CONCISE REPORT

Prevalence and impact of arthritis among nursing home residents

J E Abell, J M Hootman, C G Helmick

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Objective: To determine the prevalence, characteristics, and impact of arthritis in the US nursing home population.

Methods: A national cross sectional sample of US nursing homes (8138 sampled residents in 1406 nursing homes) from the 1997 National Nursing Home Survey provided demographic and functional characteristics for residents with primary arthritis, any arthritis, or no arthritis diagnosis at admission.

Results: Of the estimated 1.6 million current nursing home residents in 1997, only 43 000 (3%) had a primary and 300 000 (19%) had any arthritis diagnosis at admission. People with a primary or any arthritis diagnosis received physical/occupational therapy, used wheelchairs and walking aids, and needed assistance with walking and transferring more often than those with no arthritis diagnosis.

Conclusions: These national estimates suggest that arthritis is underreported in nursing home residents. Because arthritis contributes to an increased physical burden on staff and decreased functional capability of residents, both staff and residents can benefit from better diagnosis, intervention, and education.

An estimated 70 million American adults had arthritis or chronic joint symptoms in 2001,¹ and the number of people over age 65 with arthritis is expected to double by 2030.² The prevalence and impact of arthritis in nursing homes is not well characterised. The purpose of this study is to determine the prevalence, characteristics, and impact of people with arthritis and other rheumatic conditions in the nursing home population.

METHODS

Data were obtained from the 1997 National Nursing Home Survey. A two stage probability sample of 1488 nursing homes was selected from a list of 17 900 nursing homes representing all US nursing home residents³; 1406 homes (94%) participated in the survey. The survey consisted of three questionnaires: a facility questionnaire, a current resident questionnaire, and a discharged resident questionnaire. Data from the current resident questionnaire were used in this study. During an onsite visit, an interviewer and the facility administrator (or designee) created a sampling list of all current residents and six residents were randomly selected from the list, resulting in a total sample of 8138 residents.

Detailed information on each resident (demographic characteristics at admission, date of admission, source of payment currently and at time of admission, current functional status, and the primary and up to five other diagnoses at admission) was obtained through interview

with the nursing staff provider most knowledgeable about the resident's care. No residents were directly interviewed.

Current residents with arthritis were identified by a standard set of *International Classification of Disease, 9th revision—Clinical Modification* (ICD9-CM) diagnostic codes developed by the National Arthritis Data Workgroup⁴ to represent a wide variety of arthritis and other rheumatic conditions.

Age was obtained either directly from the resident's chart or calculated by subtracting the resident's year of birth from the year of admission. Race/ethnicity was categorised as non-Hispanic white, non-Hispanic black, and other. Other characteristics included sex, the Metropolitan Statistical Area (urban v rural) of the sampled facility and the level of care received (skilled, intermediate, or residential). Functional characteristics included participation in physical or occupational therapy, use of a wheelchair, use of a walking aid (including a walker, cane, or crutches), and the need for assistance in each of five activities of daily living (bathing, dressing, eating, walking, and transferring).

Three arthritis diagnostic subsets of this population were defined: residents with primary (first listed) arthritis diagnosis, residents with any arthritis diagnosis (any of six diagnosis fields), and residents with no arthritis diagnosis at admission. Estimates of each characteristic were obtained by weighting eligible records to represent all nursing home residents by using the inverse of the probability of selection adjusted for non-response, and over- or undersampling to determine statistical weights.

Actual sample numbers, as well as estimated population numbers and percentages, were calculated for each descriptive characteristic. Confidence intervals (95% CI) for the percentages were calculated with use of relative standard errors derived from published coefficients.³ An estimate was considered unreliable and therefore not reported if the sample size was less than 30. An estimate is considered potentially unreliable and flagged if the sample size is between 30 and 59 or if the sample size is 60 or more and the relative standard error is greater than 30%.³

RESULTS

In 1997, there were an estimated 1 609 000 nursing home residents. At admission, 43 000 (~3%) of these residents had a primary arthritis diagnosis, over 300 000 (~19%) had any arthritis diagnosis, and 1.3 million had no arthritis diagnosis.

Characteristics varied among the three diagnostic subsets (table 1). Women constituted 86% of residents with a primary arthritis diagnosis at admission, 81% of those with any arthritis diagnosis, but only 70% of those with no arthritis diagnosis. Similarly, residents aged 85 years and

Abbreviations: NSAIDs, non-steroidal anti-inflammatory drugs; OT, occupational therapist; PT, physical therapist

Table 1 Distribution of demographic characteristics among nursing home residents, by arthritis diagnostic subset, US, 1997 National Nursing Home Survey

Resident characteristics	Primary arthritis diagnosis (n = 43 000)†		Any arthritis diagnosis (n = 302 000)†		No arthritis diagnosis (n = 1 307 000)†	
	%	(95% CI)	%	(95% CI)	%	(95% CI)
Sex						
Female	85.9	(+/-5.2)	81.2	(+/-2.2)	70.1	(+/-1.2)
Male	*14.1	(+/-5.2)	18.8	(+/-2.2)	29.9	(+/-1.2)
Age (years)						
<65	*		*2.8	(+/-1.0)	9.7	(+/-0.8)
65-74	*		8.1	(+/-1.5)	12.8	(+/-0.9)
75-84	30.6	(+/-6.9)	29.9	(+/-2.6)	33.1	(+/-1.3)
≥85	59.6	(+/-7.3)	59.3	(+/-2.8)	44.4	(+/-1.4)
Race						
Non-Hispanic white	90.6	(+/-4.3)	89.6	(+/-1.7)	84.3	(+/-1.0)
Non-Hispanic black	*		7.4	(+/-1.4)	11.0	(+/-0.8)
Other (Hispanic, Asian, other)	*		*2.5	(+/-1.0)	3.9	(+/-0.5)
Metropolitan Statistical Area						
Urban	62.7	(+/-7.2)	65.7	(+/-2.7)	70.2	(+/-1.2)
Rural	37.3	(+/-7.2)	34.3	(+/-2.7)	29.8	(+/-1.2)
Level of care						
Skilled	48.3	(+/-7.5)	45.7	(+/-2.8)	48.7	(+/-1.4)
Intermediate	46.8	(+/-7.5)	49.8	(+/-2.8)	46.7	(+/-1.4)
Residential	*	*	*3.7	(+/-1.1)	3.7	(+/-0.5)

*Figure does not meet standard of reliability or precision because sample size is less than 30 and, therefore, is not reported. If shown with a number, it should not be assumed reliable because the sample size is either between 30 and 59 or is greater than 59 but has a relative standard error over 30%.

†Estimated.

older and non-Hispanic whites represented a greater percentage of those with a primary or any arthritis diagnosis than of those with no arthritis diagnosis. Level of care was similar in all three diagnosis subsets.

A significantly higher percentage of residents with a primary arthritis diagnosis received physical and/or occupational therapy than in the other groups (fig 1). Those with

primary or any arthritis diagnosis used wheelchairs and especially walking aids more than those with no arthritis. For activities of daily living, those with primary or any arthritis diagnosis at admission needed assistance with walking and transferring more often than those with no arthritis diagnosis at admission, but they required less assistance with eating.

Figure 1 Use of services, equipment, and assistance needs of nursing home residents by arthritis diagnostic subset, US, 1997 National Nursing Home Survey. PT, physical therapy; OT, occupational therapy. *Use walking aids such as cane, crutch, or wheelchair. Significant difference $p=0.05$ by diagnosis category.

DISCUSSION

Of all nursing home residents in 1997, only 3% had a primary arthritis diagnosis and 1% had any arthritis diagnosis at admission, a far smaller percentage than the 50% of people aged 65 years and older with arthritis in the civilian non-institutionalised population.⁵ This marked discrepancy may have several causes. Firstly, there may be overreporting in the general population, but multiple surveys have found a similar or greater prevalence of arthritis. Secondly, there may be underreporting of arthritis in nursing homes. Prete and Phan found that musculoskeletal disease was more prevalent when determined from a complete musculoskeletal examination by a rheumatologist than from examination by a primary care giver or from self report, with mild to moderate disease not being recognised.⁶ They also found that very old people may underreport their musculoskeletal complaints even with direct aggressive inquiry, possibly because they believe that aches and pains are a normal part of aging or because they are so used to accommodating their disease that they no longer recognise it as a hindrance. Thirdly, the low rate of arthritis may be real, perhaps because arthritis has a protective effect on nursing home admissions. Non-steroidal anti-inflammatory drugs (NSAIDs), which are commonly used to treat arthritis, have been found to have a significant inverse relationship with Alzheimer's disease.⁷⁻⁹ Because Alzheimer's disease is a common reason for nursing home admissions, people with arthritis who take NSAIDs may be less likely to be admitted to nursing homes for this condition.

Residents with diagnosed arthritis, particularly those with decreased mobility, have an increased impact on nursing home staff because they require more assistance with ambulation and daily tasks. Residents with undiagnosed arthritis may be placing similar but unrecognised physical demands on staff. For the residents with either diagnosed or undiagnosed arthritis, reduced mobility results in decreased muscle strength and poor cardiorespiratory function. Consequently, more falls and injuries may occur as well as increased morbidity due to diseases related to inactivity such as cardiovascular disease, diabetes, and some cancers.¹⁰

Although more residents with diagnosed arthritis receive physical/occupational therapy than those without arthritis, the relatively low rate of these effective interventions may represent a missed opportunity.¹¹⁻¹³ Przybylski *et al* conducted a randomised controlled programme evaluation that looked at the effect of increasing the number of full time physical therapists (PTs) and occupational therapists (OTs) per bed in nursing homes.¹³ They found that not only was one PT/OT per 50 beds more effective at promoting, maintaining, or limiting decline in functional status than was one PT/OT per 200 beds but also that the 1:50 group required less care giver involvement and less overall care delivery resources than the 1:200 group, resulting in a net benefit even when the costs for PT/OT were included. Prevention of disability, or limiting the progression of disability, can have a profound impact on not only the individual person's quality of life but also on the workload of nursing home staff, the economic structure of the facility, and the economics of the healthcare industry.

This study has at least three possible limitations. Firstly, nursing home residents with arthritis may be overlooked because the National Nursing Home Survey collects information on only six admission diagnoses, and arthritis may be "bumped" off that list for people with seven or more conditions. However, the probability of this happening is probably minimal because only 29% of sampled residents had all six slots for admission diagnoses filled. Secondly, some residents with a primary arthritis diagnosis might have been

admitted temporarily after joint replacement surgery and thus would not represent a long term nursing home problem, but we lacked data to determine this. Thirdly, the survey information may be incomplete because the reporting nursing staff provider who knows the resident best may not know the selected resident very well or, in the absence of medical record documentation, may not recall some details of the resident's care because of the number of patients in his or her charge. The primary strength of this study is that it is a large, nationally representative sample that fills a gap in our knowledge of arthritis epidemiology and provides a profile of diagnosed arthritis in residents that might direct future nursing home research.

Arthritis is a large and probably underrecognised problem in nursing homes. People diagnosed with arthritis place greater physical demands on nursing home staff, and undiagnosed arthritis is probably adding to that burden. Staff and residents both may benefit from greater physical and occupational therapy to prevent progression. In addition, other non-pharmacological interventions, such as self management education (Arthritis Self-Help Course) and physical activity programmes ("People with Arthritis Can Exercise" and the "Arthritis Foundation Aquatics Program"), are effective at reducing pain, improving function, and decreasing the risk of disability¹⁴ in the general population and may help in nursing homes as well.

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Authors' affiliations

J E Abell, Department of Biometry and Epidemiology, Medical University of South Carolina, Charleston, SC, USA

J M Hootman, C G Helmick, Division of Adult and Community Health, National Center for Chronic Disease Prevention and Health Promotion, Centers for Disease Control and Prevention, Atlanta, GA, USA

Correspondence to: Dr J M Hootman, Centers for Disease Control and Prevention, 4770 Buford Highway NE, Mailstop K-45, Atlanta, GA 30341; jhootman@cdc.gov

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ECHO

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Laboratory imposed restrictions on ANCA testing

Testing for antineutrophil cytoplasmic antibodies (ANCA) is useful for patients with Wegener's granulomatosis or other systemic vasculitides. When laboratories accede to all requests for ANCA testing however, the results may be difficult to interpret or irrelevant because more than half of positive tests are in patients who do not have a systemic vasculitis. In Portsmouth, UK a policy of selective testing has been in place for ten years and has resulted in more focused requesting of ANCA tests by clinicians.

The laboratory has performed ANCA testing only when the request form indicated one of the following conditions; acute or chronic renal failure, polyarteritis nodosa, Wegener's granulomatosis (established or suspected), proteinuria or haematuria (requests from the renal/transplant unit), Churg-Strauss syndrome, nephrotic syndrome, abnormality on chest x ray or lung biopsy, haemoptysis, perforation of the nasal septum, or Henoch-Schönlein purpura. (Scleritis, prolonged sinusitis, and sudden hearing loss have recently been added to the list.) Requests not conforming to this list are refused initially but can be discussed. During the six months of June to January 2000 there were 287 requests for ANCA testing. Two hundred and eight (72.5%) were regarded as appropriate and 75 were refused. (Four requests made in person by a consultant were allowed although they would not otherwise have been regarded as appropriate.) In 1991–2, before the introduction of selection, 508 ANCA tests were done and the total number of routine autoimmunity tests (including rheumatoid factor, antinuclear, antithyroid, anti-endomysium, antismooth muscle, anti-mitochondrial, anticardiolipin, and antidouble stranded DNA antibodies) was 12068 (4.2% ANCA). In 2002–3 there were 930 ANCA requests out of a total of 38543 (2.4%). The calculated saving in laboratory costs was £2000 per year.

Two years after the end of the study all laboratory data subsequently accumulated for the 287 study patients was reviewed. Among the 75 patients who had ANCA testing requested but not performed only one patient had had a diagnosis of systemic vasculitis (Wegener's granulomatosis). Her ANCA testing had been delayed by only two days however, because a second sample had been sent with the information, "episcleritis/haematuria and proteinuria". Of the 212 ANCA tests done 57 (27%) were positive, 37 for cytoplasmic ANCA and 20 for perinuclear ANCA. Forty two of the 57 patients proved to have an ANCA related vasculitis (43 Wegener's, five microscopic polyangiitis, and two Goodpasture's).

Since the introduction of the selective policy there have been fewer 'inappropriate' requests for ANCA testing. Clinicians have been 'educated' (but the renal/transplant unit was apparently a major source of requests and one of the three authors of this paper was a consultant renal physician). The authors maintain that their policy makes testing more efficient and clinically relevant as well as saving money.

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