RESEARCH ARTICLE

Identifying cues of distorted memories in intensive care by focus group interview of nurses

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Abstract

Aim: To determine cues to identify intensive care unit patients with distorted memories and related practices.

Design: Qualitative descriptive study.

Methods: Twenty nurses were included in semi-structured focus groups. Qualitative content analysis was conducted.

Results: Cues and nursing practices related to distorted memories emerged under the following categories: "Get to know daily life before admission," "Facial expressions and behaviour are different from usual," "Pay close attention to the treatment outcome," "Notice it after the fact," "Sharing patients' intensive care unit experiences" and "Creates a new life." Nurses tried to detect distorted memories by observing the patients' facial expressions, medication effects and delirium presence during their normal lives and treatments, while trying to understand the patients' intensive care unit experiences and provide care that promotes autonomous living. This study emphasizes the importance of support for reconstructing ordinary life through communication and rehabilitation, in addition to support for medical care for distorted memories.

KEYWORDS
critical care, cues, focus groups, intensive care unit, memory, memory disorder, mental disorders

1 | INTRODUCTION

Intensive care always prioritizes patients' lives, saving many critically ill patients. While this allows for subsequent long-term survival, certain patients develop physical, mental and cognitive impairments after intensive care. The concept of post-intensive care syndrome (PICS) was proposed in 2010 (Needham et al., 2012). The long-term quality of life (QOL) of PICS patients is considered to be low;

intensive care is therefore focused on improvement of QOL in post-intensive care unit (ICU) patients as the next step after lifesaving.

Post-ICU patients experience mental disorders including anxiety (23%–48%), depression (8%–57%) and post-traumatic stress disorder (PTSD) (10%–50%), thereby reducing their QOL (Harvey & Davidson, 2016). They have distorted memories of their ICU stay, including memory loss or delusions, resulting in inconsistent memories. Several studies have reported an association between delirium

and delusional memory, anxiety and depression (Bashar et al., 2018; Denke et al., 2018; Svenningsen et al., 2014). Delirium distorts memory and reduces QOL after ICU discharge; these patients usually cannot organize their memories and cope with the experience of being affected by a serious illness. They need to overcome this in their daily lives, after discharge with support from their family, friends and medical staff (Fukuda et al., 2013). Patients who survive serious illnesses need PICS-related care from the time they enter the ICU in order to return to their own lifestyle both, physically and mentally.

2 | BACKGROUND

Distorted memories, induced by stay in the ICU, are associated with delirium, deep sedation, length of stay and illness severity (Ringdal et al., 2009; Samuelson et al., 2006). Inconsistent memories owing to missing factual and delusional memories and residual unpleasant emotions are associated with anxiety, depression and PTSD following ICU discharge (Wu et al., 2018). In particular, memories of pain- and delirium-related invasive treatment remain vivid for ICU patients (Granja et al., 2008). Since 1990, healthcare providers have adopted approaches to supplement memory and provide consistency for patients after ICU discharge, compatible with the needs of patients desiring to recall ICU memories; these include ICU diaries and post-ICU visits (Hale et al., 2010). These methods focus on memories from early stages in the ICU, aiming to improve the QOL of post-ICU patients (Engström et al., 2018; Glimelius Petersson et al., 2018).

Studies have evaluated approaches and effects of care for distorted memories in post-ICU patients (Burry et al., 2015; Giraud et al., 2016; Karnatovskaia et al., 2016). However, these approaches are symptomatic, and there are no standards to indicate when to care for patients at high risk of having distorted memories. The decision to initiate care, and its nature, depends on bedside nurse experience. Promptly identifying patients with distorted memories and providing a clear protocol on how to care for them will facilitate factual memory and its reconstruction in daily nursing care; it will also guide the approach of the medical team, thereby preventing and mitigating mental disorders after ICU discharge.

To improve physical functioning of patients after intensive care, early rehabilitation and nutritional management are important (Fuke et al., 2018; Moore et al., 2017). Improvement in activities of daily living (ADL) and physical functioning provides a sense of recovery, instills confidence and improves mental wellbeing. However, a study reported that post-ICU patients experienced feelings of "wanting to know what happened in the ICU, but not knowing what to do," "vague negative impressions lingering in the mind" and "feeling distressed by the mixture of reality and hallucination" (Fukuda et al., 2013). Care to supplement events and memories in the ICU through ICU diaries and ICU visits is becoming more widespread. However, some patients are embarrassed or afraid of knowing what happened in the ICU and seek help from medical staff.

This study explored how nurses detect and care for patients with distorted memories based on cues. In this study, distorted memory was defined as a condition in which patients express the occurrence of a strange or unconvincing event while in the ICU or cannot recall all or part of the events that occurred there. This includes cases where patient narratives are verifiably untrue, based on objective evidence from medical staff.

3 | METHODS

3.1 | Aim

The aim of this study was to explore cues from patients and practices of nurses, in identifying ICU patients with distorted memories.

3.2 | Design

This qualitative descriptive study aimed to gain a deeper understanding of nursing practices. The study was conducted according to the Consolidated Criteria for Reporting Qualitative Studies (COREQ: Tong et al., 2007). Data were obtained through focus group interviews with nurses as such interviews emphasize on interaction and shared dialogue and provide data based on different opinions, knowledge and values (Halkier, 2010; Krueger & Casey, 2014). These interviews elicit ideas, thoughts and perceptions of people with common experiences regarding a particular topic or issue concerning an area of interest. Our focus group interviews were semi-structured to increase data collection flexibility and generate rich stories (Creswell & Poth, 2017).

3.3 | Sample

Participants were recruited from three university hospitals in Japan and included ICU and general ward nurses with experience in caring for patients with distorted memories. Their wards were not limited; this provided broader experience in detecting distorted memories in ICU patients. However, nurses in pediatric ICUs were excluded as their specialization and care methods differed from those of the general ICU. For feasibility reasons, participants were mainly recruited from the authors' hospitals; they were assigned to focus groups at locations where participation was possible. Four groups of approximately five nurses each were created to explore the knowledge and care of patients with distorted memories, through effective group dynamics.

3.4 | Data collection

We conducted all focus group interviews in a meeting room at the researchers' hospitals between December 2019–July 2020; each

interview lasted approximately 60–90 min. All researchers had a master's degree in critical care nursing.

All interviews were semi-structured and conducted according to an interview guide. They began with participants providing their affiliations and professional backgrounds and describing encounters with patients with distorted memories. The researchers then presented five questions based on the interview guide (Table 1). To ensure consistency in data collection, the interview guide was adhered to while exploring the participants' stories; the focus group interviews were transcribed verbatim.

To understand participant backgrounds, data pertaining to sex, ward where they worked, years of clinical nursing experience and years of critical care experience were obtained.

3.5 | Analysis

The verbatim transcripts of the focus group interviews were analysed based on thematic content analysis (Sandelowski, 2000). The researchers summarized and coded the verbatim transcripts, taking care not to change the meaning of the content, and then compared them to the verbatim transcripts (Graneheim & Lundman, 2004). During the coding process, the sentences' meaning and importance were carefully considered based on the researchers' experience and expertize. The extracted codes were then abstracted to a higher logical level; at each abstraction stage, the text was labelled, sorted and classified. To improve inter-researcher confirmability, four researchers individually coded the content of focus group interviews, and two independently evaluated the coding process. For holistic analysis, the two evaluators then assessed the code findings and categories based on the data.

All researchers analysed the verbatim transcripts and codes, considering whether the meanings expressed in the data, codes and extracted categories were appropriate and whether the narratives symbolized were appropriate. All researchers had prior experience in facilitating focus group interviews and were familiar with the procedures and interview process. During and after each interview, the researcher deepened the narratives by rephrasing the narrative arguments into understandable language and checking the participants' meanings and interpretations on the spot.

To ensure reliability and validity, criteria related to credibility, transferability, dependability, confirmability and reflexibility were applied (Lincoln & Guba, 1985). Additionally, all the researchers read

TABLE 1 Interview topic guide

| 1. Cues to identify patients with distorted memories in the ICU |
| 2. Instances when you thought you had overlooked a case of distorted memories |
| 3. What the patient said or did that made you think that the patient had distorted memories |
| 4. What you closely observe to detect distorted memories at an early stage |
| 5. Nursing care you provide to patients with distorted memories |

and thoroughly discussed the verbatim transcripts to reach interpretation consensus and validate result interpretation. To ensure content transferability, a codebook was created to provide a verbatim description of the interviews and information on whether the revealed codes and categories fit the data. The researchers reevaluated the data throughout the analysis, examining the categories and codes and the related raw data.

3.6 | Ethics

This study was conducted with approval from the research ethics committee of our university and research field (#19029, 19R-278). Participants were informed orally and in writing about the study purpose, expected burden and protection of their personal information; they provided written consent for participation and interview recording. The study was conducted as per the principles of the Declaration of Helsinki.

4 | RESULTS

We recruited 21 nurses and divided them into four groups; one participant withdrew for personal reasons. Six participants were men, and 14 were women. The median clinical and critical care experience was 7 and 4 years, respectively (range, 2–23 and 1–16 years, respectively). Table 2 summarizes the characteristics of the participants and groups.

From the focus group discussions, we identified six categories that detailed the cues and nursing practices for ICU patients with distorted memories (Table 3): (a) get to know daily life before hospitalization, (b) facial expressions and behaviour are different from usual, (c) pay close attention to the outcome of the treatment, (d) notice it after the fact, (e) sharing patients' ICU experiences and (f) create a new life. The following is a verbatim description of the focus group interviews.

4.1 | Category 1: Get to know daily life before admission

This constitutes three subcategories: "Collect information on age, medical history and procedures performed," "Know the standard of living" and "Identify any differences in the patient's condition before and after admission"; these categories were extracted from "age, medical history and procedures performed" and indicated that nurses implemented patient care after gathering detailed information regarding the patient's current illness, medical history and lifestyle from direct conversations with the patient and the medical records. They also indicated that nurses were collecting information on the status of invasive treatment, comorbidities, compliance with treatment and standard of living as information that could lead to distorted memories.

TABLE 2 Characteristics of study participants and groups

Focus group	Participants and gender (F/M)	Critical care/clinical experiences	Current field of work	Position
A	1F	10/10	ICU/CCU	Staff nurse
	2F	5/8	ICU	Staff nurse
	3M	5/6	HCU	Staff nurse
	4F	6/6	–	Master's course student
B	1F	4/20	ICU	Head nurse
	2F	2/23	Cardiovascular ward	Deputy head nurse
	3F	0/16	Cardiovascular ward	Deputy head nurse
	4F	0/3	Cardiovascular ward	Staff nurse
	5F	0/4	Vascular surgery and otorhinolaryngology ward	Staff nurse
	6F	1/12	ICU	Staff nurse
C	1M	6/12	ICU	Staff nurse
	2M	2/2	ICU	Staff nurse
	3M	8/8	ICU	Staff nurse
	4F	2/2	ICU	Staff nurse
D	1F	7/7	Emergency ICU/HCU	Staff nurse
	2M	7/9	Emergency ward	Staff nurse
	3F	5/7	Emergency ward	Staff nurse
	4F	6/6	ICU	Staff nurse
	5F	6/6	HCU	Staff nurse
	6M	3/3	Emergency ward	Staff nurse

Abbreviation: CCU, critical care unit; F, female; HCU, high care unit; ICU, intensive care unit; M, male.

In the subcategory, "Collect information on age, medical history and procedures performed," information on the patient's age, medical history and actual medical procedures was used to understand the implemented invasive procedures and patient physical reserve capacity. A nurse of focus group A explained why comorbidities and distorted memories were considered to be related:

> There are a lot of people who have comorbidities that are not well controlled, and become very ill. I still think that such people are more likely to have distorted memories personality…

They emphasized that patients with poorly controlled comorbidities were more likely to have disease exacerbations, potentially affecting their memory during treatment. Nurses empirically emphasized the importance of "know the standard of living" and felt that patients with a low standard of living indicated the presence of distorted memories.

In the last subcategory, "Identify any differences in the patient's condition before and after admission," nurses could only recognize patient conditions before and after admission. Therefore, they inquired the visiting family and friends regarding patient conditions before admission, especially if the patient was in a state of low activity after admission. The nurses said, "When we wonder what kind of person the patient really is, the family's words become the standard," and they tried to compare the patient's daily life as seen by the family with that of the patient during hospitalization and apply it to their care.

4.2 | Category 2: Facial expressions and behaviour are different from usual

This is based on the narrative that nurses believe that changes in patient comprehension and mental states, such as delirium, are closely related to distorted memories. The nurses found distorted memories as an indicator for predicting changes in mental state and cognition from patient facial expressions and gestures; for instance, they detected cases of possible distorted memories from changes in eye expressions. They recognized that the results of delirium screening tools, such as the Confusion Assessment Method for ICU (CAM-ICU) and the Intensive Care Delirium Screening Checklist (ICDSC), do not necessarily predict distorted memories. This category includes "Getting fidgety," "The story makes sense, yet the eyes are glare," "Monitor cord tied" and "Sleepless nights and an indistinct sense of time."

The nurses' mentioned the patients' facial expressions, behaviours and sensations. In the "Getting fidgety" subcategory, it was reported that the first step in caring for distorted memories is to detect a patient who is somewhat restless. In the "The story makes sense, yet the eyes are glare" subcategory, it was reported that if

TABLE 3 Categories and subcategories of focus group interviews

Subcategories	Categories
Collect information on age, medical history and procedures performed Know the standard of living Identify any differences in the patient's condition before and after admission	Get to know daily life before admission
Getting fidgety The story makes sense, yet the eyes appear glazed Monitor cord tied Sleepless nights and an indistinct sense of time	Facial expressions and behaviour are different from usual
Prolonged effects of sedatives Frequent delirium screening Invasive treatment and use of opioids Fluctuating sedation depth	Pay close attention to the outcome of the treatment
Negative delirium screening Uneventful course of treatment Normal conversation and facial expressions and stable consciousness level	Notice it after the fact
Believe and accept the patient's words Support the piecing together of memories Share the patient's goals regarding treatment	Sharing patients' ICU experiences
Arrange a recuperation environment Face to face interactions Feelings of being alive	Create a new life

Abbreviation: ICU, intensive care unit.

patients' eyes are glaring, patient memories may be distorted even if the content of the conversation is consistent; the nurses predicted that the patient could have been consciously hallucinating.

The subcategory "Monitor cord tied" was a symptom preceding hyperactive delirium and was introduced as an example of the connection between delirium and memory distortion. Touching familiar objects is a sign of restless emotions, which is related to changes in consciousness level. The nurses emphasized the importance of helping patients recognize their situation, and increasing their daily activities to prevent such symptoms.

In the fourth subcategory, "Sleepless nights and an indistinct sense of time," the nurses noted that sleep state and dream content could affect the persistence of negative memories in patients. They were concerned that complaints of insomnia and nightmares could trigger distorted memories. Patients sometimes said they were "not sleeping at all" when they were sleeping, wondering if their time was unconsciously shifting from reality. This showed a difference between objective and patient perceptions of sleep status, suggesting that sedation in the ICU and interventions and touch performed throughout the day and night interfere with the natural sleep cycle and subjective sleep. It also highlights the importance of the patient feeling that they are getting a good night's sleep, and that nurses are taking care to regulate the patient's circadian rhythm.

4.3 | Category 3: Pay close attention to the outcome of the treatment

In the ICU, patients may feel long "uncomfortable" sensations, such as pain from the disease itself and invasive treatments, and discomfort

from physical restraints. This category is based on the nurses' perspective that it is necessary to eliminate pain and discomfort during treatment. This category includes four subcategories: "Prolonged effects of sedatives," "Frequent delirium screening," "Invasive treatment and use of opioids" and "Fluctuating sedation depth."

The nurses prioritized pain and discomfort relief as much as possible while tracking the course of treatment and varied their nursing care according to drug use in particular. Regarding critically ill patients using midazolam, they were aware of the "prolonged effects of sedatives," and because of the prolonged loss of consciousness and memory lapses tendencies, they tried to support patients by gradually telling them about the events during treatment after they awakened; the patient's memory was supported to maintain consistency. They also conducted "frequent delirium screening" to try to understand the pattern of changes in level of consciousness; this would make it easier to decide when to visit the patient.

In the subcategory, "Invasive treatment and use of opioids," the researchers found that sedatives and opioids, administered during repeated procedures in burn patients, can lead to "memory loss and traumatic memories." In the subcategory of "traumatic memories," the possibility of "memory loss and traumatic memories" in burn patients was illustrated. Pain can also induce delirium; pain assessment was therefore one of the most important roles for nurses. The nurses thought that maintaining a constant depth of sedation during treatment could alleviate distorted memories. "In a state of fluctuating sedation depth," they said, "the patient wakes up, confused, tries to move, the alarm goes off... and when he wakes up, he hears it. I heard that it was very painful, difficult and scary." This narrative was deeply agreed upon by the other group members.

4.4 | Category 4: Notice it after the facts

This is based on the narrative that it is difficult to identify signs of memory distortion in young patients, those with a clear level of consciousness and those who are not delirious. This category included three subcategories: "Negative delirium screening," "Uneventful course of treatment" and "Normal conversation, facial expressions and stable consciousness level." The results showed that nurses were more likely to overlook the presence of distorted memories in patients with a successful course of treatment and hospitalization. Alternatively, it was reported that patients sometimes tell them that their memory is abnormal, and communication with them can trigger initiation of care for distorted memories.

Patients after scheduled surgeries often have "negative delirium screening," because they know what the ICU looks like. It was mentioned that there are patients who can provide the correct date, time and location, but may have a condition such as hypoactive delirium. Such patients tend to be discharged from the ICU early due to the "uneventful course of treatment" and cannot be cared for. Moreover, patients with "normal conversation, facial expressions and stable consciousness level" were more likely to have "distorted memories and hallucinations when they entered the ICU." Moreover, patients with "normal conversation, facial expressions and stable consciousness level" were less likely to tell the nurses that they were experiencing distorted memories or hallucinations when they entered the ICU.

However, in many cases experienced by nurses, the patients said: "I want you to apologize to the ICU nurses on my behalf because I used to say and do inappropriate things in the ICU" after transfer to the general ward; they also roughly shook the nurses' hands. Thus, despite limitations in detecting distorted memories, the nurses were aware that the presence of delirium was not related to distorted memories and took the utmost care.

4.5 | Category 5: Sharing patients' ICU experiences

For patients who were identified as being at high risk for distorted memories, the nurses mentioned the importance of communication to help the patient understand the current situation. Nurses believed that patients were experiencing distorted memories if they were unable to carry on or understand the conversation. This category included three subcategories as follows: "Believe and accept the patient's words," "Supporting the piecing together of memories" and "Share the goals in the treatment life." These subcategories indicated that the nurses were trying to provide direction for the next step by sharing the recovery process for the patients.

In the subcategory, "Believe and accept the patient's words," there were nurses who believed and accepted the patient's words, regardless of whether their memories were distorted. The nurses tried to enter into the patient's experience by accepting the patient's words, which sometimes included complaints about the medical staff. It was also mentioned that by not denying the patient's words,

the nurses were trying not to lower the patient's motivation for treatment. Moreover, the nurses were helping the patients to access their memories and supplement them, aiming at "supporting the piecing of memories." The nurses noticed that different patients had different ways of exploring reality.

> Younger patients tended to disclose their distorted memories to others or ask for help in organizing their memories. Older patients, on the other hand, were less likely to share their experiences with others and tried to analyze what had happened to them by connecting their contradictory memories with the surrounding circumstances.
>
> (Focus group D).

The nurses made detailed observations regarding patients' ages and characteristics and helped them to figure out how to connect memories in a way that was appropriate for each patient. In the third category, "Share the goals in the treatment life," the nurse's action was to align the pieces of the patient's memory and to assist the patient with the next step. The nurse's strategy was to anticipate the patient's future road to recovery and to increase the chances of success by accumulating short-term goals, thereby helping the patient to actively move towards the goal of hospitalization, which tends to be passive.

4.6 | Category 6: Create a new life

Severely ill patients are not only treated invasively, but also rehabilitated both physically and mentally; in some cases, they are prepared for reintegration into society after discharge from hospital while continuing treatment, to create a new life. This category mainly consists of narratives regarding patient care, including the three subcategories: "Arrange recuperation environment," "Face to face interactions" and "Feelings of being alive."

In the subcategory of "Arrange recuperation environment," it was reported that critically ill patients are often immobile due to symptoms of the disease and invasive treatment, and that their senses are acutely sensitive. Efforts were made to create an environment that would prevent false memories from occurring. Particularly in the ICU, where the environment is often cut off from the surroundings, nurses were careful about monitors and daily sounds, especially at night, to ensure that patients could sleep and maintain their circadian rhythm. Furthermore, some nurses mentioned not only sounds but also smells, taking into consideration the influence of the sense of smell on memory.

> We also take care of our own smells: strong smelling hand creams, perfumes, and so on. There are people who might feel uncomfortable with We also take care of our own smells: strong smelling hand creams, perfumes, and so on. There are people who might feel

uncomfortable with such things, and it might trigger something in them. That's what we want to take into consideration. I've heard that smell is directly connected to memory!

(Focus group A).

Further, critically ill patients are likely to feel lonely, because they have few opportunities to interact with others except during treatment and rehabilitation. The nurse thought that "face-to-face interactions" would be effective in helping patients regain their daily lives. The nurses took into account the frequency of visits to stimulate the patients physically and mentally and created opportunities for conversations with patients in wheelchairs whose ADLs had improved. Moreover, for patients who were not energetic or who could not follow conversations, the nurses asked them what they were thinking and how they viewed reality to try to reconcile their memories. Especially in situations where family visits were not possible due to the effects of coronavirus disease, the nurses actively provided opportunities for patients to talk to each other, trying to meet their needs for someone to talk to.

In the last subcategory of "Feelings of being alive," nurses tried to create a new life for patients by allowing autonomous living during their hospital stay. Nurses "assessed the patient's physical condition, expanded ADLs and prepared the environment so that the patient could do as many things as possible on his or her own." However, "while in the ICU, the patient may become passive and not start thinking. They do not think much, so they may not remember things; it is also not good for patients to feel forced to do things." They also indicated that active encouragement from nurses and medical personnel could be negative. From this point, it can be understood that the nurses promoted recovery of daily life by supporting patient autonomy to build a new life "by themselves."

5 | DISCUSSION

This study used focus group interviews to identify and categorize perceived cues and nursing practices for detecting distorted memories in ICU patients. The nurses perceived the state of hallucinations and delusional behaviour as clear signs of distorted memories and initiated support to promote patient awareness of the current situation. Delirium is a well-established risk factor for long-term cognitive dysfunction, and using delirium-prevention strategies may be important for cognitive protection (Rengel et al., 2019). Although the CAM-ICU and ICDSC scales detect delirium, the nurses experienced that even patients with a clear level of consciousness, who were negative for delirium according to these scales, exhibited distorted memories. Therefore, these scales were not always useful in detecting distorted memories. Nurses could detect the onset of delirium and distorted memories by carefully observing facial expressions and eye movements of patients, including those who appeared to have no psychiatric symptoms and a clear level of consciousness. As impaired attention and cognitive functions during ICU stay cause

distorted memories (Aitken et al., 2016), it may be reasonable to consider these changes as precursory symptoms of delirium and distorted memories. Even if the ICDSC and CAM-ICU assessments are negative, the "inattention" and "Acute Change or Fluctuating Course of Mental Status" items of these scales may be useful for detecting memory distortions.

Underlying illness, mechanical ventilation, delirium, restraint and sedative use can interfere with the formation of coherent memories, leading to mental impairment after ICU stay (Bienvenu et al., 2017; Jones et al., 2010). Nurses in this study recognized that sedation and variations in its depth can affect distorted memories; they attempted to maintain constant depth of sedation to prevent or alleviate distorted memories. Fluctuations in sedation depth are reported to influence the occurrence of delirium in ICU patients (Svenningsen, 2013). In addition, adequate analgesia and shallow sedation in critically ill patients is associated with a lower incidence of delirium and PTSD after ICU discharge, and the use of sedation protocols, including those led by nurses, has been shown to be effective (Pearson & Patel, 2020). Adequate maintenance of the level of consciousness prevents delirium and reduces the frequency of physical restraint. Maintaining light depth of sedation may be effective in both, preventing delirium and caring for distorted memories.

Additionally, when midazolam is used, patients are prone to deep sedation and delusional memories (Samuelson et al., 2006). Appropriate opioid use may prevent cognitive decline after ICU discharge and can improve comfort and emotional stability in critically ill patients (Fernández-Gonzalo et al., 2020; Fukuda et al., 2020). Thus, pain assessment and maintenance of light sedation with appropriate analgesics can also be useful in relieving patients from long-term pain and discomfort, preventing distorted memories and forming consistent memories.

In our focus group interviews, the nurses stated that even patients recovering well from critical illness or surgery may have distorted memories. In such patients, it is extremely difficult to determine the occurrence of distorted memories in the ICU; the therapeutic environment of the ICU is highly restrictive with blocked views, monitored sounds and physical restraints, which tend to sharpen the patients' senses. Good sleep is paramount for retention of true memory; however, ICU patients do not sleep well (Pisani & D'Ambrosio, 2020). Therefore, various factors such as sounds and smells that occur in the ICU may be associated with poor sleep quality, affecting patient memories. Considerations to ensure good sleep (Patel et al., 2014) may be effective in terms of promoting awareness of the current situation and protecting true memory.

One interesting aspect of this study is that the nurses checked not only comorbidities, but also the standard of living when collecting patient information. PICS-related symptoms and long-term cognitive impairment after ICU are also linked to socioeconomic factors such as patient race and education (Haddad et al., 2020); the nurses suspected that the distortions in memory were also related to patient personality and daily life. The nurses also said that patients differed in the way they compensated for their memories depending on their age. Older patients are more prone to delirium

and long-term cognitive decline due to invasive treatments such as surgery (Mahanna-Gabrielli et al., 2020; Schulte et al., 2019). The differences in coping with memory between younger and older patients observed in this study can be considered as early detection of distorted memories and cognitive dysfunction in older patients, suggesting that they are autonomous in maintaining memory consistency.

Support to diminish distorted memories includes creating situations that facilitate memorization, and eliciting the patient's coping skills (Sakaki et al., 2019). In the ICU, recovery is the priority, and patients tend to be one-sided recipients of treatment and care. To recover both physically and mentally, critically ill patients must recognize the events that happened to them chronologically and regain their autonomy (Corner et al., 2019). In addition to explanations from nurses and acceptance of the patient's statements to promote recognition of the current situation, support for their active recuperation via direct conversations with other patients and nurses and rehabilitation may prevent distortion of memories and maintain their consistency. As early support for distorted memories, it is necessary to ease the strain of the ICU environment on patients and to restore their ordinariness.

5.1 | Limitations

This study explored nurses' perspectives on the cues that lead to the detection of distorted memories in patients. Future research is needed to examine and validate the objective causes of distorted memories in ICU patients, such as the drugs administered, the ICU environment and the care provided to the patients. The focus group interviews in this study were conducted at several facilities, and the results may reflect the treatment and nursing characteristics of each facility. Additional data are required to reach theoretical saturation.

6 | CONCLUSION

The ICU nurses in this study viewed their patients holistically, and integrated information obtained from the patients and families, responses to treatment and care, and patients' facial expressions and behaviours to try to detect distorted memories.

To provide patients with true and consistent memories, the nurses considered it important to help patients regain their ordinariness. The care was constructed such that patients could think coherently and lead an active ICU life; this included maintaining circadian rhythms, talking about their medical care over time and voluntarily performing rehabilitation.

This study identified and organized the signs and practices by which nurses perceive patients' distorted memories. The results of this study are useful for the management and prevention of distorted memories, and for avoiding mental disorders after discharge

from the ICU. The effects of care for distorted memories and its contributions to the improvement of patients' QOL need to be verified in future studies.

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