Original Article

Adherence to Medication Guideline Criteria in Cancer Pain Management

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Abstract
The medication-assessment tool for cancer pain management (MAT-CP) is a novel tool for measuring the quality of drug use in chronic pain management in relation to guideline standards. MAT-CP has recently been revised and validated for use in the U.K. clinical setting. This article presents a measure of the adherence of current practice to specific cancer pain guideline criteria in two palliative care settings. Adult patients with malignant disease experiencing pain and/or receiving analgesics were identified by clinical pharmacists at two hospitals and five hospices in Scotland, United Kingdom. The MAT-CP was applied to data extracted from case notes. Results were quantified in terms of applicability and adherence to guideline criteria and the presence of insufficient data. MAT-CP was applied to 192 cancer patients experiencing pain; 103 (54%) were males and the mean (standard deviation) age was 68.5 (13.0) years. Overall guideline adherence was 75% (confidence interval [CI]: 74%, 77%; n = *3460 applicable criteria). Low adherence (<50%) was seen for nine criteria, whereas 21 criteria were considered high-adherence criteria (>75%). Overall adherences for 56 (29%) hospitalized patients and 136 (71%) hospice patients were 65% (CI: 62%, 68%) and 79% (CI: 78%, 81%), respectively. Although good overall guideline adherence was found, there were gaps in both the hospice and hospital palliative care settings in the implementation of certain treatment recommendations, particularly in relation to pain assessment. The application of the tool has highlighted issues for feedback to health care providers and for further study.* J Pain Symptom Manage 2009;37:1006–1018.
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Key Words
Cancer pain management, palliative care, quality of prescribing, pharmaceutical care, clinical audit

Introduction

Pain affects most of the patients with advanced malignant disease.[1] In the last two decades, there has been an increasing awareness of the importance of palliative care, in particular, the provision of adequate cancer pain relief.[2,3] Satisfactory pain relief is thought to be a realistic achievement with conventional

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analgesic drug therapy for up to 90% of cancer patients experiencing pain.[4] However, it is also generally agreed that adequate pain relief may be found to be suboptimum in cancer patients.[5–8]

Emphasis is being placed on the evaluation of health care services using quality indicators. However, traditional indicators frequently used to assess health care performance (e.g., length of stay) might not be readily measured and interpreted in a palliative care setting. Therefore, the adequacy of pain management has been suggested as a relevant performance marker for treatment of patients receiving palliative care.[9] As pharmacological management is the mainstay of cancer pain treatment,[10] adequacy of pain management can be related to appropriateness of analgesic prescribing. Inappropriate prescribing because of lack of patient-provider communication, insufficient knowledge of treatment strategies, or lack of translating knowledge into actual practice are important barriers to adequate pain relief.[11] Audits of cancer pain management have identified gaps between clinical practice and guideline recommendations and a potential for improvement in analgesic prescribing in various settings.[6,12–15] However, patient or caregiver variables that may be associated with low adherence to treatment guidelines remain to be systematically investigated.

The World Health Organization (WHO) has established pain management recommendations; however, their effectiveness remains somewhat controversial.[16,17] There is insufficient information about their level of implementation in routine practice, in part because of the lack of formal methods to assess guideline adherence.[18] Nevertheless, the WHO treatment principles are generally considered to have improved the provision of pain control, and are widely accepted as the main prescribing guide in cancer pain care pending an evidence-based alternative. Consequently, information about the adherence to these guidelines still needs to be sought.[9]

Based on WHO and other relevant clinical guidelines,[10,19] we have recently developed a medication-assessment tool for cancer pain management (MAT-CP), which addresses prescribing and prescribing-related issues.[18,20] Health care audits and subsequent feedback of findings to caregivers are recommended and have been shown to improve health care performance.[9,21] The use of this novel tool may facilitate improved medication use by helping practitioners discuss local practice with reference to treatment recommendations. Findings from applying MAT-CP to clinical data may help to quantify adherence to guidelines and pinpoint specific problematic areas that need to be presented to and discussed within the health care team. The tool, perhaps in an abbreviated form, also may be used for routine assessment of clinical practice.

The MAT-CP has recently been revised and validated for use in U.K. clinical settings, and satisfactory validity, reliability, and feasibility have been reported.[20] This article highlights the role of the MAT-CP as an audit tool, and illustrates how its findings can be interpreted in relation to quality of pain management. The aims of the present study were to audit current practice of pain management by applying the MAT-CP to adult cancer patients in two palliative care settings in Scotland, and to discuss the findings with the palliative care team at one of the investigated sites.

Methods

Patients and Settings

Patient data were collected retrospectively during two audit periods (February to April and August to September, 2006). Eligible patients were identified from a referral list to the palliative care team serving two hospitals (A), by staff nurses at different wards at these two sites, and by the research investigator or the palliative care pharmacists at five hospices (B). Participating sites were two hospitals (440 and 1000 beds) providing a range of educational, general hospital, regional and national acute clinical services, and five hospices with an average of 15 (range 8–35) inpatient beds. The hospices offer symptom relief and/or end-of-life care by specialist multidisciplinary teams to patients with life-threatening disease, primarily cancer patients.

Patients were eligible if they were adults admitted to one of the participating sites for more than one day, had cancer, experienced pain, and/or were on analgesics. Only information already recorded in the patients' medical notes were documented. Information regarding pain and pain management from the last admission was extracted from patient

hospital records using a specially designed data collection form to generate consistent patient profiles. Data from the first audit period were used to validate the U.K. tool.[20]

The General Structure of the Medication-Assessment Tool for Cancer Pain Management

The revised MAT-CP for use in the U.K. is based on international and national guidelines for cancer pain management.[10,19] The tool comprises 37 criteria (Appendix), which are grouped under six subheadings covering different aspects of pain management: pain assessment, start of strong opioid therapy, current continuous analgesia, current intermittent analgesia, follow-up of therapy, and other care issues. Each criterion consists of two statements, a qualifier (q) followed by an audit standard (s). The former is a statement to determine whether the criterion applies to the patient and indicates that the standard is appropriate to be tested in that patient. The latter is a statement of the guideline recommendation and requires a "yes" or "no" response on the basis of evidence that the standard is being met. If nonadherence is justified because of patient-specific characteristics (e.g., contraindication), this is recorded as "no justified" (N_j). Inappropriate applicability of the criterion to the patient is indicated with "not applicable" (NA). Missing information ("insufficient data" [ID]) is recorded as affecting the application of the qualifier (ID_q) or the standard (ID_s). Instructional guidelines on the application of the MAT-CP have been generated to ensure consistent interpretation and application by researchers. The MAT-CP is intended to be applied to case records, and it can be used as a tool to estimate adherence to defined clinical guidelines.[20]

Audit of Pain Management

The criteria of the U.K. version of MAT-CP were applied to patient profiles. Results were obtained in terms of percent applicability of criteria, insufficient data, and adherence to guidelines (overall, per patient and to individual criteria). Adherence was also calculated for subgroups of patients based on site of recruitment, age (<70 and ≥ 70 years), gender, and disease stage (metastatic or locally confined).

To complete the audit loop, feedback of the findings was provided to practicing professionals in the field of palliative care. The MAT-CP adherence findings were presented and discussed within two focus groups consisting of 15 pharmacists from the Scottish Palliative Care Pharmacists' Association (SPCPA), and 15 palliative care medical and nursing staff at one of the participating hospices, respectively.

Statistics

Quantitative data were managed and analyzed using Microsoft® Office Excel 2003, Microsoft Corporation (Norway) and SPSS 14.0 for windows, SPSS Inc. (Norway). Adherence to the guideline recommendations was calculated for each criterion and for the MAT-CP overall by summing the "yes" responses to the standard and expressing them as a percentage of the total number of applicable criteria. The denominator in the calculation excluded those affected by an ID_q and included those affected by an ID_s. The prevalence of ID_s, therefore, contributed to the "no" response and must be taken into account in any interpretation of low adherence. Similarly, justified causes of nonadherence (N_j) also contribute to the "no" response. A 95% confidence interval (CI) was calculated for the adherence data based on the number of applicable cases (criterion analysis, $n = 3460$) or the number of patients (patient analysis, $n = 192$). For interpretation of findings, a clinically significant difference in adherence between subgroups of patients was arbitrarily set at $\pm 10\%$. Statistically significant nonadherence and adherence differences were interpreted as $P < 0.05$, calculated using a *t*-test, the Wilcoxon rank sum test, significance test for two proportions, and Chi-squared statistics or, where appropriate, Fisher's exact test.

Ethics

The study was approved by the medical directors, consultants, and palliative care pharmacists at participating sites. The project protocol was reviewed by the relevant National Health Service Local Research Ethics Committee. Data were anonymously extracted from medical records by staff with honorary health service appointments. The data collection was conducted without altering usual practice and with confidentiality maintained; hence, the committee did not consider patient consent as necessary.

Results

Patient Characteristics

Pain management in a total of 192 patients was audited. Patient characteristics are given in Table 1. A recent record of measured pain intensity was found for 73 (38.0%) patients. Of these, 59 (80.8%) and 14 (19.2%) patients reported moderate/severe or mild/moderate pain, respectively. The pain intensity was measured using different methods, either patients' self-reported pain (mostly numeric rating scales [NRS]) or health personnel-graded patients' perceived pain (without the use of formal methods) was recorded. Fifty-six (29.2%) and 136 (70.8%) patients were admitted to hospitals (A) and hospices (B), respectively.

Table 1
Demographic Data for Cancer Inpatients ($n = 192$)

Patient Characteristics	Site of Recruitment		Total
	Hospital	Hospice	
General characteristics			
Number of patients	56	136	192
Gender (%)			
Male	34 (60.7)	69 (50.7)	103 (53.6)
Female	22 (39.3)	67 (49.3)	89 (46.4)
Age (years)			
Mean (SD)	69.9 (12.7)	67.9 (13.1)	68.5 (13.0)
Median (IQR)	71 (9.5)	70 (15.0)	71 (13.0)
Range (min, max)	69 (29, 98)	71 (26, 97)	72 (26, 98)
Total number of analgesics, *n* (%)			
Mean (SD)	3.1 (1.3)	2.5 (1.0)	2.7 (1.2)
Median (IQR)	3 (2)	2 (1)	3 (1)
Range (min, max)	6 (1, 7)	5 (1, 6)	6 (1, 7)
WHO analgesic ladder, *n* (%)			
0—no analgesics BTC	3 (5.4)	3 (2.2)	6 (3.1)
1—nonopioid	9 (16.1)	5 (3.7)	14 (7.3)
2—weak opioid	10 (17.9)	7 (5.1)	17 (8.9)
3—strong opioid	34 (60.7)	121 (89.0)	155 (80.7)
Cancer diagnosis,[a] *n* (%)			
Hematological	3 (4.9)	3 (2.1)	6 (3.0)
Solid tumors	58 (95.1)	137 (97.9)	195 (97.0)
Prostate	3 (5.2)	12 (8.8)	15 (7.7)
Breast	3 (5.2)	14 (10.2)	17 (8.7)
Gynecological	3 (5.2)	9 (6.6)	12 (6.2)
Gastrointestinal	6 (10.3)	20 (14.6)	26 (13.3)
Lung	21 (36.2)	36 (26.3)	57 (29.2)
Other	21 (36.2)	45 (32.8)	66 (33.8)
Unknown primary site	1 (1.7)	1 (0.7)	2 (1.0)
Metastatic disease	36 (64.3)	94 (69.1)	130 (67.7)

SD = standard deviation; IQR = interquartile range; BTC = by-the-clock.
[a]Some patients had more than one cancer diagnosis.

Audit of Pain Management

The overall guideline adherence as measured by MAT-CP was 75.4% (CI: 73.9%, 76.8%) for $n = 3460$ criteria applied (Table 2). Twenty-one criteria were categorized as high-adherence criteria (>75%), seven criteria as intermediate-adherence criteria (50−75%), and nine criteria as low-adherence criteria (<50%). The overall adherences to guideline recommendations in 56 hospital patients and 136 hospice patients were 65.0% (CI: 62.0%, 68.0%) and 79.3% (CI: 77.7%, 80.9%), respectively. No major adherence differences were seen for the other subgroups investigated.

When adherence findings were analyzed on a per-patient basis, 106 (55.2%) patients fell in the high-adherence range (mean: 85.8%; CI: 84.4%, 87.2%; standard error [SE]: 0.7), 81 (42.2%) in the intermediate-adherence range (mean: 64.6%; CI: 62.9%, 66.3%; SE: 0.8), and only five (2.6%) in the low individual-adherence range (mean: 40.0%; CI: 36.5%, 43.5%; SE: 1.8). Because the number of patients in the low-adherence group was so small, only the high- and intermediate-adherence groups were compared. A lower proportion of hospital patients was found in the high-adherence group (17 out of 56 [30.4%] vs. 89 out of 136 [65.4%]; $P < 0.0001$), with a correspondingly higher proportion of hospital patients in the intermediate-adherence group (34 out of 56 [60.7%] vs. 47 out of 136 [34.6%]; $P < 0.002$). Adherences and numbers of nonadherences ("no" responses) found in the two settings are compared in Fig. 1a and b.

Further detailed analysis was conducted on a per-criterion basis. Low and intermediate adherence for the total study sample affected criteria relating to pain assessment (Criteria 1−3, 5, and 6), start of opioid treatment (Criteria 7−11), current continuous analgesia (Criteria 12 and 16), pain therapy follow-up (Criterion 24), and other care issues (Criteria 35−37). The highest adherence (>75%) was seen for criteria relating to: pain assessment (Criterion 4); continuous analgesia (Criteria 13−15, 17); intermittent analgesia (Criteria 18−23); follow-up of therapy, that is, criteria addressing adverse effects of analgesic drugs (Criteria 25−30); and other care issues, that is, adjuvant analgesics (Criteria 33) and treatment of symptoms that may affect the patients' pain experience (Criteria 31, 32, and 34).

Table 2
Measured Adherence to MAT-CP Guideline Criteria ($n = 3460$ Total Applicable Criteria) in 192 Cancer Patients

		Applicable Cases	Insufficient Data[a]		Adherence[b]	
Criterion Focus		No. (%)	ID_q (%)	ID_s (%)	No. (%)	95% CI
Pain assessment documented in admission notes						
1	Analgesic drugs	133 (69.3)	0 (0)	0 (0)	84 (63.2)	(55.0, 71.4)
2	Pain intensity[c]	133 (69.3)	0 (0)	0 (0)	43 (32.3)	(24.4, 40.3)
3	Duration of pain	132 (68.8)	0 (0)	0 (0)	82 (62.1)	(53.8, 70.4)
4	Location of pain	132 (68.8)	0 (0)	0 (0)	121 (91.7)	(87.0, 96.4)
5	Subjective characteristics	132 (68.8)	0 (0)	0 (0)	58 (43.9)	(35.5, 52.4)
6	Etiology	133 (69.3)	0 (0)	0 (0)	30 (22.6)	(15.5, 29.7)
	Subtotal (6 criteria)	795 (69.0)	0 (0)	0 (0)	418 (52.6)	(49.1, 56.0)
Start of continuous opioid therapy during current admission						
7	Pain intensity assessed before start[c]	48 (25.0)	0 (0)	0 (0)	12 (25.0)	(12.8, 37.3)
8	Normal-release preparation preferred	28 (14.6)	0 (0)	0 (0)	10 (35.7)	(18.0, 53.5)
9	Initial standard dose	14 (7.3)	0 (0)	0 (0)	10 (71.4)	(47.8, 95.1)
10	Pain intensity assessed after start[c]	23 (12.0)	0 (0)	0 (0)	4 (17.4)	(1.9, 32.9)
11	Not on morphine; had morphine first	15 (7.8)	0 (0)	0 (0)	6 (40.0)	(15.2, 64.8)
	Subtotal (5 criteria)	128 (13.3)	0 (0)	0 (0)	42 (32.8)	(24.7, 40.9)
Current continuous analgesia						
12	On nonopioids: adequate pain relief[c]	18 (9.4)	0 (0)	1 (5.6)	13 (72.2)	(51.5, 92.9)
13	WHO ladder drug combinations	139 (72.4)	0 (0)	0 (0)	123 (88.5)	(83.2, 93.8)
14	Dose of WHO Step 1 or 2 analgesics	150 (78.1)	0 (0)	0 (0)	143 (95.3)	(92.0, 98.7)
15	Dosing interval within range	183 (95.3)	0 (0)	0 (0)	182 (99.5)	(98.4, 100)
16	Reason for nonoral route documented	72 (37.5)	0 (0)	0 (0)	54 (75.0)	(65.0, 85.0)
17	If stable, slow-release preparation preferred	55 (28.6)	0 (0)	0 (0)	49 (89.1)	(80.9, 97.3)
	Subtotal (6 criteria)	617 (53.6)	0 (0)	1 (0.2)	564 (91.4)	(89.2, 93.6)
Current intermittent analgesia						
18	Intermittent pain: PRN prescribed	8 (4.2)	0 (0)	0 (0)	8 (100)	(100)
19	Moderate/severe pain: PRN prescribed	143 (74.5)	37 (19.3)	0 (0)	143 (100)	(100)
20	Strong opioid for BTP: PRN prescribed	144 (75.0)	0 (0)	0 (0)	144 (100)	(100)
21	BTP: normal-release preparation preferred	144 (75.0)	0 (0)	0 (0)	144 (100)	(100)
22	BTP: nominal minimum dose exceeded	144 (75.0)	0 (0)	1 (0.7)	111 (77.1)	(70.2, 83.9)
23	BTP: intensity of PRN use not exceeded	173 (90.1)	0 (0)	1 (0.6)	160 (92.5)	(88.6, 96.4)
	Subtotal (6 criteria)	756 (65.6)	37 (3.2)	2 (0.3)	710 (93.9)	(92.2, 95.6)
Follow-up of pain therapy—current admission						
24	Pain intensity record[c]	184 (95.8)	0 (0)	0 (0)	57 (31.0)	(24.3, 37.7)
25	Opioid side effects addressed	161 (83.9)	0 (0)	0 (0)	141 (87.6)	(82.5, 92.7)
26	Opioid coprescribed with laxatives	178 (92.7)	0 (0)	2 (1.1)	134 (75.3)	(68.9, 81.6)
27	Mouth care	72 (37.5)	0 (0)	0 (0)	65 (90.3)	(83.4, 97.1)
28	NSAID-induced GI effect risk assessment	32 (16.7)	6 (3.1)	0 (0)	30 (93.8)	(85.4, 100)
29	NSAID-induced GI effect managed	15 (7.8)	18 (9.4)	0 (0)	14 (93.3)	(80.7, 100)
30	Prescribed analgesic tolerated	12 (6.3)	0 (0)	0 (0)	11 (91.7)	(76.0, 100)

(*Continued*)

Table 2
Continued

Criterion Focus		Applicable Cases	Insufficient Data[a]		Adherence[b]	
		No. (%)	ID_q (%)	ID_s (%)	No. (%)	95% CI
	Subtotal (7 criteria)	654 (48.7)	24 (1.8)	2 (0.3)	452 (69.1)	(65.6, 72.7)
Other care issues—current admission						
31	Treatment of nausea/ vomiting	111 (57.8)	0 (0)	0 (0)	109 (98.2)	(95.7, 100)
32	Treatment of sleep disturbance	95 (49.5)	0 (0)	0 (0)	93 (97.9)	(95.0, 100)
33	Treatment of neuropathic pain	41 (21.4)	6 (3.1)	1 (2.4)	34 (82.9)	(71.4, 94.4)
34	Treatment of anxiety/ depression	114 (59.4)	0 (0)	0 (0)	114 (100)	—
35	Painful bone metastases: radiation therapy	58 (30.2)	1 (0.5)	16 (27.6)	32 (55.2)	(42.4, 68.0)
36	Coprescribing: bisphosphonates	59 (30.7)	1 (0.5)	18 (30.5)	22 (37.3)	(24.9, 49.6)
37	Coprescribing: hormone therapy	32 (16.7)	13 (6.8)	3 (9.4)	18 (56.3)	(39.1, 73.4)
	Subtotal (7 criteria)	510 (37.9)	21 (1.6)	38 (7.5)	422 (82.7)	(79.5, 86.0)
Total for 37 criteria		3460 (48.7)	82 (1.2)	43 (1.2)	2608 (75.4)	(73.9, 76.8)

BTP = breakthrough pain; NRS = numerical rating scale; NSAID = nonsteroidal anti-inflammatory drug; GI = gastrointestinal; PRN = pro re nata (as needed).
[a]ID_q: insufficient data to decide whether the criterion qualifier is met (% of assessed criteria); ID_s: insufficient data to decide whether the criterion's standard is met (% of applicable criteria).
[b]The number of N_j (justified cause of nonadherence) was low ($n = 33$) and mainly affected Criteria 24, 26, and 34 (15 out of 33). CI containing values of zero or less are not reported.
[c]Criteria 2, 7, 10, and 24 relate to the use of formal pain intensity measures (e.g., NRS). Adequate pain relief (Criteria 12) is defined as no or mild pain (e.g., ≤4 on a 11-point NRS).

In 33 cases, the lack of adherence was justified (e.g., by a contraindication). This justified cause of nonadherence mainly affected Criteria 24, 26, and 33 (four, five, and six N_j responses, respectively). The applicability of these three criteria was good, and in general, the effect of the N_j responses on adherence findings was of minor importance.

The adherence differences between the two settings seen for the overall criteria and for nine individual criteria (Criteria 1–3, 5–8, 12, 32, and 37) were both clinically and statistically significant (Table 3). Twenty-five criteria were categorized as high-, five as intermediate-, and seven as low-adherence criteria in the hospice setting. In the hospital setting, there were 19 high-, six intermediate-, and 12 low-adherence criteria. Criteria related to continuous and intermittent analgesia and pain therapy follow-up were highly adhered to in both hospices and hospitals. Two important exceptions were Criteria 12 and 24, relating to adequate pain relief on nonopioids and recording of pain intensity, respectively; however, the former was affected by a low applicability because of small patient numbers. Higher adherences of criteria relating to treatment of nausea and sleep disturbances, and for coprescribing of hormone therapy were found in hospices.

Completeness of Data

The prevalences of ID_s and ID_q responses were both at an acceptable low level (1.2%) compared with the number of applicable and total criteria, respectively. The ID_s responses were scattered among seven individual criteria, mainly Criteria 35 and 36, relating to the use of radiation and bisphosphonate treatment, respectively, of patients with painful bone metastases. Likewise, the ID_q responses affected seven criteria, mainly Criteria 19, 29, and 37, relating to intermittent analgesic use, management of nonsteroidal anti-inflammatory drug-induced gastrointestinal side effects, and endocrine therapy, respectively.

Feedback from Focus Groups

The audit findings were presented to two focus groups of palliative care professionals. They pointed out some issues regarding the content of MAT-CP, mainly related to the wording of Criteria 35 and 36, and reasons for why some clinical guidelines might not be adhered to (e.g., time constraints, individual drug response, site variations regarding preferred

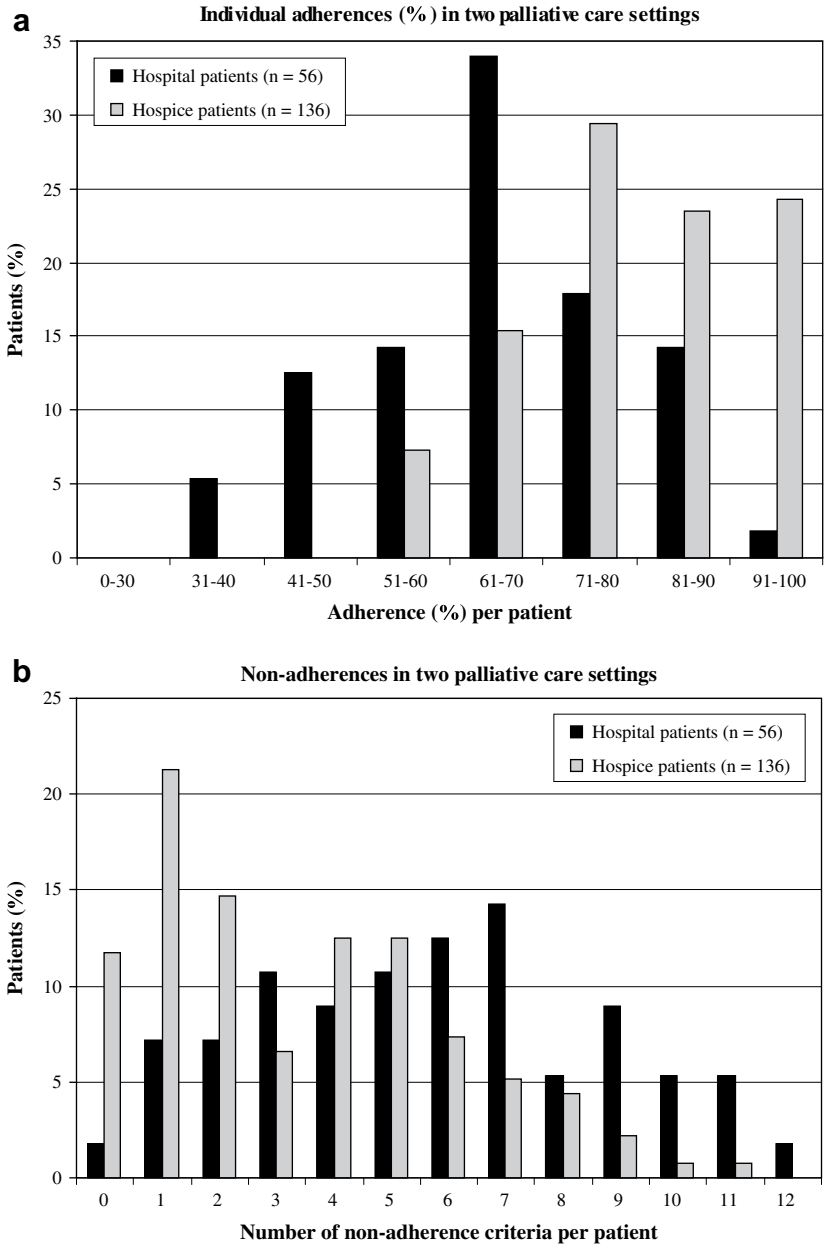

Fig. 1. a) Distribution frequency of percent adherences per patient in the two palliative care settings investigated. Mean adherence in the hospital group was 65.0% (CI: 62.0%, 68.0%) compared with 79.3% (CI: 77.7%, 80.9%) in the hospice group (*t*-test, $P < 0.001$). b) Distribution frequency of nonadherences per patient in the two palliative care settings investigated. Median (interquartile range) number of nonadherences per patient in the hospital and hospice were 6 (3, 8) and 3 (1, 5), respectively (Wilcoxon rank sum test, $P < 0.001$). Mean (standard deviation) number of nonadherences per patient in hospital and hospice were 5.8 (3.0) and 3.3 (2.6), respectively (*t*-test, $P < 0.001$).

drug). There was general agreement among the group participants that, although a time-consuming activity, regular pain assessment is beneficial for pain therapy follow-up. They pointed out that although formal methods (mainly 11-point NRS) were frequently used to assess pain, the measurement was not regularly documented, possibly because of time constraints or lack of awareness of the importance of systematic documentation. They also expressed surprise over measured adherence to Criterion 33 (treatment for neuropathic pain), which they expected to be even higher.

Table 3
Comparison of Adherence Findings for 56 Hospital Patients (A) and 136 Hospice Patients (B)[a]

		Applicable Cases A	Applicable Cases B	Adherence A		Adherence B			
Criterion Focus		*n* (%)	*n* (%)	*n* (%)	95% CI	*n* (%)	95% CI	Diff.[b]	*P*[c]
Pain assessment documented in admission notes									
1	Analgesic drugs	41 (73.2)	92 (67.6)	11 (26.8)	13.3, 40.4	73 (79.3)	71.1, 87.6	−52.5	<0.001
2	Pain intensity	41 (73.2)	92 (67.6)	6 (14.6)	3.8, 25.5	37 (40.2)	30.2, 50.2	−25.6	<0.005
3	Duration of pain	41 (73.2)	91 (66.9)	19 (46.3)	31.1, 61.6	63 (69.2)	59.7, 78.7	−22.9	<0.025
5	Subjective characteristics	41 (73.2)	91 (66.9)	11 (26.8)	13.3, 40.4	47 (51.6)	41.4, 61.9	−24.8	<0.01
6	Etiology	41 (73.2)	92 (67.6)	3 (7.3)	—	27 (29.3)	20.0, 38.7	−22.0	<0.005
	Subtotal (6 criteria)	246 (73.2)	549 (67.3)	87 (35.4)	29.4, 41.3	331 (60.3)	56.2, 64.4	−24.9	<0.001
Start of opioid therapy during current admission									
7	Pain intensity assessed before start	24 (42.9)	24 (17.6)	3 (12.5)	—	9 (37.5)	18.1, 56.9	−25.0	<0.05
8	Normal-release preparation preferred	17 (30.4)	11 (8.1)	2 (11.8)	—	8 (72.7)	46.4, 99.0	−60.9	<0.001
	Subtotal (5 criteria)	58 (20.7)	70 (10.3)	9 (15.5)	6.2, 24.8	33 (47.1)	35.4, 58.8	−31.6	<0.001
Current continuous analgesia									
	Subtotal (6 criteria)	176 (52.4)	441 (54.0)	159 (90.3)	86.0, 94.7	405 (91.8)	89.3, 94.4	−1.5	NS
Current intermittent analgesia									
	Sub total (6 criteria)	336 (53.9)	575 (70.5)	170 (93.9)	90.4, 97.4	540 (93.9)	92.0, 95.9	0	NS
Follow-up of pain therapy—current admission									
	Sub total (7 criteria)	177 (45.2)	477 (50.1)	110 (62.1)	55.0, 69.3	342 (71.7)	67.7, 75.7	−9.6	<0.01
Other care issues—current admission									
31	Treatment of nausea/vomiting	28 (50.0)	83 (61.0)	26 (92.9)	83.3, 100	83 (100)	—	−7.1	<0.025
32	Treatment of sleep disturbance	20 (35.7)	75 (55.1)	18 (90.0)	76.9, 100	75 (100)	—	−10.0	<0.01
37	Coprescribing: hormone therapy	9 (16.1)	23 (16.9)	3 (33.3)	2.5, 64.1	15 (65.2)	45.8, 84.7	−31.9	<0.05
	Subtotal (7 criteria)	108 (27.6)	402 (42.2)	80 (74.1)	65.8, 82.3	342 (85.1)	81.6, 88.6	−11	<0.001
Total criteria		946 (45.7)	2514 (50.0)	615 (65.0)	62.0, 68.0	1993 (79.3)	77.7, 80.9	−14.3	<0.001

[a]Only subtotals and statistically significant differences for individual criteria are shown.
[b]Arbitrary clinically relevant difference (diff.) is ±10%.
[c]Statistically significant difference in adherence findings was calculated using Chi-squared statistics and Fisher's exact test. $P \geq 0.05$ is judged as not significant (NS).

Discussion

Adherence Findings

Overall, measured adherence to guideline criteria was good (intermediate to high). The findings indicate that issues related to pain management prescribing, as measured using MAT-CP, are well taken care of in the study sample investigated. The high overall adherence may, in part, be explained by considering the characteristics of the settings. Most of the patients studied received care from palliative care pharmacists, and they were all identified at specialist health care services where health personnel are likely to be experienced with treatment of cancer patients. However, a potential for improvement in adherence to some of the individual criteria was identified.

Because of a poor correlation between patient- and caregiver-perceived pain intensity, the regular use of patient-administered pain scales is recommended. The use of pain scales may contribute to an overall improvement in analgesic therapy by increasing the health professionals' appreciation of pain as a problem in individual patients.[22–24] Thus, the MAT-CP addresses documentation of pain severity. Preferably, pain severity should be recorded on a regular basis (Criterion 24; 31%), because pain is not a static phenomenon, but tends to change over time.[1,10] Reassessment after treatment interventions is necessary to evaluate if further treatment modifications are needed.[10] Thus, particular care in documenting patient outcomes should be taken when adjusting the analgesic treatment

regimen (Criterion 7, 25% and Criterion 10, 17%). Similarly, at admission, the patient should receive a complete assessment to obtain all the information necessary to evaluate the patient's pain management (Criteria 1–6). As emphasized by Grond et al., such a systematic and thorough initial assessment of pain is essential for treatment success.[25] However, there was very little evidence of the systematic use of formal instruments to assess pain in the present study, and patient assessments were frequently incomplete according to the documentation. These findings are consistent with previous reports of inadequate documentation of pain assessment.[24,26–28] For example, Cohen et al.[26] reviewed the medical records of in- and outpatients suffering from cancer pain with respect to documentation of pain assessment and management. Pain intensity was recorded for only 53% and 57% of patients, respectively. Furthermore, reassessment after treatment interventions was apparently not routinely performed for these patients.[26]

The other criteria under the subheading "start of strong opioid therapy" (Criteria 8 and 11) also showed low adherence (36% and 40%, respectively). However, it is difficult to draw any firm conclusions regarding adherence for this subgroup of criteria, because of the criteria's low applicability.

The highest adherence was seen for criteria relating to continuous analgesic drugs and those relating to intermittent pain. Patients need to receive appropriate analgesic treatment in a proactive manner based on the degree of pain they experience.[10] However, although patients on by-the-clock analgesia received the recommended analgesic combination regimens without exceeding maximum dose and dose interval (Criteria 13, 14, 15, 17), some patients received analgesics corresponding to an inappropriate step of the WHO ladder (Criterion 12). Such inappropriate use of the analgesic ladder is a common problem in cancer pain management.[6,12,29]

The assessment tool addresses the (prophylactic) treatment of side effects that are frequently associated with analgesic use (e.g., constipation, nausea). As such symptoms may be significant causes of noncompliance, and hence, treatment failure,[30–33] they should be adequately addressed. The criteria related to the prevention or treatment of adverse effects was highly adhered to in the present investigation. However, adherence to Criterion 26 (prophylactic laxative treatment) was 75%, thus indicating a potential for improvement in the prevention of opioid-induced constipation. A need to improve coprescription of laxatives in both primary and secondary care has previously been described.[14,34]

Although Criterion 33 was considered a high-adherence criterion, the focus group clinicians expected its adherence to be even higher. However, neuropathic pain may, in some cases, respond to opioids.[35] Furthermore, it is important to consider the cases of justified nonadherence (steroid treatment required), which affected the apparent adherence findings.

It is reasonable to estimate that approximately one in three cancer patients experience neuropathic pain.[35,36] In contrast, Criterion 33 was applicable to one in five of patients in the present study. Complaints, such as burning pain or allodynia, were sometimes found in medical records, without the pain being explicitly identified as neuropathic. Thus, even though pain classification based on quality descriptors alone is debatable,[37] the applicability of Criterion 33 might have been underestimated.

Bone pain is considered the single most common type of pain.[1] The adherence to criteria regarding adjuvant analgesic treatment for painful bone metastasis (Criteria 35–37) was in the range of 37–56%. The focus groups pointed out that a distinction of the clinical guidelines should be taken into consideration when interpreting Criterion 36 (coprescribing of bisphosphonates). According to one guideline, bisphosphonate treatment should be considered for patients with multiple myeloma or breast cancer who have pain because of metastatic bone disease, whereas bisphosphonates should only be used within clinical trials for painful bone metastases owing to other neoplasms.[19]

The audit feedback provided to health personnel had two main purposes. First, their response to the findings was used to further evaluate the tool's face and content validity,[20] and to interpret the audit findings. Second and most important, the use of MAT-CP is intended to inform caregivers of gaps between clinical practice and guidelines. Although the use of such audit reports is recommended and has been shown to improve health care performance,[9,21] increased awareness of problems

does not automatically imply improved practice. Thus, this process preferably should be accompanied by other interventional strategies in future audits of pain management.

Comparison of the Hospital and Hospice Settings

As one might expect, a significant higher overall guideline adherence was seen for patients admitted to hospices compared with hospitalized patients, which indicates a true difference in clinical practice between these two settings. Lin found that hospice patients reported significantly lower level of pain intensity and higher satisfaction with pain management, as compared with hospitalized cancer patients.[38] One can assume that in hospices, the main focus is on palliation, and consequently, adequate management of pain, which is one of the most important aspects of palliative care. This is in contrast to the situation in hospitals, where patients might be assumed to be admitted for additional reasons other than symptom relief and end-of-life care. The hospice patients in the present study were seen by palliative care specialists at admission, whereas in hospitals, the patients might be referred to a specialist palliative care team only at a later time. The supposedly higher level of clinician experience with symptom management is another factor that may contribute to improved guideline adherence and symptom relief in hospices.[38] However, the hypothesis that hospices offer better pain care compared with other settings (hospitals, primary care) remains to be investigated further.[9,38,39]

The high adherence seen for several criteria in the hospice setting was, in most cases, accompanied by an acceptable level of applicability, which strongly implies that high-quality care as measured by MAT-CP is provided by the hospices investigated. It seems that pain assessments overall are done in a more systematic manner and that criteria relating to "start of opioid therapy" is more frequently adhered to in the hospice setting than in the hospital setting. However, gaps between guidelines and clinical practice in the hospices also were seen, and there was relatively poor evidence of routine pain assessment in both settings.

The focus groups emphasized that, in general, the patients with more severe problems are admitted to the hospices. Thus, deviations from guideline recommendations can be appropriate for some of these patients, for example, because of patients' (drug) preferences or treatment failure on conventional therapy. However, if deviations from the guidelines are justified by a documented patient-specific condition, this justification is automatically recorded in MAT-CP and can be considered when interpreting findings.

Limitations

The data were retrospectively extracted from patients' medical records. Thus, although a valid and reliable audit tool,[20] the MAT-CP was somewhat dependent on the quality of data recorded in medical notes. The investigators had to rely on clinical documentation for recent information on pain severity. This information was not sufficient to investigate any potential correlations between low adherence and poor pain control in terms of pain severity. Furthermore, although no information was available regarding the patients' cognitive function, one can assume that caregiver-rated pain frequently may be based on observation of patients' pain behavior, which confers some uncertainty to the pain ratings.[40]

Practical considerations and the somewhat labor-intensive manual data collection resulted in a relatively low number of audited patients. The audit would have benefited from a larger study sample, in particular, for analysis of patient subgroups, as most of the patients investigated were treated at hospices. Low numbers of patients being audited affects the applicability, which in turn results in variable adherence or presumably high-adherence findings for individual criterion. The low applicability found for some criteria may, in part, be explained by the audit period chosen (e.g., Criteria 7–11 relating to start of opioid therapy during current admission)[20] or the characteristics of the patients investigated. For example, advanced disease is more frequently accompanied by moderate to severe rather than mild pain, and constant rather than intermittent pain, thus affecting applicability of both Criterion 12 (pain relief with nonopioids) and Criterion 18 (analgesia when required for intermittent pain). Nevertheless, the audit findings have helped to identify important trends and do raise several questions for further study.

Conclusion and Future Implications

The overall level of adherence calculated indicates an intermediate to high level of adherence to guideline recommendations. However, there is a potential for improvement of adherence to specific individual criterion: 1) especially for criteria related to pain assessment, which is crucial for providing satisfactory pain relief; and 2) pain management in the hospital setting. Clinical interpretation and proposals for changes in practice have been considered in the feedback of findings to medical staff. The MAT-CP is suitable for performing similar audits to further investigate cancer pain guideline adherence, including potential differences in clinical practice between various health care settings.

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Appendix

Definitions of the 37 Explicit Criteria in the Medication Assessment Tool for Cancer Pain Management[20] Based on the Existing Evidence Base for Cancer Pain Management[10,19]

Qualifying Statement	Standard
Current admission: Pain assessment	
Patient who has received a pain review under inpatient/ambulatory care	Has documented information about:
1	• Analgesic drugs
2	• Pain intensity (*specify method*)
3	• Duration
4	• Location
5	• Subjective characteristics (e.g., stabbing, burning)
6	• Etiology (e.g., neuropathic)
Current admission: Start of continuous strong opioid[a] therapy	
7 Patient, who has received a strong opioid during the current admission	Had his/her pain intensity measured before start of treatment
8 Patient who has received a slow-release strong opioid during the current admission	Was initially started on an oral normal-release preparation
9 Patient started on oral normal-release morphine and without an indication for a reduced dose	Was initially started on 20–60 mg over 24 hours in divided doses
10 Patient started on an oral normal-release preparation of a strong opioid	Has had his/her pain intensity measured within 24–72 hours and the dose adjusted accordingly

(*continued*)

Appendix
(continued)

Qualifying Statement	Standard
11 Patient receiving an oral/injectable strong opioid that is not morphine	Was first tried on morphine
Identify current medication regimens intended to provide continuous analgesia	
12 Patient with pain and receiving no analgesics other than salicylate, acetaminophen (paracetamol), or NSAID	Reports satisfactory pain control
13 Patient receiving more than one analgesic	Is not being treated with a disallowed combination according to the WHO ladder (*specify disallowed combinations*)
14 Patient receiving first- or second-step analgesics (salicylate, acetaminophen [paracetamol], NSAID, weak opioids)	Has been prescribed them without exceeding the maximum recommended doses stated in The British National Formulary
15 Patient currently on continuous analgesia	Has no analgesic that is prescribed beyond its maximum dosing interval
16 Patient on nonoral analgesic medication	Has a documented reason for why the oral route is not preferred (*specify the nonoral route and the reason*)
17 Patient on stable strong opioid analgesic dose (i.e., same product, dose and dose interval for ≥7 days)	Is either 1) receiving an oral slow-release preparation twice a day; or 2) a dermal slow-release preparation
Identify current medication regimens intended to provide analgesia for intermittent pain	
18 Patient who is not on regular analgesia and who is experiencing episodic pain	Is prescribed analgesia PRN (i.e., on an "as needed" basis)
19 Patient with moderate/severe pain	Is prescribed PRN analgesia
20 Patient receiving	Is prescribed the BTP opioid PRN
21 strong opioid analgesics	Is prescribed a normal-release preparation for the BTP
22 for regular and for BTP	Is prescribed a dose corresponding in "*morphine equivalents*" to no less than 1/6 of the total daily strong opioid dose used for continuous analgesia
23 Patient prescribed a strong opioid analgesic for BTP	Is not taking 3 or more doses per day over a period ≥2 days
Current admission: Follow-up of pain therapy and therapy-related care issues	
24 Patient on regular analgesics	Has a follow-up record of formal assessment of pain intensity
25 Patient receiving an opioid analgesic and experiencing dry mouth, GI and/or CNS effects	Is having those effects addressed
26 Patient receiving an opioid analgesic	Is prescribed a laxative unless contraindicated
27 Patient with known mouth problems	Is having those problems addressed
28 Patient on long-term NSAID	Has been assessed for need for prophylaxis against GI complications
29 Patient on long-term NSAID and with known GI complications	Is prescribed a proton pump inhibitor
30 Patient with documented intolerance to a specific analgesic	Has not been prescribed the analgesic in question (*specify intolerance*)
Current admission: Other care issues	
31 Patient with recorded episodes of nausea/vomiting	Has had this complication addressed by changes or additions to his/her pharmacological treatment
32 Patient with recorded episodes of sleep disturbance	Has had this complication addressed by changes or additions to his/her treatment
33 Patient with neuropathic pain[b]	Is, unless contraindicated, either receiving 1) a TCA and/or an anticonvulsant; or 2) has had a trial of these drugs
34 Patient on chronic analgesia and diagnosed with symptoms of anxiety/depression	Is assessed for need for treatment of these symptoms
35 Patient receiving analgesia for bone metastases	Is assessed for need for radiation therapy
36 Patient receiving analgesia for bone metastases or multiple myeloma	Is assessed for need for treatment with bisphosphonate unless contraindicated
37 Patient on analgesics and having a hormone-sensitive tumor	Is assessed for need for hormone treatment

NSAID = nonsteroidal anti-inflammatory drug; PRN = as needed; GI = gastrointestinal; CNS = central nervous system; BTP = breakthrough pain; TCA = trycyclic antidepressant.
[a]Strong opioid: an opioid on the third step of the WHO ladder.
[b]Patient who is diagnosed with or *apparently* is experiencing neuropathic pain. Classification of pain is based on pain descriptors (i.e., etiology and/or subjective characteristics).