PREVALENCE OF RHEUMATOID ARTHRITIS IN URBAN AND RURAL POPULATIONS IN SOUTH WALES

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The wide range of estimates of the prevalence of rheumatoid arthritis which is evident from a study of surveys undertaken in Great Britain and other countries (Cobb and Lawrence, 1957; Cobb, Warren, Merchant, and Thompson, 1957) is open to two interpretations: either large regional differences do exist or the diagnostic criteria adopted in these surveys are insufficiently standardized for valid comparison of the findings. Though the former explanation may be the correct one, the latter is certainly true also, and differences reported at present can be attributed as much to diagnostic criteria and population selection as to true epidemiological variations in prevalence.

In a first attempt to remedy this deficiency, the Manchester University Rheumatism Centre and the Medical Research Council's Pneumoconiosis Research Unit have pooled their resources and carried out a number of population studies (Miall, Caplan, Cochrane, Kilpatrick, and Oldham, 1953; Kellgren and Lawrence, 1956).

In this paper we summarize the results of two of these co-operative investigations. More detailed accounts of some of this work have already been published (Ball, 1955; Miall, 1955); reports of other joint studies will follow. The purpose of this paper is to describe the material from these two studies as a whole, and to discuss the validity of the diagnostic criteria used and methods of population sampling for this type of work.

Methods

(1) **Choice of Population.**—The prevalence of a number of common diseases has been measured by the M.R.C. Pneumoconiosis Research Unit in two geographically defined areas in South Wales (Cochrane, Cox, and

Jarman, 1955; Miall and Oldham, 1955; Thomas, Cotes, and Higgins, 1956; Cochrane, Miall, and Clarke, 1956); the Rhondda Fach is a typical densely populated mining valley with a population of about 20,000 people aged 15 years or more. The Vale of Glamorgan is an agricultural area surrounding the small market town of Cowbridge. The population here comprised about 4,600 people aged 15 years or more. Each population was defined by private census shortly before the surveys. The two areas were chosen to provide neighbouring urban and rural populations in which the epidemiology of common diseases could be studied and compared. Their geographical centres were separated by about 15 miles.

(2) **Techniques.**—These surveys were undertaken in 1953 and 1955. At the time of the census in each area, an adult member of each household was asked to give the names of any individuals in the home who were thought to have arthritis or rheumatism. Subsequently 90 per cent. of the Rhondda Fach population and 95 per cent. of that in the Vale, attended a centre for chest radiography. As each subject attended, he or she was questioned about painful swelling of the small joints of the hands and feet. From these sources, and from rheumatism clinics, general practitioners, and gossip with cases of known rheumatoid arthritis, visiting lists were compiled, and all these people were interviewed by a physician in their homes. On the basis of the history and any physical signs present in accessible joints, those who were thought to be possible cases of rheumatoid arthritis, or to have had a past poly-arthritis of the rheumatoid type, were asked to attend a centre for further investigation.

These two surveys differed in only one important way. The screening was deliberately made at a lower threshold during the Vale of Glamorgan survey. This resulted in relatively more subjects being included with only vague and indefinite symptoms, and no residual physical signs, of arthritis. In both surveys subjects showing only the physical signs of degenerative arthritis were included if

their symptoms suggested that there had also been an episode of rheumatoid arthritis.

Diagnostic Criteria

The standardization of diagnostic criteria has been met by including radiographical and serological data. Radiographs were taken of the hands and feet with a control bone to facilitate the assessment of osteoporosis. All films were read by a single observer (J.H.K.). The sheep cell agglutination tests for rheumatoid arthritis were all performed in one laboratory by the method of Ball (1950). Agglutination at a titre of at least 1 in 32 after 18 hrs' incubation was accepted as a positive result. In each case precautions were taken to avoid any secular changes in standards. Steps were also taken to ensure that the opinion of the observer grading the films corresponded with the mean opinions of three other clinicians and two radiologists, all of whom had a special interest and experience in rheumatic diseases (Kellgren, 1956). Further studies concerning grading of the radiological changes of both rheumatoid and osteo-arthritis in hand films, together with illustrations of agreed grades of change, are being published elsewhere (Kellgren and Lawrence, 1957a, b).

No defined standards were used for the clinical diagnosis of rheumatoid arthritis—this was largely left to clinical judgment, which was based on a history, with or without residual physical signs, of polyarthritis with characteristic symmetrical affection of certain peripheral limb joints with soft tissue swelling rather than bony enlargement, often accompanied by morning stiffness, constitutional disturbances, and occasionally by subcutaneous nodules.

In surveys of this kind, a standard of reproducible diagnosis is essential. Unfortunately the diagnostic difficulty in rheumatism is considerable, except in its more severe forms. In these screened populations, subjects have not been investigated unless a characteristic history was obtained, and they have been rejected if this history was not confirmed by radiological or serological evidence of the disease. Though it is not claimed that all rheumatoid arthritis satisfies these criteria, probably few false positive results are obtained, and for comparative purposes a reproducible diagnosis at a high threshold is more useful than an unreproducible one at a lower threshold.

Response Rates

The population in the Rhondda Fach and the Vale of Glamorgan is shown in Table I, together with the number of people who passed the initial screening for polyarthritis. The marked differences in the overall percentages of the populations who passed this preliminary screening reflect only the different criteria used at this stage, but we believe that the final criteria which had to be satisfied for the arthritis to be accepted as rheumatoid were sufficiently strict to overcome these differences in screening procedure.

Table II (opposite) shows the rates in the investigation of suspected cases in the two surveys. 474 suspected cases, 449 (95 per cent.) were investigated either by x ray or serologically, and 391 by both methods (82 per cent.). Among those not investigated were eight severe and bedridden cases of typical rheumatoid arthritis who have been presumed positive; those who refused or were unable to be investigated have been included as

TABLE I
PREVALENCE OF SUSPECTED RHEUMATOID ARTHRITIS BY AGE AND SEX, RHONDDA FACH (1953) AND VALE OF GLAMORGAN (1955)

Survey	Age (yrs)	Females			Males		
		Population	Suspected Cases		Population	Suspected Cases	
		No.	No.	Per cent.	No.	No.	Per cent.
Rhondda Fach	15–	1,857	—	—	1,640	—	—
	25–	1,953	10	0·5	1,957	12	0·6
	35–	1,856	15	0·8	1,725	16	0·9
	45–	1,719	39	2·3	1,612	30	1·9
	55–	1,477	68	4·6	1,301	21	1·6
	65+	1,430	51	3·6	1,195	20	1·7
	Total	10,292	183	1·8	9,430	99	1·1
Vale of Glamorgan	15–	369	3	0·8	365	—	—
	25–	464	10	2·2	464	2	0·4
	35–	403	17	4·2	426	8	1·9
	45–	439	41	9·3	410	12	2·9
	55–	339	38	11·2	311	22	7·1
	65+	328	22	6·7	303	17	5·6
	Total	2,342	131	5·6	2,279	61	2·7

TABLE II

RESPONSE RATES IN THE INVESTIGATION OF SUSPECTED CASES, RHONDDA FACH (1953) AND VALE OF GLAMORGAN (1955)

Survey	Sex	Age (yrs)	Suspected Cases			Investigated			Not Investigated		
			Total	Investigated	Not Investigated	X ray and S.C.A.T.	X ray Only	S.C.A.T. Only	Bedridden with R.A.	Assumed Positive	Assumed Negative
Rhondda Fach	Females	15-25-	10	10		9	1				
		25-35-	15	14	1	8	6				1
		35-45-	39	37	2	33	4			1	1
		45-55-	68	66	2	54	10	2	1	1	
		55-65+	51	44	7	27	14	3	3	1	3
		Total Per cent.	183 (100)	171 (93)	12 (7)	131 (72)	35 (19)	5 (3)	4 (2)	3 (2)	5 (3)
	Males	15-25-	12	12		11	1				
		25-35-	16	16		13	3				
		35-45-	30	28	2	26	1	1		1	1
		45-55-	21	21		17	2	2			
		55-65+	20	20		18	1	1			
		Total Per cent.	99 (100)	97 (98)	2 (2)	85 (86)	8 (8)	4 (4)	0	1 (1)	1 (1)
Vale of Glamorgan	Females	15-25-	3	2	1	1	1				1
		25-35-	10	10		10					
		35-45-	17	17		17					
		45-55-	41	39	2	37	2				2
		55-65+	38	35	3	34	1		1	2	2
		Total Per cent.	131 (100)	121 (92)	10 (8)	116 (89)	4 (3)	1 (1)	3 (2)	2 (2)	5 (4)
	Males	15-25-	2	2		2					
		25-35-	8	8		8					
		35-45-	12	12		12					
		45-55-	22	22		22					
		55-65+	17	16	1	15	1		1		
		Total Per cent.	61 (100)	60 (98)	1 (2)	59 (97)	1 (2)	0	1 (2)	0	0

positive only if the home visit notes showed clear evidence of undoubted rheumatoid disease.

Results

The prevalence of confirmed rheumatoid arthritis by age is shown in Table III (overleaf) for the two surveys.

"Confirmed" rheumatoid arthritis, as here defined, refers to those cases of polyarthritis in which the diagnosis was confirmed as rheumatoid either by radiological changes in the films of the hands or feet, or by the sheep cell agglutination test, or by both.*

This Table shows that the overall prevalence according to these strict criteria is almost equal in females and males in both the Rhondda Fach and the Vale of Glamorgan. Ball (1955) has shown

that, after allowing for duration and severity of arthritis, agglutination occurs at higher titres in the sheep cell test when rheumatoid arthritis is associated with the progressive massive fibrosis of coalworkers' pneumoconiosis. In populations containing large numbers of miners and ex-miners, therefore, it could be argued that these criteria could artificially swell the number of confirmed rheumatoid arthritics amongst the men. The number of subjects with a characteristic history confirmed only by a positive sheep cell test is shown in the middle columns of this Table, and it is evident that the numbers of such cases are roughly equal in the two sexes. The third column, showing the difference between the first two, gives the prevalence of symptomatic cases with radiological confirmation in the hands and/or feet together with the small number of obvious and mostly bedridden cases.

These prevalence data for the two areas are set out in Fig. 1 (overleaf), which shows two striking

* The fourteen advanced cases (eight of whom were bed-ridden), who were not investigated, are included as "confirmed" cases.

TABLE III

PREVALENCE OF CONFIRMED RHEUMATOID ARTHRITIS BY AGE AND SEX, RHONDDA FACH (1953) AND VALE OF GLAMORGAN (1955)

Survey	Sex	Age (yrs)	Population	Confirmed by					
				Positive X ray and/or Positive S.C.A.T.		Positive S.C.A.T. Only		Positive X ray or Obvious Signs	
				No.	Per cent.	No.	Per cent.	No.	Per cent.
Rhondda Fach	Females	15-25	1,857	3	0.2	2	0.1	1	0.1
		25-35	1,953	1	0.1			1	0.1
		35-45	1,856	17	1.0	7	0.4	10	0.6
		45-55	1,719	28	1.9	5	0.3	23	1.6
		55-65+	1,477	17	1.2	2	0.1	15	1.1
		65+	1,430						
	Total		10,292	66	0.6	16	0.2	50	0.5
	Males	15-25	1,640	7	0.4	2	0.1	5	0.3
		25-35	1,957	10	0.6	4	0.2	6	0.4
		35-45	1,725	20	1.2	4	0.3	16	1.0
		45-55	1,612	15	1.2	5	0.4	10	0.8
		55-65+	1,301	11	0.9	2	0.2	9	0.8
		65+	1,195						
	Total		9,430	63	0.7	17	0.2	46	0.5
Vale of Glamorgan	Females	15-25	369						
		25-35	464	1	0.3			1	0.3
		35-45	403	2	0.5			2	0.5
		45-55	439	9	2.7			9	2.7
		55-65+	339	13	4.0			13	4.0
		65+	328						
	Total		2,342	25	1.1	0		25	1.1
	Males	15-25	365						
		25-35	464	2	0.5			2	0.5
		35-45	426	3	0.7			3	0.7
		45-55	410	5	1.6	1	0.3	4	1.3
		55-65+	311	12	4.0	1	0.3	11	3.6
		65+	303						
	Total		2,279	22	1.0	2	0.1	20	0.9

features: first, the very different shapes of the curves relating prevalence and age in the two areas which is apparent in both sexes; secondly, the similarity in the prevalence curves for males and females in the two surveys. In the Rhondda Fach, where the prevalence is higher in the younger age groups, it reaches a maximum between the ages of 45 and 64 years, and then becomes less in the elderly, whereas in the Vale of Glamorgan the prevalence goes on rising in the older age groups in both sexes. The resultant differences in prevalence in those over 65 years of age are significant at the 2 per cent. level. These features are discussed later.

Discussion

Survey Technique.—We are fully aware that surveys of symptomatic disease are far from ideal; in this as in most chronic diseases there is a significant group of affected people who are either asymptomatic or who have such vague or bizarre symptoms that they are not easily revealed by simple screening questions. We believed from the outset that the most valuable information would result

from identifying all cases of classical rheumatoid arthritis in the populations studied, and that the type of case in which there was involvement only of spinal or larger limb joints could be ignored without introducing biases.

The results of the investigation by Kellgren and Lawrence (1956) of a random sample of the urban population of Leigh, Lancashire, suggested that a clinical opinion about the presence or absence of rheumatoid arthritis might have little significance except for severe classical cases; one of the disturbing features was the number of subjects with positive agglutination tests, or positive radiographs, in whom no evidence of rheumatoid arthritis was recorded at the clinical examination.

We have therefore to be clear about what we are investigating. If rheumatoid arthritis is defined as a polyarthritis of the peripheral limb joints the type of screening test we used in these two surveys, which is based on a history of painful swellings of the small joints of the hands and feet, may be a good one; but if rheumatoid arthritis is one manifestation of a form of connective tissue disease associated with

Fig. 1.—Prevalence of confirmed rheumatoid arthritis in the two surveys.

a positive agglutination test, then a screening technique designed for arthritis of the hands and feet may be too exclusive.

There is another weakness of screening in this way: we have no knowledge that different populations respond identically to the questions. The alternative approach is to investigate fully random samples of populations, but this would be extremely laborious if adequate numbers from all age groups were studied. It appears likely that a combination of both these methods of study will be found to produce the most useful information, and later we hope to report the results of investigations of random samples of these and other geographically defined populations, which should supplement the present findings.

Differences in Prevalence between the Rhondda Fach and the Vale of Glamorgan.—Before attributing the differences we have found to epidemiological factors, we must be sure that they are not artefacts either due to the screening or resulting from differential migration in the two areas. The initial screening was identical in the two populations and covered all age groups equally well in both areas. The clinical

screening was deliberately altered between the two surveys, but we do not believe that this has materially influenced the threshold for those satisfying such strict criteria. The lower threshold for symptoms used in the Vale produced the expected difference between the number of suspected and confirmed cases in all age groups except those over 65, where the figures for confirmed and suspected cases became thirteen out of 22 for females and twelve out of seventeen for males, compared with the Rhondda figures of seventeen out of 51 for females and eleven out of twenty for males. The larger change for the females is, we believe, due to the inclusion of relatively more cases of generalized osteo-arthritis in the earlier survey. Nothing is as yet known about the prevalence of asymptomatic serological and radiological findings in those over 65, and it is conceivable that this may increase abruptly in old age to a substantial proportion of the population, in which case prevalence rates of rheumatoid arthritis in those over 65 would be greatly affected by the proportion of individuals investigated. However, the differences in prevalence between the two areas are almost unchanged if the analysis is confined only to those with moderate and severe radiological changes.

In general it is the healthier section of the population that migrates (Hill, 1925). We should therefore expect high prevalence rates for diseases in the residual populations where migration has been great; it is likely that migration has been greater from the Rhondda than from the Vale, and thus migration would have biased the results in the opposite direction to those found.

None of the elderly rheumatoid arthritics in the Vale had come into the area since developing arthritis. We feel justified, therefore, in assuming that the differences are true epidemiological ones; a fall in prevalence among the elderly, as in the Rhondda data, must mean either that the combination of the case recovery rate and the case fatality rate is exceeding the attack rate amongst the elderly, or that the disease, the mean age of onset of which is in the fifth decade in our data, is becoming more common. On the other hand, a prevalence curve showing highest rates in the elderly, as in the Vale of Glamorgan, could be explained by an attack rate in the elderly which exceeds the combined cure rate and mortality rate, or by the disease becoming less common in the last few decades.

The prevalence of severely disabled cases is certainly higher in the Rhondda except above age 65; the mean age of onset in females was almost identical in the Rhondda and Vale (48 and 47 years respectively), but males were attacked on the average 10 years earlier in the Rhondda (43 to 53 years). In both sexes, for the same degree of radiological disease, the sheep cell tests were positive at higher titres in the Rhondda than in the Vale. Table IV shows the data for all subjects in whom there were both radiological and sheep cell test results available, except for miners with massive fibrosis, who have

been omitted from this Table because of the enhanced agglutination titres associated with this condition. The overall difference between the Rhondda Fach and Vale data in Table IV is statistically significant at the 2 per cent. level.

If, as our data suggest, rheumatoid arthritis is occurring earlier in the Rhondda Fach and in a more severe form and if prolonged rheumatoid arthritis is accompanied by a significant mortality from intercurrent disease as shown by Cobb, Anderson, and Bauer (1953), this could explain some of the difference between the areas. A preliminary comparison of the 4-year follow-up of the Rhondda Fach rheumatoid population with controls balanced for age and sex shows that the female rheumatoid arthritic patients have suffered a significant excess mortality over their controls; the males have shown no such significant difference, despite their high prevalence of massive fibrosis (Miall, 1955). Attack rate and mortality studies which will be obtained from the continued follow-up of these populations may explain the differences between rheumatoid arthritis in the two areas.

Sex Differences in Prevalence.—Perhaps the most surprising finding from these two surveys in South Wales is that the prevalence of rheumatoid arthritis satisfying these strict criteria was equal in the sexes, whereas clinical polyarthritis was found much more frequently in women. Similar results were found by Kellgren and Lawrence (1956) in their population sample of the inhabitants of Leigh. Clinical polyarthritis of a rheumatoid type was much more common in females, but the distribution of the grades of radiological changes was similar in the two sexes; this is also true of random samples of the

TABLE IV

RELATIONSHIP BETWEEN RADIOLOGICAL RHEUMATOID ARTHRITIS AND SHEEP CELL AGGLUTINATION TITRE IN THE RHONDDA FACH AND THE VALE OF GLAMORGAN

Sex		Females						Males					
		2		3		4		2		3		4	
		Rhondda	Vale	Rhondda	Vale	Rhondda	Vale	Rhondda	Vale	Rhondda	Vale	Rhondda	Vale
Radiological Grade of Rheumatoid Arthritis	<4	3	4		1	1	1	2	6	1	3	1	
	4							1	1				
	8	2		3	1	1		1	4				
	16	1	1	1						1			
	32	1	1		1	1	1					1	
	64	2	1		2	2	3	1	1				
	128	2		2		1	2	1	2			1	
	256					2	1	2		2		1	1
	512			3		3		2		1		2	
	1,024					2				2		1	
	2,048									1			
	4,096					1							
Total		13	7	9	5	14	8	10	14	8	3	8	1

same age group of the Vale of Glamorgan population, which we shall discuss fully elsewhere.

Furthermore, the agglutinating titres in the sheep cell test were distributed in a similar manner in both sexes in the Leigh sample. One explanation for this difference between the subjective and the objective findings would be a lower complaint threshold amongst women, since a clinical diagnosis of polyarthritis is largely determined by a complaint of pain, swelling and joint stiffness.

However, there are other possibilities. Table I shows the numbers of suspected rheumatoid arthritics in these surveys of clinical disease to have the expected preponderance of females.

Fig. 2 (1), overleaf, shows the prevalence of such cases for the Rhondda Fach by age and sex. At the level of screening used in that survey, the female preponderance is largely restricted to those aged 50 years or more. In these surveys a number of cases of multiple osteo-arthritis were investigated because their medical histories, including previous treatment, suggested an episode of rheumatoid arthritis.

Fig. 2 (2), overleaf, shows the effect on the prevalence of suspected rheumatoid arthritis of the removal of all those who eventually showed only evidence of multiple osteo-arthritis with no definite radiological or serological evidence of rheumatoid disease. The remaining cases, consisting of rheumatoid arthritics and subjects with a polyarthritis, the nature of which could not be confirmed radiologically or serologically, then showed a much reduced sex difference in prevalence.

In the Vale of Glamorgan survey, which allowed investigation of a greater number of extremely doubtful cases, the prevalence of suspected disease is naturally much higher (Fig. 2 (1)), and the sex difference is greater throughout, except in the oldest age group where degenerative arthritis and rheumatoid arthritis are most easily distinguished. Removing those who ultimately showed only evidence of osteo-arthritis diminishes the prevalence at ages 45, 55, and 65+ (Fig. 2 (2)) in women, but still leaves a marked sex difference in the younger age groups. As it disappears when only confirmed cases of rheumatoid arthritis are considered, this sex difference is again due to subjects with a polyarthritis which failed to satisfy objective criteria of either rheumatoid or osteo-arthritis. This sex difference in the younger age groups remains to be explained; it could be due to unconfirmed rheumatoid disease or to unconfirmed early multiple osteo-arthritis. We should, however, examine the evidence that this generalized osteo-arthritis is not osteo-arthritis secondary to rheumatoid arthritis. The former condition is found predominantly in middle-aged

women and often appears to have a rather acute spontaneous onset; affected joints tend to pass through two stages, an initial acute phase during which the joints may be warm, red, tender, and swollen, and after a period of several months this is followed by a chronic phase, characterized by bony outgrowths around the joint margins (Kellgren and Moore, 1952). It is not surprising therefore that, when this process involves those joints which are characteristically affected by rheumatoid arthritis, the differential diagnosis may be extremely difficult (Cobb, Merchant, and Rubin, 1957). This is particularly true perhaps under survey conditions, for the subjects are not necessarily seen when they have the kind of active disease which brings them to hospital. Further difficulty is introduced because rheumatoid arthritis and generalized osteo-arthritis are common diseases and may co-exist in the same individual.

An examination of the radiological data for the Leigh random sample shows no positive correlation between radiological rheumatoid and osteo-arthritic disease. There is in fact a low negative association between the two conditions; a person with rheumatoid arthritis appears less liable to osteo-arthritis than a normal subject, and conversely a person with osteo-arthritis appears less liable to rheumatoid disease than would be expected if the conditions were independent. We hope to discuss this when further sets of radiographs from random samples are available. If this type of multiple osteo-arthritis were frequently secondary to rheumatoid arthritis, we should expect to be able to detect radiological evidence of rheumatoid changes in the more severe cases. Furthermore, if it occurred secondary to an onset of rheumatoid arthritis in middle-aged females, one would expect, in these surveys, a marked excess of confirmed cases in females over males in middle-age. This was not found in the South Wales surveys. Ball (1952) found that 64 per cent. of 178 male rheumatoids from a busy hospital out-patient clinic reacted positively to the sheep cell agglutination test read at 18 hours, whereas only 46 per cent. of 464 females reacted in this way; this suggested that rheumatoid arthritis might not be a homogeneous disease in females. More recent observation on hospital in-patients suggests that, at this level of severity and diagnostic accuracy, rheumatoid arthritis is much more homogeneous, since positive tests were obtained in 90 per cent. of 149 males and 84 per cent. of 244 females; if only those with subcutaneous nodules were included, the proportion with positive tests rose to 100 per cent. of 62 males and 92 per cent. of 91 females.

The most recent analysis of the long-term results

1. BEFORE INVESTIGATION

2. AFTER INVESTIGATION
AND EXCLUSION OF CASES
SHOWING GENERALIZED
OSTEO-ARTHRITIS ONLY

RHONDDA FACH SURVEY (1953)

VALE OF GLAMORGAN SURVEY (1955)

Fig. 2.—Prevalence of suspected rheumatoid arthritis in the two surveys.

of treatment of early cases of rheumatoid arthritis with cortisone and aspirin (M.R.C. and Nuffield Foundation, 1957) showed that the prognosis of patients in whom the sheep cell test was persistently negative was much better than in those with a persistently or intermittently positive test. Similar findings have been reported by Duthie, Brown, Knox, and Thompson (1957). The strict criteria which we have used in the definition of rheumatoid arthritis in these surveys of symptomatic cases would not accept the serologically negative cases of rheumatoid unless radiological signs were present; perhaps these criteria are in fact excluding a type of polyarthritis, possibly part of the spectrum of rheumatoid disease, which is more prevalent amongst women, associated with negative sheep cell agglutination tests and an absence of destructive bone changes and accompanied by a good prognosis. Such a polyarthritis may indeed ultimately show sequelae only of osteo-arthritis.

Findings like these, which are so contrary to accepted clinical experience, obviously need further investigation.

They also challenge some of our clinical concepts of rheumatoid arthritis and osteo-arthritis, and in our present state of ignorance it is clearly essential to carry out additional complete studies of random population samples so that we may obtain information about the distribution of sheep cell agglutination titres and radiological signs of both rheumatoid arthritis and osteo-arthritis at different ages. This should enable us to define more clearly the inter-relationship between clinical polyarthritis and types of radiological change on the one hand, and high agglutinating titres in the sheep cell test on the other. Furthermore, it may in time be possible to define other clinical and radiological abnormalities not at present considered rheumatoid in nature but nevertheless associated with high agglutinating titres, which may therefore represent as yet unrecognized features of rheumatoid disease.

At the same time, it would appear that both methods of study employed to date can give most useful information, that we are already in a position to assess comparative prevalence rates of rheumatoid arthritis in different populations, and that a start has been made towards establishing the geographic distribution of this important disease.

Summary

Surveys of the prevalence of rheumatoid arthritis have been carried out in the complete populations of a mining valley, the Rhondda Fach, and of an agricultural area, the Vale of Glamorgan, in South Wales.

All subjects who passed an initial screening designed to reveal cases of polyarthritis of the rheumatoid type were asked to attend a centre for investigations. Radiographs of the peripheral joints were taken and sheep cell agglutination tests were carried out; the criteria adopted required confirmation of the diagnosis by positive radiological or serological findings.

The prevalence of rheumatoid arthritis, according to these strict criteria, was higher in the urban population, except in the oldest age groups, where it was higher in the rural population; for each radiological grade of severity of arthritis, the sheep cell agglutination test was positive at greater dilutions in the urban than in the rural subjects. These data suggest that subjects in the urban population are affected by the disease earlier, or in a more severe form, or both, but more extensive investigations are needed to establish whether this finding is generally applicable.

The expected sex difference in the prevalence of rheumatoid arthritis was present after the initial clinical screening, but largely disappeared when these strict diagnostic criteria were used. The possible implications of this finding are discussed.

We wish to record our thanks to the people of the Rhondda Fach and the Vale of Glamorgan who co-operated in these surveys; to acknowledge the help of our colleagues in both Units, particularly Dr. J. S. Lawrence, now Director of the Empire Rheumatism Council Field Unit, and Dr. J. C. Gilson, Director, and Dr. A. L. Cochrane and Mr. P. D. Oldham of the Pneumoconiosis Research Unit, for valuable discussion, advice, and statistical comment; and to thank the epidemiological and radiological teams for much of the field work involved.

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Fréquence de l'arthrite rhumatismale dans les populations urbaine et rurale du Pays de Galles du Sud

RÉSUMÉ

On a procédé à une enquête concernant la fréquence de l'arthrite rhumatismale parmi les populations entières de deux régions situées au Pays de Galles du Sud; une minière, Rhondda Fach, et l'autre agricole, Vale of Glamorgan.

Tous les sujets qui à un examen préliminaire avait révélé des symptômes de polyarthrite de type rhumatismal furent invités à un centre d'investigation. Ils y furent soumis à la radiographie des articulations périphériques et à la réaction d'agglutination de globules de mouton, conformément aux critères adoptés, demandant une confirmation radiologique et sérologique du diagnostic.

La fréquence de l'arthrite rhumatismale, selon ces critères strictement appliqués, fut plus grande parmi la population urbaine, sauf pour des personnes d'âge avancé pour lesquelles elle fut plus grande parmi la population rurale. Pour chaque grade radiologique de sévérité de l'arthrite, la réaction d'agglutination de globules de mouton fut positive à des dilutions plus grandes chez des sujets urbains que chez des sujets ruraux. Ces données suggèrent que les citadins contractent la maladie plus tôt, ou sous une forme plus sévère, ou les deux; de plus amples recherches sont cependant nécessaires pour savoir si cela s'applique généralement.

Comme on avait prévu, la différence entre les sexes en ce qui concerne la fréquence de l'arthrite rhumatismale fut rencontrée après le triage clinique préliminaire, mais cette différence tendit à s'effacer dès qu'on appliqua les rigides critères diagnostiques. On discute les implications possibles de ce fait.

Frecuencia de la artritis reumatoide en las poblaciones urbana y rural del país de Gales del Sur

SUMARIO

Se investigó la frecuencia de la artritis reumatoide en las poblaciones completas de dos regiones del país de Gales del Sur: una cuenca minera, Rhondda Fach, y la otra agrícola, Vale of Glamorgan.

Todos los sujetos que en un examen preliminar revelaron síntomas de poliartitis de tipo reumatoide fueron invitados a un centro de investigación, y sometidos a radiografías de las articulaciones periféricas y a la reacción de aglutinación de eritrocitos de oveja, en conformidad con los criterios diagnósticos adoptados, postulando una confirmación radiológica y serológica.

La frecuencia de la artritis reumatoide, según estos criterios estrictamente aplicados, fué mayor en la población urbana, salvo para las personas de edad avanzada, respecto a las cuales esta frecuencia fué mayor en la población rural. Para cada grado radiológico de severidad de la artritis, la reacción de aglutinación de eritrocitos de oveja fué positiva a diluciones mayores en los sujetos urbanos que en los rurales. Estos datos sugieren que los ciudadanos contraen la enfermedad más temprano, o en una forma más severa, o ambos; se precisan más amplias investigaciones para ver si esto se puede aplicar generalmente.

En la clasificación clínica preliminar se encontró la diferencia anticipada entre los sexos respecto a la frecuencia de la artritis reumatoide, pero con la aplicación de los rígidos criterios diagnósticos, esta diferencia tendía a desaparecer. Se discuten las implicaciones probables de este hecho.