

Self-Reported Management of Pain in Hospitalized Patients: Link Between Process and Outcome

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PURPOSE: Hospitalized patients commonly experience pain. We investigated the association between patients' reported use of recommended pain management practices and overall pain relief.

METHODS: All adult patients discharged during a 1-month period from a Swiss teaching hospital were invited to complete a mailed survey that included the Picker patient experience questionnaire, questions on pain relief during hospitalization, and questions on various procedures that are recommended as standards of pain management.

RESULTS: Of 2156 eligible patients, 1518 (70%) participated. Sixty-nine percent ($n = 1050$) had experienced pain during their hospital stay, of whom 71% ($n = 697/978$) reported complete pain relief. After adjustment for sex, age, general health,

and hospital department, pain relief was associated independently with availability of physicians (odds ratio [OR] = 11; 95% confidence interval [CI]: 3.3 to 36 for excellent vs. poor availability), having received information about pain and its management (OR = 2.8; 95% CI: 1.8 to 4.2), regular pain assessment (OR = 1.8; 95% CI: 1.2 to 2.8), modification of pain treatment when ineffective (OR = 3.0; 95% CI: 1.6 to 5.6), and waiting less than 10 minutes for pain medications (OR = 3.5; 95% CI: 1.9 to 6.6).

CONCLUSION: Patient reports that recommended pain management procedures had been used were associated with better self-reported pain relief among hospitalized patients. *Am J Med.* 2004;117:569–574. ©2004 by Elsevier Inc.

Timely and appropriate analgesic treatment is the cornerstone of pain relief among hospitalized patients. This requires a global pain management strategy that includes regular pain assessments, patient education about pain and its treatment, and training of medical staff (1–3). Nevertheless, repeated surveys confirm that many hospitalized patients have pain and that it is often controlled poorly (4–9). Many factors contribute to this problem (1), including underestimation of pain severity by health care professionals (7,8,10), lack of institutional commitment (1), and patient reluctance to report pain (11).

In addition, health care professionals fail to recognize the efficacy of applying pain management guidelines in everyday practice (1,3), perhaps because the evidence linking implementation of recommended pain management processes to pain relief is limited. Prospective studies have found little effect of hospital-wide initiatives to improve pain management on patient outcomes (12–14). On the other hand, pain relief was better among patients who were encouraged to report pain (10), who received information about pain (15), or who did not wait long for pain medication (6,16). Other studies have examined pa-

tients' satisfaction with pain treatment, which is not necessarily equivalent to effective pain relief (17).

As part of an audit of the quality of pain management in a large, general teaching hospital, we sought to document pain management processes and to compare these practices with recommendations of the American Pain Society Quality of Care Committee (2). This paper focuses on the relation between pain management processes and patients' overall evaluation of pain relief (18) during the hospital stay.

METHODS

Setting

This study was conducted at Geneva University Hospitals, a 2200-bed public teaching hospital in Geneva, Switzerland. The hospital comprises acute care, geriatric, psychiatric, and rehabilitation facilities. For the past 15 years, a multidisciplinary pain clinic and mobile team have offered pain consultations at all sites. During the last 5 years, two additional mobile nursing and medical teams have been introduced in the geriatrics and rehabilitation facilities. Multidisciplinary postoperative pain and analgesia committees have been developed in the anesthesia, surgery, and intensive care departments, in the pediatric anesthesia unit, and in general pediatric care. Each entity has developed specialized guidelines for pain management in collaboration with clinical pharmacology and pharmacy specialists. Pain management processes have been emphasized at all sites, but their implementation has been variable.

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Study Design and Sample

Data collection was integrated into the annual patient satisfaction survey. All adult patients discharged alive from the institution in March 2001 (N = 2437) were surveyed by mail, with up to two reminders sent to non-respondents during the next 3 months. We excluded 51 patients who died after discharge, 72 with an incorrect address, 29 who did not understand enough French, and 129 who considered that they were too ill to participate in the survey, leaving 2156 eligible patients. As a quality improvement project involving minimal risk to participants, the study was exempted from formal review by the hospital's research ethics committee.

Questionnaire

The core of the patient questionnaire was the Picker instrument (19,20), which measures patient experience rather than satisfaction. For most items, patients are asked to report their experiences about processes or events. The section on pain management was expanded with questions developed by members of the Geneva Hospitals Pain Management Network to address several pain management processes (information, assessment, pain intensity, and modification of treatment).

Study Variables

The outcome variable was the patient's overall assessment of pain relief during hospitalization ("Overall, was your pain relieved during the hospital stay?"). The answers "yes, to some extent" and "no" were grouped and compared with "yes, completely".

The main predictor variables were patient reports of compliance with the following recommended pain management processes (Table 1): having received information about pain and its management, regular pain assessment, regular use of a pain assessment tool, regular administration of analgesics, modification of pain treatment when current treatment proved ineffective, use of a patient-controlled analgesic device, waiting time before the requested pain medication was brought to the patient, availability of nurses, and availability of doctors. Intensity of pain ("In general, when you were in pain, how severe was the pain?"; severe vs. moderate vs. mild) was used for descriptive purposes only because intensity is affected both by the underlying disease and by analgesic treatment.

Additional variables included patient age, sex, number of hospitalizations during the past 6 months, educational level, and two single-item measures from the 36-Item Short Form health survey (general health and feeling depressed [21]). Information on the hospital department (internal medicine, geriatrics, surgery, gynecology-obstetrics, or psychiatry) from which the patient was discharged was obtained from hospital administrative records.

Statistical Analysis

We first identified patients who had experienced pain at any time during hospital stay ("Were you ever in pain during your hospital stay?"; yes vs. no). Because some patients who answered "no" to this question or who skipped it nevertheless described pain intensity, reported change in pain medication, or reported having asked for pain medication, answers to these other questions were also used to identify patients who experienced pain during their hospital stay.

Chi-squared tests were used to study how overall pain relief varied by patient characteristics and reported aspects of medical care. Logistic regression was used to identify multivariate predictors of pain relief. Variables that were significant in univariate analyses were included in the multivariate model, along with important determinants of pain relief that have been identified by others, including sex (22), age (15), and hospital department (10). A stepwise procedure, guided by the analyst, was used to identify variables for inclusion in the final model. We did not include level of pain because we hypothesized that it reflects the effectiveness of pain management and therefore belongs in the causal chain. Finally, we counted how many significant medical care processes were reported as implemented by each patient, and computed the proportions of patients reporting pain relief by count. For this analysis, we combined very good and excellent availability of physicians. All statistical tests were two-sided, with a significance level of 0.05. Statistical analyses were performed using SPSS 11 (Chicago, Illinois).

RESULTS

After two reminders, 1518 (70%) of the 2156 eligible patients returned the survey. The mean (\pm SD) time between discharge from the hospital and completion of the survey was 80 ± 21 days. About two thirds of the patients (69%, n = 1050) reported pain during their hospital stay: 830 reported that they had been in pain, 208 described pain intensity, 8 noted a change in pain medication, and 4 asked for pain medication. Pain was reported as severe by 455 respondents (47%), moderate by 402 (42%), and mild by 106 (11%). Pain was more frequently reported by women, younger patients, non-Swiss patients, patients with two or more hospital stays in the past 6 months, and patients who more frequently felt depressed (Table 2).

Pain Relief

Overall pain relief during the hospital stay was evaluated by 978 (93%) of the 1050 patients who experienced pain: 697 (71%) said "yes, completely", 240 (25%) said "yes, to some extent", and 41 (4%) said "no". Complete pain relief was reported more frequently by patients whose pain was milder (mild: 90% [95/106]; moderate: 76% [306/402]; severe: 63% [285/455], $P < 0.001$), men, patients aged 25 to 84

Table 1. Medical Care Factors Associated with Self-Reported Pain Relief in 978 Hospitalized Patients

| Characteristic | Patients with Self-Reported Complete Pain Relief | | |
|---|--|--------|---------|
| | n/N* | (%) | P Value |
| Items from the Picker instrument | | | |
| Did you have a patient-controlled device to administer a pain medication in case of need? | | | 0.35 |
| Yes | 123/166 | (74.1) | |
| No | 548/778 | (70.4) | |
| When you asked for a pain medication, how long did you wait on average? | | | <0.001 |
| Never asked | 286/360 | (79.4) | |
| <1 minute/immediately | 100/115 | (87.0) | |
| 1–5 minutes | 171/232 | (73.7) | |
| 6–10 minutes | 67/113 | (59) | |
| 11–15 minutes | 19/40 | (48) | |
| 16–30 minutes | 7/33 | (21) | |
| >30 minutes | 6/24 | (25) | |
| Never received the painkiller | 0/7 | | |
| How do you rate the availability of the medical doctors who took care of you? | | | <0.001 |
| Poor | 8/33 | (24) | |
| Fair | 57/119 | (48) | |
| Good | 266/380 | (70.0) | |
| Very good | 203/258 | (78.7) | |
| Excellent | 148/167 | (88.6) | |
| How do you rate the availability of the nurses who took care of you? | | | <0.001 |
| Poor | 10/28 | (36) | |
| Fair | 41/88 | (47) | |
| Good | 246/371 | (66.3) | |
| Very good | 232/287 | (80.8) | |
| Excellent | 152/183 | (83.1) | |
| New items | | | |
| Did you receive any information about pain and its management during your hospital stay? | | | <0.001 |
| Yes, definitely | 429/507 | (84.6) | |
| Yes, to some extent | 129/246 | (52.4) | |
| No | 119/203 | (58.6) | |
| Was your level of pain regularly assessed? | | | <0.001 |
| Yes, always | 471/578 | (81.5) | |
| Yes, sometimes | 148/261 | (56.7) | |
| No | 62/122 | (51) | |
| To assess the intensity of pain, was a pain assessment tool used (e.g., visual analog scale, "pain ruler", 0 to 10 numeric scale, list of words)? | | | 0.001 |
| Yes, always | 238/302 | (78.8) | |
| Yes, sometimes | 104/171 | (60.8) | |
| No | 303/448 | (67.6) | |
| During the hospital stay, did you receive a treatment to relieve pain? | | | <0.001 |
| Yes, regularly (several days) | 504/669 | (75.3) | |
| Yes, sometimes | 136/215 | (63.3) | |
| No | 44/81 | (54) | |
| In case pain was not relieved by the treatment, was it modified? | | | <0.001 |
| Yes, it was modified | 201/311 | (64.6) | |
| No, it was not modified | 35/120 | (29) | |
| Pain was always modified | 412/479 | (86.0) | |

* n = number with complete pain relief; N = number who responded. Ns do not sum to 978 because of missing data.

Table 2. Patient and Hospital Characteristics Associated with Self-Reported Pain and Pain Relief

| Characteristic | Patients Reporting Pain during Hospitalization | | | Patients Reporting Complete Pain Relief | | |
|---|--|--------|---------|---|--------|---------------------|
| | n/N* | (%) | P Value | n/N* | (%) | P Value |
| Sex | | | 0.04 | | | 0.005 |
| Female | 608/852 | (71.4) | | 388/572 | (67.8) | |
| Male | 442/666 | (66.4) | | 309/406 | (76.1) | |
| Age (years) | | | <0.001 | | | 0.04 |
| 15–24 | 55/69 | (80) | | 36/53 | (68) | |
| 25–44 | 325/429 | (75.8) | | 219/318 | (68.9) | |
| 45–64 | 300/435 | (69.0) | | 204/285 | (71.6) | |
| 65–84 | 314/497 | (63.2) | | 212/276 | (76.8) | |
| >84 | 56/88 | (64) | | 26/46 | (57) | |
| Nationality | | | 0.001 | | | 0.41 |
| Swiss | 659/996 | (66.2) | | 431/613 | (70.3) | |
| Other | 390/521 | (74.9) | | 265/364 | (72.8) | |
| Education | | | 0.79 | | | 0.23 |
| Primary school or apprenticeship | 637/914 | (69.7) | | 418/597 | (70.0) | |
| Secondary school, university, other | 336/487 | (69.0) | | 234/317 | (73.8) | |
| Medical service | | | <0.001 | | | <0.001 |
| Internal medicine | 302/491 | (61.5) | | 161/272 | (59.2) | |
| Geriatrics | 59/88 | (67) | | 28/46 | (61) | |
| Surgery | 469/626 | (73.5) | | 355/439 | (80.9) | |
| Psychiatry | 55/100 | (55) | | 25/50 | (50) | |
| Gynecology-obstetrics | 174/213 | (81.7) | | 128/171 | (74.9) | |
| Hospital stay in last 6 months | | | 0.006 | | | 0.05 |
| 1 | 664/977 | (68.0) | | 450/621 | (72.5) | |
| 2 or more | 316/420 | (75.2) | | 195/295 | (66.1) | |
| In general; would you say your health is: | | | 0.83 | | | <0.001 |
| Excellent | 89/127 | (70) | | 62/83 | (75) | |
| Very good | 176/257 | (68.5) | | 138/169 | (81.7) | |
| Good | 469/685 | (68.5) | | 331/433 | (76.4) | |
| Fair | 215/305 | (70.5) | | 113/202 | (55.9) | |
| Poor | 63/85 | (74) | | 29/58 | (50) | |
| In the last 4 weeks, have you felt down or low? | | | <0.001 | | | <0.001 [†] |
| All of the time | 40/56 | (71) | | 17/35 | (49) | |
| Most of the time | 132/163 | (81.0) | | 71/124 | (57) | |
| Some of the time | 381/536 | (71.1) | | 247/365 | (67.7) | |
| A little of the time | 254/356 | (71.3) | | 192/238 | (80.7) | |
| None of the time | 205/336 | (61.0) | | 148/185 | (80.0) | |

* n = number who reported pain (or complete pain relief); N = the number with the characteristic. Ns do not sum to 1518 (or 978) because of missing data.

[†] Test for linear trend.

years, patients with only one hospital stay in last 6 months, and patients who were in better health (Table 2).

Patient-Reported Use of Recommended Practices
Reported use of recommended pain management practices varied substantially (Table 1). Of the 564 patients who asked for pain medication, 20% received it immediately, 41% waited 1 to 5 minutes, 20% waited 6 to 10 minutes, and 19% waited 11 minutes or more. Forty-four percent of patients rated the availability of doctors as very good to excellent, and 49% thought the same of nurses. The majority of patients

(53%) received enough information about pain and its management, 60% reported regular pain assessment, and 53% were always relieved. When pain was not relieved by treatment, 72% of patients had their treatment changed. Systematic use of a pain assessment tool was reported by only 33% of patients.

Associations with Pain Relief

Reported use of most pain management recommendations, except for access to a patient-controlled analgesic device, was associated with self-reported complete pain

Table 3. Medical Care Factors Associated with Self-Reported Complete Pain Relief in a Multivariate Logistic Regression Model

| Characteristic | Odds Ratio* | (95% Confidence Interval) |
|---|-------------|---------------------------|
| Availability of medical doctor | | |
| Poor | 1.0 | — |
| Fair | 2.3 | (0.8–7.0) |
| Good | 4.0 | (1.4–11) |
| Very good | 5.9 | (2.0–17) |
| Excellent | 11 | (3.3–36) |
| Received information about pain and its management (definitely vs. to some extent or did not receive) | 2.8 | (1.8–4.2) |
| Regular assessment of pain (vs. irregular or none) | 1.8 | (1.2–2.8) |
| Treatment modification (vs. no modification) | | |
| Pain was always relieved | 11 | (5.8–20) |
| Treatment was modified | 3.0 | (1.6–5.6) |
| Average waiting time before receiving a pain medication | | |
| Never asked | 3.7 | (1.9–7.2) |
| 0–10 minutes | 3.5 | (1.9–6.6) |
| >10 minutes | 1.0 | — |

* Adjusted for age, sex, general health, and type of medical service.

relief (Table 1). Shorter waiting time and better availability of doctors and nurses were also associated with a higher likelihood of complete pain relief.

After adjustment for sex, age, general health, and hospital department, five medical care factors remained associated with self-reported complete pain relief, including availability of doctors, information about pain and its management, regular pain assessment, modification of treatment, and short average waiting time before receiving a pain killer (Table 3). When none of the five factors was reported, only 11% of patients noted pain relief, but when all were reported, 95% of patients did (Figure).

DISCUSSION

We found that reported use of recommended pain management procedures during routine care was associated with better self-reported pain relief among hospitalized patients. A majority of patients (69%) said they had experienced pain, many of whom had inadequate pain relief. Pain relief was more common in patients who reported they had received information about pain and its management, regular pain assessment, modification of pain treatment when necessary, and short average waiting time before receiving a requested pain medication. These results confirm that several of the pain management pro-

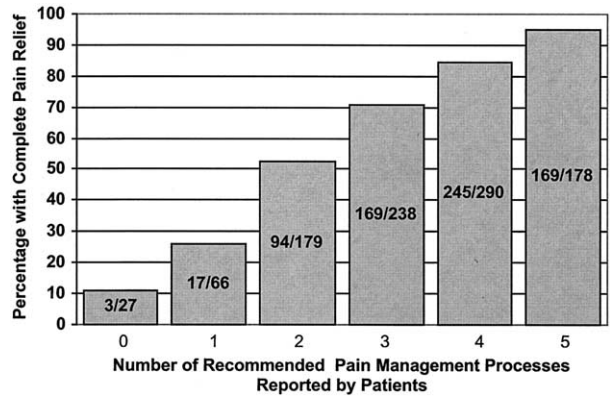


Figure. Relation between the number of recommended pain management processes reported by patients and self-reported pain relief among hospitalized patients. Factors included very good or excellent availability of medical doctor; definitely received information about pain and its management; regular assessment of pain; modification of treatment or pain always relieved; never asked for a pain medication; and waiting time of 10 minutes or less.

cesses recommended by international guidelines are associated with better self-reported pain relief among patients. However, one process indicator—use of a patient-controlled analgesic device (23)—was not associated with pain relief. We believe that process indicators associated with good outcomes are most useful for monitoring quality of care.

We also found that women, patients who reported being in poor health, and patients who felt depressed at the time of the survey were more likely to report unsatisfactory pain relief. We cannot determine whether these characteristics identify patients who are less tolerant of pain or who are less likely to receive effective analgesia in the hospital.

From the patient’s standpoint, the availability of doctors and nurses appears to affect pain management. In our study, perceived availability of doctors was associated significantly with pain relief, whereas the availability of nurses was related to pain relief in univariate analysis but not after adjustment for specific medical care variables. A likely explanation is that medical care is mostly carried out by nurses, who perform regular pain assessments and respond to patients who request a pain medication. Thus, nurse availability matters because it is a requirement for successful implementation of pain management guidelines.

Previous studies suggest that a good relationship between patient and physician is linked with successful pain management (24,25). For a patient, being given undivided attention and being shown empathy by one’s doctor can have an analgesic effect (24). Our results suggest that the availability of doctors may influence pain relief through mechanisms that were not captured by the ques-

tionnaire, such as the prescription of effective doses of analgesics.

We relied exclusively on patient reports of pain relief and pain-related processes using a survey that was administered several weeks after hospitalization. This raises the issue of recall bias. Nevertheless, retrospective pain assessments appear to be valid for a 3-month period (26). Because we relied on patient reports, we were not able to measure some important pain management processes, such as type of analgesia or dosage used. Furthermore, our questions may not have allowed patients to discriminate between pain and other types of suffering, such as emotional distress, which are unlikely to be alleviated by analgesics. Finally, as with any cross-sectional study, causal interpretation of our findings must be done cautiously.

However, we studied a large sample of patients from several services at a general hospital, and the participation rate was reasonable. Finally, our results were based on the views of patients, whose judgment is essential when dealing with pain management (9).

In conclusion, we found that at a large general teaching hospital, the majority of patients experienced pain during hospitalization. Pain relief was inadequate in a substantial minority. Recommended pain management practices were applied inconsistently, even though many were associated with better pain relief. Hospitals should be encouraged to apply these practices more consistently.

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