

Assessing an Educational Program to Improve Documentation and Reduce Pain in Hospitalized Patients

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Abstract

Few experimental studies have evaluated the efficacy of continuing educational programs aimed at the improvement of nurses' pain-management skills. This study assessed whether a standardized educational program aimed at nurses could increase the use of the Numeric Rating Scale-11 in both documenting and reducing postoperative pain-intensity levels in hospitalized surgical patients. The study had a quasi-experimental pre- and post-intervention design. Data were collected from records of surgical patients prior to and after the standardized educational program was completed. There were no significant differences between pre- and post-intervention groups in terms of either pain-documentation frequency or pain-intensity level. The study showed no increase in the frequency of postoperative pain documentation and no reduction of surgical patients' postoperative pain-intensity level. This finding indicates that the standardized educational program on postoperative pain management was insufficient to bring about changes in clinical practice.

Keywords

Educational Program, Documentation, Numeric Rating Scale, Pain Assessment, Postoperative Pain

1. Introduction

Important goals of managing postoperative pain (POP) are to minimize pain and discomfort, facilitate the recovery process, and avoid complications [1]. Strong unrelieved POP increases the risk for developing chronic

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pain after surgery [2]-[4]. In spite of increased knowledge about pain, effective POP management is still a major challenge, and multiple studies have identified areas of poor clinical practice [4]-[11]. Nurses and physicians often underestimate pain [12] [13], and inadequate communication about pain between nurses and patients remains a problem in pain relief [9]. Karlsten *et al.* [14] argued that POP management success requires active postoperative pain assessment, improved staff training, regular staff meetings, and audits with feedback to the staff involved. The Norwegian Medical Association [15] recommends using a pain-rating scale—the Numeric Rating Scale-11 (NRS-11), in which 0 represents no pain and 10 represents the worst pain imaginable—to assess and treat POP in accordance with the International Association for the Study of Pain (IASP) [1]. The NRS-11 is a reliable and valid scale for assessing and evaluating POP management [16]. Because nurses play an important role in assessing and treating POP, they need to understand the proper use of pain scales [16] [17].

Several studies [18]-[20] have identified poor POP documentation in nursing records. In an investigation of the consistency between care given to patients postoperatively and what information is documented, De Marinis *et al.* [18] found that nursing records were inadequate for quality care evaluation because they did not include a comprehensive account of the care activities of the nurses.

Gunnarsdóttir *et al.* [21] conducted a systematic review of 11 experimental studies that evaluated the efficacy of educational programs aimed at improving the pain-management skills of health care professionals. Due to variations in methodology, patient population, setting, and intervention targets, only 4 of the 11 studies were relevant for the present study [22]-[25]. Francke *et al.* [22] [23] tested a comprehensive training program (eight three-hour sessions) aimed at surgical nurses in five Dutch hospitals. After the program's completion, no increase in the use of pain-rating scales was found [22]. However, the study indicated a positive effect on patients' pain intensity [23]. Ravaud *et al.* [24] found significant improvements in POP documentation and significant reductions in pain-intensity scores after 48-hour stays in surgical intervention units compared to stays of the same length in surgical control units. The intervention aimed at nurses included a one-hour educational program about pain and the use of a visual-analogue scale to assess pain. Michaels *et al.* [25] found no significant effect on POP documentation after an educational intervention in eight units compared to eight control units in which no intervention was conducted. This educational program comprised 20 - 30 minute lectures for staff followed by a video presentation.

Several comprehensive quality-improvement studies conducted between 2000 and 2005 have displayed positive results [14] [26] [27]. A pain-monitoring program for nurses proved to be effective in improving nurses' assessment of pain and documentation of pain in nursing records [26]. Warrén Stomberg *et al.* [27] studied the impact of database documentation of POP management of an anesthesia organized, nurse-based, anesthesiologist-supervised acute pain service on surgical wards over a two-year period. They found that about 60% of the data charts were properly completed and documented in the database and remained the same over the two year period [27]. Karlsten *et al.* [14] found that a three-year quality-improvement study using annual audits and education improved the use of the NRS-11 in surgical wards. Crawford *et al.* [28] reported that significantly fewer patients experienced mild and moderate pain subsequent to an intervention composed of postoperative analgesic protocols and supported by education of staff and patients. However, the percentage of patients who experienced severe pain remained the same after the intervention [28].

To our knowledge, only three studies with less comprehensive and expensive interventions have been conducted [24] [25] [28]. Because previous studies have shown different results regarding POP documentation and patients' pain-intensity level, more knowledge is needed regarding educational interventions that may help to increase nurses' use of the NRS-11 in POP management and to reduce patients' pain-intensity level. This paper focuses on educational programs designed to enhance nurses' use of assessment tools and documentation in POP management.

This study assessed whether a standardized educational program aimed at nurses could increase the use of the NRS-11 in documenting and reducing POP intensity level in hospitalized surgical patients.

2. Methods

2.1. Design, Sample, and Setting

The study had a quasi-experimental pre- and post-intervention design [29] and was a joint study between a university college and a hospital involving nursing students. The study was performed in four surgical units and the Post Anesthesia Care Unit (PACU) at a hospital in Norway.

The inclusion criteria were records of hospitalized surgical patients aged 18 years and above who had undergone abdominal or orthopedic surgery with pain documented using the NRS-11 three times or more, from the day of surgery to the fifth postoperative day or discharge. Exclusion criteria were records of surgical patients with pain documented using the NRS-11 fewer than three times, from the day of surgery to the fifth postoperative day or discharge. Data were collected between September and December 2009 prior to the educational intervention and from May to October 2010 after the intervention.

2.2. Instruments and Data Collection

A registration instrument was developed based on the hospital's pain paper schema, which included the following variables: NRS-11 pain-intensity ratings on arrival at the PACU and on discharge from the PACU, NRS-11 pain-intensity ratings, on arrival to the surgical unit, NRS-11 pain-intensity ratings at rest and in movement in the surgical ward, whether or not analgesics were given when the pain-intensity level was above 3 on the NRS-11, and variables for nausea and other pains. The pain paper schema follows patients through the entire surgical trajectory, from arrival at the PACU to discharge from the hospital, and is part of the surgical patient's record. Additional demographic and clinical information was obtained on age, sex, preoperative risk in accordance with the American Society of Anesthesiologists (ASA), which is a 5-point scale, type of surgery, and type of anesthesia (main or supplementary anesthesia).

Data were collected from the hospital's pain paper schema in the patient's record and transferred into the registration instrument developed for this study.

Data were collected from the day of surgery until the fifth postoperative day or discharge. The data collection was performed by one nurse, and every 20th transferred registration was controlled. The educational program was pilot tested with eight nurses, who found it easy to understand. No corrections were made.

2.3. The Educational Program

The educational program included a 20-minute standardized PowerPoint presentation with 24 slides based on guidelines from the IASP [1] and a 15-minute discussion.

The PowerPoint presentation included the following:

- 1) Background: included a definition of pain [1], negative psychological and physiological effects of POP, barriers to and predictors of POP, and why it is important to use the NRS-11 when assessing POP;
- 2) Description of the NRS-11: the reliability and validity of the scale;
- 3) Proper use of the NRS-11: the importance of communicating pain, the aim of $NRS \leq 3$ in the postoperative phase, and how to ensure that the patient understands the scale and the method of documentation.

The discussion following the PowerPoint presentation was primarily concerned with the practical application of the NRS-11, how to inquire about pain, why to trust patients' self-reporting on pain, and the importance of documenting pain.

2.4. Procedures for Nursing-Student Involvement and Educational-Program Implementation

The educational program was carried out by 17 nursing students in either the second and third year of their bachelor's program as part of mandatory pedagogical training in clinical practice. The authors introduced the students to the educational program and provided them with a manuscript to support the Power Point presentation. During the presentation and the following discussion, the students were always accompanied by one of the authors. The standardized educational program was offered at various times during the day and evening shifts in order to facilitate participation.

All nurses in the four surgical units and the PACU were encouraged by the management to attend the educational program. However, participation was voluntary. On average, 80% of the nurses from the surgical units and 90% of those from the PACU attended the lectures, and a total of 123 nurses participated in 18 lectures with 2 - 15 nurses per lecture.

2.5. Ethics

In accordance with the Norwegian Regional Ethical Committee, it was unnecessary to obtain informed consent

from the patients, nurses, and students. The nurses who participated in the educational program were informed about the project by their managers. The study was approved by the Norwegian Social Science Data Services and the hospital's Ethics Committee.

2.6. Data Analysis

Data were analyzed using SPSS version 17.0 for Windows (SPSS, Inc., Chicago, IL). Descriptive statistics were used to assess demographic and clinical characteristics, as well as pain-intensity scores. Owing to low data frequencies of the variables for other pains, nausea, vomiting, and whether or not analgesics were administered, these variables were omitted from the statistical analysis. Analyses on surgical-unit levels were not possible owing to the low frequency of data; hence, the four surgical units were collapsed into one unit. Results were recorded as mean, standard deviation (SD), median, range, and number (percentage). Differences between pre- and post intervention patient groups were analyzed using Student's independent-samples *t*-test and a chi-square test. Student's independent-samples *t*-test and/or the Mann-Whitney *U* test were used to compare the mean scores of pain before and after the educational program. A *p*-value less than 0.05 indicated that the variable estimated was statistically significant.

3. Results

3.1. Sample Characteristics

The sample included 355 (40.8%) of a total of 870 records from patients who had undergone abdominal or orthopedic surgery in the preintervention period and 363 (42.6%) of a total of 852 records in the post intervention period. For conformity with the inclusion criteria, every record included in the sample had a pain paper schema in which POP was documented at least three times.

Approximately two-thirds of the patients were female, their mean age was in the low 60 s, and both groups had a median ASA score of 2 (range 1 - 4). **Table 1** summarizes the distribution of demographic and clinical characteristics. No differences were found in the demographic and clinical characteristics between the two groups.

Table 1. Demographic and clinical characteristics of the pre- and post-intervention groups.

	Pre-intervention		Post-intervention	
	N [#]	(%)	N [#]	(%)
Age (years mean ± SD*)	63 (mean)	16 (±SD [§])	62 (mean)	16 (±SD [§])
ASA (mean ± SD*)	2.2 (mean)	0.6 (±SD [§])	2.1 (mean)	0.7 (±SD [§])
Gender				
Female	232	(66)	227	(63)
Male	117	(34)	132	(37)
Surgery				
Orthopedics	295	(84)	266	(73)
Abdominal	56	(16)	97	(27)
Main anesthesia				
General anesthesia	175	(50)	206	(57)
Blocks(spinal, epidural, regional)	178	(50)	155	(43)
Supplementary anesthetics				
Epidural and regional nerve blocks	84	(24)	82	(23)
Local infiltration analgesia	75	(47)	77	(48)
Local infiltration				
Yes	171	(50)	191	(53)
No	170	(50)	167	(47)

*SD: Standard deviation; [#]Sample size may vary due to missing data.

3.2. Frequency of Documentation and Level of Postoperative Pain Intensity

On arrival at the PACU the median POP intensity level was 0.0 (Range 10) in the pre-test vs. 0.0 (Range 10) in the post-test, on discharge from the PACU median was 2.0 (Range 6) vs. 2.0 (Range 5), and on arrival at the surgical unit it was 2.5 (Range 8) vs. 2.8 (Range 7). **Figure 1** shows the variation of the patients' pain-intensity scores. The frequency of POP documentation on arrival at the PACU was relatively high in both the pre- and post-test, whereas it was low at discharge in both periods. On arrival at the surgical unit it was even lower, as shown in **Figure 1**. There were no significant differences between pre- and post intervention groups in the frequency of POP documentation or level of pain intensity upon arrival at or departure from the PACU or on arrival at the surgical units.

As shown in **Figure 2**, the frequency of POP documentation at rest was higher during the evening shift in the pre- and post-test than during the day shift. The frequency was lowest during the night shift. The median POP intensity level at rest was 2.5 (Range 10) in the pre-test and 1.0 (Range 10) in the post-test during the day shift on the day of surgery (POD 0). During the evening shift the median was 3.0 (Range 10) vs. 2.5 (Range 10), and during the night shift it was 3.0 (Range 10) vs. 3.0 (Range 8). The variation of the patients' pain-intensity scores is shown in **Figure 2**. No significant differences were found between the groups with respect to documentation and POP intensity level at rest on the day of surgery.

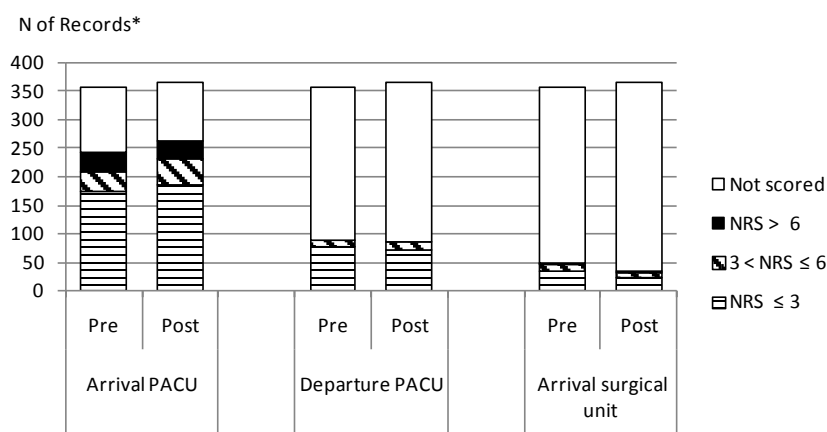


Figure 1. Frequency of POP documentation and level of pain intensity using the NRS-11 scale on arrival and departure from the PACU and on arrival to surgical unit for the pre- and post-intervention groups. *Number of records of surgical patients with POP documented three times or more.

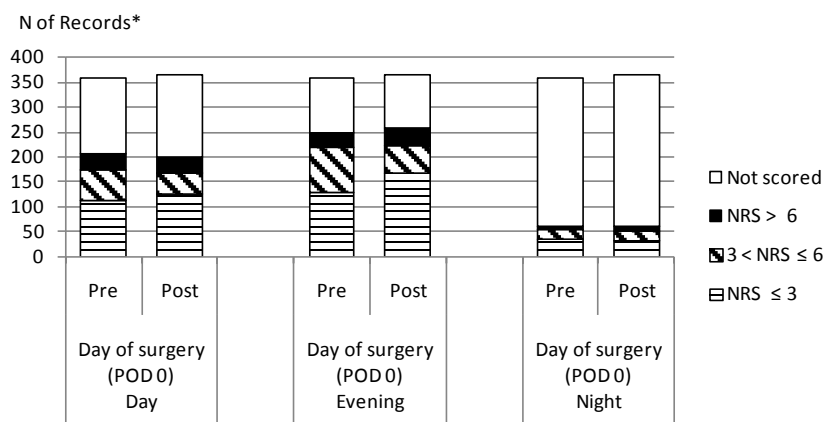


Figure 2. Frequency of POP documentation and level of pain intensity using the NRS-11 at rest during day, evening, and night shifts on the day of surgery (POD0) for the pre- and post-intervention groups. *Number of records of surgical patients with POP documented three times or more.

As **Figure 3** shows, POP documentation occurred with low frequency in the surgical unit, and data on POP intensity level were consequently scarce on the first day of surgery (POD 1).

The frequency of POP documentation using the NRS-11 from the second to the fifth postoperative day was so low that these data were omitted from the analyses.

4. Discussion

This study assessed whether a standardized educational program could increase the documentation of pain and reduce the POP intensity level of hospitalized surgical patients. The results showed no significant difference in the frequency of POP documentation, which agrees with the findings of Michaels *et al.* [25]. The duration of the educational program in that study was similar to ours, although the content differed to some extent. In the Michaels *et al.* study, in addition to offering a video presentation after the educational session, four clinical nurse specialists conducted the education program [25], whereas in the present study nursing students conducted the educational program with support from the authors. In Michaels *et al.*'s study, the discussion focused on the difference between acute and chronic pain, whereas the focus of the discussion in our study was on acute pain. Both programs offered discussions on common myths and barriers associated with pain management.

In contrast to our study, Ravaud *et al.* [24] found that an educational program for nurses led to significant improvements in POP documentation. The content of their educational program, which involved a 20 - 30 minute lecture, seemed quite similar to ours. In addition, their program was extended with a video presentation and individual feedback, and the main educators were an anesthetist who was an expert in pain management and a chief nurse. In our study, the main educators were students, and this may have influenced how important the nurses considered the message to be, which may have affected our results. It is interesting to note that Ravaud *et al.*'s assessment was performed 48 hours after the intervention, whereas in our study it was performed after a minimum of three months. The studies of de Rond *et al.* [26] and Warrén Stomberg *et al.* [27] found positive effects on POP documentation. However, the more comprehensive interventions conducted in those studies may explain their positive results. Improving nurses' knowledge and changing their attitudes toward pain management seems to take a significant amount of time and effort.

The discussion that followed the educational program in our study often concerned whether nurses could trust patients' self-report of pain. In the educational program, we gave an example of how a patient can self-report a pain level of 7 on the NRS-11 and still retain the ability to read a newspaper. Some nurses questioned this example and stated they would not trust such a patient's subjective report of pain. However, not trusting patients' self-report of pain is seen as a barrier to effective POP pain relief [1]. As a lived, subjective experience, pain is difficult to measure, and it differs from other vital signs (pulse and blood pressure) that are objective and easily measured.

Previous studies have shown that nurses in general maintain low levels of documentation of their nursing

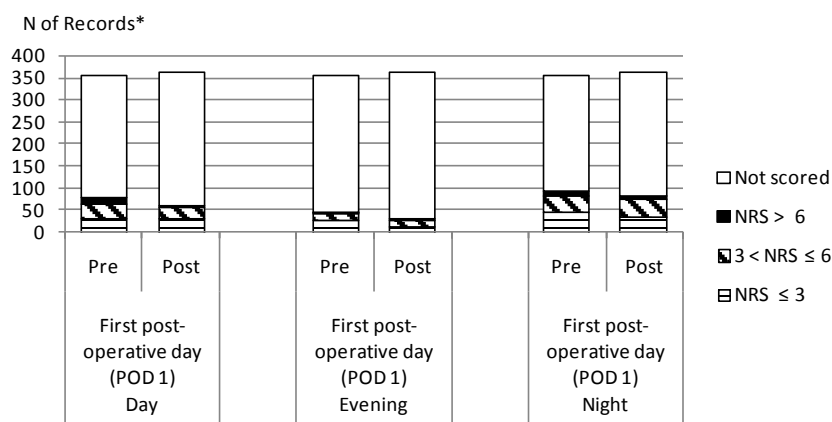


Figure 3. Frequency of POP documentation and level of pain intensity using the NRS-11 scale at rest during day, evening, and nightshifts on the first postoperative day (POD 1) for the pre- and post-intervention groups. *Number of records of surgical patients with POP documented three times or more.

activities [18] [19] [30]. De Marinis *et al.* [18] found that nurses prioritize patient care and that they do more than they record. This finding may apply to our study. In the hospital where our study took place, pain should be documented primarily in the pain paper schema, but it can also be documented in the patient's records. This is potentially confusing, because it may be perceived as a double system of documentation. The pain paper schema used by the hospital in this study is rather comprehensive, and it maybe too complex to be used for regular documentation by busy nurses. In Norway, however, nurses have a general obligation to document relevant observations and interventions [31]. POP management is one of many nursing activities that should be documented, but the failure to do so has no serious consequences in Norwegian hospitals today.

In this study, no significant reductions in the patients' POP intensity levels were found three months after the education program. This result contrasts with the studies of Ravaud *et al.* [24] and Crawford *et al.* [28], which found reduced POP intensity scores after an educational intervention. However, in Ravaud *et al.* [24], the assessment was performed 48 hours after the intervention, compared to three months in our study. To maintain the effect of an intervention over time, it seems to be essential to establish routines that use continuous feedback and auditing, as recommended by Warrén Stomberg *et al.* [27] and Karlsten *et al.* [14]. Crawford *et al.* [28] used a medical protocol in addition to the educational intervention, which may explain the differences between the results of that study and those of ours.

The results of our study showed that the mean pain-intensity level conformed to the guidelines of the IASP [1] and the Norwegian Medical Association [15], which recommend that the patient's POP intensity level should be treated and preferably held at 3 or below (≤ 3) on the NRS-11 in the acute postoperative phase. The distribution of pain-intensity scores indicated that there was a group of patients that continued to have moderate (3.5 - 6.0) and severe (>6.5 - 10) pain, which is in line with other studies [28] [32] [33].

Our study had several limitations. The inclusion of only one hospital reduces the generalizability of the results. Moreover, the study design would have been stronger if a control group had been included, and the exclusion of records from surgical patients with fewer than three NRS-11 documentations may have influenced the results. Finally, we collected data only from the pain paper schema and not from the patients' records, which may represent a weakness of this study. We suggest three areas for future research, 1) nurses' beliefs and attitudes as this remain a major barrier for optimal POP management and calls for nurses to audit their own practice [14], 2) developing a health care culture that promotes optimal pain management which is strongly related to unit leadership, values held by the staff, nurse competency, and effective quality programs that include process and outcome indicators of pain management [14] [20], and 3) implementation of the NRS-11 in the electronic record, because it would enable systematic data monitoring. Despite the fact that pain was assessed and registered as a vital sign and documented by nurses on a regular basis using an electronic device, Carr *et al.* [34] found that POP was suboptimal managed. However, Carr *et al.* [34] found that assessment and documentation increased using an electronic device which is a prerequisite for handling POP management.

5. Conclusion

The standardized educational program conducted as a single session in this study resulted in no increase in the frequency of POP documentation using the pain-rating scale (NRS-11) and no decrease of the POP intensity level in hospitalized surgical patients assessed after three months.

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Conflict of Interest Statement

We do not have any conflict of interest with any issue discussed in this article

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