

RECOLLECTION OF ICU ADMISSION

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for the degree of Master of Medicine (Internal Medicine)

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Signed

(J.S.Turner)

Date 29.10.89

DEDICATION

To my late Father, to my Mother, and to Roseanne.

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I would like to acknowledge the encouragement and advice given to me by my supervisor Professor P.D.Potgieter and by Dr D.M.Linton.

I would like to thank Sandra Briggs and Helge Springhorn for their enthusiasm and insight into the problems experienced by the patients.

I would like to thank Julie Steere for her help in collecting some of the data.

I would like to pay tribute to the nursing staff in the Respiratory ICU for their dedication even in difficult circumstances.

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SUMMARY

This study prospectively evaluates the recall of one hundred patients following admission to an Intensive Care Unit (ICU) at Groote Schuur Hospital. It was prompted by criticism (by members of staff and visitors to the ICU) of our practice of wardrounds, arterial blood gas sampling, and light sedation of patients. In addition, staff preconceptions about patients' reactions to the ICU needed evaluation.

The patients analyzed included a wide spectrum of race, religion, occupation, and educational levels. The more common diagnoses included asthma (22%), pneumonia (14%), trauma (13%), and Adult Respiratory Distress Syndrome (ARDS) (13%). The average APACHE II score (a scoring system widely used to evaluate severity of illness) was 12.27 and 68% of the patients were mechanically ventilated.

Objective data collected while the patients were in the ICU included demographic information, diagnosis, APACHE II score, sedation, level of consciousness, and procedures. Within 48 hours of discharge from the ICU, patients were interviewed and asked to quantify their recall of procedures and events which had occurred while they were in the ICU. Data was entered into a microcomputer database for analysis

and, where appropriate, statistical tests were performed.

Seventy-one patients recalled being admitted to hospital but only 50 remembered being admitted to ICU. Eighty-four patients described the ICU atmosphere as friendly or relaxed. Seventy-three patients felt that they had sufficient sleep while in the ICU. The most frequently reported unpleasant experiences were arterial blood gas sampling (48 patients), tracheal suctioning (30 of 68 ventilated patients), pain (22 patients), and noise (20 patients). Only 6 patients disliked wardrounds and discussion around the bedside.

Conclusions include the suggestions that arterial catheters or pulse oximetry should be used when frequent arterial blood gas analyses are needed, and that tracheal suctioning should be performed with more care.

INTRODUCTION

Little information is available concerning the recall of patients admitted to an Intensive Care Unit (ICU). These patients are very ill and are subjected to a foreign environment as well as a variety of drugs, procedures, and unfamiliar (and usually unpleasant) experiences. A review of the literature reveals only a few group studies and personal observations about ICU admission recall (1-9), although unpublished anecdotes and preconceptions abound. These are often based on second-hand information and used without foundation to predict the effect of ICU admission and procedures on an individual patient.

The group studies looking at general aspects of ICU recollection (1,2) were carried out in the last decade and in London hospitals. The patient profile, treatment regimens, and patient expectations differ significantly from those found in South Africa in 1989.

The personal experiences (4-9) cover a variety of disorders and scenarios. They are very enlightening and informative, but are written by intelligent and well-informed people mostly with a medical background and therefore may not reflect the reactions of the majority of patients.

There was thus an obvious need to add to the available information and more specifically to obtain details of ICU admission recall pertinent to our own situation. This would enable medical and paramedical staff looking after critically ill patients to have more insight into their predicament and their expectations and fears.

In addition, this study was prompted by criticism (by nursing staff and visitors to the ICU) of our practice of wardrounds (carried out at the bedside and within the patient's hearing), of arterial blood gas sampling (done without local anaesthetic), and of the use of minimal sedation. There was also concern that patients in the ICU were getting insufficient sleep.

It was therefore proposed to determine precisely what patients remember as pleasant or unpleasant of their stay in the ICU and to make recommendations for improving conditions wherever possible.

REVIEW OF THE LITERATURE

Hewitt (1) evaluated 100 patients admitted to a surgical ICU. Ninety percent of these patients had been subjected to elective cardiothoracic surgery and thereafter admitted to the ICU for short-term monitoring and ventilation, during which time it appears that they were heavily sedated. This type of patient represents only a small percentage of those found in a general ICU, and their recall is likely to be selective and biased by their procedures and sedation. Despite a recent general anaesthetic and this sedation, the most frequently noted worrying factor amongst these patients was difficulty in resting and sleeping.

Jones et al (2) also analyzed 100 patients from a surgical ICU, just over half of whom were elective postoperative admissions. Their main complaints were lack of sleep and pain. Their ICU admission period was short, with only 5 patients staying longer than 4 days. Only 22 patients were mechanically ventilated. Again this patient profile differs significantly from ours.

The study of Bergbom-Engberg et al (3) examines patient awareness of ventilatory treatment, finding that only about 50% of ventilated patients recall the ventilation. Some

other interesting points emerged. They found that the recall of ventilatory treatment was reduced in patients with head injuries, those unconscious on admission, and in the elderly. They also noted that preoperative information about ventilatory treatment did not influence patient awareness.

The recollection of a thymectomy for myasthenia gravis (4) was written by a professor of dentistry, and his insight and medical knowledge are clearly evident. His main complaints were the discomfort of the endotracheal tube and the constant light, but he had great praise for the medical and nursing staff, especially the latter.

The author of "a horror story" after coronary artery bypass surgery (5) earned a degree in respiratory therapy 9 months after his operation, and his unpleasant experience has given him valuable insight into treating postoperative patients. He was unable to coordinate his breathing with the controlled mechanical ventilation (no longer used in such circumstances) he received postoperatively, and also found tracheal suctioning to be very painful.

A final year medical student, suffering from polyneuropathy, gives a clear and detailed account of the illness (6), which included a period of almost complete paralysis. After a few days of anxiety, frustration, and discomfort he was able to appreciate his surroundings and recounts the positive and negative feelings that he experienced.

A life-threatening experience is told by the survivor of a cardiac arrest (7), with observed events being added by the resuscitation registrar. This is an extremely interesting account, filled with the precise details of his near-death experience ("I was acutely aware that I had been near to death, but was equally certain that I was coming through safely and that all would be well") as well as of his subsequent gradual awakening and recovery.

The clinicians' and patient's story of an attack of tetanus (8) includes both objective and subjective details. The patient was a 20 year old analytical chemist and his non-medical background is evident in his recollection, contrasting with most of the other personal reports reviewed here.

Finally a professor of anaesthetics relates his experience of the Guillain-Barre syndrome (9). He made every effort to be "a good patient", and found it interesting to observe colleagues in their activities and attitudes. He discusses the psychological aspects of his illness and dependancy in greater detail than any of the other authors. He wrote his account at the request of the physicians who had treated him.

METHODS

This prospective descriptive study was performed in the Respiratory ICU (a ten-bedded multidisciplinary ICU with a geographically separate three-bedded isolation unit) at Groote Schuur Hospital between 26.9.1988 and 8.2.1989.

Entry criteria

All patients admitted to the ten-bedded ICU during the study period were eligible for entry into the study.

Exclusions

1. Patients admitted from or discharged to another ICU (including the isolation unit).
2. Patients unable (by reason of mental or physical incapacity) to answer questions at the post-discharge interview (see Data Collection below).
3. Patients refusing to be interviewed.
4. Patients who died.
5. Patients discharged from hospital before the interview.

ICU personnel

The ICU is staffed by a director, two full-time anaesthetists, and four part-time pulmonary medicine

consultants. There are four residents (two from Internal Medicine and two from Anaesthetics), each responsible for the total care of three or four patients (including the isolation unit patients) with direct patient responsibility resting with the duty consultant. Residents do call for 24 hour periods and remain in the ICU the following day to look after their patients and to ensure continuity of care. The ratio of registered nurses to patients is 1:2, and the same registered nurse will not necessarily look after the same patients each day. Nurse aids assist with patient care. The multidisciplinary team also includes an ICU technologist, physiotherapists, a dietitian, a social worker, and an occupational therapist.

ICU environment

The ten beds are divided into open-plan units of six and four beds respectively. This structure, together with insufficient noise damping and a large number of people entering the ICU daily, leads to the (purely subjective, as noise levels have not been measured) impression of a very noisy environment. The beds are spaced 2.5 metres apart, and there are no structures between them. The windows look out onto a grey wall and there is a short period of direct sunlight daily.

ICU routine

Routine patient management, including sedative and analgesic regimens, were maintained during the study period.

In general, our policy is to promote patient cooperation at the earliest possible time. To achieve this, we attempt as soon as possible to remove the "hardware" (endotracheal tubes, arterial and venous catheters, urinary catheters, nasogastric tubes) from the patients, reduce sedation and analgesia, commence feeding and mobilisation, and perform fewer procedures. Patients are energetically encouraged to achieve independence and the nursing staff have a very positive attitude.

Sedation and analgesia

We attempt to use as little sedation as possible, mainly in the form of small titrated doses of benzodiazepines (diazepam, midazolam, and occasionally lorazepam) combined with opioid analgesics (morphine, fentanyl, and occasionally papaveratum), ensuring only that the patients are manageable and able to be adequately ventilated.

To permit and encourage sleep at night, the lights in the ICU are lower and there is less activity. Occasionally patients may be given a short-acting benzodiazepine (lorazepam) to help them sleep.

For pain relief we generally use continuous infusions of opioid analgesics rather than intermittent injections,

and sometimes epidural opioid analgesics are used in patients with chest trauma.

Wardrounds

Formal wardrounds in our ICU are carried out twice daily, with all the staff attending them. They take place around the patient's bedside, with the patient usually able to clearly hear the discussion. We find this to be the most useful format, as the patient, the charts and laboratory results, and the equipment and monitors are all together and can be assessed as a whole. When sensitive issues such as the possibility of an incurable illness, withdrawal of active treatment, or personal problems need discussion, the wardround moves away from the bedside without causing alarm to the patient (the doctor in charge will usually suggest that everyone withdraw to look at the X-rays).

Procedures

Arterial blood gas sampling is performed mainly by nursing staff, without local anaesthetic and using a scalp vein set with 23 gauge needle.

Tracheal suctioning is performed by nursing staff, using size 12 FG sterile suction catheters.

Arterial catheters, central venous catheters, pulmonary artery catheters, and chest tubes are inserted by residents under local anaesthetic and usually with additional sedation

in the form of short-acting benzodiazepines (eg. midazolam) and opioid analgesics (eg. fentanyl).

Data collection

The following data was collected and was entered onto a form devised specifically for this study (Appendix I).

Firstly objective data was obtained while the patient was in the ICU. This included demographic information, diagnosis, sedation given, level of consciousness, and procedures performed on the patient. The APACHE II score was calculated according to the method described by Knaus et al. (10). Scoring was performed 24 hours after admission to the ICU by the resident looking after the patient, with the worst physiological values for the first 24 hours being entered. The APACHE II scoring sheet appears in Appendix II.

Secondly an interview with the patient was carried out within 48 hours of discharge from the ICU. This time period was chosen in an attempt to prevent patients being discharged home or to other hospitals before being interviewed. The interview evaluated subjective quantified responses to questions asked about recall of specific procedures and events which occurred while in the ICU. These questions covered an extremely wide range of topics which had been determined after consultation with nursing staff, doctors, paramedical personnel, and some informal interviews with recovering patients. When the patient

spoke an African language, an interpreter was used to conduct the interview.

The interview was only carried out if the patient was assessed by the interviewer to be orientated for time, place, and person, and to be able to carry out a rational conversation.

Risk of dying was computed for each patient using the APACHE II score and a mathematical formula (10).

Data was entered by the author into an IBM-compatible microcomputer database (Paradox 2.0, Ansa Software) for analysis.

Statistical analysis

Where appropriate, data was statistically analyzed using Chi-squared analysis (for two-by-two tables), Fisher's Exact Test (for two-by-two tables where any cell number was less than 5), Spearman's Rank Correlation Coefficient (for categorical data correlation), and the Mann-Whitney Test (for non-parametric two sample analysis). A p-value of less than 0.05 was, according to convention, regarded as being statistically significant. The statistical calculations were performed using IBM-compatible microcomputer programs Statgraphics 2.6, Statistical Graphics Corporation (used for Spearman's Rank Correlation Coefficient analysis and Mann-Whitney Test) and Epistat, Copyright 1985 Tracy L. Gustafson (used for Chi-squared and Fisher's Exact tests).

RESULTS

Numbers and exclusions

One hundred and thirty-eight patients were admitted to the ICU during the study period, and 100 were analyzed in this study. Reasons for exclusion are listed in Table 1.

Table 1 Reasons for exclusion.

Reason	Number
Died	14
Admission to/from other ICU	10
Discharged before interview	7
Unable to answer questions *	6
Refused to answer questions	1
Total	38

* Due to severe neurological/psychiatric disturbances.

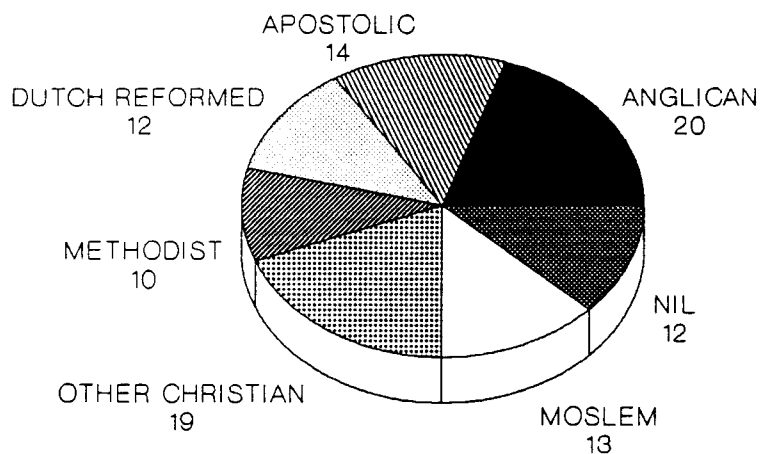
Patient profile

The average age was 38.1 years (range 13-78 years, median 35.5 years, 25th centile 24 years, 75th centile 53.5 years) and the male:female ratio was 45:55. The average APACHE II score was 12.27 (range 1-34, median 12, 25th

centile 8, 75th centile 15) and 68% of patients were mechanically ventilated. The average duration of admission was 6.97 days (range 1-47 days, median 5 days, 25th centile 3 days, 75th centile 8 days).

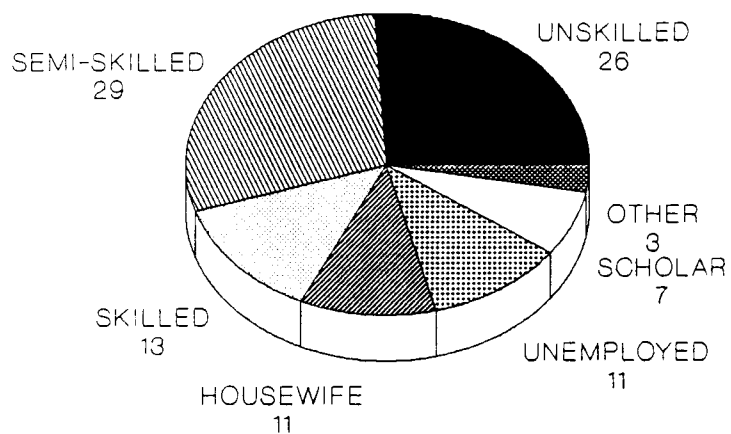
Twenty-two patients were White, 57 were of Mixed Race, and 21 were Black. There was a wide range of religion, occupation, and education (Figure 1). In one patient, data relating to education was not entered.

Figure 1 Religion, occupation, and education.

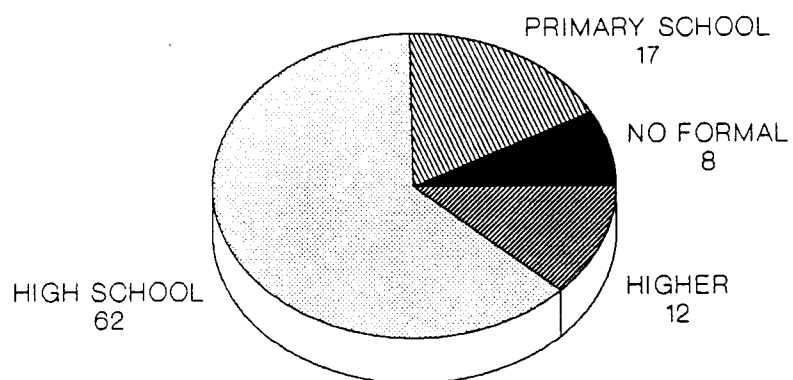


RELIGION

Figure 1 Religion, occupation, and education (continued).



OCCUPATION



EDUCATION

The most common diagnostic categories of the 100 patients evaluated, together with average APACHE II scores, are listed in Table 2.

Table 2 Main diagnostic categories and average APACHE II scores.

Diagnosis	Number	APACHE II score
Asthma *	22	12.5 (range 2-34)
Pneumonia	14	14.9 (range 6-26)
Trauma	13	9.2 (range 2-23)
ARDS	13	14.4 (range 7-26)
Drug Overdose	7	11.6 (range 5-18)
Other lung infection	6	13.0 (range 8-22)
Eclampsia	5	15.6 (range 10-26)
Elective postoperative	4	11.0 (range 1-17)

* Two asthmatic patients were admitted after cardio-respiratory arrests. Their APACHE II scores were 34 and 31 respectively. Excluding them, the average APACHE II score is 10.5 (range 2-18).

Sedation

Sedation received by patients is outlined in Table 3.

Table 3 Sedation received.

Sedation	Number
None	36
Benzodiazepines * + opioid analgesics #	33
Opioid analgesics only	15
Benzodiazepines only	11
Thiopentone	3
Phenothiazines	3

* included diazepam, midazolam, lorazepam.

included morphine, fentanyl, papaveratum.

Orientation and procedures

Seventy patients were fully orientated for their entire ICU admission while at some stage in the ICU 28 were confused and 9 were unconscious (no response to painful stimuli).

Procedures carried out in the ICU included the following: 53 patients had arterial lines or central lines (central venous or pulmonary artery catheters), 10 patients underwent tracheostomy, and 14 had other surgical procedures.

Recall

Admission to hospital was remembered by 71 patients but admission to ICU by only 50. Explanation of their illness was remembered by 70 patients with 51 describing the explanation as good or excellent. Explanation of procedures was remembered by 69 patients with 62 describing it as good or excellent. The ability to recall admission to ICU was not related to level of consciousness ($p=0.18$, Fisher's Exact Test), although recall was significantly inversely correlated with APACHE II score ($p=0.007$, Mann-Whitney Test).

The ICU atmosphere was described as friendly by 81 patients and relaxed by 13. Only 3 patients felt it to be hostile or tense, and 2 had no recollection of it.

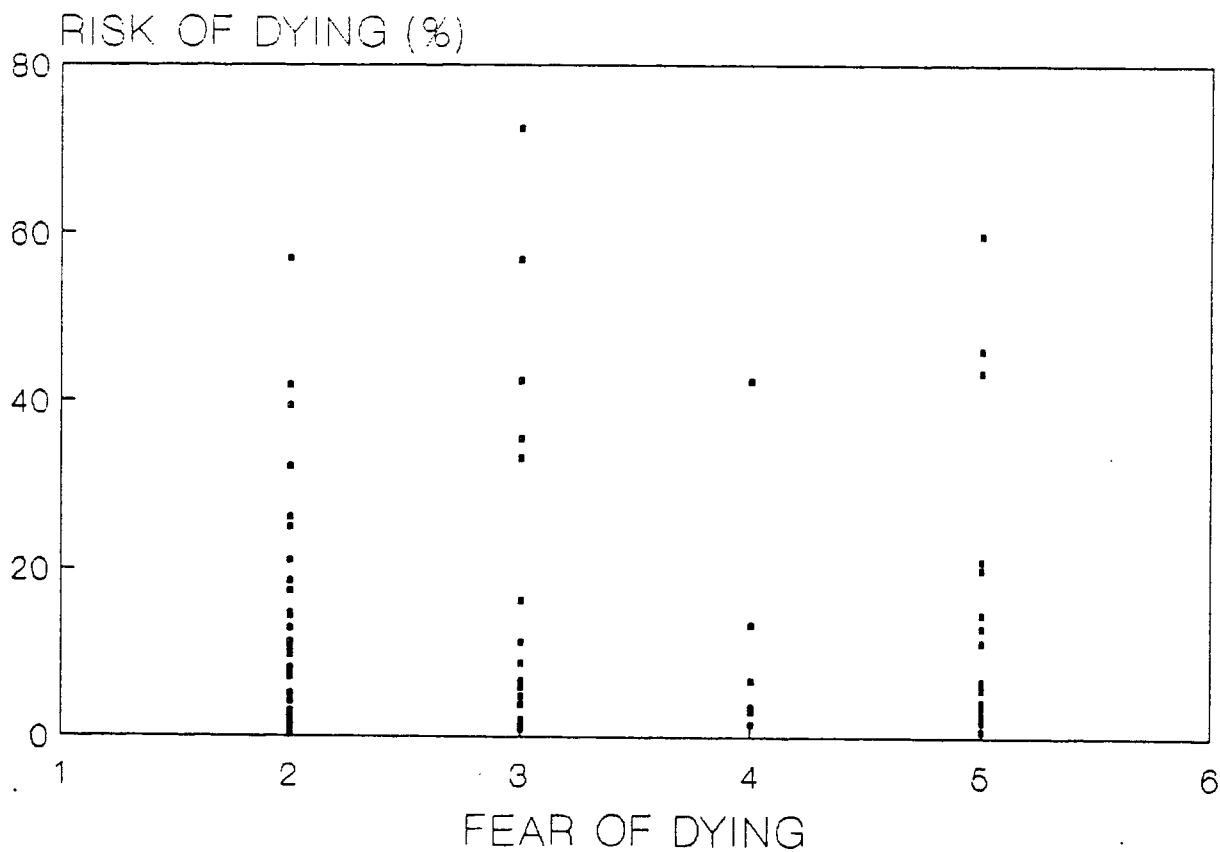
Confidence in doctors was described as good or excellent by 89 patients and confidence in nurses good or excellent by 90 patients. Only 3 patients had poor confidence in doctors and 1 poor confidence in nurses. Thirty five patients related better to nurses and 28 better to doctors, while the remainder had no special preference. This was not influenced by the nature of the interviewer (doctor or nurse) ($p=0.88$, Chi-squared Test).

Patient concerns

Fear of dying was described as moderate or severe by 28 patients and nil by 49. There was no statistical relationship between fear of dying and religion ($p=0.57$,

Chi-squared Test), race ($p=0.23$, Chi-squared Test), education ($p=0.19$, Chi-squared Test), or sedation with diazepam ($p=0.09$, Fisher's Exact Test) or midazolam ($p=0.85$, Chi-squared Test). There was no correlation between fear of dying and the calculated risk of dying (Spearman's Rank Correlation Coefficient= 0.19 , NS). (Figure 2).

Figure 2 Fear of dying vs risk of dying.



Procedures and feelings most often felt by patients to be moderately or severely worrying appear in Tables 4 and 5.

Table 4 Moderately or severely worrying factors (these included all patients).

Factor	Number
Arterial blood gas sampling	48
Pain	22
Noise	20
Family worries	18
Frustration	15
Hunger	15
Alarms	13
Fear of procedures	13
Financial worries	12
Being unaware of the time	11
Bright lights	11
General discomfort	10
Being washed	7
Wardrounds at bedside	6

Table 5 Moderately or severely worrying factors
(applicable to 68 ventilated patients only).

Factor	Number
Tracheal suctioning	30
Fear of being weaned	10
Fear of machine failure	8

Sleep

Amount of sleep was felt to be sufficient by 73 patients and too little by 24. There were complaints of too much sleep by 3 patients (2 of these patients had received thiopentone infusions). There was no relationship between subjective amount of sleep recalled and whether sedation was given ($p=0.51$, Chi-squared Test).

Responses to all questions asked are tabulated in Appendix III.

DISCUSSION

Study inclusion

One hundred patients were evaluated in this study, a figure large enough to be representative of the patient profile of our ICU. The diagnostic categories are similar to those observed in a previous review of 728 patients over a two-year period (11), apart from the larger number of asthmatics in this study (22% as opposed to 13% - a difference probably due both to seasonal variations in severe asthma attacks and to the low mortality of asthmatics in the ICU), but the average APACHE II scores are lower (12.27 as opposed to 14.1) because in the present study patients who died or were unable to answer questions were not included.

The patients who died (and possibly some of those excluded for other reasons) would have included some who were more ill than those who survived and they may have had different experiences to relate. On the other hand, they may have been more obtunded or sedated and therefore suffered less and remembered less. Thus the patients analyzed may not be entirely representative of the whole patient spectrum.

Study design

There was no opportunity for a later or additional interview as a number of patients come from far afield or do not attend followup appointments. There is a potential problem in this timing, as at this early stage patients are most likely to be experiencing only positive feelings (relief at having survived, freedom from intensive monitoring, gratitude towards the ICU staff) and thus might not be entirely objective in their answers. A later interview might have allowed patients to develop a more balanced outlook. In addition, there is no guarantee that patients will have full recall within this 48 hour period. Although only patients assessed by the interviewer to be fully orientated were interviewed, there is a possibility that minor degrees of confusion and disorientation were present. There was also no objective personality testing carried out to assess personality disorders or exclude neurotic tendencies among the patients that complained the most.

The interviewers were generally part of the ICU staff who had looked after the patient, and would have been identified as such when conducting the interview. Thus the possibility of bias in the answers because of gratitude and an eagerness to please cannot be ignored.

Study comparisons

It is conceded that any study of this nature is applicable mainly to the patient population and ICU environment that it sets out to evaluate. However, certain extrapolations can be made in a broader context. The patient profile (including demographic factors) and spectrum of illnesses is representative of that found in the general ICUs of the large teaching hospitals throughout South Africa, and hence the findings would be applicable to these patients. Clearly slight racial and educational differences exist in different parts of the country, and these would need to be corrected for. The findings of this study cannot however be extrapolated to advanced First World countries, where patient profile, patient expectations, spectrum of diseases, and treatment regimes are very different. The comparison of this study with one done today in such a country would be of great interest.

Results

General recall

Seventy patients were felt to be fully orientated for their entire ICU admission, but only 50 remembered being admitted to the ICU. This is probably due to short periods of mild disorientation not detected by the investigators or possibly to the amnesic effects of benzodiazepines received by some patients. Patients who recalled their admission to ICU had significantly lower APACHE II scores than those who

did not.

The majority of patients felt the explanation of their illness or of procedures (including minor and routine procedures such as venesection, arterial blood gas sampling, and tracheal suctioning) to be good or excellent. These explanations are carried out by both doctors and nurses. There is, however, cause for concern that some patients were dissatisfied, and this needs to be rectified. Patients may easily misunderstand or not want to hear what is told to them, so explanations should be clear and repeated. Denial may be prominent in reactions to acute stress, and would explain the phenomenon of "not wanting to know" that appeared in our study group.

Confidence in doctors and nurses was excellent, with only a small number of patients reporting it as poor. Previous studies have shown that patients generally feel positive about the ICU staff (1,2). The ICU atmosphere was well received; hopefully this is a reflection of the friendly and positive attitude of the entire multidisciplinary team. Possible bias in the answering of these questions has been dealt with above. Kornfield notes that a supportive ICU atmosphere may reduce stress (12).

Patient concerns and study recommendations

Fear of dying was a major problem for 28 patients and was not influenced by religion, race, education, or sedation. The way the question was phrased allowed this

term to include both fear of death itself and the fear that death was close. It will be noted that there was no correlation between fear of dying and calculated risk of dying. It is therefore clear that many patients had no insight into the seriousness of their condition, and that others with minimal risk of dying were very worried and therefore need constant reassurance to relieve their anxiety. None of the papers on ICU recall (1-9) deal with fear of dying, although the survivor of a cardiac arrest (7) felt he had been near to death but that all would be well.

Arterial blood gas sampling was the procedure that most often distressed the patients. Some patients did not mind the procedure when done by an experienced operator, but dreaded it when done by less experienced staff. Unfortunately, as our ICU is a training unit for both doctors and nurses, it is unavoidable that the less experienced will carry out procedures. It is recommended that whenever frequent sampling is necessary, an arterial catheter should be inserted. The technique of arterial puncture should be properly taught to new staff, and the discomfort of a poorly performed procedure impressed upon them. Pulse oximetry could also be used to lessen the number of arterial punctures required.

Tracheal suctioning has been previously reported as being unpleasant in small numbers of patients (1,2) and some individual observations support this (5,6). Shovelton describes it as "not a disturbing procedure" (4). Thirty

patients felt it to be moderately or severely unpleasant. Considering that only 68 patients underwent the procedure, this is a significant problem. Again there was a lot of variation, with some nurses being reported to be much better at the technique than others. This was also described by Henschel (9), who found that some nurses made suctioning "an excruciating experience". It is recommended that the procedure be properly taught and be carried out with the utmost care.

Pain was a major problem for 22 patients. The causes included postoperative pain, fractures, procedures, endotracheal tubes, and backache from lying in bed for a prolonged period of time. Complaints of pain will obviously vary from unit to unit, depending on the type of patients admitted, and will probably be more frequent in surgical ICUs. In one series from a surgical ICU only 7% of patients were worried about pain (1), whilst in another general ICU 22% were worried a little and 10% a lot (2). The nursing staff do not try to limit analgesics for fear of addiction, and they are prompt to offer them. Despite their efforts, and although some degree of pain is inevitable, the amount noted here is worrying.

Noise was moderately or severely worrying to 20 patients. Hewitt et al (1) report that noise worried 10% of their patients a lot, while Jones et al (2) showed that 8% of patients were worried a little and 4% a lot. Taking the opposite view, Gandy (8) states that "the worst times

were when there was nothing to hear" as hearing conversations and the radio occupied his mind. Noise levels have been accurately measured in a hospital and were found to reach annoying levels during both day and night in the ICU (13). There is also a concern that noise is an additional stress factor for patients already under emotional strain.

Family worries were a problem in 18 patients. These included worries about the spouse or children being unable to cope without the patient at home, and about the family not knowing where the patient was or not coming to visit. These worries were often unable to be communicated while the patient was intubated and were therefore unable to be relieved. Later on, simple reassurance and contact with the family usually sorted out these problems. There is a definite place for the more frequent use of a social worker in our team.

Frustration moderately or severely worried 15 patients. In the words of Shovelton (4), "frustration is inevitable". This is understandable in a setting where patients are often intubated and for various reasons unable to perform their normal independent daily functions. Full and patient explanations can usually serve to lessen this problem considerably.

Hunger was a problem for 15 patients. These were invariably the less sick or recovering patients. The hospital food is unfortunately not always similar to the

home diets of the patients, and some patients have appetites that the average caterer cannot predict or accommodate.

Alarms were moderately or severely worrying to 13 patients. There are alarms on almost every piece of equipment in the ICU, including ventilators, ventilator humidifiers, electrocardiograph monitors, respiration monitors, pressure monitors, pulse oximeters, and infusion pumps. Busy nursing staff may not immediately respond to minor alarms. This tends to frighten the patient, who feels that there is a grave malfunction of the equipment going unnoticed while he is powerless to even call for attention. Simple reassurance will usually resolve the problem.

Thirteen patients were afraid of procedures. These ranged from minor and routine procedures (including venesection and arterial blood gas sampling) to placement of central lines, arterial lines, and chest tubes, and tracheostomy and surgery. Unfortunately these are usually both painful and unpleasant, but are entirely necessary. Adequate explanation, together with good local anaesthetic technique and occasionally some sedation, can make these procedures less unpleasant.

Financial worries were a problem for 12 patients. Specifically, patients were usually afraid of losing their jobs while in hospital. Occasionally there were pensions that needed to be collected in person. Telephone calls to the employer usually revealed that he was actually really

concerned about the patient and had no intention of dismissing him. Pensions could be arranged to be collected by a nominee.

Eleven patients reported that they were worried by being unaware of the time. This feeling led to complete disorientation and feeling of depersonalisation. Some lights are of necessity kept on throughout the night (11 patients were in fact worried by bright lights) and the day tends to merge imperceptibly into the night and all the familiar and reassuring visual cues disappear. Keep et al (14) describe disorientation, sleep disturbance, and visual disturbance to be more prevalent in an ICU lit solely by artificial light. Kornfield suggests that a large clock and calendar visible to the patient would help with orientation (12).

Fear of being weaned (10 patients) and of machine failure (8 patients) were concerns of the 68 ventilated patients. These are quite understandable fears and may be extremely distressing as noted in a patient described by Tomlin (15). This patient was afraid that he would be unable to breathe while asleep and consequently forced himself to stay awake for 36 hours. Such fears can be reduced by constant reassurance and encouragement. A positive attitude taken by all the staff will make the patient feel more secure.

Wardrounds

Some of the nursing staff felt the format of our wardrounds to be distressing to the patients. This is indeed the traditional view. It was found that only 6 patients were worried by these wardrounds, and the reason given by most of them was that nobody came to talk to them at the end of the discussion. A number of patients volunteered that they liked having discussion within their earshot, and felt relieved that information was not being hidden from them. It is suggested that wardrounds in this form are optimal, but that more time should be devoted to communicating with the patients at the end of the discussion.

Sleep

Nearly three-quarters of our patients felt that they had enough sleep while in the ICU. It must be emphasized that this was a purely subjective impression, and no monitoring of sleep was carried out. The commonly held preconception had been that all patients are sleep-deprived. Hewitt et al (1) found that 26% of patients were worried a lot by difficulty in resting or sleeping, while Jones et al (2) showed that 24% of patients complained of insufficient sleep. Several studies in the hospital and ICU settings (16-19) have objectively shown severe sleep disturbances including a marked reduction in rapid eye movement sleep and slow wave sleep. Aurell and Elmqvist (19) point out that

sleep time estimated by nursing staff was often misjudged and overestimated when compared with parallel objective measurements. A degree of sleep deprivation is inevitable when observations and procedures have to be carried out at frequent intervals, but where possible (and always in the less critically ill patient) patients should be disturbed only as often as is absolutely necessary, a view supported by Kornfield (12).

Sedation

No sedation at all was given to 36 patients. The light sedative regimes used in our ICU allow earlier mobilization, both in and out of bed, thereby shortening time on the ventilator and in the ICU. There was no statistical difference in patients' perception of the amount of sleep they had and whether or not they received sedation. Sedation did not modify fear of dying.

Conclusions

In conclusion, the information we have collected has important implications for the improvement of patient care. Suggestions and recommendations have been made throughout the above discussion, and these have been communicated to the medical, nursing, and paramedical staff of the ICU and have been received with interest and implemented. The need for further study has been stimulated, with suggestions including the assessment of critically ill patients' ability

to sign informed consent for procedures and the use of a local anaesthetic jelly to lessen the discomfort of arterial punctures.

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APPENDIX I (DATA FORM)

A. PATIENT DETAILS (Hospital sticker)

- * Name
- * Age
- * Race and Sex (1-8)
- * Religion
- * Occupation (previous if unemployed)
- * Education

- * Diagnosis
- * APACHE II, Sedation, Level of Consciousness

	APACHE II	Sedation	LOC
Day 1			
2			
3			
4			
5			
10			
20			
30			

(APACHE II - score only, day 1 only)

(Sedation - include type and amount)

(LOC - orientated/confused/unconscious - not responding to verbal command)

* Procedures ventilator/lines/tracheostomy/surgery

* Date admitted

* Date discharged

* Discharged to

B. RECALL

1. Do you remember

- * admission to hospital Yes/No
- * admission to ICU Yes/No
- * explanation of illness Yes/No poor/good/ex
- * explanation of procedures Yes/No poor/good/ex

Comments

2. Was the ICU atmosphere

Hostile/tense/relaxed/friendly/other/don't remember

Comments

3. How do you relate your

- * confidence in doctors poor/mod/good/ex
- * confidence in nurses poor/mod/good/ex

To whom did you relate best?

Comments

4. How much did the following worry you

NA/don't remember/nil/mild/mod/severe

- * fear of dying
- * fear of procedures
- * fear of being weaned
- * fear of machine failure
- * pain
- * suctioning
- * physiotherapy
- * noise
- * alarms
- * bright lights
- * frustration
- * general discomfort
- * financial worries

- * family worries
- * other patients
- * being washed
- * lack of privacy
- * hunger
- * wardrounds and discussion
- * staff being reprimanded
- * staff changes
- * being unaware of the time
- * arterial blood gas sampling
- * visitors (too few/enough/too many)
- * sleep (too little/enough/too much)

Comments

5. Which other memories were

- * pleasant
- * unpleasant

APPENDIX II (APACHE II SCORING SHEET)

This full-page scoring sheet appears on the following page

APACHE II: A SEVERITY OF DISEASE CLASSIFICATION SYSTEM

INSTRUCTIONS

- 1) use number '2' pencil, 2) darken appropriate circles completely, 3) make no stray marks, and 4) erase completely.
1. 'AP' physiologic measurements are mandatory. For Acute Physiology Score (AP).
2. For worst over 24 hour score, record physiologic values farthest away from normal. For Age and Chronic Health Evaluation (B and C).
- Refer to initially completed 'ICU Admissions form'.

5. TIMING OF THIS SCORE:

initial/point in time or
worst over 24 hours

4. IF LAST ICU DAY WAS PATIENT DISCHARGED:

Alive or Dead

3. NUMBER OF THE ICU DAY

0 1 2 3 4 5 6 7 8 9

PATIENT NAME

0 1 2 3 4 5 6 7 8 9

	HIGH ABNORMAL RANGE					NORMAL					LOW ABNORMAL RANGE						
	+4	+3	+2	+1	0	+1	0	+1	+2	+3	+4	+1	0	+1	+2	+3	+4
TEMPERATURE - rectal Centigrade - [°C = (°F-32)x5/9]	<input type="radio"/> > 41°	<input type="radio"/> 39°-40.9°	<input type="radio"/> 110-129	<input type="radio"/> 38.5°-38.9°	<input type="radio"/> 38°-38.4°	<input type="radio"/> 38.5°-38.9°	<input type="radio"/> 38°-38.4°	<input type="radio"/> 34°-35.9°	<input type="radio"/> 32°-33.9°	<input type="radio"/> 30°-31.9°	<input type="radio"/> < 28.0°	<input type="radio"/> 34°-35.9°	<input type="radio"/> 38°-38.4°	<input type="radio"/> 32°-33.9°	<input type="radio"/> 30°-31.9°	<input type="radio"/> < 28.0°	<input type="radio"/> < 28.0°
MEAN BLOOD PRESSURE - mm Hg (2x diastolic BP + systolic BP)/3	<input type="radio"/> ≥ 180	<input type="radio"/> 130-159	<input type="radio"/> 110-129	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 50-89	<input type="radio"/> 55-89	<input type="radio"/> 40-54	<input type="radio"/> < 39	<input type="radio"/> 50-89	<input type="radio"/> 70-109	<input type="radio"/> 50-89	<input type="radio"/> 40-54	<input type="radio"/> < 39	<input type="radio"/> < 39
HEART RATE (ventricular response)	<input type="radio"/> ≥ 180	<input type="radio"/> 140-179	<input type="radio"/> 110-139	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 70-109	<input type="radio"/> 50-89	<input type="radio"/> 55-89	<input type="radio"/> 40-54	<input type="radio"/> < 39	<input type="radio"/> 50-89	<input type="radio"/> 70-109	<input type="radio"/> 50-89	<input type="radio"/> 40-54	<input type="radio"/> < 39	<input type="radio"/> < 39
RESPIRATORY RATE - total non-ventilated or ventilated rate	<input type="radio"/> ≥ 50	<input type="radio"/> 35-49	<input type="radio"/> 12-24	<input type="radio"/> 12-24	<input type="radio"/> 12-24	<input type="radio"/> 12-24	<input type="radio"/> 10-11	<input type="radio"/> 6-9	<input type="radio"/> 6-9	<input type="radio"/> 6-9	<input type="radio"/> < 5	<input type="radio"/> 12-24	<input type="radio"/> 6-9	<input type="radio"/> 6-9	<input type="radio"/> < 5	<input type="radio"/> < 5	
O₂ SATURATION: A-aDO₂ or PaO₂ (mm Hg) 1. if FiO ₂ > 50 then record A-aDO ₂ A-aDO ₂ = (FiO ₂ - PaO ₂) - PaCO ₂ / 0.8 2. if FiO ₂ < 50 then record only PaO ₂	<input type="radio"/> ≥ 65	<input type="radio"/> 46-64	<input type="radio"/> 26-45	<input type="radio"/> 42-55	<input type="radio"/> 29-42	<input type="radio"/> 42-55	<input type="radio"/> 29-42	<input type="radio"/> 20-29	<input type="radio"/> 20-29	<input type="radio"/> 20-29	<input type="radio"/> < 20	<input type="radio"/> 42-55	<input type="radio"/> 29-42	<input type="radio"/> 20-29	<input type="radio"/> 20-29	<input type="radio"/> < 20	<input type="radio"/> < 20
ARTERIAL pH arterial blood gases, ABGs	<input type="radio"/> ≥ 7.7	<input type="radio"/> 7.8-7.89	<input type="radio"/> 7.33-7.49	<input type="radio"/> 7.33-7.49	<input type="radio"/> 7.33-7.49	<input type="radio"/> 7.33-7.49	<input type="radio"/> 7.25-7.32	<input type="radio"/> 7.15-7.24	<input type="radio"/> 7.25-7.32	<input type="radio"/> 7.15-7.24	<input type="radio"/> < 7.15	<input type="radio"/> 7.33-7.49	<input type="radio"/> 7.25-7.32	<input type="radio"/> 7.15-7.24	<input type="radio"/> 7.15-7.24	<input type="radio"/> < 7.15	<input type="radio"/> < 7.15
SERUM SODIUM (mMol/L)	<input type="radio"/> ≥ 180	<input type="radio"/> 160-179	<input type="radio"/> 155-159	<input type="radio"/> 150-154	<input type="radio"/> 130-149	<input type="radio"/> 150-154	<input type="radio"/> 130-149	<input type="radio"/> 120-129	<input type="radio"/> 120-129	<input type="radio"/> 111-119	<input type="radio"/> < 110	<input type="radio"/> 155-159	<input type="radio"/> 130-149	<input type="radio"/> 120-129	<input type="radio"/> 111-119	<input type="radio"/> < 110	<input type="radio"/> < 110
SERUM POTASSIUM (mMol/L)	<input type="radio"/> ≥ 7	<input type="radio"/> 6-8.9	<input type="radio"/> 3.5-5.4	<input type="radio"/> 5.5-5.9	<input type="radio"/> 3.5-5.4	<input type="radio"/> 5.5-5.9	<input type="radio"/> 3-3.4	<input type="radio"/> 2.5-2.9	<input type="radio"/> 2.5-2.9	<input type="radio"/> < 2.5	<input type="radio"/> < 2.5	<input type="radio"/> 6-8.9	<input type="radio"/> 3.5-5.4	<input type="radio"/> 2.5-2.9	<input type="radio"/> < 2.5	<input type="radio"/> < 2.5	<input type="radio"/> < 2.5
SERUM CREATININE (mg/100 ml) * Double the creatinine point score for BUNR renal failure (ARF)	<input type="radio"/> ≥ 301-600	<input type="radio"/> 177-300	<input type="radio"/> 136-175	<input type="radio"/> 75-135	<input type="radio"/> 75-135	<input type="radio"/> 75-135	<input type="radio"/> < 75	<input type="radio"/> < 75	<input type="radio"/> < 75	<input type="radio"/> < 75	<input type="radio"/> < 75	<input type="radio"/> 301-600	<input type="radio"/> 177-300	<input type="radio"/> 136-175	<input type="radio"/> 75-135	<input type="radio"/> < 75	<input type="radio"/> < 75
HEMATOCRIT (%)	<input type="radio"/> ≥ 60	<input type="radio"/> 40	<input type="radio"/> 20-39.9	<input type="radio"/> 15-19.9	<input type="radio"/> 3-14.9	<input type="radio"/> 15-19.9	<input type="radio"/> 3-14.9	<input type="radio"/> 1-2.9	<input type="radio"/> 1-2.9	<input type="radio"/> 1-2.9	<input type="radio"/> < 1	<input type="radio"/> 40	<input type="radio"/> 20-39.9	<input type="radio"/> 15-19.9	<input type="radio"/> 3-14.9	<input type="radio"/> < 1	<input type="radio"/> < 1
WHITE BLOOD COUNT (total, cs/mm) (in 1,000's)	<input type="radio"/> ≥ 15,000	<input type="radio"/> 10,000-15,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> < 5,000	<input type="radio"/> 10,000-15,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> 5,000-10,000	<input type="radio"/> < 5,000	<input type="radio"/> < 5,000

Neurologic Points for GLASGOW COMA SCORE (GCS)
To calculate: Neurologic Points = (15 - actual GCS); Points: See below to determine actual GCS.

TRAIL ACUTE PHYSIOLOGY SCORE (APACHE II)
Sum of the 12 individual variable points

GLASGOW COMA SCORE (GCS): Sum of Best Eye Opening, Best Verbal, and Best Motor Responses. Scoring of responses as follows: (Unintentional)

EYE - Open: Spontaneously (4); to verbal command (3); to pain (2); No response (1).

VERBAL - Obeys verbal command (5); Responses to painful stimuli: 1 (oriented pain), 2 (words without pain), 3 (incomprehensible sounds), 4 (moans), 5 (no response).

MOTOR - Obeys verbal command (6); Responds to painful stimuli: 1 (localizes pain), 2 (withdraws), 3 (decorticate rigidity), 4 (decerebrate rigidity), 5 (no response without any command).

APACHE II SCORE
Sum of **A** + **B** + **C**

AGE POINTS: Assign points as follows:
AGE (yrs) Points
≤ 44 0
45-54 2
55-64 3
65-74 5
≥ 75 6

CHRONIC HEALTH POINTS: If the patient has a positive Chronic Disease History, i.e., history of severe insufficiency or is immuno-compromised (uses opposite side for detailed definitions) then assign points as follows:
a. for nonoperative or emergency postoperative patients - 5 points
or b. for elective postoperative patients - 2 points

APPENDIX III (RESPONSES TO QUESTIONS)

Numbers of patients in each category are listed below.

1. Do you remember

* admission to hospital Yes 71 No 29

* admission to ICU Yes 50 No 50

* explanation of illness Yes 70 No 30

(poor 19 good 29 ex 22)

* explanation of procedures Yes 69 No 31

(poor 7 good 38 ex 24)

2. ICU atmosphere

Hostile 1

Tense 2

Relaxed 13

Friendly 81

Other 0

Don't remember 2

Data not recorded 1

3. Confidence in staff

In doctors poor 3 mod 6 good 32 ex 57

(Data not recorded 2)

In nurses poor 1 mod 8 good 34 ex 56

(Data not recorded 1)

Related better to doctors 28

Related better to nurses 35

No particular preference 37

4. Worrying factors (Where remembered)

	nil	mild	mod	severe
* fear of dying	49	18	7	21
* fear of procedures	58	16	6	7
* fear of being weaned #	42	10	6	4
* fear of machine failure #	56	2	3	5
* pain	58	18	12	10
* suctioning #	21	9	15	15
* physiotherapy	68	9	4	0
* noise	71	7	10	10
* alarms	71	11	8	5
* bright lights	81	6	8	3
* frustration	67	15	7	8
* general discomfort	70	17	6	4
* financial worries	83	2	6	6
* family worries	70	9	8	10
* other patients	88	6	3	2
* being washed	82	8	6	1
* lack of privacy	96	1	1	0
* hunger	77	6	6	9

	nil	mild	mod	severe
* wardrounds and discussion	81	9	3	3
* staff being reprimanded	46	0	2	0
* staff changes	90	5	2	1
* being unaware of time	82	5	6	5
* blood gas sampling	35	13	17	31

Applicable to 68 ventilated patients only.

* visitors too few 9 enough 82 too many 8

(Data not recorded 1)

* sleep too little 24 enough 73 too much 3