Physical and Mental Health of Patients Immediately After Discharge From Intensive Care Unit and 24 Hours Later

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Abstract

Background: Monitoring the health status of patients discharged from intensive care units is a crucial method of service evaluation.
Objectives: This study aimed to assess the physical and mental health status of patients immediately after discharge from the ICU and 24 hours later.
Patients and Methods: This descriptive comparative study was conducted on 104 patients discharged from the ICUs of a referral trauma center in Shiraz, Southwest Iran. Physical parameters, including respiratory rate, need for supplemental oxygen, heart rate, blood pressure, and need for cardiac monitoring, were assessed. Hospital anxiety and depression scale (HADS) was used for mental health evaluation. The mental and physical status of patients were assessed before ICU discharge and 24 hours later; data were recorded in information forms and were analyzed using SPSS statistical software version 17.
Results: At the time of discharge, the respiratory rate of 28% of the participants was more than 24 minutes, and 95.2% received supplemental oxygen. However, after 24 hours these values decreased to 10% and 21.6%, respectively. The mean heart rate and systolic blood pressure were within the normal range at both time points. Additionally, 63% of the patients had anxiety scores above 11 at both time points, reflecting high anxiety. The number of patients who reported depression increased from 58.7% at ICU discharge to 69.6% after 24 hours.
Conclusions: Despite the considerable improvement in most of the patients' physical condition in the first 24 hours after discharge from ICU, a significant number of them remain at risk for the development of adverse effects from this transition. The high prevalence of mental health disorders in these patients reveals the necessity to conduct follow-up consultations.

Keywords: Intensive Care Units, Patient Discharge, Physical Status, Mental Health

1. Background

Admission to the intensive care unit (ICU) is an unexpected event (1, 2). Although, it is described by patients and their families as an unpleasant, traumatic, and frightening experience (3), they are assured that they will receive the best and the most complete care possible (4, 5). After the acute phase of the disease is managed, the patients reach a stable condition and require less hemodynamic monitoring. Thus, they are discharged from the ICU and are transferred to the general wards. In their view, such a transition is a transfer from the safe and familiar environment of ICUs to the non-familiar environment of general wards (1, 5). Although discharge from the ICU is a positive step reflecting improvement of their health status (2), it may put them at risk of developing adverse physical and psychological events (6-8). These adverse events include unintentional injuries and events mostly caused by treatment and performance of the medical staff rather than by the disease; this can result

in disabilities and prolonged hospitalization (9). Despite initial recovery from critical diseases, about 10% of patients transferred from the ICU to general wards die (10, 11) and about 7%–10% are readmitted to ICUs (12-14). Recent evidence has shown that the outcomes of discharge from the ICU are associated with underlying diseases, age (15), length of ICU stay, discharge at the wrong time, high dependency on nursing care (16), low Glasgow Coma scale (GCS) score, abnormal laboratory test results (17), ward nurses' attention to patients (18), heart rate greater than 100minutes, and respiratory rate greater than 24 minutes (8). Therefore, rapid detection of deteriorating patients and immediate and appropriate treatment is crucial in the general wards (18). Nevertheless, recent studies have revealed that the quality of care provided in general wards is below the desirable level (19-21) and vital functions are neither reported nor managed as expected (22, 23). Therefore, patients' recovery from serious diseases

may be endangered after discharge from the ICU despite their successful treatment process.

Nevertheless, this transfer can cause psychological problems, such as post-ICU anxiety (2, 3, 24) and depression among patients (5, 25). According to the results of previous research, 37% – 47% of patients discharged from the ICU suffered from anxiety (26, 27). In addition, the prevalence of depression was reported to be between 10% and 30% in these patients (24). Pain, inability to express needs, length of ICU stay, and analgesics were the factors contributing to depression in such patients (24, 28). Jones and O´Donnell (1994) suggested that the lack of attention to the mental health status of patients admitted to ICUs reflected the deficit of the care they received. They also emphasized that disregard for psychological problems after discharge from ICU could turn them into chronic psychiatric disorders (29). The above-mentioned physical and psychological complications can increase treatment costs or even lead to irreversible damage (30). Therefore, monitoring mental and physical health of patients in the early hours after discharge from the ICU can help the staff in the general ward provide holistic care (8).

2. Objectives

This study aimed to compare physical and mental health of patients upon discharge from the ICU and 24 hours later.

3. Patients and Methods

This descriptive comparative study was conducted on patients who were hospitalized in the ICU of a referral trauma trauma center, which include 45 ICU beds and 5 general wards in Shiraz, southwest Iran, from May to October 2013. The inclusion criteria of the study were age over 18 years, willingness to participate in the study, ability to communicate verbally and non-verbally, having no previous experience of ICU admission, lack of any incurable physical diseases and known mental disorders before admission, and ICU stay of at least three days. During the six months of data collection in ICUs, out of the 183 patients who met the inclusion criteria, 104 who were willing to participate in the study were enrolled and their physical status was monitored. However, only 46 patients cooperated in completing the depression and anxiety questionnaires at the two time time points. The study data were collected using a questionnaire containing two sections: demographic information and physical condition parameters, respiratory status (respiratory rate and need for supplemental oxygen) and hemodynamic status (heart rate, blood pressure, and need for cardiac monitoring). Respiratory rate, heart rate, and blood pressure were measured by the researcher according to the standard method. The manometer used in this study was calibrated at the beginning and in the middle of the data collection period.

The need for supplemental oxygen and cardiac monitoring was determined by the physician.

The Persian version of the hospital anxiety and depression scale (HADS) was utilized to assess the patients' mental status. HADS is a 14-item self-report scale developed to assess the state of depression and anxiety. It has two subscales, namely, HADS-A that measures anxiety (7 items) and HADS-D that measures depression (7 items). On this scale, a score from 0 to 3 is assigned to each item, and the total score is computed by the sum of items 1–7 (range: 0 – 21). Accordingly, scores of 0 – 7 on either subscale were considered normal, scores of 8 – 10 were considered borderline, and scores of 11 or above were considered significant mood disorder (31-33). HADS is commonly used in patient populations in Iran, regardless of type of illness (34-36). The reliability and validity of this scale in the Iranian population was confirmed by Montazeri et al. (2003) after being translated to Persian (32). The questionnaires were completed by the researcher through an interview at bedside in the ICUs or ward. The researcher monitored and recorded mental and physical health before ICU discharge and 24 hours later. Then, the collected data were entered into the SPSS statistical software version 17 and analyzed using independent and paired t-test and chi-square as appropriate. $P < 0.05$ was considered statistically significant.

3.1. Ethical Considerations

This study was approved by the Ethics Committee of Shiraz University of Medical Sciences, Shiraz, Iran (CT-92-6525-6525). All the participants signed a written informed consent after receiving an explanation about the study objectives and procedures. Anonymity and confidentiality were guaranteed.

4. Results

In this study, 88.5% of the participants were male. The patients' age ranged from 18 to 88 years, with a mean age of 38 ($\pm$18.36) years. The mean length of ICU stay and the duration of mechanical ventilation were 7.9 ($\pm$7.8) and 3.3 ($\pm$6.2) days, respectively. The mean GCS scores at the time of ICU discharge and 24 hours later were 13.5 and and14 (range: 5 – 15), respectively. Demographic and clinical characteristics are presented in Table 1. According to the results, 29 participants (28%) had a respiratory rate greater than 24minutes upon ICU discharge, but this measure decreased to 11 (10%) after 24 hours. Despite the reduction observed in the number of patients with a high respiratory rate, the chi-square test showed no significant difference in this regard ($P > 0.05$). To improve the respiratory status, 95.2% of the patients received supplemental oxygen (through nasal cannula or face masks) at discharge. However, only 21.6% of them still used the supplemental oxygen during the first 24 hours after discharge from the ICU, and the difference was statistically significant based on the results of the chi-square test ($P < 0.0001$) (Table 2).

Table 1. Demographic and Clinical Characteristics of Patients Discharged From the ICU

Variables	Values[a]	Values[b]
Age, y		38.3 ± 18.6
18 - 40	67 (64.4)	
41 - 60	19 (18.3)	
> 60	18 (17.3)	
Total	104 (100)	
Marital status		
Single	50 (48.1)	
Married	54 (51.9)	
Total	104 (100)	
Educational status		
Primary school	22 (21.2)	
High school	72 (69.2)	
Academic	10 (9.6)	
Total	104 (100)	
Weight, kg		71.18 ± 7.6
< 50	2 (1.9)	
50 - 70	66 (63.5)	
> 70	36 (34.6)	
Total	104 (100)	
Length of ICU stay, day		7.9 ± 7.8
< 10	86 (82.7)	
> 10	18 (17.3)	
Total	104 (100)	
GCS (at time of discharge)		13.5 ± 2.1
< 8	5 (4.8)	
> 8	99 (95.2)	
Total	104 (100)	

[a]Data are presented as No. (%).
[b]Data are presented as mean ± SD.

The findings revealed that four patients (3.8%) were under cardiac monitoring at the time of discharge, but this number increased to 7 (6.7%) 24 hours later. The mean heart rate at discharge from the ICU and 24 hours later was 84 (± 14.6) and 80 (± 5.3) b/m, respectively. The mean systolic blood pressure was 124 (± 9.7) and 113 (± 7.3) mmHg, respectively, at the mentioned time points. However, the results of the paired t-test showed no significant difference in this regard (P > 0.05). Moreover, four patients (3.8%) had a heart rate of >110minutes at discharge from the ICU, but no such cases were found 24 hours later. The mean score of anxiety decreased from 11.47 (± 2) upon discharge from the ICU to 10.89 (± 2.6) 24 hours later, but the difference was not statistically significant based on the results of the paired t-test. About 63% of the patients reported anxiety scores of greater than 11 at both measurement time points, thus reflecting the fact that they were experiencing anxiety. In addition, 32.6% and 23% of the patients were suspected to suffer from this mood disorder at discharge and 24 hours later, respectively (Table 3).

Table 2. Respiratory Status of Patients Immediately and 24 Hours After Discharge From the ICU

Respiratory Variables	At Discharge[a]	24 Hours Later[a]	P Value
Respiratory rate			.539[b]
< 24 min	73 (71.6)	91 (89.2)	
≥ 24 min	29 (28.4)	11 (10.8)	
Total	102 (100)	102 (100)	
Need for supplementaloxygen			.0001[b]
Yes	97 (95.2)	22 (21.6)	
No	5 (4.8)	80 (78.4)	
Total	102 (100)	102 (100)	

[a]Data are presented as No. (%).
[b]Chi square test.

Table 3. Anxiety and Depression Scores at the Time of Discharge and 24 Hours Later

Variables	At Discharge[a]	24 Hours Later[a]	At Discharge[b]	24 Hours Later[b]	P Value
Anxiety			11.47 (2)	10.89 (2.6)	.322[c]
0 - 7	2 (4.4)	6 (13.1)			
8 - 10	15 (32.6)	11 (23.9)			
≥ 11	29 (63)	29 (63)			
Total	46 (100)	46 (100)			
Depression			11.33 (2.62)	11.5 (3.2)	.220[c]
0 - 7	2 (4.3)	5 (10.8)			
8 - 10	17 (37)	9 (19.6)			
≥ 11	27 (58.7)	32 (69.6)			
Total	46 (100)	46 (100)			

[a]Data are presented as No. (%).
[b]Data are presented as mean (SD).
[c]Paired t-test.

Furthermore, the number of patients who reported depressive disorder increased from 27 (58.7%) at discharge to 32 (69.6%) 24 hours later. The mean scores of depression increased from 11.33 (± 2.62) upon discharge to 11.5 (± 3.2) 24 hours later, with scores above 11 indicating the possibility of such mood disorder. Nonetheless, no statistically significant difference was detected in the mean depression scores (Table 3). The findings of the study demonstrated no statistically significant relationship between physical and mental statuses and age, sex, and length of ICU stay. During the first 24 hours of transfer to the general wards, two patients were readmitted to the ICU; one due to diabetic ketoacidosis and changes in vital signs and the other due to respiratory distress occuring after the removal of the central venous catheter.

5. Discussion

During the first 24 hours after discharge from the ICU, most of the patients had normal and stable hemodynamic conditions. The majority of the patients who had abnormal respiratory conditions or needed supplementary oxygen at the time of discharge returned to normal after 24 hours. In this study, approximately one-third of the patients (28%) experienced a respiratory rate > 24 minutes at discharge from the ICU, but this value decreased to 11 (10%) after 24 hours. Evidence has confirmed that respiratory rate of greater than 24 minutes is a predictor of patient deterioration (20), cardiac arrest (37, 38), and unplanned ICU admission (39, 40). The need for oxygen decreased significantly within the first 24 hours after discharge. Despite the improvement in the respiratory status within 24 hours after transfer to general wards, a considerable number experienced a respiratory rate > 24 minutes (10%) and still required supplemental oxygen (16.3%).

Our study findings demonstrated that the first 24 hours after discharge was critical for the patients, and thus special care programs should be planned for this period. Providing special care for patients transferred from ICUs is impossible because of low physician /nurse-to-patient ratios in general wards. In ICUs, every nurse is generally responsible for one or two patients, and every physician is responsible for 8 to 10 patients, but the workload increases to 4–8 patients per nurse and 65 patients per physician in the general wards during normal working shifts (41-43). Considering the hemodynamic dimension, our patients' systolic blood pressure and heart rate were within the normal range, and the results revealed no significant difference between the two measurement time points in this regard. The results of a systematic review reported that the major factors contributing to ICU readmission were hypoxia, respiratory rate > 24 minutes, and heart rate > 110 minutes (44). Another study also indicated that patients with heart rate >110 minutes were twice more likely to experience adverse events after discharge from the ICU (8). In our study, only a few patients

(3.8%) experienced such a problem, but they returned to normal condition within 24 hours. Therefore, abnormal heart rate was not considered as a contributing factor. Evaluating the patients' levels of anxiety and depression at the two measurement points confirmed that most of the patients experienced these two common mood disorders both at discharge and 24 hours later. Similarly, studies have demonstrated that 55% – 78% of the patients who were in ICUs (45) and 37% – 47% of those who were discharged (26, 27) suffered from anxiety. However, in the study conducted by Gustad et al. (2008), the mean anxiety scores did not change over time and remained low in 44 patients over three data collection periods: immediately after discharge from ICU, after 4 hours, and after one night in the ward (5).

In the present study, although the mean score of anxiety slightly decreased at the second measurement point, 63% of the patients reported anxiety after 24 hours of being in the wards. Apart from the contributing factors, such as lack of proper patient preparation, lack of constant presence of the nurse at patient's bedside, insufficient monitoring facilities in the ward, and patients' knowledge deficit, the ICU discharge process itself is stressful (2, 46). This condition is known as transfer or displacement anxiety disorder (5). To reduce this type of anxiety, determining a specific time and date for discharge is suggested, so that patients and their families can prepare themselves mentally for such a transfer (3). The ward staff's awareness of the patients' anxiety level and considerations to the patients' mental status may also help in this regard (5). The present study findings indicated that the majority of the participants suffered from post-ICU depression, as their mean depression scores slightly increased 24 hours after discharge from the ICU. Similarly, the results of a systematic review revealed that 28% of the patients reported severe depressive symptoms after discharge from the ICU (28). A significant incidence of post-ICU depression reflects patients' need for psychological care. They may also require special psychological consultation, and this possibility should be considered. The utilization of ICU liaison nurse services could also be effective by educating patients, their families, and wards staff and by providing facilities for them (47, 48). The nursing system known as liaison nurse service began to be implemented a decade ago to provide planned care for patients who were transferred between wards and those who were discharged from the ICU (49, 50). During the first 24 hours after discharge from the ICU, patients may experience changes in physical and mental health status. Despite the improvement observed in patients health status in this study, a significant number presented risk factors that could cause adverse effects and ICU readmission. Therefore, the careful and frequent monitoring of vital signs and the early detection of changes in the physical status in the first 24 hours after discharge. Moreover, because of the shortage of medical staff in general wards, the liaison nursing system can be used as a possible effective strategy in this regard.

Acknowledgments

Footnote

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