Nursing in Critical Care

WILEY | BACCN

RESEARCH ARTICLE OPEN ACCESS

Effects of Anxiety Focused Nursing Interventions on Anxiety, Cognitive Function and Delirium in Neurocritical Patients: A Non-Randomized Controlled Design

Seo-young Jang[1] | Myung Kyung Lee[2]

[1]Department of Forensic Nursing, Graduate School of Forensic and Investigative Science, Kyungpook National University, Daegu, South Korea | [2]College of Nursing, Research Institute of Nursing Innovation, Kyungpook National University, Daegu, South Korea

Correspondence: Myung Kyung Lee (mlee@knu.ac.kr)

Received: 23 September 2024 | **Revised:** 21 April 2025 | **Accepted:** 23 April 2025

Keywords: anxiety | cognitive function | incidence of delirium | neurocritical care | nursing intervention programme | patients in intensive care unit

ABSTRACT

Background: Anxiety and cognitive dysfunction are common concerns in neurological intensive care units (ICUs) and are associated with adverse outcomes, including delirium. Addressing these issues effectively is crucial for improving patient outcomes and quality of care.

Aim: To develop an anxiety-focused nursing intervention programme and investigate the effects of this programme on anxiety levels, cognitive function and the incidence of delirium among patients in a neurological ICU.

Study Design: A non-randomized controlled design was employed.

Method: The outcome variables of experimental and control groups were compared. Sixty patients in a 1235-bed tertiary general hospital ICU in South Korea were assigned to the experimental ($n=30$) or control group ($n=30$), which were administered the anxiety nursing intervention and standard care, respectively. Anxiety and cognitive function were measured before and after the intervention, while the incidence of delirium was monitored throughout the study period.

Results: The results showed that the experimental group exhibited significantly lower anxiety levels ($t=6.83$, $p<0.001$) and improved cognitive function ($t=2.56$, $p=0.013$) compared to that of the control group. Additionally, the incidence of delirium in the experimental group was significantly reduced ($\chi^2=11.28$, $p=0.001$) post-intervention.

Conclusions: The anxiety nursing intervention programme effectively reduces anxiety, improves cognitive function and decreases the incidence of delirium in patients with neurocritical conditions.

Relevance to Clinical Practice: These findings highlight the essential role of comprehensive nursing interventions in addressing the psychological and cognitive needs of patients with neurocritical conditions. Training nurses to implement the developed protocol is vital to improve patient outcomes in neurological intensive care settings.

1 | Introduction

Patients admitted to the intensive care unit (ICU) often experience significant anxiety driven by the unfamiliar environment, severity of their condition and uncertainty of their prognosis [1]. Various stressors contribute to this anxiety, including life-threatening health conditions, the use of life-support devices, medical equipment noise, continuous day-and-night activities, limited social interaction owing to restricted visitor access and severe physical discomfort from pain [1, 2]. Anxiety symptoms affect 12%–60% of patients in the ICU [3, 4], and those with neurocritical conditions often experience heightened levels because of conditions such as stroke, traumatic brain injury or post-neurosurgical care [5].

Summary

- What is known about this topic
  - Anxiety symptoms in ICU patients are closely associated with delirium and cognitive function.
  - To date, research on anxiety-focused interventions for ICU patients has been based on psychological approaches.
- What this paper adds
  - This study developed a structured framework integrating cognitive, physical, communicative, psychological and environmental interventions into existing ICU nursing practices for neurocritical patients.
  - The findings demonstrated significant improvements in patient anxiety, cognitive function and delirium occurrence.

Functional neurological disorders further disrupt emotional regulation, intensify autonomic responses and exacerbate anxiety, which may impede recovery and lead to long-term psychological challenges [6, 7].

2 | Background/Justification for Study

Initiating anxiety-focused interventions promptly upon ICU admission is critical. Acute anxiety symptoms can develop within 48 h of ICU admission [2]. Prolonged anxiety not only increases physical pain and impairs immune function but also delays wound healing [8], ultimately hindering the recovery process. Furthermore, anxiety significantly influences the quality of life (QOL) of the patients [9]. Therefore, early intervention is crucial in managing anxiety symptoms effectively [2]. ICU hospitalization is also strongly linked to delirium, with its incidence among patients with neurocritical conditions ranging from 10% to 48% [10].

Anxiety-focused interventions for neurocritical patients may help improve delirium and cognitive function. Delirium, characterized by impaired attention and reduced consciousness, is frequently triggered by high anxiety levels in patients in the ICU [11], which may also worsen cognitive decline [12]. The presence of delirium among patients in the ICU is associated with prolonged ICU stay [13], extended ventilator usage [10], higher complication rates [14], and increased mortality [14, 15]. In particular, prolonged delirium often results in lasting cognitive function that persists post-discharge. The use of mechanical ventilation in patients requiring intensive care increases the risk of cognitive impairment [16]. Additionally, anxiety may significantly accelerate cognitive decline, particularly in patients with early-stage neurocognitive disorders [15]. Therefore, addressing the relationship between anxiety, delirium and cognitive function is crucial for developing effective anxiety-focused interventions. Integrated nursing interventions targeting anxiety can prevent and mitigate delirium and cognitive decline [17].

Previous experimental studies have explored various nursing interventions to reduce anxiety in patients in the ICU. These interventions primarily focus on psychosocial approaches, including music therapy, maintaining ICU experience diaries [18], and providing education during hospital stays [19]. Another programme highlights the importance of continuous information sharing and effective communication [20]. In neurocritical care, early detection of anxiety levels is critical for tailoring appropriate nursing interventions [21]. However, several previous interventions lacked a systematic framework that integrates anxiety management into routine ICU nursing practices. Furthermore, these studies primarily addressed anxiety symptoms in isolation, overlooking the interconnections between anxiety, delirium and cognitive function.

In this study, we categorized existing ICU nursing practices into cognitive, physical, communicative, psychological and environmental interventions to establish a structured and comprehensive framework. Activities such as introducing nurses by name, providing written information, assessing delirium and pain and facilitating calming communication were systematically implemented to evaluate their collective effect on reducing patient anxiety. This approach bridges a critical research gap by organizing routine nursing care into a cohesive structure that fosters psychological stability while systematically measuring its effectiveness. We developed a comprehensive anxiety-focused nursing intervention programme for patients in the ICU, addressing cognitive, physical, communicative, psychological and environmental components by integrating the performance of nurses into the care process.

3 | Aims and Objectives of Study/Research Questions/Hypothesis

This study aims to develop anxiety-focused nursing interventions for patients in the ICU with neurocritical conditions, assessing their effects on anxiety, cognitive function and delirium incidence. Additionally, this study seeks to explore how these interventions can be integrated into clinical practice to manage anxiety in critically ill patients with neurological conditions. The research hypotheses are as follows: the experimental group (1) will exhibit lower levels of anxiety than those of the control group; (2) will demonstrate better cognitive function than that of the control group; and (3) will experience a reduced incidence of delirium compared to that of the control group.

4 | Design and Methods

This non-randomized controlled design was conducted to evaluate the effects of anxiety-focused nursing interventions on anxiety levels, cognitive function and delirium incidence in patients with neurocritical conditions (Table S1).

4.1 | Setting and Sample

The target population comprised patients admitted to the neurological ICU of a tertiary university hospital in Metropolitan City B, South Korea. Data collection and intervention procedures were approved by the nursing department and neuro ICU directors. The inclusion criteria were as follows: (1) admission to

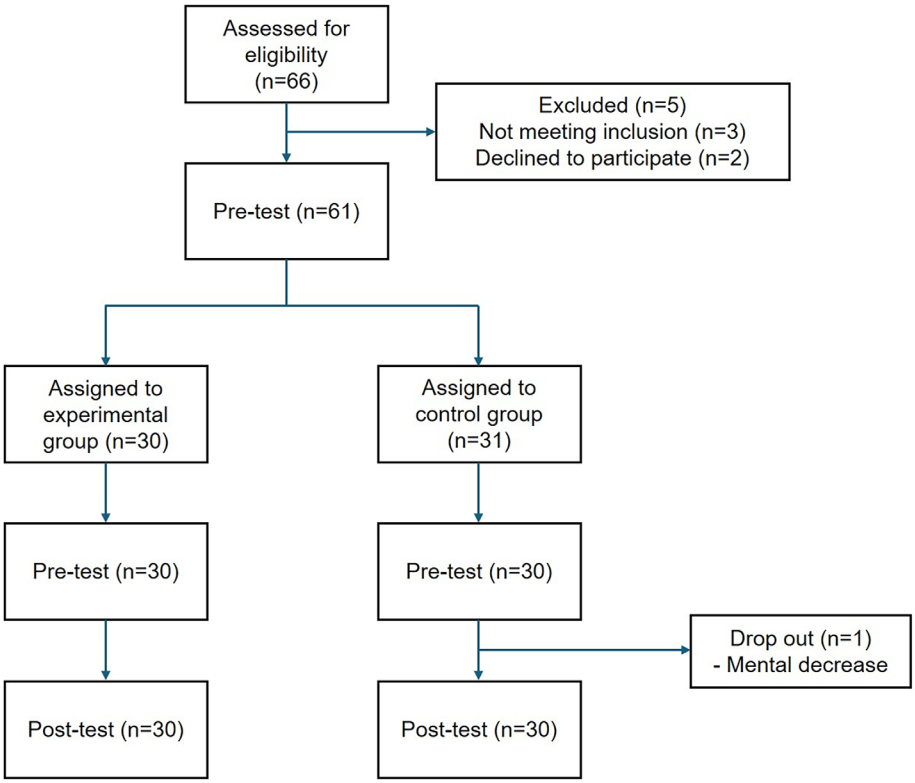

FIGURE 1 | Flowchart of the experimental study.

the neurological ICU of the university hospital; (2) adults aged ≥19 years who provided informed consent; (3) individuals capable of verbal or nonverbal communication with a Richmond Agitation-Sedation Scale score of ≥3 (indicating alertness, drowsiness or agitation) [22]; and (4) patients who have been hospitalized in the ICU for ≥2 days. The exclusion criteria were as follows: (1) the use of sedative medications and (2) a psychiatric diagnosis, including dementia.

Participants who met the inclusion criteria understood the purpose and methodology of the study, and voluntarily provided consent were recruited for this study. Eligible adult patients admitted to the neurological ICU were informed about the study during their admission process. They were provided with detailed explanations at their bedside while being guided through hospitalization procedures and reviewing the research participant manual. Before obtaining consent, the purpose and methodology of the study were explained to the participants, with assurances that participation would not affect their treatment in the ICU. Patients who declined participation were reassured they would still undergo a one-time admission orientation to facilitate ICU adaptation, and no personal information would be collected. Furthermore, the participants were informed that their consent process would not result in any disadvantages, and voluntary consent was guaranteed. If any part of the manual was unclear or if participants had additional questions, they were encouraged to contact the researcher directly. Data collection for the study was conducted between January 15, 2024, and May 8, 2024.

The sample size was calculated using G-Power software (version 3.1.7) with the parameters set to a significance level of $\alpha = 0.05$, power of $1\text{-}\beta = 0.80$, effect size = 0.8, two groups, and an independent *t*-test as the statistical method. The calculation was employed to determine a minimum required sample size of 26 participants per group. To account for a 13% anticipated dropout rate, reported based on dropout rates in psychosocial interventions for individuals with severe mental illness [23], 60 participants were recruited, with 30 allocated to each group.

Sixty-six potential participants were assessed based on the inclusion and exclusion criteria. Of these, 61 met the inclusion criteria, while 5 were excluded owing to communication barriers at admission ($n = 3$) and declining participation ($n = 2$). The remaining 61 patients were then randomly assigned to an experimental or control group. During the study, one participant in the control group withdrew owing to reduced consciousness. Consequently, 30 participants in each group were included in the final statistical analyses (Figure 1).

4.2 | Data Collection Tools and Methods

4.2.1 | Data Collection Tools

Measurements were performed by two independent, trained nurses who were not involved in the intervention. For both groups, a presurvey assessing anxiety, cognitive function and delirium was conducted upon admission. In the experimental group, additional measurements were taken pre-intervention every 2 days during the intervention, for a total of six evaluations. In the control group, measurements were conducted 2 days after admission, with participants responding to questions directly using the research tool.

The experimental group was evaluated both during and post-intervention, with assessments conducted every 2 days (6 evaluations in total).

4.2.1.1 | General and Clinical Characteristics. General characteristics assessed included age, sex, marital status and religion. Clinical characteristics encompassed medical history, hearing and vision impairments, use of body protectors and administration of vasopressors. Additionally, previously recorded data on anxiety, cognitive function and delirium occurrences were verified by research staff.

4.2.1.2 | Anxiety. Anxiety was measured using the Hamilton Anxiety Rating Scale (HAM-A), a 14-item tool structured as an interview. Scores ranged from 0 (absence of symptoms) to 4 (severe symptoms), with higher scores indicating more anxiety severity [24]. The HAM-A demonstrated good reliability in its original version, with Cronbach's $\alpha = 0.74$ [24]. Subsequently, the scale was translated into Korean [25]. In this study, the translated version of the HAM-A exhibited high reliability with a Cronbach's α of 0.92.

4.2.1.3 | Cognitive Function. Cognition encompasses the mental processes involved in perception, learning, memory, understanding, recognition, reasoning, judgement, intuition and language use [26]. Cognitive function was measured using the Mini-Mental State Examination (MMSE) [27], a tool widely recognized for its strong reliability and validity. The MMSE comprises 27 items that assess various cognitive domains, including memory, attention, calculation skills, language comprehension and judgement. In this study, cognitive function was determined using the Korean version of the MMSE (MMSE-K), which evaluates cognitive domains such as orientation, attention and calculation, memory, language and visuospatial ability [28]. The MMSE-K scores range from 0 to 30, with scores of ≤ 23 indicating cognitive impairment. The original MMSE exhibited strong reliability, with a Cronbach's α of 0.98 [27], while the MMSE-K used in this study had a Cronbach's α of 0.78.

4.2.1.4 | Delirium. Delirium is an acute mental state characterized by cognitive impairments such as confusion, agitation, disorientation and disturbances in consciousness. It primarily involves hallucinations, delusions, sudden onset, fluctuating symptoms, attention deficits and significant cognitive changes [26].

In this study, delirium was evaluated using the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) [29]. The CAM-ICU assesses delirium based on four criteria, as follows: (1) sudden fluctuations and changes in mental status, (2) reduced attention and concentration, (3) disorganized thinking and (4) altered levels of consciousness. A diagnosis of delirium requires at least two of these criteria. Regular assessments using the CAM-ICU are critical for evaluating the effectiveness of interventions aimed at reducing the risk of delirium in the ICU.

The CAM-ICU demonstrated high reliability, with sensitivity and specificity ranging from 93% to 100%, respectively [29]. In this study, the Korean-translated version of the CAM-ICU [21], which had a Cronbach's α of 0.79, was employed.

4.2.2 | Methods

4.2.2.1 | Intervention Programme. Table 1 outlines the hourly anxiety-focused nursing interventions implemented in this study. Patients in the ICU predominantly required support for managing pain, sensory impairments and psychological stress. Placing emphasis on creating a therapeutic environment, early detection of acute stress and providing psychological support is crucial. Effective nurse–patient communication is essential to better address these needs [20].

Following the guidelines of the American Association of Critical-Care Nurses for managing anxiety and stress in patients in the ICU [4], an anxiety prevention focused intervention was developed in this study. The programme was subsequently tailored to meet the specific needs of patients in the neurological ICU.

The anxiety-focused nursing intervention programme was designed to mitigate the onset of delirium by addressing five critical domains as follows: cognitive, physical, communication, psychological and environmental. The programme aimed to manage anxiety in patients in the ICU, thus reducing anxiety levels and enhancing cognitive function. An expert panel comprising four senior nurses with ≥ 10 years of experience specializing in critical care nursing, psychiatric nursing, nursing education and clinical research validated the content of the programme. The programme achieved a Content Validity Index (CVI) of 0.9.

As part of cognitive mediation, the following components were included: *orientation video*, *nurse introduction*, *bedside calendar*, *daily schedule briefing* and *delirium assessment*. The instructional video, shown upon admission, was designed to help patients quickly and effectively acclimate to the ICU environment. The video aims to alleviate patient uncertainty and anxiety by presenting the layout of the ICU, explaining routine activities and demonstrating the functions of the equipment. Introducing the nursing staff by name, along with providing details about the date, time and location, helps patients understand their current situation and reduce confusion regarding their surroundings [30]. This approach can increase patient engagement in their treatment and clarify what to expect at each stage. Informing patients in advance about scheduled tests, procedures and surgeries reduces uncertainty—a major contributor to anxiety [30]. This proactive communication helps patients understand the purpose and timing of their treatments. Delirium, a prevalent condition in ICUs, can adversely influence the recovery and long-term health of the patient. Therefore, regular assessment and early detection of delirium are vital to safeguard cognitive function and prevent long-term complications [31]. Cognitive mediation strategies support the mental stability of the patients and enhance their adaptation to the ICU environment.

For physical mediation, interventions included *pain monitoring* and *hourly vital signs checks* to maintain physiological stability. Pain is a significant stressor for patients, and inadequate pain management can intensify anxiety and stress [32]. In the ICU, health care providers utilize various pain assessment tools to assess pain levels and implement pharmacological and nonpharmacological interventions effectively. Maintaining physiological stability is crucial. Regular monitoring of vital signs, including blood pressure, pulse, respiratory rate and

TABLE 1 | Anxiety nursing intervention checklist.

Item	Arbitration protocol checklist	Checklist											
		7A–9	9–11	11–13	13–15	15–17	17–19	19–21	21–23	23–1A	1–3	3–5	5–7
Cognitive mediation	Intensive care unit instruction video provided upon admission.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Introduction of the nurse by name.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Written information about date, time and location provided (e.g., bedside calendar).	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Written information on any tests, procedures or scheduled surgeries for the day.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Delirium assessed using CAM-ICU at 7 AM, 3 PM and 11 PM.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Physical mediation	Pain assessed based on hospital regulations. (For patients who are not subject to daily re-evaluation, use an appropriate pain tool to check whether the pain is well-controlled).	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Vital signs checked every hour to maintain appropriate levels.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Communicative mediation	Speak calmly and slowly in a low tone.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Call the patient by name when providing care.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Psychological mediation	Family visits allowed at set times. Ask the guardian to hold the hand of the patient.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Encourage the patient to express personal fears.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Music played upon patient request.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Assign a nurse to each patient for every shift, providing direct nursing care.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
Environmental mediation	Provide assistive devices (e.g., glasses, hearing aids) if previously used.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Provide earplugs and eye masks to block noise and light, improving sleep quality.	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
	Use a sleep light during sleeping hours (11 PM – 6 AM).	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐

Abbreviation: CAM-ICU, Confusion Assessment Method for the Intensive Care Unit.

temperature, ensured the condition of the patient remained stable and guided necessary interventions. This consistent monitoring also reduces anxiety by providing patients with a sense of physical security [33].

In terms of communicative mediation, staff were instructed to *speak calmly, use patients' names* and *engage with a low, reassuring tone*. Clear and calm communication by medical staff was also emphasized to contribute to patient stability [34]. Moreover, addressing patients by name was intentionally practiced to demonstrate personal interest and build trust [34], thereby enhancing the overall therapeutic environment.

Psychological mediation encompassed scheduled family visits, emotional expression support, music therapy on request and individual nurse assignment to ensure direct care. Family visits were actively facilitated to provide emotional comfort and reduce anxiety [35], allowing patients to freely express their fears and enhancing their emotional well-being. In addition, music therapy—an evidence-based method for alleviating anxiety [36]—was implemented to further support psychological relaxation and stability [5].

Lastly, environmental mediation provided assistive devices, earplugs and eye masks for sleep support, and the use of a sleep light during nighttime hours to enhance sleep quality. Auxiliary devices, such as glasses and hearing aids, were provided to improve patient comfort. Ensuring adequate sleep was another priority, given its significance for overall recovery. Environmental adjustments—including dimming lights, reducing noise and providing comfortable bedding—were made to improve sleep quality [37]. These multiple strategies play a crucial role in reducing anxiety in patients in neurological ICUs, significantly promoting emotional and psychological stability among patients.

4.2.2.2 | Procedures. Before conducting the study, two nurses in the ICU with over 7 years of experience underwent training on the intervention protocol. They assessed the anxiety, cognitive function and delirium levels in five patients in the ICU, repeating the assessment three times until they achieved 100% inter-rater agreement. To ensure unbiased results, the nurses involved in the pre-measurements and/or post-measurements were excluded from conducting the intervention.

On the day of ICU admission, a presurvey evaluating anxiety, cognitive function and delirium was administered to both groups. All patients were admitted to the same neurological ICU ward. To avoid experimental contamination, patients admitted during the first half of the study period were sequentially assigned to the control group, while those admitted during the second half were assigned to the experimental group.

ICU nursing staff training was conducted after data collection for the control group concluded and before the pretest for the experimental group commenced. The training sessions were held for 30 min daily over 7 days, during the overlapping day-to-evening shifts. The sessions included face-to-face instruction on measurement techniques and programme usage, with the researcher directly supervising the application of the programme. Additional individual training was provided to nurses who demonstrated insufficient understanding.

4.2.2.3 | Experimental Group. Pre-measurements, intervention care and measurements during and after interventions for the experimental group were conducted between February 25, 2024, and May 8, 2024. Table 1 details the anxiety-focused nursing intervention programme implemented in this study. This programme aimed to mitigate anxiety, delirium and cognitive decline in patients in the ICU with neurocritical conditions. It encompassed five domains—cognitive, physical, environmental, communication and psychological—comprising 16 specific nursing actions (Table 1).

Delirium in patients was assessed during every shift by ICU nurses using the CAM-ICU. The ICU nurses also administered the anxiety-focused nursing intervention programme to patients in the experimental group during every shift. As the intervention required continuous application for 24 h, all ICU nurses strictly adhered to the intervention protocol. The timing and frequency of the intervention care were recorded using an intervention checklist.

4.2.2.4 | Control Group. The control group underwent premeasurement, routine care and measurements during and after the intervention between January 15, 2024, and February 24, 2024. Upon admission, they underwent a one-time orientation to help them acclimate to the ICU environment, along with the standard nursing care provided in this setting.

4.2.3 | Data Analysis

Prior to conducting parametric analyses, to determine whether the primary variables of anxiety and cognitive function satisfied the assumption of normality, skewness and kurtosis were evaluated for each group. The normality assumption is generally met when skewness values fall between −2 and +2, and kurtosis values range from −7 to +7 [38].

The Chi-square test (χ^2 test) and independent sample *t*-test were used to assess the homogeneity of demographic and clinical characteristics between the groups. An independent samples *t*-test was used to compare baseline anxiety and cognitive function levels between the experimental and control groups. Additionally, the Chi-square test was utilized to compare the incidence of delirium between these groups.

To evaluate within-group changes in anxiety and cognitive function before and after the intervention, a paired samples *t*-test was conducted. Changes in anxiety and cognitive function from baseline to post-intervention were compared between the two groups using an independent samples *t*-test. Data were analysed using IBM SPSS Statistics 26.0 (IBM, NY, US), with a statistical significance level (α) set at $p < 0.05$.

5 | Ethics and Research Approvals

Before the study commenced, the rights and well-being of participants were prioritized. Final approval was obtained from the Institutional Review Board of Kyungpook National University (Approval No. 2023–0573, granted on November 29, 2023).

TABLE 2 | Homogeneity test between the experimental and control groups.

Variables	Categories	Total ($n=60$)	Control ($n=30$)	Experimental ($n=30$)		
		n (%)/M ± SD	n (%)/M ± SD	n (%)/M ± SD	χ^2/t	p
Sex	Female	36 (60.0)	16 (53.3)	20 (66.7)	1.11	0.292
	Male	24 (40.0)	14 (46.7)	10 (33.3)		
Age		63.02 ± 15.23	66.43 ± 15.42	59.60 ± 14.50	1.77	0.082
Spouse	Absent	18 (30.0)	6 (20.0)	12 (40.0)	2.86	0.091
	Present	42 (70.0)	24 (80.0)	18 (60.0)		
Religion	Absent	25 (41.7)	10 (33.3)	15 (50.0)	1.71	0.19
	Present	35 (58.3)	20 (66.7)	15 (50.0)		
Past history	Absent	17 (28.3)	9 (30.0)	8 (26.7)	0.08	0.774
	Present	43 (71.7)	21 (70.0)	22 (73.3)		
Hearing impairment	Absent	52 (86.7)	25 (83.3)	27 (90.0)	0.58	0.448
	Present	8 (13.3)	5 (16.7)	3 (10.0)		
Vision impairment	Absent	40 (66.7)	21 (70.0)	19 (63.3)	0.30	0.584
	Present	20 (33.3)	9 (30.0)	11 (36.7)		
Use of vasopressors	Absent	58 (96.7)	30 (100.0)	28 (93.3)	2.07	0.15
	Present	2 (3.3)	0 (0.0)	2 (6.7)		
Use of restraints	Absent	44 (73.3)	20 (66.7)	24 (80.0)	1.36	0.243
	Present	16 (26.7)	10 (33.3)	6 (20.0)		
Anxiety			14.13 ± 8.70	14.47 ± 8.05	0.15	0.878
Cognitive function			22.70 ± 5.71	21.77 ± 5.48	−0.65	0.521
Delirium						
Absent			18 (60.0%)	18 (60.0%)		
Present			12 (40.0%)	12 (40.0%)	0.00	1.000

Abbreviations: M, mean; SD, standard deviation.

Participants were provided with clear and comprehensible information regarding the purpose, procedures and potential risks of the study. They were informed that participation was voluntary and that they could withdraw at any time without consequence.

To protect the personal information of the participants, all data were anonymized to prevent identification in the research results. The collected data were securely stored on a password-protected computer, accessible only to authorized researchers. Furthermore, written informed consent was obtained following the guidelines of the Ethics Committee. Special ethical considerations were implemented to account for the vulnerability of patients in the ICU, including minimizing physical and psychological burdens during interventions. Throughout the study, the research team ensured compliance with ethical standards, maintaining transparency and accountability to safeguard the dignity and confidentiality of the participants.

6 | Results/Findings

6.1 | Participant Characteristics and Homogeneity Testing

Table 2 presents the homogeneity test results between the two groups. Of the 60 participants, the experimental and control groups encompassed 20 (66.7%) and 16 (53.3%) ($\chi^2=1.11$, $p=0.292$) females, respectively. The average age in the experimental and control groups was 60 years and 66 years ($t=1.77$, $p=0.082$), respectively. Eight (26.7%) and nine (30.0%) participants in the experimental and control groups, respectively, reported no past medical history ($\chi^2=0.08$, $p=0.774$). Regarding hearing impairment, three (10.0%) and five (16.7%) participants in the experimental and control group, respectively, were affected ($\chi^2=0.58$, $p=0.448$). Eleven (36.7%) and nine (30.0%) participants in the experimental and control groups, respectively, reported visual impairment ($\chi^2=0.30$, $p=0.584$). No significant

TABLE 3 | Effects of nursing interventions on anxiety, cognitive function and delirium incidence.

Variables	Group	Pre	Post	Within group t/χ^2 (p)	Change	Time × group t (p)
		M ± SD/n (%)	M ± SD/n (%)		M ± SD/n (%)	
Anxiety	Experimental	14.13 ± 8.70	5.17 ± 5.20	−5.46 (< 0.001)	−8.97 ± 8.99	−4.90 (< 0.001)
	Control	14.47 ± 8.05	17.50 ± 8.41	1.67 (0.106)	3.03 ± 9.97	
	Between group t (p)	0.15 (0.878)	6.83 (< 0.001)			
Cognitive Function	Experimental	22.70 ± 5.71	24.03 ± 5.03	2.42 (0.022)	1.33 ± 3.02	3.55 (0.001)
	Control	21.77 ± 5.48	20.23 ± 6.39	−2.60 (0.014)	−1.53 ± 3.22	
	t (p)	−0.65 (0.521)	2.56 (0.013)			
Delirium	Experimental	12 (40.0%)	8 (26.7%)	1.20 (0.273)	−4 (−13.3%)	
	Control	12 (40.0%)	21 (70.0%)	5.45 (0.020)	9 (30.0%)	
	χ^2 (p)	0.00 (1.000)	11.28 (0.001)			

Abbreviations: M, mean; SD, standard deviation.

differences were observed in the baseline scores for anxiety ($t = 0.15$, $p = 0.878$), cognitive function ($t = -0.65$, $p = 0.521$) and the baseline prevalence of delirium ($t = 0.00$, $p = 1.000$) between both groups. Overall, the analysis revealed no significant differences in demographic and clinical characteristics between both groups.

6.2 | Assessment of Normality for Anxiety and Cognitive Function Scores

The normality assumption is generally met when skewness values fall between −2 and +2, and kurtosis values range from −7 to +7 [38]. For the experimental group, the skewness and kurtosis values for anxiety and cognitive function, measured before and after implementing the intervention programme, fell within acceptable thresholds for both groups. The experimental group showed pre (post) skewness and kurtosis intervention values of 0.62 (1.97) and 0.04 (6.55) and −1.70 (−1.71) and 3.36 (3.70) for anxiety and cognitive function, respectively. Conversely, the control group showed pre (post) skewness and kurtosis intervention values of 0.46 (−0.64) and −0.17 (−0.67) and −0.79 (−0.70) and −0.12 (−0.62) for anxiety and cognitive function, respectively. This indicates that the data for anxiety and cognitive function are considered satisfactory for the normality assumption.

6.3 | Hypothesis Testing: Effects of Anxiety Focused Nursing Interventions on Anxiety, Cognitive Function and Incidence of Delirium

Table 3 presents the results of the hypothesis tests.

6.3.1 | Hypothesis 1: Effect of the Intervention on Anxiety

A significant difference in anxiety levels between the experimental and control groups was observed post-intervention ($t = 6.83$, $p < 0.001$). The experimental group exhibited a significantly lower level of anxiety than that of the control group. The shift in anxiety levels from baseline to post-intervention was also significantly greater in the experimental group than in the control group (−8.97 vs. 3.03, $t = -4.90$, $p < 0.001$). Therefore, the nursing intervention programme significantly decreased anxiety levels.

6.3.2 | Hypothesis 2: Effect on Cognitive Function

The experimental group exhibited significantly higher cognitive function than that of the control group post-intervention ($t = 2.56$, $p = 0.013$). Additionally, the change in cognitive function from pre-intervention to post-intervention showed a significant difference between both groups. The experimental and control group increased and decreased by 1.33 and 1.53 points, respectively (1.33 vs. −1.53, $t = 3.55$, $p = 0.001$). Therefore, the nursing intervention programme significantly enhanced cognitive function only in the experimental group.

6.3.3 | Hypothesis 3: Effect on Delirium

The post-intervention delirium rate was significantly lower in the experimental group (26.7%) than in the control group (70.0%) ($\chi^2 = 11.28$, $p = 0.001$). The control group exhibited a significant increase in delirium incidence, rising from 40.0% to 70.0% ($p = 0.020$), while the experimental group showed no significant change, decreasing from 40.0% to 26.7% ($p = 0.273$). These findings suggest that the nursing intervention programme was more effective in preventing an increase in delirium incidence.

7 | Discussion

This study examined the effects of an anxiety-focused nursing intervention programme on anxiety levels, cognitive function and delirium among patients in a neurological ICU. The

intervention significantly reduced anxiety levels in the experimental group compared to those in the control group, underscoring its effectiveness. Previous studies show the benefits of nonpharmacological strategies, such as music therapy, psychological interventions and virtual reality (VR), in mitigating psychological distress among patients in the ICU [5, 39, 40].

For example, a randomized clinical trial conducted in the Netherlands reported that music therapy effectively reduces anxiety levels in patients in the ICU [5]. Similarly, early psychological support from trained clinicians within the ICU setting in Italy also alleviates anxiety and depression symptoms [39]. Additionally, a preliminary study conducted in China reports that VR-based interventions could improve psychological well-being by reducing anxiety, depression and post-traumatic disorder symptoms [40].

These findings highlight the significance of integrating nonpharmacological interventions, such as music, VR and psychological support, into ICU care to address the mental health of patients comprehensively. Furthermore, our intervention strategy builds on this evidence by integrating routine nursing care activities—including personalized nurse introductions, written informational support, delirium and pain assessment and calming communication—into a structured programme. This approach contributes to advancing strategies for anxiety reduction among patients in neurological ICU.

This finding underscores the effectiveness of the nursing intervention programme in reducing anxiety and enhancing cognitive outcomes. It aligns with previous studies conducted in the United States and Denmark, which emphasize the benefits of cognitive interventions in ICU settings [41, 42]. The previous studies on managing delirium and improving cognitive outcomes in patients in the ICU show various effective approaches, including cognitive stimulation [41], multicomponent interventions [42], and environmental and preventive strategies [41, 42]. Nonpharmacological strategies, such as maintaining proper sleep hygiene, promoting mobility and using sensory aids (such as glasses and hearing aids) effectively reduce delirium incidence and support cognitive recovery [41, 42]. Briefly, structured cognitive stimulation tasks led by nurses were particularly effective in decreasing the incidence and duration of delirium by engaging patients cognitively and mitigating its effects. The intervention used in this study, which combines cognitive, physical, communicative, psychological and environmental strategies, aligns with prior research but differs in its experimental design. It quantitatively demonstrates that an integrated intervention strategy effectively reduces anxiety, improves cognitive function and mitigates delirium, thereby establishing causal relationships.

Before the intervention, both groups had a delirium rate of 40.0%. Following the intervention, the delirium incidence rate was significantly lower in the experimental group (26.7%) than in the control group (70.0%). These findings suggest that this anxiety-focused nursing intervention programme, which integrates cognitive, physical, communicative, psychological and environmental mediations, effectively mitigates delirium risk. This also supports earlier findings from the United States advocating for early and continuous psychological support to prevent delirium in patients with critical illness [43].

This study shows that several interventions, such as providing patients with detailed information about the ICU environment, introducing nursing staff and explaining scheduled procedures, effectively reduce uncertainty and increase predictability. Nurse-driven **c**ognitive stimulation tasks and reorientation strategies improve patient understanding, reduce uncertainty, and support cognitive recovery [41]. These measures fostered a sense of control, potentially contributing to decreased anxiety and improved cognitive function. Additionally, effective pain management, such as the use of nonpharmacological methods, alleviated physical stress. Lower pain levels were linked to decreased stress responses, resulting in reduced anxiety and the risk of cognitive disturbances such as delirium. Calm and clear communication by health care providers, addressing patients by name and offering reassurance, effectively stabilized the emotional states of the patients and fostered a sense of security. Encouraging family visits, allowing patients to express fears and offering calming activities, including music therapy, promoted emotional stability. These interventions decreased psychological stress, thereby alleviating anxiety and mitigating cognitive disorientation. Reducing environmental stimuli, such as noise, and using eye masks or earplugs improved sleep quality, which is essential for cognitive function. Adequate sleep is also critical in reducing the risk of delirium, as sleep deprivation is a major contributor to cognitive impairment and delirium onset. Together, these interventions reduced overall stress, providing physical and psychological stability. Consequently, patients experienced decreased anxiety levels, improved cognitive function, and a lower incidence of delirium. Implementing this anxiety-focused nursing intervention may also shorten hospitalization and reduce medical costs associated with delirium complications, thereby improving cost efficiency and treatment outcomes.

Critical care nurses must understand the relationship between anxiety, delirium and cognitive function to provide comprehensive nursing interventions. Effective anxiety management in patients with neurocritical conditions could prevent delirium and cognitive decline [44].

This finding supports the effectiveness of the anxiety-focused nursing intervention programme in reducing anxiety, improving cognitive function and lowering the incidence of delirium in patients with neurocritical conditions. Additionally, these findings emphasize the need for comprehensive nursing interventions that address the psychological, cognitive, physical and environmental aspects of care for patients with neurocritical conditions. Future research should focus on addressing the diverse needs of these patients, ultimately improving overall QQL and supporting rehabilitation.

7.1 | Limitations

This study has some limitations. First, the study participants were recruited from a single ICU, which may restrict the generalizability of the results. Therefore, future research should include patients from multiple ICUs to confirm these findings across broader populations. Second, this study evaluated only short-term outcomes. Long-term follow-up is essential to assess the sustained influence of the intervention on anxiety, cognitive function and delirium incidence. Third, despite efforts to

minimize bias, the non-randomized controlled design may have introduced biases related to participant selection and data collection, which could limit the strength of causal inferences. Additionally, the interventions and outcomes of the study were conducted under controlled conditions, which may not fully reflect real-world settings. Future studies should prioritize randomized controlled trials conducted in diverse, real-world ICUs to enhance the validity and applicability of the findings.

7.2 | Implications and Recommendations for Practice

Based on the findings of this study, the following recommendations are proposed to improve the quality of nursing care: (1) future studies should investigate the effectiveness of this anxiety-focused nursing intervention programme across several patients in the ICU, beyond neurological cases, to confirm its generalizability and (2) ICU nurses should undergo targeted training on the proper implementation of intervention programmes to ensure consistent and effective application, ultimately improving patient outcomes. These steps are essential to advancing nursing care quality, leading to better patient outcomes and more efficient health care delivery in critical care environments.

8 | Conclusion

In conclusion, this study demonstrates that anxiety-focused nursing interventions significantly reduce anxiety, potentially enhance cognitive function and substantially lower the risk of delirium among patients in the neurological ICU, thereby enhancing patient care. The statistically significant findings indicate the significance of a comprehensive approach addressing cognitive, physical, environmental, communicative and psychological aspects of patient care. This approach can serve as a model for future nursing practices aimed at optimizing outcomes for diverse patient populations in the ICU. The current anxiety-focused nursing intervention protocol is well-suited for integration into standard ICU nursing practices, promoting holistic anxiety-focused management strategies in critical care environments.

Acknowledgements

Special thanks to the participants who were admitted to the intensive care unit and took part in the intervention programme during the study.

Ethics Statement

The study was conducted in accordance with the Declaration of Helsinki, and approved by the Institutional Review Board of Kyungpook National University (Approval No. 2023–0573, granted on November 29, 2023).

Consent

Informed consent was written by all participants involved in the study.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

References

1. K. Chahraoui, A. Laurent, A. Bioy, and J. P. Quenot, "Psychological Experience of Patients 3 Months After a Stay in the Intensive Care Unit: A Descriptive and Qualitative Study," *Journal of Critical Care* 30, no. 3 (2015): 599–605, https://doi.org/10.1016/j.jcrc.2015.01.015.

2. D. Wade, N. Als, V. Bell, et al., "Providing Psychological Support to People in Intensive Care: Development and Feasibility Study of a Nurse-Led Intervention to Prevent Acute Stress and Long-Term Morbidity," *BMJ Open* 8, no. 7 (2018): e021083, https://doi.org/10.1136/bmjopen-2017-021083.

3. K. K. N. Gonçalves, J. I. Silva, E. T. Gomes, L. L. S. Pinheiro, T. R. Figueiredo, and S. M. M. Bezerra, "Anxiety in the Preoperative Period of Heart Surgery," *Revista Brasileira de Enfermagem* 69 (2016): 397–403, https://doi.org/10.1590/0034-7167.2016690307i.

4. J. Hernández-Palazón, D. Fuentes-García, L. Falcón-Araña, et al., "Assessment of Preoperative Anxiety in Cardiac Surgery Patients Lacking a History of Anxiety: Contributing Factors and Postoperative Morbidity," *Journal of Cardiothoracic and Vascular Anesthesia* 32, no. 1 (2018): 236–244, https://doi.org/10.1053/j.jvca.2017.05.041.

5. E. Kakar, T. Ottens, S. Stads, et al., "Effect of a Music Intervention on Anxiety in Adult Critically Ill Patients: A Multicenter Randomized Clinical Trial," *Journal of Intensive Care* 11, no. 1 (2023): 36, https://doi.org/10.1186/s40560-023-00658-5.

6. S. Pick, L. H. Goldstein, D. L. Perez, and T. R. Nicholson, "Emotional Processing in Functional Neurological Disorder: A Review, Biopsychosocial Model, and Research Agenda," *Journal of Neurology, Neurosurgery and Psychiatry* 90, no. 6 (2019): 704–711, https://doi.org/10.1136/jnnp-2018-319201.

7. S. A. Shdaifat and M. Al Qadire, "Anxiety and Depression Among Patients Admitted to Intensive Care," *Nursing in Critical Care* 27, no. 1 (2022): 106–112, https://doi.org/10.1111/nicc.12555.

8. H. Peplau, "A Working Definition of Anxiety," in *Some Clinical Approaches to Psychiatric Nursing*, eds. S. Burd and M. Marshall (Macmillan, 1963).

9. S. Nikayin, A. Rabiee, M. D. Hashem, et al., "Anxiety Symptoms in Survivors of Critical Illness: A Systematic Review and Meta-Analysis," *General Hospital Psychiatry* 43 (2016): 23–29, https://doi.org/10.1016/j.genhosppsych.2016.08.005.

10. J. B. Haymore and N. Patel, "Delirium in the Neuro Intensive Care Unit," *Critical Care Nursing Clinics of North America* 28, no. 1 (2016): 21–35, https://doi.org/10.1016/j.cnc.2015.10.001.

11. M. Y. Shim, S. H. Song, M. Lee, et al., "The Effects of Delirium Prevention Intervention on the Delirium Incidence Among Postoperative Patients in a Surgical Intensive Care Unit," *Journal of Korean Clinical Nursing Research* 21, no. 1 (2015): 43–52.

12. L. V. Karnatovskaia, P. J. Schulte, K. L. Philbrick, et al., "Psychocognitive Sequelae of Critical Illness and Correlation With 3 Months Follow-Up," *Journal of Critical Care* 52 (2019): 166–171, https://doi.org/10.1016/j.jcrc.2019.04.009.

13. Y.-S. Kang, S.-H. Kim, M.-J. Lee, et al., "Investigation of Delirium Occurrence and Intervention Status in Intensive Care Unit at a Hospital and Perception of Delirium by Medical Staff," *Journal of Korean Critical Care Nursing* 16, no. 1 (2023): 71–86.

14. S. Ouimet, B. P. Kavanagh, S. B. Gottfried, and Y. Skrobik, "Incidence, Risk Factors, and Consequences of ICU Delirium," *Intensive Care Medicine* 33 (2007): 66–73, https://doi.org/10.1007/s00134-006-0399-8.

15. J. McManus, R. Pathansali, H. Hassan, et al., "The Course of Delirium in Acute Stroke," *Age and Ageing* 38, no. 4 (2009): 385–389, https://doi.org/10.1093/ageing/afp047.

16. T. G. Bassi, E. C. Rohrs, and S. C. Reynolds, "Systematic Review of Cognitive Impairment and Brain Insult After Mechanical Ventilation," *Critical Care (London, England)* 25, no. 1 (2021): 99, https://doi.org/10.1186/s13054-021-03506-8.

17. A. M. J. MacLullich, A. Hosie, Z. Tieges, and D. H. J. Davis, "Three Key Areas in Progressing Delirium Practice and Knowledge: Recognition and Relief of Distress, New Directions in Delirium Epidemiology and Developing Better Research Assessments," *Age and Ageing* 51, no. 11 (2022): afac271, https://doi.org/10.1093/ageing/afac271.

18. Y. Zheng, L. Zhang, S. Ma, et al., "Care Intervention on Psychological Outcomes Among Patients Admitted to Intensive Care Unit: An Umbrella Review of Systematic Reviews and Meta-Analyses," *Systematic Reviews* 12, no. 1 (2023): 237, https://doi.org/10.1186/s13643-023-02396-2.

19. J. Haruna, T. Unoki, N. Nagano, S. Kamishima, and T. Kuribara, "Effectiveness of Nurse-Led Interventions for the Prevention of Mental Health Issues in Patients Leaving Intensive Care: A Systematic Review," *Healthcare* 10, no. 9 (2022): 1716, https://doi.org/10.3390/healthcare10091716.

20. S. Fleischer, A. Berg, J. Behrens, et al., "Does an Additional Structured Information Program During the Intensive Care Unit Stay Reduce Anxiety in ICU Patients? A Multicenter Randomized Controlled Trial," *BMC Anesthesiology* 14 (2014): 48, https://doi.org/10.1186/1471-2253-14-48.

21. M. Y. Yu, J. W. Park, M. S. Hyun, and Y. J. Lee, "Factors Related to Delirium Occurrence Among Patients in the Intensive Care Units," *Journal of Korean Clinical Nursing Research* 14, no. 1 (2008): 151–160.

22. C. N. Sessler, M. S. Gosnell, M. J. Grap, et al., "The Richmond Agitation-Sedation Scale: Validity and Reliability in Adult Intensive Care Unit Patients," *American Journal of Respiratory and Critical Care Medicine* 166, no. 10 (2002): 1338–1344, https://doi.org/10.1164/rccm.2107138.

23. M. Bouchard, T. Lecomte, B. Cloutier, J. Herrera-Roberge, and S. Potvin, "Dropout Rates in Psychosocial Interventions for People With Both Severe Mental Illness and Substance Misuse: A Systematic Review and Meta-Analysis," *Frontiers in Psychiatry* 13 (2022): 842329, https://doi.org/10.3389/fpsyt.2022.842329.

24. W. Maier, R. Buller, M. Philipp, and I. Heuser, "The Hamilton Anxiety Scale: Reliability, Validity, and Sensitivity to Change in Anxiety and Depressive Disorders," *Journal of Affective Disorders* 14, no. 1 (1988): 61–68, https://doi.org/10.1016/0165-0327(88)90072-9.

25. C.-Y. Kim, *Psychiatric Assessment Instruments* (Hanampc, 2001).

26. G. R. VandenBos, *APA Dictionary of Psychology* (American Psychological Association, 2007).

27. M. F. Folstein, S. E. Folstein, and P. R. McHugh, ""Mini-Mental State": A Practical Method for Grading the Cognitive State of Patients for the Clinician," *Journal of Psychiatric Research* 12, no. 3 (1975): 189–198, https://doi.org/10.1016/0022-3956(75)90026-6.

28. Y.-C. Kwon and J.-H. Park, "Korean Version of Mini-Mental State Examination (MMSE-K) Part I: Development of the Test for the Elderly," *Journal of Korean Neuropsychiatric Association* 28, no. 1 (1989): 125–135.

29. E. W. Ely, S. K. Inouye, G. R. Bernard, et al., "Delirium in Mechanically Ventilated Patients: Validity and Reliability of the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)," *JAMA* 286, no. 21 (2001): 2703–2710, https://doi.org/10.1001/jama.286.21.2703.

30. L. Y. Kiyohara, L. K. Kayano, L. M. Oliveira, et al., "Surgery Information Reduces Anxiety in the Preoperative Period," *Revista do Hospital das Clínicas da Faculdade de Medicina da Universidade de São Paulo* 59, no. 2 (2004): 51–56, https://doi.org/10.1590/S0041-87812004000200002.

31. J. Ma, C. Li, W. Zhang, et al., "Preoperative Anxiety Predicted the Incidence of Postoperative Delirium in Patients Undergoing Total Hip Arthroplasty: A Prospective Cohort Study," *BMC Anesthesiology* 21 (2021): 1–8, https://doi.org/10.1186/s12871-021-01403-4.

32. C. Gélinas, "Pain Assessment in the Critically Ill Adult: Recent Evidence and New Trends," *Intensive & Critical Care Nursing* 34 (2016): 1–11, https://doi.org/10.1016/j.iccn.2016.03.001.

33. Y. Dong, L. Zhang, L. W. Chen, et al., "Music Therapy for Pain and Anxiety in Patients After Cardiac Valve Replacement: A Randomized Controlled Clinical Trial," *BMC Cardiovascular Disorders* 23, no. 1 (2023): 32, https://doi.org/10.1186/s12872-023-03012-6.

34. S. H. Sharkiya, "Quality Communication Can Improve Patient-Centred Health Outcomes Among Older Patients: A Rapid Review," *BMC Health Services Research* 23, no. 1 (2023): 886, https://doi.org/10.1186/s12913-023-10155-1.

35. H. J. Yoo and J. Shim, "The Impact of Family Care Visitation Programme on Patients and Caregivers in the Intensive Care Unit: A Mixed Methods Study," *Journal of Clinical Nursing* 32, no. 13–14 (2023): 3797–3809, https://doi.org/10.1111/jocn.16665.

36. J. M. Ferro, L. Caeiro, and A. Verdelho, "Delirium in acute stroke," *Current Opinion in Neurology* 15, no. 1 (2002): 51–55, https://doi.org/10.1097/00019052-200202000-00010.

37. J. M. Latour, N. Kentish-Barnes, T. Jacques, et al., "Improving the Intensive Care Experience From the Perspectives of Different Stakeholders," *Critical Care* 26, no. 1 (2022): 218, https://doi.org/10.1186/s13054-022-04101-6.

38. J. Hair, W. C. Black, B. J. Babin, and R. E. Anderson, *Multivariate Data Analysis*, 7th ed. (Pearson Educational International, 2010).

39. A. Peris, M. Bonizzoli, D. Iozzelli, et al., "Early Intra-Intensive Care Unit Psychological Intervention Promotes Recovery From Post Traumatic Stress Disorders, Anxiety and Depression Symptoms in Critically Ill Patients," *Critical Care Medicine* 15, no. 1 (2011): R41, https://doi.org/10.1186/cc10003.

40. J. Zou, Q. Chen, J. Wang, M. Gu, X. Jiang, and M. Mao, "Effects of Virtual Reality for Psychological Health of ICU Patients: A Study Protocol for Systematic Review and Meta-Analysis," *BMJ Open* 13, no. 7 (2023): e073660, https://doi.org/10.1136/bmjopen-2023-073660.

41. A. M. Parker, L. Aldabain, N. Akhlaghi, et al., "Cognitive Stimulation in an Intensive Care Unit: A Qualitative Evaluation of Barriers to and Facilitators of Implementation," *Critical Care Nurse* 41, no. 2 (2021): 51–60, https://doi.org/10.4037/ccn2021583.

42. S. F. Herling, I. E. Greve, E. E. Vasilevskis, et al., "Interventions for Preventing Intensive Care Unit Delirium in Adults," *Cochrane Database of Systematic Reviews* 11 (2018): CD009783, https://doi.org/10.1002/14651858.CD009783.pub3.

43. P. P. Pandharipande, T. D. Girard, and E. W. Ely, "Long-Term Cognitive Impairment After Critical Illness," *New England Journal of Medicine* 370, no. 2 (2014): 185–186, https://doi.org/10.1056/NEJMra1207760.

44. C. K. Koh, "Patients' Anxiety in Intensive Care Units and Its Related Factors," *Journal of Korean Academy of Nursing* 37, no. 4 (2007): 586–593, https://doi.org/10.4040/jkan.2007.37.4.586.

Supporting Information

Additional supporting information can be found online in the Supporting Information section.