

## ISSUES AND INNOVATIONS IN NURSING PRACTICE

# The implementation of a Pain Monitoring Programme for nurses in daily clinical practice: results of a follow-up study in five hospitals

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**The implementation of a Pain Monitoring Programme for nurses in daily clinical practice: results of a follow-up study in five hospitals**

**Aims of the study.** To study the effects of the implementation of a Pain Monitoring Programme (PMP) for nurses in daily clinical practice. In addition, nurses' and physicians' pain knowledge and attitudes were studied, as well as change in nurses' pain knowledge after implementation of the programme.

**Rationale.** The rationale for the study was that many hospitalized patients suffer from pain and treatment of pain is often inadequate.

**Background.** Reasons for inadequate treatment of pain are the failure of nurses to assess pain on a daily basis and insufficient knowledge about pain and pain management in both nurses and physicians. The PMP tried to overcome these barriers by implementing daily pain assessment and educating nurses about pain and pain management.

**Research methods.** This follow-up study was conducted in five hospitals. In total, 277 nurses and 115 physicians participated. The implementation and long-term effects of the programme were measured with a pretest–post-test design without a control group.

**Results.** Results showed that nurses carried out daily pain assessment in at least 75% of patients during the first 5 months of the intervention period, but in the remaining 2 months professional compliance gradually decreased. Both nurses and physicians are positive about daily pain assessment and want to continue with it. The level of nurses' and physicians' knowledge about pain and pain management is moderate. The programme increased nurses' knowledge and satisfaction regarding the quality of pain treatment.

**Discussion.** Because professional compliance decreased after 5 months, incentives are needed to motivate nurses to continue with daily pain assessment. Continuous Quality Improvement may be a useful method to guide the implementation process. **Conclusions.** Based on these results it can be concluded that it is possible to implement the PMP in daily clinical practice. Moreover, the beneficial effects of our programme on nurses' knowledge and attitudes have been demonstrated. Therefore, participating hospitals were advised to continue and extend the programme and other hospitals are encouraged to implement it.

**Keywords:** pain education, daily pain assessment, pain knowledge, attitudes, nurses, physicians

## Introduction

Many hospitalized patients suffer from a variety of types of pain which are not always adequately managed (Dorrepaal *et al.* 1989, Coyle *et al.* 1990, Kuhn *et al.* 1990, Juhl *et al.* 1993, Lin & Ward 1995, De Wit *et al.* 1999). A complexity of factors are responsible for this poor state of affairs, including insufficient knowledge of nurses and physicians about pain management (Jacox *et al.* 1994, McCaffery & Ferrell 1995, Clarke *et al.* 1996, Lebovits *et al.* 1997). In addition, both nurses and physicians lack knowledge about opioid analgesic drugs and have misconceptions about addiction, tolerance, etc. (Fife *et al.* 1993, Von Roenn *et al.* 1993, Ferrell & McCaffery 1997, McCaffery & Ferrell 1997, Furstenberg *et al.* 1998).

Failure to assess pain on a daily basis is another reason for inadequate pain management. When pain is not assessed in a systematic way, it is difficult to determine the effect of a pain treatment and, if necessary, to adjust this treatment (Donovan 1985, Jacox *et al.* 1992, American Pain Society Quality of Care Committee 1995). Nevertheless, assessment of pain complaints does not have to be difficult; an earlier study demonstrated the feasibility of nurses assessing their patients' pain twice a day, after having participated in an education programme on pain and pain relief (De Rond *et al.* 1999). Nurses asked patients to score the severity of their pain twice a day from 0 (no pain) to 10 (worst pain imaginable) and recorded results on the vital signs chart. Daily pain assessment could be easily integrated into the nurses' daily routine (De Rond *et al.* 1999), and the education programme led to an improvement in their pain knowledge (De Rond *et al.* 2000b). As a result of the programme, nurses were more aware of their patients' pain complaints and documented more information about pain in the nursing records (De Rond *et al.* 2000a). The ultimate goal of the programme was to optimize pain relief and decrease pain complaints by patients. This goal was met,

because the programme led to a decrease in patients' pain intensity (De Rond *et al.* 2001).

Thus, monitoring pain and educating nurses is feasible when they are introduced and integrated as part of a research programme. Implementation of this Pain Monitoring Programme (PMP) was performed in the setting of a dedicated study, in which research nurses were present on the wards daily to interview patients and stimulate pain assessment. Furthermore, research nurses were able to promote the use of newly acquired knowledge.

This paper describes a study in which a PMP was implemented in clinical practice without the use of any extra facilities, such as the availability of research nurses. Implementation of daily pain assessment combined with pain education in clinical practice has been studied by several groups as part of Continuous Quality Assessment/Improvement Programmes (Dietrick-Gallagher *et al.* 1994, Titler *et al.* 1994, Bach 1995, Dufault *et al.* 1995, Ferrell *et al.* 1995, Bookbinder *et al.* 1996, Campese 1996, Caswell *et al.* 1996). These latter studies came to similar conclusions, as reported by De Rond *et al.* (1999, 2000a, 2000b, 2001), but most of these studies comprised small homogeneous study groups (mostly cancer patients), the outcome measures were not always clearly defined, and only one study investigated nurses' professional compliance with daily pain assessment (Bookbinder *et al.* 1996).

## The study

### Aim

The aim of the present study was to investigate whether implementation of the PMP is feasible in clinical practice and to investigate the long-term effects of the programme. We evaluated the effects of the programme on nurses' pain knowledge, nurses' understanding of patients' pain complaints, and the quality of pain management. Finally, we

studied the knowledge and attitudes of physicians towards pain management. We hypothesized that the PMP would improve nurses' pain knowledge, resulting in a better understanding of patients' pain complaints and improved quality of pain management.

## Method

### Sample

The programme was carried out in five general hospitals in the same programme region as the Comprehensive Cancer Centre Amsterdam. A total of 11 wards (six medical, four surgical and one mixed) with 277 nurses and 115 physicians participated.

### Design

The effect of the PMP on nurses' pain knowledge was studied in a pretest–post-test design without a control group. Prior to implementation of the programme nurses filled in a questionnaire about pain and pain management. During the implementation period, data were collected about the extent to which nurses assessed pain systematically. Seven months after implementation of the PMP, nurses' pain knowledge and attitudes were assessed for a second time, and their opinion on daily pain assessment was evaluated. In addition at this stage, physicians were surveyed about pain and pain management.

### Procedures: the Pain Monitoring Programme

From June 1996 to February 1998, the PMP was introduced on 11 wards in five hospitals. The purpose of the programme was to improve nurses' assessment of patients' pain and to increase nurses' pain knowledge, and thereby optimize pain relief and reduce pain complaints.

Prior to implementation of daily pain assessment, all nurses followed an education programme lasting 3 hours. This consisted of a lecture and discussion, and focused on basic knowledge and attitudes about current trends in pain assessment, pain treatment with analgesics and the use of nonpharmacological pain treatment. Physicians received only written information about the programme, and were briefly instructed about the basic principles of pain management. After all nurses had followed the education programme, daily pain assessment was implemented in nursing practice. Patients were asked twice a day by nurses to rate their present pain on an 11-point numeric rating scale, on which 0 represents 'no pain at all' and 10 'the worst possible pain'. Nurses charted the pain scores on the vital signs chart, so that patients' pain intensity, as well as the effectiveness of pain treatment, could be quickly determined by both nurses and physicians.

### Measures

The implementation of daily pain assessment was evaluated by means of establishing nurses' professional compliance and a questionnaire which measured nurses' and physicians' opinions about daily pain assessment. To establish nurses' professional compliance, pain scores from the nursing records were collected. Using these data, we calculated how often nurses assessed pain: the number of pain scores recorded on the vital signs chart was divided by the maximum number of pain scores possible. Nurses' professional compliance was assessed twice a month in the first 2 months, and then once a month; this means that each time about 300 nursing records were checked in the five hospitals. When nurses assessed pain in more than 75% of the patients, compliance was deemed satisfactory (De Rond *et al.* 1999).

Nurses' and physicians' opinions about daily pain assessment were evaluated with the Daily Pain Assessment Questionnaire (DPAQ) at post-test (De Rond *et al.* 1999). This questionnaire covers the following issues: nurses' attitudes to daily pain assessment, the feasibility of daily pain assessment, problems in eliciting a pain score, timing of daily pain assessment, and the effect of daily pain assessment on communication. Nurses could answer on a 5-point Likert Scale, which was later recorded into three categories (agree, neutral and disagree).

Pain knowledge was assessed by the Dutch Language Version of the Pain Knowledge Questionnaire (PKQ-DLV) (De Rond *et al.* 2000b). The PKQ-DLV has been shown acceptable levels of validity and reliability (De Wit 1995). Although the PKQ-DLV was originally designed for use with cancer patients, the questions seemed suitable to test the basic knowledge of nurses and physicians. The PKQ-DLV includes eight statements measuring knowledge about cancer pain and pain management, and these were answered on a 5-point Likert scale ('strongly agree', 'agree', 'not agree/not disagree', 'disagree', 'strongly disagree'). Before transforming the answers into a 0–100 scale, some items were recoded. A total score was computed for overall pain knowledge.

Attitudes towards pain and pain management were assessed using the Pain Attitude Inventory (PAI) (De Rond *et al.* 2000b). This questionnaire has seven statements which measure nurses' and physicians' opinions on several aspects of pain, including the quality of pain management and nurses' role in pain management. The questions (formulated as statements) were answered on a 5-point Likert scale ('strongly agree', 'agree', 'not agree/not disagree', 'disagree', 'strongly disagree'), which was later recoded into three categories (agree, neutral and disagree).

*Statistical analysis*

Data were analysed using the Statistical Package for the Social Sciences for Windows (SPSS) version 9.0. Descriptive statistics were used to evaluate nurses' and physicians' sociodemographic characteristics. Differences between nurses' pain knowledge at pretest and post-test were analysed with the paired *t*-test, and nurses' attitudes with the chi-square and other nonparametric tests (Wilcoxon sign test).

**Results**

**Sociodemographic characteristics of nurses and physicians**

Of the 277 nurses in the wards which were invited for the education programme, 244 (88.1%) participated in the programme. Six months later, 236 nurses received the post-test questionnaire, of whom 201 (85.2%) returned the questionnaire. To study nurses' pain knowledge and attitude, complete pretest and post-test data were needed for the analysis; due to the turnover rate only 130 nurses were available at both times. The mean age of these nurses was 32.9 (SD = 8.3) years and the mean professional nursing experience was 8.9 (SD = 7.8) years. Those who completed both the pretest and post-test were older ( $P < 0.001$ ), had more professional working experience ( $P < 0.01$ ), and were more often registered nurses ( $P < 0.001$ ) than those who completed only a pretest or post-test questionnaire.

Of the 115 physicians, 68 (59.1%) returned the questionnaire. Their mean age was 36.9 (SD = 10.6) years and the mean professional experience was 7 (SD = 8.4) years. Most of the physicians who returned the questionnaire were general physicians who had not yet completed their specialization (Table 1).

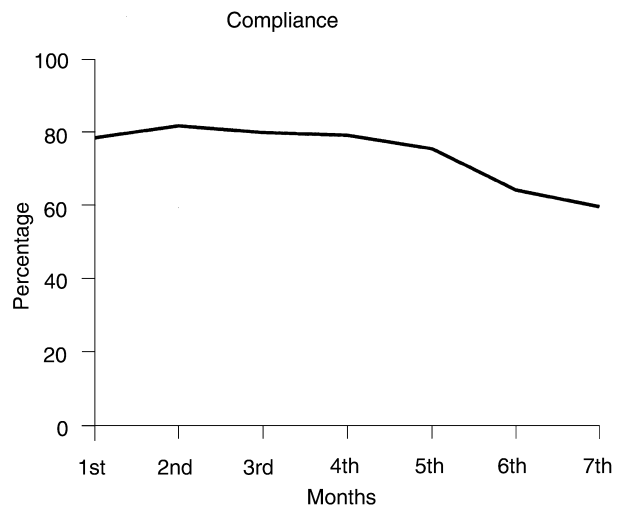
**Implementation of daily pain assessment**

In the first 5 months, nurses assessed pain on a daily basis in 75–82% of the patients. In the sixth month, this percentage gradually decreased and reached 59% in the seventh month (Figure 1). Nurses' compliance with daily pain assessment depended on care setting and hospital: nurses from surgical wards were less compliant after the first months than those from medical wards. Differences were also found between the five hospitals: compliance ranged from 36% to 99%, and in three hospitals nurses noted the pain scores in less than 75% of patients during a 3-month period.

The DPAQ was completed by 201 nurses and 68 physicians (Table 2). Results show that both nurses and physicians had a

**Table 1** Sociodemographic characteristics of nurses and physicians

	Nurses ( <i>n</i> = 130)	Physicians ( <i>n</i> = 68)
Gender ( <i>n</i> , %)		
Male	15 (11.5%)	44 (64.7%)
Female	115 (88.5%)	23 (33.8%)
Missing or unknown	–	1 (1.5%)
Age in years (mean, SD)	32.9 (8.3)	36.9 (10.6)
Professional experience in years (mean, SD)	8.9 (7.8)	7.0 (8.4)
Educational level ( <i>n</i> , %)		
Student nurse	6 (4.6%)	
In-service education	96 (73.9%)	
Other education	28 (21.5%)	
Care setting ( <i>n</i> , %)		
Medical ward	65 (50.0%)	39 (57.4%)
Surgical ward	58 (44.6%)	29 (42.6%)
Combined ward	7 (5.4%)	



**Figure 1** Nurses' professional compliance with daily pain assessment over 7 months.

positive attitude towards daily pain assessment: 84.6% of nurses and 79.4% of physicians stated that daily pain assessment is important, 67.7% of nurses stated that they always perform pain assessment, and 77.6% of nurses and 64.7% of physicians wanted to continue with daily pain assessment in future.

According to 83.6% of the nurses, daily pain assessment fits in easily with their daily routine, and 78.1% thought it useful to record pain scores on a diagram on the vital signs chart. A majority of nurses had no problem with eliciting a pain score, and around 50% of both nurses and physicians

**Table 2** Results of the Daily Pain Assessment Questionnaire

	Nurses, <i>n</i> (%) ( <i>n</i> = 201)	Physicians, <i>n</i> (%) ( <i>n</i> = 68)
Attitude towards daily pain assessment		
I think that pain assessment is important*	170 (84.6)	54 (79.4)
I always perform the pain assessment	136 (67.7)	NA
In future too, nurses should ask for a pain score each day	156 (77.6)	44 (64.7)
Feasibility of daily pain assessment		
Daily pain assessment fits in with the nurses' daily routine	168 (83.6)	NA
Daily pain assessment takes additional time	33 (16.4)	NA
Recording of the pain scores in diagram on the vital signs chart is useful	157 (78.1)	50 (73.5)
Patients find it easy to give a pain score	33 (16.4)	17 (25)
The pain score given by the patient often differs from what I consider it to be	56 (27.9)	14 (20.6)
Physicians make adequate use of the pain assessment	31 (15.4)	18 (26.5)
During rounds, I always look at the recorded pain scores	NA	32 (47.1)
Eliciting a pain score		
It is difficult to ask for a pain score when you expect patients to be in pain	29 (14.4)	NA
It is bothersome to ask for a pain score when patients do not have pain	47 (23.4)	NA
Timing of daily pain assessment		
Asking for 'pain at the present moment' is preferable to asking for average pain during the past 24 hours	87 (43.3)	30 (44.1)
I consider asking for pain intensity twice a day appropriate	107 (53.2)	36 (52.9)
Effects of daily pain assessment on communication		
Since the introduction of daily pain assessment, pain is more often discussed during the change of shifts than it used to be	88 (43.8)	NA
Since the introduction of daily pain assessment, pain is more often reported in the nurses' records than it used to be	96 (47.8)	NA
Since the introduction of daily pain assessment, pain is more often discussed during the rounds with the physician than it used to be	80 (39.8)	NA
Since the introduction of daily pain assessment, pain is more often discussed during clinical meetings than it used to be	NA	27 (39.7)
Since the introduction of daily pain assessment, pain is more often reported in the medical records than it used to be	NA	24 (35.3)
Since the introduction of daily pain assessment, nurses raise the issue of pain more often than they used to	NA	34 (50)
Since the introduction of daily pain assessment, patients raise the issue of pain more often than they used to be	81 (40.3)	11 (16.2)

\*Percentages of nurses and physicians who agreed with the statement. NA: not applicable.

found the timing of daily pain assessment appropriate. Only 16.4% of nurses reported that it seemed easy for patients to give a pain score. It was striking that only 15.4% of nurses were satisfied with the way physicians used the pain assessment, while 47.1% of physicians claimed that they checked recorded pain scores daily.

Concerning communication, about 46% of nurses and 37% of physicians communicated more frequently with colleagues as a result of the daily pain assessment. Although only 15.4% of nurses reported that physicians make adequate use of the daily pain assessment, 39.8% thought that pain is more often discussed during rounds with the physician.

According to 50% of physicians, communication with nurses about pain improved. Communication with patients about pain improved according to 40.3% of nurses and 16.2% of physicians.

Nurses from medical wards had a more positive attitude towards daily pain assessment ( $P < 0.001$ ) and were more positive about the effects of daily pain assessment on communication ( $P < 0.001$ ) compared with their colleagues from surgical wards. There were also differences between the five hospitals. In one hospital, nurses were more positive about all aspects of daily pain assessment compared with the others. In another hospital, nurses were more negative about

**Table 3** Results of Pain Knowledge Questionnaire-Dutch Language Version of nurses ( $n = 130$ ) and physicians ( $n = 68$ )

	Nurses			Physicians, mean (SD)
	Pretest, mean (SD)	Post-test, mean (SD)	P-value	
Cancer pain can be effectively relieved	77.8 (14.3)*	79.8 (15.8)	NS <sup>†</sup>	76.2 (17.5)
Pain medication should be given only when pain is severe <sup>‡</sup>	83.2 (19.6)	89.3 (15.9)	<0.01	82.0 (22.9)
Most cancer patients who take pain medication, will become addicted over time <sup>‡</sup>	62.6 (26.9)	78.9 (23.4)	<0.001	76.5 (23.8)
It is important to give the lowest amount of medicine possible to save larger doses for later when the pain is worse <sup>‡</sup>	54.2 (30.1)	65.6 (31.7)	<0.001	51.2 (34.3)
It is better to give pain medications around the clock (on a schedule) rather than only when needed	85.6 (21.1)	85.8 (23.0)	NS	78.9 (28.9)
Treatments other than medications (such as massage, heat, relaxation) can be effective for relieving pain	82.5 (18.5)	82.1 (20.5)	NS	81.5 (18.4)
Patients are often prescribed too much pain medicine <sup>‡</sup>	62.8 (25.0)	71.3 (21.8)	<0.001	58.6 (28.9)
Prescriptions for the use of pain medicine can be adjusted by the patient, without consulting the general practitioner/specialist/(district) nurse <sup>‡</sup>	59.7 (30.5)	66.7 (28.0)	<0.05	53.6 (32.0)
Total score	71.1 (12.3)	77.3 (11.4)	<0.001	69.7 (12.4)

\*Higher scores indicate better pain knowledge; † Not significant; ‡ Statements were recorded.

the feasibility of daily pain assessment ( $P < 0.05$ ), timing of daily pain assessment ( $P < 0.05$ ), and effects of daily pain assessment ( $P < 0.001$ ).

### Pain knowledge

Overall scores on the PKQ-DLV at pretest ranged from 37.5 to 100 (mean = 71.1; SD = 12.3) (Table 3). The lowest score was for the item 'giving the lowest amount of medicine possible' (54.2) and the highest score was for 'pain medication should be given around the clock' (85.6).

Results showed that nurses' pain knowledge increased after they had followed the pain education programme: mean increase from 71.1 to 77.3 ( $P < 0.001$ ). Item analysis showed improved knowledge on the items: 'psychological addiction is inevitable over time' ( $P < 0.001$ ); 'giving the lowest amount of medicine possible' ( $P < 0.001$ ); 'patients are often over-medicated' ( $P < 0.001$ ); 'medication only for severe pain' ( $P < 0.05$ ); and 'prescriptions can be changed by patients themselves' ( $P < 0.05$ ).

Because they did not follow the education programme, we have only one assessment of physicians (Table 3). Physicians' mean total score was 69.7 (SD = 12.4). They scored low on the items 'giving the lowest amount of medicine possible' (51.2) and 'prescriptions can be adjusted without consulting caregivers' (53.6), and high on 'medication only for severe pain' (82.0) and 'treatments other than medications can be effective' (81.5).

### Attitudes towards pain management

Table 4 gives the results of the PAI. At pretest, 53.1% of nurses felt that most patients receive less pain medication than necessary. However, 64.6% evaluated the quality of pain management on their ward as good. Only 60% felt that nurses had sufficient knowledge and skills to relieve pain, thus confirming the need for pain education. All nurses thought that they played an important role in pain relief, and were more positive about the attention they gave to patients' pain complaints (78.5%) than that of physicians (52.3%).

After implementation of the programme, nurses' pain attitudes changed. At pretest, 33.1% felt that most patients receive adequate pain treatment. After implementation of daily pain assessment and after being educated about pain, this percentage increased to 48.5% ( $P < 0.01$ ). According to 64.6% of nurses at pretest and 76.9% at post-test, the quality of pain management on their ward is good ( $P < 0.05$ ). At pretest, 78.5% felt that they paid enough attention to patients' pain complaints; at post-test, 90.8% felt that they paid enough attention ( $P < 0.01$ ). The proportion of nurses who believed that they had sufficient knowledge and skills to relieve pain increased from 60% at pretest to 70.8% at post-test ( $P < 0.05$ ).

Physicians were positive about nurses' role in pain management (97.1%), and the attention nurses (89.7%) and physicians (70.6%) give to patients' pain complaints. The

**Table 4** Results of Pain Attitude Inventory (PAI) of nurses ( $n = 130$ ) and physicians ( $n = 68$ )

	Nurses			Physicians, $n$ (%)
	Pretest, $n$ (%)	Post-test, $n$ (%)	$P$ -value	
Which statement is applicable			<0.01	
Most patients receive more pain medication than necessary	15 (11.5)	8 (6.2)		3 (4.4)
Most patients receive less pain medication than necessary	69 (53.1)	53 (40.8)		30 (44.1)
Most patients receive adequate pain treatment	43 (33.1)	63 (48.5)		34 (50)
Missing or unknown	3 (2.3)	6 (4.6)		1 (1.5)
What is your opinion about the quality of pain management on your ward?			<0.05	
Good	84 (64.6)	100 (76.9)		55 (80.8)
Not good/not poor	42 (32.3)	24 (18.5)		11 (16.2)
Poor	3 (2.3)	5 (3.8)		1 (1.5)
Missing or unknown	1 (0.8)	1 (0.8)		1 (1.5)
Nurses pay enough attention to patients' pain complaints*	102 (78.5)	118 (90.8)	<0.01	61 (89.7)
Nurses have sufficient knowledge and skills to relieve pain	78 (60)	92 (70.8)	<0.05	17 (25)
Nurses play an important role in pain relief	130 (100)	129 (99.2)	NS <sup>†</sup>	66 (97.1)
Physicians pay enough attention to patients' pain complaints	68 (52.3)	70 (53.8)	NS	48 (70.6)
Physicians have sufficient knowledge and skills to relieve pain	–	94 (72.3)	–	47 (69.1)

\*Percentages of nurses who agreed with the statement; † Not significant.

majority of physicians were of the opinion that the knowledge and skills of physicians regarding pain relief is sufficient (69.1%), but only 25% considered that nurses have sufficient knowledge and skills to relieve pain.

## Discussion

The rationale for this programme was lack of pain knowledge in both nurses and physicians, and the absence of a method to assess pain systematically. It has been shown previously that educating nurses about pain improves pain knowledge and that it is possible to implement daily pain assessment in a research setting (De Rond *et al.* 1999, 2000b). Implementation of daily pain assessment in a clinical setting, without the aid of research nurses, has not been properly studied in a heterogeneous population. Moreover, the current study investigated the long-term effects of implementing daily pain assessment combined with a nursing pain education programme.

Our study showed that implementation of daily pain assessment in clinical practice is possible. Nurses' professional compliance with daily pain assessment was satisfactory, but gradually decreased to 59% after 7 months. Apparently, daily pain assessment had lost its novelty and incentives are needed to motivate nurses to continue with daily pain assessment. Only by means of a long-term follow-up can the standard of assessing pain in at least 75% of the patients daily be achieved. Therefore, a

Continuous Quality Assessment/Improvement process should be used (Miaskowski & Donovan 1992, Bookbinder *et al.* 1996).

Both nurses and physicians evaluated the implementation of daily pain assessment as positive. Nurses were more positive about several aspects than physicians, particularly about the beneficial effect of daily pain assessment on communication with patients. Nurses asked for the pain score, so patients probably discussed pain more readily with them than with physicians.

The results show that the level of nurses' and physicians' pain knowledge is moderate. Surprisingly, prejudices about medication appear to persist among both groups, despite efforts to counteract these. They think that patients should be given the lowest amount of medicine possible, and that patients are often overmedicated. Nurses and physicians have a positive attitude towards pain management. However, on the one hand nurses are positive about the quality of pain management on their ward, but also believe that most patients receive less pain medication than they need. This may be explained by the fact that the majority of patients are satisfied with their pain management despite high pain levels (Miaskowski *et al.* 1994, Ward & Gordon 1994).

Nurses' pain knowledge and attitudes improved as a result of the pain education programme and implementation of daily pain assessment. Studies by Titler *et al.* (1994), Bach (1995), Dufault *et al.* (1995), and Bookbinder *et al.* (1996) also found an increase in pain knowledge after nurses had

followed an education programme. The 6.2 increase in score on the knowledge questionnaire may seem moderate, but on important pain management issues there was a substantial increase. With regard to attitudes, nurses were more satisfied about the quality of pain management, about their own knowledge and skills to relieve pain, and about the attention they paid to patients' pain complaints after implementation of the PMP.

### Study limitations

Although the results of the current study are promising, some limitations and shortcomings should be addressed. First, there was no control group in this study. Without a control group it is impossible to state that the increase in pain knowledge was not caused by other factors than the education programme. On the other hand, nurses from 11 wards in five hospitals were included in this study, so one can assume that other factors are neutralized. Second, the results from the nurses cannot easily be compared with those from physicians because physicians were only surveyed at post-test and did not follow the education programme. Third, the PKQ-DLV was originally designed to measure patients' cancer pain knowledge, and the PAI has not been extensively used before. Therefore, the suitability of both questionnaires is debatable, but definite beneficial effects on nurses of the programme were found using these two questionnaires. Fourth, the sociodemographic characteristics of the nurses who filled in both pretest and post-test differed from those who completed only a pretest or post-test questionnaire. The turnover rate of nurses is high: we have 7-month follow-up data on about half the nurses in our study population. However, these nurses can be considered the backbone of the wards.

### Conclusion

Based on this study, it is concluded that it is possible to implement the PMP in a normal clinical setting. The study demonstrated that both nurses and physicians are positive about daily pain assessment and want to continue with it. Furthermore, the study showed that the level of nurses' and physicians' knowledge about pain and pain management is moderate. Educating nurses about pain and pain management proved to be effective in increasing nurses' knowledge and satisfaction about the quality of pain treatment. Based on these results, participating hospitals are advised to continue and extend the PMP and other hospitals are encouraged to implement it. To this end, an extensive manual has been developed incorporating a teaching video for nurses in

which patients, nurses and physicians explain daily pain assessment<sup>1</sup>.

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<sup>1</sup>The manual can be obtained from the Comprehensive Cancer Centre Amsterdam, Plesmanlaan 125, 1066 CX Amsterdam (Tel.: +31 20 346 25 25) or the Pain Expertise Centre, University Hospital Rotterdam, Dr Molewaterplein 40, 3015 GD Rotterdam (Tel.: +31 10 463 92 22), The Netherlands.



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