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Administration of post-operative analgesia

Liora J. Valinsky
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ADMINISTRATION OF POST-OPERATIVE ANALGESIA

LIORA J. VALINSKY, R.N.

WESTERN AUSTRALIAN COLLEGE OF ADVANCED EDUCATION

NOVEMBER 30, 1989

ABSTRACT

Pain is one of the major problems encountered by patients who have undergone surgery. The relief of pain is an important part of their treatment, and is both a nursing and a medical responsibility. Analgesics, both narcotic and non-narcotic, are usually prescribed by doctors on a pro re nata, or 'as needed' basis. The responsibility for administration lies with the nurses, and they choose the type and quantity of drug to be given. Research into the area of pain relief has shown that both nurses and doctors need further education in the judicious use of analgesics, particularly narcotics. This study was conducted on 27 patients on two orthopaedic wards in a public hospital. Using the patients' drug charts and information obtained from nurses, the relationship between the type of drug (narcotic and non-narcotic) and quantity of analgesics administered post-operatively, and several environmental and patient related variables was investigated. The study tested whether any statistically significant correlations exist between the variables (gender of the patient, age of the patient, the nurses' perception of the severity of injury, the person initiating the analgesia, time lapsed from surgery, and the shift the nurse is working) and the type and quantity of analgesia administered. It was hypothesised that positive correlations would be found for all the variables. Results showed no relationship between the age or gender

of the patient and analgesia administered. A negative correlation was found between the nurses' perception of the severity of the patient's injury and the quantity of analgesia given. There was no difference between the quantity or type of analgesia administered during different shifts. A pattern of administration was found for the first 48 hours post-operatively. Results also showed a significant correlation between the person initiating the administration of analgesic and the type of analgesic given. From these findings it was recommended that further investigation of the correlations be done using a larger population from different wards and social background. Education of both nurses and patients is essential for pain management. Some ways in which this can be improved are by using pain measurement instruments to enhance nurses' assessment skills, incorporating pain management skills into both basic and inservice education for nurses, and implementing a 'pain management nurse specialist' to educate patients pre-operatively and serve as a resource person for nursing staff.

I certify that this thesis does not incorporate, without acknowledgment, any material previously submitted for a degree or diploma in any institution of higher education and that, to the best of my knowledge and belief, it does not contain any material previously published or written by another person except where due reference is made in the text.



Liora Valinsky

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INTRODUCTION

Research Problem

One of the most common problems experienced by patients who have undergone surgery is pain. Although the development of methods to treat pain has advanced significantly (Sofaer, 1983), many studies have found that post surgical patients are routinely under-treated with regard to pain relief (Weis et.al.1983, Cohen 1980, Dodd 1986, Chapman et.al.1987). The reasons given for this are related to both medical and nursing practice.

Most post-operative analgesics are usually prescribed on a pro-re-nata (p.r.n., or "as needed") basis and therefore nurses have major influence in determining their administration. They frequently fail, however, to do this adequately (Angell 1982; McCaffery 1986 and others). This is mainly due to lack of education and misconceptions regarding the use of analgesics (Marks & Sachar 1973, Cohen 1980) and nurses' attitudes towards pain relief (McCaffery 1976, Sofaer 1983). Although pain relief should be one of the major goals in post-operative nursing care it is often not achieved satisfactorily. One of the main reasons for this is ineffective use of available analgesics by nurses.

Research Purpose

There are many factors which affect nurses' decisions in relation to the administration of analgesics. Studies have shown that the nurses' attitude towards the patients' suffering and their perception of the degree of suffering have major influence on the way nurses function. This perception was shown to vary between patients of different gender, age and nationality, and many other factors (Davitz & Davitz 1981).

The purpose of this study is to investigate the relationship between choices made by nurses when administering post-operative analgesia and different situational variables which may have influence on these choices.

Research Questions

The questions for study are: Are the quantity and type (i.e. narcotic and non-narcotic) of analgesics administered by nurses to post-operative patients related to the following factors:

- * Gender of the patient
- * Age of the patient
- * Severity of the patient's injury as perceived by the nurse
- * The initiator of analgesia administration

- * The shift the nurse is working
- * Time lapsed since the patients' return from theatre.

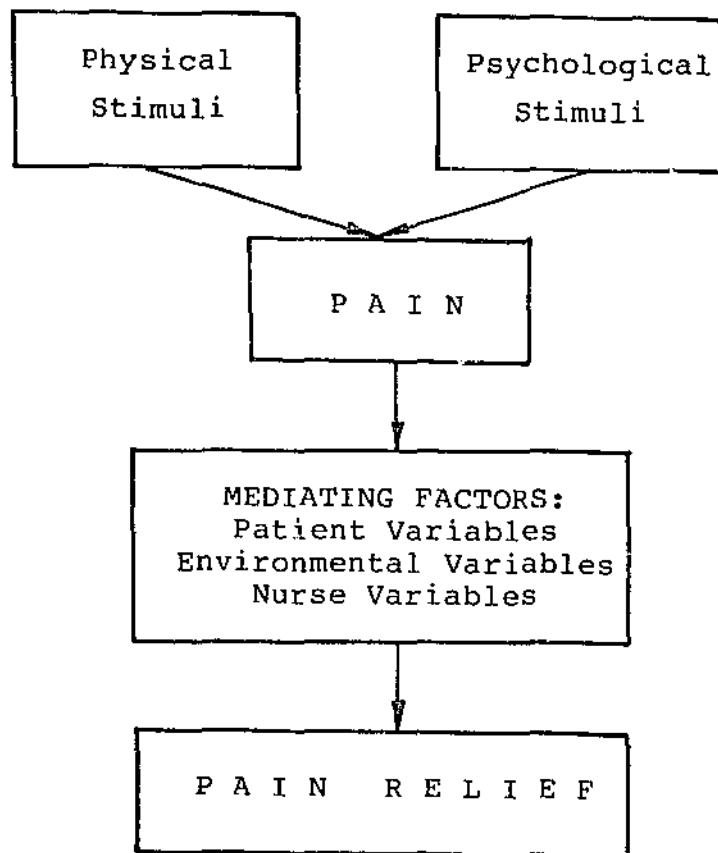
Research Hypotheses

1. There is a statistically significant correlation between the gender of the patient and the quantity of analgesia administered.
2. There is a statistically significant correlation between the age of the patient and the quantity of analgesia administered.
3. There is a statistically significant correlation between the nurses' perception of the severity of the patients' injury and the quantity of analgesia administered.
4. There is a statistically significant correlation between the person initiating administration and the type of analgesic given.
5. There is a statistically significant correlation between the type and quantity of analgesia administered and the shift the nurse is working.

6. There is a statistically significant correlation between the time lapsed from surgery and the type and quantity of analgesic administered.

Conceptual Framework

Diagram I : Conceptual Framework



The concept of pain is extremely difficult to define. It is described as a situation where physical and psychological discomfort interfere with the individuals' ability to function.

McCaffery (1979) states that pain is usually a combination of mental events and physical stimuli, and "pure" psychogenic or physiological pain is very rare. Anxiety is usually related to acute pain while depression is associated with chronic pain.

McCaffery also describes the psychological aspect as being either situational or associated with the individual's characteristics, and these influence the occurrence, severity, tolerance and expression of pain. It is important to understand the total subjectivity of pain, as the sufferer is the ultimate authority on his pain (Sofaer 1984).

The importance of pain relief in a therapeutic situation is discussed by many authors. Sofaer (1984) states that pain relief should be "at the very core of nursing practice". Davitz and Davitz (1981) believe that "caring for patients who experience suffering represents a central aspect of nursing practice". McCaffery (1979) writes that pain relief is a legitimate therapeutic goal, and should be of high priority in patient care. Every patient has the right to pain relief, as it is vital to psychological and physical wellbeing, and pain may hinder the patient's recovery (McCaffery 1979).

What, then, is the role of the nurse in the relief of pain? The concept of role is defined as the carrying

cut of the rights and obligations associated with a status. It is a social and professional expectation of the nurse to alleviate suffering. As pain and suffering are closely related concepts, pain relief is central to the role of the carer (Davitz et.al. 1981). The vast difference in attitudes between cultural and ethnic groups of nurses in the way they perceive patients' suffering (Davitz et.al. 1981), shows the variety of behaviours that can be associated with the same role in different situations.

If the nurse's attitude towards pain relief is a socially learned behaviour, and individual to every nurse, how can it be altered to enable all nurses to function at a satisfactorily level in this area? Davitz and Davitz (1981) ask whether nursing education can be altered to accommodate the development of commitment and empathy together with the high level of technical competence required for nurses to fulfil their role. Sofaer (1984) sees pain relief as an urgent priority in nursing education. She believes the outcome of pain relief can be significantly improved by increasing nurses' knowledge and awareness in this area.

This study is designed to identify specific environmental and patient-related factors which may be utilised to define more sharply the needs of nursing education.

REVIEW OF LITERATURE

Empirical Studies

Dolorology, or the study of pain (McCaffery, 1979) has been studied by almost every professional discipline throughout time. A survey conducted by Lindeman in 1975 (McCaffery, 1979) described pain management as one of the subjects with the greatest potential for study related to clinical nursing. Davitz & Davitz (1981) conducted many studies related to nurses' inferences of pain and psychological distress in patients. These studies compared inferences for many situations among nurses of different backgrounds, origin, age, specialties and nationalities. They also compared inferences for patients of different sex, background, ethnic origin and many other factors. Large differences were found between various groups of nurses in the way they perceived individual patients' degree of suffering.

Marks and Sachar (1973) conducted a survey of medical patients and house staff physicians in two large hospitals in New York. They compared patients' perceptions of pain relief with the analgesia prescribed and administered for them. This was done by structured interviews with the patients and chart review. The study included 37 patients who had received narcotic analgesics for 48 hours. Although 73% (n=37) of the patients

reported being in moderate to severe pain, patients had received "substantially less" analgesics than ordered. A significant lack of correlation was found between the patients' expressed satisfaction of pain relief, and their actual satisfaction when questioned more specifically. The findings were described as "Another type of drug misuse - the failure to treat patients in severe pain with adequate doses of narcotic analgesics" (p.173). They recommended further study on interpretation of p.r.n. order.

Cohen conducted a two part study in 1980 which looked at the adequacy of pain relief among post-surgical patients in six surgical wards, and the ways in which nurses chose analgesics. She stated that "much of the responsibility for the comfort of the patient in pain rests with the nurse who must assess the patient's pain, make an appropriate decision about whether or not to give the analgesia, which one to give, which dose to give and what time to administer it"(p.264). One hundred and nine patients, aged between 18-69, were included in the study. They all had p.r.n. orders for analgesia and were conscious and orientated. An adapted version of the Marks & Sachar (1973) questionnaire was used to interview the patients, and nurses were given vignettes of surgical patients as well as multiple choice questions. The findings were similar to those from Marks & Sachar's study (1973). Seventy

nine percent (n=109) of the patients stated that pain relief was adequate, but responses differed when specific questions about their pain were asked. Over 80% of patients had received less than the prescribed amount of analgesia, and the majority of these were in moderate to severe pain. Patients claimed to be afraid or unsure about requesting analgesia, but stated there was no difficulty obtaining analgesia at night. The findings from the nurses' questionnaires were that 82% (n=121) of nurses thought that administration of analgesia was adequate, differing significantly from the patients' response. The main criteria described by nurses on the questionnaire for choices of analgesia were: size of the patient, severity of pain, type of surgery, time lapsed since surgery, and age of the patient. Sex of the patient, time of day, non-verbal behaviour, frequency of request, attitude and insistence were rated insignificant. On the vignettes the nurses' choices of analgesia were greatly below the amount adequate for the patients, with significant difference between patients of different sex (male patients were given more analgesia than females). The investigator concluded that patients expect to be undermedicated, as they expect to have some degree of pain. Cohen recommends further research into differences between male and female patients, and states the need for improved education on the use of narcotics.

A comparison of patients' perceptions of post-

operative pain, before and after implementation of an education programme for nurses on pain relief was conducted by Sofaer in 1983. The study was conducted in four orthopaedic, gynaecology and surgical wards in three hospitals. Patients were divided into two groups, one studied before implementation of the programme and the second after completion. Patients were interviewed on the third post-operative day using a graphic rating scale. The patients were interviewed again at home following discharge to ascertain their general perceptions of pain relief in hospital. The nurses were interviewed regarding their attitudes, beliefs, values and knowledge about pain relief. The study was not complete at the time of publication. Preliminary findings showed that the education programme significantly improved the patients' stated degree of pain, and that nurses found the programme interesting and beneficial. No further report of this study was found in publications to 1989.

In a study conducted by Dodd (1986) in orthopaedic, surgical and urology wards, patients were assessed for pain levels during activity and at rest over three post-operative days. Only 22 patients were included in this study. Findings showed that patients experienced "unacceptably high" levels of pain, and that there was no consistent pattern in the way analgesia was prescribed and administered. In the investigator's opinion, the

reasons for this lay in inadequate pharmacological knowledge of doctors and nurses, and lack of communication between patients and nurses.

A questionnaire completed by 86 registered nurses (Chapman et.al., 1985) looked at nurses' knowledge, attitudes and administration of post-operative analgesics, as well as nurses' opinions of the doctors' prescribing habits. This was the first study of this type done in Australia. Eighty-six nurses, representing all levels of experience and training were involved. Seventy-four percent of these felt that patients received adequate pain relief. Twenty-five percent would wait for severe pain before administering narcotics. Ninety-eight percent felt it was advantageous to use p.r.n. prescriptions for analgesics. The conclusions of this study were that nurses perceive patients as having adequate analgesia, and there is a need for more emphasis on analgesic administration in nursing education programmes.

A study by Maher and Mackie (1983) on 170 children found that nurses prefer to use non-narcotics when the option is available, and the doses of analgesia are small and infrequent. Nurses were seen to interpret p.r.n. analgesia as "as little as possible"(in Chapman et.al., 1985, p.450).

Donovan (1983) conducted a study on post-operative analgesia in a large public hospital. The study included 200 patients (88 males and 112 females) aged 15-89, from 5 surgical wards. Visual analogue scales were used to assess the patients' attitudes to management of their pain. The study referred only to narcotic analgesics. Although 86% (n=200) stated they were satisfied with their pain relief, 30% were not given sufficient analgesia to cover their pain. No relationship was found between type of surgery and satisfaction from analgesia. Two thirds of the patients would have liked more frequent doses in spite of apparent satisfaction with pain relief. Dissatisfaction with analgesic administration was strongly correlated with age. Donovan states these results reflect on staff attitudes and practices, and mentions delays in administration may be due to ward routine and "logistics". As a result of this study it was decided to introduce more frequent use of intravenous and regional analgesia for post-operative patients.

In a study by Weis et.al. (1983) nurses and housestaff physicians from surgical, orthopaedic and gynaecological wards were given a questionnaire designed to assess knowledge and practice in analgesic administration. One hundred patients aged 18-65 who were mentally competent and were scheduled for elective surgery were interviewed pre-operatively and assessed 48 hours post-operatively with regard to their pain.

Although 75% (n=100) of patients thought their pain relief was adequate, more than 41% experienced moderate to severe pain during their post-operative period. Of the staff responses, only 20% of both groups (nurses n=142, doctors n=97) aimed for complete pain relief, and a small number claimed it was acceptable for patients to have some distress. Many misconceptions and potentially harmful lack of knowledge were found among the staff about analgesic use, which, according to the investigators, could be eliminated by effective teaching.

A survey conducted by Watt-Watson(1987) during a pain education programme assessed knowledge and attitudes of 207 registered and student nurses to pain relief. Scores were generally low, with only 6 nurses scoring higher than 75%, and 99 scoring 50% or less. Results showed lack of knowledge about narcotics, and similarly to previous studies most nurses aimed for reduction rather than relief of pain. One third of the nurses believed prevention of tolerance and addiction were the aims of p.r.n. prescription.

Theoretical Literature

Sanford et.al. (1986) provided a questionnaire for self evaluation on biases affecting administration of

pain relief. The questions included several categories of biases, among them sexual, racial, and age-bias, bias related to certain groups of patients, such as alcoholics, as well as preconceptions in regards to analgesics and their use and effects. General statements were then provided to assist with self evaluation, for example: "A person's sex, race and age have no bearing on his pain tolerance"(Sanford et. al. 1986).

In her article "The Quality of Mercy", Angell (1982) states that "...The treatment of severe pain in hospitalised patients is regularly and systematically inadequate"(p.89). She believes that p.r.n. prescriptions force the patient to request analgesia, and these requests may be inhibited by attitudes of the staff, therefore causing the analgesia to be given in inadequate doses at large time intervals. Friction is created when a patient desperately awaits his/her next dose, and is viewed negatively by the staff worried about addiction. Angell suggests a combination of p.r.n. and fixed interval administration, where the patient is offered p.r.n. analgesia at fixed intervals, therefore allowing the patient to control his/her own analgesia. The author calls for renewed attention and cooperation within the health team on the subject of pain relief and says: "Pain is soul destroying. No patient should have to endure pain unnecessarily"(p.99).

A situation similar to this is described by Weiner (1975). Among patients with back pain, where assessment is difficult, patients are forced into hiding their pain both by facial and verbal expressions of the staff and 'delaying tactics' when administering analgesia. Weiner concludes that increased cooperation and self awareness among staff, as well as increased knowledge of pain management are essential to improve patient care.

Infante et.al.(1987) state that pain relief is one of the main goals of orthopaedic care. Personal judgements, fear of narcotic addiction, lack of knowledge and organisational constraints are identified as some of the reasons for inadequate pain relief. The time of day, staffing patterns and unit setting (type of ward) are some of the organisational problems isolated, which are exacerbated on evening and night shifts. A comprehensive approach to pain relief, involving the patient and effective assessment are necessary to improve the quality of orthopaedic nursing care.

Another problem area for pain management are Intensive Care Units. In her discussion of the nurses' role in pain control for patients in this area, Hill (1985) believes that the nurse must assume that the patient is the authority on his pain, while the nurse is the authority on methods of pain relief. Setting realistic goals, involving the patient and frequent

evaluation are seen as positive steps towards effective pain relief. Use of the intravenous route for analgesic administration is seen as more effective than other routes for severe pain, and alternative methods of pain relief (such as heat, cold etc.) are viewed favourably.

Sofaer (1984) suggests that the patients' recovery and rehabilitation are delayed by unrelieved acute pain. Even when analgesia is inadequate, patients feel guilty about reacting to pain, and are reluctant to request analgesia. Sofaer believes it is essential to raise awareness in all nurses regarding the importance of pain management.

McCaffery (1976) discusses what she terms "undertreatment of acute pain with narcotics". The misconception that narcotics should only be administered for severe pain is one of the main reasons for undertreatment. Patients' reluctance to request analgesia and their reliance on nurses to offer pain relief also contribute to the problem. She states that severe pain is more easily prevented than treated effectively, and larger, more frequent doses of narcotics should be given when pain is moderate. The individual patient's response to analgesia should determine subsequent administration. The need for education of nurses and doctors, and consequently patients, on pain relief is of major importance for increasing effective

use of analgesics.

In a later paper, McCaffery (1987) states Meperidine (Pethidine) administration is done automatically rather than individually and this increases the drugs' adverse effects. She believes the doses given are too low for adults, and the I.M.I. route takes longer and does more damage, and frequency of administration is insufficient. The p.r.n. method of administration is seen to increase pain and anxiety.

The use of p.r.n. analgesics is condemned by Alexander et.al. (1987, p.102):

"The p.r.n. or 'on demand' prescription is especially difficult to administer, since demands by each patient occur, and must be responded to, at irregular intervals. The demand itself represents inadequate analgesia, the cumulative effect of preceding doses is difficult to assess, and the administration of drugs, especially controlled drugs, is time consuming and usually delayed. It is actually less time consuming to offer analgesics to all post-operative patients at relatively frequent intervals".

Furthermore, the only study which showed no improvement in pain relief with patient controlled analgesia (Ellis et.al. 1982, in Alexander et.al.1987, p.126) reported an unusually high frequency of nurse administered analgesia in the control group.

In Hosking et.al.(1985,p.74), the nurse's attitude is believed to be of vital importance in the effective use of analgesics. Empathy, acceptance and rapid response to the patient's need greatly enhance administration of analgesics. It is the nurse's responsibility to administer the appropriate dose of analgesic at the appropriate time. Hosking et.al. (1985 p.82) also state that patients' responses to pain vary, and are affected by their age and the severity of their injury.

Summary

It is evident from the literature that there is a great need for improving pain management for all patients, and especially post-operative patients. Further research into this area is essential, particularly with regard to administration of p.r.n. analgesics. Most of the research reviewed was conducted by doctors on nursing practices. This stresses the need for nursing research into administration of post-operative analgesics.

Specific suggestions for future investigation were related to factors affecting administration, and patients' sex, age, and attitudes towards requesting analgesia were some of those mentioned. Some of the studies mentioned ward routine and procedures, and staffing levels as examples of problems hindering appropriate pain management.

An increasing volume of available information and knowledge related to pain relief will guide the nursing profession towards improvement of nursing education, a need identified by all the authors reviewed.

RESEARCH DESIGN

The study was conducted on two orthopaedic wards in a large public hospital. The population included in the study were patients with orthopaedic injuries which required surgical intervention or intervention under a general anaesthetic. Information was obtained from the patients' medication charts and medical notes, as well as a data sheet filled in by the nurses. Additional information was obtained from a severity of injury scale filled in by the nurses after all other data was obtained. All collected data was then investigated for significant relationships.

Operational Definitions of Terms

Patient:

Inpatients in the ward where the research was conducted.

Post-operative:

Following surgical intervention or a procedure which required a general anaesthetic.

Analgesic:

A drug given to achieve pain relief. Subdivided

into:

Narcotic Analgesic: Analgesic included in the Schedule 8 list of drugs. Given intramuscularly. Also seen as I.M.I. (Intra-muscular injection) analgesic.

Non-Narcotic Analgesics: Not included in the Schedule 8 list of drugs. Given orally.

Nurse:

Any Registered, Enrolled or Student nurse who administers analgesics to a patient on the wards.

Study Setting

The study was conducted in two wards in a large public hospital. One of these wards is exclusively an orthopaedic ward, and the second is a combination of orthopaedic and neurosurgery.

Patients in this study were observed for 48 hours post-operatively. This was the time frame used in previous studies related to analgesics (Marks et. al., 1973, Cohen, 1980).

All nurses in both wards participated in the study, in that data collected from the patients medication charts included analgesics given by all nurses.

Study Population

The patients included in this study were a convenience sample of patients admitted to the wards during the period of data collection. Data was collected for one month.

The criteria for inclusion of patients were:

1. Patients who sustained orthopaedic injuries.
2. Patients who underwent surgery or a procedure requiring a general anaesthetic following this injury.
3. Patients who were conscious and orientated to ensure their ability to request analgesia.

Patients who had sustained multiple injuries were excluded from the study. These patients would be expected to undergo several surgical procedures and remain on narcotic analgesics for a relatively long period of time. It would also be difficult to define their severity of injury in relation to a specific procedure.

There were 27 patients in the study aged between 15 and 91 years. There were 10 female patients and 17 male. Data from two of the patients were not used as one was transferred to a different ward halfway through data

collection and the second became confused post-operatively.

Assumptions and Limitations

It is assumed during this study that all analgesics administered to patients were recorded on the medication chart as legally required.

A limitation of this study would be the nurses' awareness of the study procedures. Analgesic administration may have been altered by this. This was minimised by ensuring the nurses were aware that they would remain anonymous in the study as it involved patterns of administration rather than personal behaviours.

Undue influence on patient behaviour was prevented in two ways: (1) Most of the patients were unaware of data collection while it was being conducted (see Ethical Considerations), and (2) The consent form did not relate specifically to analgesics, but requested general permission to obtain information from the patient's records (Appendix 5).

The study was also limited in that it was only related to analgesics and did not investigate any other

methods of pain relief which may have been used, such as hot packs.

Ethical Considerations

This study was approved by the Western Australian College of Advanced Education Ethics Committee and The Ethics Committee of the hospital involved. The patients included in the study were requested to sign consent forms (Appendix I), giving their agreement to participate in the study. Due the nature of the wards, patients were admitted and taken to theatre at all hours, and it was difficult to approach them pre-operatively. Patient data collection was commenced immediately post-operatively, and was therefore commenced before the consent forms were signed. Once patients had recovered from the general anaesthetic they were approached and their participation requested. If the patient did not agree to participate in the study the data collected on this patient was discarded. Only one of the patients approached refused to participate.

It was also necessary not to refer specifically to analgesia when explaining the study to the patients, as it was considered this would affect their behaviour and distort the findings of the study. The patients were aware that the study was related to post-operative nursing care. Both of these measures were discussed with

and approved by the Head of the hospital Ethics Committee. The identities of both patients and nurses remained confidential.

INSTRUMENTS AND MEASURES

Data Collection Sheet

Information regarding specific doses of analgesics was collected on Data Collection Sheets (Appendix II). This included information for future identification of the dose described, such as the patient's name, date and time of administration, and the type and quantity of analgesic given.

The following data were collected:

Initiator:

The person who initiates the administration of any given dose of analgesic. If the patient has requested analgesia the initiator is defined as Patient (P). If the nurse has offered the analgesia to the patient, the initiator is defined as Nurse (N).

Three columns were used to describe the initiator on the Data Collection Sheet. The first one was marked 'PT REQ' (patient request), and the other two were marked 'NSE INIT' (nurse initiated), and divided into 'ROUND' (during drug round) and 'OTHER' (between drug rounds). A column was left for any comments the nurses wanted to make in regards to the each administration, i.e. whether this was the patient's first request, whether specific circumstances necessitated analgesics, etc.

Validity: The only information obtained from these charts alone was the initiator of analgesic administration. There were only three possibilities when recording this information, and these were well defined and left no room for misinterpretation of what was required.

To ensure the reliability of this tool, precise use of these sheets was explained to all the nurses using them. Simple guidelines for filling in the initiator were given to them (e.g. if the patient rings the bell, or calls the nurse and specifically asks for pain relief, or tells the nurse he has pain, he is the initiator). The information obtained from these sheets was straightforward, and the nurses were requested to fill them in as close to the time of administration as possible to prevent memory distortion. To avoid bias in documentation the nurses were assured they would not be identified, as this was not necessary for the study.

Patient Data Sheet

The following demographic data about each patient, and information about the analgesics given to him/her was collected on Patient Data Sheets (Appendix III):

Age of the Patient:

Cohen (1980) found that age was seen by nurses as an important criterion for selection of medication for pain. Donovan (1983) reported that patients' satisfaction with pain relief was strongly correlated to their age. This study therefore used age as a variable. This information was obtained from the patients' notes.

Gender of the Patient:

The patient's sex was not seen by nurses as a relevant criterion for the selection of analgesia in Cohen's study (1980). However, significantly different doses of analgesics were recommended for male and female patients on vignettes given to nurses in the same study. Further investigation of this is therefore warranted.

This category is divided into M (male) and F (female).

Patient's Diagnosis/Procedure Performed

The patient's diagnosis or the procedure he/she underwent was collected on this sheet to develop the 'Perceived Severity of Injury Scale' at a later stage.

Time:

The date and time of each dose of analgesic given to the patient were recorded. This enabled analysis of the doses given in terms of time lapsed from surgery and time of the day.

Previous papers have mentioned a relationship between nursing routine and administration of analgesics (Knight & Mehta, 1978 in Chapman, 1987, Donovan, 1983). A study by M. Donovan (Clinical Update, Nursing 88, April 1988) found that nurses undermedicated patients at night under the misconception that sleeping patients had no pain. This study looked at the differences in the quantity and type of analgesics administered at different times of the day. This variable was divided into three categories named Shift 1 (SH1), Shift 2 (SH2) and Shift 3 (SH3), similar to the shifts worked by the nursing staff:

SH1 or A.M. shift from 0730 to 1430

SH2 or P.M. shift from 1430 to 2130

SH3 or NOCTE shift from 2130 to 0730.

The times were set according to observed ward routine. For example, although morning shift commences at 0700, the first half hour is spent in handover and night staff remain on the ward during this time. Similarly between 1330 to 1430 afternoon staff are

usually at handover, and between 2100 and 2130 night staff are at handover. The shifts were therefore defined according to the staff actually caring for the patients at the time.

Type of Analgesic

The studies reviewed investigated pain relief only in relation to narcotic analgesics (Donovan, 1983, Marks et.al., 1973, Cartwright, 1985, Cohen, 1980). However, oral analgesics are both prescribed and administered routinely to post-operative patients. Both narcotic and non-narcotic analgesics were therefore investigated in this study. These were defined according to the route they were given - I.M.I. and ORAL.

Although Panadeine Forte, the most frequently used oral analgesic, contains a small amount of Codeine, it will be classified as non-narcotic due to its relative weakness compared to other narcotics. Both Hosking (1985, p.105) and McCaffery (1976) have defined it as being equivalent to aspirin in efficacy. It is also not included in the Schedule 8 list of drugs.

There were several varieties of narcotics administered to patients. For analysis purposes the doses

were converted to the pharmaceutical equivalent for Pethidine. This information was obtained from the senior pharmacist at the hospital where the study was conducted (see Appendix IV).

Data in relation to the patients' medication was collected from their medication charts.

Percentage of Analgesic:

Although the total quantity of analgesics which may be given to a patient throughout his/her hospitalisation is prescribed by his/her doctor, in most cases the actual quantity given is a nursing decision. As this study is directly related to nursing the variable looked at was the amount of drug administered expressed as a percentage of the total prescribed quantity over a period of 48 hours post-operatively. Other studies have found this variable useful when investigating analgesic administration (Cohen, 1980, Marks et.al., 1973).

The percentages of analgesics administered were calculated using the total dose prescribed on the patients' medication charts.

Doses of analgesic:

Although the efficacy of analgesics depends both on

quantity and frequency of administration the studies reviewed investigated either the relationship between the quantity prescribed and quantity administered (Marks et.al.,1973, Cohen, 1980) or the number of doses given (Cartwright, 1985) rather than the specific quantity of drug given each time. Observation of drug charts on the wards shows that nurses usually administered the full quantity prescribed each time, with longer time intervals between doses rather than smaller doses. The term 'doses' will therefore indicate the number of times the patient was given analgesics, and not the quantity of drug given.

Perceived Severity of Injury Scale:

Perceived Severity of Injury was defined as the nurses' perception of the patients' severity of injury. To obtain these scores a data sheet was designed listing the procedures which the patients in the study had undergone, after patient data collection was completed (Appendix IV). The nurses were asked to mark on a scale from 1-5 (1=mild, 3=moderate and 5=severe), how severe they perceived each injury to be. The scores were then analysed and the mean of all the nurses' scores obtained for each injury.

The procedures the patients had undergone were used for this data sheet rather than their injury as it was

considered that the injury was better defined in this manner. For example a certain fracture can range from simple to severe, but a simple fracture will be "closed-reduced" that is, aligned without surgical intervention, whereas a severe fracture will require "internal fixation", or insertion of a nail or screw.

Validity: As previously discussed the severity of an orthopaedic injury is more clearly defined by the procedure required to correct it. The nurses marked the chart after patient data were collected and specific information regarding the patient (e.g. sex, age and side of injury) was not supplied. In this way it was ensured that the scores were related only to the injury itself, and not influenced by the nurses attitudes to other factors. Although definitions of the words "mild", "moderate" and "severe" may vary between nurses, this would also reflect their attitude to the injury itself.

DATA COLLECTION PROCEDURES

Following approval from the required hospital authorities the study was discussed with the nursing staff on the wards. It was extremely difficult to include all nurses, as only a relatively small number of nurses are present and available on the ward at a given time. The majority of nurses were contacted by approaching both groups of nurses during handover and individually on all shifts. The study was also discussed with all ward clerks on the wards, and their assistance requested, as most of the admissions and theatre scheduling are processed by them.

Initially the study was explained and suggestions regarding collection methods and convenience of these were requested to increase participation. Letters explaining the study and collection procedures were posted in several visible locations on the wards (Appendix V).

Guided by the nursing staff's suggestions, data collection sheets were placed in three places on each ward: one on each medication trolley (there are two on each ward) and one on the counter where narcotics are checked. In this way all locations where analgesics are obtained were covered.

When eligible patients were admitted to the ward and scheduled for theatre their drug charts were marked to identify their inclusion in the study. This was done with the assistance of nursing staff and the ward clerks when necessary. Forty eight hours post-operatively the identification stickers were removed to avoid excess documentation, and all the required data were transcribed to Patient Data Sheets (Appendix III) for analysis.

To ensure data collection sheets were filled by nursing staff daily presence of the researcher on the wards and regular reinforcement was required throughout the period of data collection. Data collection was ceased after one month due to time constraints.

Although a comparison between the two wards in terms of analgesic administration would have been interesting, this was impossible due to the small number of patients included from one of the wards ($n=2$, 8%). This may have been due to a smaller number of orthopaedic admissions as well as reduced participation by nursing staff.

When patient data collection was completed 21 nurses from both wards (a convenience sample of all nurses present on the wards at the time) were given a Severity of Injury Scale (Appendix IV) and asked to assess how severe each injury was, on a scale of 1-5. As it was marked by the nurses between scores (e.g.1.5, etc.), the

scale was later regarded as a 1-9 scale to facilitate data analysis.

RESULTS

An evaluation was conducted of the quantity and type of analgesia received by the patients in relation to percentage of analgesia administered and amount of doses administered.

The following table illustrates the percentage, from the total dose prescribed, of both types of analgesia which was given to the patients during the first 48 hours post-operatively.

Table 1 : Type of Analgesics Administered

PROPORTION OF PRESCRIBED ANALGESICS			
ANALGESIC TYPE	RANGE	MEAN	(SD)
I.M.I.	0 - 98%	32%	(26%)
ORAL	0 - 75%	40%	(20%)
I.M.I + ORAL	---	71%	(20%)

On examination of the number of doses of IMI analgesia, the majority of patients were given between 1 and 8 doses, with an average of 4.7 doses per patient.

The following table illustrates an analysis of the quantity of analgesics administered expressed as a percentage of the total dose prescribed, to male and female patients.

Table 2 : Amount* of Analgesia Administered to Male & Female Patients

ANALGESIC	SEX	N	MEAN	(SD)
IMI	F	8	54.000	(28.318)
	M	17	48.176	(35.875)
ORAL	F	8	45.875	(27.040)
	M	17	33.235	(31.143)

*Amount is expressed as a percentage of the total dose prescribed over a 48 hour period.

A t-test showed that there was no statistically significant difference between the percentage of IMI analgesics given to male and female patients ($t=0.4024$, $P<0.666$). There was also no statistically significant difference between males and females in the percentage of

oral analgesia administered ($t=0.984$, $P<0.315$).

An analysis of percentages of analgesia administered and patients' ages using Pearsons' Correlation Coefficient showed no statistically significant correlation between age of the patient and percentage of IMI analgesia administered ($r=0.301$, $P<0.1433$). No statistically significant correlation was found between percentage of oral analgesia administered and age of the patient ($r=0.0394$, $P<0.8513$).

The Severity of injury Scale as perceived by the nurses showed mean scores from 3 out of a score of 9 (for fixation of a finger) to 7.1 (for internal fixation of a fractured femur). Standard deviations between nurses ranged from 1.4 to 2.2, which appears reasonable for the mean values. This appears to show a reasonable range of results both in terms of severity of different injuries and differences in perception between nurses. A correlation analysis using Pearsons' Correlation Coefficient showed a statistically significant **negative** correlation ($r=-0.4093$, $P<0.0421$) between the nurses' perception of the severity of injury and the percentage of IMI analgesia given. There was no significant correlation between perceived severity of injury and oral analgesia administered ($r=0.1139$, $P<0.5877$).

Using the data recorded by nurses related to the initiator of administration, a Chi-square test was done between type of analgesia administered and initiator of administration. Not all data were available as approximately 30-40% of administrations were not recorded. It is assumed that the available data were representative of the rest, and there is a similar distribution of initiator in the unavailable data. Table 3 shows the number of doses of analgesia administered in relationship to the initiator of administration and the type of analgesia given.

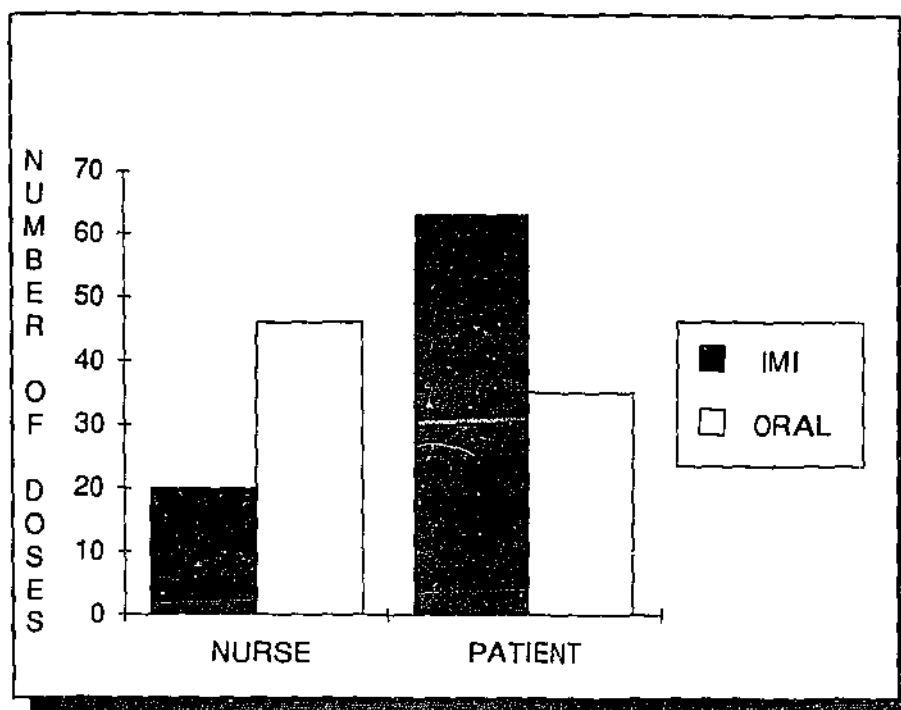
Table 3: Initiator of Administration & Type of Analgesic Given

TYPE/INITIATOR	NURSE	PATIENT	TOTAL
IMI	20	63	83
ORAL	46	35	81

It was found that there is a statistically significant relationship ($\text{Chi-square}=18.2$, $\alpha=0.001$), between the initiator of analgesia and the type of analgesia given. The following graph shows the number of doses given of both types of analgesia in relation to the

initiator of administration.

Graph 1 : Relationship Between Initiator & Analgesic Given



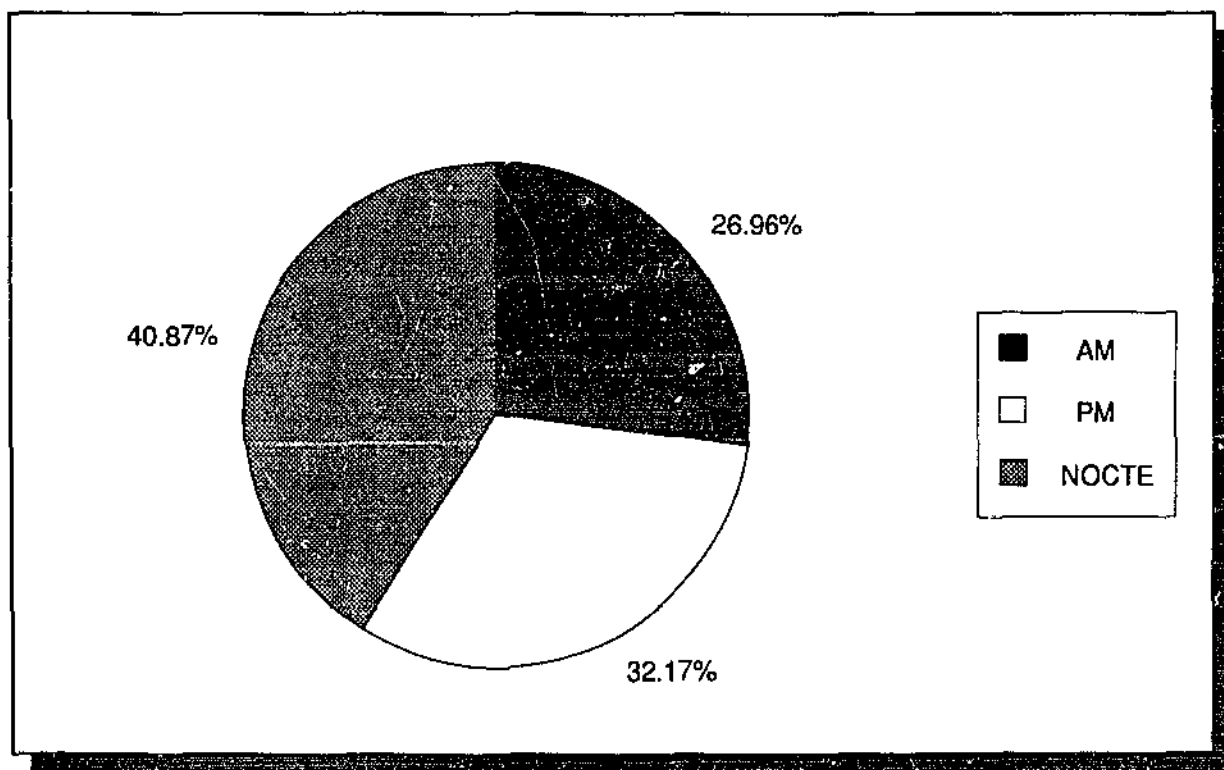
A Chi-square analysis shows no statistically significant difference ($\text{Chi-square}=2.138$, not significant at $\alpha=0.005$). in the type or quantity of analgesia administered between day, afternoon and night shifts. Table 4 shows the number of doses of both types of analgesics given during the three shifts.

Table 4 : Number of Doses of Analgesia Given Each Shift

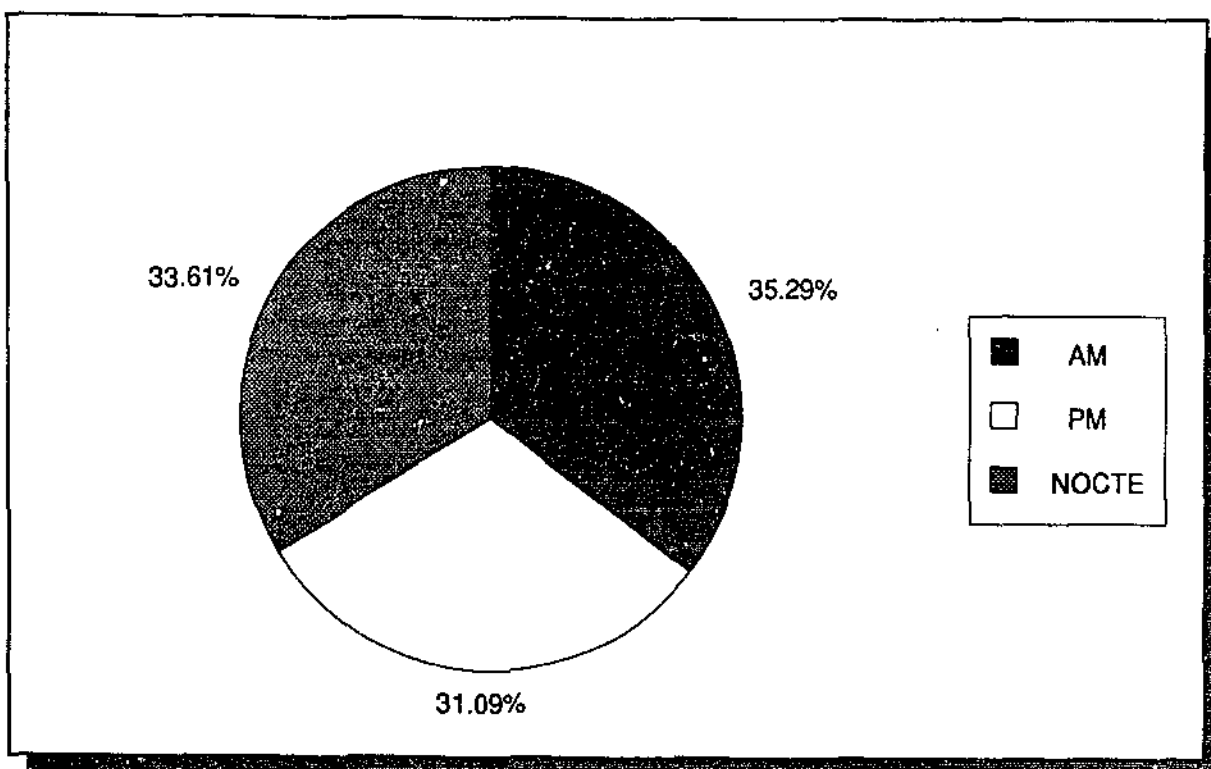
TYPE/SHIFT	SHIFT 1	SHIFT 2	SHIFT 3	TOTAL
ORAL	40	33	39	112
IMI	33	39	47	119
TOTAL	73	72	86	231

The following graphs illustrate the number of doses of both oral and IMI analgesia given each shift. The shifts are defined as A.M., P.M., and NOCTE (night shift).

Graph 2 : Number of Doses Administered During Shifts
(IMI)



Graph 3 : Number of Doses Administered During Shifts
(Oral)



The last relationship to be tested was between time lapsed from surgery and the number of doses given of each type of analgesic. The 48 post-operative hours during which patients were observed were divided into 8 periods consisting of 6 hours each for convenience of measurement. These periods were considered appropriate in terms of phases of recovery from surgery. Table 5 shows the distribution of the doses of analgesia administered to all patients in relation to time lapsed from surgery divided into 6 hour periods.

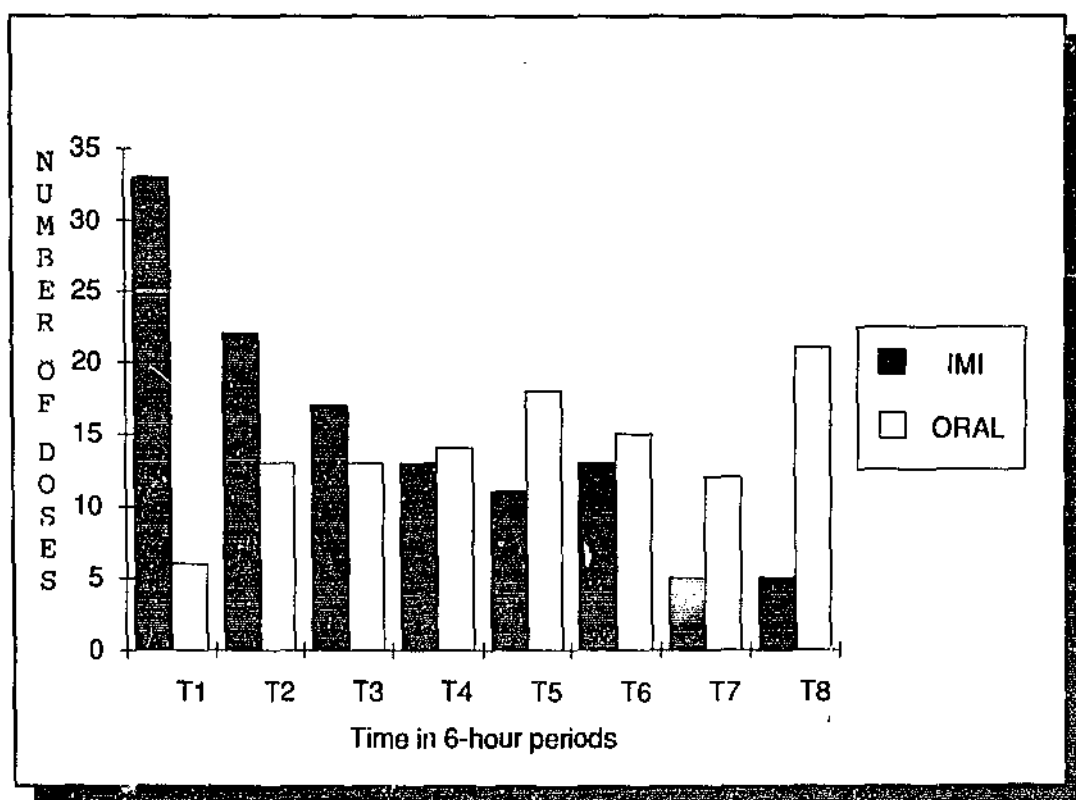
Table 5 : Number of Doses Given During 48 Hours Following Surgery

TYPE/PERIOD	T1	T2	T3	T4	T5	T6	T7	T8	TOTAL
IMI	33	22	17	13	11	13	5	5	119
ORAL	6	13	13	14	18	15	12	21	112

A Chi-square analysis showed a statistically significant difference between the number of doses of both oral and IMI analgesics given for each time frame (Chi-square=34.7, significant at $\alpha=0.001$). The following graph illustrates the pattern of administration of analgesics for 48 hours. A significant gradual decline in number of doses of IMI analgesia is seen, together with a gradual increase in oral analgesia, which

peaks 36 hours post-operatively, and then decreases, increasing suddenly at 48 hours.

Graph 4 : Number of Doses of Analgesic Given During First 48 Hours Following Surgery.



Summary

Findings of this study show the following :

There was no significant difference in the amount (expressed as a percentage) of analgesics administered to male and female patients.

There was no significant correlation between the

percentage of analgesics administered and age of the patient.

There was a statistically significant negative correlation between the nurses' perception of severity of injury and the percentage of analgesics administered.

There was a significant correlation between the initiator of administration and the type of analgesic administered. Patient initiated analgesia was usually IMI, and nurse-initiated analgesia was usually oral.

There was no significant difference in the type of analgesia, or the number of doses administered, between shifts.

There was a significant difference in the type of analgesia and number of doses administered, as time lapsed from surgery. A gradual decrease in IMI analgesia was seen, coupled with a slow increase, peak and decrease in oral analgesia.

DISCUSSION

This study investigated the relationships between the quantity and type of analgesia administered to patients during the first 48 hours post-operatively, and different situational and patient-related factors which may affect nurses' decisions in relation to analgesic administration. Specifically the study looked at age and gender of the patient, the nurses' perception of the patients' severity of injury, the person initiating analgesic administration, the shift the nurse is working and time lapsed since surgery.

General observation of the data obtained in relation to the type and percentage of prescribed analgesics administered (Table 1), shows that approximately 32% of IMI and 40% of oral analgesics prescribed were given to the patients. Although these results are similar to those found in previous studies (Marks et.al. 1973; Cohen 1980), it is interesting to note that a combination of both types of analgesia shows a much higher percentage of analgesia administered (the majority of patients received between 50-90% of both types of analgesics together). This suggests that the problem with post-operative analgesic administration by nurses may be related to the type of analgesic administered rather than the quantity. This is an important aspect of pain management that was not investigated in previous studies.

Interchanging the two types of analgesics could be a result of lack of awareness of their relative potency, a situation that would be comparatively simple to improve with specific education.

The average number of doses found to be administered to patients was found to be 4.7. This was consistent with the number of doses expressed by nurses as necessary for 48 hours post-operatively in a previous study (Cartwright 1985).

No significant difference in percentages of IMI and oral analgesics given to male and female patients was found. This is consistent with nurses' responses in Cohen's (1980) study regarding the criteria they use to determine analgesia. The same nurses' responses to vignettes (Cohen 1980) differed from these results, however, which suggests the need for further investigation of this point. The fact that this study showed no discrimination between patients of different sex can be seen as a positive finding. This merits further investigation however, as there is evidence that the requirements of males and females are different (Alexander et.al., 1987).

No statistically significant correlation was found between the percentage of analgesia administered and the patients' age. This finding differs from Cohen's (1980)

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study, which found that age was a criterion used by nurses in determining analgesic administration. Although Donovan (1983) found that patients' satisfaction with analgesia was strongly correlated with age, this does not necessarily imply that patients of different age receive different quantities of analgesia, and it could be that the patients' attitude towards pain, as well as their expectations, vary with age.

A statistically significant negative correlation was found between percentage of IMI analgesics administered and perceived severity of injury. This is extremely surprising, as it implies that the more serious nurses perceived an injury to be, the lower the percentage of IMI analgesia which was administered. This is difficult to explain. It may be that patients' behaviour alters more radically when their injury is more severe, and this elicits negative responses from nurses. Another explanation may be that nurses are reluctant to administer narcotics to patients whose injuries are more severe in fear of respiratory complications. This is consistent with nurses opinions expressed in previous research (Watt-Watson 1987), but it must be remembered that none of the patients in this study were severely injured, and therefore in immediate danger of respiratory complications.

A statistically significant correlation was found

between the initiator of administration and the type of drug given. Graph 1 clearly shows that if the initiator is the patient, IMI analgesia is given more frequently, whereas if the initiator is the nurse the drug given is usually oral. Although data were unavailable regarding administration during drug rounds, from observation of the times of administration many of the oral doses were given during medication rounds. This may be one reason that nurses tend to offer oral rather than IMI analgesics. Oral medications are more easily available and do not require the same lengthy procedure as narcotics. This is consistent with Donovan(1983), who states that ward routine and staff convenience affect analgesic administration.

Results showed that a similar number of doses of both oral and IMI analgesia were administered during morning, afternoon and night shifts. No significant difference was found between the types or number of doses of analgesia given during different shifts. Although slightly more IMI analgesia was given during night shift, this may be due to the increased length of his shift (10 hours) as compared to the other two (approximately 8 hours each). This could be seen as a positive finding, as patients were not neglected in terms of analgesic administration at any time of the day or night. Closer scrutiny of patient's pain levels at different times of

the day could determine the validity of this conclusion.

A statistically significant difference was found between the analgesia administered during different time periods following surgery. The pattern of analgesic administration over time (Graph 4) shows a slow decrease in doses of IMI analgesics from the time of return from surgery. Doses of oral analgesics increase initially, and then slowly decrease. It is interesting to note the rise in doses of oral analgesics on T8 (42-48 hours post operatively), which may indicate that pain levels in patients rise at this point in time. This may be due to routine commencement of mobilisation of the patients at this stage.

STUDY RECOMMENDATIONS

Recommendations for Clinical Practice

Individual assessment of pain is essential for adequate pain management. Vandenbosch (1988) wrote "If assessing a patient's pain were as easy as taking his temperature, pain control would be a lot easier"(p.50). Although the apparent lack of discrimination between male and female patients, and between patients of different ages may be seen as encouraging, not all patients are alike in their needs. The elderly, for example, have specific needs in regards to narcotic analgesics as drugs are distributed differently throughout their body because of their decreased muscle bulk. They also tend to have a reduced excretion rate and more pronounced side effects (Alexander et.al.1987, p.196). The negative correlation found between perceived severity of injury and percentage of IMI analgesia given, may also indicate a lack of individual assessment of pain. Improving nurses' assessment skills in relation to pain relief, "the grayest of gray areas in nursing" (Olsson et.al.1987 p.52), needs to be one of the aims of clinical nursing.

One of the ways of doing this is by using Pain Flow Charts as described by Vanderbosch (1988). For these to be used successfully it is important to use words that the patient can relate to individually, rather than

a numerical score when rating pain levels, and to use the chart as a tool and not as proof of the patient's credibility - accepting the patient's perception of his own pain. Use of these charts can encourage a trusting relationship between the patients and the nurses.

Olsson (1987) uses a method called the Loeser Model to assess pain. The model includes four levels of pain perception:

Nociception - the cause of pain at tissue level

Pain - as it is subjectively described and objectively measured (e.g. changes in pulse rate, blood pressure etc.).

Suffering - emotional impact of pain on the individual.

Pain Behaviours - expressions of pain.

Effective use of tools like this model or a pain flow chart can greatly improve pain assessment.

The most important need for improvement of pain management is education. This includes both education of nurses and education of patients. As well as including the subject of pain management in nurse education, nurses already in the work-force must be re-educated in terms of attitudes, prejudice and knowledge. The effectiveness of inservice education has already been tested by Sofaer (1983) and appeared to be positive. The finding that nurses tend to offer oral analgesia rather than narcotics

to post-operative patients indicates the lack of awareness in relation to relative strength of these drugs.

Many authors contend that patients are reluctant to request analgesics, and expect a certain degree of pain following a surgical procedure (Cohen 1980; Donovan 1983 et.al.). This study showed that nurses administer narcotics more readily when they are requested by the patient. Education of the patients would therefore be extremely beneficial towards improving their pain management. This could be done by a specific, well informed nurse, a 'Pain Management Nurse', who would routinely visit patients pre-operatively and evaluate them post-operatively. This nurse could also be available as a resource person for nursing staff and doctors.

Incorporation of regular administration of narcotic analgesics into ward routine, similarly to the medication round, including routine assessment of all patients for pain could encourage the use of narcotics rather than oral analgesics during the initial post-operative period.

Recommendations For further Study

This study included a relatively small number of patients. Although this number lies within the range included in the studies reviewed, it would be beneficial, to repeat this study using a larger number of patients to improve the reliability of the findings. A study of several wards, including several specialties such as plastic surgery and burns would be a useful basis for comparison.

Findings of this study which differed from previous study findings may be related to cultural and social differences (e.g. the relationship between analgesic administration and gender or age of the patient). These differences were highlighted in the studies conducted by Davitz and Davitz (1981). It would be interesting to conduct similar studies comparing results in different cultural settings.

Further study into attitudes and factors which motivate nurses in their choices of analgesics would greatly enhance the use of nurse education to improve pain management.

APPENDIX I : PATIENT CONSENT FORMS

Dear Patient,

I am currently conducting a study as the final part of an Honours Degree in nursing. The purpose of this study is to investigate post-operative nursing care. I am hoping that this study will assist in improving nursing care in the future.

I would like your permission to include you in this study. This will involve using information from your hospital records. You will remain anonymous in the study results.

Participation in this study is voluntary. Whether you agree to participate or refuse to do so, your treatment will not be affected in any way.

If you agree to participate please sign this consent form.

I, _____ HAVE READ AND UNDERSTOOD THE ABOVE AND AM WILLING TO PARTICIPATE IN THIS STUDY.

DATE _____

SIGNATURE _____

WITNESS _____

Thank you for your cooperation,



Liora Valinsky

APPENDIX II : DATA COLLECTION SHEET

[illegible]

DATA SHEET NO. _____

PT. NAME _____ AGE _____

DIAGNOSIS

DATE OF SURGERY _____ RTW _____

PRESCRIBED ANALGESIA _____

[illegible]

% GIVEN IN 1st 24/24 2nd 24/24

1. NARCOTIC ANALGESICS

There are a number of narcotic analgesics available for the treatment of severe pain. In treating individual patients, differences between dosage forms, pharmacokinetic parameters and adverse effects complicate selection of drug and dosage regime. The following table compares some of the characteristics of agents used in this hospital.

TABLE 1: Comparison of Narcotic Analgesics

DRUG	ONSET (MINUTES)	DURATION (HOURS)	EQUIANALGESIC DOSE TO 10MG MORPHINE (IM)
Buprenorphine	15-30(IM)	6 - 8	0.3mg(IM)
Dextromoramide	15-30(O) 20-30(PR)	1.5 - 3	10mg(O) 20mg(PR)
Methadone	30-60(O)	4 - 12*	15- 20mg(O)
Morphine <i>OM NORAL</i>	30-60(O) <i>300 (O)</i>	3 - 4 <i>3 - 4</i>	60mg(O) 10mg(IM) <i>2mg/im</i>
Oxycodone	10-15(O)	3 - 6(O) 6 - 8(PR)	10- 15mg(O) 45mg(PR)
Pentazocine		4 - 6(O)	100-200mg(O) 45- 60mg(IM)
Pethidine	30-50(IM)	2 - 3	300-400mg(O) 75-100mg(IM)

* See Comments.

BUPRENORPHINE - Buprenorphine is a partial antagonist and should be used with caution in conjunction with other narcotic analgesics. Patients who are already addicted to narcotics may develop abstinence symptoms when given buprenorphine. Unlike the other narcotics listed above, buprenorphine has respiratory depressant effects only partially reversible by naloxone, even by doses as high as 16mg. It has a high opiate receptor binding affinity and this is responsible for its long duration of action. However, time to maximum binding is slow resulting in a slow onset of action. The abuse potential of buprenorphine is claimed to be low but this statement should be treated with caution until more experience accumulates with use of the drug.

DEXTROMORAMIDE - Dextromoramide is a potent analgesic but has a short duration of action necessitating frequent dosage. It may be unsuitable for maintenance of continuous analgesia, but is very useful as a supplement medication for periods of acute pain.

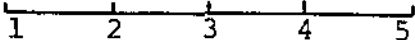
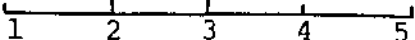
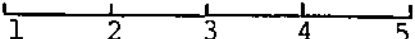
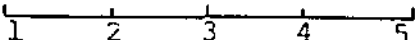
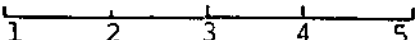
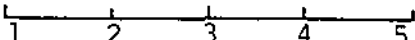
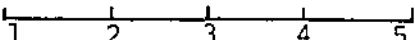
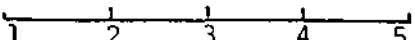
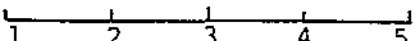
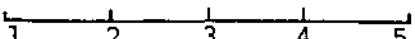
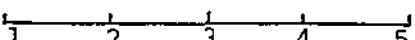
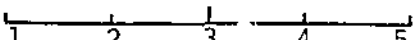
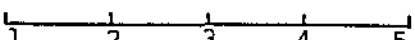
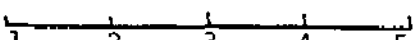
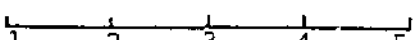
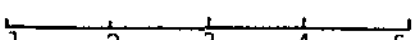
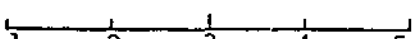
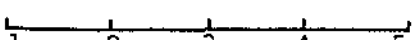
METHADONE - Continuous administration of methadone according to the manufacturer's recommendations can lead to unwanted accumulation. The pharmacokinetics of methadone indicate that the more logical method of using the drug is by initially "loading" the patient using recommended doses for 5-7 days, then reducing frequency of administration to twice a day.

MORPHINE - This has a high oral to parenteral dosage ratio (6:1) dependent on first pass hepatic metabolism. However, this ratio should be applied with caution as most trials are carried out on healthy individuals. Careful oral dosage adjustment according to clinical signs is therefore warranted.

APPENDIX V : PERCEIVED SEVERITY OF INJURY CHART

SEVERITY OF INJURY SCALE

On the following list of injuries, please mark with an X on the appropriate scale whether you think the injury is mild (1) moderate (3) or severe (5) or between 2 categories (2 or 4).

ORIF OF A HUMERUS	
REPAIR OF KNEE LIGAMENTS	
DEBRIDEMENT OF WOUND AND SKIN GRAFT	
REPAIR OF ACHILLES TENDON	
ORIF OF A RADIUS	
ARTHROSCOPY OF A KNEE	
ORIF OF A TIBIAL PLATEAU	
ORIF OF A TIBIA	
ORIF OF A FRACTURED PATELLA	
CLOSED REDUCTION OF A TIBIA AND FIBULA	
ORIF OF AN OLECRANON	
ORIF OF A FRACTURED NECK OF FEMUR	
K-WIRE FIXATION OF A FINGER	
ORIF OF A CALCANEUM	
ORIF OF A MALLEOLUS	
CLOSED AO NAIL TO FEMUR	
ORIF OF FRACTURED FEMUR	
REMOVAL OF A PREVIOUS INTERNAL FIXATOR	

APPENDIX VI : LETTER OF EXPLANATION TO NURSES

Dear Nurse,

Thank you for helping me with my research project.

The first part of this research involves extracting information from the patients' drug chart in relation to type and quantity of analgesia received.

The second part relates to who initiated administration of the analgesia. If the patient requested analgesia or complained of pain, please tick the column marked PT.REQ. If you administer the analgesia during a medication round please tick the column marked NSE. INIT. / ROUND. If the analgesic was offered by you between rounds please tick the column marked NSE.INIT./ OTHER.

Comments in relation to the patient's activity at the time, i.e. B.A. (before activity) or A.A. (after activity), and whether this was the patient's first request for analgesia, or he had requested it before it was due will be very helpful and most welcome, as well as any other comment you care to make.

I will be available on the ward to answer any queries in regard to the study. If I am not, please feel free to contact me on Ph. No. 275-6468.

Thank you again for your cooperation,

Liora

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