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Depression, Anxiety, and Post-traumatic Stress Disorder in ICU Survivors

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Abstract

Background: Mental disorders in patients admitted to the intensive care unit (ICU) can further deteriorate patients' physical and mental conditions and exert an undesirable impact on different aspects of their lives.
Objectives: This research aimed to determine the prevalence of post-traumatic stress disorder (PTSD), anxiety, and depressive symptoms in patients discharged from the ICU and identify the associated factors.
Methods: In this cross-sectional study, 106 patients aged 18 years or over hospitalized for at least 48 hours in the ICUs affiliated with Babol University of Medical Sciences were enrolled by the census method for six months. At ICU discharge and four weeks later, they were examined by the Hospital Anxiety and Depression Scale (HADS) and Post Trauma Symptom Scale (PTSS)-10.
Results: The prevalence rates of anxiety, depression, and PTSD were 60.3%, 26.4%, and 17.9%, respectively. These symptoms decreased after four weeks of discharge ($P \leq 0.001$). There was a significant correlation between the duration of ICU stay and anxiety symptoms ($r = 0.210$, $P = 0.032$). Furthermore, there was a significant association between a history of physical illness before ICU admission and anxiety ($P = 0.03$).
Conclusions: Screening of ICU-admitted patients for PTSD, anxiety, and depressive symptoms is recommended; however, the frequency of these symptoms is expected to reduce one month after ICU discharge.

Keywords: Anxiety, Depression, Post-traumatic Stress Disorder, Intensive Care Unit

1. Background

A limited number of studies have assessed the prevalence of psychiatric disorders in ICU survivors, and there is a need for longer follow-up of these patients (1). Critical disorders requiring intensive care unit (ICU) admission are increasing worldwide. While health care measures are improving, more patients are surviving, and it is expected that their stay in the ICU will be more prevalent; however, there is an increase in the number of patients who might have challenges during the recovery phase (2). Hospitalization in the ICU is considered a risk factor for psychiatric disorders because it causes the patient to experience more stressful traumas (3, 4). Patients may have different physical and psychological stressors during ICU admission, including lack of privacy, fear, pain, delirium, administration of sedatives, noise, sleep deprivation, and the specific ICU environment. These experiences may impact patients' recovery from critical illness (2, 5). The ICU treatment can be associated with the development of psychological illness and complications. Depression, anxiety, and post-traumatic stress disorder (PTSD) symptoms may increase by 30%, 40%, and 60% in ICU survivors, respectively (3). Post-intensive care syndrome (PICS) is defined as a set of symptoms that remain in ICU survivors and includes impairment in cognition, psychological health, and physical function of patients (6). Besides, PICS affects patients' healing process, reduces their quality of life, increases the burden on families, and increases the cost of health care (5). Literature review reveals a wide range of psychiatric symptoms in ICU survivors across different studies (7, 8). A previous study in Iran reported that 40.7% of the patients admitted to the ICU had severe anxiety, and 44.4% had moderate depression (9).

Several factors determine the psychological impact on patients and their relatives following ICU admission, including patient-related factors such as the severity of ill-

ness, lower patient age, long duration, and chronic diseases, family-related factors such as female gender and marital status, ICU-related factors such as the presence of more than one patient in the room, the involvement of patient's relatives in the decision-making processes, and ICU staffing conditions, and the level of education, economic status, socio-cultural condition, and service delivery system (10, 11).

2. Objectives

Due to different results about the psychiatric disorders among ICU-hospitalized patients, this research aimed to assess the prevalence of anxiety, depression, and PTSD in patients discharged from the ICU and explore the associated factors. Based on the results, interventions can be planned to prevent and reduce the incidence of these psychological consequences in patients who need ICU admission.

3. Methods

This cross-sectional observational study was conducted on adult patients aged 18 or over, discharged from the ICUs affiliated with Babol University of Medical Sciences for six months. Adult patients admitted for at least 48 hours in the ICUs were included. Patients with cognitive problems such as dementia or delirium and those who could not provide the consent form were excluded. All patients were followed in two psychiatric visits. The first visit was conducted on the day of ICU discharge (zero-day), and the second visit was planned four weeks after ICU discharge. In the follow-ups, they were examined for PTSD, anxiety, and depressive symptoms.

Collected data included age, gender, educational level, marital status, occupation, underlying disorder for ICU hospitalization, duration of ICU stay, past medical history of physical illnesses, history of psychiatric disorders or psychiatric treatment before ICU admission, the type of diagnostic and therapeutic measures taken during ICU stay, and receiving psychiatric counseling after ICU admission. The Hospital Anxiety and Depression Scale (HADS) was used to assess the status and severity of depression and anxiety, and the Post Trauma Symptom Scale (PTSS-10) to assess the patients' response to the trauma of staying in the ICU.

The HADS has two subscales for anxiety (seven items) and depression (seven items). For each item, the participants were asked to represent which of the four options (rated from 3 to 0) described how they felt in the past week. A score of 11 - 21 showed severe anxiety or depression, 8 - 10 represented mild anxiety or depression, and 0 - 7 indicated no clinical symptoms of anxiety or depression. This questionnaire was translated into Persian, and its validity and reliability were confirmed in previous studies (12, 13).

The PTSS-10 is to measure the symptoms of a person's reaction to psychological trauma. In this 10-question scale, seven options are considered to report the person's answer. When the answer is "1 to 3," the score is zero, while for the answers "4 to 7", the given score is one. A total score ≥ 5 indicated a severe reaction to psychological trauma. This questionnaire has been used in various studies both inside and outside the country, and its validity and reliability have been confirmed (14-16).

Data analysis was performed by SPSS-22 software. The chi-square test was used to analyze the qualitative variables, the McNemar test to examine the grouped data, and paired *t* test to compare the outcome measures with initial values. A P-value of less than 0.05 was considered the significance level.

This study was approved by the Ethics Committee of Babol University of Medical Sciences with registration number MUBABOL.REC.1395.218.

4. Results

The study enrolled 106 patients with a mean age of 49.1 $\pm$ 19.8 years (range 18 - 91 years). Besides, 59 (55.7%) patients were male, and 47 (44.3%) were female. Also, 94 (88.7%) patients had a high school diploma or lower education, 12 (11.3%) had a college education, and 74 (69.8%) were married. The most frequent underlying disorders for ICU admission were surgical procedures (49; 46.2%), multiple trauma (32; 30.2%), internal medicine disorders (16; 15.1%), and stroke and brain hemorrhage (9; 8.5%), in sequence. The mean hospitalization duration in the ICU was 5.9 $\pm$ 6.7 days (range 2 - 48 days); 89 (84.0%) patients had less than one week, nine (8.5%) patients had 1 - 2 weeks, and eight (7.5%) patients had more than two weeks stay in the ICU. Eighty-seven (82.1%) individuals received non-invasive procedures, and 53 (50.0%) received invasive procedures in the ICU. Sixty-nine (65.1%) patients reported a previous history of medical disorders before ICU admission. After one month of discharge, only 71 patients completed the questionnaires (response rate of 67.0%). Hospital anxiety, depression, and severity of reaction to psychological trauma measured on the day of ICU discharge and four weeks after discharge are summarized in Table 1.

The mean anxiety, depression, and PTSS scores of the patients at baseline and follow-up examinations are presented in Table 2. There was a significant reduction in anxiety, depression, and psychiatric reaction to trauma four weeks after ICU discharge ($P < 0.001$).

Table 1. Anxiety, Depression, and Severity of Reaction to Psychological Trauma During the Study [a]

Measurement Time/ Variables	HADS Anxiety Subscale Score			P-Value [b]	HADS Depression Subscale Score			P-Value [b]	PTSS Score		P-Value [b]
	Without Clinical Symptoms of Anxiety	Mild Anxiety	Severe Anxiety		Without Clinical Symptoms of Depression	Mild Depression	Severe Depression		No Reaction to Psychological Trauma	Severe Reaction to Psychological Trauma	
Zero-day ICU discharge	42 (39.6)	24 (22.6)	40 (37.7)	< 0.001	78 (73.6)	20 (18.9)	8 (7.5)	0.308	87 (82.1)	19 (17.9)	0.309
Four weeks after ICU discharge	47 (66.3)	16 (22.5)	8 (11.2)		62 (87.3)	7 (9.9)	2 (2.8)		65 (91.5)	6 (8.5)	

[a] Values are expressed as No. (%).

[b] P-value was calculated with the McNemar test, considering the dropout of the patients on the follow-up visit.

Table 2. Anxiety, Depression, and Severity of Reaction to Psychological Trauma During the Study

Measurement Time	Mean ± SD	P-Value (Paired *t*-test)
HADS anxiety score		< 0.001
Zero-day ICU discharge	8.8 ± 4.2	
Fourth week after ICU discharge	6.6 ± 3.5	
HADS depression score		0.001
Zero-day ICU discharge	4.4 ± 3.3	
Fourth week after ICU discharge	3.3 ± 2.9	
PTSS score		< 0.001
Zero-day ICU discharge	2.5 ± 2.0	
Fourth week after ICU discharge	1.4 ± 1.6	

The association of anxiety, depression, and severity of psychiatric reaction to trauma on the zero-day of ICU discharge with demographic and clinical characteristics of the patients showed that 49.2% of males and 27.7% of females had no clinical symptoms of anxiety (P = 0.07), and 79.7% of males and 66.0% of females had no clinical symptoms of depression (P = 0.27). Pearson's correlation coefficient showed a significant correlation between symptomatic anxiety and the duration of hospitalization in the ICU (r = 0.210, P = 0.032). No significant association was found between anxiety, depression, and PTSS scores, and patients' age, marital status, and education level (P > 0.05).

Four weeks after ICU discharge, symptomatic anxiety, depression, and PTSD decreased significantly, and no statistically significant association was found between these outcomes and age, gender, marital status, education level, and duration of ICU hospitalization (P > 0.05), except for one; a significant association was observed between symptomatic anxiety and longer duration of ICU hospitalization (P = 0.01).

We found no significant association between invasive and non-invasive procedures in the ICU and anxiety, depression, and PTSD (P > 0.05); however, the previous history of medical disorders before ICU admission had a significant association with symptomatic anxiety on the zero-day of ICU discharge (P = 0.03).

5. Discussion

In our study, 60.3% of the patients had mild or severe anxiety symptoms on the day of ICU discharge, 26.4% had depressive symptoms, and 17.9% had a severe reaction to the psychological trauma. After four weeks, these values decreased to 33.7%, 12.7%, and 8.5%. In this study, a higher prevalence of anxiety symptoms was found in patients, both at the time of discharge and one month after discharge. Choi in the USA reported that most ICU survivors were at risk of clinical depression, andconcluded that patients who needed more care and/or were unable to return home soon were expected to have more anxiety or depressive symptoms (17). Pain, fatigue, weakness, and sleep disturbance were reported as the four common symptoms during the first four months of post-ICU discharge, and 88.5 - 97% of these patients reported one or more of these four symptoms (18). Fumis in Brazil reported that patients had symptoms of anxiety (26.1%), depression (12%), or both (8.7%) during the ICU stay, and 6.9% had symptoms of PTSD at 30 days that disappeared at 90 days (19). Svenningsen in Denmark stated that 5 - 8% of the patients had symptomatic anxiety two months after ICU discharge, 2 - 3% had severe depression, and 1 - 2% had severe PTSD (4). Castillo in Australia reported that nearly two-thirds of ICU patients had an anxiety state (20). The variation in results can be related to study design, the method and timing of anxiety, depression, and PTSD assessment, the events preceding ICU admission, the critical illness itself, and the treatment received in the ICU (21, 22). Different factors such as pain, infection, mechanical ventilation support, medications, muscle wasting, and metabolic changes can contribute to post-ICU anxiety, depression, and PTSD (23).

Symptomatic anxiety was significantly higher in female patients on the day of ICU discharge (zero-day). Also,

it had a significant correlation with a longer duration of hospitalization in the ICU and the previous history of medical disorders before ICU admission; however, no significant relationship was found between the symptomatic anxiety and other variables examined such as age, marital status, and education level. Symptomatic depression and PTSD had no significant correlation with any mentioned variables. In the fourth week after ICU discharge, symptomatic anxiety had a significant correlation with a longer duration of hospitalization in the ICU. Auxéméry showed that unrelated to the traumatic event, female individuals, younger patients, and persons with lower socioeconomic status and social support, premorbid personality characteristics, and preexisting anxiety or depressive disorders had an increased risk of PTSD (24). Wang reported that younger ICU survivors and lower educated people were expected to develop more depressive symptoms (25). Myhren found no significant relationship between age and gender and posttraumatic stress, anxiety, and depressive symptoms in patients during the first year after ICU discharge (11). Castillo assessed the impact of anxiety during ICU hospitalization on the development of PTSD and concluded that PTSD was significantly associated with higher levels of trait anxiety, younger age, mental health treatment before ICU admission, and more symptoms of anxiety after ICU discharge (26). Nikayin assessed anxiety symptoms in the survivors of critical illnesses in a systematic review and meta-analysis, concluding that none of the variables, namely age, gender, the severity of illness, primary diagnosis at ICU admission, and duration of hospital or ICU stay was associated with anxiety. However, psychiatric symptoms such as stress reactions in the ICU or hospital and stressful nightmares, and extreme fear were associated with post-discharge anxiety symptoms. Furthermore, delirium and memories of delusional experiences were reported as risk factors for post-ICU anxiety symptoms (22).

Considering the large proportion of the patients with clinical symptoms of anxiety, depression, or PTSD at ICU discharge, proper interventions should be implemented to reduce these psychological problems. Depression, fatigue, and poor appetite often prevent ICU-admitted patients from enjoying work or other activities after hospital discharge. Furthermore, other health-related complications may arise from poor nutritional status, such as wound healing impairment, falls and fractures, and even hospital re-admission. A history of mental health disorders such as depression, anxiety, and PTSD may predispose people to develop psychiatric disorders requiring long-time attention after ICU discharge (27). Therefore, ICU practitioners should encourage patients and their families to consult with clinical psychiatrists or psychologists before ICU discharge and during recovery and rehabilitation. Schofield-Robinson published his protocol to review the follow-up services to improve ICU survivors' long-term outcomes (28).

Jonasdottir reported that a structured nurse-led follow-up of the patients over 12 months after ICU discharge did not improve patients' psychological recovery (29). Harvey focused on the three key emerging concepts for the prevention and management of post-intensive care syndrome: (1) Safe transition and handoffs, (2) family-centered care, and (3) proper health care provided in the ICU (30). Peris suggested an early intra-ICU clinical psychologist intervention to reduce ICU survivors' anxiety, depression, and PTSD. He reported that psychological support of ICU patients could be associated with decreased pain, anxiety, and complications and improved sleep and patient satisfaction (3). The PTSD symptoms can be due to the traumatic etiology of the disorder, such as re-experiencing the trauma, intrusive memories, and vivid images of the event during waking hours, which can be of such intensity that the patient loses contact with his surroundings. Furthermore, hyperarousal symptoms (such as sleep disturbance, irritability, and difficulty with concentration) are other symptoms of PTSD. Thus, psychological preventive services should be considered in the ICU settings (3).

The small size of the study population and short follow-up time after patient discharge from the ICUs are the most critical limitations of this research. We found a limited number of similar studies in Iran. Therefore, it is proposed to conduct multicenter longitudinal research to identify different psychiatric disorders among ICU survivors in a long-term follow-up period.

5.1. Conclusions

A notable proportion of patients hospitalized in the ICU might have anxiety, depressive symptoms, or post-traumatic stress disorder; therefore, screening programs for the detection of these disorders among ICU-admitted patients should be considered. However, after one month of discharge from the ICU, the frequency of these symptoms is expected to reduce.

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Footnotes

Authors' Contribution: F.R. helped with the implementation of the study and data collection. S.M. and E.A. initiated the study design. F.R., E.A., and S.M. collected research data. A.B. provided statistical expertise and analyzed the data. All authors contributed to the refinement of the study and approved the final manuscript.

Conflict of Interests: No conflict of interest is declared.

Ethical Approval: This study was approved by the Ethics Committee of Babol University of Medical Sciences with registration number MUBABOL.REC.1395.218.

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