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The prevalence of pain and pain interference in a general population of older adults: cross-sectional findings from the North Staffordshire Osteoarthritis Project (NorStOP)

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Abstract

Although pain is experienced at all ages, there is uncertainty about the pattern of its occurrence in older people. We have investigated the prevalence of three aspects of self-reported pain—occurrence of any recent pain, number and location of pain sites, and interference with daily life—to determine their association with age in older people. A cross-sectional postal survey of all adults aged 50 years and over registered with three general practices ($n = 11230$) in North Staffordshire using self-complete questionnaires was conducted. Respondents' gender, age, employment status, socio-economic classification, and general health status were gathered to characterise the population under study. The location of any recent pain (past 4 weeks) was recorded on a full-body manikin and pain interference was based on a single question. Completed questionnaires were received from 7878 respondents (adjusted response of 71.3%). The 4-week prevalence of any pain was 72.4%; similar across 10-year age-groups, and higher in females than males. In those with pain the median number of painful areas (from 44) was 6, and 12.5% of the responding population were classified as having widespread pain, both figures similar across age-groups. Most regional pains showed a decline in prevalence in the older age-groups, the exceptions being the lower limb regions (hip, knee, foot). Pain that interfered with daily activities was reported by 3002 (38.1%) respondents overall. There was a clear age-related rise in this prevalence with age up to and including the oldest group. Within each regional pain subgroup, the proportion of people who also reported pain interference rose with age. Our study has provided evidence that increasing age in the elderly population is not associated with any change in the overall prevalence of pain, although, as previous studies have suggested, the pattern of pain prevalence in different body regions does change with age. More importantly the extent to which pain interferes with everyday life increases incrementally with age up to the oldest age-group in the community-dwelling general population.

Keywords: North Staffordshire Osteoarthritis Project; Pain; Aged; Cross-sectional survey; Interference

1. Introduction

In recent years pain has come to be seen as a problem on which clinicians and researchers can focus in its own right and not only as an expression of underlying pathology. Numerous population-based surveys have established its common occurrence and the considerable impact it has on individuals, families, society and health care systems (Crook et al., 1984).

It is often stated that self-reported pain prevalence declines in age-groups beyond 60 years (Helme and Gibson, 2001), for reasons suggested to range from physiological alterations in nociception to an increase in stoicism (Gibson and Helme, 2001). However, although the occurrence of certain types of self-reported pain (such as back pain) may decline with age, that of other types (such as large joint pain) may increase (Gibson and Helme, 2001; Helme and Gibson, 2001; Sternbach, 1986), and the pattern of pain prevalence overall in older people is unclear. Furthermore, although older people may complain less of some pains, the extent to which pain disrupts or influences their lives may be greater at older ages. Reyes-Gibby et al. (2002) recently described the extent to which pain is a predictor of poor health status among older people in the community. However, a systematic review of the literature relating to pain and quality of life among older people with arthritis by Jakobsson and Hallberg (2002)

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pointed to the lack of studies focussed on those aged over 75 years.

As part of a large population-based survey, we have investigated the prevalence of three aspects of self-reported pain—occurrence of any recent pain, number and location of pain sites, and interference with daily life—to determine their association with age in older people.

2. Methods

The design of the study was a cross-sectional postal survey of an older adult population using self-complete questionnaires. Ethical approval for the study was obtained from the North Staffordshire Local Research Ethics Committee.

2.1. Study population

Three primary care general practices from the North Staffordshire Primary Care Research Consortium were recruited to the study. The sampling frame consisted of all adults aged 50 years and over registered with the three practices ($n = 11309$). The samples were then checked by the general practitioners (GPs) for exclusions (for example, severe psychiatric or terminal illness). Questionnaires were mailed with a letter from the GP practice, accompanied by a study information leaflet, and reminders were sent to non-responders after two and four weeks. Full details of the study design and methods have been presented elsewhere (Thomas et al., 2004).

In the United Kingdom (UK), about 98% of the population are registered with a general practitioner and so practice registers provide a convenient frame for sampling a local population (Bowling, 1997), regardless of the extent or nature of any contacts with the practice. No UK national level data is available to determine the accuracy of contact details stored on GP registers at any given point in time. For individual studies, researchers have compared GP register data to other general population registers, such as the national census (itself subject to inaccuracies (Bowling et al., 1989)). Their findings suggest that between 15–30% of contact information does not match on the two sources and this contributes to apparent non-response in population-based surveys using general practice registers as their sampling frame (Pope and Croft, 1996; Thomas, 1999).

2.2. Health survey questionnaire

The survey consisted of a health questionnaire that collected information on several areas of life including socio-demographics, general health, bodily pain, and the interference of pain with daily life.

2.2.1. Socio-demographic and general health data

All respondents were asked their gender, date of birth (to enable the calculation of current age), and current employment status (employed, not working due to ill health, retired, seeking employment, housewife, and other) and occupation to determine the individual's socio-economic classification (ONS, 2000, 2002). Participants' general health was assessed by the MOS SF-12, a validated, multipurpose short-form generic measure of health status. For this study, we have calculated the scores for the two summary scales (Physical Component Summary (PCS) and the Mental Component Summary (MCS)) which are standardised to scores from the general US population (mean = 50, standard deviation = 10) such that scores above the mean imply better health (Ware et al., 1996).

2.2.2. Pain occurrence, number and location of pain sites

Our measure of the occurrence of self-reported pain was based on a single question. Participants were asked, "In the past 4 weeks have you had pain that has lasted for one day or longer in any part of your body?". Those responding positively were asked to shade their painful areas on a full body manikin (front and back views). The manikin was separated into 44 mutually exclusive areas, and these were recorded by using a standard transparent template marked with the borders, a method shown to be repeatable (Lewis et al., 2002).

From the manikin data, two measures of bodily pain were determined. Firstly, the number of areas (from 44) in which pain was recorded was calculated, and responses categorised into four groups with approximately equal numbers of respondents (1–3 areas, 4–6 areas, 7–11 areas, 12–44 areas). Secondly, we characterised a specific subgroup of the population who had widespread pain according to the definition of Macfarlane et al. (1996), derived from American College of Rheumatology criteria for fibromyalgia (Wolfe et al., 1990) but more stringent (axial pain plus pain in at least two sections of each of two contralateral quadrants of the body). This 'widespreadness' of pain is associated in population studies both with perceived severity of pain as measured by visual analogue scales and with the severity of affective and cognitive aspects of pain (McBeth et al., 2001).

Finally we identified ten separate regional pain syndromes on the basis of the manikin data, by combining shaded areas, using definitions derived from previous epidemiological studies, where possible (low back—Papageorgiou et al., 1995; hip—Birrell et al., 2000; forearm—Macfarlane et al., 2000; neck—Croft et al., 2001; knee—Jinks et al., 2001).

2.2.3. Pain interference with everyday life

As a measure of impact, we used current interference of the pain in everyday life, based on a single item from the MOS SF-12: "During the past 4 weeks, how much did pain interfere with your normal work (including both work

outside the home and housework)" (Ware et al., 1996). The question used has five response options which were dichotomised for this analysis: (i) Pain interference—'Moderately', 'Quite a bit' or 'Extremely' and (ii) No pain interference—'Not at all' or 'A little bit'. This categorisation was applied to identify a group of respondents whose pain causes them more than minimal interference with daily activities. This approach has been used in previous population-based surveys of pain (Blyth et al., 2001; Scudds and Østbye, 2001).

2.3. Statistical analysis

A brief description of the demographic differences between responders and non-responders is presented. The population of responders is then described in terms of socio-demographic factors and general health. The prevalence of pain, number of painful areas, and widespread pain was determined overall, and by gender and age-group (50–59 years, 60–69 years, 70–79 years, 80 + years). This analysis was then repeated for prevalence of pain interference with everyday life.

The prevalence of pain for each individual regional pain syndrome was also calculated, by age-group. The number of participants with pain interference, as a proportion of those with pain at each specific regional pain syndrome, has also been calculated.

A conservative approach to estimating prevalence was adopted given item non-response in the questionnaire. The prevalence estimates were calculated for the relevant total responding population and hence missing data was assumed to indicate a negative response to the question, i.e. no pain or no pain interference.

3. Results

From the population of adults aged 50 years and over at the three practices ($n = 11309$), exclusions by the GP were made in 79 cases and hence 11230 questionnaires were mailed. During the three mailing waves of the questionnaires, 175 exclusions were made to the database (45 deaths or departures from the practice, 105 questionnaires were returned as addressee unknown, and 25 people had comprehension or memory problems) leaving an eligible study population of 11,055 adults. 7878 completed questionnaires were received from the eligible 11,055, giving an adjusted response of 71.3%. The non-responders were made up of 255 people who declined to participate, 109 people who stated ill health as the reason for their not completing the questionnaire, and 2813 people for whom no response was received. Hence we have confirmed correct address information for 74% (7878 + 25 + 109 + 255/11230) and confirmed incorrect address information for 0.9% of the intended study population.

3.1. Differences between responders, exclusions, and non-responders

Responders were more likely to be female compared to those excluded or not responding. The non-response group were most likely to be in the youngest age-group whilst those excluded had a higher proportion of patients aged over 80 years. When examined by gender, differences in age structure existed between the non-responders and exclusions. Within non-responders, females were fairly evenly distributed across the four age-groups studied, whereas almost half of the male non-responders were aged under 60 years. Female exclusions from the study were most likely to be in the oldest age-group compared to males who were most likely to be aged under 60 years (Table 1).

3.2. Socio-demographic and general health data

The responders were 56% female with an overall mean (standard deviation) age of 66.3 years (10.3 years) which was slightly higher in females (66.9 years) than in male responders (65.5 years) (Table 2). The majority of the responders were retired with just over a quarter still in employment. In terms of socio-economic classification, the majority of the responders were in semi-routine or routine occupations. Table 2 also summarises the health status of this study population for reference purposes.

Table 1
Demographic differences between responders, exclusions, and non-responders to the health survey

	Responders ($n = 7878$), (%)	Exclusions ($n = 175$), (%)[a]	Non-responders/refusers ($n = 3177$), (%)
Gender			
Females	4416 (56.1)	81 (46.3)	1651 (52.0)
Males	3462 (43.9)	94 (53.7)	1526 (48.0)
Age group (years)			
Overall			
50–59	2521 (32.0)	53 (30.6)	1273 (40.1)
60–69	2352 (29.9)	28 (16.2)	783 (24.7)
70–79	2030 (25.8)	40 (23.1)	602 (19.0)
80 +	975 (12.4)	52 (30.0)	519 (16.3)
Females			
50–59	1347 (30.5)	12 (15.2)	554 (33.6)
60–69	1269 (28.7)	9 (11.4)	375 (22.7)
70–79	1158 (26.2)	18 (22.8)	331 (20.1)
80 +	642 (14.5)	40 (50.6)	391 (23.7)
Males			
50–59	1174 (33.9)	41 (43.6)	719 (47.1)
60–69	1083 (31.3)	19 (20.2)	408 (26.8)
70–79	872 (25.2)	22 (23.4)	271 (17.8)
80 +	333 (9.6)	12 (12.8)	128 (23.7)

[a] Two missing dates of birth from GP register.

Table 2
Socio-demographic and lifestyle factors for responders: overall and by gender

	Responders		
	All ($n = 7878$), (%)	Females ($n = 4416$), (%)	Males ($n = 3462$), (%)
Gender			
Females	4416 (56.1)		
Males	3462 (43.9)		
Age group (years)			
50–59	2521 (32.0)	1347 (30.5)	1174 (33.9)
60–69	2352 (29.9)	1269 (28.7)	1083 (31.3)
70–79	2030 (25.8)	1158 (26.2)	872 (25.2)
80 +	975 (12.4)	642 (14.5)	333 (9.6)
Employment status[a]			
Employed	1980 (26.1)	924 (22.0)	1056 (31.1)
III	594 (7.8)	261 (6.2)	333 (9.8)
Retired	4384 (57.8)	2509 (59.8)	1875 (55.2)
Unemployed	75 (1.0)	25 (1.0)	50 (1.5)
Housewife	388 (5.1)	388 (9.2)	
Other	168 (2.2)	87 (2.1)	81 (2.4)
Socio-economic classification[a,b]			
Higher managerial	201 (2.8)	29 (0.7)	172 (5.3)
Higher professional	133 (1.9)	13 (0.3)	120 (3.7)
Lower managerial/ professional	898 (12.5)	443 (11.3)	454 (13.9)
Intermediate occupations	889 (12.4)	642 (16.4)	247 (7.5)
Self-employed	462 (6.4)	116 (3.0)	346 (10.5)
Lower supervisory/ technical	433 (6.0)	49 (1.3)	384 (11.7)
Semi-routine occupations	1771 (24.6)	1205 (30.7)	566 (17.3)
Routine occupations	2413 (33.5)	1429 (36.4)	984 (30.1)
SF-12: Physical component score[a]			
Mean (SD)	40.7 (12.5)	40.3 (12.6)	41.3 (12.4)
SF-12: Mental component score[a]			
Mean (SD)	48.8 (11.2)	47.9 (11.4)	49.9 (10.9)

SD, standard deviation.
[a] Subject to missing data.
[b] See references ONS, 2000, 2002.

3.3. Pain occurrence, number and location of pain sites

The overall 4-week period prevalence for any pain was 66.2% (5215/7878) (Table 3). The prevalence of pain was similar across the age-groups, but was higher in females than males (% difference 2.6%; 95% confidence interval 0.5, 4.7%) (Table 3). The prevalence of each category of 'number of painful areas' did not change with age. Females were more likely to have pain in 7 or more areas when compared to males (% difference 5.2%; 3.2, 7.2%). The prevalence of widespread pain (that is contralateral pain in addition to axial skeletal pain) was 12.5% overall (985/7878) and this declined in the oldest age-groups (% differences in those aged 70 years and over compared with those aged under 70 years—females: 3.4%; 1.3, 5.5% and males: 3.1%; 1.1, 5.1%). Widespread pain was more prevalent in females than males (% difference 4.7%; 3.3, 6.2%).

3.4. Pain occurrence, by region

The prevalence of each regional pain syndrome, categorized by age-group, is shown in Table 4. There is a consistent decline in prevalence of each syndrome in the oldest age-groups, with the exception of the lower limb regions (hip, knee and foot).

3.5. Pain interference with everyday life

The prevalence of pain interference in the responders was 38.1% (3002/7878), which equates to 58.7% of those who reported any pain (Table 5). Pain interference prevalence was seen to rise sharply with increasing age. Pain interference was more prevalent in females than males (% difference 2.8%; 0.7, 5.0%). The prevalence of pain interference increased with the number of painful areas reported—overall, in males and females separately, and within age-group.

The prevalence of widespread pain plus pain interference was 10.4%. There was no clear trend of this prevalence with age, but it was higher in females than males (% difference = 4.2%; 2.9, 5.5%).

When the study responders were classified according to the presence of each individual regional pain syndrome, the proportion of people in each pain group who also reported pain interfering with their everyday lives increased with age in all the regions (Table 6).

4. Discussion

The sample for this population survey of people aged 50 years and over was sufficiently large to allow for age-stratified comparisons using 10-year age-groupings. The prevalence of 'any recent pain in the past month' did not alter with age in this older population. Furthermore the prevalence of multiple-area pain did not change substantially with age, although the prevalence of the more specific symptom of 'widespread pain' was lower in those aged over 70 years. By contrast, the prevalence of pain that interferes with life, as measured by a simple question ("During the past 4 weeks, how much did pain interfere with your normal work, including housework?") is clearly related to age, with a pattern of increase from those aged 50–59 years through to the eldest group studied. The prevalence of regional pain syndromes in this sample confirms findings suggested by earlier studies, namely that most regional pain declines in prevalence at the oldest ages, with the exception of lower limb pain in the hip, knee and foot.

Table 3
Pain prevalence by gender and age group ($n = 7878$): any pain, number of painful areas, and widespread pain

	Pain in past 4 weeks (%)	Number of painful areas				Widespread pain (%)
		1–3 (%)	4–6 (%)	7–11 (%)	12–44 (%)	
Overall	5215 (66.2)	1352 (17.2)	1337 (17.0)	1146 (14.5)	1221 (15.5)	985 (12.5)
Females (years)	2974 (63.7)	717 (16.2)	737 (16.7)	666 (15.1)	762 (17.3)	644 (14.6)
50–59	932 (69.2)	229 (17.0)	227 (16.9)	216 (16.0)	240 (17.8)	220 (16.3)
60–69	876 (69.0)	204 (16.1)	221 (17.4)	190 (15.0)	237 (18.7)	198 (15.6)
70–79	745 (64.3)	178 (15.4)	197 (17.0)	172 (14.9)	170 (14.7)	136 (11.7)
80 +	421 (65.6)	106 (16.5)	92 (14.3)	88 (13.7)	115 (17.9)	90 (14.0)
Males (years)	2241 (64.7)	635 (18.3)	600 (17.3)	480 (13.9)	459 (13.3)	341 (9.8)
50–59	778 (66.3)	226 (19.3)	208 (17.7)	175 (14.9)	153 (13.0)	112 (9.5)
60–69	741 (68.4)	205 (18.9)	195 (18.0)	162 (15.0)	161 (14.9)	135 (12.5)
70–79	531 (60.9)	148 (17.0)	153 (17.5)	106 (12.2)	105 (12.0)	72 (8.3)
80 +	191 (57.4)	56 (16.8)	44 (13.2)	37 (11.1)	40 (12.0)	22 (6.6)

With respect to the specific question of whether pain becomes a less frequent symptom in the most elderly age-groups of the older population, our study suggests that, although some regional pains decline in prevalence in the elderly, others increase, and so the overall prevalence of pain does not change with age. Furthermore the experience of pain becomes consistently more disabling with age, as measured by interference with daily activities.

Non-response to the survey was approximately 30%, which is about average for postal surveys of this type. When comparing those who did and did not complete the questionnaire, differences in the age and gender structure were apparent. The overall prevalence of pain might have been affected by these demographic differences through its association with pain experience. However it is unlikely that this would affect the age-related patterns, which are the topic of the analysis presented here. The gender comparisons might have been affected by the lower response in the younger males and older females, but studies of non-responders to pain surveys have suggested generally that, although non-responders probably have less pain than responders, the difference is modest (Papageorgiou et al., 1995). To explore the possibility of non-response bias in the current study we compared prevalence figures for any pain and pain interference for those who responded to the three different mailing stages of the survey, under the assumption that late responders more closely resemble non-responders than those who respond to first mailing with no need for reminders. In terms of pain we have found that the prevalence of pain decreases, though not significantly, with lateness of response (67.1, 65.5, 63.7%). However, the prevalence figures for pain interference remain stable across mailing wave (38.4, 38.2, 36.9%).

The method applied to calculate the prevalence estimates incorporated an assumption that missing data indicated a negative response to the question. An examination of missing data suggests that although the degree of missing data was found to increase slightly with age, it's affect on the results in minimal.

However there may be two other biases in the non-response. Firstly, questionnaires based on self-report of pain rely on a level of cognition that might be impaired in a small but important group of older people—those who cannot communicate their pain because of a loss of motor skills or memory loss. Secondly, questionnaires mailed via

Table 4
Prevalence of regional pain syndromes by age group ($n = 7878$)

	Age group (%)			
	50–59 years	60–69 years	70–79 years	80 + years
Abdomen	296 (11.7)	268 (11.4)	197 (9.7)	95 (9.7)
Foot	557 (22.1)	552 (23.5)	456 (22.5)	237 (19.5)
Forearm	591 (23.4)	486 (20.7)	343 (16.9)	139 (12.2)
Hand	601 (23.8)	602 (25.6)	411 (20.2)	200 (16.9)
Head	306 (12.1)	247 (10.5)	167 (8.2)	78 (7.2)
Hip	650 (25.8)	665 (28.3)	549 (27.0)	250 (25.6)
Low back	905 (35.9)	825 (35.1)	607 (29.9)	266 (27.3)
Knee	901 (35.7)	887 (37.7)	719 (35.4)	367 (37.6)
Neck	574 (22.8)	539 (22.9)	360 (17.7)	145 (14.9)
Shoulder/upper arm	788 (31.3)	776 (33.0)	569 (28.0)	243 (24.9)

Table 5
Pain interference prevalence by gender and age group ($n = 7878$): any pain, number of painful areas, and widespread pain

	Pain interference overall (%)	Pain interference by number of painful areas				Widespread pain plus pain interference (%)
		1–3 (%)	4–6 (%)	7–11 (%)	12–44 (%)	
Overall	3002 (38.1)	460 (5.8)	666 (8.5)	750 (9.5)	1027 (13.0)	821 (10.4)
Females	1738 (39.4)	252 (5.7)	371 (8.4)	420 (9.5)	642 (14.5)	542 (12.3)
50–59 years	433 (32.1)	43 (3.2)	88 (6.5)	110 (8.2)	183 (13.6)	168 (12.5)
60–69 years	481 (37.9)	45 (3.5)	103 (8.1)	116 (9.1)	205 (16.2)	173 (13.6)
70–79 years	502 (43.4)	94 (8.1)	116 (10.0)	125 (10.8)	149 (12.9)	117 (10.1)
80 + years	322 (50.2)	70 (10.9)	64 (10.0)	69 (10.7)	105 (16.4)	84 (13.1)
Males	1264 (36.5)	208 (6.0)	295 (8.5)	330 (9.5)	385 (11.1)	279 (8.1)
50–59 years	392 (33.4)	68 (5.8)	81 (6.9)	107 (9.1)	126 (10.7)	89 (7.6)
60–69 years	417 (38.5)	50 (4.6)	105 (9.7)	116 (10.7)	136 (12.6)	113 (10.4)
70–79 years	319 (36.6)	59 (6.8)	82 (9.4)	74 (8.5)	88 (10.1)	60 (6.9)
80 + years	136 (40.8)	31 (9.3)	27 (8.1)	33 (9.9)	35 (10.5)	17 (5.1)

a population register may fail to reach a totally representative sample of institutionalised older people (Fox et al., 1999). Both these groups may have higher levels of pain than community dwelling alert older adults. With respect to our study, the numbers in both groups are likely to be small relative to the whole population of pain sufferers in the older population and patterns of pain across age-groups are unlikely to have been distorted by this problem. However even if it had led to a significant underascertainment of pain in the very elderly in our sample, our conclusion of 'no decline in prevalence with age' would not be undermined.

In terms of generalisability, i.e. external validity, the age and gender structure of the participating population was similar to that of the North Staffordshire area and England and Wales (ONS, 2001). Moreover, in terms of general health, the SF-12 scores obtained from the current study are not dissimilar from those reported from a study of older adults in London (Pettit et al., 2001).

The prevalence of 'any pain' in our study is comparable with figures from other population-based surveys which have included sufficient numbers of people from older age-groups to produce stratified figures (Brattberg et al., 1996; Helme and Gibson, 2001; Mobily et al., 1994). In agreement with earlier work by Scudds and Østbye (2001), our study suggests that the overall prevalence of self-reported pain remains constant with age in older people.

Our analysis of regional pain syndromes fits with evidence that has been accumulating since the Nuprin study in the 1960's that some self-reported regional pain syndromes decline in prevalence in the older age-groups (Gibson and Helme, 2001; Sternbach, 1986; Urwin et al., 1998). However our study emphasises that the overall prevalence of pain does not decline, despite the change in pattern of regional involvement.

The proportion of people reporting interference from pain increases with age regardless of the specific pain complaints that they have. Our question about interference of pain in everyday life was a single one, and not specific to any particular pain. It might be that as people age, the number of sites of pain involvement increases, and this is why interference with daily life increases. However our data show that neither the median number of pain areas nor the prevalence of multiple pain sites or

Table 6
Proportion of regional pain syndrome sufferers reporting pain interference by age group

	Age group (%)			
	50–59 years	60–69 years	70–79 years	80 + years
Abdomen	193 (65.2)	199 (74.3)	156 (79.2)	79 (83.2)
Foot	339 (60.9)	404 (73.2)	327 (71.7)	190 (80.2)
Forearm	375 (63.5)	361 (74.3)	264 (77.0)	118 (84.9)
Hand	370 (61.6)	422 (70.1)	302 (73.5)	165 (82.5)
Head	183 (59.8)	170 (68.8)	134 (80.2)	70 (89.7)
Hip	406 (62.5)	460 (69.2)	398 (72.5)	206 (82.4)
Low back	545 (60.2)	554 (67.2)	419 (69.0)	208 (78.2)
Knee	507 (56.3)	589 (66.4)	514 (71.5)	298 (81.2)
Neck	368 (64.1)	380 (70.5)	268 (74.4)	125 (86.2)
Shoulder/upper arm	465 (59.0)	514 (66.2)	410 (72.1)	208 (85.6)

widespread pain increases with age in this older population. Multiple pains cannot therefore explain the rising impact of pain on daily life with age.

Gibson et al. (1994) drew attention a decade ago to the possibility that once persistent or recurrent pain was present in older adults, it may have a greater impact on psychological, social and physical functioning than in younger people. Our study has now provided evidence that the prevalence of pain that interferes with everyday life increases incrementally with age up to the oldest age-group in the community-dwelling general population. There are a number of possible explanations for this. The regional pain syndrome of osteoarthritis, with its specific impact on lower limb mobility, is likely to increasingly dominate the overall experience of pain in older people (March et al., 1998) and the proportional increase we found in hip, knee and foot pain prevalence with age supports this interpretation. The increasing frequency of non-musculoskeletal comorbidity at older ages may influence the level of restriction which people attribute to pain in this age-group. Moreover, we cannot rule out the influence of a cohort effect, i.e. the level of pain interference experienced by the oldest subjects is higher than the level that will be experienced by the study's youngest subjects in 30 years time.

5. Conclusions

Whatever the explanation for the findings from this study, the lowered health status related to pain among older people is considerable. This fact should be weighed against the evidence from elsewhere of age-related declines in nociception or increases in stoicism, which might explain the decline in some regional pains at the oldest ages, but which may falsely imply that pain is less prominent a feature of older people's health. Given that 'the ability of the older person to function independently in the community is a critically important public health issue' (Guralnik et al., 1996), the need to reduce the morbidity and activity limitation and participation restriction associated with pain in older people should be a high public health priority.

6. Competing interests

None.

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