Research paper

In ICU state anxiety is not associated with posttraumatic stress symptoms over six months after ICU discharge: A prospective study

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ARTICLE INFORMATION

ABSTRACT

Background: Posttraumatic stress symptoms are common after intensive care treatment. The influence of anxiety during critical illness on the development of posttraumatic stress symptoms needs to be investigated.

Objective: To determine the association between anxiety during critical illness (state and trait components) and posttraumatic stress symptoms over six months after ICU discharge.

Methods: Prospective study including 141 patients admitted $\geq$24 h to a closed mixed adult ICU in a tertiary hospital. State anxiety was assessed with the Faces Anxiety Scale during ICU stay. Trait anxiety was measured with the State-Trait Anxiety Inventory Form Y-2. Posttraumatic stress symptoms were measured at three and six months after ICU discharge using the Post-Traumatic Stress Symptoms 10-Question Inventory. Clinical and demographical data were also collected. Mixed effect regression models were used to determine if state and trait anxiety were factors significantly associated with posttraumatic stress symptoms over time.

Results: Moderate to severe levels of state anxiety in ICU were reported by 81 (57%) participants. Levels of trait anxiety (median 36 IQR: 29–47) were similar to the Australian population. High levels of posttraumatic stress symptoms occurred at three (n = 19, 19%) and six months (n = 15, 17%). Factors independently associated with posttraumatic stress symptoms were trait anxiety (2.2; 95% CI, 0.3–4.1; p = 0.02), symptoms of anxiety after ICU discharge (0.6; 95% CI, 0.2–1.1; p = 0.005), younger age (−1.4; 95% CI, −2.6 to −0.2; p = 0.02) and evidence of mental health treatment prior to the ICU admission (5.2; 95% CI, 1.5–8.9; p = 0.006).

Conclusions: Posttraumatic stress symptoms occurred in a significant proportion of ICU survivors and were significantly associated with higher levels of trait anxiety, younger age, mental health treatment prior to the ICU admission and more symptoms of anxiety after ICU discharge. Early assessment and interventions directed to reduce state and trait anxiety in ICU survivors may be of benefit.

1. Introduction

Survivors of critical illness experience compromised psychological health including the development of posttraumatic stress symptoms (PTSS). Consistent predictors of PTSS following treatment in intensive care unit (ICU) include premorbid psychopathology, greater benzodiazepines administration during ICU treatment, post-ICU memories of frightening experiences and psychotic/nightmare experiences during ICU treatment.[1] Younger age

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and female gender are less consistent predictors.[1] Although a number of predictors have been identified, the effects of trait and state anxiety during critical illness have not been thoroughly investigated as independent risk factors for the development of PTSS in the ICU survivors. The concept of anxiety has been defined as comprising two components: trait anxiety and state anxiety.[2] Trait anxiety corresponds to the individual personality trait of anxiety; namely, the person's tendency to experience state anxiety. State anxiety corresponds to the emotional (e.g. feelings of fear, worry and apprehension) and physiological (e.g. tachycardia) manifestations of anxiety when faced with a stressful stimuli.[2] One could think of trait anxiety as chronic and state anxiety as acute anxiety.

In the general literature of posttraumatic stress disorder (PTSD), it can be observed that individual differences in personality traits contribute significantly to the development of this condition.[3] Specific personality traits of anxiety and hostility/anger have been associated with PTSD.[4,5] In contrast, personality traits that seem to have a protective effect from PTSD are hardiness and optimism.[6,7]

In the ICU context, the exploration of the role of personality in the development of PTSS is at the early stages. There is beginning evidence regarding two relevant personality traits: trait optimism and trait anxiety. Trait optimism was found to be an independent predictor of reduced PTSS after ICU treatment in a study exploring adverse emotional outcomes after ICU.[8] Trait anxiety was moderately correlated (rho = 0.49, p = 0.007) with intrusion symptoms (one of the four distinct diagnostic clusters of PTSD described in the DSM-V)[9] at eight weeks after ICU discharge.[10] However, this finding needs further consideration and statistical approaches such multivariate analysis to determine unique contributions and rule out the influence of confounding factors. In addition, it is unclear if this association would persist over a longer period of time. The state component of anxiety during critical illness has also been proposed as a possible risk factor for the development of PTSS during recovery.[11] Further, state anxiety and PTSS have been found to co-occur frequently during recovery.[12]

The distinction between PTSS and the fully activated disorder (PTSD) needs to be made. Unlike PTSS, PTSD is a psychiatric diagnosis that impairs patients' ability to function. In this study, PTSS correspond to patients' self-report of posttraumatic stress symptoms at 3 and 6 months after ICU discharge using a validated questionnaire without the clinical diagnosis (i.e. PTSD) performed by a physician. Another term conceptually related to this topic is acute stress symptoms, which refers to PTSS experienced shortly (less than 1 month) after the exposure to the traumatic event.[13]

In this study, we hypothesised that anxiety during critical illness would be associated with the development of PTSS over six months after ICU discharge. Data about social support, cognitive functioning, optimism, symptoms of anxiety and depression after the ICU experience and medications such as corticosteroids, opioids and beta-blockers were also collected because they appear in the literature as possible risk factors for adverse emotional outcomes.[8,14–19] As such, the purpose of this research was to determine the association between anxiety during critical illness (state and trait components) and posttraumatic stress symptoms over six months after ICU discharge in survivors of intensive care treatment.

2. Methods

2.1. Settings

This prospective study was carried out at one mixed medical/surgical/trauma adult ICU in a tertiary hospital located in Brisbane, Australia. There were approximately 1130 admissions to this ICU during the six-month enrolment period (September 2012 to February 2013). This 25-bed closed ICU had a registered nurse-patient ratio of 1:1. The Griffith University (NRS/35/12/HREC) and Princess Alexandra Hospital Ethics Committees (HREC/12/QPAH/173) approved this research, informed written consent was obtained from all participants, and the study protocol was published elsewhere.[20] A summary of the methods is provided below and in Table 1.

2.2. Patients

Adult patients ($\geq$18 years of age) who stayed in ICU for $\geq$24 h, were able to communicate verbally or non-verbally at the time of enrolment and each subsequent day of data collection; understand English; and, open their eyes spontaneously or in response to voice were invited to participate in this study. We performed power analysis a priori using multiple regression test (fixed model, R^2 increase); power of 80%; significance level of α = 0.05; a maximum of seven variables; and, medium size effect (0.15). This was based on previous research reporting a strong association between trait anxiety and PTSS (Spearman's correlation rank 0.49) and reflecting a medium effect size.[10,21] An in-hospital mortality rate of 10% and a dropout of 30% at six months were projected.[20,22] A sample size of 104 participants was estimated for this study.

2.3. Data collection

As soon as patients agreed to participate in this study, the principal investigator or the ICU research nurse commenced the state anxiety assessments in ICU using the Faces Anxiety Scale (FAS). Patients reported on their levels of state anxiety twice a day (morning 8–11 am and afternoon 4–7 pm) up to 30 days. Clinical data collected twice a day at the moment of state anxiety assessment included: Delirium status (The Confusion Assessment Method for the ICU: CAM-ICU), airway status (tracheostomy, endotracheal tube), mechanical ventilation status (invasive, non-invasive, non-ventilation), oxygen saturation, pain score (Critical-Care Pain Observation Tool: CPOT) and sedation (total dose of sedatives and analgesics as well as total hours of continuous infusion of sedoanalgesia).[23,24] ICU diagnosis, Acute Physiology and Chronic Health Evaluation (APACHE) III, mental health history, gender and age were also collected from medical records.

Marital status, level of education, employment status, evidence of mental health treatment prior to the ICU admission, current smoking habits as well as pre-ICU medications (opioids, beta-blockers and corticosteroids) were obtained through a demographic questionnaire administered when patients were in the hospital wards. Patients who answered "Yes" to either of the following two question were considered to have evidence of mental health treatment prior to the ICU admission: (1) Have you ever visited a general practitioner (GP) or a mental health professional for symptoms of psychological distress or emotional problems? (2) Were you taking benzodiazepines, anxiolytics or antidepressants medications within the 12 months prior to the ICU admission? A similar approach has been used previously.[25] Trait anxiety was assessed using the Trait component of the State-Trait Anxiety Inventory (STAI) for adults Form Y-2.[2]

In the hospital wards, patients confirmed their wish to participate in this project by giving written informed consent and completing the questionnaires. The principal investigator or the ICU research nurse assisted the patients (when needed due to physical impairment) with the surveys in hospital wards.

All instruments used in this study: The Posttraumatic Stress Symptoms 10-Question Inventory (PTSS-10); trait component of the State-Trait Anxiety Inventory (STAI) for Adults Form Y-2; Hospital Anxiety and Depression Scale (HADS); Faces Anxiety Scale (FAS); Multidimensional Scale of Perceived Social Support (MSPSS); Life Orientation Test-Revised (LOT-R); and, Cognitive Functioning Scale