

# ORIGINAL ARTICLES

## A Comparison of Rural and Urban Rheumatoid Arthritis Populations

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### Abstract

#### Introduction

There is evidence to suggest that remote populations have poorer clinical outcomes in certain disease processes such as asthma and cancer. This study looks to identify any disparities in the management of patients with rheumatoid arthritis in the context of rurality.

#### Methods

A retrospective observational study was performed on all 1314 patients with a diagnosis of rheumatoid arthritis who have been under the care of the principal rheumatologist at Raigmore Hospital, Inverness, between the years 1994 and 2004 inclusive.

Rurality was defined according to the Scottish Household Survey.

Populations were assessed in terms of age; sex; duration of diagnosis; number of years of Disease Modifying Anti-Rheumatic Drugs (DMARD) therapy, prednisolone use and the number of musculoskeletal practical interventions undertaken (eg joint aspiration or replacement).

#### Results

Two thirds of patients were considered rural dwellers. No significant difference was established between the populations with regards to management. DMARD therapy had been prescribed in 77% of rural patients vs 70% of their city counterparts for a mean 5.4 and 4.0 years respectively.

The proportion of patients exposed to prednisolone therapy and who underwent musculoskeletal procedures were equivalent.

#### Conclusions

Rural dwellers, with rheumatoid arthritis in the Highlands of Scotland, do not appear to be disadvantaged in regards to their disease management in comparison to the urban population.

#### Key Words

Rheumatoid arthritis, Rural

### Introduction

The perception of rural communities as idyllic havens may be misguided as rural inequality is increasingly being recognised. Deprivation is on the increase in some rural areas as a result of higher living costs, poor service access and unemployment.

Health service provision also appears to be disadvantaged in remote populations. There is evidence to suggest that such populations have poorer clinical outcomes in asthma<sup>1</sup> and cancer.<sup>2</sup> The recent push towards centralisation of specialised services in combination with difficulties in retaining and recruiting rural doctors are contributing factors. A fear of this trend has recently been voiced by a government advisory group.<sup>3</sup>

There is little data available on health care provision for chronic diseases in a rural context, particularly those such as rheumatoid arthritis requiring specialist input. There is now good evidence that early referral to a specialist multidisciplinary team and prompt initiation of disease modifying anti-rheumatic drugs (DMARD) can curtail the destructive process of this debilitating disease.

This is the first study to examine the delivery of rheumatological services to rural dwellers. We looked at the management of patients with rheumatoid arthritis in the Highlands of Scotland, an area with a significant rural populace, and hypothesised that rural dwellers received fewer specific therapies compared to their urban neighbours.

### Patients and methods

The Highlands represent one third of Scotland's landmass, but with approximately 210,000 inhabitants, only four percent of its population. In fact, it has the lowest population density of any region within the European Community.<sup>4</sup>

The majority of Highland rheumatoid arthritis patients, both rural and urban, are under the care of a single rheumatologist. This population is served primarily by a centralised outpatient clinic based at the main secondary referral centre of the region, Raigmore Hospital, Inverness. In addition there is an inpatient facility at the Highland Rheumatology Unit in Dingwall, 20 miles north of Inverness and approximately twenty peripheral clinics every year in a spread of locations.

Between the years 1994 and 2004 inclusive, all patients with a diagnosis of rheumatoid arthritis under the care of the principal rheumatologist were entered into the HARIS database which captures rheumatology audit data from every clinical contact, generating a clinical letter. The dataset included details regarding age; sex; duration of diagnosis; type and duration of

DMARD therapy, prednisolone use and number of musculoskeletal practical interventions undertaken (eg joint aspiration, joint surgery).

There are several definitions of rurality. These depend on the issue being analysed (e.g. health) or the geographical context (eg regional, national). The Scottish Household Survey, which was created in 1999-2000 by the Scottish Executive Environment and Rural Development Department<sup>5</sup> uses an eight fold classification which defines rurality by population size and remoteness. It has been used both politically and clinically to assess health services in Scotland and for the purposes of this study, the classification was abbreviated into two categories:

**Urban:** Settlement of at least 10,000 inhabitants or within 30 minutes driving time of a settlement of 10,000 or more.

**Rural:** Settlement with less than 10,000 inhabitants and more than 30 minutes driving time from a settlement of 10,000 or more.

Patients were categorised on the basis of their registered general practitioner (GP).

The two populations were retrospectively analysed in this observational study. Statistical analysis was undertaken using Stata 8.0. Mann-Whitney and t-testing were used and a p value < 0.05 was considered significant.

## Results

In total, 1314 patients with rheumatoid arthritis received care from the specialist between the years 1994 and 2004 inclusive. Of these, 888 (67%) were considered rural dwellers, the remaining 426 urban.

Analysis of GP practice sizes in relation to the study population studied gave a crude prevalence of rheumatoid arthritis of 5.9 per 1000 population. This is similar to our previous assessment<sup>8</sup> and to estimates elsewhere in the United Kingdom (UK).<sup>9</sup> This breaks down to 5.8 per 1000 rurally and 6.0 per 1000 in urban populations.

The two populations were similarly distributed in terms of age, sex and disease duration.

**Table I: Characteristics of Highland Rheumatoid Arthritis Patients**

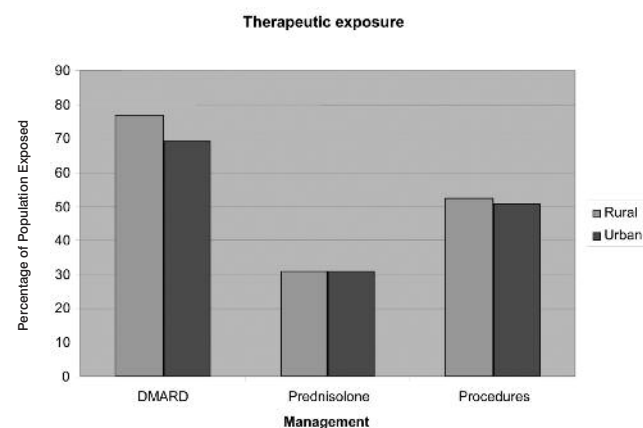
	Rural	Urban	p value
<b>Total population</b>	888	426	
<b>Males (%)</b>	255 (29)	138 (32)	0.173
<b>Females (%)</b>	633 (71)	288 (68)	
<b>Mean Age (range)</b>	68.8 (22-104)	67.6 (22-105)	0.1778
<b>Median Disease duration(y)</b>	14.4	13.2	0.0196

The drug management and musculoskeletal practical interventions were equivalent in the two groups.

DMARD therapy was prescribed in 77% of rural patients vs. 70% of their city counterparts for a mean 5.4 and 4.0 years respectively (p=0.04).

Similarly, the proportion of patients exposed to prednisolone therapy (31.1% vs. 31.1%) and the number of musculoskeletal interventions received (3.5 vs 3.3) were equivalent.

**Figure 1: Management of Rural and Urban Populations with Rheumatoid Arthritis**



## Discussion

This study does not support the hypothesis that the rural population in the Scottish Highlands is disadvantaged in the management of rheumatoid arthritis compared to urban dwellers. Indeed, if anything, rural inhabitants appear to have slightly greater use of, and longer exposure to, DMARD therapy. The populations are well matched for age but do not include a measure of deprivation or an objective measure of disease severity. Deprivation is an important influence on outcome of a variety of diseases including rheumatoid arthritis<sup>6</sup> although the scales in common use are poor indicators of deprivation in rural settings.

It is, however, reasonable to extrapolate (that greater exposure and) the use of DMARD therapy as a measure of care and access to specialist rheumatology input and the equivalent use by rural and urban Highland populations implies equivalence in care. Equally one might argue that over use of steroid and orthopaedic intervention are markers of a poor standard of care and inadequate specialist rheumatology input and we found no differences in this study. However, measures such as waiting times for new patient referrals and total contact time with the rheumatology team may be more accurate measures of access. Furthermore, disease assessment scores such as the DAS28 and HAQ are more appropriate measures of outcome and hence standard of care.

The near equivalent results for the two populations contrast with some previous studies of rural health care provision. Rural health care service inequality has been observed as far back as 1912<sup>7</sup> as well as more recently in the UK. Research from Canada suggests a discrepancy exists in the health status of residents from remote areas compared to urban, the former being at a disadvantage.<sup>8</sup> Scottish cancer deaths in the early 1990's showed higher death rates in lung, colorectal, breast, prostate and stomach cancer in rural areas. Specifically, it was found that rural breast, bowel and stomach cancer patients were three, two and four times respectively, as likely to die before diagnosis.<sup>2</sup> Negative correlations have also been made with asthma death rates<sup>1</sup> and diabetic retinopathy screening rates<sup>9</sup> in rural areas.

Conversely, a recent study on stroke outcomes and service use in the Scottish Highlands did not show any rural disadvantage.<sup>10</sup> In regards to arthritis, a small Dutch project showed urban and rural populations to be matched in regards to functional disability and access to services.<sup>11</sup> It remains unclear which element of the health care process or of the respective populations leads to disparate outcomes in rural populations.

Thus, specific health care strategies may need to be employed for certain diseases in rural populations.

Results of this analysis are strengthened by the large sample size of the study. Although the prevalence rate seems reasonable in comparison to epidemiological data,<sup>12</sup> one must assume there to be a number of undiagnosed rheumatoids or select population of patients who have chosen not to present to their primary care practitioner, or more likely to have refused the invitation to specialist review. Referral bias seems unlikely as the proportion of patients correlates to the practice prevalence and to the overall prevalence of rheumatoid arthritis seen in an earlier study.<sup>13</sup> Remote populations may be disproportionately represented in the latter group because of a reluctance to travel long distances, transport difficulties or differing health expectations. A number of studies suggest that these communities are 'more content with their lot' when it comes to their health, with a greater threshold prior to perceiving themselves as ill.<sup>14</sup> In chronic disease such as rheumatoid arthritis, this can conceivably result in delayed presentation. Thus, one would expect the rural populace to be under reported. Given that there is no evidence to suggest that prevalence of rheumatoid arthritis varies with rurality, the similar rates described here do not support the suggestion of rural bias in under reporting.

The definition of rurality varies with some studies concentrating on population density, while others consider land use, remoteness and geographical features. In general, healthcare researchers are concerned with distance from major facilities. The Scottish household survey provides a sound example of a definition combining both sparsity and remoteness.<sup>6</sup>

The short fall of 77% and 70% DMARD exposure rates seen in these rural and urban populations, respectively, can be explained by a large elderly population diagnosed many years ago in the days of the 'pyramidal therapeutic approach' presenting with 'burnt out' disease alone. This, combined with the retrospective calculation of the disease duration, eg patient presenting several years after initial joint symptoms, also goes some way to explain why patients from both populations were treated with DMARDs for a minority of their total disease duration.

The provision of adequate rheumatological services for the entire population, rural or otherwise, is becoming increasingly important, particularly with the need for earlier treatment and increasingly more specialist dependent therapies such as the biologics. Equally, the valuable input of specialists from other clinical disciplines such as physiotherapy, nursing and occupational therapy should be provided on an equitable basis and at appropriate locations.

Overall, this study suggests that the current organisation of consultant rheumatology care in the Scottish Highlands does not disadvantage the rural population.

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The authors declare no conflicting interests.

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