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Pain assessment and management in the critically ill unconscious patient in the adult intensive care units

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2010-06-25T11:02:25Z
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CHAPTER 4

DATA ANALYSIS AND DISCUSSION OF RESULTS

4.1 INTRODUCTION

This chapter describes the method of data handling and the approach used for analysis of results. Data was collected in two parts (part one and part two). At the end of data collection in each part, data files were set within the computer statistical package 'STATA 10', data entered once and then verified during the second round direct entry. Descriptive and comparative statistics were used to achieve the study objectives. The descriptive tests (frequency distribution and percentages) were used to synthesise intensive care nurses and patient participant's demographic data and questionnaire schedules. Whereas, comparative statistics were used to compare variables derived from both parts (part one and part two) of the study. Statistical tests included the Fischer's exact test. Testing was done at the 0.05 level of significance. Findings will be discussed on participant level.

In this chapter, the descriptive and comparative statistics employed to describe and synthesise the data and interpretation of the research findings will be presented.

4.2 APPROACH TO DATA ANALYSIS

In Part One, descriptive statistics were used to present the interpretation of the demographic data of intensive care nurse participants. Percentages in these findings were taken to the nearest whole number.

Descriptive statistics were then employed to describe and synthesise the distribution of intensive care nurse's responses on parameters that could be used for pain assessment inclusive of ten item scores derived from collapsing the categories on the Likert scale where 1, 2 and 3 were grouped together to form a disagree category, while 4 and 5 were grouped together to form an agree category. Collapsing categories on the Likert scale was done to facilitate presentation of the data, however it was noted that a larger percentage of respondents answered agree or disagree in the itemised analysis.

In Part Two, descriptive statistics were used to present the interpretation of the demographic data of the patient participants. Percentages in these categories were taken to the nearest whole.

Descriptive statistics were then employed to describe and synthesise the distribution of the items derived from the patient's prospective record review. This was inclusive of twelve (12) sub-items derived from five (5) main headings of the parameters that were extrapolated from participants' records (ICU charts) over a period of forty eight (48) hours. Analysis of data was facilitated by dividing the data into two 24 hour periods.

A comparison was undertaken by using intensive care nurse's responses on parameters that could be used for pain assessment (part one of the study) and corresponding items obtained from patient participants prospective record review (part two of the study). Subgroups were identified for events, which were determined by a sudden increase in a parameter and deviation from the patients 'normal' range of parameters. Events were inclusive of increase in heart rate, blood pressure, temperature, pupil size and respiratory rate. For example, if the ICU nurse response was an increase in any of these parameters could be indicative of

pain in the unconscious patient, it was then determined through the analysis if analgesia was given in the hour of the event of sudden increase in the parameter to determine whether the itemised response in the questionnaire was reflected through management of pain.

From the comparative study, it was observed that ICU nurses managed pain differently. As such, four (4) management categories were derived from different types of management that ICU nurses employed. Fisher's exact test was used to compare ICU trained nurses pain management categories to that of the untrained ICU nurses to determine whether ICU training influenced the management of pain. Fisher's exact test was also used to compare the difference in pain management categories of ICU nurses by shift i.e. day or night, to determine whether pain was managed differently at night when compared to day shifts.

As a single centre study was used it should be borne in mind that findings cannot be extrapolated to all ICU nurses and patients in other ICUs. It was hoped that because of the homogeneity of the sample the findings may be of interest to other public sector ICUs, clinical practice and education of intensive care nurses.

4.3 RESULTS AND FINDINGS

4.3.1 Questionnaire Section One: Nurses Demographic Data

This section comprised five (5) items related to the intensive care nurse, which were obtained through self-administered questionnaires. This was inclusive of research codes,

professional qualification, shift worked, years of nursing experience and period worked in ICU. Research codes were assigned by the researcher to all participants, in order to ensure anonymity and confidentiality. Random numbers were used as codes and ranged from one to forty (1 to 40).

Professional Qualification

Of all nurses (n=40) surveyed, 26 (65.0%) were registered nurses with no formal ICU training. Fourteen (35%) were trained and registered with South African Nursing Council (SANC) as intensive care registered nurses. These findings are summarised in **Figure 4.1.**

The situation of less trained ICU nurses working in the ICU as compared to non-trained nurses appears to be a worldwide phenomenon. Literature suggests both difficulty in attracting and retaining intensive care nurses (Buerhaus, Straiger & Auerbach, 2000; Dracup & Bryan-Brown, 1995). An adequate supply of intensive care nurses' means that new nurses must be recruited, both into the nursing labour force in general and into the speciality and nurses already in the speciality must be retained (Buerhaus et al, 2000; Dracup & Bryan-Brown, 1995). From these researchers, it was suggested that the current shortage of intensive care nurses is attributable to specialised nurses in their late 30's and early 40's either leaving the workforce or reducing their working hours and not being replaced by the required number of younger nurses.

The International Council of Nurses (1992) emphasises the need to ensure the presence of the right nurses, with the right qualification, in the right role and at the right place with proper authority and recognition

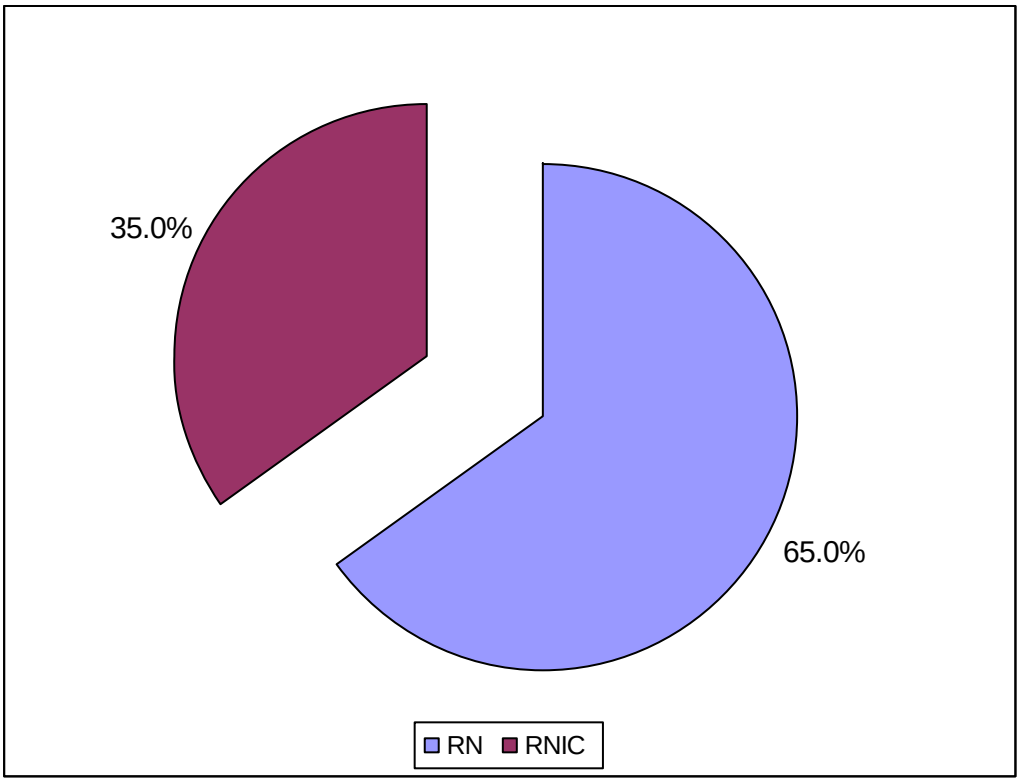


Figure 4.1: Professional Qualifications

Key: RN=Registered Nurse; RNIC= Registered Nurse with Additional lntensive Care Training

Shift

Thirty-one nurses (n = 31; 77.5%) worked on the day shift and nine (n = 9; 22.5%) worked on the night shift (**Figure. 4.2)**. It was important to include ICU nurses on both shifts in order to obtain a wide range of participant's opinions. In the study, more day shift nurses were surveyed due to availability and willingness to participate in the study. The ICU nurses were more readily available at the end of the day shift as compared to night nurses who were commencing their shift.

The researcher ensured that each day and night nurses in the sample had nursed the patient for two concurrent 12 hour shifts. This was to ensure that they covered the 24 hours of data

collection and to provide enough time to adequately assess the nurse's attitude to pain management.

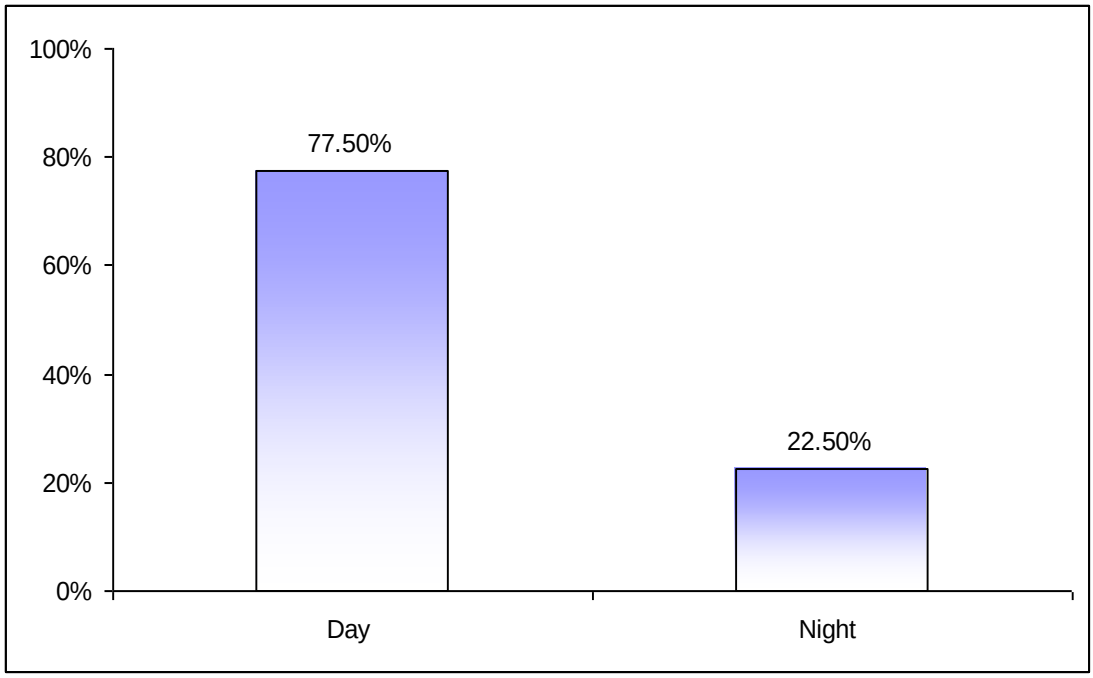


Figure 4.2: Shift Worked Day / Night

Years of Nursing Experience

In this category, mean years of nursing experience was 11.2 years. Majority (27.5%) of nurses had one to five (1-5) years of nursing experience, followed closely by 25.0 % of nurses who had between six to ten (6-10) years, 22.5% and 20.0 % had between 11- 15 and 16-20 years of nursing experience respectively. Five percent (5.0%) of the total sample had more than twenty years of nursing experience. Findings are summarized in **Figure 4.3.**

As nursing experience in the sub-category of one to five (1-5) years formed the largest number of nurses sampled in the study**.** Literature suggests that this could be due to the fact that intensive care areas traditionally attract relatively younger nurses from the acute hospital sector (Australian Health Workforce Advisory Committee (AHWAC), 2002).

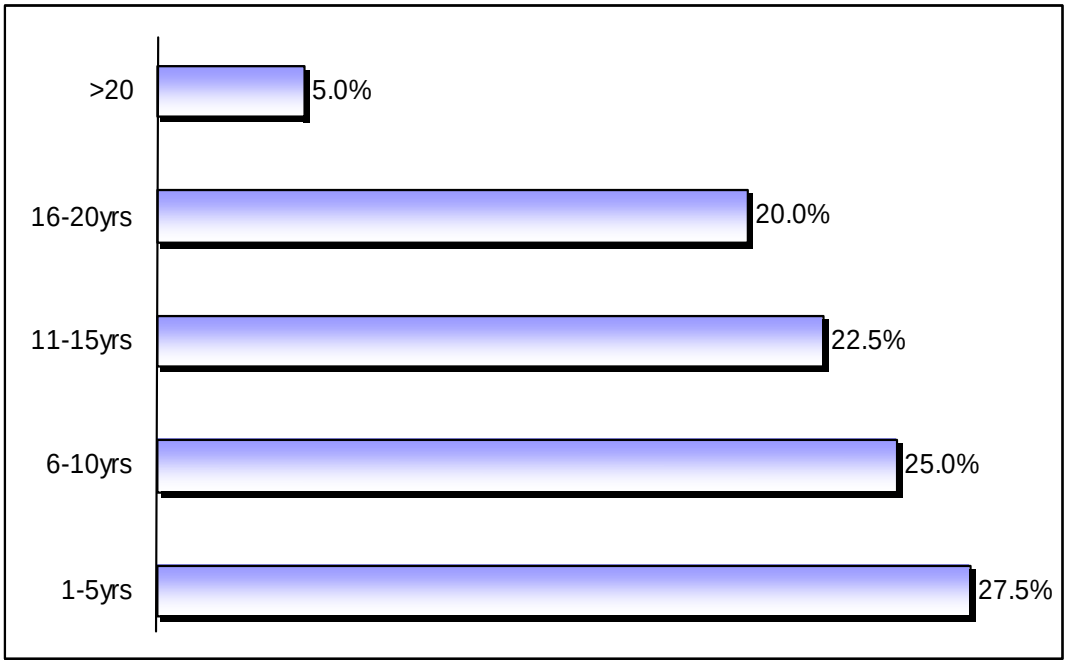


Figure 4.3: Years of Nursing Experience

Period Working in ICU

In this category, the ICU experience of all nurses (n=40) sampled ranged from 6 months to 15 years. Majority (55.0%) of nurses had between one to five (1-5) years of experience in the ICU. Whereas 25 % of nurses had between six to ten (6-10) years, followed by 12.5% and 7.5% respectively, less than one (1) year and eleven to fifteen (11-15) years. Findings are displayed in **Figure 4.4**.

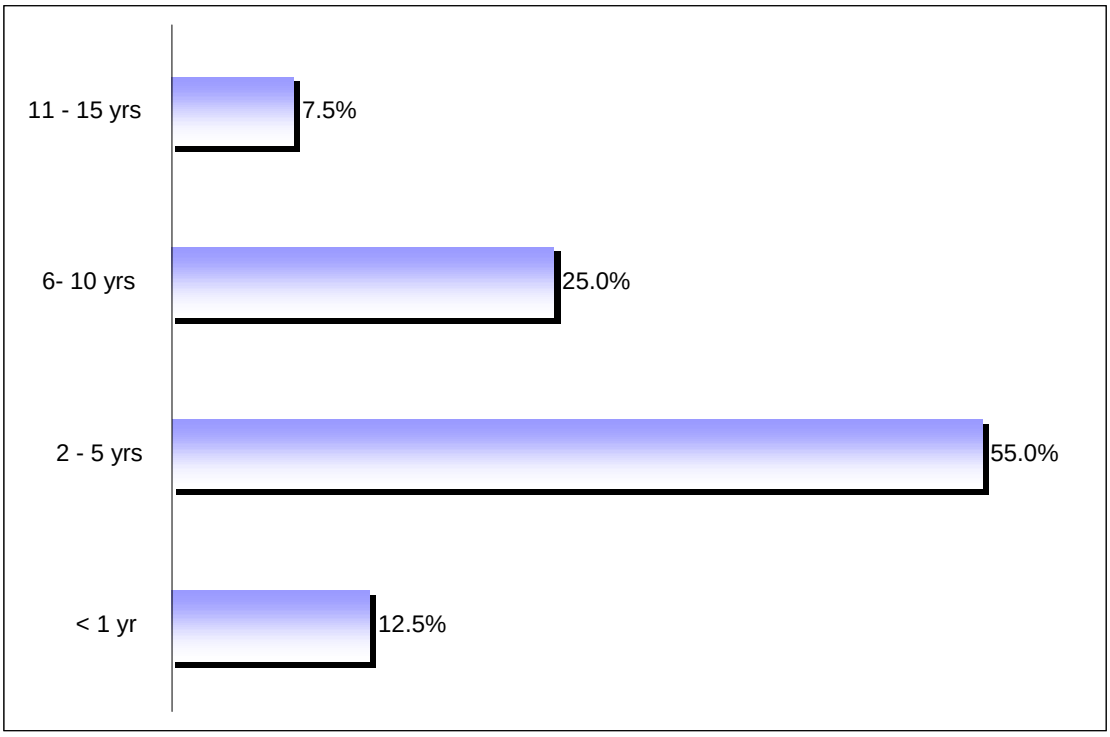


Figure 4.4: Period Working in ICU

4.3.2 Questionnaire Section Two: Parameters used for Pain Assessment

This section comprised ten (10) itemised responses related to parameters that could be indicative of pain, pain assessment and management pertaining to unconscious patients, which were obtained through self administered questionnaire from ICU nurse participants. These were inclusive of increase in blood pressure, pyrexia, increased respiratory rate, dilated pupils, increased heart rate, Glasgow Coma Scale (GCS) score, sedation, amount and frequency of analgesia, haemodynamic instability and pain assessment. Results of the process are summarized and displayed in **Table 4.1**.

Table 4.1: Parameters Used by ICU Nurses for Assessing Pain

Item		Response	Frequency	Percentage
2.1	Raised blood pressure is an indicator of pain in the unconscious patient	Disagree Agree	4 36	10.0% 90.0%
2.2	Pyrexia is an indicator of pain in the unconscious patient	Disagree Agree	25 15	62.5% 90.0%
2.3	Increased respiratory rate could be associated with pain in the unconscious patient	Disagree Agree	3 37	7.5% 37.5%
2.4	Patients who are sedated require less analgesia than those not sedated.	Disagree Agree	23 17	7.5% 92.5%
2.5	Dilated pupils may be indicative of pain in the unconscious patient	Disagree Agree	32 7	82.1% 17.9%
2.6	Increased heart rate is an indicator of pain in the unconscious patient.	Disagree Agree	12 28	30.0% 70.0%
2.7	Smaller doses of analgesia frequently are more effective than large doses less frequently.	Disagree Agree	13 26	33.3% 66.7%
2.8	Patients with Glasgow Coma Scale (GCS) of less than 4/10 require analgesia less often.	Disagree Agree	19 21	47.5% 52.5%
2.9	Haemodynamically unstable patients should not be given analgesia.	Disagree Agree	6 34	15.0% 85.0%
2.10	Pain should be assessed every time before administration of analgesia.	Disagree Agree	6 34	16.0% 85.0%

As two participants did not answer question 2.5 and question 2.7, only 39 (n=39) responses were presented for analysis of data.

Question 2.1

In this item, majority (90.0%; n=36) participants agreed in responses that raised blood pressure (BP) could be an indicator of pain in unconscious patients, whereas 10.0% (n=4) disagreed. Thus the majority (90.0%) of all nurses sampled agreed that raised BP in an unconscious patient could mean that the patient is in pain. Similarly, as suggested in the literature raised blood pressure could be an indicator of pain in the unconscious patient (Puntillo et al., 1997; Tittle & McMillan, 1994). .

Question 2.2

In this item, a minority (37.5%; n=15) of participants agreed that pyrexia could be indicative of pain in unconscious patients, whereas majority (62.5%; n=25) disagreed. Tittle and McMillan, (1994); Puntillo et al., (1997) concluded that sweating which could be due to increased temperature (pyrexia) could be a physiologic indicator of pain in patients that cannot verbalises their pain.

Question 2.3

In this item, majority (92.5%; n=37)) of participants agreed that increased respiratory rate could also be an indicator of pain in unconscious patients, whereas 7.5% (n=3) disagreed. This finding is supported in the literature, whereby Tittle and McMillan, (1994) reported that increased respiratory rate could be indicative of pain in the unconscious patient.

Question 2.4

In this item, majority (57.5%; n=23) of the participants disagreed that patients who are sedated require less analgesia than those not sedated, whereas 42.5% (n=17) of the sample agreed. Researchers had concluded that it must be assumed that patients that are unable to report pain which includes sedated patients also experience pain sensation (Puntillo et al., 2001).

Question 2.5

In this item, minority (17.9%; n=7) agreed that dilated pupils could be indicative of pain in unconscious patients, whereas 82.1% (n=32) of the participants disagreed. Literature suggests that dilated pupils may be indicative of pain in the unconscious patient (Puntillo et al., 1997).

Question 2.6

In this item, majority (70.0%; n=28) of the participants that agreed that increased heart rate could be indicative of pain in the unconscious patient, whereas 30.0% (n=12) of participants disagreed. According to literature (Puntillo et al., 1997; Tittle & McMillan 1994) an increased heart rate could be indicative of pain in the unconscious patient

Question 2.7

In this item, majority (66.7%; n=26) of participants agreed that giving smaller doses of analgesia frequently is more effective than large doses less frequently, whereas 33.3% (n=13) disagreed. According to the spinal gate theory (Melzack & Wall, 1965), small doses of analgesia administered frequently are more effective than large doses less frequently as small doses maintain a peak level of analgesia in the blood.

Question 2.8

In this item, 47.5% (n=19) of the participants disagreed that the patient with GCS score of less than 4/10 do not require analgesia less often than those with a higher GCS score, whereas majority (52.5%; n=21) participants agreed. Puntillo et al., 2001 states that it should be assumed that those unable to report their pain (such as deeply unconscious patients) also experience pain sensation.

Question 2.9

In this item, majority (85.0%; n=34) participants disagreed that haemodynamically unstable patients should not be given analgesia, whereas minority (15%; n=6) agreed. According to JCACHO (2004) all patients have a right to an ongoing pain assessment and management of pain. Thus patients should not be denied analgesia on the basis that they are haemodynamically unstable.

Question 2.10

In this item, majority (85.0%; n=34) participants agreed that pain should be assessed every time before pain medication is administered, whereas 15.0% (n=6) disagreed. Literature suggests that pain should always be assessed before analgesia is administered (JCACHO, 2004, NHMRC, 1999, Coyne et al., 1999). In one study, Brett (2001) found that despite nurses' agreement that pain must be assessed every time before administration of analgesia, they are ineffective in their pain assessment and have limited knowledge base of pain.

In summary, in this study it was surmised that most intensive care nurses agreed that raised BP, respiratory rate and heart rate could be indicative of pain in unconscious patients and

these parameters must therefore be considered when managing pain in unconscious patients. A number of nurses also knew that dilated pupils and raised temperature could be indicative of pain in the unconscious patient. As these patients are unable to communicate their pain, pain must be ruled out first before other treatments for raised vital signs are attempted. Tittle and McMillan (1994) also reported that changes in vital signs inclusive of heart rate, respirations and blood pressure should be taken as indicators of pain in the unconscious patient.

Most intensive care nurses in this study knew that patients who are sedated do not require less analgesia than those not sedated and smaller doses of analgesia often is more effective than large doses less frequently. They also knew that haemodynamically unstable patients should be given analgesics and not denied because of their haemodynamic instability. The nurses also knew that pain should always be assessed before administration of analgesia. Aslan et al., (2003) also reported that 52.7% (n = 48) of nurses surveyed in their study defined physiological responses to pain as tachycardia, 47.3% (43) as increased arterial blood pressure and 31.9% (n = 29) as increased respiration rate. However, one quarter (25.0%) of participants (n = 23) sampled stated that they did not know what the physiological responses to pain were in ICU patients and 33% (n = 30) indicated that vital signs would be taken as a criteria for pain assessment in confused patient.

4.3.3 Questionnaire Section One: Patient Demographic Data

This section was composed of nine (9) items related to the patient participants, which were obtained through prospective record review. This was inclusive of research code, date and time of admission, gender, age, diagnosis on admission, type of analgesia prescribed, amount of analgesia given in 24hours and route of administration. Results of the process are summarized and discussed for the total sample (n=40). Research codes were assigned by the researcher for all the patient participants in order to ensure anonymity and confidentiality. Random numbers were applied and ranged from one to forty (1-40).

Date and Time of Admission

The forty (n=40) patients in the study were admitted to the ICU between the period of 18/6/05 to 18/11/05 at various times of the day and night.

Gender

Most of the patients (80.0%; n=32)) in the study were male and 20.0% (n=8) were female (n = 8). Findings are displayed below in **Figure 4.5.** These findings were similar to another study conducted in the same ICUs. Schmollgruber (2002) reported that 80.0% of the ICU patient populations were male and 20.0% were female. Further, suggesting that this could be due to the fact that most ICU patients were traditionally male due to the nature of their disease conditions such as gunshot wounds

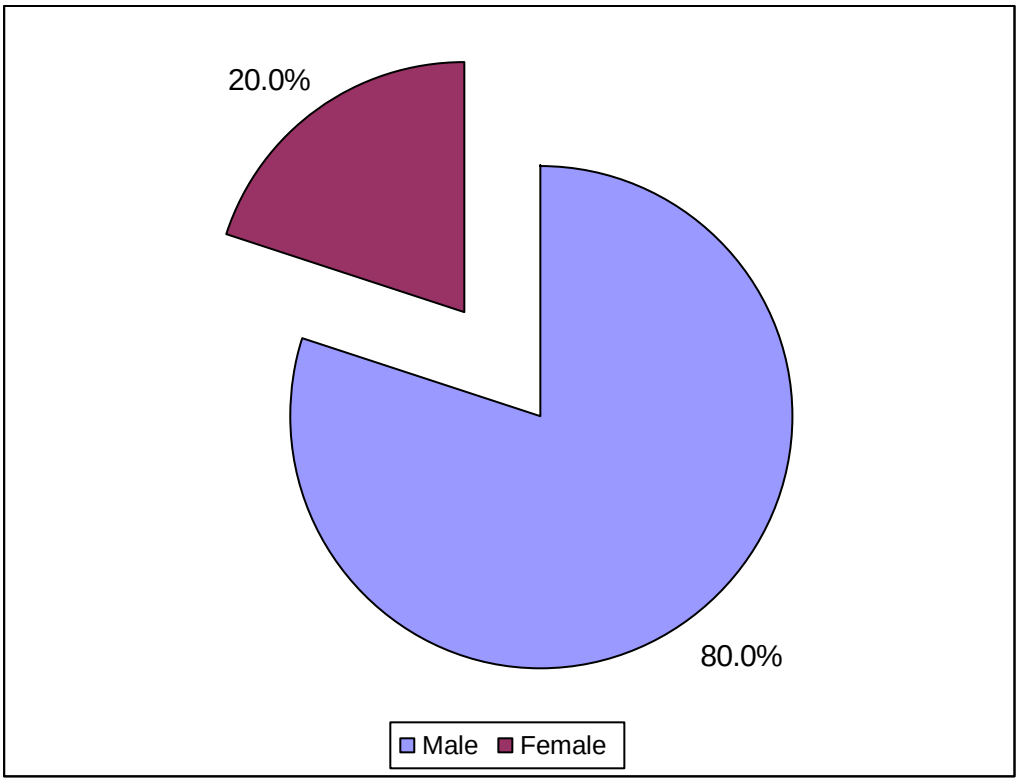


Figure 4.5: Gender of Patients

Age

Patients between the ages of 18 to 36 years formed 47.5% (n = 19) of the patient population. Whereas 47.5% (n = 19) were between 37 to 57 years of age, one (n=1; 2.5%)) 58 to 78 years and one (n=1; 2.5%) > 79 years of age. As such, a younger (18 to 57), in years of age, patient population in this study formed the largest number of unconscious patients in the ICU's surveyed.

Diagnosis on Admission

Due to the fact that patients with so many different diagnoses were admitted to the ICUs, they were put into four groups to facilitate statistical analysis. They consisted of trauma with head injury, surgical, trauma without head injury and medical diagnosis. Trauma patients with head injuries formed the largest (45.0%; n=18)) part of unconscious patients

surveyed. This was followed by 37.4 % (n=15) of surgical (post operative) patients, ten (10.0%; n=4) percent were trauma without head injury and 7.5% (n = 3) had medical related diagnoses.

Of all patients (n=40), 5.0 % (n=2) had a GCS score of 7/9, whereas 17.5 % (n=7) had a GCS score 6/9, 27.5 % (n=11) has a score of 5/9. This was followed by 10.0% (n=1) has a GCS score of 3/9 and 15.0 % (n=6) has a GCS score of 2/9.

The analgesia portion was included in the demographic data to give an overview of the type, dose and route of analgesia given in 24 hours. This is discussed below.

Type of Analgesia

In this study, majority (75.0%; n=30) patients were on morphine intravenously for pain relief. Morphine is the drug of choice for pain management in most of ICUs. The largest percentages of these patients were on morphine titration. This was followed by a ten (10.0%) percent of patients who were on panado, and 15.0% (n=6) were on DF 118. Further, it was observed that the drug Panado, in addition to pain relief, was also used in the neurosurgical ICU to prevent or treat pyrexia which is an important factor in reducing the intracranial pressure of patients with head injury. The drug, DF 118 was also used only in the neurosurgical ICU

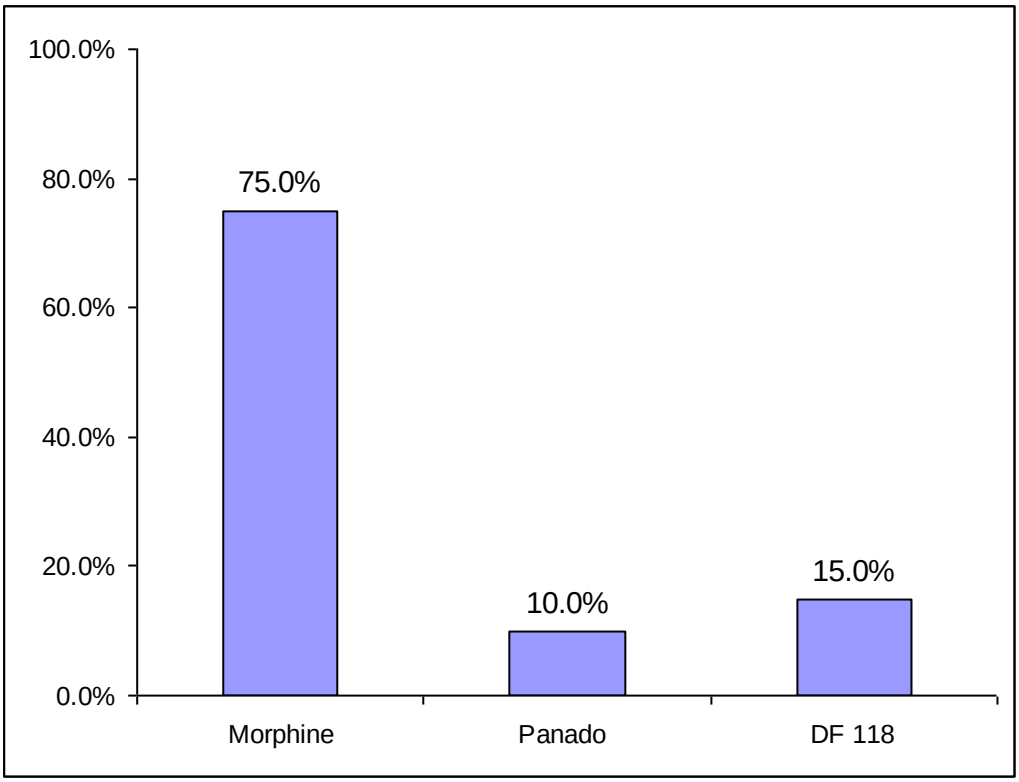


Figure 4.6: Type of Analgesia

Dosage of Analgesia

Of all patients (75.0%; n=30) that received morphine titration, 5 (12.5%) were prescribed for morphine 2mg IV PRN, 12 (30.0%) were to have morphine 2mg 2 hourly PRN, 9 (22.5%) were on morphine 2-4mg IV prn and 4 (10.0%) were prescribed for morphine 2mg 3 hourly PRN. Findings for the drug morphine are summarised and displayed below in **Table 4.2.**

Table 4.2: Analgesia (Morphine)

Amount of Morphine Prescribed	Amount given in 24 hours	No. of Patients
2mg IV prn (n = 5)	4mg	2
	8mg	1
	10mg	1
	12mg	1
2mg 2 hourly prn (n = 12)	4mg	1
	8mg	3
	10mg	2
	12mg	1
	14mg	1
	18mg	2
	20mg	1
	22mg	1
2-4mg IV prn (n = 9)	4mg	1
	10mg	1
	12mg	1
	14mg	1
	18mg	1
	20mg	1
	24mg	1
	26mg	1
	36mg	1
2mg 3 hourly prn (n = 4)	6mg	1
	8mg	1
	0mg	1
	12mg	1

Findings for the drug DF 118 are summarised and displayed below in **Table 4.3.** Of these, six (n=6; 15.0%) patients were given the drug, DF 118 as choice of analgesia. Five (n=5;

12.5%) patients were prescribed DF 118 30mg 6 hourly and one (n=1; 2.5%) patient had DF 118 30mg at 8 hourly intervals.

Table 4.3: Analgesia (DF 118)

Amount of DF 118 Prescribed	Amount given in 24 hours	No. of Patients
30 mg 6 hourly (n=5)	90 mg	1
	120 mg	2
	150 mg	1
	180 mg	1
30 mg 8 hourly (n=1)	180 mg	1

Findings for the drug Panado are summarized and displayed in **Table 4.4.** Of these, four (n=4) patients were on panado for pain control. All the patients were to receive panado 2 tablets 6 hourly.

Table 4.4: Analgesia (Panado)

	Amount given in 24 hours	No. of Patients
2 tablets 6 hourly (n = 4)	6 tablets	1
	8 tablets	3

Route of Administration

As majority (75.0%; n=30) of patients were on morphine titration, the intravenous route was the route most used. This was due to the fact that most patients were critically ill and the intravenous route was the most appropriate route of administration for this level of acute pain. This was followed by ten (10.0%; n=4) percent of patients on the drug panado which was administered through their naso-gastric or orogastric tubes and 15.0% (n = 6) were on DF 118 also given through their naso-gastric or orogastric tubes. Thus making morphine the most used analgesic in the ICUs surveyed and the intravenous route of administration was the most used.

4.3.4 Questionnaire Section Two: Patient Record Review

In this section patients' ICU records (ICU charts) were reviewed prospectively for the first 48 hours of admission to the ICU. It was divided into the first 24 hours and second 24 hour period. The first 48 hours was chosen because it is the most acute phase of the patient's condition in which it is believed that the patient may have the most pain. The record review was grouped under five headings **(**refer **Annexure B).** This included haemodynamic parameters, neurological parameters, respiratory parameters, type and dosage of analgesia and other types of medication.

Haemodynamic Parameters

The haemodynamic parameters consisted of four parameters: heart rate, blood pressure, mean arterial pressure and temperature. Of all these parameters, 100.0% (n=40) were

recorded hourly in all the ICUs surveyed. Variation of frequency was observed in the immediate post-operative period, such as quarter- to half hourly in the cardiothoracic ICU. Haemodynamic parameters were important indicators of pain in unconscious patients.

Neurological Parameters

This consisted of two parameters: Glasgow Coma Scale (GCS) score and pupil size. One of the inclusion criteria for patients in the study was a GCS of < 7/15 and it also helped to determine if patients were given pain medication even if they were deeply unconscious.

Pupil size of the patient was also recorded and this helped to determine if the pupils were dilated or not.

Respiratory Parameters

This consisted of two parameters: respiratory rate and mode of ventilation. Of all patients (100.0%, n=40), respiratory rate was recorded hourly in all the ICUs surveyed. Of the 100.0% of patients surveyed 80.0% were intubated and ventilated on synchronised intermittent mandatory ventilation (SIMV) and pressure support (PS) and 20.0% on Continuous Positive Airway Pressure (CPAP) ventilation. To obtain the respiratory rate of the patients on SIMV, the breath rate set on the ventilator was subtracted from the total rate as recorded on the patients ICU chart.

Parameters were reviewed over the 48 hour period taking particular note of when they were increased or events and if analgesia was given.

Type and Dosage of Analgesia

All the patients (75.0%; n=30) that were on morphine titration were prescribed for when necessary (PRN). This means that the nurses will give the medication when they have assessed the patients and think they need the analgesia. Ten percent (10.0%; n=4) of patients were on panado which was prescribed for two tablets six hourly and 15% (n=6) on DF 118. Of the patients who had DF 118, 12.5% had 30mg six hourly and 2.5% had 30mg eight hourly. This review was done for 48 hours to see how much analgesia was prescribed and how much was given by ICU nurses in the hour of events.

Other Types of Medication

Sedation – All the patients (75.0%) on morphine titration were also prescribed for dormicum for sedation when necessary. Morphine and dormicum were observed to be given mostly at the same time.

Paralysing agents - An absence (100.0%; n=40) of the use of paralysing agents was observed for the total sample surveyed.

4.3.5 Comparative Section

Nurses responses to items on the questionnaire were analysed as discussed above, then the unconscious patient's record review was also analysed. On the unconscious patients' ICU chart, sudden significant increases in heart rate, blood pressure, temperature, pupil size and respiratory rate which are classified as events by the researcher were identified on each patient's record review**.** The ICU nurses responses to the questionnaire were then compared to the patient's record review of parameters. Each nurse's response was

compared to the record review of the patient he or she nursed on either day or night shift. This was done to see if the nurses that agreed that increases in these parameters could be indicative of pain in the unconscious patient gave pain medication in the hour when the parameters had increased. Nurse's responses and patients events were summarised and displayed in **Tables 4.5** and **4.6** below.

Only the events in the patients of the nurses that agreed that elevated parameters could be indicative of pain in the unconscious patient were discussed below. Events did occur in the patients of nurses who disagreed too. That explains why the events in the **Table 4.6** are higher than the discussed events below. The table summarises all the events that occurred in the total patient population.

Table 4.5: Nurse Participants Responses

Value	Participant Response (n=40)									
	Heart Rate		Blood Pressure		Temperature		Pupils		Respiration	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Agree	28	70.00	36	90.0%	15	37.5%	7	17.5%	37	92.5%
Disagree	12	30.00	4	10.0%	25	62.5%	33	82.5%	3	7.5%
Total	40	100.0	40	100.00	40	100.0%	40	100.0%	40	100.0%

Table 4.6: Patient Events

Value	Patient Events (n=40)									
	Heart Rate		Blood Pressure		Temperature		Pupils		Respiration	
	f	%	*f*	%	*f*	%	*f*	%	*f*	%
Present	35	87.5	35	87.5	26	65.0	12	30.0	38	95.0
Absent	5	12.5	5	12.5	14	35.0	28	70.0	2	5.0
Total	40	100.0	40	100.00	40	100.0%	40	100.0%	40	100.0%

Of the 70.0% (n=28) of nurses that agreed that **increased heart rate** could be an indicator of pain in the unconscious patient, 62.5% (n=25) of their patients' had episodes of sudden significant increases in their heart rates that were big deviations from their heart rates as monitored every hour. It was however identified that pain medication was not given in all these patients in the hour of the event.

Of the 90% (n=38) of nurses that agreed that **increased blood pressure** could be indicative of pain in the unconscious patient, 80% (n=32) of their patients had blood pressure events but pain medication was not given in the hour of the events. A similar finding was made with **increases in temperature**. Although 22.5% (n=9) of the patients of the 37.5% (n=15) 0f the nurses that agreed that increased temperature could be indicative of pain in the unconscious patient had events, pain medication was not given by the nurses in the hour of the increase.

The same findings applied to **increases in pupil size**. Of the 17.5% (n=7) of the nurses that agreed that dilated pupils could be indicative of pain in the unconscious patient,7.5% (n=3) of their patients had sudden significant increases in their pupil size but pain medication was not given in the hour of the events

Although almost all the ICU nurses surveyed (92.5%; n==37) agreed that **increases in respiratory rate** could be indicative of pain in the unconscious patient, the 87.5% (n=35) of their patients that had significant sudden increases in their respiratory rates did not get pain medication in the hour they had the events.

The results discussed above, does not mean that pain medication was not given at all by ICU nurses. It was just not given in the hour of the events which is a sudden significant increase in the patients parameter and more likely to be when the patient needed it. ICU nurses conducted themselves in regard to the administration of pain medication in four different ways. These were put into one of **four categories to make statistical analysis possible**. In order **to facilitate the discussion these categories were randomly labelled by the researcher as categories A to D**. Findings are summarised and displayed in **table 4.7**

Category A

Of the 40 (n=40) ICU nurses surveyed, majority (45.0%; n=18) gave pain medication strictly according to prescription, such as 2 hourly or 6 hourly with no consideration to the increases in the parameters they identified that could be indicators of pain in the unconscious patient. Thus pain medication was only given when it was due to be given. Although some of the prescriptions specifically stated when necessary (PRN) others such as panado and DF118 were fixed prescriptions.

Category B

Of the 40 (n=40) ICU nurses surveyed, 42.5% (n=17) gave pain medication strictly when the nurse thought it was necessary (prn) but often with no consideration to the increases in parameters identified. Thus they were times when the parameters were elevated but no pain medication was given and they were times when they are not elevated but pain medication was given.

Category C

Ten percent (10.0%; n=4) of ICU nurses withheld pain medication from the patient during most times of the day or night but gave it only once in a long while when they thought the patient needed it with no consideration to the identified parameters. It was identified that the patients in this group were haemodynamically unstable (low blood pressure, low heart rate)

Category D

Of the 1CU nurses surveyed 2.5% (n=1) did not give the patient any pain medication at all despite pain medication being prescribed for prn. This patient was also identified to be haemodynamically unstable and deeply unconscious with a GCS score of less than 4/10.

Table 4.7: Pain Management Categories

Pain management conduct	Frequency	Percentage
Category A	18	45.0%
Category B	17	42.5%
Category C	4	10.0%
Category D	1	2.5%

According to these results it was determined that knowledge about the parameters that could be indicative of pain in unconscious patients did not influence their pain management strategies of nurses. Thus the answers to the questionnaire did not influence management practices of ICU nurses and despite knowing that increased vital signs or parameters could be indicative of pain in the unconscious patients, no consideration was given to it when managing pain.

Pain medication is routinely prescribed but not strictly adhered to since they are often prescribed for when necessary (PRN). Since they are mostly prescribed for when necessary (PRN), nurses decide entirely by virtue of their knowledge and experience on when an unconscious patient needs analgesia.

Literature supports the fact that for pain assessment to be done adequately, it should be carried out simply, consistently and frequently using a standardized form of assessment (Coyne et al, 1999; Dalton et al, 1989; NHMRC, 1999; White 1999). Puntillo 1997 et al, suggested that effective pain management can only be achieved through accurate and systemic assessment and when critically ill patients are unable to report their pain, comprehensive pain assessment can only be achieved by using a scoring tool based on physiological and behavioural indicators of pain.

ICU nurses did not consider elevated identified parameters in their management of pain because pain medication was given to unconscious patients at times when their parameters were not elevated and not given at times when they were elevated though they agreed that elevated BP, heart rate and respiratory rate could be indicative of pain in the unconscious patient. Thus ICU nurses did not assess patients' pain according to the parameters they agreed could be indicative of pain and thus they managed pain by giving analgesia when they felt it was necessary with no consideration to the unconscious patient's elevated parameters or vital signs which could indicate the time the patient is in pain.

Puntillo et al (2001) showed that 78.0% of ICU nurses in their study accepted that ICU patients received inadequate treatment for their pain. Despite this acknowledgement it was shown that 98.0% of these nurses did not administer the analgesia prescribed in case of need.

Of all management categories (categories A to D) identified from the patients' record review, none of the nurses considered changes in vital signs or events when managing pain. The indicators of pain in unconscious patients identified by ICU nurses were not considered in their pain management. Aslan et al, (2003) suggested the clear need to address nursing education and training with regard to assessment and management of patients' pain whilst in the intensive care environment.

In this study, nurse's categories and firstly their professional qualification and, secondly day or night shift were also compared. Findings are summarised and displayed in **Tables 4.8 and 4.9** respectively.

Table 4.8: Professional Qualification versus Pain Management by Categories

Professional Qualification		**Management Category A**	**Management Category B**	**Management Category C**	**Management Category D**
RN	Frequency	9	13	4	-
	Percentage	34.6%	50%	15.4%	-
RN ICU Trained	Frequency	9	4	0	1
	Percentage	64.3%	28.6%	0.00%	7.1%

The comparison between professional qualification and categories of nurses was done as a matter of interest to see if qualification had any influence on the pain management conduct of ICU nurses. The comparison indicated that ICU training did not have much influence ($p=0.058$) on the pain management of critically ill unconscious patients in the ICU.

Table 4.9: Shift versus Management of Patients

Shift		Management Category A	Management Category B	Management Category C	Management Category D
Day	Frequency	16	11	4	0
	Percentage	51.6%	35.5%	12.9%	0.0%
Night	Frequency	2	6	0	1
	Percentage	22.2%	66.7%	0.0%	11.1%

The comparison also indicated that there was no significant (p=0.071) difference between pain management categories (Categories A to D) of intensive care nurses on night and day shifts.

4.4 SUMMARY

This chapter discussed the descriptive and comparative statistics employed to describe, synthesise and analyse the data and interpretation of research findings.

Of significant note in the above results is the number of nurses that disagreed that the parameters could not be indicative of pain in the unconscious patient even though they are supported by literature. There thus appear to be a gap between research and clinical practice which can be corrected by education.

The research hypothesis of pain assessment and management by ICU nurses working in the intensive care units being inconsistent in the unconscious patients was supported by the fact that ICU nurses knowledge about the indicators of pain in unconscious patients does

not translate into practice. The fact that standardised tools in ICUs for assessment and management of pain in unconscious patients are not routinely used makes nurses' pain assessment and management inconsistent. Pain medication is also routinely prescribed for when necessary, thus pain is entirely managed according to the nurses' experience and knowledge.

The following chapter will discuss the limitations of the study, summary of research findings, conclusions and recommendations for further research.