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Psychological sequelae following ICU admission at a level 1 academic South African hospital

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Purpose. The purpose of this research was to determine the extent to which anxiety symptoms, depressive symptoms and post-traumatic stress (PTS) symptoms were experienced by a sample of patients after discharge from intensive care units (ICUs). The participants had a mean stay of 3 days in ICUs in a level 1 academic hospital in Gauteng, South Africa.

Methods. A prospective, quantitative, cross-sectional, descriptive design was used to investigate these variables. A preliminary record review of the hospital's ICU bed occupancy for the previous year was 1 596. The total study sample was 98 (*N*=98) to ensure that a power of at least 95% accuracy was acquired for the 0.05 level of significance testing. The instruments used in the structured interview were the Hospital Anxiety and Depression Scale (HADS) developed by Zigmond and Snaith (1983) and the Experience after Treatment in Intensive Care 7-Item scale (ETIC-7) developed by Scragg, Jones and Fauvel (2001). Data were analysed using STATA 10.

Findings. Just under half the sample population (48%) had symptoms of anxiety, more than a quarter had symptoms of depression (28%), and 32% had symptoms of PTS. Furthermore, it was elicited that 58% of the sample had combined anxiety and depressive symptoms severe enough to have a 'possible clinical disorder'. An unexpected finding of this study was that patients who had memory of physical restraints in the ICU were six times more likely to develop symptoms of PTS than those with no memory of physical restraint.

Conclusions. It was observed in this study that a significant number of ICU patients returning to the community develop psychological sequelae related to their admission and the treatments necessary, e.g. mechanical ventilation. This psychological distress can affect patients' physical recovery (by an altered and decreased immune function), their quality of life and their functioning in the family and in society.

Clinical relevance. The prevalence of psychological sequelae after treatment in an ICU was found to be high. At present ICU staff in South Africa have limited evidence on which to base decisions about improvements to critical care practice and the psychological sequelae following treatments in an ICU. Critical illness and the recovery from it do not end at the ICU door, and patients should be *identified*, followed up and offered the necessary support.

Symptoms of anxiety, depression and post-traumatic stress (PTS) have been identified in many patients after treatment in an intensive care unit (ICU).[1-3] The nature of the ICU environment, the patients' experiences, and the treatments they receive while in the ICU may leave long-standing psychological symptoms that impair their quality of life.[4]

Concern about PTS symptoms in ICU survivors is growing[2] and has led in some cases to changes in patient management in response to the perception that PTS symptoms are a common outcome.[3]

Psychological sequelae after treatment in the ICU have been explored in the developed world, and countries with sophisticated infrastructures have been actively researching this phenomenon, whereas there is a lack of research on this topic in South Africa.

Literature review

As long ago as 1995, Dyer noted that staff working in ICUs were aware that patients may experience psychological trauma.[5] In spite of this knowledge, 15 years after the publication of Dyer's findings such trauma continues to

occur. Dyer went on to describe the emotional stressors experienced by patients in ICU as a 'type of torture', and went so far as to use publications from Amnesty International – which described methods of psychological torture – to support her suggestion.[5]

Progress in critical care has led to a decline in mortality rates among patients admitted to ICUs.[6] However, for many survivors their ICU hospitalisation results in a life of severe limitation, obstacles, cognitive dysfunction and psychological sequelae.[7] The physical needs of patients are addressed in modern ICUs, where the main outcome measure is survival status, but psychological needs are often ignored, despite the possibility that patients will be left with deep emotional scars.[7]

In previous systematic reviews of PTS symptoms, very few patients were asked if they had prior mental health problems or had been on psychiatric medication.[8] Studies need to be undertaken that omit patients admitted as a result of a traumatic event.[9] There is also little information regarding the use of physical restraints in the ICU. Cognizance was taken of these factors in this study.

Methods

Study design

A quantitative, prospective, descriptive, cross-sectional design was used to investigate the prevalence of the symptoms of anxiety, depression and PTS in the sample population using two instruments, the Hospital Anxiety and Depression Scale (HADS)[10] and the Experience after Treatment in ICU-7 scale (ETIC-7).[4]

Research setting

Sites for collection of the data were the outpatient clinics at a level 1 academic hospital, which is a major tertiary referral centre in South Africa. This public sector hospital has 1 190 beds, of which 39 are ICU beds. Most of the patients who use the hospital facilities have no private medical aid coverage, and many are migrants. Data were collected by the first author (CH) over a 3-month period in 2009. Patients who participated in this study had been discharged from one of four adult ICUs in the hospital. The nurse-to-patient ratio in these ICUs is 1:1.

Study population and sampling

With a bed occupancy of 1 596 patients during the previous year, a total sample size of 98 was deemed adequate to ensure a power of at least 95% accuracy for the 0.05 level of significance testing. Criteria for inclusion in this study were that the patient was aged 18 years and above, had been treated in one of four adult ICUs, namely medical, surgical, cardiac and neurosurgical, and had returned to the outpatient department (OPD) for their first post-ICU discharge visit. The sample's median length of ICU stay was 3 days.

Patients excluded were those admitted to the trauma ICU and all whose admission was a result of physical violence or trauma. This was to exclude PTS symptoms, anxiety and depressive symptoms resulting from causes other than the ICU experience.

Ethical considerations

Approval for the study was sought and obtained from the Faculty of Health Sciences Postgraduate Committee and the Human Research Ethics Committee (Medical) (MO60455) of the University of the Witwatersrand, Johannesburg. Permission to conduct the research was also obtained from the Deputy Director of the relevant Provincial Health Department and from the Chief Executive Officer of the hospital. Anonymity of participants and confidentiality of data were maintained and informed consent was obtained from each participant.

Data collection

Once permissions had been granted, the researcher attended the OPD twice a week. She introduced herself to small groups of patients who were attending the department, gave a brief presentation about the research that was being conducted, and asked all patients who were returning for their first visit after ICU discharge, and were willing to participate in the study, to make themselves known to the researcher. All patients who were included in the sample had their names checked against the ICU registers.

Data were collected by means of a structured interview using a checklist comprising three sections, namely demographic and patient information and items derived from two instruments, the HADS[10] and the ETIC-7 scale.[14] The interview took approximately 10 minutes to complete. The patients were given the opportunity to ask questions after the structured interview.

Timing of the measurement of anxiety, depressive and PTS symptoms in this study was at the first visit to the OPD, after ICU and hospital discharge. The researcher noted that although the patients were returning for their first visit, the time since discharge from ICU ranged from 4 weeks to 4 months. Many of the patients had failed to return for their first scheduled appointment.

The average length of stay in the ICU was 5.6 days, but this result was skewed due to a small number of patients who had an extended (>30-day) stay. The median was 3 days. The majority of patients (77%) had an ICU stay of 1 - 6 days.

A pilot study was conducted on 10 participants before the main study, to test the participants' understanding of the informed consent sheet, the wording of the information letter and the wording of the questionnaire. All items were understood and the results from the pilot study were not included in the main study. Questionnaires were in English, and the interviews were conducted in English as well.

Instruments

The instrument used to collect the data during the structured interview consisted of three parts. Section 1 consisted of 10 items, including age, gender, race, ICU type, ventilated or not, memory of physical restraints, length of stay in the ICU, stressful event before admission or after discharge from the ICU, current medications, and finally a question pertaining to prior treatment for stress or psychological problems, to address the issue of pre-existing psychological problems. Section 2 was the HADS and section 3 was the ETIC-7.

The Hospital Anxiety and Depression Scale

The HADS was developed by Zigmond and Snaith in 1983,[10] has been widely used, and is a popular measure that has been extensively translated and used in a broad variety of clinical populations.[9] This 14-item scale has consistently been found to be a reliable and valid measure of two independent and separable dimensions of anxiety and depression,[4] scoring results in scales of 0 - 21 for depression and anxiety respectively. Scores of 9 and 10 on each subscale indicate the possibility of anxiety or depression, and scores of 11 or above indicate a 'case' of anxiety or depression.[10] There is also a HADS total score, which is used as an additional measure for psychological distress.[4] Scores from the two subscales (anxiety and depression) can be combined to produce the HADS full-scale score. A full-scale score of >12 may be indicative of a clinical disorder. Anxiety and depression symptoms in this study are defined as all cases above the threshold score of 8, and in addition to this a 'clinical case' of anxiety or depression can be defined as a score of 11 or above. A total HADS score is computed for each participant to detect the prevalence of a 'possible clinical disorder'. This measure has good internal reliability, construct, discriminative and predictive validity as well as being readily accepted by patients in acute settings;[11] it takes minutes to complete and has been validated in ICU patients with a stated Cronbach coefficient for anxiety of 0.78 - 0.93 and a Cronbach coefficient for depression of 0.82 - 0.90.[12] It is traditionally a self-report measure, but has been used successfully as part of a structured interview.[13]

The Experience after Treatment in Intensive Care 7-Item scale

The ETIC-7 scale has 7 items and was designed by Scragg *et al*. in 2000.[4] It was specifically designed to measure PTS symptoms directly related to a patient's experience in an ICU. The construct criteria were taken from the *Diagnostic and Statistical Manual*, 4th edition (DSM-IV), and the criteria come from the trauma re-experiencing (for example, intrusive thoughts and upsetting recollections of the trauma, recurrent dreams or nightmares, and flashbacks), and trauma stimuli-avoiding (for example, efforts to avoid conversations, places and thoughts associated with the trauma,

detachment from others, and a restricted range of affect) symptom clusters. Scores on the ETIC-7 range from 0 to 21. Scores of 0 - 7 indicate no symptoms, and all scores of 8 and above indicate symptoms of PTS. The higher the score, the more severe the symptoms.[4] The Cronbach alpha for the ETIC-7 is 0.84.[4]

Data analysis

Prevalence rates for the symptoms of anxiety, depression and PTS are reported along with their 95% confidence intervals (CIs). Prevalence rates were also calculated for individual items on the ETIC-7. All significance testing was two-tailed. t-tests were used when comparing two groups and univariate analysis of variance using the F-statistic was used to test groups with (>2) comparisons. Logistic regression was performed on memory of restraints in ICU patients with PTS symptoms to provide odds ratios (ORs). Testing was done at the 0.05 level of significance.

Main findings

The reliability coefficient for the symptoms of anxiety, depression and PTS in this study was 0.71.

Demographic data (Table I). The total number of participants was 98. The average age of the participants was 55.2 years (standard deviation (SD) 13.66). The youngest was 18 years old and the oldest 81, making the range 63.

Gender. The majority of participants were male (N=59, 60%) and there were 39 females (40%).

Ethnic groups. The majority of the sample were whites (N=47) (48%), followed by blacks (N=32, 33%), Indians (N=15, 15%) and coloureds (N=4, 4%). This is not an accurate representation of the racial ratios in the South African population, of which blacks make up 79.6%.[13] It is possible that a large number of black patients discharged from ICUs do not return for their follow-up visits as scheduled.

ICU type. Thirty-eight participants (39%) had been treated in the cardiac, 36 (37%) in the surgical, 14 (14%) in the medical and 10 (10%) in the neurosurgical ICU (Table II).

Length of stay. The average length of stay in ICU was 5.6 days, but this number was skewed due to a small number of patients who had an extended (>30-day) stay in ICU. The mode was 2 days and the range 59 days. The majority of participants in this study had short stays, 75 participants (77%) staying for 1 - 6 days.

Mechanical ventilation. Thirty-three patients (34%) had been mechanically ventilated. Both ventilated and non-ventilated patients were included in the study, as differences between the two groups are largely unexplored.[14]

Memory of physical restraints. Twenty-four participants (24%) had memory of physical restraint.

Table I. Demographic profile of the participants

Variable	N	%
Total sample	98	100
Gender		
Male	59	60
Female	39	40
Age (yrs)		
18 - 35	7	7
36 - 55	40	41
>55	51	52
Ethnic group		
Black	32	33
White	47	48
Indian	15	15
Coloured	4	4

Table II. Clinical data for the sample population

Variable	N	%
ICU type		
Neurosurgery	10	10
Cardiac	38	39
Surgical	36	37
Medical	14	14
Length of ICU stay (days)		
1 - 6	76	77
7 - 10	9	9
>11	13	14
Ventilated		
Yes	33	34
No	65	66
Memory of restraints		
Yes	24	24
No	74	76
Prior stressor		
Yes	6	6
No	92	94
Prior psychiatric treatment		
Yes	5	5
No	93	95

Stressors before admission to ICU or after discharge. Six patients (6%) had had a stressful event just before admission to the ICU or after discharge.

Previous psychiatric history/treatment. Five patients (5%) stated that they had previously sought treatment for a psychological problem or stress. There is a possibility that patients may have been reluctant to divulge such sensitive information because of the stigma attached to mental illness.

Prevalence of anxiety symptoms

A total of 48% (standard error (SE) 0.05; CI 0.38 - 0.58) of the sample showed signs of anxiety symptoms (Table III), using the threshold score of 8 on HADS. Possible scores on the HADS for anxiety ranged from 0 to 21, with 0 = no symptoms of anxiety and 21 = the highest possible score. The mean score was 8.14 (SE 4.50). Anxiety symptoms were most prevalent in the white population, of whom 53% (SE 0.07) had scores above the cut-off, although there were no statistically significant differences between the racial groups (F=1.788; df=3; p=0.67). Females had a higher prevalence of anxiety (59%, SE 0.08) compared with males (41%, SE 0.06). The difference was not statistically significant (t=1.20; df=96; p=0.233). The age group with the highest prevalence of anxiety was the youngest group (18 - 35 years) (71%; SE 0.18), although this result may not be a true reflection of anxiety in this age group as the number of participants in this group was only 7. The oldest group (>55 years) had the next highest prevalence of anxiety, 49% (SE 0.07), and the 36 - 55-year group had the lowest prevalence of anxiety, 42% (SE 0.07). An ANOVA test showed that the differences between the groups for age and anxiety symptoms were statistically significant (F=3.475; df=2; p=0.035).

Prevalence of depressive symptoms

A total of 28% (SE 0.45; CI 0.185 - 0.365) of the sample showed symptoms of depression using the cut-off score of 8 on the HADS. The mean score was 6.5 (SE 3.73), the range was 16 and the mode was 7. Depressive symptoms were most prevalent in the white population, of whom 30% (SE 0.07) had scores above the cut-off, although no statistically significant differences were found between the racial groups (F=0.152; df =3; p=0.928). Females had a higher prevalence (36%; SE 0.08) than males (22%; SE 0.05). The difference was not significant (t=0.29; df=96; p=0.776). The age group with the highest prevalence of depression was the oldest group (>55 years), of whom 35% (SE 0.07) had symptoms of depression. No significant differences were found between the age groups.

Table III. Prevalence rates of psychological sequelae in the sample population

	%	Standard error	Confidence interval
Anxiety	48	0.05	0.38 - 0.58
Depression	28	0.45	0.185 - 0.365
PTS	32	0.05	0.22 - 0.41

HADS total score

A total of 57 of participants (58%) had a total HADS score above the cut-off of 12. A full-scale score of >12 may be indicative of a clinical disorder.[4] Forty-two (42%) had scores <12.

Prevalence of PTS symptoms

A total of 32% (SE 0.05; CI 0.22 - 0.41) of the sample showed symptoms of PTS, counting all scores of 8 and above on the ETIC-7. The mean score on the ETIC-7 was 5.96 (SD 5.34), the range was 21 and the mode was 0. It can be extrapolated from these results that the majority of patients had no symptoms of PTS. Two patients in the sample (2%) had the maximum score of 21, and they were both male. Females had higher rates of PTS symptoms (41%; SD 0.08) than males (25%; SD 0.06), but differences were not statistically significant (t=0.99; df=96; p=0.324). The age group with the highest prevalence of PTS symptoms was the youngest group (18 - 35 years), with a figure of 43% (SD 0.20). Differences between age groups were not statistically significant (F=0.233; df=2; p=0.800).

Anxiety, depressive and PTS symptoms

There is significant evidence of a strong association between the subscales of HADS anxiety and HADS depression from the chi-square analysis: (χ^2=21.17; p=0.000) and also from Pearson's correlation (r=0.534; p=0.000). This concurs with previous studies done using the HADS.[4,10]

There is also significant evidence of an association between the ETIC-7 and HADS depression from the chi-square analysis: (χ^2=15.99; p=0.003) and from Pearson's correlation (r=0.366; p=0.002). There is also a highly significant association between the HADS anxiety component and the ETIC-7 as shown by Pearson's chi-square (χ^2= 3.68; p=0.008).

This confirms that the ETIC-7 is a valid measure and correlates with both the anxiety and depression subscales of the HADS.

Anxiety, depression, PTS symptoms and memory of physical restraints

The number of patients in this study who had memory of physical restraints while in the ICU was 24 (24%).

Using logistic regression, it was found that patients who had memories of physical restraint were 6 times more likely to develop PTS symptoms than those with no memory of restraint (OR 6.04; SE 3.06; p=0.000; CI 2.23 - 16.33). This supports the fact that restraints may increase the possibility of PTS symptoms developing.

The memory of restraints was also found to have a strong correlation with PTS symptoms (r=0.814; p=0.000).

Discussion

The prevalence of psychological distress levels following ICU treatment was found to be high despite the facts that the majority of the patients in this study had short stays (1 - 6 days) in the ICU and only 34% of the sample had been ventilated. Regardless of ethnicity, age or ICU type, the prevalence of psychological distress in South African patients at their first visit at outpatients after ICU discharge is significant. If these patients do not receive follow-up or psychological support, they may suffer for an undetermined length of time, and this may impact on their quality of life, their family life and their successful re-integration into society and return to gainful employment.[15] PTS symptoms at 3 months after ICU admission tend to persist chronically without treatment and the average duration of untreated post-traumatic stress disorder (PTSD) is 7 years,[9] so non-identification and/or non-treatment will lead to chronic suffering. An unexpected finding of this study was that memory of physical restraints during the ICU stay correlated with the development of PTS symptoms. Using logistic regression it was found that patients with memory of physical restraints were 6 times more likely to develop symptoms of PTS.

Anxiety. The total prevalence of anxiety in this study was high, with almost half (48%) of the patients showing symptoms; 27 participants from the sample population (28%) had symptoms severe enough (≥11) on the HADS to be classified as a 'clinical case' of anxiety.[4] This prevalence of anxiety closely mirrors the findings of Sukansarat *et al.*[16] and Scragg *et al.*,[4] who both used the HADS to measure anxiety. Women had higher prevalence rates for both anxiety and depression, which concurs with the findings of international studies,[4,17-20] although differences in our study did not reach statistical significance. This high prevalence of anxiety is troubling because its importance and its medical and psychological consequences are often ignored by health care providers because it is a universal emotion that is managed without adverse consequences by many people. Anxiety has been described as 'the rust of life' because it may have medical or psychological consequences when it is persistent or severe.[19]

Depression. The prevalence of depression was lower than that of anxiety, but still high, with more than quarter of the sample (28%) showing symptoms. Fifteen per cent (15%) of the total sample had symptoms severe enough (≥11) on the HADS to be classified as a 'clinical case' of depression. Findings of this study are similar to those of Scragg *et al.*,[4] who reported an incidence of 30%.

PTS symptoms. The prevalence of PTS symptoms directly related to the ICU experience as measured by the ETIC-7 was 32%. This is just under a third of the total sample population, and these findings closely mirror previous studies,[4,21] which both reported a prevalence of 30%. Of the 32% of the sample with PTS symptoms, there were 8% with scores above 15 on the ETIC-7, indicating

severe symptoms. PTS symptoms may have potential for increased morbidity, mortality and non-compliance, resulting in wasted health care resources.[22] It is therefore important to identify those at risk.

PTS symptoms and physical restraints. An unexpected finding of this study was that memory of physical restraints during the ICU stay correlated significantly with the development of PTS symptoms. Patients with a memory of physical restraints were 6 times more likely to develop symptoms of PTS (OR 6.04; SE 3.06; p=0.000; CI 2.23 - 16.33). This requires further investigation.

PTS symptoms and mechanical ventilation. Fifty-three per cent (53%) of patients were not ventilated but nevertheless developed symptoms of PTS. This finding supports previous research[23] indicating that no single type of trauma causes psychological disturbances. Critical illness and mechanical ventilation are not necessarily enough to cause PTS in all patients. The degree to which these events are experienced as traumatic may be mediated by age, severity of illness, abruptness of onset, religious faith and individual interpretation.[24]

Limitations of this study

Limitations exist at present, with ICU staff having mainly 'death' or 'discharged alive' from hospital as clinical outcomes from which to judge practice performance.[25]

The sample population in this study was heterogeneous in age, ethnicity, gender and types of ICU that the patients were admitted to. This will make generalisation of the results difficult, although the findings are pertinent to this particular study as heterogeneity is a reality in South Africa. The fact that the researcher requested that patients discharged from the ICU make themselves known to her in order for them to be included in the study could have excluded patients who had 'avoidant' symptoms of PTS. The majority of patients in this sample population were not ventilated (66%), and furthermore the average length of stay was short, with the median being 3 days. Results might differ with a sample in which all patients were ventilated.

Recommendations

In South Africa there is currently no follow-up of patients once they have been discharged from an ICU. The intensive care team has only 'death' or 'discharged alive' as clinical outcomes on which to judge their performance, and limited evidence exists on which to base decisions regarding improvements to critical care practice.[14]

A follow-up of patients could be introduced into the OPD, whereby patients returning for their first visit after discharge could be given a self-report questionnaire to complete, which includes the HADS and the ETIC-7. Alternatively, it could be given to patients (or a family member) on their discharge from the ICU, with a request

to return it when they return for their first visit in OPD. A sealed post-box could be placed in the OPD for the patients to 'post' their completed questionnaires. These questionnaires could be scored and assessed by an appointed health care professional. Those patients found to be 'at risk' of developing a psychological disorder could be contacted telephonically and offered supportive counselling. Sellick and Edwardson[26] have successfully used this screening technique, using the HADS, at their oncology centre in Canada.[27]

Reduction of stressors

Nurses are in constant contact with patients in the ICU and are in an ideal position to reduce the amount of stressors that patients have to deal with. Basic nursing care, for example, promoting comfortable positioning, ensuring effective pain relief, providing periods of uninterrupted sleep, reducing environmental noise and lighting, ensuring a degree of patient privacy and effective communication could all assist in reducing the stressors a patient has to contend with.

Physical restraints

Because the memory of physical restraints was found to be a factor predicting the development of PTS symptoms in this study, patients should only be physically restrained when all other alternatives have failed (e.g. increasing sedative medication, effective communication, pain relief, etc.). There should also be some 'slack' in the IV lines and monitor cables attached to the patient so that his or her movement is not completely restricted.

Further research

As we are not aware of other studies on this subject in South Africa, there is enormous scope for researchers to explore this subject matter.

The majority of patients in this sample were not ventilated (66%) and had short stays in ICU, with the median being 3 days. The study should be repeated on a fully ventilated sample and a comparison made between these groups.

Further research needs to be done into the effectiveness of informational and educational pamphlets in ICU, the role of the nurse in reducing the risk of psychological sequelae, and the planning and follow-up care of those patients found to be at risk of developing psychological sequelae after ICU discharge. These patients first need to be identified by completing a questionnaire that includes the HADS and ETIC-7. Once identified, they can be offered supportive counselling and further treatments as necessary. Furthermore, research needs to be done into factors that have been found to decrease the incidence of psychological sequelae – e.g. perceived social support,[27] daily interruption of sedative infusions,[28] patient diaries to improve factual recall,[29] and the use of these diaries as a debriefing tool.[30]

Conclusions

Just under half the sample population (48%) had symptoms of anxiety, more than a quarter had symptoms of depression (28%), and almost a third (32%) had symptoms of PTS.

These patients need to be identified early and offered appropriate treatment and support by developing good-quality follow-up services with strong links to outpatient services and mental health services. However, to ensure that these patients are identified, a screening tool must be implemented and used routinely on all patients at ICU discharge or at their first return visit to the OPD. This study has demonstrated that the psychological effects of critical illness, admission to ICU and the necessary treatments rendered therein do not stop at the ICU door. These patients require guidance and follow-up counselling to ensure their full recovery.

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