

Who Suffers Most? Dementia and Pain in Nursing Home Patients: A Cross-sectional Study

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Objectives: To explore the relationship between nursing home patients with different stages of dementia and different dementia diagnoses and use of pain medication according to pain intensity.

Design: Cross-sectional study.

Setting and Participants: Participants included 181 consecutive, long-term stay patients, 43 primary caregivers, 1 geriatric study nurse, and 4 physicians of a Norwegian nursing home.

Measurements: Admission records, prescription lists, care plans, Mini-Mental State Examination, Diagnostic and Statistical Manual of Mental Disorders (DSM-IV), International Classification of Diseases (ICD-10), cerebral computed tomography, pain diagnoses and pain locations by physicians' examinations, and pain intensity by MOBID-2 (Mobilization-Observation-Behavior-Intensity-Dementia Pain Scale), a novel staff-administered pain tool in dementia.

Results: Patients with severe dementia do not experience less pain intensity ($P = .079$), numbers of pain diagnoses ($P = .172$), and pain locations ($P = .202$) compared to other stages of dementia. Severely demented patients receiving opioids demonstrated higher pain intensity (mean 4.4, SD 1.7) than nondemented patients (mean 2.9, SD 1.8), and received less pain treatment ($P = .018$). Pain intensity did not differ between diagnostic groups of dementia ($P = .439$). Patients with mixed dementia receiving opioids had more pain (mean 5.3, SD 1.5, range 4–7) than mentally healthy controls and received less pain treatment ($P < .005$).

Conclusion: Patients with severe dementia and mixed dementia are at high risk to suffer from severe pain. More research and quality improvement programs are needed to increase the knowledge in pain treatment by staff, which requires competence in both pain assessment and dementia. (*J Am Med Dir Assoc* 2008; 9: 427–433)

Keywords: Dementia; pain assessment; pain management; nursing home

Advanced age is associated with high prevalence of dementia often combined with pain.^{1,2} Older adults tend to have more painful illnesses than their younger counterparts.³ With increasing cognitive impairment, patients' ability to report pain decreases,⁴ leading to the interpretation that they have fewer pain complaints than nondemented elderly.^{5,6} Questions remain as to whether different levels of dementia and

dementia diagnoses influence patients' pain perception, and may explain that demented patients receive fewer pain medications than mentally healthy controls.^{7,8}

Some studies indicate an alteration in pain experience in patients with Alzheimer's disease (AD), the most common cause of dementia, due to degeneration of brain regions involved in the processing of pain stimuli.⁹ Benedetti and colleagues¹⁰ found higher tolerance of experimental pain in AD patients compared with nondemented elderly and other dementia subtypes. Contrary to prevailing hypotheses of less pain perception in demented patients, Cole and colleagues¹¹ found that AD patients showed, as a response to noxious stimuli, greater amplitude and duration by functional brain imaging (fMRI), compared with controls. Thus, if the deduced hypothesis of the latter study is correct, pain perception and processing are not diminished in AD, and thus this frail group of people may be underdiagnosed and undertreated for pain.

For the purpose of pain assessment in patients with dementia, observational pain behavior instruments are required, as the use of self-report measures may provide uncertain results in patients with severe dementia.^{12,13} However, observed pain

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This research was conducted independently by the University of Bergen, funded by the Norwegian Foundation for Health and Rehabilitation (2003/2/0096) and the Kavli's Research Center for Dementia, Bergen. Competing interests: None declared.

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DOI: 10.1016/j.jamda.2008.03.001

behavior may also be difficult to interpret, because symptoms attributed to pain can as well be indicators of dementia.¹⁴

As our main pain assessment tool in this study, we used the nurse-administered Mobilization-Observation-Behavior-Intensity-Dementia (MOBID-2) Pain Scale to assess pain intensity in patients with dementia.¹⁵⁻¹⁷ This recently developed tool is based on pain behaviors in connection with standardized active, guided movements of different body parts and pain behaviors related to internal organs, head, and skin. We hypothesized that the amount of pain characteristics (diagnoses, location, intensity of pain) and pain medications decrease with increasing levels of dementia, and that pain intensity differs between subjects with different dementia diagnoses.

METHODS

The study was performed at a Norwegian nursing home (NH) and included skilled nursing units, a rehabilitation unit, and a palliative care unit. Inclusion criteria for the study were long-term stay (>4 weeks), age 65 or older, and a regular family visitor or legalized guardian. In the course of 6 weeks, 215 patients were admitted to the NH. We excluded 20 patients as they were allocated to short-stay admissions, and 14 patients with physical or psychological impairment (8 dying patients and 6 with delirium or psychosis). Thus, 181 residents aged 65 to 103 years were included.

Verbal and written informed consent was obtained in direct conversation with all cognitively intact patients. In patients with cognitive impairment, verbal and written informed and presumed consent was obtained in direct conversation with the patient and his legal guardian, usually a family member or advocate, after explaining the aims of the study and its protocol. The study was approved by the Regional Committee for Medical Research Ethics, Western Norway (REK-Vest nr: 190.04), and the Data Inspectorate (nr: 11529).

Dementia was diagnosed by 4 physicians according to the International Classification of Diseases (ICD)-10¹⁸ and the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV)^{19,20} based on history, physical examination, routine laboratory tests, and cerebral computed tomography (cCT) of the head (71% of the patients). They also collected information regarding pain diagnoses and pain location, and assessed the pain intensity by Numerical Rating Scale (NRS).²¹ They followed a standard procedure used at the NH, which included pain behaviors observed in connection with the consultation, palpation for trigger points, and active and/or passive movements of the limbs. Physician examination was performed the same day, shortly before pain assessment by caregivers.

Information was collected from patients' medical records concerning the total amount of nonpain medications and pain medications. The number of different pain medications was registered in accordance with the World Health Organization (WHO) analgesic ladder: No pain medications (Npm), nonopioid analgesics (WHO I), weak opioids (WHO II), or strong opioids (WHO III). WHO II and III were combined because of the rare use of weak opioids.

For each patient, the primary caregiver, who was familiar with the patient and knew his or her usual behavior, participated in the testing. The caregivers, 13 registered nurses and 30 licensed practical nurses, had worked at the NH for a mean of 4.1 years (SD = 5.0, range 1-23) and had mean 6.5 (SD = 6.5, range 1-33) years of working experience. In a 2-hour training session, the raters were provided with basic information regarding dementia, musculoskeletal pain, pain behavior, and pain drawings, and were trained in the use of the MOBID-2 Pain Scale.¹⁵⁻¹⁷ These caregivers did not provide pain medications to the patients.

A geriatric study nurse in collaboration with the patient's primary caregivers collected the information about the patient's cognitive and daily functioning. They used the Mini-Mental State Examination (MMSE),²² with scores less than 24 as a criterion for dementia. Patients were assigned to one of the following groups: severe dementia (MMSE < 12), moderate dementia (12 ≤ MMSE < 18), mild dementia (18 ≤ MMSE < 24), or no dementia (MMSE ≥ 24).²³ In addition, the Clinical Dementia Rating (CDR)²⁴ was administered, which includes 6 domains assessing the patient's memory, orientation, judgment, problem solving, community affairs, hobbies, and personal care. Each domain is scored on a 4-point scale (0-3); the total scale ranging from 0 to 18 (0 for healthy people, and 1, 2, and 3 for respectively mild, moderate, and severe dementia). Activities of Daily Living (ADL)²⁵ were rated, including activities like feeding, moving, personal toilet, and dressing; higher values indicating higher levels of activities of daily functioning and independency. Patients were classified into 4 groups: no dementia, Alzheimer's dementia (AD), vascular dementia (VaD), and mixed dementia, ie, AD plus VaD (ADVaD). Primary caregivers also assessed patients' pain and filled in the MOBID-2 Pain Scale during morning care.

We calculated the mean, standard deviation (SD), and range for patients' demographics. Pain characteristics (diagnoses, location, and MOBID-2 Pain Scale intensity score), pain medications, nonpain medications, and ICD-10 diagnoses were examined according to different levels and diagnoses of dementia.

One-way analysis of variance (ANOVA) was used for comparisons between the groups for continuous variables. Pairwise between-group comparisons were provided by post hoc tests (Bonferroni correction).²⁶ Two-way ANOVA was used to compare pain intensity scores by MOBID-2 Pain Scale as dependent variable, with (1) levels of dementia, (2) dementia diagnoses, and (3) pain medications as independent variables. For the ordered categories (levels of dementia and pain medication categories), linear contrast was additionally used to examine trend, relative to level. Simple contrast was used to compare different types of dementia diagnoses, using no diagnoses as reference category. We considered an adjusted *P* value less than .05 to be statistically significant. All statistical analyses were performed with SPSS-13 for Windows (SPSS, Chicago, IL).

RESULTS

Sample characteristics are shown in Table 1. By the MOBID-2 Pain Scale, inferred pain intensity greater than 0 on a 10-cm visual analogue scale²¹ was observed in 141 (78%) patients, and 3 or higher in 98 (54%) patients; 55% received any kind of pain medications. About 37% of mentally healthy controls received opioid analgesics, compared with 24% of the patients with severe dementia and 9% with ADVaD.

All over, we found no difference between groups with different levels of dementia, concerning pain diagnoses, location, and intensity of pain assessed by the MOBID-2 Pain Scale, and number of pain medications (Table 2). Dementia was associated with more ICD-10 diagnoses ($P < .001$), but tended to be given with fewer nonpain medications ($P < .001$), using mentally healthy controls as a reference.

Pain diagnoses, intensity, and medications of pain did not differ according to dementia diagnoses and no dementia (Table 3). Significantly more pain locations were observed in patients with VaD ($P = .035$) and ADVaD ($P = .049$) as compared with patients with AD. Nondemented patients had fewer ICD-10 diagnoses than all groups of demented patients ($P < .001$), but received more nonpain medications ($P = .003-.036$).

Pain diagnoses ($P < .001$), pain location ($P < .001$), and pain intensity by MOBID-2 ($P < .001$) differed according to pain medications (Table 4). Patients who received WHO I or WHO II/III had significantly more pain diagnoses and locations and higher pain intensity than patients without pain medications.

Although patients with dementia did not receive less pain medication by number (Table 3), patients with severe dementia receiving opioids as pain treatment were given higher pain intensity scores (mean 4.4, SD 1.7, range 2–8) than nondemented patients (mean 2.9, SD 1.8, range 0–6) (Figure 1). Two-way ANOVA with pain intensities assessed by MOBID-2 as dependent variable demonstrated significant main effects of pain medications by WHO classification ($F = 12.432$, $P < .001$), and of different levels of dementia ($F = 3.655$, $P = .014$). Results were supported by a significant linear contrast, as severely demented patients receiving opioid analgesics were found to experience higher pain intensity than mentally healthy controls ($P = .018$).

Also, those with ADVaD receiving opioids were given higher intensity scores than mentally healthy controls receiving opioids (mean 5.3, SD 1.5, range 4–7) (Figure 2). Main effects were significant between pain intensities and pain medications by WHO classification ($F = 17.739$, $P < .001$) and between pain intensities and dementia diagnoses ($F = 3.169$, $P = .038$). Results were supported by significant simple contrasts, when no dementia was compared to each of the other dementia diagnoses, indicating that mentally healthy controls may experience less pain than those with dementia diagnoses.

DISCUSSION

Contrary to our hypothesis, pain characteristics and the number of pain medications were not found to be associated

Table 1. Sample Characteristics ($n = 181$)

Variables	n (%)	Mean \pm SD, Range
Age, y		84.7 \pm 6.7, 65–103
Gender, female	135 (75)	
Months in the nursing home		25.9 \pm 24.0, 1–122
Basic education	173 (96)	
Single	23 (13)	
Married	39 (22)	
Widowed	111 (62)	
Separated	8 (4)	
Etiology of dementia	143 (80)	
Alzheimer's dementia	45 (25)	
Circulatory dementia	66 (37)	
Alzheimer's dementia & circulatory dementia	32 (18)	
cCT	129 (71)	
MMSE score (0–30)		12.3 \pm 9.7, 0–30
No impairment	30 (17)	
Mild	32 (18)	
Moderate	42 (23)	
Severe	77 (43)	
CDR score (0–18)		11.3 \pm 6.1, 0–18
ADL score (0–20)		10.0 \pm 5.9, 0–20
ICD diagnoses		3.7 \pm 1.4, 0–7
Dementia	145 (80)	
Circulatory	140 (77)	
Nervous system	138 (76)	
Musculoskeletal	97 (54)	
Genitourinary	55 (30)	
Stroke	51 (28)	
Endocrine	34 (19)	
Cancer	32 (18)	
Pain diagnoses		1.6 \pm 1.4, 0–6
Osteoporosis	53 (29)	
Old fracture	51 (28)	
Arthritis	51 (28)	
Muscle spasm	23 (13)	
Contracture	22 (12)	
Neuropathy	19 (11)	
Cancer	18 (10)	
Wound/gangrene	12 (7)	
Pain location		1.7 \pm 1.8, 0–10
Shoulder	45 (25)	
Hip	44 (24)	
Knee	37 (20)	
Back	37 (20)	
Foot	25 (14)	
Abdomen	17 (9)	
Wrist	13 (7)	
Mouth	9 (5)	
Nonpain medications		3.7 \pm 2.1, 0–13
Pain medications	100 (55)	
WHO I*	56 (31)	
WHO II	7 (4)	
WHO III	37 (20)	

MMSE, Mini-Mental State Examination; CDR, Clinical Dementia Rating; ADL, Activities of Daily Living; ICD, International Classification of Diseases; WHO, World Health Organization.

* WHO analgesic ladder: I = peripheral pain medications, II = weak opioids, III = strong opioids.

with severity of dementia. Patients with severe dementia did neither experience less pain intensity, nor have fewer diagnoses and locations of pain than those with moderate, mild, and no dementia. However, patients with severe dementia

Table 2. Comparison of Pain Characteristics, Number of Pain Medications, Number of Nonpain Medications, and ICD-10 Diagnoses According to Different Levels of Dementia by Mini-Mental State Examination in Nursing Home Patients (n = 181)

	ND n = 30 (17%)	MiD n = 32 (18%)	MD n = 42 (23%)	SDem n = 77 (43%)	Between Groups P Value*	Comparison Groups	Pairwise Between Groups P Value†
	Mean, SD, range						
Pain diagnoses	1.4 ± 1.1, 0–4	1.3 ± 1.3, 0–5	1.7 ± 1.3, 0–4	1.8 ± 1.5, 0–6	.172		
Pain location	1.6 ± 1.7, 0–7	1.2 ± 1.4, 0–5	1.7 ± 1.6, 0–5	2.0 ± 2.0, 0–10	.202		
MOBID-2	2.5 ± 1.5, 0–6	2.2 ± 1.8, 0–7	2.2 ± 1.8, 0–6	2.9 ± 2.0, 0–8	.079		
MOBID-2 Part 1	2.2 ± 1.9, 0–6	1.8 ± 1.9, 0–7	1.6 ± 1.8, 0–5	2.8 ± 2.0, 0–8	.026	MD-SDem	.026
MOBID-2 Part 2	1.9 ± 1.7, 0–5	1.5 ± 1.6, 0–5	1.7 ± 1.8, 0–6	2.0 ± 2.2, 0–10	.664		
Pain medications	1.1 ± 0.9, 0–3	0.6 ± 0.9, 0–3	0.7 ± 0.8, 0–3	0.7 ± 0.7, 0–2	.101		
Nonpain medications	5.0 ± 2.3, 2–13	4.3 ± 3.4, 0–9	3.6 ± 2.0, 1–10	3.0 ± 1.6, 0–7	<.001	MiD-SDem ND-SDem ND-MD	.007 <.001 .017
ICD diagnoses	2.7 ± 0.9, 1–4	3.6 ± 1.3, 1–7	4.0 ± 1.2, 2–7	3.9 ± 1.5, 0–7	<.001	ND-SDem ND-MD ND-MiD	<.001 <.001 .044

ND, No Dementia; MiD, Mild Dementia; MD, Moderate Dementia; SDem, Severe Dementia; ICD, International Classification of Diseases.

* One-way analysis of variance.

† Bonferroni.

receiving opioids as pain treatment were assessed as having higher pain intensity than nondemented persons receiving opioids. Further, pain intensity did not differ in diagnostic groups of demented patients compared with nondemented patients, but those with ADVaD receiving opioids tended to have higher pain intensity than nondemented persons receiving opioids. Although patients with dementia had significantly more ICD diagnoses ($P < .001$), they received fewer total medications ($P < .001$). Our findings also suggest that NH patients demonstrate a complex picture of suffering, in-

cluding a high number of diagnoses and possibly undertreatment of pain, especially in severe dementia and ADVaD.

These findings are not in line with some previous studies, all comparing self-reported pain intensity in the elderly according to severity of dementia. Parmelee⁵ found that patients with severe dementia reported fewer pain locations and pain intensity than nondemented patients. In a study by Proctor and Hirdes,⁶ decreasing prevalence of pain related to increasing levels of dementia was found. Also, Leong and Nuo²⁷ demonstrated that increasing levels of dementia were associ-

Table 3. Comparison of Pain Characteristics, Number of Pain Medications, Number of Nonpain Medications, and ICD-10 Diagnoses According to Different Dementia Diagnoses in Nursing Home Patients (n = 181)

	ND n = 30 (17%)	AD n = 47 (26%)	VaD n = 72 (40%)	ADVaD n = 32 (18%)	Between Group P Value*	Comparison Groups	Pairwise Between Groups P Value†
	Mean, SD, range						
Pain diagnoses	1.4 ± 1.1, 0–4	1.5 ± 1.5, 0–6	1.7 ± 1.3, 0–5	1.9 ± 1.5, 0–5	.503		
Pain location	1.6 ± 1.7, 0–7	1.1 ± 1.2, 0–5	2.0 ± 1.9, 0–7	2.1 ± 2.3, 0–10	.023	AD-VaD AD-ADVaD	.035 .049
MOBID-2	2.2 ± 1.5, 0–6	2.4 ± 2.2, 0–7	2.5 ± 1.7, 0–8	2.9 ± 1.9, 0–7	.439		
MOBID-2 Part 1	2.2 ± 1.9, 0–6	1.9 ± 2.1, 0–7	2.3 ± 1.8, 0–8	2.6 ± 2.2, 0–8	.475		
MOBID-2 Part 2	1.9 ± 1.8, 0–5	1.8 ± 2.1, 0–8	1.8 ± 1.7, 0–7	1.9 ± 2.4, 0–10	.988		
Pain medications	1.1 ± 0.9, 0–3	0.6 ± 0.6, 0–2	0.7 ± 0.8, 0–3	0.7 ± 0.8, 0–3	.096		
Nonpain medications	5.0 ± 2.3, 2–13	3.3 ± 2.0, 0–10	3.4 ± 2.0, 0–9	3.6 ± 1.7, 0–7	.002	ND-AD ND-VaD ND-ADVaD	.003 .003 .036
ICD diagnoses	2.7 ± 0.9, 1–4	3.5 ± 1.5, 0–7	3.9 ± 1.3, 1–7	4.3 ± 1.5, 0–7	<.001	ND-AD ND-VaD ND-ADVaD AD-ADVaD	.061 <.001 <.001 .025

ND, No Dementia; AD, Alzheimer's Dementia; VD, Vascular Dementia; ADVaD, Mixed Dementia; ICD, International Classification of Diseases.

* One-way analysis of variance.

† Bonferroni.

Table 4. Comparison of Pain Characteristics, Number of Pain Medications, Number of Nonpain Medications, and ICD-10 Diagnoses Compared Between Groups of Pain Medications

	Npm n = 81 (45%)	WHO I n = 56 (31%)	WHO II/III n = 44 (24%)	Between Groups P Value*	Comparison Groups	Pairwise Between Groups P Value†
	Mean, SD, range					
Pain diagnoses	0.8 ± 1.0, 0–9	2.1 ± 1.2, 0–5	2.6 ± 1.4, 1–6	<.001	Npm-I Npm-II/III	<.001 <.001
Pain location	0.7 ± 1.3, 0–6	2.2 ± 1.6, 0–7	2.9 ± 1.9, 1–10	<.001	Npm-I Npm-II/III	<.001 <.001
MOBID-2	1.7 ± 1.6, 0–6	2.8 ± 1.7, 0–7	3.6 ± 1.8, 0–8	<.001	I-II/III Npm-I Npm-II/III	<.001 <.001 <.001
MOBID-2 Part 1	1.3 ± 1.7, 0–7	2.4 ± 1.8, 0–7	3.6 ± 1.8, 0–8	<.001	I-II/III Npm-I Npm-II/III	.09 <.001 <.001
MOBID-2 Part 2	1.4 ± 1.8, 0–10	1.6 ± 1.7, 0–6	2.9 ± 2.1, 0–8	<.001	I-II/III Npm-I Npm-II/III	.05 <.001 <.001
Nonpain medications	2.9 ± 1.8, 0–8	4.1 ± 1.9, 1–10	4.5 ± 2.3, 1–13	<.001	I-II/III Npm-I Npm-II/III	.003 <.001 <.001
ICD diagnoses	3.5 ± 1.4, 0–7	4.0 ± 1.4, 1–7	3.6 ± 1.4, 1–7	.121	Npm-I Npm-II/III	.002 <.001

Npm, No pain medications; ICD, International Classification of Diseases; WHO, World Health Organization analgesic ladder: I = peripheral pain medications, II = weak opioids, III = strong opioids.

* One-way analysis of variance.

† Bonferroni.

ated with decreased prevalence of pain. In their study, communicative and noncommunicative patients were not assessed by the same pain scale, leaving the results difficult to compare.

We found significantly more pain locations in patients with VaD and ADVaD than in AD. These results support a previous study by Scherder and colleagues,²⁸ who suggested that disruption by white matter lesions may increase pain experi-

ence by deafferentiation in patients with VaD compared with nondemented patients. High prevalence of pain combined with communication disabilities may therefore lead to a rather serious situation for these patients. Another explanation could be the presence of depression related to dementia with possible impact on the pain threshold. However, a recent study indicates that depression and pain are more closely

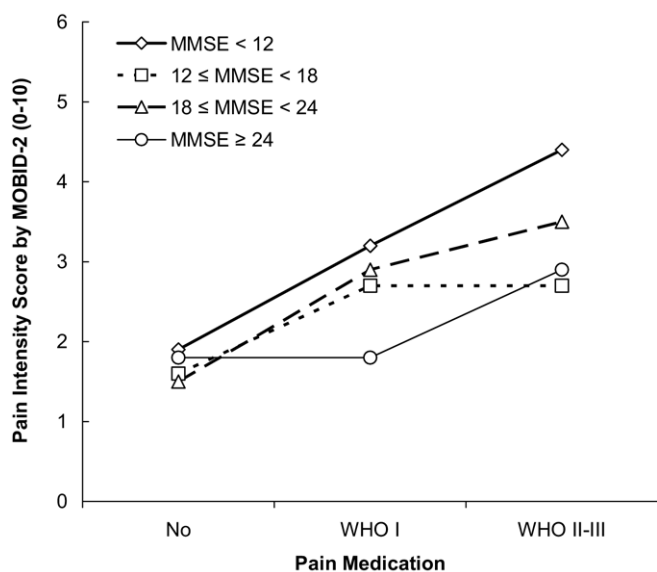


Fig. 1. Relationships between different levels of dementia, pain intensity, and pain medications.

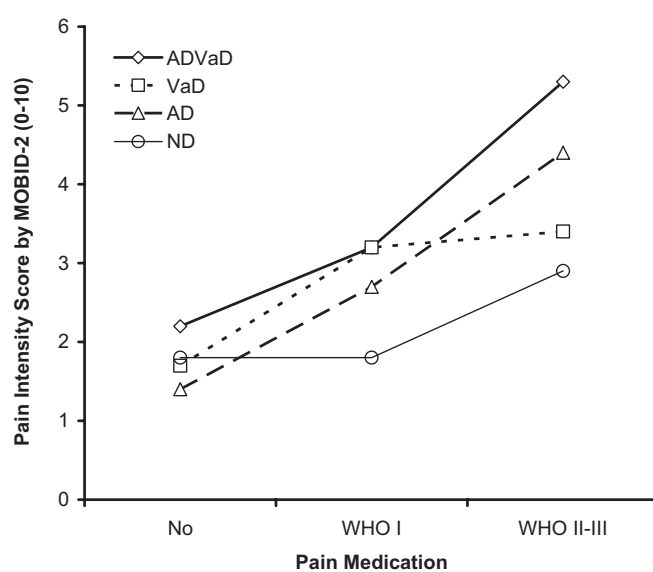


Fig. 2. Relationships between dementia diagnoses, pain intensity, and pain medications.

related in subjects without dementia compared with people with AD.²⁹

In line with other studies,³⁰ mentally healthy controls received a significantly higher amount of nonpain medications. This may imply that cognitively intact patients are more able to communicate their symptoms to the staff, resulting in more medications. Contrary to previous findings,^{31,32} the total number of pain medications did not differ according to different levels of dementia and dementia diagnoses, suggesting a comparable need for pain treatment. The reason why patients with severe dementia (24%) and ADVaD (9%) did not receive the same amount of opioids as nondemented elderly (37%) could be explained by an attempt to avoid side-effects.³³ However, we found no studies investigating opioid side effects in patients with dementia. The fact that this NH has a palliative care unit with physicians and caregivers skilled in pain treatment might have influenced the findings. The use of opioids in general did not seem to be restricted, since a high percentage of mentally healthy controls received opioids as pain treatment. Why, in particular, patients with ADVaD received fewer opioids may be due to difficulty of capturing pain behavioral expressions in this group of patients. It seems not sufficient to be generally competent in pain assessment and treatment; competence should also include pain in dementia.

We used the recently developed MOBID-2 Pain Scale, which is based on observation of pain behavior during standardized movements of the different body parts, as well as the observation of behavior that might be caused by pain related to internal organs, head, and skin over time. It is a prerequisite that caregivers are not blinded and know the usual behavior of demented patients, as it is very difficult to differ between behavior that might be caused by pain and behavior related to dementia.^{13,14} This approach might have affected findings and disclosed higher pain intensity scores than if pain was simply based on unstructured daily life observation by blinded caregivers.¹⁵ High to excellent inter-rater and test-retest reliability for MOBID-2 pain intensity scores were demonstrated.¹⁷ Internal consistency of the tool was highly satisfactory ($\alpha = 0.84$). Construct and concurrent validity were indicated, as pain scores by MOBID-2 were highly correlated with physicians' clinical examination of pain using the NRS, diagnoses and location of pain, and pain medications.¹⁶ However, the findings in the present study are based on data from only one NH, and external validity might be questioned. As most of the patients were admitted to the present institution from primary health care and hospitals, patients included in the study could reflect the frequency of pain problems in elderly patients in general. The fact that the included patients were admitted to the NH indicated that they were more severely ill than patients in the same age with the same diagnoses treated at home. Compared to them, Norwegian NH patients may have more clinical risk factors, for instance immobility caused by stroke, and thus a higher probability of having pain. Therefore, one should be cautious about general extrapolation of the study findings to primary care. In addition, a more severely ill patient might also be expected to develop more drug-

related interactions related to opioid analgesics or nonsteroidal anti-inflammatory drugs (NSAIDs).

The classification into dementia etiology groups was based on physicians' clinical examination and cCT. This classification may be attenuated by underlying subtle brain processes that can only be clarified by autopsy.³⁴ Patients in Norwegian NHs have a mean age of about 84 years, and advanced dementia is a major prerequisite to receive a long-term care place.³⁵ In our study, 66% of the patients were moderately or severely demented, 77% had a history of circulatory diseases, and 28% had had a stroke. Only 17% were not mentally impaired. In younger outpatients, Lewy Body Dementia (DLB) may be more prevalent than VaD.³⁶ The majority of community-dwelling older persons with dementia have multiple brain pathologies, which greatly increases the odds of dementia.³⁷ The differentiation between dementias in the late stages of disease is very difficult.³⁸ This is particularly true for the differentiation between DLB and AD. In addition, dementia was diagnosed according to ICD-10 and DSM-IV, which does not include DLB and Frontotemporal Dementia as a separate diagnostic category.

To our knowledge, this is the first study to compare prevalence, intensity, location, and treatment of pain in NH patients according to severity and type of dementia, using the same pain assessment instrument irrespective of cognitive function. Pain assessment in dementia is complex, but the patients' pain characteristics and needs for pain relief seem to be comparable with mentally healthy controls. At all levels of dementia and in VaD and ADVaD, the increased prevalence of ICD-10 diagnoses may contribute to strengthen the patients' suffering. The fact that patients with severe dementia and ADVaD receiving opioids as pain treatment were assessed to have higher pain intensity than nondemented patients does not necessarily indicate a restricted use of opioids. We suggest that these patients received less pain relief than needed, but isolated increase of opioids may be limited by high prevalence of ICD diagnoses and opioid side effects. The patients' multimorbidity and lack of communication ability may suggest the need of a comprehensive approach of pain assessment and treatment in a multidisciplinary perspective. More research and quality improvement programs regarding pain assessment and pain management in dementia are needed.

ACKNOWLEDGMENTS

The authors thank the patients, the relatives and the multidisciplinary team of the nursing home for their willingness and motivation that made this study possible.

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