

Concomitant use of analgesics and psychotropics in home-dwelling elderly people – Kuopio 75 + study

Sirpa Hartikainen,^{1,2} Pekka Mäntyselkä,^{3,4} Kirsti Louhivuori-Laako,³ Hannes Enlund⁵ & Raimo Sulkava^{1,6}

¹Division of Geriatrics, Department of Public Health and General Practice, University of Kuopio, ²Municipal Hospitals of Kuopio, Kuopio,

³Department of Public Health and General Practice, University of Kuopio, ⁴Unit of General Practice, Kuopio University Hospital, Kuopio,

⁵Department of Social Pharmacy, University of Kuopio and ⁶Rheumatism Foundation Hospital, Heinola, Finland

Correspondence

Sirpa Hartikainen, Division of Geriatrics, Department of Public Health and General Practice, University of Kuopio, P.O. Box 1627, 70211 Kuopio, Finland.

Tel: + 358 1716 2947

mobile: + 358 4144 13209;

Fax: + 358 1716 2937;

E-mail: Sirpa.Hartikainen@uku.fi or Pekka.Mantyselka@uku.fi

Keywords

analgesics, elderly, psychotropics

Received

16 June 2004

Accepted

18 January 2005

Aims

To investigate the extent of concomitant use of analgesic and psychotropic medicines among home-dwelling elderly people aged at least 75 years in Finland.

Methods

This was a population-based study in Finland, performed as part of Kuopio 75 + study focusing on the clinical epidemiology of diseases, medication and functional capacity. A random sample of 700 persons was drawn from the total population of the city of Kuopio, eastern Finland, aged 75 years on January 1, 1998 ($n = 4518$). Ninety-nine persons could not be examined and 78 were living in long-term institutions, so that the number of home-dwelling elderly persons amounted to 523. A trained nurse interviewed the participants about their use of medicines, and a geriatrician examined their overall physical and mental status. Dementia and depression were diagnosed according to the DSM IV criteria. Both regular and irregular prescribed and nonprescribed drug use was recorded.

Results

Every fourth elderly person (27.2%) used analgesics and psychotropics concomitantly, this use becoming twice as common with advancing age (19.6% in the age group 75–79 years, 38.2% among the oldest, aged 85 + years). Concomitant use of psychotropics and opioids also became more common with increasing age (2.8% in age group 75–79 years and 9.6% in the oldest group, aged 85 + years). The use of opioids was nearly twice as common among concomitant users (19.7%) than among those using only analgesics (11.3%). Concomitant users suffered from interfering daily pain and daily pain at rest more commonly than nonusers of analgesics. Depression, sleeping problems and polypharmacy were more common among the concomitant users, who had also had more hip fractures than the rest.

Conclusions

Concomitant use of analgesics and psychotropics becomes more common with advancing age and is a potential risk factor for adverse drug effects.

Introduction

Pain is a common problem among elderly people living in the community [1, 2], affecting between one in three and more than half of those aged 75 or over [3, 4]. The

use of analgesics is also common, with every fourth elderly person taking at least one drug regularly [1, 4]. In our previous study 70% of elderly aged 75 years or older used at least one analgesic medicine, every second

used NSAIDs, every fifth paracetamol and every tenth opioids [5]. Most persons used analgesics only when needed. The use of nonsteroidal anti-inflammatory drugs in particular incurs risks of heart failure [6], serious gastrointestinal adverse effects and renal failure [7–9].

The use of psychotropics becomes more common with advanced age, even among persons aged 75 years or more. This use is associated with female sex, widowhood and living alone [10]. In our previous study 12% of psychotropic users were found to take at least two psychotropic drugs [10]. These are indeed seldom used alone, but usually concomitantly with a large number of other drugs. This creates risks of drug interactions and adverse drug effects (ADE). The oldest persons are the most vulnerable to injurious falls, sedation, cognitive decline and orthostatic blood pressure [11–14].

The concomitant use of analgesics and psychotropics can potentially multiply the adverse effects of these drugs, but our knowledge about their concomitant use among the home-dwelling elderly population is still limited. We therefore set out to analyze this in a random sample of home-dwelling elderly people aged 75 years or more.

Methods

Population

The Kuopio 75 + Study is a population-based health survey focusing on the clinical epidemiology of diseases, medication and functional capacity in people aged 75 years or more. A random sample of 700 persons was drawn from the total population of the city of Kuopio, eastern Finland, aged 75 years in January 1, 1998 ($n = 4518$). Ninety-nine persons could not be examined (79 persons refused to participate, five could not be contacted and 15 died before the examination). A geriatrician and a trained nurse carried out a structured clinical examination and interview on the remaining 601 persons (86% of the random sample) in 1998. After exclusion of those in long-term institutional care ($n = 78$), the number of home-dwelling elderly persons amounted to 523.

Data collection

A trained nurse interviewed the participants at the outpatient clinic of the municipal hospital about their use of medicines. They had been asked to bring their prescription forms and drugs with them to show what they were currently taking. A close relative or caregiver provided information if the person could not answer the questions. A geriatrician reviewed the drugs and examined the person's overall physical and mental status. Medical records from the municipal health centre, home nursing service, local hospitals and Kuopio University

Hospital were also available. These included information about fractures. If the person was unable to visit the municipal hospital, a trained nurse and a geriatrician made a home visit to perform the interview and examination and check the use of drugs.

In the structured interview the participants were asked about perceived pain during the previous month: whether they had musculoskeletal (back or joint) pain daily or at any time, daily interfering pain or daily pain at rest. The structured interview and examination also included items concerning sociodemographic factors, living conditions, social contacts, health behaviour, state of health and symptoms such as sleeping problems. The protocol also included basic laboratory tests and a chest X-ray. Patients were referred for further examinations and imaging if warranted by their clinical condition.

A history of cognitive decline was achieved by interviewing the subject and relatives and examining the medical records. The Mini-Mental Status Examination (MMSE) was used to screen cognitive capacity [15]. Dementia was diagnosed as Alzheimer's disease, vascular dementia or dementia due to other general medical conditions according to the DSM-IV criteria [16]. Depression was also diagnosed according to the DSM IV criteria.

Definitions and classification of medicines

Both regular and irregular prescribed and nonprescribed drug use were recorded during the interview. Medication was defined as regular if it was taken daily or at regular intervals, such as once a week or month, as in the case of long-acting intramuscularly injected antipsychotics, or as irregular if taken only when needed.

The drugs were classified according to the Anatomical Therapeutic Chemical (ATC) classification system (version 2002) recommended by the WHO [17]. Analgesics belong to classes M01A – anti-inflammatory and antirheumatic products, nonsteroids (e.g. indomethacin, diclofenac, piroxicam, ibuprofen, ketoprofen, celecoxib, nimesulid), N02A – opioids (e.g. morphine, oxycodone, fentanyl, pethidine, dextropropoxyphene, codeine + paracetamol, tramadol) and N02B – other analgesics and antipyretics (e.g. acetylsalicylic acid, paracetamol). Low-dose aspirin (250 mg or less) was classified as a blood medicine and not as an analgesic. Psychotropics were classified into N05A – antipsychotics, N05B – anxiolytics, N05C – hypnotics/sedatives and N06A – Antidepressants.

Definition of somatic multimorbidity

Somatic multimorbidity was defined as the simultaneous occurrence of at least three diseases belonging to

different groups, e.g. cardiovascular, pulmonary, diabetes, musculoskeletal, or Parkinson's disease. Thus a person with hypertension, myocardial infarction and cardiac insufficiency was not included in the multimorbidity group, but a person with asthma, diabetes and Parkinson's disease was.

Statistical methods

The statistical significances of differences between groups were evaluated using the Chi-squared test, *t*-test and one-way ANOVA and 95% confidence intervals (CI) were calculated for differences between two proportions.

Ethical issues

Written informed consent was obtained from the subjects or their relatives. The research was approved by the ethics committee of Kuopio University Hospital and the University of Kuopio.

Results

Every fourth elderly person (27.2%) was taking analgesics and psychotropics concomitantly, the proportion increasing with age from 19.6% in the youngest age-group (75–79 years) to 38.2% in the oldest (85 + years) (Table 1). The difference between age groups was 18.6% (95% CI 8.7%, 28.8%). On the other hand, the use of analgesics without psychotropics decreased with age, the corresponding difference being 20.9% (95% CI 10.1%, 30.6%).

Concomitant users were taking NSAIDs ($n = 96$, 67.6%) as commonly as were the other users of analgesics ($n = 170$, 76.6%) ($P = 0.060$), but were taking paracetamol ($n = 63$, 19.7%) less commonly than those taking only analgesics ($n = 145$, 65.3%) ($P < 0.001$). The use of opioids was more common among the concomitant users ($n = 28$, 19.7%) than those using only

analgesics ($n = 25$, 11.3%) ($P = 0.025$). Of all the elderly subjects, 5.4% were taking psychotropics and opioids concomitantly. This became more common with advanced age, involving 2.8% ($n = 7$) in the age-group 75–79 years, 6.3% ($n = 10$) in age-group 80–84 years and 9.6% ($n = 11$) in the oldest group, aged at least 85 years. There were no differences in the use of the various psychotropic drugs between concomitant users and those taking psychotropic drugs alone.

The concomitant users had the highest mean number of all medicines taken (10.0) (Table 2), and together with those taking analgesics only suffered interfering daily pain and daily pain at rest more commonly than those who were not taking analgesics ($P \leq 0.001$) (Table 3). Every fourth concomitant user with daily interfering pain ($n = 18$, 28.6%) and every third with daily pain at rest ($n = 9$, 33.3%) was taking antidepressants. Depression was more common among the concomitant drug users (43.7%) than among other elderly persons ($P \leq 0.001$) and concomitant users had also more hip fractures (13.4%) than the rest ($P = 0.004$). These differences were statistically significant.

Discussion

Concomitant use of analgesics and psychotropics was common in this Finnish elderly population. It remains to be seen whether this is a universal phenomenon or merely a Finnish one. Concomitant use was most prevalent among the oldest and most frail persons, aged 85 years or more.

It seems that concomitant use of analgesics and psychotropics is connected with multimorbidity. These subjects are usually taking a great number of other drugs as well, so that only a third of the total number represents analgesics or psychotropics. The sedative load of drugs [18] increases the risk of falls [13, 19–21], and in our study the subjects who had suffered hip fractures were

Table 1

Use of analgesics and psychotropics in a home-dwelling population aged at least 75 years by age groups

Medicines	Age (years)			P value*
	75–79 $n = 250$ (%)	80–84 $n = 158$ (%)	85 + $n = 115$ (%)	
Analgesics and psychotropics	49 (19.6)	49 (31.0)	44 (38.3)	0.001
Analgesics and no psychotropics	124 (49.6)	65 (41.1)	33 (28.7)	0.001
Psychotropics and no analgesics	21 (8.4)	15 (9.5)	17 (14.8)	0.163
No analgesics and no psychotropics	56 (22.4)	29 (18.4)	21 (18.3)	0.510

*Chi-squared test.

Table 2

Drug use in concomitant users and in users of analgesics or psychotropics in a home-dwelling population aged at least 75 years

	Analgesics and psychotropics <i>n</i> = 142	Analgesics and no psychotropics <i>n</i> = 222	Drug use Psychotropics and no analgesics <i>n</i> = 53	No analgesics and no psychotropics <i>n</i> = 106	<i>P</i>
Male (%)	29 (20.4)	58 (26.1)	15 (28.3)	41 (38.7)	0.015*
Mean age in years	83	80	82	80	0.001**
Mean number of all drugs (range)	10 (2–23)	6 (1–16)	6.2 (1–16)	3.6 (0–13)	0.001**
Analgesics (range)	1.7 (1–5)	1.4 (1–5)			0.447#
Psychotropics (range)	1.6 (1–5)		1.4 (1–3)		0.511#

*Chi-squared test, **One-way ANOVA, #t-test.

Table 3

Prevalence of certain diseases and symptoms in concomitant users and in users of analgesics or psychotropics in a home-dwelling population aged at least 75 years

	Analgesics and psychotropics <i>n</i> = 142 (%)	Analgesics and no psychotropics <i>n</i> = 222 (%)	Drug use Psychotropics and no analgesics <i>n</i> = 53 (%)	No analgesics and no psychotropics <i>n</i> = 106	<i>P</i> *
<i>Perceived daily pain</i>					
Interfering	63 (44.4)	85 (38.3)	8 (15.1)	19 (17.9)	0.001
At rest	27 (19.0)	29 (13.1)	1 (1.9)	3 (2.8)	0.001
Somatic multimorbidity#	45 (31.7)	40 (18.0)	15 (28.3)	28 (26.4)	0.022
Dementia	29 (20.4)	20 (9.0)	16 (30.2)	12 (11.3)	0.001
Depression	62 (43.7)	26 (11.7)	14 (26.4)	0 (0)	0.001
Sleeping problems	61 (43.0)	44 (19.8)	22 (41.5)	16 (15.1)	0.001
<i>Fractures</i>					
Hip	19 (13.4)	11 (4.9)	5 (9.4)	3 (2.8)	0.004
Wrist	38 (26.8)	55 (24.8)	13 (24.5)	35 (33.0)	0.920

*Chi-squared test; #pulmonary, cardiovascular, cerebral vascular, diabetes, locomotive or cancer.

more commonly taking analgesics and psychotropics concomitantly. We do not, however, know in this kind of cross-sectional study, whether they were taking analgesics because of the hip fracture or whether they had been taking analgesics and psychotropics before that. Previous studies have shown psychotropics [19, 25] and opioids [19, 20, 26] to be risk factors for falls and for injurious falls and the concomitant use of opioids and psychotropics to increase the risk of hip fracture nearly three-fold relative to nonusers of either drug [26]. Hip fracture does not explain use of psychotropics, however.

Concomitant use of analgesics and psychotropics seems to be connected with daily pain. Depression and

possible neuropathic pain could be an explanation for this connection, but this would explain only a part of the use of psychotropics among such persons.

Other studies have reported increased use of psychotropic drugs, especially antipsychotics and hypnotics, with advancing age in elderly populations [9, 18, 22], and it is known that all psychiatric disorders in the general population, including mood disorders, are treated mainly with anxiolytics [23] while depressed elderly persons commonly receive benzodiazepines and antipsychotics [24]. It now seems that they also take analgesics and almost a half of them are taking psychotropics and analgesics concomitantly. It may be that

some symptoms such as pain or anxiety are not recognized as symptoms of depression.

The reliability of data on the use of drugs is considered to be good, because we enquired about current use and not only the medicines that had been prescribed. The information on drug use was also checked from the medical records and with family members and home care personnel. Point prevalence determinations of this kind are recommended in studies of medicine use [27].

In conclusion, concomitant use of analgesics and psychotropics becomes more common with advancing age and is a potential risk factor for adverse drug effects.

References

- Landi F, Onder G, Cesari M, Gambassi G, Steel R, Russo A, Lattanzio F, Bernabei R. Pain management in frail, community-living elderly patients. *Arch Intern Med* 2001; 161: 2721–4.
- Chodosh J, Ferrell B, Shekelle P, Wenger N. Quality Indicators for pain management in vulnerable elders. *Ann Intern Med* 2001; 135: 731–5.
- Reyes-Gibby C, Aday LA, Cleeland C. Impact of pain on self-rated health in community-dwelling older adults. *Pain* 2002; 95: 75–82.
- Pitkälä K, Strandberg T, Tilvis R. Management of nonmalignant pain in home-dwelling older people: a population-based survey. *J Am Ger Soc* 2002; 50: 1861–5.
- Hartikainen S, Mäntyselkä P, Louhivuori-Laako K, Sulkava R. Balancing pain and analgesic drug treatment. *Ann Pharmacother* 2005; 39: 11–6.
- Bleumink GS, Feenstra J, Sturkenboom MC, Stricker BH. Nonsteroidal anti-inflammatory drugs and heart failure. *Drugs* 2003; 62: 525–34.
- Garcia Rodrigues LA, Hernandez-Diaz S. Nonsteroidal anti-inflammatory drugs as a trigger of clinical heart failure. *Epidemiology* 2003; 14: 240–6.
- Ray WA, Stein CM, Byrd V, Shorr R, Pichert JW, Gideon P, Arnold K, Brandt KD, Pineus T, Griffin MR. Educational program for physicians to reduce use of nonsteroidal anti-inflammatory drugs among community-dwelling elderly persons: a randomized controlled trial. *Med Care* 2001; 39: 425–35.
- Griffin MR, Yared A, Ray WA. Nonsteroidal anti-inflammatory drugs and acute renal failure in elderly persons. *Am J Epidemiol* 2000; 151: 488–96.
- Hartikainen S, Rahkonen T, Kautiainen H, Sulkava R. Does advanced age predict more common use of psychotropics among the elderly? – Kuopio 75 + Study. *Int Clin Psychopharmacol* 2003; 18: 163–7.
- Blazer D, Hybels C, Simonsick E, Hablot JT. Sedative, hypnotic and anti-anxiety medication use in an ageing cohort over ten years: a racial comparison. *J Am Geriatr Soc* 2000; 48: 1073–9.
- Hughes SG. Prescribing for the elderly patient: why do we need to exercise caution? *Br J Clin Pharmacol* 1998; 46: 531–3.
- Byerly MJ, Weber MT, Brooks DL, Snow LR, Worley MA, Les Courflaire E. Antipsychotic medication and the elderly: effects on cognition and implication of use. *Drugs Ageing* 2001; 18: 45–61.
- Bae J-M, Koo H-W, Junf K-O, Park B-J. A cohort study on association between psychotropics and hip fracture in Korean elderly women. *J Korean Med Sci* 2002; 17: 65–70.
- Folstein MF, Folstein SE, McHugh PR. 'Mini-Mental State' A practical method for grading the cognitive state of patients for the clinician. *J Psychiatr Res* 1975; 12: 189–98.
- Diagnostic and Statistical Manual of Mental Disorders 1994 4th edn. American Psychiatric Association, Washington, DC, 1994.
- ATC Index with DDDs 2002. WHO Collaborating Centre for Drug Statistics Methodology. Oslo, Norway, 2002.
- Linjakumpu T, Hartikainen S, Klaukka T, Koponen H, Kivelä S-L, Isoaho R. Psychotropics among the home-dwelling elderly – increasing trends. *Int J Geriatr Psychiatry* 2002; 17: 874–83.
- Marks R, Allegrante JP, MacKenzie CR, Lane JM. Hip fracture among the elderly: causes, consequences and control. *Ageing Research Reviews* 2003; 2: 57–93.
- Guo Z, Wills P, Viitanen M, Fastbom J, Winblad B. Cognitive impairment, drug use, and the risk of hip fracture in persons over 75 years old: a community-based prospective study. *Sam J Epidemiol* 1998; 148: 887–92.
- Liu B, Anderson G, Mittmann N, To T, Axell T, Shear N. Use of selective serotonin-reuptake inhibitors or tricyclic antidepressants and risk of hip fractures in elderly people. *Lancet* 1998; 351: 1303–7.
- Hartikainen S, Klaukka T. Use of psychotropics is high among very old people. *Eur J Clin Pharmacol* 2004; 59: 849–50.
- Ohayon MM, Lader MH. Use of psychotropics medication in general population of France, Germany, Italy, and the United Kingdom. *J Clin Psychiatry* 2002; 63: 817–25.
- Hartikainen S, Rahkonen T, Kautiainen H, Sulkava R. Use of psychotropics among home-dwelling nondemented and demented elderly. *Int J Geriatr Psychiatry* 2003; 18: 1135–41.
- Cumming RG, Klineberg RJ. Psychotropics, thiazide diuretics and hip fractures in the elderly. *Med J Aust* 1993; 156: 414–7.
- Shorr RI, Griffin MR, Daugherty JR, Ray WA. Opioid analgesics and the risk of hip fracture in the elderly: codeine and propoxyphene. *J Gerontol* 1992; 47: M111–115.
- Mantel-Teeuwisse AK, Klungel OH, Verschuren WM, Porsius A, de Boer A. Comparison of different methods to estimate prevalence of drug use by using pharmacy records. *J Clin Epidemiol* 2001; 54: 1181–6.