January 31, 2000; accepted in revised form on September 8, 2000.

© Copyright CLINICAL AND

EXPERIMENTAL RHEUMATOLOGY 2001.

Introduction

Musculoskeletal disorders are the most common cause of severe long-term pain and physical disability. Rheumatic diseases represent a relevant problem for the patient, the society, and the health care system because of the amount of disability, the loss of working days, and the health resource burden. Joint symptoms are extremely frequent in the general population with prevalences varying between 27% in Filipinos more than 15 years of age (1), 47% in Northern Chinese women more than 20 years of age (2), and up to 60% in subjects over 39 years of age from industrialized countries (3). Mapping the frequency of joint signs and symptoms in different geographical areas may be important not only for the economics of health care but also for identifying etiological risk factors.

One of the major problems in comparing the literature on joint complaints is that most authors have used different methods to evaluate such complaints. Pain was evaluated as "joint discomfort ever" in a study from China, (2), "pain in the spine or in the periheral joints during the year prior to the interview" in another study from Spain (4), and "ache, stiffness, soreness in moving, numbness, or pain in the joints and muscles" in a third study from Finland (3). It is evident that the data in these surveys are hardly comparable.

Recently, a simple questionnaire developed by the ARC Epidemiology Unit in Manchester, UK, has been used to screen the general population for rheumatoid arthritis (RA) (5). One of its questions investigates whether the patient has experienced pain or swelling in the peripheral joints which had been present for 4 or more weeks during his/her lifetime. The questionnaire also provides useful information on actual joint symptoms and their localization. To date, this questionnaire has been used in epidemiological studies in the UK (5), Hong Kong (6), Nigeria (7), Pakistan (8) and Sweden (Lennart Jacobsson, personal communication). This widespread use is a good omen for comparative studies in different areas.

Data on the prevalence of joint symptoms are scanty in Mediterranean coun-

tries, including Italy. This work is concerned with the prevalence of articular complaints evaluated by means of the above-mentioned questionnaire in a northern Italian population. This large-scale screening formed the basis for a study on the prevalence of RA in this population (9).

Patients and methods

Setting

The study was performed in the small town of Chiavari in the years 1991-1992. Chiavari is located on the Ligurian coast of northwestern Italy and is surrounded by farmland. It has a population of about 28,500; nearly one-fourth of its inhabitants are farmers.

Study population

In Italy, all citizens are registered with a general practitioner (GP) of the National Health System. The GP is chosen directly by the patient without major restrictions. 4,456 subjects aged 16 years or more listed in 4 general practices took part in the study. In this area, there are 24 general practices; 12 general practitioners (GPs) were available to participate in the study and 4 were randomly selected from among them. The selected practices were not different from the others in terms of general indicators of the socioeconomic status of the population. None of the GPs involved in this study were specialists in joint diseases. No selection bias for the patients in these general practices could be identified. The age and sex distribution of the sample were similar to those of the Italian population from the 1992 census (data not shown).

Questionnaire

An Italian translation of the ARC questionnaire was used (5). The text was back-translated into English to ensure reproducibility. Individuals were asked to report: (a) any past occurrence of joint swelling lasting more than 4 continuous weeks and to indicate the distribution of the swollen joints on a mannequin (the joints shown on the mannequin were the shoulders, elbows, wrists, fingers, knees, ankles and toes and the maximum number of joints that could be reported was 14); (b) any joint

Table I. Demographic data of the responders to the questionnaire according to the different time of the response.

Answer collection	Number of responders (%)	% Women	Age (SD)
Waiting room	673 (15.1)	57.2	51.9 (19.4)
First postal	1191 (26.7)	54.9	49.9 (19.5)
Second postal	594 (13.3)	55.4	47.1 (19.4)
Phone	836 (18.8)	48.1	45.8 (18.5)
None	1162 (26.1)	55.8	50.7 (21)

pain lasting more than 4 continuous weeks; (c) current joint pain or swelling; (d) morning stiffness lasting more than 30 minutes; (e) whether they had been told in the past by a doctor that they had arthritis; (f) their physical activity according to a three-class grading system (intense: farmer or blue collar; moderate: housewife or craftsman; mild: retired or student). The questionnaire was validated in a group of 68 outpatients on their first visit to a rheumatological clinic by comparison with the results of a direct interview, clinical examination, and evaluation of relevant files. The sensitivity of any single question ranged between 92% for morning stiffness to 98% for long-lasting pain and current pain or swelling. The specificity of any given question was comprised between 73% for a previous diagnosis of arthritis and 92% for current joint pain or swelling.

In the first phase of the study, which lasted for 2 months, the questionnaire was distributed in the waiting rooms of the GPs. At the end of this period, the questionnaire was mailed to the remaining subjects who had not visited their GP for a consultation in this period. Non-responders were mailed a second questionnaire after 2 months. Finally, a trained interviewer administered the questionnaire by phone to those subjects who had failed to respond to the previous two attempts to contact them. The sex and age distribution of the responders according to the timing of their response and of the non-responders are given in Table I.

Statistical analysis

All data were recorded on a PC using Dataflex software. Statistics included Student's t-test, the chi-square test with Yates' correction, and a Mantel-Haen-

zel logistic regression method. K statistics were used where appropriate. All of the tests were two-tailed.

Results

The cumulative response rate was 73.9% (3,294/ 4,456). The mean age of the 3,294 responders was 48.3 ± 19.3 years and 53.7% were women. Of the 1,162 subjects not included in the study because of failure to respond, 15 had returned incomplete questionnaires, 70 had died, and 166 had moved to other areas. The remaining 912 individuals who did not answer the questionnaire had a mean age of 49.5 ± 20.3 years and 57.5% of them were women. Therefore no statistical difference in age existed between responders and non-responders. Since not all the questions were answered in a few instances, the individual totals may differ from 3,294.

Figure 1 shows the prevalence of pain ever, swelling ever, present pain or swelling, morning stiffness, and a previous diagnosis of arthritis by a physician, according to the timing of the response. As expected, the prevalence of positive results declined after the first phase. Healthy subjects were in fact less motivated to answer the questionnaire.

The lifetime prevalence of joint pain

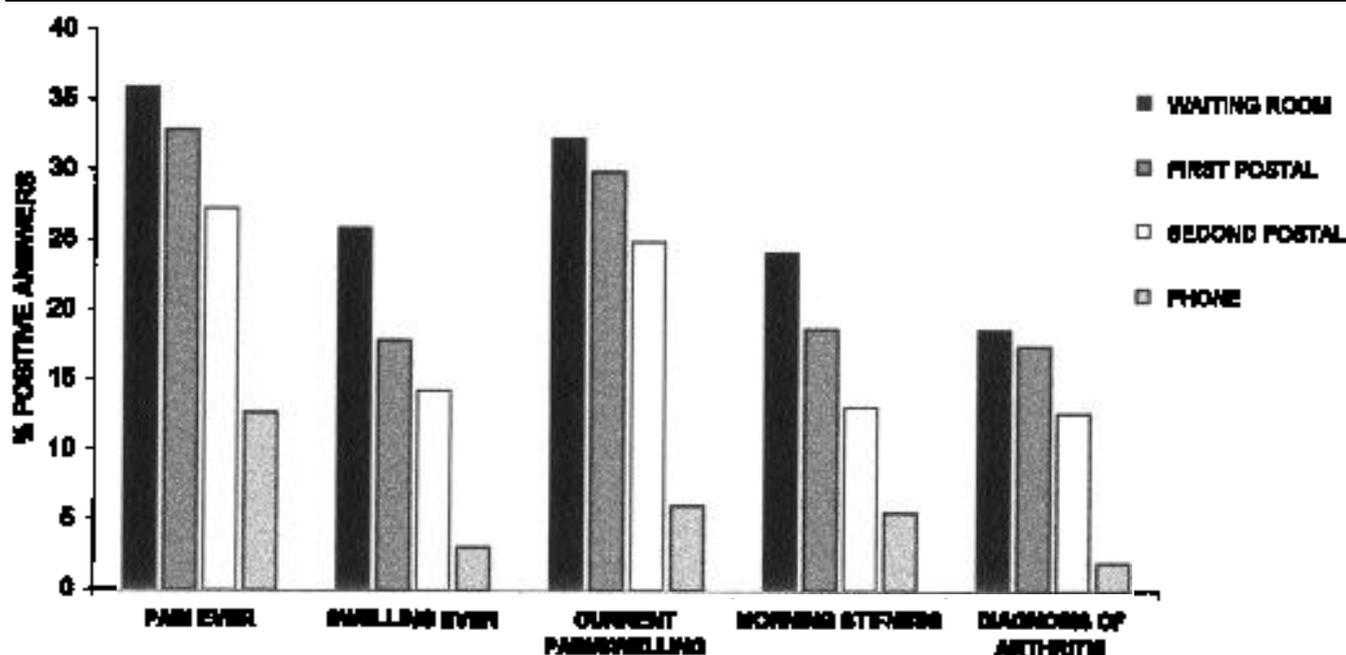
**Fig. 1.** Percentage of positive answers to the questionnaire according to the timing of the response.

Table II. Lifetime prevalence of joint pain or joint swelling lasting for more than 4 weeks according to sex and age.

Age	Joint pain		Joint swelling	
	Males n (%)	Females n (%)	Males n (%)	Females n (%)
15-24	22 (9.1)	14 (7)	12 (5)	7 (3.5)
25-34	28 (11.2)	37 (12.8)	15 (6)	15 (5.2)
35-44	45 (18.4)	53 (20.5)	16 (6.6)	31 (12)
45-54	64 (27)	102 (41.1)	19 (8)	45 (18.1)
55-64	86 (36.3)	133 (44.3)	44 (18.6)	71 (23.7)
65-74	54 (30.5)	120 (46)	30 (17)	78 (29.9)
75+	38 (27.5)	93 (43.4)	24 (17.4)	56 (26.2)
Total	337 (22.1)	552 (31.2)	160 (10.5)	303 (17.1)

Table III. Prevalence of current pain or swelling, lifetime early morning stiffness and previous diagnosis of arthritis according to sex and age (* p < 0.00001).

Variable	Prevalence	Men/Women (%)	Mean age (years)
Current joint pain/swelling			
Yes	762 (23.1%)	18.8/27.6 *	56.3 ± 16.9 *
No	2532 (76.9%)	81.2/72.4	45.9 ± 19.3
Early morning stiffness			
Yes	486 (14.7%)	10.7/18.2 *	57.3 ± 17 *
No	2808 (85.3%)	89.3/81.8	46.7 ± 19.2
Diagnosis of arthritis			
Yes	422 (12.8%)	9.6/15.5 *	61.5 ± 15.8 *
No	2872 (87.2%)	90.4/84.5	46.4 ± 19

Table IV. Number of patients with single-sided or symmetric involvement of specific joints.

Joint	Right side	Left side	Bilateral
Shoulder	123	125	80
Elbow	65	57	33
Wrist	97	77	59
Finger	191	166	134
Knee	177	159	116
Ankles	171	154	119
Toes	98	88	75

and joint swelling lasting more than 4 weeks is shown in Table II. Joint pain was reported by 889 (27%) subjects and joint swelling was reported by 463 (14%) subjects. More women than men reported joint pain (31.2% vs. 22.1%; $\chi^2 = 33.8$, $p < 0.00001$) and joint swelling (17.1% vs. 10.5%; $\chi^2 = 29.2$, $p < 0.00001$). The prevalence of both features was higher in women than in men

for all age groups, except for age group 15-24 years for joint pain and 15-34 years for joint swelling. The prevalence of joint pain and swelling increased with age in both sexes until age 55-64 years, when a plateau was observed (Table II). The mean age of the patients with joint pain was higher than that of the patients without pain (56.7 ± 16.3 years vs. 45.2 ± 19.4 years; $t = 15.7$, $p = 0.001$). The same was true for joint swelling (58.5 ± 16.6 years vs. 46.7 ± 19.2 years; $t = 12.5$, $p = 0.001$).

Current joint pain or swelling (point prevalence) was reported by 23.1% (762/ 3,294) subjects, early morning stiffness lasting more than 30 minutes by 14.7% (486/ 3,294) subjects, and a physician-based diagnosis of arthritis by 12.8% (422/ 3,294) subjects. Patients with these characteristics were more frequently women than men and belonged to the older age groups (Table III). The prevalence of current pain in

the different age classes followed a pattern similar to that observed for pain ever (data not shown).

The independent contribution of demographic features and of physical activity to joint pain and swelling was investigated using Mantel-Haenzel logistic regression analysis. Age was the most powerful predictor of joint symptoms ($p < 0.001$), while gender was relevant only for differences in morning stiffness, current joint pain, and physical activity ($p < 0.001$).

Physical activity was graded as intense by 1,130 (34.5%) subjects, moderate by 1,603 (48.9%) subjects, and mild by 544 (16.6%) subjects. Seventeen subjects did not answer this question. With univariate analysis, no correlation was found between physical activity and joint pain or swelling. However, men with intense physical activity were more frequently diagnosed as arthritic by their physicians (13.9%) than those with mild (9.5%) or moderate (8%) physical activity ($\chi^2 = 7.9$, $p = 0.019$). Women with mild or moderate physical activity showed hand swelling more frequently than those with intense physical activity ($p = 0.009$ for the left hand, $p = 0.048$ for the right hand). In the multivariate analysis, after adjustment for age and sex, intense physical activity was found to be independently related to joint pain.

Joint swelling was monoarticular in 21.1% of the subjects, oligoarticular (more than 1 and less than 6 joints) in 57.5% and polyarticular in 21.2%. No significant differences between sexes were found. Joints on the dominant side were more frequently swollen (422 vs. 369; $\chi^2 = 6.84$, $p = 0.009$). The hand was the joint most frequently affected (357 citations), followed by the knee (336), ankle (325), shoulder (248), foot (186), wrist (174), and elbow (122) (Table IV). Women had swelling of the hands and ankles more frequently than men. A symmetry index was calculated for every joint by dividing the number of patients with bilateral involvement by the total number of patients reporting single-sided involvement. Ideally, this index would be 0.5 if all the patients had bilateral swelling and 0 if none of them had bilateral

swelling. The symmetricity index was highest for the feet (0.4) followed by the hands and ankles (0.37), knees and wrists (0.40), shoulders (0.32) and elbows (0.27). No sex difference was identified, with the exception of the knees, which were swollen in a symmetrical fashion slightly more often in women (0.37) than in men (0.29). Except for the elbows, the frequency of bilateral involvement was higher than that expected to occur by chance, as demonstrated by χ^2 analysis and by the overall k statistics of 95 ($p < 0.0001$). In contrast, no side preponderance was seen (overall k statistics = 1.13; $p = 0.87$) among patients with single-sided involvement.

Discussion

Our data indicate that about 27% of a northern Italian population had suffered from joint pain for more than one month during their lifetime. In addition, 14% had long-lasting joint swelling in the peripheral joints, a sign that may indicate a more serious health problem. These findings confirm that musculoskeletal conditions are among the most common health problems in the general population. Asking subjects if they have ever suffered from joint symptoms probably introduced a recall bias because old symptoms are more likely to be forgotten; this could have resulted in an underestimate of the frequency of lifetime symptoms but should not have affected the evaluation of current symptoms.

We obtained information on pain at any location and on swelling of the peripheral joints, although no specific questions investigating low back pain were included in the questionnaire. Since low back pain represents one of the more frequently reported musculoskeletal conditions, our total figures are probably underestimated. Studies that have included questions addressing spinal involvement showed prevalences of joint pain ranging between 45% - 70% in different European areas (3, 4). In our study, the point prevalence of joint pain was 23.1%, which value is very close to that of 26% observed in Spain (4).

The response rate to the screening

questionnaire (73.9%) was good, although the procedure was time-consuming as it required 4 steps to collect the data, i.e. direct contact, two mailings and a phone interview. A decrease in the prevalence of joint symptoms along these subsequent steps was clearly demonstrated in the present study (Fig. 1). This fact could be due to different recall patterns associated with different methods. We feel, however, that the trends observed were due to late responders being on average healthier than early responders, regardless of the data collection procedure used. This observation confirms the importance of maximizing participation in epidemiological studies.

A physician-based diagnosis of arthritis was reported by 12.8% of the subjects. This percentage is surprisingly high if we consider that osteoarthritis is called "artrosi" in Italy and is not included among the arthritides. Other rheumatic diseases, such as fibromyalgia, scapulo-humeral peri-arthritis, and possibly aspecific rheumatoid factor positivity, were likely to be included among the arthritides by the GPs or by the patients themselves. Rheumatoid factor positivity is rather frequent in the Italian general population because of the high prevalence of hepatitis C virus infection. The value of self-reported information could be questionable because its sensitivity (i.e., the proportion of signs, symptoms and clinical diagnoses correctly self-reported or true positives) and specificity (i.e., the proportion of true negatives) are unknown. Nonetheless, the figures obtained in our study are similar to those observed in other surveys. Our aim was not only to ascertain the prevalence of joint symptoms in an Italian population, but also to compare our results with those obtained in studies carried out in other countries using similar methods. In addition, self-reported questionnaires have been found to be reliable for the identification of rheumatological diagnoses (10) and for the distinction between RA and non-inflammatory musculoskeletal pain (11) in selected groups of rheumatic patients.

The age and sex distribution of the

patients was similar to that reported in the literature (3), with female sex and older age as important determinants of articular pain. Only in the younger age classes, i.e. 15-24 years for joint pain and 15-34 years for joint swelling, was the male sex strongly represented. We feel that this observation may be related to the fact that young males are engaged in heavy work or sports activities more often than females (12). As expected, intense physical activity was related to joint pain, a finding that has been observed also in Sweden (13).

Among the studies performed using the Manchester questionnaire (5-7, 14), only two reported the sex and age distribution of patients with joint pain or swelling (6, 14). Joint pain was twice as common in Italians than in the Chinese population of Hong Kong described by Lau *et al.* (6), and joint swelling was thrice as common. In comparison with a population of Pakistanis living in England (14), the prevalence of joint pain in Italy was up to 6 times higher in the age classes below 55 years. Above that age, the prevalence of joint pain became similar in the two populations. Pakistanis living in Pakistan had even less joint pain than those living in England. This observation is surprising, because a recent review has emphasized that subjects of Asian origin living in the UK have a higher prevalence of joint symptoms than the Caucasian population (15).

There are several possible explanations for these findings. The Hong Kong and Pakistan studies used a direct interview instead of a questionnaire sent by mail. It is possible that some of the Italian recipients of the posted questionnaire misinterpreted the questions and overestimated their joint symptoms. Although the single questions showed good sensitivity and specificity in our pilot study of rheumatological outpatients, their performance could have been less reliable in the general population. These differences may also reflect cultural and social diversity in the perception of disease, as well as true differences in the prevalence of rheumatic symptoms in various areas of the world. It is regrettable that pain prevalence data from the studies performed

in Africa and the UK using the same questionnaire were not available to expand this geographical comparison.

Acknowledgements

We are indebted with Drs Antonio Zampogna, Sergio Murrone, Silvano Baruffi and Giacomo Alessio of the Gruppo di Medicina Generale, Chiavari, for allowing us to contact their patients. Dr Elena Barbiroglio and Dr Pietro Picetti, USL 13, Chiavari, made the necessary arrangements for facilities for the clinical examinations. Dr. Carlo Maria Pesce, Università di Genova, kindly reviewed the manuscript.

References

1. WIGLEY RD, MANAHAN L, CARAGAY R *et al.*: Observations on rheumatic diseases in Polynesia and The Philippines. *J Rheumatol* 1983; (Suppl. 10) 10: 37-9.
2. WIGLEY RD, ZHANG N-Z, ZENG Q-Y *et al.*: Rheumatic diseases in China: ILAR-China study comparing the prevalence of rheumatic symptoms in northern and southern rural populations. *J Rheumatol* 1994; 21: 1484-1490.
3. TAKALA J, SIEVERS K, KLAUKKA T: Rheumatic symptoms in the middle-aged population in southwestern Finland. *Scand J Rheumatol* 1982; (Suppl. 47): 15-29.
4. BALLINA GARCIA FJ, HERNANDEZ MEJIA R, MARTIN LASCUEVAS P, FERNANDEZ SANTANA J, CUETO ESPINAR A: Epidemiology of musculoskeletal complaints and use of health services in Asturias, Spain. *Scand J Rheumatol* 1994; 23: 137-41.
5. MACGREGOR AJ, RISTE LK, HAZES JMW, SILMAN AJ: Low prevalence of rheumatoid arthritis in black Caribbeans compared with whites in inner city Manchester. *Ann Rheum Dis* 1994; 53: 293-7.
6. LAU E, SYMMONS D, BANKHEAD C, MACGREGOR A, DONNAN S, SILMAN A: Low prevalence of rheumatoid arthritis in the urbanized Chinese of Hong Kong. *J Rheumatol* 1993; 20: 1133-7.
7. SILMAN AJ, OLLIER W, HOLLIGAN S *et al.*: Absence of rheumatoid arthritis in a rural Nigerian population. *J Rheumatol* 1993; 20: 618-22.
8. HAMEED K, GIBSON T, KADIR M, SULTANA S, FATIMA Z, SYED A: The prevalence of rheumatoid arthritis in affluent and poor urban communities of Pakistan. *Br J Rheumatol* 1995; 34: 252-6.
9. CIMMINO MA, PARISI M, MOGGIANA GL, MELA GS, ACCARDO S: Prevalence of rheumatoid arthritis in Italy: The Chiavari study. *Ann Rheum Dis* 1998; 57: 315-8.
10. RASOOLY I, PAPAGEORGIOU AC, BADLEY EM: Comparison of clinical and self reported diagnosis for rheumatology outpatients. *Ann Rheum Dis* 1995; 54: 850-2.
11. CALLAHAN LF, PINCUS T: A clue from a self-report questionnaire to distinguish rheumatoid arthritis from non-inflammatory diffuse musculoskeletal pain. The P-VAS: D-ADL ratio. *Arthritis Rheum* 1990; 33: 1317-22.
12. SALLIS JF, ZAKARIAN JM, HOVELL MF, HOFSTETTER CR: Ethnic, socioeconomic, and sex differences in physical activity among adolescents. *J Clin Epidemiol* 1996; 49: 125-34.
13. JACOBSSON L, LINDGARDE F, MANTHORPE R, OHLSSON K: Effect of education, occupation and some lifestyle factors on common rheumatic complaints in a Swedish group aged 50-70 years. *Ann Rheum Dis* 1992; 51: 835-43.
14. HAMEED K, GIBSON T: A comparison of the prevalence of rheumatoid arthritis and other rheumatic diseases amongst Pakistanis living in England and Pakistan. *Br J Rheumatol* 1997; 36: 781-5.
15. NJOBVU P, HUNT I, POPE D, MACFARLANE G: Pain amongst ethnic minority groups of south asian origin in the United Kingdom: A review. *Rheumatology* 1999; 38: 1184-7.