Prevalence of arthritis and joint pain in the oldest old: findings from the Newcastle 85+ Study

SIR—Arthritis is a condition strongly associated with age, yet surprisingly few comprehensive studies to date have examined how arthritis affects the oldest old—those aged 85 years and older, who will number 3.3 million in the UK by 2033 [1]. As the prevalence of musculoskeletal disease increases with age [2, 3], and musculoskeletal pain is one of the leading causes of age-related disability [4], increasing longevity is likely to have major consequences for older people’s quality of life and service provision in the UK. Estimates for arthritis in the 85+ group range from 24.2 to 57.1% [5, 6], with shoulder disorders being common [7]. Prevalence of joint pain in those over 85 years old is estimated between 12.9 and 57.0%, with painful joints more likely to be in the lower limb [3, 7–11]. However, only one of these studies is UK based. We present baseline findings on the prevalence of arthritis and of joint pain from the Newcastle 85+ study [12], an unselected cohort of 1,029 individuals born in 1921.

Methods

Study design and population

A prospective observational cohort study of 85 year olds (1921 birth cohort) from general practices in Newcastle upon Tyne and North Tyneside Primary Care Trusts. Full details of the study design, recruitment and data collected have been published previously [12]. Data were gathered by two methods—(i) general practice record review (GPRR) and (ii) a multidimensional health assessment (MDHA) conducted by trained research nurses in the participants’ own home or institution.

Full ethical approval was obtained for all parts of the study from Newcastle and North Tyneside Local Research and Ethics Committee. This work is supported by a joint grant from the Medical Research Council and the Biotechnology and Biological Sciences Research Council (G0500997). The funders had no role in the design and analysis of this study.

Data collection

Socioeconomic data and information regarding joint pain were obtained at the MDHA. The GPRR (paper and electronic records) provided lifetime prevalence of arthritis, as the reliability of self-report in a population with high levels of impaired cognition is questionable [13–16].

Full details of methods are provided in Supplementary data in Age and Ageing online, Appendix 1.

Statistical analysis

Lifetime prevalence of arthritis and the point prevalence of joint pain are presented using frequencies and percentages and the total number of painful joints as a median and
inter-quartile range (IQR). Gender differences in arthritis prevalence and joint pain were assessed using a Chi-square test and in the total number of painful joints by Mann–Whitney U test. SPSS 16.0 was used for all analyses.

**Results**

One thousand and four hundred and fifty-three eligible individuals were identified, of whom 1,040 (71.6%) participated in the study, with 1,029 completing the GPRR and 845 also undertaking the MDHA. Comparing participants who undertook both complete GPRR and MDHA (n = 845) to those with GPRR only (n = 184) suggested men were more likely to participate in MDHA plus GPRR than GPRR only (37.8 versus 27.2%, P = 0.007) as were individuals with a diagnosis of ‘any arthritis’ (67.3 versus 56.6%, P = 0.005) and osteoarthritis (OA) (53.5 versus 44.6%, P = 0.003).

**Sociodemographic data**

Sixty-two percent of the cohort were women and 99.6% were white. A total of 64.2% had a history of smoking (5.7% current) and 9.8% were classed as obese (BMI ≥30 kg/m²). Over three-quarters lived in standard housing, 12.8% in sheltered accommodation and 10.2% in institutionalised care.

**Prevalence of arthritis**

The lifetime prevalence of ‘any arthritis’ was high, occurring in 673 participants [65.4% (95% CI: 62.5–68.3)], and was more common in women than men (69.1 versus 58.8%, P = 0.001) (Table 1).

OA was common and occurred in 534 participants [51.9% (95% CI: 48.8–54.9)], and was more common in women than men (57.1 versus 42.5%, P < 0.0001). Table 1 outlines the lifetime prevalence of arthritis in more detail. Bilateral OA was common: hip 52.8% (95/180), hand 53.9% (41/76), knee 49.2% (155/315), while unilateral hip, knee and hand OA tended to occur on the right side.

One hundred and thirty-nine (13.5%) participants had undergone either a hip or knee replacement, occurring more frequently in women (15.6 women versus 9.8% men, P = 0.008). Hip replacement had occurred in 8.1% of participants with 22.9% having bilateral replacements. Knee replacements were slightly less common (6.2% of participants) but more often bilateral (32.8%).

**Prevalence and distribution of joint pain**

Eight hundred and three participants completed the section on joint pain. A total of 63.1% (95% CI: 59.8–66.5) reported joint pain in the last month. Women reported any pain more often than men (67.7 versus 55.8%, P = 0.001), though men (71.5%) and women (71.8%) were equally likely to report joint pain occurring on most days of the last month.

In individuals who experienced pain on most days of the last month, this was most likely to be knee pain (64.6%), then shoulder (30.7%), lower back (28.2%), hip (24.6%) and hand (24.3%) (Figure 1). Pain was more prevalent in women across all 11 joint areas but the gender difference was only statistically significant for foot (P = 0.002), neck (P < 0.0001), ankle (P = 0.01) and lower back pain (P = 0.001). In those reporting pain on most days in the last month, women had a higher median number of painful joints (women: 3, IQR: 2–5; men: 2, IQR: 1–3; P = 0.001).

Although many participants identified the knee as the most painful joint, the foot, ankle and lower back had the highest pain score. Women reported higher median pain scores for all joints with the exception of the shoulder and foot.

See Supplementary data in Age and Ageing online, Appendix 2.

**Discussion**

We found the lifetime prevalence of arthritis in 85 year olds to be 65.4%, occurring more commonly in women. Knee OA and cervical spondylosis were the most common diagnoses. Joint pain in the last month was reported by 63.1% and was more prevalent in women in all 11 joint areas assessed.

Our arthritis prevalence estimate of 65.4% is higher in comparison with other studies of 85 year olds; Lawrence et al. estimated 57.1% of individuals to have arthritis [5] and

| Table 1. Lifetime prevalence of arthritis, frequency (percentage) |
|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|
|                 | All             | Women           | Men             | P-valueab       |
| Osteoarthritisa |                 |                 |                 |                 |
| Hip             | 180 (17.5)      | 131 (19.8)      | 49 (13.3)       | 0.008           |
| Knee            | 315 (30.6)      | 217 (32.9)      | 98 (26.6)       | 0.035           |
| Hand            | 76 (7.4)        | 57 (8.6)        | 19 (5.1)        | 0.04            |
| Generalised     | 163 (15.8)      | 131 (19.8)      | 32 (8.7)        | <0.0001         |
| Degenerative    | 30 (2.9)        | 25 (3.8)        | 5 (1.4)         | 0.026           |
| Spondylosis     |                 |                 |                 |                 |
| Cervical spondylosis | 195 (19.0)  | 119 (18.0)      | 76 (20.6)       | 0.31            |
| Lumbar spondylosis | 174 (16.9)  | 127 (19.2)      | 47 (12.7)       | 0.008           |
| Major inflammatory arthritis |        |                 |                 |                 |
| Rheumatoid arthritis | 36 (3.5)     | 34 (5.2)        | 2 (0.5)         | <0.0001         |
| Psoriatic arthritis | 2 (0.2)         | 1 (0.2)        | 1 (0.3)         | 0.68            |
| Ankylosing spondylosis | 9 (0.9)       | 4 (0.6)        | 5 (1.4)         | 0.22            |
| Other arthritis |                 |                 |                 |                 |
| Septic arthritis | 4 (0.4)        | 2 (0.3)        | 2 (0.5)         | 0.56            |
| Gouty arthritis | 2 (0.2)        | 1 (0.2)        | 1 (0.3)         | 0.86            |
| Periarthritis of shoulder | 2 (0.2)       | 0 (0)         | 2 (0.5)         | 0.06            |
| Polyarthritis   | 3 (0.3)         | 3 (0.5)        | 0 (0)           | 0.20            |
| Other specified arthritis | 4 (0.4)  | 3 (0.5)        | 1 (0.3)         | 0.65            |
| Non-specified arthritis | 48 (4.7) | 31 (4.7)      | 17 (4.6)        | 0.95            |

aNumbers will vary due to individuals having multiple diagnoses.
bP-value for gender difference.
Dunlop et al. 35.5% of women and 24.2% of men [6]. There may be a number of explanations for this. First, the Newcastle 85+ study reported lifetime prevalence rather than a period prevalence in the last 12 months. Second, Dunlop et al. required individuals to have consulted a doctor regarding their arthritis and hence, this group will most likely have been symptomatic and sought medical help, and contributed to the substantially lower occurrence than that of Lawrence. Third, in contrast to self-reported arthritis in other studies, we used medical record data, since previous research has shown self-reported disease can often be inaccurate, particularly for arthritis, which is underestimated by older people [14]. OA was most commonly found in the knee joint followed by the hip and hand, similar to that found in another study of 85 year olds [7].

Almost two-thirds of our population reported joint pain in the last month, with 71.7% reporting pain occurring on most days of the month. This is marginally higher than previous population studies including those aged 85+: UK 56.9% (women 64.5%, men 44.2%) and 53.6% (women 58.3%, men 39.6%), Netherlands 57% (women 62%, male 47%), Sweden (women 48.7%, men 12.9%) [3, 7, 8, 11], although in common we found women reported more joint pain. Other population based studies, assessing lower limb pain only, also reported lower estimates but observed the same gender pattern [9, 10]. Knee pain was the commonest joint pain reported in our study, confirming others [8]. vanSchaardenburg reported high levels of shoulder and lower back pain, these being the second and third most commonly reported painful areas in our study [7]. It is likely that the shoulder pain we report often represents soft tissue problems rather than primary OA.

There are aspects of our study that merit a degree of caution. First, our population was urban and second, we only enquired about arthritis. Third, individuals with arthritis recorded at GPRR were more likely to participate in the MDHA and therefore be asked about joint pain, which may have led to its overestimation.

The strengths of the study were the success in securing representative recruitment, particularly those living in institutions. And though 99.6% of our sample was white, this is comparable with the 2001 census where 98.5% of those aged 80 years and over in England were white [17]. Our use of a single year birth cohort meant that a comprehensive picture was obtained of the spectrum of health within this age group, unconfounded by age differences and secular trends.

Establishing the impact of arthritis on disability, health and well-being and healthcare use, is fundamental before we can determine treatment approaches and measure their success; particularly in the presence of multimorbidity in this age group [18]. The economic burden of musculoskeletal disease in the oldest old is potentially huge and its management presents a major challenge [19].

**Key points**

- Arthritis and joint pain are highly prevalent in the oldest old.
- Knee OA and cervical spondylosis were the most common diagnoses.
- In the 11 joint areas studied, pain occurred more frequently in women in all areas.
- Women reported a higher total number of painful joints than men.
- A total of 13.5% of participants had undergone either a hip or knee replacement.

**Acknowledgements**

The Newcastle 85+ Study is supported by a joint grant from the Medical Research Council and the Biotechnology and Biological Sciences Research Council (Grant No G0500997). This work was supported by the UK NIHR Biomedical Research Centre for Ageing and Age-related disease award to the Newcastle upon Tyne Hospitals NHS Foundation Trust. The pilot study was supported by grants from the Dunhill Medical Trust, Unilever Corporate Research, the British Heart Foundation, Newcastle University and Newcastle Primary Care Trust. We are grateful for the support of the Newcastle and North Tyneside Primary Care Trusts and the local general practitioners and their staff. We warmly thank the research nurses for their effort, Pauline Potts for data management and Lucy Farfort for secretarial work. Thanks are especially due to the 85 year olds of Newcastle and North Tyneside for their participation in the study.

**Conflicts of interest**

None declared.

**Supplementary data**

Supplementary data mentioned in the text is available to subscribers in *Age and Ageing* online.
References


Age-related differences in postprandial glycaemia and glycaemic index

SIR—The glycaemic index (GI) is a concept that ranks the glycaemic potency of foods [1]. Postprandial hyperglycaemia following consumption of a food is measured over time and expressed as incremental area under the blood glucose curve (iAUC). GI is then calculated as the iAUC of a test food relative to the iAUC of a reference food (normally a glucose beverage containing the same amount of carbohydrate). Some evidence is suggestive that dietary GI is positively associated with risk of several chronic diseases including type 2 diabetes [2, 3]. Additionally, the prevalence of impaired fasting glucose and diabetes increases with age [4]. There is debate as to the necessity of including GI in dietary recommendations [5] but if GI is to be used it is important to confirm that the GI of the food, a value typically obtained in young people, is applicable to an older age group. Guidelines on GI testing do not specify a preferred age of participants [6, 7]. The average age of GI participants has been reported from mid-twenties to mid-fifties [8–10]. Wolven et al. did not find differences in GI for three foods tested in people aged either younger or older than 40 years with a differential in mean age between the groups of 20 years [11]. However, this is a relatively close age gap considering the ageing population living into their seventh decade and older. We have tested two ready-to-eat breakfast cereals in groups of people differing substantially in