Peritraumatic Stress Symptoms during Early Post–Intensive Care Unit Recovery

To the Editor:

The coronavirus disease (COVID-19) pandemic has already left many intensive care unit (ICU) survivors in its wake (1–4). Although its long-term psychological impact on survivors is not yet known, prior data suggest ICU survivors often have upsetting memories of the ICU experience (e.g., fears of death, breathing discomfort, hallucinations during delirium) that may precede new or worsening mental health problems (5, 6). Few studies have examined the early phase of post-ICU recovery (7), including peritraumatic stress symptoms that can occur during or in the immediate aftermath of a traumatic experience. These symptoms, such as feeling emotionally numb or disconnected from reality, are linked to later post-traumatic stress disorder (PTSD) onset in other populations (8–10), suggesting they may be harbingers of future PTSD (11). Despite their potential implications for screening and intervention, peritraumatic stress symptoms remain underinvestigated among critical illness survivors.

Prior to the COVID-19 pandemic, we conducted a small descriptive study to assess peritraumatic dissociative symptoms and other behavioral factors during early post-ICU survivorship to inform larger studies and interventions. We interviewed patients before hospital discharge and 1 month after discharge using validated assessments. Here, we report early post-ICU survivors’ psychological symptoms, which may be useful in the context of growing efforts to support their mental health.

Methods

Adult English-speaking patients who were admitted to or recently transferred from the medical ICU were identified in collaboration with clinicians using discharge rosters. Research staff then monitored medical charts and approached patients to introduce the study when medically and cognitively stable. Those with severe baseline cognitive impairment, severe psychiatric conditions, or anticipated discharge to hospice were excluded. The study was conducted with Institutional Review Board

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approval; written informed consent was obtained. Data were collected between July 2018 and November 2019.

Trained research staff conducted brief, 30-minute interviews with participants within approximately 1 week before anticipated hospital discharge and by telephone approximately 1 month following hospital discharge. At baseline, all participants were given a list of community mental health resources to use as needed.

Measures. Instrument selection was guided by the recommended Core Outcomes Set (12, 13). We explored additional psychosocial factors using validated tools. At baseline, patients rated dissociative symptoms on the Peritraumatic Dissociative Experiences Questionnaire (PDEQ) (14) to index peritraumatic reactions. At follow-up, PTSD symptoms were measured using the Impact of Events Scale-Revised (IES-R) (15). At both assessments, patients rated anxiety and depressive symptoms using the Hospital Anxiety and Depression Scale (HADS-A and HADS-D subscales) (16), health status using the EQ-5D-5L (17), loneliness (3-item Loneliness scale) (18), and interest in stress management resources (1-item Likert rating). Coping strategies were assessed at follow-up (Brief COPE) (19).

Analysis. Descriptive statistics (median; interquartile range [IQR]) were used to evaluate symptom severity. Cronbach’s alpha was used to assess scale internal reliability. Based on prior work, we calculated the proportion of patients who scored above clinically significant symptom thresholds for depressive symptoms (HADS-D subscale \(>8\) [16]), anxiety symptoms (HADS-A subscale \(>8\) [16]), peritraumatic dissociation (PDEQ \(>15\) [20]), and PTSD symptoms (IES-R \(>33\) [21]). Given prior work suggesting links between early peritraumatic dissociation and subsequent PTSD symptoms (8, 11), we conducted exploratory analyses to summarize the proportion scoring above and below threshold on the baseline PDEQ and 1-month IES-R in a \(2 \times 2\) frequency table. We refrained from formally testing differences because of the small sample size and one cell with zero observations, but we explored the bivariate association (Spearman’s rho) between continuous scores on each measure; we acknowledge

| Characteristic | Baseline \((n = 15)\) [Median (IQR) or n (%)] | 1-Month Follow-Up \((n = 10)\) [Median (IQR) or n (%)] |
|---------------|--------------------------------|--------------------------------|
| Age, yr       | 48 (41–63)                     | 48 (37–59)                     |
| Sex           |                                |                                |
| Female        | 9 (60%)                        | 5 (50%)                        |
| Male          | 6 (40%)                        | 5 (50%)                        |
| Race          |                                |                                |
| Black         | 6 (40%)                        | 5 (50%)                        |
| White         | 6 (40%)                        | 3 (30%)                        |
| Asian or Pacific Islander | 1 (7%) | 1 (10%) |
| Other         | 2 (13%)                        | 1 (10%)                        |
| Ethnicity     |                                |                                |
| Hispanic/Latino | 4 (27%)         | 2 (20%)                        |
| Non-Hispanic/Latino | 11 (73%) | 8 (80%)                        |
| Education level |                                |                                |
| High school diploma | 2 (13%) | 1 (10%)                        |
| Some college  | 5 (33%)                        | 3 (30%)                        |
| College degree | 5 (33%)                        | 4 (40%)                        |
| Graduate/professional degree | 3 (20%) | 2 (20%)                        |
| Reason for ICU admission |                                |                                |
| Respiratory failure | 5 (33%) | 3 (30%)                        |
| Renal failure  | 4 (27%)                        | 3 (30%)                        |
| Sepsis or septic shock | 5 (33%) | 4 (40%)                        |
| Other         | 1 (7%)                         |                                |
| ICU length of stay, d | 3 (2–13) | 3 (2–12)                        |
| Prior psychiatric diagnosis (self-report) |                                |                                |
| Yes           | 6 (40%)                        | 4 (40%)                        |
| No            | 9 (60%)                        | 6 (60%)                        |
| Depressive symptoms (HADS) | 4 (2–9) | 6.50 (4.75–7.75)         |
| Anxiety symptoms (HADS) | 8 (6–11) | 5 (1.50–10.25)         |
| Peritraumatic dissociative symptoms (PDEQ) | 19 (12–31) |                                |
| PTSD symptoms (IES-R) | — | 29.50 (13.25–38.75)         |
| Self-rated health (EQ-5D-5L) | 50 (50–70) | 62.50 (40–85)         |
| Loneliness (3-item Loneliness Scale) | 4 (3–8) | 4 (3–8)                        |
| Stress-management interest (1–10 Likert) | 9 (6.50–10) | 6 (2.50–9)                        |

Definition of abbreviations: HADS = Hospital Anxiety and Depression Scale; ICU = intensive care unit; IES-R = Impact of Events Scale-Revised; IQR = interquartile range; PDEQ = Peritraumatic Dissociative Experiences Questionnaire; PTSD = post-traumatic stress disorder.

% indicates percentage of those with available data for the time point.
these results should be interpreted with caution given the small sample size.

**Results**

The 15 enrolled participants were primarily middle-aged (median, 48 years; range, 21–76 yr) females (60%) admitted to the medical ICU for respiratory failure (33%) or sepsis (33%); see Table 1. Prior to hospital discharge, 67% reported significant peritraumatic dissociative symptoms (PDEQ ≥15). Participants most commonly endorsed (“very true” or “extremely true”) that what was happening felt unreal (47%), that their body felt distorted or disconnected (33%), and that they were surprised to find that they were unaware of events that had happened (33%) during hospitalization. In total, 33% and 53% reported clinically significant depressive symptoms and anxiety symptoms, respectively (HADS subscale ≥8). Internal consistency was acceptable for HADS-D, HADS-A, and PDEQ scales (Cronbach’s alpha = 0.81, 0.75, and 0.92, respectively). On the loneliness scale, 20%, 27%, and 33% reported they “often” felt isolated, left out, or lacked companionship, respectively. Median self-rated health on the EQ-5D-5L was 50 (IQR, 50–70) on a 1–100 scale. The majority (73%) rated high interest in learning ways to manage their stress (≥7 on a 1–10 Likert scale). Eleven patients were discharged home, and four were discharged to a skilled nursing facility.

Ten patients (67%) completed 1-month follow-up interviews; nine were at home and one was in a rehabilitation facility. Three patients did not return calls, one patient declined completing the interview because of competing time demands, and one patient died in the interim. Of these 10 patients, 20% and 30% reported clinically significant depressive symptoms and anxiety symptoms, respectively. Forty percent had elevated trauma-related symptoms. In exploratory analyses, baseline PDEQ scores and follow-up IES-R scores were correlated (Spearman’s rho = 0.70; P = 0.02). As shown in Table 2, all four of the cases with clinically significant IES-R scores at follow-up were among those with above-threshold peritraumatic dissociative symptoms at baseline, whereas none of those with below-threshold baseline PDEQ scores had clinically significant IES-R scores at follow-up. Median Brief COPE subscale scores indicated participants’ most frequently used coping strategies were emotional support, religion, acceptance, and planning. Median self-rated health was 62.5 (IQR, 40–85). Forty percent rated high interest in stress-management resources (≥7 on 1–10 scale) at follow-up.

**Discussion**

These data provide a glimpse into patients’ early post-ICU recovery experience. Peritraumatic dissociative symptoms were common during hospitalization. A notable subset endorsed clinically significant depression, anxiety, and trauma-related symptoms prior to hospital discharge and at 1-month postdischarge. Most patients were interested in stress-management resources before hospital discharge.

In the context of these results and the larger ICU survivorship literature, we offer several suggestions that may inform emerging research efforts. Patients without severe cognitive impairment were able to complete 30-minute interviews in the hospital, and scales were internally consistent, suggesting initial feasibility of these procedures. Before hospital discharge, patients endorsed peritraumatic stress symptoms such as derealization. Notably, caregivers likewise had peritraumatic symptoms during patients’ ICU admissions in a separate study (22). Accordingly, interventions introduced during hospitalization likely need to account for or directly address these symptoms. Given links between peritraumatic stress and PTSD risk in other groups (8–10), this approach could have potential benefits for mitigating PTSD onset (23). Although this study was not designed for predictive purposes, exploratory analysis suggested a bivariate link between predischarge peritraumatic dissociative symptoms and 1-month PTSD symptoms. These exploratory results should be interpreted with caution given the small sample size and should not be used for causal inference. Yet, this pattern raises several questions for future well-powered, prospective studies to test this link and inform potential clinical utility, such as the following: Does screening for peritraumatic stress at hospital discharge help determine which patients may benefit from further monitoring and intervention for posthospital PTSD? Do interventions targeting early peritraumatic symptoms help to mitigate longer-term PTSD among ICU survivors?

Additionally, though most hospitalized patients were interested in stress-management resources, fewer were interested 1 month later. Although this pattern might reflect differential attrition or symptom abatement, it suggests that stress-management approaches or referrals may be met with greater interest before hospital discharge than at a later time. Finally, ICU

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**Table 2.** Frequencies of scores above and below thresholds on baseline peritraumatic dissociative symptoms (PDEQ) and follow-up posttraumatic stress symptoms (IES-R) among participants with follow-up data (n = 10)

| Follow-Up (1-Mo Postdischarge) | Lower Posttraumatic Stress Symptoms (IES-R < 33) | Higher Posttraumatic Stress Symptoms (IES-R ≥ 33) | Row Total |
|--------------------------------|-----------------------------------------------|-----------------------------------------------|-----------|
| Lower peritraumatic dissociative symptoms (PDEQ < 15) | 4 (40%) | 0 (0%) | 4 (40%) |
| Higher peritraumatic dissociative symptoms (PDEQ ≥ 15) | 2 (20%) | 4 (40%) | 6 (60%) |
| Column total | 6 (60%) | 4 (40%) | — |

*Definition of abbreviations: IES-R = Impact of Events Scale-Revised; PDEQ = Peritraumatic Dissociative Experiences Questionnaire.*
survivors’ mental health symptoms in this study and the broader literature highlight the importance of integrating behavioral health services during discharge planning and multidisciplinary follow-up.

This pilot study’s limitations include its small sample size and the possibility of selection bias. A larger study is needed to determine whether these findings are generalizable to the broader population of ICU survivors. Strategies to improve study retention are also likely to be useful, including increased contact attempts (24). In addition, we assessed dissociative symptoms to reflect patients’ peritraumatic reactions during hospitalization and reserved assessment of posttraumatic symptoms for the posthospital period. In future work, it may also be helpful to include a broader index of trauma-related symptoms at baseline for comparison (e.g., IES-R, IES-6), which was a limitation of this study.

Overall, this small study draws attention to the peritraumatic stress symptoms experienced by ICU survivors in the early postacute recovery period, an underrecognized phenomenon. Current pandemic-related factors (e.g., visitation restrictions, fears regarding resource scarcity) could exacerbate acute stress symptoms. Research and clinical innovations to maximize psychological recovery for ICU survivors continue to be urgently needed. As the COVID-19 pandemic response begins to include survivorship care, multidisciplinary efforts should include a strong focus on psychological health.

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