Epidemiology of rheumatoid arthritis, juvenile idiopathic arthritis and gout in two regions of the Czech Republic in a descriptive population-based survey in 2002-2003

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Abstract

Objective

To estimate the annual incidence and prevalence of rheumatoid arthritis (RA), juvenile arthritis (JIA) and gout in a population based study in two regions of the Czech Republic with total population of 186,000 inhabitants.

Methods

Study was conducted in the Town of Ceske Budejovice and district of Cheb in the Czech Republic (with a total population of 186,000 inhabitants) in the years 2002 and 2003. Incident cases were registered on condition that the definite diagnosis was confirmed according to existing classification criteria during the study period. Prevalence was studied on the basis of identification of established diagnosis from registers of patients of participating rheumatologists and other specialists. They were asked to report all living patients that had been diagnosed before 1st March 2002. Patients were only included in the study if their permanent address was in the selected study area.

Results

Overall, we found 48 incident and 947 prevalent cases of RA among adults (16+ years), 4 incident and 43 prevalent cases of JIA among children (less than 16 years old), and 64 incident and 425 prevalent cases of gout among adults (16+ years). The total annual incidence of RA was 31/100,000 in adult population aged 16 years and more (95% CI 20 to 42/100,000). The prevalence of RA was 610/100,000 (95% CI 561 to 658/100,000) in the adult population. An annual incidence of gout in adults was 41/100,000 (95% CI 28 to 53/100,000). The prevalence of gout was 300/100,000 (95% CI 266 to 334/100,000). The annual incidence of JIA was 13/100,000 in children less than 16 years old (95%CI 1 to 20/100,000). The prevalence of JIA in children was 140/100,000 (95% CI 117 to 280/100,000).

Conclusion

This study estimates the annual incidence and prevalence rates of RA, gout and JIA in the first population-based survey in the Czech Republic. The rates of RA and JIA compare well with figures reported from other countries; figures in gout seem to be lower than reported elsewhere.

Key words

Epidemiology, incidence, prevalence, rheumatoid arthritis, juvenile idiopathic arthritis, gout.

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Introduction

The knowledge of the occurrence of inflammatory joint diseases in an exactly defined population is an important factor for the planning of rheumatology health care and it contributes to a better understanding of the disease process itself.

The estimated annual incidence of rheumatoid arthritis (RA) in Europe is between 20-45/100,000 and 24-75/100,000 in American Caucasians.(1-6) In southern Sweden, the annual incidence of rheumatoid arthritis (RA) has been reported to be 24/100,000 (29/100,000 for women and 18/100,000 for men). (1) In a British study, the annual incidence estimate of RA within the Norwich Health Authority was 30.8/100,000 for women and 12.7/100,000 for men when age-adjusted to the population of England and Wales. (2) Both these studies have used the 1987 American College of Rheumatology (ACR) criteria. The highest incidence of RA has been reported among American Indians (7-9). There have also been reports of decline in the incidence of RA in various countries (3, 8, 10), but it has not been proved by other studies.(5,11) The prevalence of RA has been reported to be 0.4-3%.(5,12-15) It has been reported to be 0.4-0.5% in northern Norway in 1989 and 1994 (5), 1.16% in women and 0.44% in men in 2001 in the UK (14). Lower prevalence rates have been reported in southern Europe and some non-European populations, for example 0.2% in Yugoslavia (16) and 0.3% in China (17). The highest prevalence (ranging between 0.4-8.2%) has been estimated among American Indians.(9, 18)

The annual incidence of gout in Europe and the US was found to be 140-350/100,000 (19-21). In the UK, the incidence of gout was reported about 250-350/100,000.(19) When restricted to first-ever episodes beginning during the study period, the estimates have decreased to 140/100,000 (210 for males and 70 for females) (20). A study based on general practice reports in the UK has reported the prevalence of gout to be 26% overall in adults (61 in males and 1% in females). (19) However, the occurrence varies in different ethnic groups.(22-25) The annual incidence of gout has been found to be increasing, and the disease tending to start at an earlier age. (26-27)

A wide range in incidence can be seen for juvenile chronic arthritis (JCA) or juvenile rheumatoid arthritis (JRA): 1.3-22.6/100,000 in children under than 16 years old (28-30). Prevalence of JCA in the Caucasian population in a retrospective study in Minnesota using EULAR criteria has been reported to be 10.5/100,000. (31-32)

In the Czech Republic, medical health care is accessible for the entire population and is overseen by the government. The country is divided into 14 regions containing 70 smaller districts. Typically, there are state hospitals and private ambulant practices in most of the districts. Several general practitioners represent primary health care in each district. Patients with specific symptoms are referred to a private specialist or, with more severe illness, to a hospital within the district. General practitioners should recommend examination by a specialist but the patient can also seek the specialist health care without recommendation. Access to specialist health care is easily available to every patient.

Patients with early inflammatory joint diseases are initially treated by general practitioners. Gout is basically treated at the primary care level. All cases of early arthritis, acute or sub acute polyarthritis are referred to rheumatologists to confirm the diagnosis and to consider appropriate therapy as soon as possible. In general, patients with ongoing inflammatory joint symptoms and patients with a confirmed diagnosis of inflammatory joint disease stay in the further care of rheumatologists. Should the assessment of the definite diagnosis be complicated or some special laboratory investigations are needed, the patient is referred to the Institute of Rheumatology in Prague (according to normal practice).

There have been no known epidemiological data on these diseases in the Czech Republic until 2002. A project of Clinical database/national register of rheumatic diseases started at the

Institute of Rheumatology in Prague in 2000. A part of the project is the population-based study described in this paper. The aim of this population-based study was to estimate the annual incidence and prevalence of rheumatoid arthritis, juvenile rheumatoid arthritis and gout in two districts of the Czech Republic between March 2002 and March 2003.

Patients and methods

Study population

Two regions of the Czech Republic with a similar number of inhabitants were chosen: city of Ceske Budejovice and the rural district of Cheb (Fig 1) with a total population of 186,077 inhabitants (97,339 in Ceske Budejovice and 88,738 in the Cheb district). 154,374 of them were 16 years old and more, and 31,703 children were younger than 16 years at the time of study. Census data from 2001 were used as basic population data. The population in both regions is mostly Caucasian and is relatively stable. The chosen areas represent an urban (Ceske Budejovice) and a rural population (Cheb district) of the country. There were several reasons for the selection of these particular study areas: all rheumatologists working in both regions were interested in this project, each of the areas was easy to define and there were only a small number of hospitals or other medical facilities in each region. These factors enabled better cooperation and helped to avoid missing patients.

The city of Ceske Budejovice is the center of the South Bohemia region with one large hospital designed to serve patients in the whole region. There are seven practicing rheumatologists in the city; all of them participated in the study. Two rheumatologists worked at the time of the study in the above mentioned hospital at the rheumatology department and one rheumatologist worked at the pediatric department. Four remaining rheumatologists worked as private practicing specialists.

In the Cheb district, there are two practicing private rheumatologists and both of them participated in the study. There are also three local hospitals in the district: in the towns of Cheb, As, and Marianske Lazne. Because of the absence of a rheumatology department in each of them, special care is guaranteed by the above mentioned practicing rheumatologists.

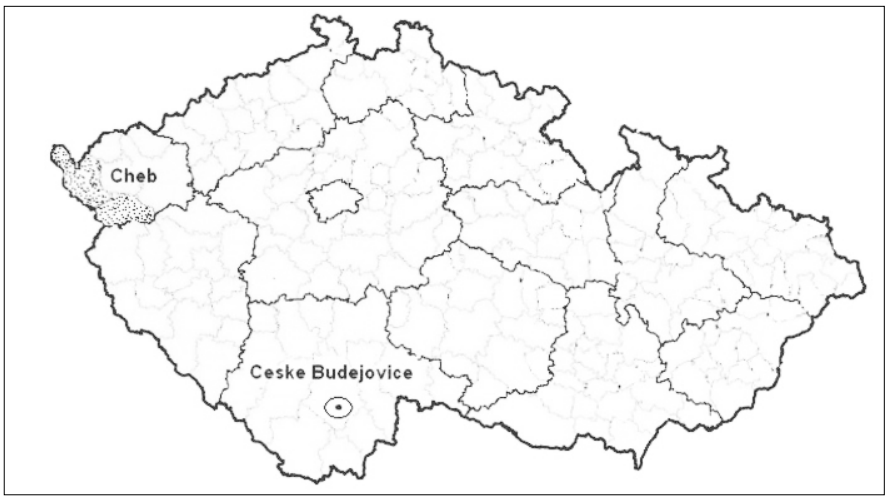

Fig. 1. Map of the Czech Republic showing the studied areas.

In both regions combined, there were 64 general practitioners at the time of the study: 37 in Ceske Budejovice and 27 in the Cheb district. Seven practitioners refused to participate in the study for time reasons (2 in Ceske Budejovice and 5 in the Cheb district).

Incidence estimates

All patients with suspect symptoms were referred by their general practitioners, pediatricians, practicing specialists (orthopedics, internists) and collaborating hospital departments where patients with inflammatory joint disease could be found (orthopedics, department of internal medicine, surgery, pediatrics) to the cooperating rheumatologists in both districts. Patients were then registered as incident cases if the diagnosis was confirmed according to existing classification criteria during the 12 month study period (between 1 March 2002 and 1 March 2003). Patients were asked to determine the year and month of the symptoms onset. In addition, specific personal data were obtained to exclude duplicities (informed consent was needed). Only collaborating rheumatologists were allowed to determine the definite diagnosis and to register a new patient with RA or JIA. Because gout is usually diagnosed and treated by general practitioners, they were allowed to register the patients fulfilling the classification criteria. Before starting the study all general practitioners, pediatricians, practicing specialists, and doctors working in the above mentioned specialized units of the hospitals were informed about the study by the investigators: they were invited to the seminar and were given written information about the study. The participating rheumatologists were instructed to use unified classification criteria and to fill in the form for each registered case. One of the investigators stayed six months in each region to encourage the participating physicians continuously and to give methodological advice when needed. These investigators also tried to estimate reporting bias by going through all patient files of all participating rheumatologists in the study and contacting specialists in neighbouring districts and country central specialist institute in Prague (in an attempt to find patients living in the study area but treated elsewhere). The data were collected monthly.

All the patients defined as having rheumatoid arthritis fulfilled the 1987 ACR (American College of Rheumatology) criteria (33) applied cumulatively as recommended (2).

Patients registered as having gout fulfilled the Wallace criteria (34). Presence of 6 of the 11 criteria yields a specificity of 93% against pseudogout and sensitivity of 85% (35). As gout is

a recurrent condition, only patients with the first-ever episode of acute primary or secondary gout were registered as incident cases.
The revised Durban 1997 classification criteria were used to diagnose JIA in children younger than 16 years. (36)

Prevalence estimates
Prevalence was studied on the basis of identification of established diagnosis from registers of the patients of collaborating rheumatologists, other practicing specialists and general practitioners. They were asked to report all living patients, who had been diagnosed before 28 February 2002. One of the investigators personally evaluated the patient-files in the registers of all participating rheumatologists (only two registers were not fully computerized). General practitioners and practicing specialists were visited by this investigator and asked to report the patients in written form. It was not possible to guarantee the proper fulfilment of classification criteria in all reported cases that had been diagnosed before the beginning of the study.
The next condition of registering the patients in both parts of the survey (monitoring of incidence and prevalence) was to have a permanent address in precisely defined regions. Recent Census 2001 data were used to get basic demographic information. Migration rates in both regions were low and the population was stable.

Procedures to improve case finding
Several procedures to minimize bias were performed. To minimize loss of patients (underreporting), we informed medical centers and specialists outside the selected study area which patients with inflammatory joint disease living in some of studied districts might visit. Patients coming from studied regions diagnosed at the Institute of Rheumatology in Prague (country central specialist institute) were also found by one of the investigators and registered as cases. There was no rheumatologist refusing cooperation in the study area. To minimize selection bias and diagnostic misclassification, all collaborators in both districts underwent a short training session in symptoms assessment. Participating rheumatologists were instructed to use unified classification criteria and were continuously encouraged and assisted. Only rheumatologists were allowed to determine the definite diagnosis and register new RA and JIA patients.

Statistical analysis
The estimates were calculated with 95% confidence intervals (95% CI). Standardised rates were calculated in Stata 8 statistical package (Stata Corporation, College Station, USA), and we used European standard population as standard.

Results

A total of 1531 patients were diagnosed as having RA, JIA or gout. One hundred and sixteen patients with a new joint disease were found in the year of the study and were registered as incident cases for these diagnoses.
Nine hundred and ninety-five patients were found as having RA. 48 patients fulfilled criteria for incident RA. This gave a total annual incidence for RA in both districts of 31/100,000 in adult population aged 16 years and more (95% CI 20 to 42/100,000). Among incident cases, 34 patients were women

Table I. Age-specific incidence and prevalence rates* of rheumatoid arthritis.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
16-19	2552	0	1 (39.2)	2472	0	0	5024	0	1 (19.9)
20-29	8036	0	2 (24.9)	7783	0	3 (38.5)	15819	0	5 (31.6)
30-39	6824	0	7 (102.6)	6199	0	7 (112.9)	13023	0	14 (107.5)
40-49	7278	1 (13.7)	14 (192.4)	6768	1 (14.8)	12 (177.3)	14046	2 (14.2)	26 (185.1)
50-59	6689	1 (14.9)	32 (478.4)	6252	2 (32.0)	26 (415.9)	12941	3 (23.2)	58 (448.2)
60-69	3762	3 (79.7)	25 (664.5)	3332	1 (30.0)	19 (570.2)	7094	4 (56.4)	44 (620.2)
70-79	2048	1 (48.8)	11 (537.1)	1695	0	13 (767)	3743	1 (26.7)	24 (641.2)
80+	1252	1 (79.9)	5 (399.4)	964	2 (207.5)	6 (622.4)	2216	3 (135.4)	11 (496.4)
Total	38441	7 (18.2)	97 (252.3)	35465	6 (16.9)	86 (242.5)	73906	13 (17.6)	183 (247.6)
Women									
16-19	2446	0	5 (204.4)	2243	0	3 (133.7)	4689	0	8 (170.6)
20-29	7887	0	9 (114.1)	7637	1 (13.1)	7 (91.7)	15524	1 (6.4)	16 (103.1)
30-39	6975	1 (14.3)	17 (243.7)	6114	0	14 (229)	13089	1 (7.6)	31 (236.8)
40-49	7425	2 (26.9)	50 (673.4)	6614	1 (15.1)	54 (816.4)	14039	3 (21.4)	104 (740.8)
50-59	7303	5 (68.5)	109 (1492.5)	6430	2 (31.1)	104 (1617.4)	13733	7 (51.0)	213 (1551)
60-69	4589	7 (152.5)	89 (1939.4)	3880	6 (154.6)	103 (2654.6)	8469	13 (153.5)	192 (2267.1)
70-79	2985	3 (100.5)	86 (2881.1)	2682	3 (111.9)	78 (2908.3)	5667	6 (105.9)	164 (2893.9)
80+	2670	2 (74.9)	17 (636.7)	2058	2 (97.2)	19 (923.2)	4728	4 (84.6)	36 (761.4)
Total	42280	20 (47.3)	382 (903.5)	37658	15 (39.8)	382 (1014.4)	79938	35 (43.8)	764 (955.7)

* Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

Table II. Age-specific incidence and prevalence* rates of gout.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
16-19	2552	0	0	2472	0	0	5024	0	0
20-29	8036	0	4 (49.8)	7783	0	2 (25.7)	15819	0	6 (37.9)
30-39	6824	3 (44.0)	12 (175.8)	6199	1 (16.1)	10 (161.3)	13023	4 (30.7)	22 (168.9)
40-49	7278	6 (82.4)	40 (549.6)	6768	3 (44.3)	32 (472.8)	14046	9 (64.1)	72 (512.6)
50-59	6689	8 (119.6)	73 (1091.3)	6252	9 (144.0)	60 (959.7)	12941	17 (131.4)	133 (1027.7)
60-69	3762	7 (186.1)	34 (903.8)	3332	5 (150.1)	36 (1080.4)	7094	12 (169.2)	70 (986.7)
70-79	2048	3 (146.5)	32 (1562.5)	1695	2 (118.0)	16 (944.0)	3743	5 (133.6)	48 (1282.4)
80+	1252	3 (239.6)	5 (399.4)	964	1 (103.7)	4 (414.9)	2216	4 (180.5)	9 (406.1)
Total	38441	30 (78.0)	200 (520.3)	35465	21 (59.2)	160 (451.1)	73906	51 (69.0)	360 (487.1)
Women									
16-19	2446	0	0	2243	0	0	4689	0	0
20-29	7887	0	0	7637	0	0	15524	0	0
30-39	6975	0	2 (28.7)	6114	0	1 (16.4)	13089	0	3 (22.9)
40-49	7425	1 (13.5)	1 (13.5)	6614	1 (15.1)	1 (15.1)	14039	2 (14.2)	2 (14.2)
50-59	7303	3 (41.1)	10 (136.9)	6430	2 (31.1)	6 (93.3)	13733	5 (36.4)	16 (116.5)
60-69	4589	1 (21.8)	9 (196.1)	3880	2 (51.5)	10 (257.7)	8469	3 (35.4)	19 (224.3)
70-79	2985	1 (33.5)	15 (502.5)	2682	1 (37.3)	3 (111.9)	5667	2 (35.3)	18 (317.6)
80+	2670	1 (37.5)	4 (149.8)	2058	0	3 (145.8)	4728	1 (21.2)	7 (148.1)
Total	42280	7 (16.6)	41 (97.0)	37658	6 (15.9)	24 (63.7)	79938	13 (16.3)	65 (81.3)

* Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

Table III. Age-specific incidence and prevalence* rates of juvenile idiopathic arthritis.

Age group	Ceske Budejovice			Cheb			Both areas		
	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)	Population	Incident cases N (Rate/100,000)	Prevalent cases N (Rate/100,000)
Men									
0-4	2071	0	0	2046	0	0	4117	0	0
5-15	6448	2 (31.0)	1 (15.5)	5884	0	2 (34.0)	12332	2 (16.2)	3 (24.3)
16-19	2552	0	2 (78.4)	2472	0	0	5024	0	2 (39.8)
20-29	8036	0	5 (62.2)	7783	0	3 (38.5)	15819	0	8 (50.6)
30-39	6824	0	2 (29.3)	6199	0	0	13023	0	2 (15.4)
40-49	7278	0	0	6768	0	0	14046	0	0
50-59	6689	0	0	6252	0	0	12941	0	0
60-69	3762	0	0	3332	0	0	7094	0	0
70-79	2048	0	0	1695	0	0	3743	0	0
80+	1252	0	0	964	0	0	2216	0	0
Total	46960	2 (4.3)	10 (21.3)	43395	0	5 (11.5)	90355	2 (2.2)	15 (16.6)
Women									
0-4	1945	0	1 (51.4)	2016	0	0	3961	0	1 (25.2)
5-15	6154	2 (32.5)	4 (65.0)	5669	0	4 (70.6)	11823	2 (16.9)	8 (67.7)
16-19	2446	0	6 (245.3)	2243	0	2 (89.2)	4689	0	8 (170.6)
20-29	7887	0	4 (50.7)	7637	0	2 (26.2)	15524	0	6 (38.6)
30-39	6975	0	2 (28.7)	6114	0	1 (16.4)	13089	0	3 (22.9)
40-49	7425	0	0	6614	0	1 (15.1)	14039	0	1 (7.1)
50-59	7303	0	1 (13.7)	6430	0	0	13733	0	1 (7.3)
60-69	4589	0	0	3880	0	0	8469	0	0
70-79	2985	0	0	2682	0	0	5667	0	0
80+	2670	0	0	2058	0	0	4728	0	0
Total	50379	2 (4.0)	18 (35.7)	45343	0	10 (22.1)	95722	2 (2.1)	28 (29.3)

* Incident cases – cases diagnosed between 1 March 2002 and 1 March 2003; prevalent cases - cases diagnosed before 1 March 2002.

and 14 were men, giving the sex specific crude incidence of 43.7 (95% CI 18 to 57/100,000) and 18.3/100,000 (95% CI 1 to 27/100,000), respectively. The incidence figure calculated for the entire population of both districts was 26/100,000 (95% CI 16 to 36/100,000). Age-sex specific incidence rates are reported in Table I. Standardised incidence rates did not substantially differ from crude incidence rates (because the age structure of study districts was similar to European standard population). The standardised incidence rates for men and women are shown in Table IV. All patients were of white Caucasian origin. The mean age at diagnosis was 56 years (SD 16 years). Fulfilling of classification criteria are summarized in table 5. 16 patients were not able to state the month of symptom onset; the median duration of symptom onset to inclusion in the study (definite diagnosis of RA) was 4 months (range 0-24) among 32 remaining patients. 30 patients (62.5%) described their difficulties in the beginning of RA as arising fast and 18 patients (37.5%) as creeping. In 8 incident patients (16.7%) radiographic changes at the cervical part of spine were found during the year of observation. None of the incident patients had had a joint replacement.

There were 947 RA cases diagnosed before 1 March 2002. This gave a point prevalence of 610/100,000 (95% CI 561 to 658/100,000) among individuals aged 16 years and more (0.61%). There were 730 women and 217 men among prevalent cases; the women-to-men ratio was 3.4:1. Age-sex specific prevalence is summarized in Table I. Age-standardized prevalence is presented in Table IV.

There were 489 patients with gout. Of these, 64 patients were diagnosed as having the first episode of acute primary or secondary gout (according to the Wallace criteria) within the year of observation, giving an annual incidence of 41/100,000 in the adult population aged 16 years or more (95% CI 28 to 53/100,000). The incidence figure for the entire population was calculated to be 34/100,000 (95% CI 23 to 46). There were 52 men and 12 women among incident cases, giving the sex specific incidence of 69 (95% CI 61 to 78/100,000), and 15/100,000 (95% CI 1 to 23/100,000) among adult men and women respectively. The age-sex specific incidence rates are reported in Table II. Age-standardised rates are in Table IV. According to everyday practice the gout was diagnosed not only by rheumatologists but also by general practitioners. 53% of incident cases (n = 34) were diagnosed by general practitioners (fulfilment of the classification criteria had to be documented in written form). The mean age at diagnosis was 58 years with minimum of 31 and maximum of 82 years. The median duration of symptom onset to inclusion in the study was 1 week, minimum 1 day, maximum 15 years. Distribution of joints affected by the first gouty attack is reported in Table VI. Particular information about serum level of uric acid was given in 43 of total of 64 patients but another 3 patients were identified as having hyperuricemia as well (71%). The median of serum level of uric acid was 423 mmol/l, the maximum 668 mmol/l and the minimum 298 mmol/l. As normal range was used 200-420 mmol/l. Observed causative factors of hyperuricemia are summarized in Table VII.

There were 425 patients who have never had an episode of gout before 1 March 2002. This gave a point prevalence of 300/100,000 (95% CI 266 to 334/100,000) in adult population of both districts (0.3%). The men-to-women ratio was 5.3:1 (357:68). The age-sex specific prevalence is summarized in Table II. Age-standardised prevalence is in Table IV. 62% of the prevalent cases were diagnosed by general practitioners (n = 263).

There were 47 children in both districts with JIA. Of these, 4 children younger than 16 years fulfilled the Durban 1997 criteria in the year of the observation, giving the annual incidence of 13/100,000 among population < 16

Table IV. Age-standardised incidence and prevalence of RA, gout and JIA (per 100,000).

	Incidence			Prevalence		
	Ceske Budejovice	Cheb	Both areas	Ceske Budejovice	Cheb	Both areas
Rheumatoid arthritis						
Children (0-15 years only)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Adults only (16+)						
Men	19.3	16.8	18.1	262.0	259.2	260.1
Women	44.8	37.8	41.5	877.0	1002.1	934.4
Whole population						
Men	15.0	13.1	14.1	204.4	202.2	202.9
Women	34.9	29.4	32.4	684.0	781.6	728.8
Gout						
Children (0-15 years only)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Adults only (16+)						
Men	79.6	62.4	71.6	535.7	474.2	506.9
Women	14.9	16.2	15.5	89.1	61.8	76.1
Whole population						
Men	62.1	48.7	55.9	417.9	369.9	395.4
Women	11.6	12.7	12.1	69.5	48.2	59.4
Juvenile idiopathic arthritis						
Children (0-15 years only)						
Men	19.7	0	10.3	9.9	21.6	15.5
Women	20.7	0	10.8	60.1	44.9	52.2
Adults only (16+)						
Men	-	-	-	-	-	-
Women	-	-	-	-	-	-
Whole population						
Men	4.3	0	2.3	20.5	10.2	15.4
Women	4.5	0	2.4	43.3	24.2	34.0

Table V. Distribution of fulfilled ACR classification criteria in incident cases of RA.

ACR classification criteria, 1987	Number of patients fulfilling single criteria	% of total of 48 patients
Morning stiffness lasting at least 1 hour	44	91.6
Arthritis of hand joints (persisting at least 6 weeks)	48	100
Symmetric arthritis (persisting at least 6 weeks)	48	100
Arthritis of ≥ 3 joint areas *	45	93.8
Rheumatoid nodules	2	4.2
Rheumatoid factor	29	60.4
Radiography change	28	58.3
Average count of fulfilled criteria in one patient (SD)	5.1 (0.6)	
Median count of fulfilled criteria in one patient (min; max)	5 (4.6)	

* Soft tissue swelling or fluid in 3 of the left or right proximal interphalangeal, metacarpophalangeal, wrist, elbow, knee, ankle, or metatarsophalangeal joints observed by a rheumatologist.

Table VI. Distribution of joints affected by first gouty attack in incident cases of gout.

swollen joint by first gouty attack	number of patients (%)
Metatarsophalangeal (MTP)	32 (50)
Small hand joints	6 (9.3)
Ankle	5 (7.8)
Knee	2 (3.1)
Patients not able to state the joint	19 (29.7)
Total	64 (100)

Table VII. Observed disorders, probable causation of gout in incident cases of gout.

Observed disorders	Number of patients (%)
Enzymatic defect	0 (not examined)
Alcoholism (60g of alcohol/day or more)	8 (12.5)
Relevant therapy (diuretic, acetylsalicylic acid, pyrazinamid)	16 (25)
Renal insufficiency (GF < 0.,5ml/s/1.,73m^2)	3 (4.6) all combined with diuretic therapy
Hemolytic anaemia	0
Neoplasia (solid tumor / lymfoproliferation)	2 (3.1)
Endocrinopathy (hypo- / hyperparathyroidism)	1 (1.6) combined with renal insufficiency and diuretic therapy
Patients exposed to lead	0
Not given information	18 (28.1)
Total	64 (100)

years old (95% CI 1 to 20/100,000). The ratio of girls to boys was 1:1 (2 cases in each sex). Sex specific incidence was 12/100,000 in girls (95% CI 1 to 19/100,000) and 13/100,000 in boys (95% CI 1 to 20/100,000). All incident cases emerged in town of Ceske Budejovice; no new patients were found in the district of Cheb. Clinical and laboratory data are summarized in Table VIII.

There were 43 children diagnosed in both regions before 1 March 2002; this gave a point prevalence of 140/100,000 (95% CI 117 to 280/100,000) of children younger than 16 years (0.14%). Age-specific incidence and prevalence rates of JIA are summarized in Table III. Age-standardised incidence and prevalence of JIA is presented in Table IV.

Ninety-two patients included in the study were not originally reported to the authors but they were either found in the patient-files of cooperating rheumatologists or diagnosed in the Institute of Rheumatology in Prague or registered by a physician outside of study area and registered during the study period. This gave the estimate of reporting bias of 6%.

Discussion

This is the first descriptive population-based epidemiological study investigating the incidence and prevalence of RA, gout and JIA in two regions of the Czech Republic with total of 186,077 inhabitants. Both districts showed very good cooperation between general practitioners, paediatricians and rheumatologists. All collaborators were adequately informed in various ways and the records were collected regularly. The presence of one of the investigators in the study area improved the quality of the collected data. All emerging problems were resolved in a short time and the collaborators were continuously encouraged. The selection of 2 study areas probably does not allow using estimated incidence and prevalence for the entire population of the Czech Republic. However we selected one urban area and one district with small towns and rural area to try to best represent the whole country with limited resources available for the project. Age-standardisation also allowed making results representative in the terms of age-structure of the selected areas. The social structure of the selected study regions is well comparable to the social structure of the whole country (using data from Census 2001; Czech Statistical Office.

The incidence and prevalence rates of RA compare well with the incidence and prevalence rates reported in recent studies. (1, 2) Gender ratios of incident cases were similar in both areas. Due to the methodology patients with “early arthritis” emerging in the study period were not probably detected. Application of ACR criteria is not helpful in searching of RA patients at disease onset. (37) Thus the patients with clinical polyarthritis who are not fulfilling the ACR 1987 criteria in one-year observation (which may be too short) were classified as having undifferentiated arthritis and were not included in the study. This may suggest that

Table VIII. Clinical and laboratory data of JIA incident patients.

JIA – forms in incident patients	Polyarthritis – girl	Polyarthritis – girl	Oligoarthritis – boy	Enthesitis related arthritis – boy
Age	5	14	15	13
Family history	negative	RA in 1 parent	negative	negative
Personal history	adenotomia, allergy	bone fracture	negative	negative
Term before falling ill	hepatitis A vaccination	negative	negative	negative
Duration between first symptom and diagnosis	2 months	4 months	8 months	9 months
Non-joint affection	-	-	-	uveitis, sacroiliitis
Laboratory	RF negative	RF negative	RF negative	RF negative B27 positive
Fitness to work	A (full)	A	A	B (limited by hard physical work)

registered patients had probably more severe disease (they fulfil the criteria sooner). However, Symmons *et al.* (2003) found that fulfilling ACR criteria does not identify patients who are ultimately likely to develop significantly more severe disease. (37) The referral of patients with arthritis to the rheumatologists was probably slightly quicker (because of the existence of the study and the pressure from the investigators) than in normal conditions. No difference between the rural and urban region was found. Homogenous population, similar age and social structure of both regions may be likely reasons for this similarity. Other lifestyle factors (such as smoking, drinking of coffee, contraception etc.) were not investigated. Detailed clinical and labour data will be published later.

Gout seems to occur less often in both regions than reported in previous studies elsewhere. (19, 20) Only patients with the first-ever episode of gout beginning during the study period were registered as incident cases. We assume several sources of underestimation, in particular due to low compliance of patients with self-limiting disease, which can have a long remission period. Patients might have not searched out medical help in the study period. Gout is usually diagnosed by general practitioners. As described in Methods, there were 7 GPs refusing cooperation in the study, so we probably missed the patients registered with these GPs. Distribution of non-cooperative GPs was not symmetrical and this may have affected the small observed difference between the regions. This fact affected the occurrence of all investigated diagnoses but occurrence of gout was particularly affected because these practitioners referred every patient with other inflammatory joint disease to the rheumatologists in everyday practice. This may also explain slightly lower occurrence of gout in Cheb district. In addition, problems with fulfilment of required criteria (such as identification of crystals in synovial fluid) for every patient were likely. The population of both regions is similar, according to age and sex-structure, and eating habits are similar to the Europian population. Further investigation would be needed to confirm lower occurence of gout in both districts.

To identify patients with JIA we used the Durban 1997 criteria. Because of the lack of studies using these criteria, it is not easy to compare the occurrence figures with previous findings. However incidence and prevalence rates in JIA seem to be similar to the rates presented in previous studies. All incident cases in one-year observation came from the urban area. There were no epidemiological reports about an increased number of hepatitis A, parvovirus infection or cases with infectious mononucleosis in this area in the time of the study. In one case there was development of JIA associated with the hepatitis A vaccination. This vaccination does not come under obligatory vaccinations in the Czech Republic and is given rather seldom. The other JIA incident patients did not have infection or vaccination in their recent past. It was reported in the literature (38) that socioeconomic variables may be associated with JIA. According to our findings, children living in flats in an urban area had a higher risk of JIA than children living on a farm in a rural area. However, as our study was running for a shorter time than the study from Denmark, population was rather homogenous and JIA is a rare disease in childhood, we believe that one-year monitoring is too short and may cause such discrepancy. The forms of JIA found in our study come under the most common forms of this disease.

As mentioned in previous section, 92 patients were identified through investigation by one of the authors. These patients were referred neither by rheumatologists nor by general practitioners nor other collaborating specialists from the study area. These patients were reported either by physician practising close to selected regions, or by rheumatologists from the Institute of Rheumatology in Prague, or were found by investigators. The reporting bias calculated from this number is 6%. Collaboration was established with all rheumatologists in both areas. Except 7seven GPs who declined cooperation for time reasons, all GPs and other specialists also collaborated with the investigators. It is very difficult to estimate the true number of missed incident and prevalent cases in the study but probability that a substantive number of patients with definite diagnosis would escape all these physicians is rather small. However some patients might have been treated in other health facilities in the country. From these reasons, the calculated bias of 6% is probably underestimated. It is very

difficult to estimate the true number of missed incident and prevalent cases in the study but we assume that only a very small proportion of cases was not identified by the investigators.

A letter of approval was used in incident cases and did not cause exclusion of patients from the study. We did not have any patient who was referred to us with a definite diagnosis by a cooperating physician and who refused registration in the study. Incident patients did not have to fill in all requested information from personal or family history, however most of the patients answered all the questions. The extent of the collected data (both questionnaire and clinical data) could not be exhaustive but the main focus of this study was to assess the occurence of selected diagnoses in the predefined study area.

In summary, this study presents the first estimates of incidence and prevalence of RA, gout, and JIA in the Czech Republic (and one of the first estimates in the countries of Central and Eastern Europe) in a population-based survey. The occurrence figures in RA and JIA are consistent with published data; figures in gout seem to be lower than reported elsewhere.

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Incidence and prevalence of psoriatic arthritis, ankylosing spondylitis, and reactive arthritis in the first descriptive population-based study in the Czech Republic

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Objective: To estimate the annual incidence and prevalence of psoriatic arthritis (PsA), ankylosing spondylitis (AS), and reactive arthritis (ReA) in a sample of the Czech population.

Methods: The population-based study was conducted in two regions of the Czech Republic (with a total population of 186000 inhabitants) in 2002–2003. Incident cases were registered on condition of confirming a definite diagnosis according to existing classification criteria during the study period (1 March 2002 to 1 March 2003). Prevalence was studied on the basis of identification of established diagnoses (before 1 March 2002) from registers of living patients of participating rheumatologists and other specialists. The age-standardized estimates of incidence and prevalence were calculated using the European standard population.

Results: The total annual incidence of PsA in adults aged ≥ 16 years was 3.6/100000 [95% confidence interval (CI) 1.4–7.6/100000] and the prevalence of PsA was 49.1/100000 (95% CI 39.5–60.4/100000). The annual incidence of AS in adults was 6.4/100000 (95% CI 3.3–11.3/100000) and the prevalence of AS was 94.2/100000 (95% CI 80.8-109.2/100 000). The annual incidence of ReA in adults was 9.3/100000 (95% CI 5.5–14.8/100000) and the prevalence of ReA was 91.3/100000 (95% CI78.1–106.2/100000).

Conclusion: The annual incidence and prevalence rates of PsA, AS, and ReA in the first population-based survey in the Czech Republic compared well with data reported from other countries.

Knowledge of the frequency of rheumatological diseases in a defined population represents the foundation stone for the planning of rheumatology health care worldwide. In the current study we investigated three such diseases, psoriatic arthritis (PsA), ankylosing spondylitis (AS), and reactive arthritis (ReA), all belonging to the sero-negative spondyloarthropathies.

PsA is a unique inflammatory arthritis associated with psoriasis. The variation in reported incidence [3–8 per 100000 (1–6) and prevalence (20–250 per 100000 (7–11)] based on hospital settings or population-based studies reported in European and US populations may be due to the different sampling methods, populations studied, lack of widely accepted classification and diagnostic criteria, or to the many patterns of the disease and the failure to make a correct diagnosis (12–14). The most recent study suggests an increasing incidence of PsA over time (2), although another study does not confirm this finding (1); the point prevalence rate in these studies was 100–158/100000 (1, 2, 10, 11).

AS is a chronic inflammatory disease affecting mainly the spine and the sacroiliac joints, although peripheral joint manifestation is not uncommon. The incidence of AS was reported to be 6.4–7.3/100000 in northern Europe and in white Caucasians of the USA (6, 15, 16) and 0.5–1.5/100000 in Japan and Greece (17, 18). The prevalence of AS was estimated to be 110–860/100000 in central Europe (19–24) and 29.5/100000 in Greece(17).

ReA refers to an infection-induced systemic illness and is characterized by aseptic inflammatory joint involvement occurring in genetically predisposed patients with a bacterial infection localized in a distant organ/system. It is not limited to the joints, and is often associated with eye and/or skin disease, enthesitis, dactylitis, and a variety of urogenital problems (25, 26). The occurrence of ReA is related to the frequency of the human leucocyte antigen HLA-B27. The incidence and prevalence are reported to be 10–28/100000 (5, 6, 27) and approximately 100/100000 (22, 28), respectively.

There have been no epidemiological data on rheumatic diseases in the Czech Republic since 1966. As part of

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the National Register of Rheumatic Diseases (29), a population-based study was set up to evaluate the incidence and prevalence of rheumatic diseases in two regions of the Czech Republic. The aim of our analysis was to evaluate the incidence and prevalence of PsA, AS, and ReA from March 2002 to March 2003, and to ascertain the time between symptom onset and establishment of diagnosis in these diseases.

Methods

Government-regulated health care in the Czech Republic is accessible to the entire population. There are state hospitals and private practices in all of the 70 districts in the 14 administrative regions of the country. Patients with specific symptoms are referred by general practitioners (GPs) to a specialist or, for those with more severe illness, to hospitals within the districts. Patients can seek specialist care even without a GP's recommendation. GPs initially treat patients with early inflammatory joint diseases. The cases of early arthritis, acute or subacute polyarthritis are then referred to rheumatologists to confirm the diagnosis and to consider the appropriate therapy. Patients with ongoing inflammatory joint symptoms and/or confirmed diagnosis of inflammatory joint disease stay in rheumatological care. If the assessment of the definite diagnosis is more complicated or special laboratory investigations are needed, the patients are referred to the Institute of Rheumatology in Prague.

Two regions of the Czech Republic were selected for the study: the city of Ceske Budejovice (population of 97339 individuals) and the district of Cheb (88738 individuals). Eighty-three percent of the study population, (154374 individuals) were aged ≥ 16 years. Data from Census 2001 were used as the basic popu- lation denominator. The population in both regions is mostly Caucasian and relatively stable. They repres- ent an urban (Ceske Budejovice) and a rural (Cheb) population of the country.

Ceske Budejovice is the administrative centre of the southern Bohemia region. It has one central hospital serving all the patients of the region. All of the seven rheumatologists in the city participated in the study. Two rheumatologists worked in the central hospital at the rheumatology department, one at the paediatric department of the hospital, and four as private specialists. In addition, there are four private dermatologists and a specialized dermatology hospital unit in the city. All of the dermatologists participated in the study. In the Cheb district, there are two private rheumatologists and both of them participated in the study. They cover all the specialist care in the district because, although there are three local hospitals in the district, they do not have specialist rheumatology units. There are also two private dermatologists but no specialized dermatology hospital unit in the district. There were 37 GPs in Ceske Budejovice and 27 in Cheb at the time of the study. Seven GPs did not agree to participate (two in Ceske Budejovice and five in Cheb).

Incidence estimates

The patients with suspect symptoms were referred by their GPs, paediatricians, orthopaedists, internists, dermatologists, and relevant hospital departments (orthopaedics, internal medicine, surgery, paediatrics, dermatology, rehabilitation) to the rheumatologists in both districts. The referred patients were registered as incident cases if their diagnosis was confirmed according to the classification criteria during the study period (1 March 2002 to 1 March 2003). Patients were only registered if they had a permanent address in one of the study regions (the same criteria were used for the prevalence estimates). Only rheumatologists were allowed to confirm the diagnosis and to register patients with AS, PsA, or ReA. Patients were then asked to specify the year and month of the onset of symptoms, and to provide questionnaire-based personal and case-history data (e.g. name, sex, residence, date of birth, education, employment, affiliated rheumatological and non-rheumatological diseases, severity of the disease). There was also space on the questionnaire for the patients to add information that they considered important. All patients were asked to give their signed informed consent. Those who did not agree to participate were registered as anonymous (only age, sex, or other information given freely about their disease was recorded without collection of personal data). Patients not fulfilling the given criteria or those fulfilling more than one set of criteria (unsolved differential diagnosis) in the study year were not registered and were not further investigated.

All investigated incident patients had radiographs of the hands and feet to estimate the type and grade of morphological changes of the affected joints according to normal practice. All registered incident patients had pelvic plain radiographs and in doubtful cases of potential sacroiliitis, computer tomography (CT) scans of sacroiliac joints were conducted according to classification criteria and recommendation published elsewhere (30). A definite diagnosis of sacroiliitis was given on the agreement of a specialist in radiology and a rheumatologist, again according to normal practice.

All GPs, paediatricians, specialists, and doctors working in previously specified hospital units were informed about the study before it started; they were invited to a seminar and were given written information about the study. The participating rheumatologists were given instructions to use unified classification criteria and to fill in the form for each potential case. One of the investigators spent 6 months in each region to give methodological advice and help when requested.

All of the patients defined as having PsA fulfilled the Vasey and Espinoza criteria (31). Patients registered

as having AS fulfilled the modified New York 1984 criteria (32). The diagnostic criteria proposed at the Third International Workshop on Reactive Arthritis in 1995 were used to diagnose ReA (33).

Prevalence estimates

Prevalence was estimated on the basis of identification of established diagnosis from the registers of patients by rheumatologists, other specialists, and GPs; they were asked to report all living patients who had been diagnosed before 1 March 2002 (vital status was verified through the country's central mortality register). One of the investigators evaluated the patient files in the registers of all rheumatologists. GPs and other specialists were asked to report the patients in written form. It was not possible to guarantee the adequate fulfilment of the above-mentioned classification criteria in all reported cases that had been diagnosed before the beginning of the study.

Procedures to improve case finding

To minimize the loss of patients (under-reporting), we informed medical centres, specialists, and GPs outside the study area that these could be used by patients from the study area with inflammatory joint disease. Patients living in the two study regions but diagnosed in the Institute of Rheumatology in Prague (country central specialist institute) were also identified and registered as cases.

To minimize selection bias and diagnostic misclassification, all collaborators in both districts underwent training in symptoms assessment. Rheumatologists were instructed to use unified classification criteria and were continuously assisted by investigators. Only rheumatologists were allowed to determine the definite diagnosis and to register new patients. A duplicity check was performed centrally at the end of the survey.

Statistical analysis

The age-standardized estimates of incidence and prevalence were calculated following Poisson distribution with 95% confidence intervals (CIs) using Stata 10 (Stata Corporation, College Station, TX, USA) and Microsoft Office Excel. For standardization we used the European standard population (downloaded in 2008 from www.euphix.org).

Results

A total of 501 patients (37 incident cases over the 1-year period and 464 prevalent cases on 1 March 2002) were diagnosed as having PsA, AS, or ReA. Age-standardized incidence and prevalence rates (both sex-specific and combined) of PsA, AS, and ReA are presented in Table 1.

Psoriatic arthritis

Incidence. Seven patients were identified and registered as new cases. This gave a total crude annual incidence for PsA in both districts of 3.8/100 000 (95% CI 1.5–7.8/100000) in the entire population and 4.6/100000 in the adult (≥ 16 years old) population (95% CI 1.8–9.4/100000). The age-standardized incidence rate was 3.6 (95% CI 1.4–7.6/100000). The male to female ratio was 1.3:1. The mean age of establishment of diagnosis was 51 years. In all new cases psoriasis preceded arthritis; the mean duration from psoriasis onset to diagnosis was 8.5 years. One patient was not able to state the year of psoriasis onset but their psoriasis also preceded the arthritis. In two cases, arthritis and psoriasis emerged within 1 year (28.6%). The mean duration from arthritis onset to diagnosis was 12 months.

The type of psoriasis was determined by dermatologists: in four patients (57.1%) as psoriasis vulgaris, in two as psoriasis pustulosa (28.6%), and in one as

Table 1. Age-standardized incidence and prevalence (and 95% CI) of PsA, AS, and ReA (per 100 000).

	Incidence			Prevalence		
	Ceske Budejovice	Cheb	Both areas	Ceske Budejovice	Cheb	Both areas
Psoriatic arthritis						
Men	6.2 (1.2–18.3)	2.7 (0.8–13.6)	4.5 (1.3–11.4)	48.0 (30.2–72.1)	49.4 (30.8–75.3)	48.6 (35.3–65.3)
Women	1.8 (0.5–10.7)	3.9 (0.8–15.3)	2.8 (0.6–8.7)	27.5 (15.0–46.2)	77.2 (53.8–107.4)	50.7 (37.4–67.1)
All	3.9 (1.0–10.2)	3.2 (0.7–9.7)	3.6 (1.4–7.6)	36.7 (25.6–50.9)	63.0 (47.6–81.8)	49.1 (39.5–60.4)
Ankylosing spondylitis						
Men	9.8 (3.0–23.6)	10.3 (3.6–25.2)	10.0 (4.6–18.9)	142.3 (110.2–180.7)	171.7 (134.9–215.4)	156.6 (131.9–184.7)
Women	3.7 (0.8–14.0)	2.3 (0.5–12.4)	3.0 (0.6–9.0)	22.5 (10.4–38.1)	44.9 (26.2–67.2)	32.9 (22.4–46.6)
All	6.5 (2.5–13.9)	6.4 (2.4–14.2)	6.4 (3.3–11.3)	81.4 (64.5–101.4)	108.4 (87.8–132.4)	94.2 (80.8–109.2)
Reactive arthritis						
Men	6.1 (1.1–18.1)	10.3 (3.6–25.1)	8.0 (3.3–16.3)	145.1 (112.7–183.9)	54.2 (34.5–80.8)	100.8 (81.0–123.5)
Women	12.4 (4.1–25.2)	8.6 (2.2–22.2)	10.5 (5.0–19.2)	107.5 (80.2–139.3)	52.3 (33.3–78.1)	81.2 (64.5–101.8)
All	9.3 (4.3–17.7)	9.4 (4.1–18.4)	9.3 (5.5–14.8)	126.8 (105.4–151.2)	53.2 (39.1–70.7)	91.3 (78.1–106.2)

erythrodermia (14.3%). Joint affection was oligoarticular (1–4 affected joints) at the time of establishment of diagnosis in five patients (71.4%), and polyarticular (more than four affected joints) in two patients (28.6%). The average number of peripheral joints with arthritis observed by a rheumatologist at the time of diagnosis was 4.4 (standard deviation 1.6). All patients had radiographs of the hands and the lumbosacral part of the spine. At the time of establishment of diagnosis four patients had erosions of the hand joints. The prevalence of radiographic evidence of sacroiliitis grade II (erosions, sclerosis) or grade III (broad erosions, unambiguous sclerosis, or partial ankylosis) in new patients was 71.4%. Neither distal erosions nor spinal involvement were proved in one patient (acute oligoarthritis was present). Most of the patients had a history of alternating enthesitis.

Prevalence of PsA. Ninety-six patients with PsA were registered as prevalent cases. This gave a total prevalence of 52/100 000 individuals (95% CI 41.8–63/100000) in the entire population and 62/100000 in the adult population (95% CI 50.5–76.2/100000). The age-standardized prevalence was 49.1 (95% CI 39.5–60.4/100000) and the male to female ratio was 0.85:1. The mean age of establishment of diagnosis was 55 years. In 33 patients (34.4%) we collected more information about the disease from patient files or from the patients coming for their regular examination during the study period. In 26 patients (79%) psoriasis preceded arthritis (with a mean of 10 years), and in seven patients (21%) arthritis preceded psoriasis with a mean of 5 years. The mean duration from psoriasis onset to diagnosis was 5 years, and the mean duration from arthritis onset to definite diagnosis was 1 year. In most of the remaining patients (65.6%) the medical records were either incomplete, and patients did not come to the examination at the time of the study, or (in a few cases) patients refused to give more information about the course of the disease.

Ankylosing spondylitis

Incidence. Thirteen patients were identified and registered as incident cases. This gave a total crude annual incidence of AS in both districts of 8.5/100000 (95% CI 4.5–14.4/100000) in the adult population. The age-standardized incidence was 6.4 (95% CI 3.3–11.3/100000) and the male to female ratio was 3.3:1. The mean age of diagnosis was 48 years. The mean age at first symptom onset was 24 years and the mean duration of the first symptom onset to establishment of diagnosis was 11 years. Seven patients had bilateral sacroiliitis of grade II–IV (53.8%), and unilateral sacroiliitis of grade III–IV was proved in six patients (46.2%). Twelve patients (92.3%) suffered inflammatory back pain at the time of diagnosis. Although one patient did not feel typical inflammatory pain, restriction of mobility of the lumbar spine in this case was proved together with a bilateral sacroiliitis of grade II (HLA-B27-negative patient). Of the incident patients, 61.5% fulfilled at least two of the three clinical criteria for AS. HLA-B27 positivity was examined in 10 out of 13 cases (76.9%). Of these, six were positive (60%). AS was defined as axial in six patients (46.2%), and in one patient had the axial form with peripheral arthritis (7.7%). Five patients had a history of enthesitis (38.5%) and two experienced iritis/uveitis (15.4%). None of the patients developed aortitis, amyloidosis, or fibrosis of the lung in the study period, and none suffered from inflammatory bowel disease. Such information could not be obtained in six patients (46.2%).

Prevalence of AS. We identified 185 patients as having AS before 1 March 2002. This gave a total crude prevalence of AS 99.4/100000 (95% CI 85.6–114.8/100000) in the entire population and 118.9/100 000 (95% CI 101.1–136.1/100 000) in the adult population. The age-standardized prevalence was 94.2 (95% CI 80.8–109.2/100000). The prevalence of AS for children younger than 16 years was 6.2/100000 (95% CI 0.7–22.4/100000). The male to female ratio was 4.6:1. The mean age of establishment of diagnosis was 34 years. Forty-eight registered patients (26.2%) answered questions about the course of their disease or the medical documentation was comprehensive. Of these, 40 patients had the axial form of AS and nine had the axial form with peripheral arthritis (83.3% and 18.8%, respectively). The most frequently affected joints were the hip, knee, small hand joints, and shoulder. Forty-seven patients had unilateral sacroiliitis grade III–IV (98%) and in only one patient was bilateral sacroiliitis grade II documented. All 48 patients with complete documentation experienced inflammatory back pain. Objective measurements of lumbar spine mobility and respiratory excursions of the thorax proved restriction in 46 and 40 patients, respectively. Enthesopathy was documented in 11 (23%) and uveitis/iritis in 17 cases (35%). Information about HLA-B27 testing was found in 50 cases. Of these, 31 patients were HLA-B27 positive (62%). In none of the prevalent patients was aortitis, amyloidosis, or fibrosis of the lung documented. Inflammatory bowel disease was documented in two women; in both, the first symptoms of AS occurred at the age of 37 years. One was HLA-B27 positive, with a history of uveitis and unilateral sacroiliitis grade III and the axial form of AS. The other was HLA-B27 negative, with bilateral sacroiliitis grade II and she also experienced uveitis.

Reactive arthritis

Incidence. Seventeen patients were identified and registered as incident cases. This gave a total crude annual incidence of 9.1/100000 (95% CI 5.3–14.6/100000) in the entire population and 9.8/100000 (95% CI 5.4–16.1/

Table 2. Causative factors of reactive arthritis in prevalent patients documented in patient files.

Documented causative factors of reactive arthritis (prevalent cases)	n (% of 147 patients)*
Enteritis without specification	39 (26.5)
Salmonella enteritidis	18 (12.2)
Yersinia	4 (2.7)
Reiter syndrome	4 (2.7)
Uroinfection without specification	4 (2.7)
Chlamydia trachomatis	27 (18.4)
Ureaplasma urealyticum	32 (21.8)
Upper respiratory tract infection	11 (7.5)
Other infection (soft tissue infection, gastritis, septicaemia due to non-mentioned pathogens)	8 (5.4)

*In these patients, causation could be evaluated; such information was not given in the remaining 36 patients (19.7%).

100000) in the adult population. The age-standardized incidence was 9.3 (95% CI 5.5–14.8/100000). Two patients < 16 years were identified; this gave an annual incidence of 6.2/100000 for children younger than 16 years (95% CI 0.8–22.4/100000). The male to female ratio was 0.7:1. The mean age of establishment of diagnosis was 39 years. The mean duration of first symptoms to diagnosis was 4 months. All patients with a new diagnosis of ReA had asymmetric arthritis of the lower limb joints predominantly. Ten patients (59%) had oligoarthritis, five monoarthritis (29%), and two developed polyarthritis (11%). Sacroiliitis was proved in 10 incident patients with ReA (58.8%): unilateral of grade III–IV in four patients (40%), and bilateral of grade II–IV in six (60%). HLA-B27 was not investigated. Enthesopathy was present in six patients (35%).

The evidence of preceding infection was an important criterion. Eleven patients with postenteric ReA were identified, giving an annual incidence of 6/100000 (95% CI 3–10.6/100000). These patients had clear clinical diarrhoea in the preceding 4 weeks and/or a positive stool culture (*Salmonella enteritidis*) or in one case anti-*Yersinia* antibodies [immunoglobulin (Ig)G + IgA]. Six patients had genitourinary ReA, giving an annual incidence of 3.2/100000 (95% CI 1.2–7/100000). These patients had clinical urethritis in the preceding 4 weeks (with IgG, IgM, and IgA types of IgG antibodies to *Chlamydia trachomatis*) and/or the finding of *Chlamydia trachomatis* or *Ureaplasma urealyticum* in the urogenital swab.

Prevalence of ReA. A total of 183 patients were found to have had ReA before 1 March 2002, giving a total prevalence of ReA 98.3/100000 (95% CI 84.6–113.7/100000) in the whole population and 119/100000 (95% CI 102.3–137.5/100000) in the adult population. The age-standardized prevalence was 91.3/100000 (95% CI 78.1–106.2/100000). The male to female ratio was 1.2:1. The mean age at establishment of diagnosis was 38 years.

Oligoarthritis (68%) was the most frequent joint affection, 18% patients had monoarthritis, and polyarthritis was sporadic (6%). This information could be found in the records of 98 patients (54% of registered prevalent cases). Among these patients, sacroiliitis was present in 42 patients (43%): unilateral in 29% grade III–IV and bilateral in 14% grade II–IV.

A possible causative factor was documented in 147 patients (80.3%). Genitourinary ReA was reported with a similar frequency to postenteral ReA (67:61 cases). Detailed data are summarized in Table 2. Retrospective information about a causative pathogen was not accessible in the records of 36 patients (19.7%).

Discussion

There are several methodological points to discuss before comparing our results with other findings. One urban and one rural area were selected to better represent the whole country as only limited resources were available. Having only two areas it is only possible to speculate about the representativeness of the sample for the entire population of the country. Age standardization meant that the results of the selected area could be representative in terms of age structure. The social structure of the selected study regions is comparable to that of the whole country (using data from Census 2001; Czech Statistical Office). Both areas were easily defined geographically and administratively. Very good cooperation between GPs, practicing specialists, and rheumatologists was a great advantage of this survey. All of the collaborators were adequately informed and the presence of the investigator in the study area improved the quality of the recorded data.

A very high proportion of cases were referred to specialists but it is possible that not all were identified. Some patients were identified at the Institute of Rheumatology in Prague, but no resident patient was referred from neighbouring regions (although the specialists were informed and no-one refused to cooperate). Therefore, it can be assumed that the resident cases sought help in their home region or in the central Institute in the capital. The number of possible missed cases [cases seeking both specialist and basic medical help (provided by GPs) in a distant region] is probably very low and these cases should not substantially bias the results.

Informed consent was obtained in all incident cases and did not cause exclusion of patients from the study. There were no patients who were referred to the study team with a definite diagnosis and who were refused registration in the study. The incident patients did not have to provide all of the information requested, but most of them did in fact answer all of the questions. Optionality improved cooperation and prevented loss of information. The questionnaire was also used in prevalent patients who had visited the physician in the time of observation but it was fully answered only by 26% (PsA) to 54% (ReA) of these. The remaining patients either did not seek medical help in the study period or did not complete the questionnaire. No prevalent patient refused registration in the study.

Psoriatic arthritis

Previous studies addressing the incidence of PsA are mostly based on hospital records or health-care services in northern Europe, giving higher incidence rates (6–8/100000) compared to our findings (although the CIs overlap) of 3.6/100000 (95% CI 1.4–7.6) (1, 2, 4–6, 10, 11). Lower incidence rates were found in Greece (3.0/100000 inhabitants) (3). The possible underestimation of the incidence of PsA may have been caused by several factors. First, we used the Vasey and Espinoza classification criteria while previous studies used criteria based on the principles of Moll and Wright (34). The Vasey and Espinoza criteria were chosen because they were being widely used at the time of the study. If we had used other classification criteria it would have been necessary to revise all the established diagnoses in the retrospective part of the study (a possible source of bias). However, the Vasey and Espinoza criteria have high specificity (between 93% and 99%) and higher sensitivity (99%) than the CASPAR criteria (35), and good feasibility in daily practice (13), and thus it is unlikely that the reported incidence or prevalence would be underestimated because of the classification criteria. Second, the methodology used is susceptible to missing mild or oligosymptomatic cases that do not fulfil the classification criteria at the time of observation. Third, insisting on confirmation of psoriasis by a dermatologist may have prolonged the diagnostic process and may have caused registrations in the study period to be delayed. The age at diagnosis of incident PsA was the same as in a previous study in Finland (6). The presence of radiographic evidence of sacroiliitis (grade II and above) was 71.4% in incident cases, compared to 78% in the USA (36). In agreement with previously published studies, psoriasis mostly preceded arthritis by 11 years (37, 38). Oligoarthritis was the most frequent subtype, followed by polyarthritis according to another study (1).

We found the prevalence rate of PsA (49.1/100000, 95% CI 39.5–60.4) to be lower than that in previously published studies. The most recent studies suggest prevalence rates of 100–158/100000 (1, 2, 10, 11). Lower prevalence rates may be caused by geographical differences but there are no known data concerning the prevalence of psoriatic skin disease in the Czech population, which could be a possible explanation. There was no possibility of confirming the diagnosis of psoriasis by a dermatologist in the retrospective part of the study, which could be a possible source of bias. Because of the retrospective search of cases, the assessment of pelvic radiographs or CT scans by two observers could not be ensured in all prevalent patients.

Ankylosing spondylitis

The incidence (6.4/100 000, 95% CI 3.3–11.3) and prevalence (94.2/100000, 95% CI 80.8–109.2) of AS in this study is consistent with published data from central Europe. A high prevalence of AS was found in Berlin by Braun et al (22) but different criteria and magnetic resonance scans were used. The higher prevalence found in Hungary (1977) and Czechoslovakia (1966) may be due to the use of older diagnostic criteria and a different sampling method (18, 24), although underestimation of disease rates due to the methodology is possible (missing of oligosymptomatic forms). However, no confirmation by other specialists was needed for AS. The prevalence of HLA-B27 in the Czech population was not investigated but is thought to be about 10%, similar to that in the neighbouring countries (17–19). HLA-B27 was specified in only 70.6% of registered incident AS cases and in 27% of prevalent cases, so evaluation of the prevalence of the allele among our AS patients is not possible in this study.

Reactive arthritis

There are only a few other studies that have addressed the incidence of ReA in a population-based setting, with incidence rates (10–28/100 000) similar to those (9.3/100000, 95% CI 5.5–14.8) presented in our study. The incidence rates of postenteric and genitourinary ReA are in the lower part of the published incidence range (27, 28). The difference compared with other studies might be due to a true different in incidence (different frequencies of HLA-B27 in the population) or to various biases related to methodology. As mentioned previously, mild or oligosymptomatic patients not fulfilling inclusion criteria and patients with unsolved differential diagnoses were probably missed. As the course of ReA may be self-limiting, it is likely that not everyone with ReA sought medical help at the time of the study. There are also different laboratory methods used in various epidemiological studies. The frequency of genitourinary or enteral infections in the Czech population is observed continuously, and there were no elevated rates reported during the time of the

study. The patients with negative cultures and negative serology were not classified as having ReA, in contrast to other study designs.

The estimated prevalence of ReA (91.3/100000, 95% CI 78.1–106.2) is similar to data reported elsewhere (100/100000) (22, 28). Likely causative pathogens were mostly well documented. Patients with no documented positive cultures or positive serology were not classified as having ReA and were not included in the study.

Conclusions

In summary, this study presents the first estimates of the incidence and prevalence of PsA and ReA in the Czech Republic in a population-based survey, and the first estimates of the incidence and prevalence of AS since 1966. The occurrence of the rheumatological diseases studied is similar to that in published data in other European countries. The current policy of rapid referral of patients with new joint inflammation to a rheumatologist is conditioned by good cooperation with GPs and specialists.

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