

THE INFLUENCE OF NURSING INTERVENTIONS ON CHEST PAIN

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Does pain relief involve more than the nurse giving a pain medication, and later checking its effectiveness? A study of twelve patients experiencing 41 episodes of chest pain showed that over half of the nursing interventions observed were ineffective in pain relief.

Pain is the most frequent complaint that compels individuals to seek medical assistance (Clark, 1975). Because of the potential risk of death due to myocardial damage, chest pain is accompanied by great anxiety (Clark, 1975). Pain and the resulting anxiety can be physiologically disruptive to the myocardium due to the resulting increased heart rate, increased blood pressure, and the provocation of serious ventricular arrhythmias (Houser, 1977). Therefore, the identification of nursing interventions that may alleviate pain and its accompanying anxiety is important. This investigation was undertaken to explore the relationship of specified interventions and pain relief.

THE PROBLEM

The problem addressed was the following: what is the influence of specified nursing interventions accompanying drug administration on relief of pain of cardiac origin?

PAIN

Pain may be defined as "an abstract concept which refers to (1) a personal private sensation of hurt; (2) a harmful stimulus which signals current or impending tissue damage; (3) a pattern of responses which operate to protect the organism from harm" (Sternbach, 1968, p. 12).

Melzack's and Wall's (1965) gate control theory was utilized as the theoretical basis of the study. This theory asserts that pain impulses transmitted from nerve receptors that travel through the spinal cord to the brain can be modulated before they evoke pain perception and response (Melzack & Wall, 1977). It is proposed that the substantia gelatinosa, a highly specialized system of cells that extends the length of the spinal cord, serves as a gating mechanism (Melzack, 1973). Small diameter fibres of peripheral nerves open the gate resulting in pain, while

large fibres on the surface of the skin when stimulated, for example by rubbing, close the gate. The balance of these excitatory and inhibitory fibres determines the pain response. Factors such as past experience with pain, anxiety, and suggestion also can have an effect on the gate's modulating properties (Melzack & Wall, 1977). For example, anxiety associated with pain can increase the perception of pain by opening the gate (Melzack, 1973). Nursing interventions which focus on decreasing anxiety as well as pain would be employing the gate control theory.

Pain is also affected by other factors including the physiological effects of anxiety (Spielberger, 1966), the transmission of anxiety between nurse and patient in an unresolved pain situation (Sullivan, 1948), and the anxiety resulting from the helplessness experienced with hospitalization (Mandler & Watson, 1966).

RELEVANT NURSING STUDIES ON PAIN

Nursing investigators have found that specific nursing interventions which accompany pain relieving drugs can be more effective in pain relief than drug administration alone (Diers, Schmidt, McBride & Davis, 1972; McBride, 1967). In McBride's (1967) study, an attempt was made to modify post-operative pain by varying the type of nursing approach employed. The experimental group received comfort measures as well as pain medication. These patients had greater relief of pain than patients in a control situation in which activity was limited to only giving the medication. McBride concluded that the effective relief of pain may require, in addition to a pain medication, the relief of anxiety which can be aided by comfort measures.

Investigators also have reported that specific nursing interventions, without the use of drugs, can be effective in pain relief (Tarasuk, Rhymes & Leonard, 1965; Moss & Meyer, 1966; Moss, 1967). In the study by Tarasuk et al, a control group was cared for by the medicine nurse while the experimental group received care by a nurse with special communication skills. The experimental situation determined that 'pain' often was not the patient's prime problem. Only 31 percent of the patients requesting pain medication in the experimental group were assessed by the nurse to be in pain and received the medication, as compared to all of the patients in the control group who received medication on request. This study illustrated that effective nurse-patient interaction is important in the assessment and treatment of pain.

Returning to patients after a pain reliever is administered not only allows the nurse to assess the level of the patient's pain, but also gives patients an opportunity to discuss their pain. When patients are allowed to express their feelings toward their pain, then their level of anxiety may be decreased (McCaffrey & Moss, 1967).

Although a review of nursing research on pain relief revealed that various approaches to the alleviation of pain have been investigated, none can be found which pertain specifically to patients with chest pain.

METHOD

As a result of the review of research findings and the development of a theoretical approach to the study of the problem, four specific nursing interventions for the relief of chest pain were identified after the nurse and patient established the presence of pain:

1. the nurse administers a pain reliever to the patient.
2. the nurse administers a pain medication and verbally suggests that the drug should help to relieve the patient's pain.
3. the nurse administers a pain medication and returns to the patient within one hour of administering the drug to inquire as to the level of the patient's pain.
4. the nurse administers a pain medication and explores with the patient how pain makes the patient feel, i.e. frightened, angry, helpless, depressed, guilty or lonely.

A pain medication was involved in all the interventions, due to the seriousness of chest pain and its physiologically damaging effect on the heart if prolonged.

Combinations of these specified interventions were possible. For example, a patient could receive a pain medication accompanied by positive suggestion, and the nurse could later check the patient's pain status.

It is assumed that:

1. pain relief has occurred if the patient no longer complains of pain after the nursing intervention(s).
2. patients experience anxiety with their chest pain.

DESIGN

This study was exploratory in design and used observation as the primary method of data collection. Patients hospitalized in intensive care units because of chest pain were observed when nurses attended them for relief of their pain. Two hundred hours of observation with a very limited participant role (Pearsall, 1965) during one month in 1979 yielded 41 episodes of pain interventions. The primary investigator, who collected all data, was seated in an unobtrusive area and was able to see and hear all activity between the patients and the registered nursing staff. A patient questionnaire was utilized to obtain, as additional data, the patients' perceptions of various nursing actions frequently utilized when chest pain occurs. Patients' charts and the nursing kardex were utilized to determine the treatment regime for the patients, specifically drug therapy for chest pain.

Chest pain in this study was defined as a broad category of variations of pain due to myocardial ischemia, irritation, or pressure. This definition of pain would include the following forms of chest pain: angina, chest pain due to myocardial infarction, pericarditis, or chest pain due to dissecting aortic aneurysm. Because of the severity of a dissecting aortic aneurysm and the fact that surgery is required as treatment (Long, 1978) a decision was made to exclude this cause of chest pain in the investigation.

THE SUBJECTS

Twelve subjects (nine male and three female) from the Intensive Care Units of two metropolitan hospitals were involved in the study. All subjects who met the following criteria were included in the study: (1) those admitted with the diagnosis of myocardial infarction or chest pain of cardiac origin, except for chest pain due to an aortic aneurysm; (2) those present in the identified Intensive Care Units during the periods of observation; (3) those over the age of majority; (4) those who received pain medication while observations were taking place; (5) those able to read English or French; (6) those mentally capable of responding to the questions in the questionnaire.

The 41 episodes of pain interventions derived from the 12 subjects provided the data for the study. Since some patients were observed to require more than one pain intervention, these interventions cannot be considered to be independent, and this is a limitation of the study in interpreting the results.

The settings selected for this study were open concept Intensive Care Units in two different hospitals. This open setting allowed all activity between the selected patients and registered nursing staff to be heard and observed.

An instrument was developed to record the nursing interventions, and the pain reliever (narcotic or vasodilator) and the respective time for each of these were given. To allow for ease of coding, the four types of nursing interventions to be observed were operationalized. For example, the intervention which involved the nurse re-assessing pain status was operationalized as follows: the nurse's statement to re-assess pain status might be similar to the question 'Is your pain gone' or 'Do you feel more comfortable or relaxed now'. A one hour time frame had been set to allow the various pain relievers to take effect. This intervention included staying with the patient until pain relief had occurred.

Patients' perceptions of the interventions nurses perform for their pain relief were elicited by utilizing a five category Likert scale, with responses to 12 statements ranging from strongly agree to strongly disagree. The questionnaire was composed of the four specific interventions on which

the study focuses, plus eight other interventions derived from observation of nursing practice which might be carried out in helping patients with chest pain. These are given in Table I. An additional statement concerning the patients' feelings about their pain was included which was, "My pain made me feel:" and the possible responses were: depressed, angry, lonely, guilty, helpless, frightened, none of these.

Table I
Frequency of Responses to Patient Questionnaire

Item	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree	Total
I think it is important that:						
1. the nurse examines the painful area.	7	3	1	0	0	11
2. the nurse takes your blood pressure and pulse.	8	2	1	0	0	11
3. the nurse administers a pain reliever promptly.	9	1	0	1	0	11
4. the nurse asked you if you are in pain without you having to tell the nurse you are in pain.	6	2	2	1	0	11
5. the nurse gives you a backrub.	3	5	2	0	1	11
6. the nurse stays with you for five minutes when you are in pain.	8	1	2	0	0	11
7. the nurse reassures you that the pain reliever should help you.	9	1	1	0	0	11
8. the nurse asks you where your pain is.	10	1	0	0	0	11
9. the nurse returns in a few minutes after she has given you a pain reliever to see how you are feeling.	11	0	0	0	0	11
10. the nurse asks how long you have had your pain.	8	2	1	0	0	11
11. the nurse asks what has caused your pain and what makes it worse.	7	2	0	2	0	11
12. the nurse gives you a pain reliever and asks if your pain is upsetting you.	7	1	3	0	0	11

Questions were pretested with various patients who were having pain, including those with chest pain, and some questions were revised. The pilot study which followed indicated no further need for revisions. The questionnaire was administered to the patients the day after discharge from the Intensive Care Unit when stability of their cardiac condition existed. Content validity of the questionnaire is claimed as the items refer to interventions for pain relief found in nursing texts and the research literature, discussed previously. The reliability of this instrument used on 12 patients in this exploratory study was not assessed.

PHARMACOLOGY PERTAINING TO CHEST PAIN

Analgesics and vasodilators were employed for chest pain relief by the two Intensive Care Units. During the time period of this study, the patients comprising the study group received morphine sulphate and meperidine hydrochloride (Demerol) as analgesics, usually by the intravenous route. The Intensive Care Units utilized vasodilators, specifically nitroglycerin in sublingual or ointment preparations. Although the sublingual preparation was for complaints of chest pain, the ointment was administered on a regular schedule to those patients for whom it was prescribed, regardless of their pain status. The episodes of pain interventions were categorized into groups: those involving the administration of analgesics, and those involving vasodilators.

DATA COLLECTION

Permission to conduct this study was obtained from the Directors of Nursing Service of the selected institutions. Because the study did not involve any manipulation of the patient, patient consent was not required by the selected institutions. The nursing staff were informed that the investigator was observing the 'cardiac patient's response to care' and that further elaboration of the study, and the results, would be given upon completion. To avoid bias in the results, the staff were not informed in advance that pain was being investigated.

The day following discharge from the Intensive Care Unit to a general ward, the investigator visited each of the selected patients to inquire if they would consent to complete the questionnaire. Confidentiality was assured.

The pilot study determined if the observed interventions could be categorized reliably. Perfect inter-rater agreement was obtained between two independent nurse observers.

FINDINGS AND DISCUSSION

The findings represent the frequency of the interventions and the relationship to the pharmacology utilized. Of the 41 interventions recorded, 28 (68%) involved the nurse administering a pain reliever and either stay-

ing with the patient, or returning in order to assess pain status. Nine (22%) of the interventions involved positive suggestion: three using positive suggestion and the pain reliever; six using positive suggestion with the pain reliever and checking pain status. Four (10%) of the 41 interventions were confined to simply giving the medication. The intervention which was exploring the patients' emotional responses to the pain experience did not occur.

Since 34 (83%) of the interventions involved re-assessing pain status after drug administration, either alone or in combination with positive suggestion, this indicates that nurses are aware of the necessity to check the patient's response to pain relievers when chest pain is experienced. Nine (22%) of the interventions involved positive suggestion indicating that perhaps positive suggestion is not part of the usual repertoire of nursing care involving drug administration. From the findings, it is clear that the patients tended to receive care which was based on more than just technical skill. Further, nursing measures concerned with the physiological stability of the patient's condition were considered more important than concern for the patient's emotional responses to pain.

The effect of the specified interventions on pain relief is illustrated in Table II.

Table II
Number of Interventions by Type and Relief of Pain

Intervention Category	Pain Relief Pain Gone	Pain Not Gone	Total
Pain medication alone	3	1	4
Pain medication and positive suggestion	2	1	3
Pain medication and later checking pain status	9	19	28
Pain medication and exploring emotional responses to pain	0	0	0
Pain medication, positive suggestion, and later checking pain status	4	2	6
TOTAL	18	23	41

Table II also demonstrate that 23 of the 41 (56%) interventions did not result in direct relief of the patients' pain, and therefore further medication was required. This a very disturbing finding, considering the disruptive physiological effects of pain on the myocardium.

To fully understand the effect of the various interventions on pain relief, an examination of the drug therapy involved was warranted. Of the 18 interventions which resulted in pain relief, two utilized vasodilators, while 16 employed narcotics.

Two important relationships emerged to be evaluated: the type of intervention on pain relief, and the type of drug administrated on pain relief. To determine if there was a difference in the different nursing interventions with respect to pain relief, Chi-Square analysis revealed a significant relationship between the intervention in which the nurse later checked pain status, and all other interventions considered together (see Table III).

Table III
Number of Interventions when Pain Status Checked
and All Other Types by Relief of Pain

Types of Interventions	Pain Pain Gone	Relief Pain Not Gone	df	x ²
Pain medication and later checking pain status	9	19		
All other types	9	4	1	4.1

Similarly, when Chi-Square was applied to the relationship of drug type to pain relief, shown in Table IV, it is revealed that narcotics were much more effective than vasodilators in the relief of pain.

Table IV
Number of Interventions by
Drug Type and Relief of Pain

Drug Type	Pain Pain gone	Relief, Pain Not Gone	df	x ²
Narcotics	16	12		
Vasodilators	2	11	1	7.3

However, caution must be exercised in the interpretation of the findings. The physiological reactions of the drugs involved were based on only 12 patients. Also, a limitation in the application of the Chi-Square statistic is that the observations were not always independent since some patients had more than one intervention.

Table II demonstrates that the interventions with the highest success in pain relief were positive suggestion given along with pain reliever, and the technical administration of the drug. These interventions also involved a high percentage of narcotic administration. For example, 100 percent of the interventions involving positive suggestion utilized a narcotic, compared with 75 percent of those involving the technical administration of the drug. Because of the interaction of the two variables, narcotics and nursing interventions, it was difficult to determine whether pain relief resulted from the narcotics, the interventions, or both. These variables could not be separated in this exploratory study design.

The results from the patient questionnaire are reported in Table I. Only 11 patients responded to the questionnaire as one patient discharged himself early from hospital.

Table I demonstrates that the four most important interventions for pain relief, in the patients' perceptions, were those of prompt administration of a pain reliever, the use of positive suggestion with a pain reliever, the nurse checking the patient's pain status after drug administration, and the nurse determining the location of the patient's pain. The findings from the questionnaire also revealed that helplessness and depression were the most frequently expressed emotions of the cardiac patient.

The questionnaire results indicated that the overriding concern of both patients and staff was pain relief: it was imperative to attend to the pain rather than explore the emotional response to pain while physiological instability persists.

IMPLICATIONS FOR NURSING

The apparent efficacy of narcotics as opposed to vasodilators in the relief of pain provides impetus for further nursing research, most usefully in collaboration with pharmacy. Although the physician prescribes pain relievers, it is the nurse who administers them. Nurses are thus in a prime position to conduct studies in which the efficacy of various pain relievers on specific pain can be examined.

Nurses should be encouraged to ascertain the location of the patient's pain. Detailed assessment of pain was a patient expectation in this study.

The results indicated that nurses in the selected Intensive Care Units do determine the patients' pain status after administering a pain reliever, and that patients believe this is an important aspect of their care. Thus, this practice is important, and should be continued.

Nurses need to examine more fully the influence of suggestion on pain relief. The issue is raised as to whether nurses can influence the effectiveness of the drugs they administer. The nurses in the two Intensive Care Units employed positive suggestion only with narcotics. When being administered a vasodilator, the patients were reassured that another drug would be given if the vasodilator was ineffective. The nurses' statements when administering a vasodilator were similar to the following: "Try this, and if doesn't work I'll get you something stronger for the pain". Perhaps reassurance of another drug resulted in the patients doubting the effectiveness of vasodilators, negative suggestion in essence, and thus contributed to the resulting poor effect of vasodilators on pain relief as shown in this study.

RECOMMENDATIONS FOR FURTHER RESEARCH

Based on the findings, this study should be replicated with the following modifications: a sample of at least 60 interventions with one type of intervention per patient; control for the type of drug being used. If this replication takes place on a surgical floor, where pain is a frequent patient complaint, observation time can be reduced, or a larger number of pain episodes can be studied.

Due to the relative ineffectiveness of vasodilators, specifically nitroglycerin as revealed by this study, further investigation is recommended. A multidisciplinary approach to include pharmacy and medicine along with nursing is needed to establish the efficacy of nitroglycerin in the relief of chest pain. Also, nurses need to examine their use of positive suggestion in administering pain relievers. A controlled study would lend understanding as to the extent of the interaction of narcotics and the use of positive suggestion as a nursing intervention.

Further studies are needed with larger samples of interventions to investigate why over one-half of the nursing interventions did not result in pain relief. With a larger study group, statistical control of important influencing variables could be instituted.

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RÉSUMÉ

Effets des interventions infirmières sur les douleurs pectorales

Cette étude a examiné l'influence de certaines interventions spécifiques du personnel infirmier sur le soulagement des douleurs thoraciques. Tenant compte d'un schème théorique de la douleur et d'une revue d'observations scientifiques sur le soulagement de la douleur, les auteurs ont mis au point quatre interventions infirmières spécifiques dans le but de déterminer leur efficacité dans le soulagement de la douleur thoracique et l'anxiété qui l'accompagne: administration technique d'un analgésique, suggestion positive et administration d'un analgésique, contrôle de l'effet du médicament, administration d'un analgésique et entretien avec le malade sur sa réaction affective à l'expérience de la douleur. L'étude avait pour sujets douze malades hospitalisés dans une de deux unités de soins intensifs pour infarctus du myocarde ou douleurs thoraciques. L'étude, de conception exploratoire était fondée sur l'observation et ne faisait appel qu'à une participation très limitée de la part des malades. Bien que les résultats, déterminés par le test du chi carré aient révélé une différence d'efficacité au niveau du soulagement de la douleur entre les agents narcotiques et la nitroglycérine ainsi qu'une différence entre la démarche de l'infirmière qui contrôlait l'effet du médicament et toutes les autres interventions spécifiées considérées ensemble, les résultats ont été limités à cause de l'hypothèse de données indépendantes dans le test du chi carré. Une questionnaire permettant de classer les réactions des malades par catégorie selon l'échelle de Likert a révélé que les malades percevaient comme interventions les plus importantes, l'administration rapide d'un analgésique, l'utilisation d'une suggestion positive avec administration d'un analgésique, la vérification de l'effet du médicament par l'infirmier et la localisation de la douleur du malade par l'infirmier.