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Frequent use of opioids in patients with dementia and nursing home residents: A study of the entire elderly population of Denmark

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Abstract

Background: Pain is believed to be undertreated in patients with dementia; however, no larger studies have been conducted. The aim was to investigate prevalent use of opioids in elderly with and without dementia in the entire elderly population of Denmark.

Method: A register-based cross-sectional study in the entire elderly (≥65 years) population in 2010 was conducted. Opioid use among elderly with dementia (N = 35,455) was compared with elderly without (N = 870,645), taking age, sex, comorbidity, and living status into account.

Results: Nursing home residents (NHRs) used opioids most frequently (41%), followed by home-living patients with dementia (27.5%) and home-living patients without dementia (16.9%). Buprenorphine and fentanyl (primarily patches) were commonly used among NHRs (18.7%) and home-living patients with dementia (10.7%) but less often by home-living patients without dementia (2.4%).

Conclusions: Opioid use in the elderly Danish population was frequent but particularly in patients with dementia and NHR, which may challenge patient safety and needs further investigation.

Keywords: Dementia; Opioids; Elderly; Buprenorphine; Fentanyl; Pain

1. Introduction

Elderly patients with dementia often suffer from multimorbidity, and pain-causing conditions are frequent [1]. Thus, appropriate use of drugs and treating comorbidity represent an important public health issue. Currently, pain is believed to be undertreated in the elderly and especially in people with dementia [2,3], an assumption corroborated by a number of small case-control studies [4–9]. Reasons for undertreatment are not well understood. Assessment of pain in patients with dementia is challenging, which may lead to undertreatment. On one hand, careful prescribing may be appropriate as elderly have an increased risk of side effects and severe adverse drug reactions [10]. Opioids may be particularly problematic in patients with dementia because of sedation and their association with a reduction in mental health functioning [11]. On the other hand, pain is associated with lower quality of life [12] and impairment of working memory [13] and should be treated efficiently. Furthermore, results have indicated that treatment of pain can improve behavioral symptoms in patients with dementia [14].

Studies examining data collected before 2000 have consistently reported that patients with dementia were less likely to receive analgesics [5,7,8]. However, more recent reports have shown a more varied picture, with some

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studies reporting that patients with dementia are more likely to receive paracetamol [15,16] and opioids, although the association of opioid use in dementia was not significant in a multivariate analysis [15]. Over the past 10 to 15 years, however, several countries have reported increasing opioid use in the general population [17–19], and recent results could indicate that prescription patterns in patients with dementia may have changed. Consequently, we conducted a nationwide register-based study in the entire elderly population of Denmark, comparing 2010 opioid prescription patterns in home-dwelling and nursing home elderly with and without dementia. Our hypothesis was that frail elderly such as patients with dementia and/or nursing home residents were less likely to receive opioids and particularly strong opioids.

2. Methods

2.1. Registry data sources

Denmark has a tax-financed health care system that provides equal access to all residents. Because individuals are given a permanent personal civil registration number at the time of birth or immigration, nationwide registries allow data retrieval at individual level [20]. This study linked individual-level data from national registries using the civil registration number. The National Patient Registry contains all hospitalizations and invasive procedures registered since 1978, and since 1995, data from hospital-based outpatient clinics and emergency departments have been registered [21,22]. The Psychiatric Central Research Registry includes data on all psychiatric inpatient admissions in Denmark since April 1, 1969, and outpatient contacts since 1995 [23]. Information comprises dates and discharge diagnosis, registered using WHO *International Classification of Diseases* (ICD) codes. ICD-8 was used from 1970 to 1993 [24] and ICD-10 from 1994 and onward [25]. ICD-9 was never used. The Danish National Prescription Registry [26] has registered dispensed prescriptions consecutively since 1995 according to the Anatomical Therapeutic Chemical (ATC) classification system [27], including data on amount and strength of dispensed tablets and dispensing dates [22].

The study was approved by the Danish Data Protection Agency (ID no: 2007-58-0015/30-0667), Statistics Denmark, and the Danish Health and Medicine Authority (ID no: 6-8011-907/1). Danish law did not require ethic committee approval or informed patient consent.

2.2. Study population

All permanent residents aged ≥65 years alive on January 1, 2010, were identified using the Central Population Registry [28]. Individuals with dementia were identified as those who had been registered in the National Patient Registry or Psychiatric Central Research Registry before January 1, 2010, with a dementia diagnosis as the main or secondary diagnosis during admission or at an outpatient visit (Supplementary Table 1 for diagnostic codes) and/or who had filled an antidementia prescription (ATC: N06D). The individuals had to be ≥60 years at the time of diagnosis and/or first prescription, as prior research has shown low validity of the dementia diagnosis in those <60 years [29]. The remaining individuals formed the group without dementia.

2.3. Opioid treatment

In Denmark, opioids are only available by prescription from a physician and can only be dispensed once per prescription. Opioid users were defined as individuals who had redeemed at least one opioid prescription (ATC: N02A) in 2010. We grouped morphine analogues (N02AA01-04), oxycodone (N02AA05-55), pethidine (N02AB02), fentanyl (N02AB03), buprenorphine (N02AE01), and ketobemidone (N02AG02) as strong opioids, whereas codeine (N02AA59), dextropropoxyphene (N02AC04), and tramadol (N02AX02) were grouped as weak opioids.

2.4. Comorbidity and demographic information

Comorbidity was evaluated at baseline (January 1, 2010). We evaluated potentially pain-causing diseases (cancer, osteoporosis, arthritis, and recent fracture) and comorbidity (diabetes, vascular, pulmonary, renal and liver disease) that may affect opioid use (Supplementary Table 2). Statistics Denmark provided information about living status (home living and nursing home).

2.5. Statistical analysis

Our descriptive analysis showed that opioid use patterns differed depending on living status, and the two groups were evaluated separately. Frequency of comorbidity and percentage of opioid users were compared using Pearson's chi-squared test. A logistic regression analysis was performed initially to evaluate the effect of covariates independently (crude analysis) and then in a multivariate logistic regression analysis (adjusted analysis), where age, sex, pain-causing disorders, and comorbidity were included as these covariates have been shown to be potential confounders [4,15].

To evaluate treatment intensity, we computed the number of prescriptions and equivalent doses of oral morphine and total dose for each user. Equivalent doses of oral morphine were calculated as the number of defined daily dosages redeemed in 2010 multiplied by a factor, which was based on content of one defined daily dosage and equianalgesic effects (Appendix Table A3). To calculate duration of use, a daily dose of 30 mg was assumed. Differences were evaluated using a nonparametric test (Wilcoxon).

Data analysis was performed using SAS statistical software, version 9.3 (SAS Institute Inc., Cary, NC, USA).