Journal of Gerontology: MEDICAL SCIENCES
2005, Vol. 60A, No. 4, 524–529

Feasibility and Reliability of Four Pain Self-Assessment Scales and Correlation With an Observational Rating Scale in Hospitalized Elderly Demented Patients

Sophie Pautex, François Herrmann, Paulette Le Lous, Malika Fabjan, Jean-Pierre Michel, and Gabriel Gold

Department of Geriatrics, Geneva University Hospitals, Switzerland.

Background. Acute and chronic pain is common in hospitalized demented elderly people, yet there are limited data about the performance of pain assessment tools in this population. The aim of this study was to evaluate the feasibility and reliability of four pain self-assessment scales in this population and compare their performance to an observational pain rating scale.

Methods. Our prospective clinical study was conducted in an acute-care and intermediate-care geriatric hospital on 160 consecutive inpatient referrals to the dementia consultation who met *Diagnostic and Statistical Manual of Mental Disorders–IV* criteria for dementia. Exclusion criteria were delirium, terminal care, and severe sensory impairment. Four unidimensional self-assessment tools—the verbal, horizontal visual, vertical visual, and faces pain scales—were administered in randomized order to mild, moderate, and severely demented patients. An observational pain rating scale was independently completed by the nursing team.

Results. Only 12% of the 160 patients (mean age 85 years, 71% women) understood no scale. Respectively, 97%, 90%, and 40% of patients with mild, moderate, and severe dementia understood at least one scale ($p < .05$). There was a nonsignificant trend toward poorer comprehension of the faces scale. Test–retest reliability was high for all four self-assessment scales, and the correlation between these scales was very strong (Spearman's $r_s = 0.81$–0.95; $p < .001$). Observational rating correlated moderately with self-assessment and tended to underestimate pain intensity ($r_s = 0.31$–0.40; $p < .05$).

Conclusions. Self-assessment pain scales can be used reliably in the vast majority of older hospitalized patients with mild to moderate dementia and in nearly half of those with severe dementia. Observational pain rating scales correlate only moderately with self-assessment and should be reserved for those few patients who have demonstrated that they cannot complete a self-assessment.

PERSISTENT pain is a major concern in elderly patients. It is highly prevalent among nursing home residents, and may occur in 25%–50% of community-dwelling older people (1–7). Its consequences include impaired ambulation, depression, anxiety, decreased socialization, sleep disturbance, increased health-care utilization, and higher health-related costs (8). Pain assessment remains difficult in frail elderly persons, and undertreatment is not uncommon (9,10). This may be related in part to the high prevalence of dementia in this population (11–13). Dementia is an important barrier to pain assessment, and several studies (14–16) have demonstrated that cognitively impaired patients receive fewer analgesics than do cognitively intact patients with similar pathology.

Self-assessment scales based on the patient's own report are the current standard in pain measurement. Several studies (6,14,17–19) suggest that they can be used in demented populations and can improve pain detection. However, their reliability in cognitively impaired populations has not been well tested, and their application may be impossible in more severely demented patients. To circumvent this issue, several scales have been developed to allow observational rating of a patient's pain (20,21), yet it is unclear how well these scales correlate with the patient's self-assessment and at what level of cognitive impairment they should be preferred to self-assessment scales. To address these issues, we determined the feasibility and reliability of four self-assessment scales in demented hospitalized elderly people, according to the severity of their cognitive deficits. Furthermore, we compared pain scores obtained by self-assessment and by observational rating in this population. The purpose of this study was to help define the best choice among currently available pain assessment scales for individuals with dementia.

Methods

All consecutive French-speaking hospitalized patients who were referred to the inpatient dementia consultation of the Geneva University Geriatric Hospital between October 2001 and April 2002 and who met *Diagnostic and Statistical Manual of Mental Disorders–IV* (DSM-IV) criteria for dementia were eligible for the study. Exclusion criteria were delirium, end-of-life care, and severe sensory impairment. Eight cases were excluded altogether (5 with delirium who left the hospital after the delirium subsided but before they could be contacted again to participate in the study and 3 who refused consent). A total of 160 patients participated in the study, and all underwent a complete neuropsychological evaluation (which is described in detail elsewhere) and

appropriate laboratory testing, including neuroimaging (22). Alzheimer's disease and vascular dementia were diagnosed according to National Institute of Neurological and Communicative Disorders and Stroke and the Alzheimer's Disease and Related Disorders Association (NINCDS-ADRDA) and National Institute of Neurological Disorders and Stroke–Association Internationale pour la Recherche et l'Enseignment en Neurosciences (NINDS-AIREN) criteria, respectively (23,24). A validated scale, the clinical dementia rating (CDR) scale, was used in all cases to assess the severity of dementia (25). The CDR assigns cognitive function to five levels defined as no dementia (CDR = 0), questionable dementia (CDR = 0.5), mild dementia (CDR = 1), moderate dementia (CDR = 2), and severe dementia (CDR = 3). Dementia severity and exclusion criteria were confirmed by a senior physician who is highly experienced in the field of dementia and cognitive impairment. All patients were asked if they experienced any pain at the time of the assessment. Other collected data included admission diagnosis, the number of comorbidities measured by the Charlson's comorbidities score (26), and use of analgesics.

The following four different unidimensional pain self-assessment scales were presented to each patient in a random order. The horizontal visual analog scale (HVAS) consists of a 10-cm line anchored by two extremes of pain: no pain and extreme pain. Patients were asked to position a sliding vertical marker to indicate the level of pain they were currently experiencing; pain severity is measured as the distance (in cm) between the zero position and the marked spot (27,28). The vertical visual analog scale (VVAS) is similar to the prior scale but is presented vertically, and the line is replaced by a red triangle with its summit facing downward (no pain = 0) and its base at the top (maximum pain = 10) (29,30). The faces pain scale (FPS) consists of a line drawing of seven faces which express increasing pain (no pain = 0, maximum pain = 6) (31). The 6-point verbal rating scale (VRS) consists of a list of adjectives which describe different levels of pain. Patients were asked to point to the adjective that best describes their current pain. We used a French set of adjectives which is included in the validated French version of the McGill questionnaire (32). Examination was completed with the examiners in a quiet room with the patient in a sitting position. Each scale was explained to the patient using a standard text, and standardized distraction material was used between each presentation. Patients who could demonstrate comprehension of a scale were then asked to indicate their current level of pain. The entire procedure was repeated 30 minutes later either by the same investigator (50% of the cases) or by a different examiner who was blinded to the first assessment. Patients were considered to have understood a scale if, on both occasions, they were able to explain its use and could correctly indicate which position corresponded to no pain at all and which position corresponded to the most severe pain. On each occasion, the explanations were repeated up to three times before patients were considered unable to comprehend a scale. There was a high level of agreement between the two assessments of comprehension (intrarater kappa between 0.93 and 0.97; interrater kappa between 0.86 and 0.97, depending on the scale).

On the same day, an observational pain assessment scale, Doloplus, was completed independently by the nursing staff in charge of the patient. The Doloplus scale was developed to assess pain in older people with communication disorders. It includes five somatic items (somatic complaints, protective body posture adopted at rest, protection of sore areas, facial expression and gaze, and sleep pattern), two psychomotor items (based on observation of washing and/or dressing and mobility), and three psychosocial items (communication, social interaction, and behavior). Each item is scored from 0 to 3 yielding an overall score between 0 and 30. A score ≥ 5 is considered indicative of pain (20,21,33). The study investigators and the nursing staff were blinded to each other's assessments.

To compare patient characteristics among dementia severity levels, categorical variables were evaluated by chi-square or Fisher's exact test as extended by Mehta and Patel (34) when appropriate, and analysis of variance was used for continuous variables. The intraclass correlation coefficient (ICC) was used to measure interrater and intrarater reliability. Spearman's rho correlation coefficient was chosen to assess the strength of the association between pain intensities measured by the different scales. After converting all scales to percent scores (no pain = 0%; maximum pain = 100%), the Wilcoxon matched-pairs signed-ranks test was used to evaluate whether the observational scale under- or overestimated pain compared to self-assessments. All analyses were performed with the Stata 7.0 statistical package (STATA Corp., College Station, TX), with the exception of reliability analysis (ICC with 95% confidence interval, test of significance for comparing ICC to 0.999) which was carried out with SPSS release 11.0 (Chicago, IL). The study protocol was approved by the local ethics committee, and all study participants or appropriate surrogates gave written informed consent.

Results

The main reasons for admission in the studied population were falls ($n = 50$; 31%), altered mental status ($n = 33$; 21%), heart failure or myocardial infarction ($n = 31$; 19%), infectious disease ($n = 22$; 14%), fracture ($n = 19$; 12%), and thromboembolism ($n = 5$; 3%). The most common comorbidities were depression ($n = 56$; 35%), hypertension ($n = 42$; 26%), cardiac disease ($n = 42$; 26%), and chronic pulmonary disease ($n = 10$; 6%). Other characteristics of the 160 patients are described in Table 1. Age, sex distribution, type of dementia, and Charlson's comorbidity score were not significantly different in individuals with mild, moderate, or severe dementia (Table 1). Nearly half the patients (47%) reported that they experienced pain in response to a direct question, and 24% of such cases were receiving no analgesics. Pain was mainly musculoskeletal in origin. There was no significant effect of dementia severity on the proportion of patients reporting pain or receiving analgesic therapy (Fisher's exact test; $p > .05$) (Table 2). Among patients who reported pain and demonstrated the capacity to use self-assessment scales reliably, pain intensities measured by the VRS, HVAS, VVAS, and FPS were, respectively, 3.0 [1.5], 5.0 [2.0], 5.0 [1.0], and 3.0 [2.0]; (median, interquartile range) for mildly demented patients and 3.0 [3.0], 4.0 [5.0], 5.0 [5.0], and 3.0 [3.0] (median, interquartile range) for

Table 1. Patient Characteristics

Characteristic	CDR = 1 (64 Cases)	CDR = 2 (81 Cases)	CDR = 3 (15 Cases)	Total (160 Cases)	*p* Value
Age, mean ± *SD*	84.2 ± 6.1	85.7 ± 5.4	86.4 ± 7.2	85.5 ± 5.8	.252*
Sex, men/women	21/43	20/61	4/11	46/114	.650*
Type of dementia, *n* (%)					.212†
Alzheimer's disease	33 (55)	28 (35)	6 (40)	69 (43)	
Mixed dementia	16 (25)	36 (44)	7 (47)	59 (37)	
Vascular dementia	11 (17)	14 (17)	2 (13)	27 (16)	
Other causes	2 (3)	3 (4)	0	5 (4)	
Mini-Mental Status Examination, mean ± *SD*	22.8 ± 5.8	16.8 ± 3.6	2.1 ± 4.6	17.8 ± 7.4	<.001*
Charlson's Comorbidity score, mean ± *SD*	1.7 ± 1.0	1.8 ± 0.9	1.3 ± 0.6	1.7 ± 0.8	.156‡

Notes: *Chi-square test.
†Fisher's exact test.
‡One-way analysis of variance.
CDR = Clinical Dementia Rating scale; *SD* = standard deviation.

moderately demented patients. None of the severely demented patients who could demonstrate appropriate use of the self-assessment scales reported experiencing any pain. Among all patients reporting pain, intensity measured by the observational rating scale was 5.0 [6.0], 4.5 [7.0], and 13 [8.0] (median, interquartile range) for mild, moderate, and severely demented patients, respectively. Comprehension rates were generally similar for all four self-assessment scales although there was a nonsignificant trend toward poorer comprehension of the faces scale and greater comprehension of the HVAS in patients with mild and moderate dementia. There was also a trend toward greater comprehension of the VRS in the severe dementia group (Table 3). The ability to comprehend and use a self-assessment scale was not related to dementia type; however, it was closely related to dementia severity. Respectively, 97%, 90%, and 40% of patients with mild (62/64 cases), moderate (73/81 cases), and severe dementia (6/15 cases) understood at least one scale ($p < .05$) (Table 4). Only 12% of the patients understood no scale at all.

The reliability of the four self-assessment scales was substantial ($0.60 < ICC < 0.8$) to almost perfect ($ICC > 0.8$) (35). The ICCs between the first and second assessments were 0.71 (FPS), 0.80 (VRS), 0.87 (VVAS), and 0.90 (HVAS) when two different raters were used and 0.94 (VVAS), 0.95 (HVAS), and 0.97 (both FPS and VRS) when the same rater performed both assessments. In all cases the ICCs were not statistically different from 0.999.

Correlation between the four self-assessment scales was very strong (Spearman's coefficient ranging from 0.81 to 0.95; $p < .001$) (Table 5). However, observational rating correlated only moderately with self-assessment (Spearman's coefficient raging from 0.31 to 0.40; $p < .05$); the strength of the correlations did not increase in patients with moderate to severe pain. Among the 76 cases reporting pain, the mean scores ranged from 41% to 46% of maximum pain levels for the four self-assessment scales and only 16% of the maximum score for the observational rating scale (Figure 1). It is important to note that 20% of such cases score below the pain threshold (score < 5) on the Doloplus scale. Furthermore, 15 among the 25 cases that scored below 5 on this scale reported feeling pain. Mean self-assessment score for these cases was 4.9/10, 5.1/10, 3.4/6, and 3.9/7 for, respectively, the HVAS, VVAS, VRS, and FPS. Among patients reporting pain, the observational rating scale underestimated severity compared to all four self-assessment scales

Table 2. Patients With Painful Condition During Assessment

	CDR = 1	CDR = 2	CDR = 3	Total
	N (%)	*N* (%)	*N* (%)	*N* (%)
Number of patients reporting pain	33 (52)	38 (47)	5 (33)	76 (47)
Etiology of pain				
Osteoarthritis of joints	16 (48)	16 (42)	2 (40)	34 (45)
Back pain (osteoporosis or ostheoarthritis)	9 (27)	13 (34)	1 (20)	23 (30)
Skin lesion	2 (6)	3 (8)	1 (20)	5 (6)
Other causes	6 (9)	6 (16)	1 (20)	13 (17)
Analgesics				
All types	25 (76)	29 (76)	4 (75)	58 (76)
WHO 1st step*	16 (48)	18 (38)	4 (75)	38 (50)
WHO 2nd step*	6 (18)	3 (6)	1 (20)	10 (13)
WHO 3rd step*	5 (15)	2 (4)	1 (20)	8 (11)

Notes: *Patients can have two different analgesics.
CDR = Clinical Dementia Rating scale; WHO = World Health Organization.

Table 3. Number and Percentage of Patients Understanding Each Scale According to the Level of Dementia (CDR)

Scale	CDR = 1 (64 Cases) *N* (%)	CDR = 2 (81 Cases) *N* (%)	CDR = 3 (15 Cases) *N* (%)	Total (160 Cases) *N* (%)
Verbal Rating Scale (VRS)	58 (91)	59 (73)	5 (33)	122 (76)
Horizontal Visual Analong Scale (HVAS)	62 (97)	64 (79)	4 (27)	130 (81)
Vertical Visual Analog Scale (VVAS)	59 (92)	60 (74)	4 (27)	123 (77)
Faces Pain Scale (FPS)	57 (89)	53 (65)	4 (27)	114 (72)

Notes: For each scale, comprehension is significantly associated with the CDR (Clinical Dementia Rating) scale.
$p < .001$ (Fisher's exact test).

Table 4. Number of Scales Understood According to Level of Dementia (CDR)

Number Understood	CDR = 1 64 Cases *N* (%)	CDR = 2 81 Cases *N* (%)	CDR = 3 15 Cases *N* (%)	Total 160 Cases *N* (%)
4	51 (80)	48 (59)	3 (19)	100 (62)
3	8 (12)	10 (12)	1 (7)	17 (13)
2	1 (2)	8 (10)	1 (7)	12 (7)
1	2 (3)	7 (9)	1 (7)	10 (6)
0	2 (3)	8 (10)	9 (60)	19 (12)

Note: CDR = Clinical Dementia Rating scale.

Table 5. Correlation Between Different Scales (Spearman's Rho)

	First Assessment				Second Assessment			
	HVAS	VVAS	FPS	VRS	HVAS	VVAS	FPS	VRS
Doloplus (observational rating scale)	0.35	0.40	0.34	0.31	0.36	0.39	0.35	0.34
First assessment								
HVAS	—	0.95	0.88	0.91	0.92	0.89	0.87	0.91
VVAS		—	0.89	0.89	0.92	0.88	0.86	0.84
FPS			—	0.89	0.82	0.81	0.87	0.86
VRS				—	0.85	0.84	0.88	0.91
Second assessment								
HVAS					—	0.95	0.87	0.85
VVAS						—	0.90	0.89
FPS							—	0.89
VRS								—

Note: HVAS = Horizontal Visual Analog Scale; VVAS = Vertical Visual Analog Scale; FPS = Faces Pain Scale; VRS = Verbal Rating Scale.

(Wilcoxon's matched-pairs signed-ranks test; $p < .001$ for all four scales).

Discussion

The proportion of patients reporting pain did not change with dementia severity. Although the simple report of pain should be interpreted with caution in demented patients, our result does not support a putative relationship between declining cognitive function and reduced sensitivity to pain as suggested by some authors (19,36). Approximately one quarter of patients reporting pain were not receiving analgesics; this finding is consistent with other reports of undertreatment in this population and highlights the importance of appropriate pain assessment in older demented hospitalized patients (8,14).

Although we used a particularly rigorous definition of scale comprehension (ability to demonstrate appropriate use on two separate occasions), we report that over 90% of elderly hospitalized patients with mild to moderate dementia and more than one third of those with severe dementia can complete at least one of four pain self-assessment scales. This finding is consistent with those of other studies reporting a completion rate of 80% or more in cognitively impaired elderly patients and a negative correlation between dementia severity and the ability to understand self-assessment scales (6,18,30). Importantly, close to half the patients with severe dementia demonstrated appropriate use of these scales. Thus our data do not provide any evidence for a clear cognitive threshold below which self-assessment scales should not be attempted.

Ability to complete an assessment does not imply reliability. This is a key issue because unreliable measurements cannot be used effectively to detect pain or, more importantly, to measure change. The current study is, to our knowledge, the first to demonstrate that pain self-assessment scales possess high test–retest and interrater reliability in a demented population. This was true for all four of the tested unidimensional self-assessment scales. Several studies (6,17,30) have attempted to determine the most appropriate scale for cognitively impaired elderly, but report conflicting results. We report a trend toward better comprehension of the HVAS, but this is not consistent across studies. Ferrell (6) found completion rates that vary from 44% for the HVAS (lowest completion rate) to 65% for the present pain intensity subscale of the McGill questionnaire, a combined word and number scale. These findings are consistent with those of Krulewitch and colleagues (17) who report the worst completion rate for a visual analog scale (53%) and the faces scale (53%) compared to the pain intensity scale (62%), a combined visual and verbal scale. However, Scherder and Bouma (30) describe a very high completion rate for the Colored Analog Scale (CAS) (100% in early Alzheimer's disease and 80% in midstage Alzheimer's disease) and a much lower one for the faces scale (60% and 30%, respectively). These differences may be explained in part by unclear definitions of comprehension, the absence of comprehensive neuropsychological evaluations leading to uncertainty in dementia severity assessments, and the lack of standardized instructions prior to scale administration. Importantly, reliability was not measured in these studies. In our experience, all of the four tested self-assessment scales performed similarly and were equally reliable, although there was a trend toward poorer comprehension of the faces scale. Although the VRS appeared to perform slightly better among patients with severe cognitive deficits, we included relatively few patients with severe dementia, and may not have had sufficient power to detect differences among the four tested scales in this particular group. Also, our study population included only hospitalized elderly patients, a group in which pain assessment is particularly crucial. Further studies in nursing home and community-dwelling elderly individuals may be needed to confirm the generalizability of our findings to these settings.

The observational rating scale Doloplus correlated modestly with self-assessment by the patient, and underestimated the level of pain. Importantly, low scores did not rule out the presence of pain. To our knowledge, one other study using a similarly constructed observational scale, the Hospice Approach Discomfort Scale, also addressed this issue and showed a poor correlation with unidimensional self-assessment tools (18). Clinicians should not apply observational scales routinely in demented patients as many of these are capable of reporting their own pain. Observational scales were designed, and should be reserved, for those few patients who have demonstrated that they cannot complete a self-assessment.

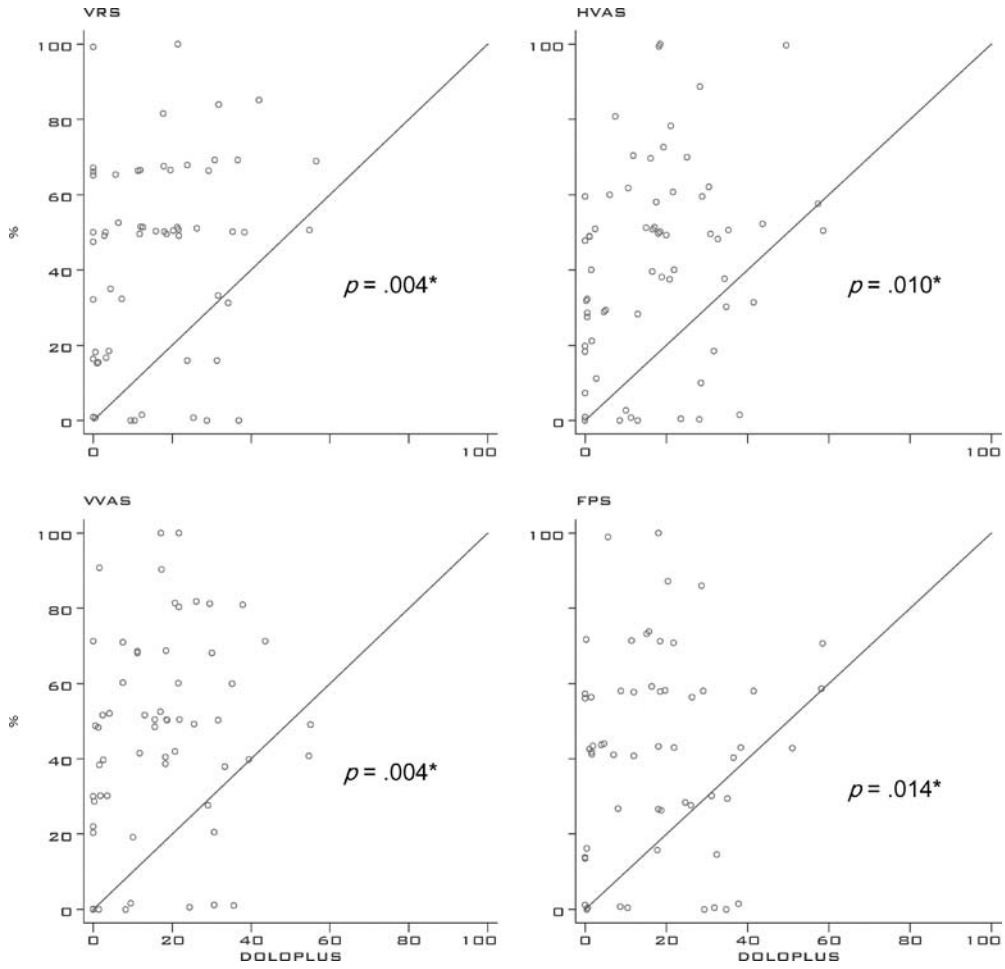

Figure 1. Scatterplot of each pain self-assessment scale versus the observational scale rating (Doloplus). All five scales are converted to a percentage to allow a direct comparison. Cases above the diagonal line correspond to situations in which self-assessment revealed a higher pain intensity than did observational assessment. Conversely, cases below the diagonal line represent situations in which self-assessment revealed a lower pain intensity than did observational assessment. *Wilcoxon signed-ranks test.

Acknowledgments

This study was supported by the ''fond de péréquation'' number 70949 of the University Hospital of Geneva.

Address correspondence to Sophie Pautex, CESCO, Department of Geriatrics, HUG, Ch. De la Savonnière 11, CH-1245 Collonge-Bellerive, Switzerland. E-mail: sophie.pautex@hcuge.ch

References

1. Fries BE, Simon SE, Morris JN, et al. Pain in U.S. nursing homes: validating a pain scale for the minimum data set. *Gerontologist*. 2001;41:173–179.
2. Mantyselka P, Kumpusalo E, Ahonen R, et al. Pain as a reason to visit the doctor: a study in Finnish primary health care. *Pain*. 2001;89:175–180.
3. Michel JP, Pautex S, Zekry D, Zulian G, Gold G. End-of-life care of persons with dementia. *J Gerontol Med Sci*. 2002;57A:M640–M644.
4. Brattberg G, Thorslund M, Wikman A. The prevalence of pain in a general population. The results of a postal survey in a county of Sweden. *Pain*. 1989;37:215–222.
5. Ferrell BA, Ferrell BR, Rivera L. Pain in cognitively impaired nursing home patients. *J Pain Symptom Manage*. 1995;10:591–598.
6. Ferrell BA. Pain evaluation and management in the nursing home. *Ann Intern Med*. 1995;123:681–687.
7. AGS panel on persistent pain in older persons. The management of persistent pain in older persons. *J Am Geriatr Soc*. 2002;50:S205–S224.
8. Bernabei R, Gambassi G, Lapane K. Management of pain in elderly patients with cancer. SAGE Study Group. *JAMA*. 1998;279:1877–1882.
9. Cramer GW, Galer BS, Mendelson MA, et al. A drug use evaluation of selected opioid and nonopioid analgesics in the nursing facility setting. *J Am Geriatr Soc*. 2000;48:398–404.
10. Herrmann FR, Mermod JJ, Henderson S, Michel JP. Epidemiology of dementia in Geneva. In: Michel JP, Hof PR, eds. *Management of Aging: the University of Geneva Experience*. Basel, Switzerland: Karger; 1999;30:94–100.
11. Hebert LE, Beckett LA, Scherr PA, Evans DA, et al. Annual incidence of Alzheimer disease in the United States projected to the years 2000 through 2050. *Alzheimer Dis Assoc Disord*. 2001;15:169–173.
12. Jorm AF, Korten AE, Henderson AS. The prevalence of dementia: a quantitative integration of the literature. *Acta Psychiatr Scand*. 1987; 76:465–479.
13. Scherder EJ. Low use of analgesics in Alzheimer's disease: possible mechanisms. *Psychiatry*. 2000;63:1–12.
14. Feldt S, Ryden M, Miles S. Treatment of pain in cognitively impaired compared with cognitively intact older patients with hip fracture. *J Am Geriatr Soc*. 1998;46:1079–1085.
15. Morrison RS, Siu AL. A comparison of pain and its treatment in advanced dementia and cognitively intact patients with hip fracture. *J Pain Symptom Manage*. 2000;19:240–248.
16. Kamel HK, Phlavan M, Malekgoudarzi B, et al. Utilizing pain assessment scales increases the frequency of diagnosing pain among

elderly nursing home residents. *J Pain Symptom Manage*. 2001;21: 450–455.
17. Krulewitch H, London MR, Skakel VJ, et al. Assessment of pain in cognitively impaired older adults: a comparison of pain assessment tools and their use by nonprofessional observationals. *J Am Geriatr Soc*. 2000;48:1607–1611.
18. Parmelee PA, Smith B, Katz IR. Pain complaints and cognitive status among elderly residents. *J Am Geriatr Soc*. 1993;41:517–522.
19. Hurley AC, Volicer BJ, Hanrahan PA, et al. Assessment of discomfort in advanced Alzheimer's patients. *Res Nurs Health*. 1992;15:369–372.
20. Lefebvre-Chapiro S. Collectif Doloplus. The Doloplus scale-evaluating pain in the elderly. *Eur J Palliat Care*. 2001;8:191–193.
21. Wary B. Doloplus-2, une échelle pour évaluer la douleur. *Soins gérontologie*. 1999;19:25–27.
22. Mulligan R, Jullierat Van der Linden AC, Di Pollina L. Evaluation and diagnosis at the memory clinic of Geneva. In : Michel JP, Hof PR, eds. *Management of Aging: the University of Geneva Experience*. Basel, Switzerland: Karger; 1999;30:113–123.
23. McKhan G, Drachman D, Folstein M, et al. Clinical diagnosis of Alzheimer's disease: report of the NINCDS-ADRDA Work Group under auspices of the Department of Health and Human Services Task Force on Alzheimer's disease. *Neurology*. 1984;34:939–940.
24. Roman GC, Tachemini TK, Erkinjuntti T, et al. Vascular-dementia: diagnostic criteria for research studies. Report of the NINDS-AIREN International Workshop. *Neurology*. 1993;43:250–260.
25. Morris JC. The Clinical Dementia Rating (CDR): current version and scoring rules. *Neurology*. 1993;43:2412–2413.
26. Charlson ME, Pompei P, Ales K, MacKenzie R. A new method of classifying prognostic co-morbidity in longitudinal studies: development and validation. *J Chron Dis*. 1990;40:373–383.
27. Jensen MP, Karoly P, Braver S. The measurement of clinical pain intensity: a comparison of six methods. *Pain*. 1986;27:117–126.
28. Tipladi B, Jackson SH, Maskrey VM, Swift C. Validity and sensitivity of visual analogue scales in young and older subjects. *Age Ageing*. 1998;27:63–66.
29. McGrath PA, Seifert CE, Speechley KN, et al. A new analogue scale for assessing children's pain: an initial validation study. *Pain*. 1996; 64:435–443.
30. Scherder EJ, Bouma A. Visual analogue scales for pain assessment in Alzheimer's disease. *Gerontology*. 2000;46:47–53.
31. Herr KA, Mobily PR, Kohaout FJ, Wagenaar D. Evaluation of the faces pain scale for use in the elderly. *Clin J Pain*. 1998;14:29–38.
32. Boureau F, Luu M, Doubrière JF. Comparative study of the validity of four French McGill Pain Questionnaire versions. *Pain*. 1992;50:59–65.
33. DOLOPLUS 2. Behavioral pain assessment scale for elderly subjects presenting with verbal communication disorders. Last update: 06/12/01. Available at: http://www.doloplus.com/versiongb/. Accessed March 12, 2003.
34. Mehta CR, Patel NR. A network algorithm for finding the exact significance levels of rxc tables. *J Am Stat Assoc*. 1983;78:427–434.
35. Landis JR, Koch GG. The measurement of observer agreement for categorical data. *Biometrics*. 1977;33:159–175.
36. McCormick WC, Kukill WA, Belle G, Bowen JD. Symptoms patterns and comorbidity in the early stages of Alzheimer's disease. *J Am Geriatr Soc*. 1994;42:517–521.

Received September 24, 2003
Accepted January 6, 2004
Decision Editor: John E. Morley, MB, BCh