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RESEARCH ARTICLE

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Chronic pain among community-dwelling elderly: a population-based clinical study

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ABSTRACT

Objective: To present the occurrence, characteristics, etiology, interference, and medication of chronic pain among the elderly living independently at home. ***Design/setting:*** A total of 460 subjects in three cohorts aged 75, 80 and 85 years respectively received visits by communal home-care department nurses for a cross-sectional survey. Of them, 175 had chronic (duration $\geq$ 3 months) pain with an average intensity of $\geq$ 4/10 and/or $\geq$ moderate interference in daily life. ***Main outcome measures:*** Clinical assessment was performed for consenting subjects to define the location, intensity, etiology, type, interference and medications of chronic pain. ***Results:*** According to home visits, elderly people with chronic pain rated their health and mobility worse and felt sadder, lonelier and more tired than those without chronic pain. A geriatrician made clinical assessments for 106 patients with chronic pain in 20092013. Of them, 66 had three, 35 had two and 5 had one pain condition. The worst pain was musculoskeletal in 88 (83%) of patients. Pain was pure nociceptive in 61 (58%), pure neuropathic in 9 (8%), combined nociceptive and neuropathic pain in 34 (32%), and idiopathic in 2 (2%) patients. On a numerical rating scale from 0 to 10, the mean and maximal intensity of the worst pain was 5.7 and 7.7, respectively, while the mean pain interference was 5.9. Mean pain intensity and maximal pain intensity decreased by age. Duration of pain was longer than 5 years in 51 (48%) patients. Regular pain medication was used by 82 (77%) patients, most commonly paracetamol or NSAIDs. Although pain limited the lives of the elderly with chronic pain, they were as satisfied with their lives as those without chronic pain. ***Conclusions:*** Elderly people in our study often suffered from chronic pain, mostly musculoskeletal pain, and the origin of pain was neuropathic in up to 40% of these cases. However, elderly people with chronic pain rarely used the medications specifically for neuropathic pain. Based on increased loneliness, sadness and tiredness, as well as decreased subjective health and mobility, the quality of life was decreased among those with chronic pain compared with those without pain.

KEY POINTS

- It is known that chronic pain is one of the most common reasons for general practice consultations and is more common in women than men.
- In our study using detailed clinical examinations, up to 40% of patients with chronic pain in cohorts aged 75, 80 and 85 years suffered from neuropathic pain.
- However, only a few elderly people with chronic pain used medications specifically for chronic pain, which may be due to side effects or non-willingness to experiment with these drugs.
- Elderly people with chronic pain rated their health and mobility to be worse and felt sadder, lonelier and more tired but were not less satisfied with their lives than those without chronic pain.

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Chronic pain; elderly; Finland; general practice; neuropathic pain; nociceptive pain; pain medication

Introduction

It has been estimated that 20% of the European population suffers from chronic pain,[1,2] which most often affects the musculoskeletal system.[3] Chronic pain impairs activities of daily living and mobility, and may predict progression of disability.[4] Especially among

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people aged 65 years and more, the severity of pain seems to be associated with increased societal costs and decreased quality of life.[5] The role of age in chronic pain is though controversial: although pain generally increases with age, the oldest old appear to suffer less from pain.[6] Nociception changes with advancing age,[7] and the oldest people may have adapted to living and coping with the chronic pain.[8]

Chronic pain can be classified according to its pathophysiology as nociceptive, neuropathic, mixed (combination of nociceptive and neuropathic pain), or idiopathic pain.[9] There is little information on the prevalence of neuropathic pain in the elderly. A Dutch study [10] found that only 2% of elderly people with back pain scored positive for neuropathic pain. However, elderly people may be at higher risk of neuropathic pain, as many diseases causing neuropathic pain—such as type II diabetes, herpes zoster, and spinal disorders – increase with age.

Our aim was to study the etiology, type, characteristics, and medication of chronic pain in elderly people, and especially the role of neuropathic pain. We studied three age cohorts retrieved from a home visit survey for home-dwelling elderly people that was organized by the municipality. We included elderly patients aged 75, 80 or 85 with chronic pain (pain with duration $\geq$3 months) who lived independently at home.

Material and methods

Preventive home visits, questionnaires, and study criteria

The municipality of Kirkkonummi (population, 37,600 inhabitants in 2012) organized preventive home visits in the period 2009–2013 for elderly people aged 75, 80, and 85 years who were living independently at home. Such preventive home visits appear to be effective in reducing admissions to nursing homes, and they have been common in Finland.[11] We recruited population-based study cohorts from three age groups: 75-year-olds (born 1933–1935), 80-year-olds (born 1931–1932) and 85-year-olds (born 1924–25), and gave them the opportunity to participate in the current study.

The target age group consisted of 802 elderly patients, 684 of whom lived independently at home. Of them, 460 consented to participate in the preventive home visits, and 175 (38%) fulfilled the inclusion criteria of the current study. Altogether 106 patients (28 males, 78 females, 26% and 74%, respectively) consented to participate in the clinical study. Data on the preventive home visits of those who did not fulfill the study criteria were available for 220 subjects. The flow chart of the patient recruitment is presented in Figure 1.

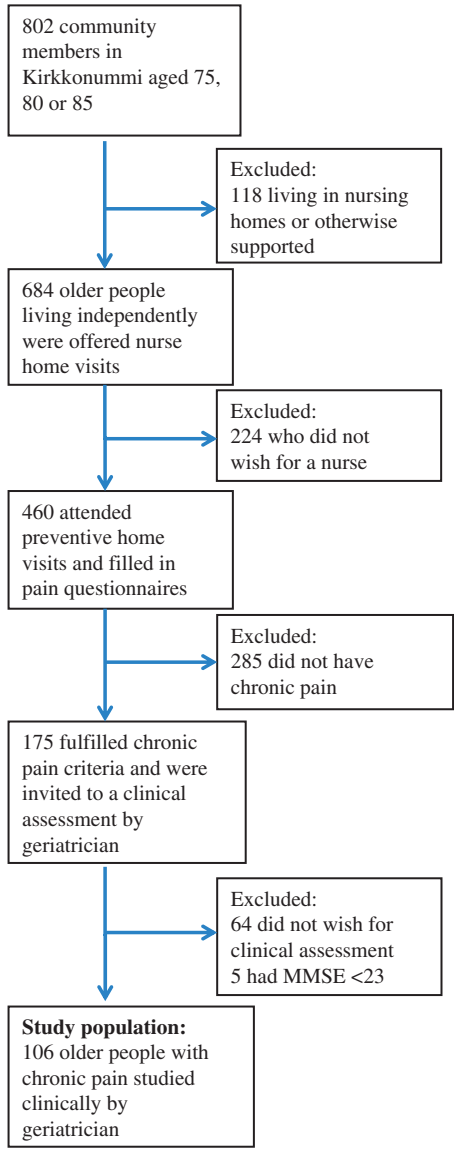

Figure 1. Flow chart of the study population.

The standardized preventive home visit questionnaire (from the Association of Finnish Local and Regional Authorities) included questions on living conditions, economic situation, health, mobility, mood, wellbeing, and satisfaction with life. We added a one-sheet pain questionnaire that included questions on the presence and intensity of chronic pain (duration $\geq$3 months), expected cause of pain, interference of pain in daily life, and current pain medication. A nurse interviewed the subjects at their homes.

Our pain questionnaire included questions on mean pain intensity and maximal pain intensity during the last week on a numeric rating scale (NRS) from 0 to 10. Those suffering from chronic pain were offered a consultation with a geriatrician (SR-P). Chronic pain was defined as pain with an average daily intensity of $\geq$4 on NRS during the previous week or with at least daily moderate interference on a verbal scale (The pain has

interfered normal life under the last week: not at all, little, moderately, a lot of or very much) or ≥4 on NRS scale. Our exclusion criteria were impaired cognitive function (MMSE < 23) or impaired communication skills (aphasia, insufficient ability to speak Finnish or Swedish). A total of five participants were excluded due to MMSE below 23 and none because of impaired communication skills.

Examination of the patients

The consenting patients who fulfilled our criteria for chronic pain received appointments to be examined by a research nurse and the geriatrician. The research nurse interviewed the patients for approximately 1 h, and the geriatrician subsequently examined them clinically. The examination included assessment of different pain states (location, duration, intensity, interference, and treatment) and lasted from 1 to 1.5 h. The clinical examination aimed at diagnosing the etiology of the pain states and the type(s) of pain (nociceptive, neuropathic, combination of nociceptive, and neuropathic pain, or idiopathic pain). In addition, optimal pain management was provided to the patients.

Statistical methods

The data is presented as means with standard deviations (SD), or as medians with interquartile range (IQR), or as counts with percentages. Statistical comparisons between the groups were performed with the chi-square test, or Fisher–Freeman–Halton test, or Mann–Whitney test as appropriate. Statistical significance for hypotheses of linearity was evaluated by a bootstrap-type analysis of variance (ANOVA). The bootstrap method is particularly helpful when the theoretical distribution of the test statistic is unknown or when the assumptions are violated. No adjustment was made for multiple testing. The STATA 13.1, StataCorp LP (College Station, TX, USA) statistical package was used for the analyses.

Ethical aspects

The study protocol was approved by the Ethics Committee of the Helsinki University Central Hospital (permission 128/13/03/00/09), and written informed consent was obtained from all participants.

Results

Results of the preventive home visits

Table 1 shows the comparisons of subjects with chronic pain to those without chronic pain in the preventive home visits. Chronic pain was more frequent in females. Subjects with chronic pain rated their health and mobility to be worse than those without chronic pain. Those with chronic pain felt sadder, lonelier, and more tired than those without chronic pain (Table 1). However, patients with chronic pain were not less satisfied with their lives than those without chronic pain (often satisfied 87% versus 91%, respectively).

Table 1. Comparison of subjects with chronic pain and without chronic pain.

	Subjects with chronic pain ($N = 175$)	Subjects without chronic pain ($N = 220$)	p Value
Age, *n* (%)			0.57
75	102 (58)	139 (63)	
80	40 (23)	42 (19)	
85	33 (19)	39 (18)	
Women, *n* (%)	129 (74)	110 (50)	≤0.001
Living alone, *n* (%)	83 (48)	82 (38)	0.051
Subjective income for daily living, *n* (%)			0.57
Good	52 (30)	77 (35)	
Satisfactory	105 (61)	123 (56)	
Insufficient	15 (9)	20 (9)	
Subjective health capability, *n* (%)			≤0.001
Good	55 (32)	127 (56)	
Satisfactory	85 (49)	82 (37)	
Insufficient	33 (19)	11 (5)	
Satisfactory moving capability, *n* (%)			≤0.001
Good	52 (30)	127 (58)	
Satisfactory	64 (36)	74 (33)	
Insufficient	59 (34)	19 (9)	
Feeling lonely, *n* (%)			≤0.011
Often	25 (14)	14 (6)	
Seldom	55 (32)	62 (28)	
Never	93 (54)	144 (66)	
Feeling sad, *n* (%)			≤0.005
Often	19 (11)	8 (4)	
Seldom	78 (44)	88 (40)	
Never	77 (45)	124 (56)	
Feeling tired, *n* (%)			≤0.001
Often	75 (43)	51 (23)	
Seldom	76 (44)	110 (50)	
Never	22 (13)	59 (27)	
Satisfied with life, *n* (%)			0.39
Often	150 (87)	200 (91)	
Seldom	21 (12)	19 (9)	
Never	2 (1)	1 (≤1)	

In the subjects who participated in the preventive home visits, the median (IQR) number of chronic diseases was 3 (2, 3) in those with chronic pain, and 2 (1, 3) in those without chronic pain ($p < 0.001$). Table 2 shows the most frequent diagnosis groups among the elderly people receiving preventive home visits. There were statistically significant differences in the presence of musculoskeletal and respiratory diseases.

Results of the clinical study

Most of the 106 pain patients examined by the geriatrician experienced multiple chronic pain states.

Table 2. Comorbidities of subjects receiving home visit with chronic pain and without chronic pain.

	With chronic pain *N* (%)	Without chronic pain *N* (%)	*p* Value
Cardiovascular diseases	123 (70)	134 (61)	0.052
Musculoskeletal diseases	107 (61)	72 (33)	<0.001
Endocrine diseases	73 (42)	84 (38)	0.48
Respiratory diseases	42 (24)	27 (12)	0.002
Neoplasms	15 (9)	18 (8)	0.89
Psychiatric diseases	11 (6)	13 (6)	0.88
Nervous system diseases	11 (6)	11 (5)	0.58

Table 3. Pain characteristics of the worst pain in 106 chronic pain patients by age group.

	Age group			
	75 Mean (SD)	80 Mean (SD)	85 Mean (SD)	*p* for linearity
Average pain intensity	6.1 (1.6)	4.9 (1.5)	4.3 (1.2)	0.008
Maximal pain intensity	8.1 (1.4)	7.3 (1.5)	6.6 (1.9)	0.004
Pain interference	6.1 (1.9)	5.4 (2.2)	5.5 (1.4)	0.25

Only 5 (5%) patients had just one pain condition, whereas 35 (33%) had two and 66 (62%) patients had three different pain conditions.

The worst pain was located primarily in the torso in 44 (42%) patients, in a lower limb(s) in 40 (38%), in an upper limb(s) in 15 (14%) and in the head or neck in 7 (6%) patients. Musculoskeletal pain was the most common etiology; 88 (83%) patients had musculoskeletal pain as their worst pain. The largest diagnoses groups of musculoskeletal pain were spine disorders (48 patients, 45%) and osteoarthritis of the hip or knee (22 patients, 21%). The worst pain was classified as pure nociceptive pain in 61 (58%) patients, pure neuropathic pain in 9 (8%), combined nociceptive and neuropathic pain in 34 (32%) and idiopathic in 2 (2%).

Average intensity (SD) of the worst pain on the NRS scale from 0 to 10 during the previous week was 5.7 (1.6), intensity of the maximal pain was 7.7 (1.6), and interference 5.9 (1.9). Average pain intensity and maximal pain intensity decreased by age (Table 3). The duration of pain was longer than five years in 51 (48%) patients.

Majority of the patients ($n = 82$, 77%) took pain medication regularly, and 38 (36%) managed with one type of medication. Paracetamol and NSAIDs were the most frequently used pain medications, by 62 and 46 patients, respectively. Traditional NSAIDs was the choice in 38 patients and cyclo-oxygenase-2 inhibitors in eight patients. Although neuropathic pain was common in the elderly, only a minority of our patients utilized drugs specifically for neuropathic pain (i.e., tricyclic antidepressant, SNRI or antiepileptic drugs). These drugs were prescribed to 9 patients, and in addition, another 18 patients received weak opioids.

Discussion

In our study, elderly people with chronic pain rated their health and mobility to be worse than those without chronic pain. In addition, they felt sadder, lonelier, and more tired than elderly people without chronic pain. However, there was no significant difference in satisfaction with life between subjects with and without chronic pain. This may reflect good coping skills and acceptance of their health state in spite of functional restrictions.

Surprisingly, neuropathic pain occurred in 40% of patients in our study, either as pure neuropathic pain (8%) or combined with nociceptive pain (32%). This is probably due to the careful clinical assessments of the patients made by the geriatrician, which enabled a more precise assessment of the type of pain than is possible in epidemiological studies.[12] However, only a minority of our patients suffering neuropathic pain had a medication specifically for neuropathic pain. This may be due to the reluctant attitudes of general practitioners to prescribe neuropathic pain medications or to the low efficacy or tolerance of neuropathic pain medications in the elderly.

General practitioners may also seek to avoid drug-interactions.[13] The GPs are warned against the potentially inappropriate medications for older people,[14] and they actively find ways to reduce non-vital drugs, potentially also those for neuropathic pain. Also, challenges in recognizing neuropathic pain in clinical settings may mean that appropriate medications are not prescribed for the elderly.[15,16] We have separately analyzed the medications for neuropathic pain, and only 22% were receiving medication that was demonstrated to be effective against neuropathic pain.[17]

In keeping with other studies of chronic pain, three quarters of our patients were women.[1,12] Generally, pain is more common in women and since women live longer, the difference increases with age. In addition, multiple pain sites and conditions were common, as found in a Swedish study of the oldest old (>77 years), in which half of the patients reported pain in two or more locations.[18] Despite this, the intensity of the average and maximal pain decreased with age. An explanation for this may be the better survival of healthier elderly people or, alternatively, it may be due to selection, i.e. those with poor health cannot live independently with increasing age.

Musculoskeletal pain (most commonly due to spinal disorder or lower limb osteoarthritis) was the most common etiology of the worst pain. Prevalence of

degenerative spine disorders and osteoarthritis increases with age, and the majority of these patients are treated conservatively. The efficacy of treatments is only partial in these conditions, and hence even treated patients fulfilled the inclusion criteria of our study.

Management of chronic pain rarely cures the pain completely, but rather gives partial pain relief.[19–22] In addition to pain relief, treatments aim at improving functional capacity and quality of life. According to our results, although chronic pain was common in the elderly, the patients were relatively satisfied with their lives, despite the pain. As the worst pain was musculoskeletal in most cases, the greatest effect was seen in mobility in the patients of our cohort.

According to our study, chronic pain deteriorates quality of life in elderly people and deserves attention in general practice. The management strategies require optimization and other methods in addition to pharmacological therapies. Our patients used medications rather restrictively, probably out of fear of side effects. Optimal treatment strategies may include counseling, physical therapies, and group interventions. Multi-professional teams that include physicians, nurses, physiotherapists, psychologists and other health professionals may be helpful in finding ways to help manage the different aspects of chronic pain in the elderly.

The strength of our study lies in the detailed data derived from the clinical examinations of the geriatrician. This enabled us to define exactly the type, site, and consequences of pain. Due to incomplete consent within the target population receiving a preventive home visit and of non-fulfillment of the inclusion criteria for an appointment with the geriatrician, we cannot provide reliable epidemiological data on the prevalence of chronic pain in the elderly.[23,24]

In conclusion, neuropathic pain was frequent in our cohort of home-dwelling elderly people and occurred mostly as combined neuropathic and nociceptive pain. Chronic pain was most often due to musculoskeletal pain, typically back pain and osteoarthritic pain. Although elderly people with chronic pain conditions also suffered from comorbidities, sadness, loneliness, tiredness, worse mobility, they were as satisfied with their lives as those without pain.

Disclosure statement

The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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