

Effects of a pain programme on nurses' psychosocial, physical and relaxation interventions

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Abstract

The effectiveness of a continuing education programme on pain assessment and management was investigated in 106 surgical cancer nurses. It was found that the programme led to a more positive attitude towards physical and relaxation interventions (such as the use of relaxation, distraction and massage techniques). In addition, an increase in the duration and quality of psychosocial interventions (provision of information, emotional support, and promotion of autonomy) was established. Furthermore, the programme resulted in an increase in the quality of physical and relaxation interventions. However, the programme did not lead to more positive attitudes towards psychosocial interventions, or to increases in the numbers of psychosocial, physical and relaxation interventions.

Keywords: Pain; Nursing; Continuing education; Training

1. Introduction

Several meta-analytic studies have pointed to a positive effect of systematic provision of information and emotional support on post-surgical pain [1–4]. In addition, there is empirical evidence that promotion of autonomy, for instance by actively involving patients in decisions about their analgesia, may result in a decrease of post-

surgical pain [5,6]. On the basis of descriptive studies [7–9] it can be assumed that nurses do apply such psychosocial interventions frequently, but that the duration and quality of the interventions are sometimes not optimal. For instance, discussions with patients are frequently brief and superficial [7,9].

Research has also been done in the area of physical and relaxation interventions. Studies indicate that when nurses promote patients' relaxation, e.g. through breathing or muscle relaxation exercises, this has a favourable impact

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on post-operative pain [10–12]. Distraction [13,14], physical and environmental comfort measures [15,16], massage [17,18] and the use of cold and heat [17,19] also relieve pain. Nevertheless, most physical and relaxation interventions are used on a modest scale in nursing [8,20–23].

Continuing education is often recommended as a way for reducing lacunas in pain assessment and management practices [24,25] and several publications have appeared in recent years on pain programmes for nurses [26]. However, only two published programmes tracked down [25,27] paid attention on nurses' psychosocial and physical and relaxation interventions (besides other programme topics). Further research in this field is thus advisable, which prompted an intervention study on the effects of a pain assessment and management programme directed to Dutch surgical cancer nurses. In this article the following research questions will be dealt with:

Did the programme lead to:

- a more positive attitude towards psychosocial and physical and relaxation interventions?
- an increase in
 - the number of psychosocial interventions?
 - the duration of psychosocial interventions?
 - the quality of psychosocial interventions?
- an increase in
 - the number of physical and relaxation interventions?
 - the quality of physical and relaxation interventions?

2. Methods

2.1. Sample

In this intervention study, five Dutch general hospitals were involved. The hospitals were chosen on the basis of geographical proximity. Entry to the hospitals was gained by contacting medical-ethical committees, nursing directors and physicians. In each hospital, two surgical wards were involved that contained both cancer

and noncancer patients. In principle, all certified nurses in the 10 wards involved were expected to cooperate in the study. Six of a total sample of 134 nurses did not, however, lend their assistance (reasons: noncompliance, $n = 2$; practical impossibility, $n = 2$; illness/pregnancy $n = 2$). All 128 nurses participating in the study met the following inclusion criteria: completed basic nursing education and involved in direct patient care activities. Of the 128 research subjects, 22 dropped out of the study (reasons: noncompliance, $n = 3$; illness/pregnancy, $n = 4$; discharge, $n = 8$; function change, $n = 7$). One of these 22 nurses also discontinued participation in the programme. The effects of the programme were determined on the basis of data from the 106 nurses who remained in the study until the last measurement point.

2.2. The programme

The continuing education programme on pain assessment and management consisted of eight weekly 3-h sessions. A follow-up meeting was held 4 months after the end of the weekly sessions. Major programme components were the transfer of knowledge and skills, and the mutual exchange of learning experiences with respect to:

- (a) pain and the assessment of pain (e.g. the uniqueness and subjectivity of pain, and characteristics of pain which should be assessed)
- (b) pharmacological pain management (e.g. types, mode of action and effects of opioids and nonopioids);
- (c) psychosocial interventions (giving information and emotional support, and promotion of autonomy),
- (d) physical and relaxation interventions (use of massage, relaxation, distraction, cold/heat, and physical and environmental comfort measures).

Approximately 3 contact hours were devoted to program item a, 4.5 to item b, 7.5 to item c, and 6 to item d. The remaining contact hours had a more general character (e.g. group evaluations). Various didactic strategies were used: introductions by the instructors, discussions by

the group as a whole and in small groups, audiovisual presentation, practical exercises and provision of relevant literature [28]. The programme took place in a room in the participating hospital and was presented by two instructors: one with a professional background in nursing, psychotherapy and nursing education and the other with a background in adult education.

2.3. Design

Effects of the programme were measured in a pretest-posttest control group design. For each of the five hospitals, random allocation was performed to decide which of the two wards would be in the experimental condition (programme) and which in the control condition (no programme). Nurses in both conditions filled in a set of questionnaires at three measurement points: just before the start of the programme (T_1); 1 month after the end of the programme (T_2); and 6 months after the end of the programme (T_3).

2.4. Instruments

The following instruments were used for measuring outcome variables (questionnaires used for measuring background characteristics are not included. See relevant literature references in Table 1).

The *Questionnaire on Attitudes Towards Psychosocial and Physical and Relaxation Interventions* is a 15-item self-developed questionnaire used to assess nurses' attitudes towards psychosocial, physical and relaxation interventions. Attitude in this context refers to the respondent's 'evaluative beliefs' [29] with respect to the usefulness of interventions. All of the items include a scale of 0–10 and a 'no opinion' option. For example, this item:

Is teaching patients how to relax muscles a useful pain control method in your work?

Absolutely unuseful = 0 0 1 2 3 4 5 6 7 8 9 10 Extremely useful = 10

[] = no opinion

The questionnaire was developed because there were no instruments in the Dutch language for measuring attitudes towards psychosocial, physical and relaxation interventions that could stand up to methodological examination. Eight pain experts evaluated the questionnaire's content validity. The questionnaire was tested (with encouraging results) on 15 nurses who did not participate in other parts of the study. Subsequently, the structure and internal consistency was determined using the data of the 106 research subjects of the intervention study. A principal component analysis for ordinal data showed that the new questionnaire is two-dimensional. The first dimension (Cronbach's Alpha = 0.69) concerns attitudes towards psychosocial interventions, while the second dimension (Cronbach's Alpha = 0.85) measures the attitude towards physical and relaxation interventions. For calculating the scores for each dimension, item scores were added up and, subsequently, divided by the total number of items of that particular dimension.

The *Adjusted Therapeutic Behaviour Scale* is a 35-item questionnaire used to determine effects on number, duration and quality of psychosocial interventions. 'Quality' in this context refers to the way in which interventions are executed. The *Adjusted Therapeutic Behaviour Scale* is an adaptation of Pool's *Therapeutic Behaviour Scale* [5]. Every item of the *Adjusted Therapeutic Behaviour Scale* includes the same 'number, duration and quality answer categories' (categories A, B and C, respectively). For example:

To inform patients about what they can do to avoid (worse) pain.

A The average number of times I practiced this intervention in the past month is:

- 1 or more times a day
- 1–4 times a week
- 1–3 times during the entire past month
- None at all

B Each time I practice this intervention I spend:

Table 1
Differences in background characteristics of 'remaining' research subjects and 'drop outs'

Background characteristics		Remaining research subjects (n = 106)			Drop outs (n = 22)		
		Experimental (n = 48)	Control (n = 58)	Test (n = 10)	Experimental (n = 12)	Control	Test
Sex	Female	97.9%	93.1%	$\chi^2 = 1.35$ $df = 1$	80.0%	83.3%	$\chi^2 = 0.041$ $df = 1$
	Male	2.1%	6.9%	$P = 0.25$	20.0%	25.0%	$P = 0.84$
Function	Head nurse/ team leader	16.7%	17.2%	$\chi^2 = 0.006$ $df = 1$	30.0%	25.0%	$\chi^2 = 0.069$ $df = 1$
	Nurse	83.3%	82.8%	$P = 0.94$	70.0%	75.0%	$P = 0.79$
Educational level	HBO ^a or greater	31.25%	41.4%	$\chi^2 = 1.96$ $df = 1$	55.6%	41.7%	$\chi^2 = 0.398$ $df = 1$
	MBO ^a	68.75%	56.9%	$P = 0.38$	44.4%	58.3%	$P = 0.53$
Participation in pain programme within past 2 years	Yes	14.58%	15.5%	$\chi^2 = 0.008$ $df = 1$	22.2%	0%	$\chi^2 = 2.947$ $df = 1$
	No	85.42%	84.5%	$P = 0.93$	77.8%	100%	$P = 0.086$
Age in years (mean (S.D.))		31.4 (9.7)	29.9 (7.1)	$t = -0.84$ $df = 82,4$ $P = 0.401$	29.8 (7.4)	26.3 (4.6)	$t = -1.24$ $df = 12,95$ $P = 0.24$
Years certified (mean (S.D.))		7.1 (8.1)	7.2 (7.9)	$t = 0.02$ $df = 103$ $P = 0.986$	6.1 (6.2)	3.2 (3.9)	$t = -1.25$ $df = 12,68$ $P = 0.24$
General work satisfaction ^b (range: 7–35) ^c (mean (S.D.))		28.7 (3.2)	29.1 (3.9)	$t = 0.47$ $df = 82$ $P = 0.64$	26.7 (3.0)	26.1 (4.3)	$t = -0.32$ $df = 14$
Experienced work load ^b (range: 4–20) ^c (mean (S.D.))		10.9 (2.6)	10.8 (2.6)	$t = -0.07$ $df = 80$ $P = 0.94$	12.2 (4.2)	10.3 (3.4)	$t = -0.94$ $df = 13$
Experienced job responsibility ^b (range: 3–15) ^c (mean (S.D.))		11.7 (1.7)	11.8 (2.0)	$t = 0.23$ $df = 8,62$ $P = 0.64$	10.4 (2.8)	11.0 (1.5)	$t = 0.49$ $df = 81$
Sensitivity to social desirability ^d (range: 0–8) ^c (mean (S.D.))		5.1 (1.8)	5.0 (2.0)	$t = 0.16$ $df = 79$ $P = 0.87$	–	–	–

^a HBO = Dutch higher professional education level, MBO = Dutch secondary professional education level.

^b Measured with Boumans' work satisfaction scale [32].

^c The most favourable scores are in italic type.

^d Determined only for the group of nurses that participated until T₃, and was measured with eight randomly chosen items from the Dutch-language Marlowe Crowne Social Desirability Scale [33].

- Less time than the first time I completed this questionnaire
- The same amount of time as the first time I completed this questionnaire
- More time than the first time I completed this questionnaire

- C Is the way you practice this intervention different from the way you did when you completed the questionnaire the first time?
- Yes
 - No
 - Not applicable

If yes, briefly describe the change:

An earlier version of the questionnaire was tested, and established as practicable, in a pilot study with 10 nurses [30]. Subsequently, the structure and internal consistency were determined using the scores on the 'number-answer category' of the 106 research subjects in the intervention study. In order to be able to present changes in number, duration and quality of interventions every time for the same group of items, we determined the questionnaire's structure on the basis of only one answer category. Particularly the 'number-answer category' was chosen because its formulation made it the most suitable for determining the structure. A principal component analysis for ordinal data indicated that the *Adjusted Therapeutic Behaviour Scale* has two dimensions. The first dimension (Cronbach's Alpha = 0.91) concerns *general* psychosocial interventions. With the term 'general', we mean not specifically focused on the pain problem of the patient. Dimension 2 (Cronbach's Alpha = 0.78) is related to *pain-focused* psychosocial interventions. The scores for each dimension were calculated as follows. For the 'number answer category': the answers on each item were converted into precise number of interventions. (The precise numbers were 80 ×, 12 ×, 2 × or 0 × per month, respectively. For more information about reasons for and procedures of conversion, we refer to the questionnaire's handbook; available on request.) Then the precise numbers were added up and divided by the number of items in that dimension. For the 'duration answer category': the number of items on which less time was spent on an intervention was subtracted from the number of items on which more time was spent on an intervention. For the 'quality answer category': respondents' open answers were first studied to evaluate whether there was an increase, a decrease or no change in quality. This was done for each item by both the first author and an independent evaluator. When their evaluations did not correspond (which was the case in less than 5% of the answers), the respondent's answer on that item was treated in the analysis as 'missing.' Subsequently, for each

respondent the number of items indicating a decrease in quality was subtracted from the number of items indicating an increase.

The *Physical and Relaxation Interventions Questionnaire* is a 12-item questionnaire used to determine changes in number and quality of physical and relaxation interventions. All of the items are succeeded by the same 'number and quality answer categories' (category A and B, respectively). For example:

To teach a patient how to relax by breathing in a particular way

A The average number of times I practiced this intervention in the past month is:

- 1 or more times a day
- 1–4 times a week
- 1–3 times during the entire past month
- None at all

B Is the way you practice this intervention different from the way you did when you completed the questionnaire the first time?

- Yes
- No
- Not applicable

If yes, briefly describe the change:

The content validity and practicability of the *Physical and Relaxation Interventions* was established in the same way as performed by the *Questionnaire on Attitudes towards Psychosocial and Physical and Relaxation Interventions* (above). A principal component analysis for ordinal data revealed that the questionnaire has a unidimensional structure (Cronbach's Alpha = 0.70). The calculations and evaluations of the scores on the answer categories were performed in the same way as described with respect to the 'number and duration answer categories' of the *Adjusted Therapeutic Behaviour Scale*.

2.5. Data collection

Two to three weeks before each of the three measurement points, the nurses from both conditions were requested to complete and return a

set of questionnaires within 3 weeks. Whenever nurses did not return the questionnaires before the set date, they were approached by the researcher and again asked to submit them. This was not complied with in three cases.

2.6. Statistical analyses

For testing differences in background characteristics, the Student *t*-test was used for continual data and the χ^2 test for categorical data (with a significance level of 0.05, both sided). Effects of the programme were determined by MANCOVA for repeated measures, with statistical adjustment for the variable 'Hospital'. Multivariate testing of the interaction between measurements and conditions took place for each outcome variable separately. Because it was expected that the programme would only result in positive effects, one-sided testing was applied (with a significance level of 0.05). Data of some outcome variables (Tables 3, 4) initially did not meet MANCOVA's assumption of normality [31] and, therefore, on these data a root transformation was applied.

3. Results

3.1. Background characteristics

There were no significant differences between experimental and control nurses with respect to relevant background characteristics (Table 1). This applied to both the 'remaining' group at T₃ ($n = 106$) and the group of 'drop outs' ($n = 22$).

3.2. Attitudes towards psychosocial and physical and relaxation interventions

As shown in Table 2, attitudes of experimental nurses towards psychosocial interventions remained virtually unchanged over the three measurement points. This was the same for control nurses. Consequently, no significant difference in trend between the two groups of nurses was established. However, in the attitudes of experimental nurses towards physical and relaxation interventions a positive change over the three measurement points occurred (Table 2). In the control condition, there was not such a positive change, even a small negative change at T₂. Accordingly, there is a significant difference in trend between the experimental and control conditions, on the basis of which it can be concluded that the programme had a positive effect on nurses' attitudes with regard to physical and relaxation interventions.

3.3. Psychosocial interventions

3.3.1. Number

During the research period, the number of general psychosocial interventions varied, both in the experimental and control conditions (Table 3). The programme did not seem to have had any effect in this respect, which can be derived from the fact that there is no significant difference in trend between experimental and control nurses. The number of pain-focused psychosocial interventions also varied during the research period in both groups, and also in this case testing showed

Table 2
Mean scores on attitudes towards psychosocial and physical and relaxation interventions

Attitudes	Condition	T ₁	T ₂	T ₃	Measurements × condition
Towards psychosocial interventions (range: 0–10) ^a	Experimental	7.7 (1.7)	7.6 (1.4)	7.6 (1.3)	<i>F</i> = 1.06 <i>df</i> = 2,103 <i>P</i> = 0.18
	Control	7.3 (1.4)	7.1 (1.8)	7.4 (1.3)	
Towards physical and relaxation interventions (range: 0–10) ^a	Experimental	5.6 (1.5)	6.3 (1.5)	6.2 (1.5)	<i>F</i> = 7.34 <i>df</i> = 2,101 <i>P</i> < 0.001
	Control	5.8 (1.3)	5.6 (1.5)	6.0 (1.4)	

^aThe most favourable scores are in italic type.

no significant difference in trend between the two groups of nurses (Table 3).

3.3.2. Duration

One month after the programme and, to a lesser extent, 6 months after the programme, experimental nurses indicated that they spend more time on general psychosocial interventions (Table 3). Control nurses virtually showed no increase, and there was a significant difference in trend between the two groups of nurses. The conclusion is that the programme resulted in an increase in the duration of general psychosocial interventions.

Experimental nurses also show an increase in the duration of pain-focused psychosocial interventions (Table 3). This increase is the greatest soon after the programme (T_1). Control nurses demonstrate no obvious change, neither in the short nor the long term. There is a significant difference in trend between both groups of nurses, and the conclusion is that the programme

resulted in an increase in the duration of pain-focused psychosocial interventions.

3.3.3. Quality

Table 3 shows an increase in the quality of experimental nurses' general psychosocial interventions. At none of the measurement points an obvious increase in the quality of control nurses' general psychosocial interventions can be seen. Testing discloses that there is a significant difference in trend between the two groups of nurses. It can, therefore, be stated that the programme led to an increase in the quality of general psychosocial interventions.

Experimental nurses demonstrate an increase in the quality of their pain-focused psychosocial interventions as well (Table 3); this increase is also most obvious soon after the programme (T_2). Control nurses do not show any apparent increase, neither in the short nor long term. The difference in trend between experimental and control nurses is significant. Consequently, it can be concluded that the programme also led to an

Table 3
Mean scores on dimensions of psychosocial interventions

Psychosocial interventions		Condition	T_1	T_2	T_3	Measurements \times conditions
Number	General (range: 0–8.9) ^{a,b}	Experimental	5.2 (1.4)	5.0 (1.4)	5.3 (1.3)	$F = 1.04$ $df = 2,101$
		Control	4.9 (1.4)	5.2 (1.3)	5.2 (1.4)	$P = 0.18$
	Pain-focused (range: 0–8.9) ^{a,b}	Experimental	5.5 (2.0)	5.5 (1.8)	5.3 (1.7)	$F = 2.09$ $df = 2,102$
		Control	5.6 (2.0)	5.3 (1.7)	5.9 (1.7)	$P = 0.06$
Duration	General (range: –26–26) ^b	Experimental	0.0 (0.0) ^c	3.1 (4.2)	1.1 (1.7)	$F = 8.29$ $df = 2,102$
		Control	0.0 (0.0) ^c	0.02 (3.5)	0.1 (0.3)	$P < 0.001$
	Pain-focused (range: –8–8) ^b	Experimental	0.0 (0.0) ^c	1.7 (2.2)	1.1 (1.7)	$F = 17.13$ $df = 2,103$
		Control	0.0 (0.0) ^c	–0.2 (1.04)	0.1 (0.3)	$P < 0.001$
Quality	General (range: –26–26) ^b	Experimental	0.0 (0.0) ^c	2.6 (4.3)	2.3 (4.6)	$F = 8.31$ $df = 2,103$
		Control	0.0 (0.0) ^c	0.3 (0.8)	0.5 (1.3)	$P < 0.001$
	Pain-focused (range: –8–8) ^b	Experimental	0.0 (0.0) ^c	1.6 (2.1)	1.0 (1.8)	$F = 15.89$ $df = 2,103$
		Control	0.0 (0.0) ^c	0.03 (0.2)	0.03 (0.4)	$P < 0.001$

^aSquare root transformed scores.

^bThe most favourable scores are in italic type.

^cIn actuality, there was no T_1 measurement for this dimension. As, however, a change in relation to T_1 is required at T_2 and T_3 , a value of 0 was supplied for T_1 .

Table 4
Mean scores on dimensions of physical and relaxation interventions

Physical and relaxation interventions	Condition	T ₁	T ₂	T ₃	Measurements × conditions
Number (range: 0–8.9) ^{a,b}	Experimental	5.2 (1.4)	5.4 (1.3)	5.2 (1.4)	<i>F</i> = 0.21 <i>df</i> = 2,103 <i>P</i> = 0.40
	Control	5.0 (1.6)	5.1 (1.7)	4.8 (1.6)	
Quality (range: –12–12) ^b	Experimental	0.0 (0.0) ^c	1.89 (2.4)	1.09 (2.1)	<i>F</i> = 18.98 <i>df</i> = 2,103 <i>P</i> < 0.001
	Control	0.0 (0.0) ^c	0.0 (0.0)	0.06 (0.3)	

^aSquare root transformed scores.

^bThe most favourable scores are in italic type.

^cIn actuality, there was no T₁ measurement for this dimension. As, however, a change in relation to T₁ is required at T₂ and T₃, a value of 0 was supplied for T₁.

increase in the quality of pain-focused psychosocial interventions.

3.4. Physical and relaxation interventions

3.4.1. Number

Experimental nurses' as well as control nurses' numbers of physical and relaxation interventions vary somewhat over the three measurement points (Table 4). The number of physical and relaxation interventions is not affected by participation in the programme, which is indicated by the nonsignificant difference in trend between experimental and control nurses.

3.4.2. Quality

Experimental nurses do show an increase in the quality of their physical and relaxation interventions (Table 4). There is virtually no change in the quality of physical and relaxation interventions of control nurses. The difference in trend between the two groups is significant, and it can be concluded that the programme had a positive effect on the quality of physical and relaxation interventions.

4. Conclusions

The programme brought about in some, but not in every, respect the anticipated and desired changes. In the first place, there were no effects ascertained with regard to attitudes towards psychosocial interventions. This finding may be

linked with a 'ceiling effect': before the programme (T₁), the experimental nurses' average attitude score was already quite high (7.6 in a theoretical range of 0–10).

In addition, no effects were ascertained on the number of psychosocial interventions. A possible explanation for this is that nurses who participated in the programme may evaluate their own interventions more critically than previously, in which case a greater number of interventions would not always be expressed in the scores [5,34]. However, if the scores do reflect the actual situation, the lack of increase in the number of psychosocial interventions may be connected to a lack of change in nurses' attitudes towards these interventions. In addition, the lack of increase in number may also be connected to the increase in quality of psychosocial interventions; carrying out high-quality interventions may be a top priority for nurses, but not a large number of interventions. Nurses indicated in the *Adjusted Therapeutic Behaviour Scale* changes concerning quality of psychosocial interventions with written comments such as: "I now project less my own ideas onto patients", "I pay more attention to patients' emotions and experiences, and go into them in greater depth", "I now involve patients more when providing information", "I provide more comprehensive information, for instance about the reasons for and methods of treatment".

Furthermore, the programme also resulted in an increase in the duration of psychosocial interventions. In view of empirical indications that

psychosocial interventions (e.g. bedside talks) are often brief and superficial [7,9], an increase in duration can be considered as positive.

Although the programme had positively affected nurses' attitudes towards physical and relaxation interventions, the number of these interventions had not changed. This finding may be explained by qualitative interviews with programme participants [35], which indicated that nurses did not feel able to put physical and relaxation interventions frequently and regularly into practice. Among other factors, insufficient familiarity with massage, relaxation and distraction techniques, limited time and personnel, and a lack of formal implementation were stated as reasons.

However, the quality of physical and relaxation interventions did improve due to participation in the programme. In the Physical and Relaxation Interventions Questionnaire, nurses provided descriptions of these changes in quality, such as: "My information to the patient about these interventions is better and more thorough now", "I now demonstrate (relaxation) exercises myself", "I now ask patients what the effects of these interventions are".

All the positive effects are more observable 1 month after the programme than 6 months afterwards. Although the effects apparently diminish with time, they are still observable at the last measurement point. This is an indication that nurses have retained what they learned and integrated it in daily practice.

Continuing education for nurses is, however, not merely intended to bring about changes in nurses' behaviour. It becomes really worthwhile when it also produces positive results for patients. Another part of the study showed that patients' pain intensity was significantly lower among those attended by nurses who had completed the programme than among those cared for by control nurses (findings not yet published). It is, however, not completely clear whether the decrease in pain intensity can be attributed to the changes in interventions described in this article. Accordingly, an interesting question for future research is whether changes in nurses' psychosocial, physical and relaxation

interventions are reflected in patients' experiences with these interventions, and, if so, whether this is connected to a decrease in pain intensity.

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