(Under)treatment of pain in dementia

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Chapter 6

Pain medication and global cognitive functioning in dementia patients with painful conditions

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Abstract

Background: Dementia patients are at an increased risk for undertreatment of pain, compared with older people without dementia, suggesting a relationship between pain medication prescription and cognitive functioning. Studies on a possible relationship between pain medication and cognitive functioning in dementia patients are ambiguous.

Objective: The objective of the study was to investigate whether a relationship between cognition and pain medication is present in patients with dementia with painful conditions.

Methods: Initially, 187 people living in Dutch nursing homes participated in the study. Sixty-one patients with dementia and at least one painful condition were included in the final analysis. Logistic regression analyses were conducted to examine the relationship between global cognitive functioning (Mini-Mental State Examination score) and pain medication for the total group and for the largest dementia subgroup, i.e. patients with Alzheimer's disease.

Results: No relationships were found between global cognitive functioning and pain medication in the total group and in the group of patients with Alzheimer's disease. Forty-five per cent of the participants did not receive any pain medication, despite the presence of a painful condition.

Conclusion: Undertreatment of pain in dementia seems to be independent of global cognitive functioning. The use of observational scales, to increase the awareness of other signs of pain, e.g. physical inactivity and behavioural disturbances, is recommended. Even if there is no obvious cause for behavioural disturbances, treatment with relatively mild pain medication should be considered.

Introduction

Although the prevalence of conditions likely to cause pain is not reduced with decreased cognitive functioning (Leong and Nuo, 2007; Proctor and Hirdis, 2001), cognitively impaired older persons receive significantly fewer analgesics than cognitively intact nursing home residents (Closs et al., 2004). Even when the presence of a painful condition is known, cognitively impaired older persons are undertreated. For example, in a group of elderly cancer patients, low cognitive performance was an independent predictor of receiving insufficient pain treatment (Bernabei et al., 1998). In addition, advanced dementia patients with a hip fracture received only one-third of the amount of opioid analgesics that cognitively intact people with a hip fracture did (Morrison and Siu, 2000. In summary, there is ample evidence that pain in patients with dementia is undertreated (Achterberg et al., 2007; Landi et al., 2001).

The general view is that undertreatment of pain in dementia patients, compared to non-demented older people, is due to changes in cognitive functioning. The decline in cognitive functioning might hamper a patient's ability to indicate pain (Scherder at al., 2005). Indeed, the prevalence of identified pain decreases with increasing cognitive impairment in nursing home patients (Proctor and Hirdis, 2001). Patients with dementia may also indicate less pain as a result of a decrease in affective- motivational aspects of pain (Scherder et al., 2003; 2005). Affective- motivational aspects of pain are mediated by the medial pain system, and are responsible for the motivation to reduce or terminate the painful experience (Price, 2000). These changes may result in lower request rates for pain medication, and thus, to an undertreatment of pain in dementia.

Multiple studies have investigated the relationship between cognitive functioning and analgesic prescription and administration in patients with cognitive impairment. One study showed that although no relationship was present between cognitive functioning and the prescription of analgesic drugs, people who did receive pain medication were cognitively less impaired than those who did not receive pain medication (Allen et al., 2003). A second study showed that both the prescription and the administration of analgesics were higher for people without cognitive

impairment than for those with cognitive impairment (Closs et al., 2004). A relationship between cognitive functioning and pain treatment has also been shown indirectly within a group of dementia patients (Torvik et al., 2009). More specifically, in that study, a positive correlation was found between cognitive functioning, measured with the Mini-Mental State Examination (MMSE), and pain intensity, measured with a 4-point verbal rating scale. Additionally, higher pain intensity was positively associated with more prescribed pain medication. However, studies on the relationship between cognitive functioning and pain medication are ambiguous. For example, a study investigating the differences in pain medication in nursing home patients with and without a dementia diagnosis showed that although cognitively more severely impaired people with a dementia diagnosis received significantly less as-needed pain medication, compared with cognitively less severely impaired residents without a dementia diagnosis, no differences were present regarding the administration of scheduled pain medication between these groups (Nygaard and Jarland, 2005). Additionally, the absence of a relationship between cognitive functioning and the amount of pain medication has also been shown within a group of cognitively impaired nursing home residents (Fisher et al., 2002). Of note is that in all the studies described above, people without pain were also included in the analyses, and in none of these studies the presence of a painful condition was an inclusion criterion (Allen et al., 2003; Closs et al., 2004; Fisher et al., 2002; Nygaard and Jarland, 2005; Torvik et al., 2009).

Therefore, the aim of the present study was to examine the relationship between pain medication and cognitive functioning within a group of nursing home residents with dementia and a painful condition. This is clinically relevant for two reasons. Firstly, the presence of this relationship might indicate that even within a group of dementia patients, those who function the worst have the highest risk for undertreatment. Secondly, the absence of a relationship should alert the medical staff that those dementia patients who function relatively well are at the same risk for pain undertreatment as those who are cognitively severely impaired.

Methods

Subjects

Initially, a total of 187 people, living in psychogeriatric wards in six Dutch nursing homes, participated in this study. Participants were excluded when they could not talk or were unable to answer questions, when data on co-morbidities or medication use was not available, and when the patient did not suffer from at least one painful condition. Eventually, a total of 61 patients with dementia remained for the final analysis (for an overview of participant enrolment, see figure 1). The group consisted of 20 males and 41 females, with a mean ± SD age of 84.98 ± 7.56 years (range 61– 98 years). All participants were cognitively impaired, with the following diagnoses: Alzheimer's disease (n = 23), vascular dementia (n = 5), mixed dementia (n = 9), dementia with Lewy bodies (n = 1), frontotemporal dementia (n = 1) and dementia not otherwise specified (n = 22).

Informed Consent

The proxies of all participants were extensively informed about the aim and procedures of this study and provided written informed consent. A local medical ethical committee approved the study.

Cognitive Functioning

Global cognitive functioning was assessed by means of the 20-item MMSE (maximum score: 30) (Folstein et al., 1975). The MMSE evaluates orientation in time and place, registration, recall, attention and calculation, language and praxis, and visuoconstructive abilities. The mean ± SD MMSE score was 9.84 ± 6.84. The MMSE-scores ranged from 0 to 27. Seven participants scored 0.

Painful Conditions

A criterion for participation in this study was the presence of at least one painful condition, defined as disorders of the locomotor system (e.g. rheumatoid arthritis, osteoporosis and hip fractures) and cancer. The medical records were kept by the patient's former general practitioner and

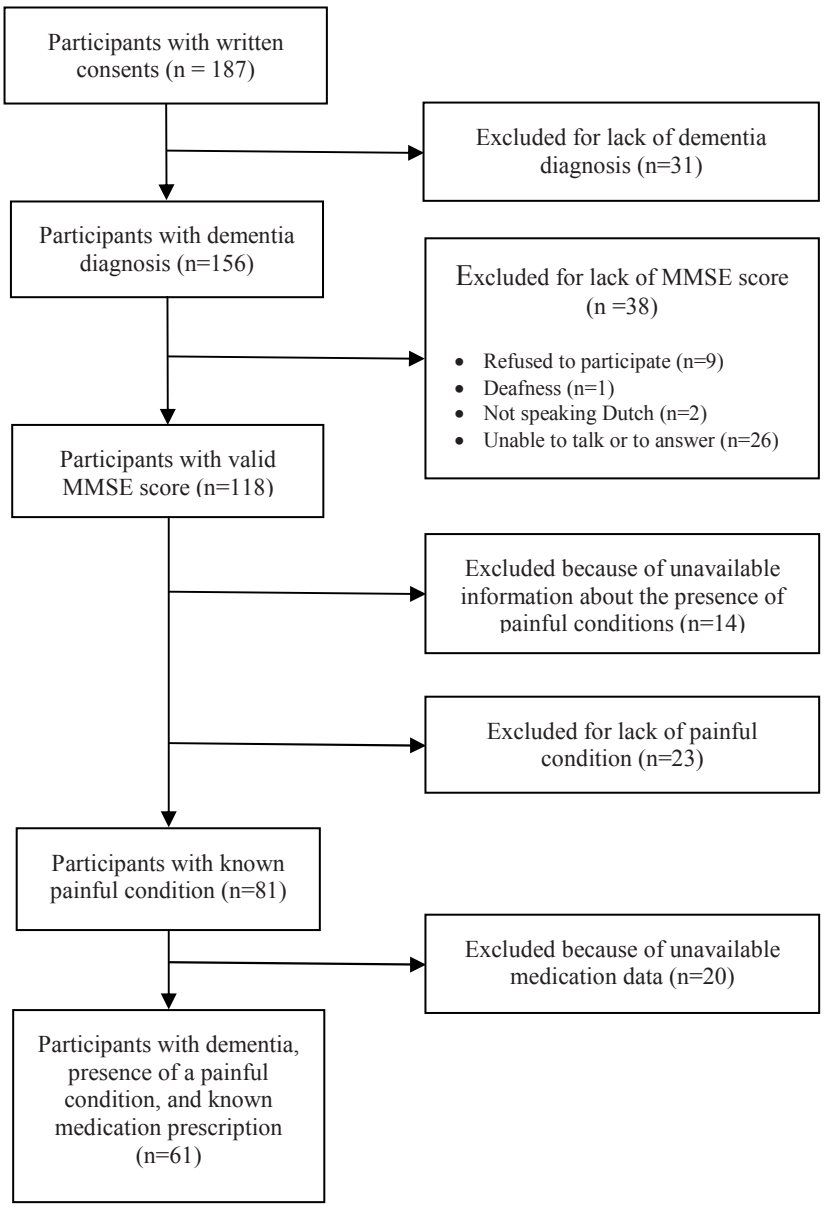

Figure 1. Flow diagram of participant enrolment. MMSE = Mini Mental State Examination.

by the present nursing home physician. Presence of a painful condition was determined by having the medical records reviewed by two of the authors (B.P. and K.v.d.S.). See table 1 for an overview.

Table 1. Sex, age, MMSE, Painful conditions, and pain medication.

Patient characteristics	Total group (n=61)	Alzheimer's disease (n=23)
Sex [n (%)]		
male	20 (32.8)	6 (26.1)
female	41 (67.2)	17 (73.9)
Age (y; mean ± SD (range)]	84.98 ± 7.56 (61-98)	84.57 ± 6.09 (66-96)
MMSE score [mean ± SD (range)]	9.84 ± 6.13 (0-27)	10.00 ± 6.68 (0-22)
Painful conditions [n(%)]		
Rheumatic arthritis	19 (31.1)	11 (47.8)
Osteoporosis	9 (14.8)	7 (30.4)
Hip fracture	22 (36.1)	8 (34.8)
Other fractures	14 (23.0)	4 (17.4)
Recent amputation	1 (1.6)	0 (0)
Cancer	21 (34.4)	8 (34.8)
Participants with no prescription (%)		
Pain medication (total)	45.9	52.2
Paracetamol	57.4	60.9
NSAID's	83.6	78.3
Opioids	90.2	91.3

MMSE = mini mental state examination; n = number of participants; NSAID = non-steroidal anti-inflammatory drug; sd = standard deviation.

Pain Experience

Because dementia may alter the pain experience, a painful condition can be present without the participant experiencing pain. Therefore, pain intensity and pain affect were assessed by means of the following three visual analogue scales:

- *The Coloured Analogue Scale (CAS) for Assessment of Pain Intensity (CAS for Pain Intensity)* (McGrath et al., 1996). The CAS is meant to assess primarily the intensity of pain in a non-verbal way, although some language abilities must be present to comprehend the instructions. The different scale positions are marked by different colours (pink at the bottom: no pain; and deep red at the top: maximum pain) and areas that facilitate the subject's selection of a scale position that best reflects his/ her pain intensity

(McGrath et al., 1996). Selecting the appropriate scale position takes place by sliding a horizontal marker from the bottom to the top. The subject's score is the numerical value on the back of the scale, which matches the selected scale position (range 0– 100).

- *The CAS for Assessment of Pain Affect (CAS for Pain Affect)*. The original CAS (McGrath et al., 1996) was modified and used to assess the affective aspects of pain. The label 'no pain' at the bottom was replaced by the label 'no suffering' and the label 'maximum pain' at the top by the label 'a great deal of suffering'. Similar to the original CAS, each scale position referred to a numerical value on the back of the scale. The subject's scores ranged from 1 to 100.
- *The Faces Pain Scale (FPS)* (Bieri et al., 1990). The FPS is meant to measure both pain intensity and pain affect. This scale can be reliably and validly administered to children as young as 3 years of age. Moreover, recent findings show that Alzheimer's disease patients retain the capacity to process facial emotions (Shimokawa et al., 2003), a prerequisite for reliable administration of the FPS. The FPS consists of line drawings of seven faces, i.e. one neutral face and six faces that express increasing feelings of pain. Each face is 6 cm high. The faces are rank-ordered from 0 to 6, from left to right. Subjects could rank their feelings from 'no pain' (score 0, the neutral face, at the extreme left side) to the most severe pain (score 6, the face expressing the greatest pain, at the extreme right side). The subject's score is identical to the scale number, i.e. it can range from 0 to 6.

Comprehension of the Visual Analogue Scales

Participants were tested for their comprehension of the scales. For the CAS for Pain Intensity/CAS for Pain Affect, they were asked to move the marker to the level that reflects the most severe pain/ the most suffering (the top of the scale) or no pain at all/ no suffering (the bottom of the scale). For the FPS, they were asked to indicate which face showed the most severe pain and which face showed no pain.

Pain Medication

Pain medication was divided into three categories, i.e. (i) paracetamol (acetaminophen), (ii) non-steroidal anti-inflammatory drugs (NSAIDs, e.g. acetylsalicylic acid, diclofenac, ibuprofen [note, low doses of acetylsalicylic acid prescribed for prophylaxis of cardiovascular events were not included]) and (iii) opioids (e.g. tramadol, fentanyl). Pain medication prescription was quantified as the amount of medication prescribed in each category during the last 6 weeks previous to administration of the MMSE, measured in grams. The amount of medication prescribed was derived from the participants' medical records by two of the authors (B.P. and K.v.d.S.). Because a limited number of participants with an indication for pain had any pain medication prescribed during the 6 weeks previous to administration of the MMSE (see table 1), it was decided that pain medication would be transformed into a dichotomous variable, i.e. any pain medication prescribed at least once during the 6 weeks previous to administration of the MMSE, or no pain medication prescribed.

Data Analysis

Logistic regression analysis was conducted to examine the relationship between cognitive functioning and pain medication. The dichotomous dependent variable was the prescription of pain medication during the previous 6 weeks: coded 1 when present; coded 0 when not present. The independent variable was the MMSE score. First, this analysis was done for the complete group of demented participants (n = 61). Because the total group of dementia patients was very heterogeneous, which could influence the results, logistic regression analysis was performed in the largest dementia subgroup, i.e. participants with Alzheimer's disease (n = 23). A significance level of alpha = 0.05 was used. The SPSS program, version 18 (SPSS Inc., Chicago, IL, USA), was used for data analysis (Norusis, 1992).

Results

Total Group

In the total group of participants with dementia the logistic regression analyses showed no relationship between global cognitive functioning, measured with the MMSE, and pain medication (odds ratio 1.032; 95% CI 0.957, 1.112; p = 0.42; Nagelkerke R2 = 0.014).

Alzheimer's Disease

Also in the subgroup of participants with Alzheimer's disease, no relationship was present between global cognitive functioning and pain medication (odds ratio 1.042; 95% CI 0.918, 1.184; p = 0.53; Nagelkerke R2 = 0.024).

Pain Experience and Pain Medication Prescription

Of the 61 participants that were included in this study, the CAS for Pain Intensity was presented to 52 participants and the CAS for Pain Affect and the FPS were presented to 50 participants.

CAS for Pain Intensity: Out of the 30 patients (57.7%) who comprehended this pain scale, 14 patients (46.7%) reported pain. Out of this latter group, 6 participants (42.9%) did not receive pain medication.

CAS for Pain Affect: Twenty-six participants (52.0%) comprehended the CAS for Pain Affect; out of these patients, 11 patients (42.3%) reported pain. Five participants (45.5%) reporting pain with the CAS for Pain Affect received no pain medication.

FPS: The FPS was comprehended by 34 participants (68.0%), of which 22 (64.7%) reported pain. Of those reporting pain with the FPS, 9 (40.9%) did not receive pain medication (table 2).

Table 2. Number and percentages of participants comprehending the pain scales, reporting pain and receiving no pain medication.

	Participants comprehending pain scale		Participants reporting pain		Participants reporting pain but receiving no pain medication	
	n	%	n	%	n	%
CAS Pain Intensity	30	57.7	14	46.7	6	42.9
CAS Pain Affect	26	52	11	42.3	5	45.5
FPS	34	68	22	64.7	9	40.9

CAS = coloured analogue scale; FPS = faces pain scale; n = number of participants.

Discussion

The results of the present study show no relationship between global cognitive functioning and pain medication in the total group of nursing home residents with dementia and at least one painful condition. Similar findings were observed in the subgroup of patients with Alzheimer's disease. Additionally, more than 40% of the dementia patients who reported pain were not receiving pain medication.

The finding of a lack of a relationship between global cognitive functioning and the administration of pain medication in dementia patients supports previous findings (Fisher et al., 2002). In the study by Fisher et al. (2002) no relationship was found between cognitive functioning and amount of pain medication in a cognitively comparable group of nursing home residents (mean MMSE score = 11.1). Other studies, however, have shown a relationship between cognition and pain medication (Allen et al., 2003; Closs et al., 2004; Torvik et al., 2009). One main difference between those studies and the present study is that in those studies the participants were relatively less cognitively impaired (mean MMSE scores: 15 (Closs et al., 2004), 20 (Torvik et al., 2009) and 10 (present study)). Another difference was that in one study the participants had to have good communication skills (use multiword phrases during conversation) (Allen et al., 2003). In both the study that showed comparable results and the studies that showed contradictory results, not all participants suffered from a painful condition (Allen et al., 2003; Closs et al., 2004; Fisher et al., 2002; Torvik et al., 2009), which may have influenced the relationship between cognitive functioning and pain medication.

Furthermore, the results of the present study support previous findings that pain is undertreated in dementia patients (Achterberg et al., 2007; Landi et al., 2001). In our population of dementia patients who had at least one painful condition, 45% did not receive any pain treatment. Additionally, the results of the present study show that even dementia patients who are able to report their pain are at risk of undertreatment of pain. More than 40% of the dementia patients who reported pain during our study with one of the three pain scales did not receive any analgesic medication. These findings are in line with findings of previous studies among Dutch nursing homes. In one study, it was shown that over 60% of the residents of psychogeriatric wards in Dutch nursing homes who had pain received no pain medication at all (Achterberg et al., 2007). Another study among demented nursing home residents (MMSE score ≥ 15) showed that 38.8% of the participants with mild pain symptoms and 30.3% of the participants with serious pain symptoms did not receive any analgesic (Smalbrugge et al., 2007). These results, together with the absence of a relationship between global cognitive functioning and the prescription of pain medication, suggest that purely the diagnosis 'dementia' is a risk factor for inadequate pain treatment. This has also been suggested in a previous study, in which the administration of analgesic medication was compared between a group of cognitively impaired nursing home residents with a dementia diagnosis and a group of nursing home residents with cognitive impairment but without a dementia diagnosis (Nygaard and Jarland, 2005). In that study, no differences were found for the administration of scheduled pain medication, but residents with a dementia diagnosis received significantly less 'as needed' pain medication compared with the cognitively impaired residents without a dementia diagnosis. The investigators concluded that the dementia diagnosis negatively influenced the interpretation of pain cues (Nygaard and Jarland, 2005). However, of note is that although the participants without the dementia diagnosis were cognitive impaired, determined by means of the 10-point Abbreviated Mental Test (AMT), their mean AMT score was higher than the mean AMT score of the participants with a dementia diagnosis (mean AMT= 5 and mean AMT= 1, respectively). This finding suggests that severity of the cognitive impairment may have influenced the findings (Nygaard and Jarland, 2005). The results of the present study show that a dementia diagnosis increases the risk for undertreatment of pain, independent of the

severity of the cognitive impairment.

Although up to 68% of the participants in the present study were able to reliably use at least one of our pain scales, and about half of those actually reported pain, the high rate of participants who do report pain but do not receive pain medication (more than 40%) suggests that these people do not spontaneously report their pain to the nursing staff. Therefore, frequent pain assessment with visual analogue scales, even in patients in whom no pain is expected, may decrease undertreatment of pain in this population. Previous studies have also shown that visual analogue pain scales can be reliably used for pain assessment in people with dementia (Pautex et al., 2005; Scherder and Bouma, 2000), and that in people with dementia who do comprehend them, visual analogue scales may improve pain assessment (Frampton, 2003).

A limitation of our study is that, although most participants had a painful condition related to the locomotor system (88.5%), immobility of the participants was not registered. As immobility is related to the severity of the dementia (Scherder et al., 2007) and to pain (Plooij et al., 2012), immobility may have influenced the results.

Another limitation is that we included participants on the basis of the presence of a painful condition, and not on the basis of the presence of self-reported pain. The rationale of this decision was that we wanted our study population to be a reliable representation of the population of demented nursing home patients, and therefore, we did not want to exclude those who were unable to report their pain. However, it is known that people with dementia may have alterations in pain experience, either a decrease (Scherder et al., 2003; 2005), or an increase (Scherder et al., 2003; 2003a). Therefore, it is possible that, despite the presence of a painful condition, some of the included participants were experiencing less or even no pain, and therefore did not use pain medication. Indeed, the results show that some participants who were able to use the pain scales reported no pain. On the other hand, older people tend to under-report their pain for fear of increasing dependence (Weiner and Rudy, 2002).

Conclusions and Clinical Guidelines

It can be concluded that dementia patients are at a very high risk for undertreatment of pain; about half of the patients with moderate to severe dementia do not receive pain medication, despite the presence of a painful condition. This undertreatment of pain seems to be independent of cognition; even dementia patients with relatively mild cognitive disorders are at risk. Irrespective of the level of cognitive and communicative abilities, our data suggest that purely the diagnosis 'dementia' seems to have a negative influence on adequate pain treatment.

These conclusions lead to the following guidelines and recommendations. First of all, it is clinically most relevant to be aware of the risk of underestimation of pain in dementia patients, even in those who might still be able to communicate about pain. Therefore, besides using self-report pain scales, and irrespective of the patients' ability to communicate about pain, one should be aware of other signs that may indicate pain, such as physical inactivity (Plooij et al., 2012) and depression (Zwakhalen et al., 2007). This awareness can be increased by daily assessment of pain by using observational scales, for example, the Pain Assessment in Advanced Dementia (PAINAD) (Warden et al., 2003) or the Pain Assessment Checklist for Seniors with Limited Abilities to Communicate (PACSLAC) (Fuchs-Lacelle and Hadjistavropoulos, 2004). When behavioural changes are observed, without patients indicating that they experience pain, one should consider prescription of relatively mild pain medication, e.g. paracetamol, in order to rule out unidentified pain as a cause for the behavioural changes (Chibnall et al., 2005).

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