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Review Article

Patients' reports on their delusional memories from the intensive care unit: A systematic review of qualitative studies

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ABSTRACT

Objective: To critically summarise the qualitative literature to understand patients' experiences of delusional memories during their Intensive Care Unit stay.
Research methodology: A systematic review of qualitative studies with *meta*-synthesis and *meta*-summary. We searched MEDLINE (via PubMed), Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, and Web of Science to July 2022. All studies that provided qualitative insights into the subjective experience of adult patients with delusional memories in the Intensive Care Unit were selected. The Critical Assessment Skills Programme checklist was used for the quality assessment.
Results: Fourteen studies were included. The 33 codes that emerged from the inductive thematic analysis were grouped into three themes: 'The sense of danger and the terrifying aspect of death' (feeling in danger, surrounded by death, persecuted by people around, and feeling unsafe), 'The presence of someone or something nearby' (perceiving the loved ones, feeling overwhelmed by scary creatures, and being neglected by those around me), and 'The reality behind the world perceived by the senses' (travelling the world, stimulating the senses, feeling peaceful, and living in a fantasy world). The most frequent code in the studies was 'Be with a family member', with an intensity of 35.7%.
Conclusion: The patient's experience described as delusional is considered a real event by the person experiencing it. Further research is needed to investigate the extent to which these experiences lead to poorer early and late outcomes for patients, and to test strategies to prevent this.
Implications for clinical practice: A deeper understanding of the phenomenon may help healthcare professionals to recognise precursors, symptoms and consequences of delusional memories and intervene with appropriate help. One strategy would be to further humanise care and focus on family involvement and communication with patients to overcome the factual events that can potentially alter patients' quality of life.

Introduction

The terms 'delusional memories' and 'memories of delusion-like experiences' have been used in critical care research to refer to memories of critically ill patients who survived the Intensive Care Unit (ICU) and who later recalled having terrifying and stressful experiences while there, including delusions, hallucinations, bizarre and vivid dreams, as well as nightmares (Jones et al., 2001). Therefore, by definition, delusional memories are delusional insights that occur in the form of memory and refer to experiences of past events that did not happen but which the subject equally clearly remembers (Buchanan, 1991; Howard & Burns, 1992).

Patients' stay in an ICU, which is associated with a number of stressors, such as pain, delirium, and an inability to speak, may leave them with a variety of distressing memories and post-traumatic symptoms (Barreto et al., 2021; Davydow et al., 2008). A patient's critical illness and intensive care can alter their ability to understand and perceive their surroundings. Memories of dreams and delusions, as well as of care, varying from refuge to alienation, of vulnerability and closeness to death, have been typically reported by patients after an ICU stay (Maartmann-Moe et al., 2021).

The prevalence of unreal experiences after admission to the ICU

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ranges from 34 % (Orwelius et al., 2016) to 68 % (Yoshino et al., 2021). The report of delusional memories depends on conditions (e.g., periods of hallucinations and delirium in the ICU) and other factors related to the healthcare setting and organisational characteristics (e.g., sedation, analgesia, and management [Aitken et al., 2016]). It is suspected that benzodiazepines and opioids, which are frequently used as sedatives and analgesics in ICUs, may have an influence on the ability to remember. In addition, up to 80 % of critically ill patients experience ICU-acquired delirium (Goldberg et al., 2020), which is considered the main risk factor for the development of delusional memories after critical illnesses (Doig & Solverson, 2020). It has been found that patients who experience delirium recall more intrusive delusional memories and fewer true memories (Svenningsen et al., 2016). Delusions belong to the group of symptoms characterizing delirium, defined by the DSM-5 criteria as '*an impairment in attention and awareness…that is associated with additional cognitive deficits*'. Yoshino and colleagues have suggested that the delirium experienced during an ICU stay may affect the way patients acquire delusional memories after leaving the ICU (Yoshino et al., 2021). They reported that delirious patients experienced a greater number of hallucinations compared to non-delirious patients ($p = 0.01$); and delirium during ICU stay was associated with delusional memories after discharge from the ICU (odds ratio 3.71; $p = 0.04$). Furthermore, invasive hallucinations and delusions are reported to continue for a long time, even persisting for months after the acute event. In fact, patients affected by delusional memories were reported to experience more post-traumatic symptoms, anxiety, and sadness for two months after their ICU stay (Samuelson et al., 2007). Neuropsychological sequelae are determined not only by the severity of a critical illness but also by the ability to deal with the memories patients' retain from that period (Granja et al., 2005). Cognitive functions should be investigated by healthcare professionals (HCPs) because they may reflect a previous delirious state (Nouwen et al., 2012).

The systematic search for qualitative studies by Maartmann-Moe et al. in 2021 is the most recent attempt to summarise evidence regarding adult patients' memories from their stay in the ICU (Maartmann-Moe et al., 2021). By including 15 studies published between 2000 and 2019, the authors presented three main themes: (a) memories of surreal dreams and delusions, (b) care memories from sanctuary to alienation, and (c) memories of being vulnerable and close to death. Although various qualitative studies were conducted on this topic, no published or ongoing qualitative *meta*-synthesis of the literature has emerged (a preliminary search was conducted examining the MEDLINE database and PROSPERO in February 2022). As there are no sets of labs, imaging, or laboratory tests required for a delusional experience, patients can provide further details about the delusions and, more importantly, an explanation of the symptoms, which emphasises the need to explore the current qualitative evidence to further understand the phenomenon. Ideally, psychopathological topics are studied by interdisciplinary research teams that are engaged in dealing with the issue of human complexity by exploring it directly and also through the careful collection and analysis of qualitative materials that are narrative and subjective (Scandinavica et al., 2008). Moreover, the process of *meta*-synthesis moves beyond summaries and offers novel interpretations of findings from primary studies (Mohammed et al., 2016).

The main intent of the current study is to perform a systematic review of qualitative studies followed by a meta–synthesis to report on adult patients' delusional memories during their stay in the ICU.

Methods

Study aims

The purpose of this study was to critically summarise the qualitative literature to understand patients' experiences of delusional memories during their ICU stay.

Study design

Drawing from Sandelowski and Barroso (Sandelowski & Barroso, 2007), a systematic review of qualitative studies is followed by a *meta*-synthesis and a *meta*-summary. In conducting the study, three steps were followed: a) a complete literature search; b) an evaluation and classification of the selected studies; c) a *meta*-synthesis and a *meta*-summary of the results (Sandelowski & Barroso, 2007). The recommended format of the Enhancing Transparency in Reporting the Synthesis of Qualitative Research (ENTREQ) statement was implemented in the preparation of the review (Tong et al., 2012). This review has been registered (PROSPERO Registration Number: CRD42022334999) on June 04, 2022.

Review question

Based on the Population, Exposure, and Outcome (PEO) model (Bettany-Saltikov, 2012), the research question was: 'What are the experiences of adult critically ill patients (P) who were cared for in an ICU (E) and reported delusional memories (O)?'

Search strategy

MEDLINE (via PubMed), the Cumulative Index to Nursing and Allied Health Literature (CINAHL), Scopus, and Web of Science were searched by two authors in July 2022 (last search on July 31, 2022). In order to obtain a comprehensive overview of the evidence, no time limit was set for the publication period. The following Medical Subject Headings (MeSH) were considered: '*Critical Illness*', '*Delusions*', '*Hallucinations*', '*Intensive Care Unit*' and '*Qualitative Research*'. All MeSH terms and free text words (e.g., '*unreal experience*', '*delusional memories*') were combined into search strings using the Boolean operator "AND". The extracted records were entered into the reference organisation software (EndNote X6, Thomson Reuters Inc.). Duplicate documents were deleted by the same software.

Study selection

The articles were included in the study according to the following criteria: a) they were written in English; b) they contained information on qualitative data; c) they investigated adult patients' subjective experience of delusional memories in the ICU. Therefore, studies that did not report on patients' experiences were excluded, as were those that included the paediatric population (over 18 years of age) or clinical settings other than the ICU (e.g., operating rooms). The inclusion criteria were first applied independently by two researchers and then agreed upon with a third researcher. The same two researchers independently reviewed and assessed the titles and abstracts of the articles for eligibility. Discrepancies were resolved through discussion with the other researcher. The complete review process was carried out in accordance with the Preferred Reporting Items for Systematic reviews and Meta-Analyses (PRISMA) statements (Page et al., 2021).

Quality assessment

The Critical Assessment Skills Program (CASP) checklist was used (Buccheri & Sharifi, 2017). Two researchers independently evaluated the quality of the selected studies; if disagreement was detected, articles were discussed and sent to the third author. With the implementation of the CASP tool, the higher the score, the better the quality of the study. According to previous research (Mattiussi et al., 2019; Rossettini et al., 2018), the authors considered the quality levels to be low (0–5), medium (6–8) and high (9–10).

Data extraction

Two researchers used a standardised Microsoft Excel® spreadsheet

to extract the following data from the selected studies: a) general information about the study, such as authors, publication years, countries, and titles; b) the main methodological characteristics of the study, such as objectives, designs, data collection years and methods, setting characteristics, and participants; c) the studies' main conclusions.

Data abstraction and synthesis

All researchers analysed the results of each study. The qualitative synthesis consisted of three stages: 1) coding text; 2) developing descriptive themes; 3) generating analytical themes. Inductive thematic analyses (Sandelowski & Barroso, 2007; Thomas & Harden, 2008) were carried out by grouping the results according to their similarities, labelling the data as codes and categories, and developing the themes. *Inductive* analysis refers to the process of comparing specific observations (i.e., experiences) with more general concepts, while *thematic* analysis refers to a method of identifying, examining, and reporting on data (i.e., themes). The final step of generating main themes was based on a vivid discussion between all authors.

According to the new findings of the *meta*-synthesis process, a conceptual diagram depicting the delusional memory of critically ill patients in the ICU was developed. Afterwards, two authors calculated the frequency of each code (frequency effect size), by using the following formula: [number of code in the study]: [number of total codes] (Onwuegbuzie, 2003). Then, the total number of codes in each study (intensity effect size) (Onwuegbuzie, 2003) was determined by the formula: [number of studies containing the code]: [total number of studies included]. By calculating the effect size, it was possible to avoid overweighting or underweighting results (Sandelowski & Barroso, 2007).

Results

Fourteen studies that satisfied all inclusion criteria were identified. In the flow diagram (Fig. 1), the inclusion process is reported, along with the reasons for exclusion. The characteristics of the selected studies are presented in Table S1. The combined total of participants in the 14 studies included in this *meta*-synthesis was 798. The average age was about 60 years, and nearly 61 % were men. In terms of methodology, Sheen & Oates (2005) carried out a phenomenological study in accordance with Husserlian's theory (Sheen & Oates, 2005), whereas Svenningsen et al. (2016) and Ringdal et al. (2008) performed hermeneutic phenomenological investigations in accordance with Ricoeur's theory (Ringdal et al., 2008; Svenningsen et al., 2016). While Cleasson et al. (2005) and Herbst & Drenth (2012) conducted a qualitative research (Claesson et al., 2005; Herbst & Drenth, 2012), Roberts et al. (2006) led a qualitative prospective cohort study (Roberts et al., 2006). Wade et al. (2015) presented an interview-based approach (Wade et al., 2015) in contrast to the other selected studies, which used a descriptive methodology by including both qualitative and quantitative data

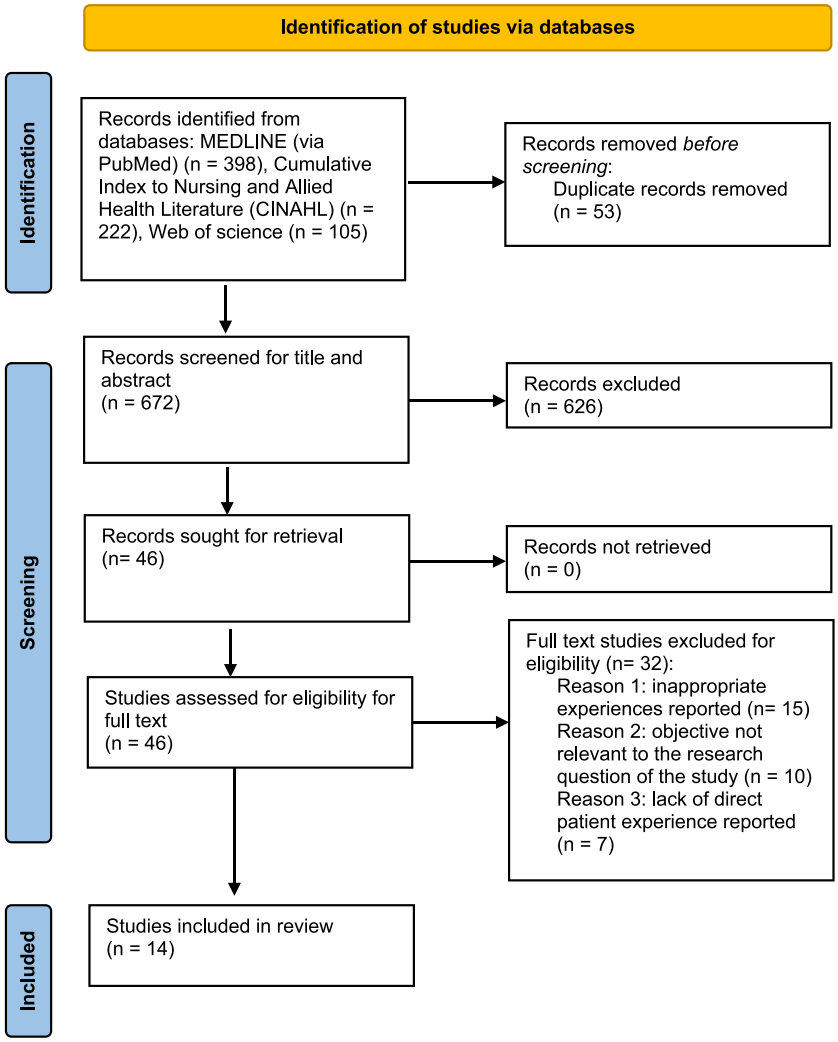

Fig. 1. Flowchart of the study (Page et al., 2021).

(Guttormson, 2014; Löf et al., 2006; Magarey & McCutcheon, 2005; Minton & Carryer, 2005; Noguchi et al., 2020; Roberts & Chaboyer, 2004; Sanson et al., 2021). All studies were rated as high quality, with the exception of one study of medium quality (see Table S2).

Qualitative synthesis

The inductive thematic analysis can be found in Table 1 and Table S3. The 33 codes that emerged from the abstraction process were grouped into 11 categories and three themes: 1) "The sense of danger and the terrifying aspect of death"; 2) "The presence of someone or something nearby"; 3) "The reality behind the world perceived by the senses". Fig. 2 summarises the themes and categories that emerged as affecting patients' reports of their delusional memories while in the ICU.

The sense of danger and the terrifying aspect of death

This theme was sorted into four categories: 'feeling in danger', 'surrounded by death', 'persecuted by people around', and 'feeling unsafe'. A general sense of uncertainty and precariousness pervading the ICU environment was highlighted in the patients' delusional memories.

These events caused patients to lose control and claim that they felt like they were going mad. Many times, the perpetrators of potential threats were the HCPs. Other times, patients were involved in quarrels, or they were abused and strived to survive.

"*I thought that they were going to kill me*" (Magarey & McCutcheon, 2005).

"*Two countries were fighting, and I set up a strategy for one of them; that was painful and exhausting*" (Noguchi et al., 2020).

Even the surroundings in hallucinations can be oppressive and suffocating for the patients, to the point where, in certain memories, there is a sense of disorientation and loss of awareness.

"*I even saw the figures when I closed my eyes… I had no sense of day and night*" (Roberts & Chaboyer, 2004).

Finally, even animals turn into threatening beings that tried to hurt and/or kill individuals who were admitted to intensive care.

"*whites bats attacked me*" (Löf et al., 2006).

The presence of someone or something nearby

The relationship with people is a feature that appears in all the delusional memories. 'Perceiving the loved ones', 'feeling overwhelmed by scary creatures', and 'being neglected by those around me' were the three categories of this second theme. Patients in intensive care engaged with a variety of people, including family members, HCPs, fantastical creatures, fictitious characters, and animals.

Table 1
Example of data synthesis process by extracting and abstracting findings in common categories and themes.

Studies	Quotes extracted from study	Codes as defined by researchers	Abstraction: categories	Abstraction: themes
Claesson et al. (2005)	I was being **chased or confined**, and I was unbelievably **cold**. I know that I was sitting on a mountain ledge completely naked and they came and got me with a submarine. I was being **hunted** down and locked up in different places	Being chased Being hunted	Feeling in danger	The sense of danger and the terrifying aspect of death

Family members that patients interacted with while in the hospital were frequently deceased relatives. While some patients were elated by the encounter, others were terrified.

"*I dreamt that I was driving down a tunnel, a door opened on my left and standing there was my brother. I was happy to see my brother and how he looked just the same as he did in the old days*" (Löf et al., 2006).

"*I went fishing with my dad, and that one did frighten me because my dad has been dead for ten years*" (Magarey & McCutcheon, 2005).

In some instances, having family nearby provided patients with the courage and inspiration to keep fighting for their lives.

"*My worst nightmare was the light at the end of the tunnel: stop breathing and you will get there. In the other direction was my pregnant daughter asking me to live. She was pregnant and I had to survive to see my grandchild*" (Svenningsen et al., 2016).

Instead, for other patients, images of animals and some imaginary characters brought them comfort, security, and tranquillity.

"*I was walking in the clouds with a dog and a rabbit, no noise just tranquillity. They were friendly and were just peacefully walking with them*" (Roberts et al., 2006).

The reality behind the world perceived by the senses

A patient's perception of their surroundings when sedated and mechanically ventilated is unclear. Four categories depicted this theme: 'travelling the world', 'stimulating the senses', 'feeling peaceful' and 'living in a fantasy world'. The stories of disappointing memories revealed a world that veers between reality and fantasy. In fact, some memories combined imagined events with real-world sounds, scents, and materials. Patients' accounts frequently involved the stimulation of the senses. Some patients claimed to have heard voices and sounds from both family members and other unknown people.

"*I heard the melody of a piano and the sound of a bell all night long*" (Noguchi et al., 2020).

"*I smelled a bad smell from the bed next to me*" (Noguchi et al., 2020).

The idea of a perpetual movement of both patients and their surroundings appeared into shapes in the delusional memories. Patients occasionally had a purpose for their travels, while other times they appeared to be doing extensive journeys without a specific goal.

"*I went to South America and I got some kind of jungle fever*" (Guttormson, 2014).

"*I was floating through the air surrounded by beautifully bright coloured foam blocks, it was so peaceful and pretty*" (Roberts & Chaboyer, 2004).

Some patients described the delusional memories of their surroundings as being a mutant world, where the hospital rooms took on different shapes and the walls and furnishing were alive. As a result, the patient's immediate environment ceases to serve its intended purpose and transforms into a setting for occurrences that cause disorientation.

"*I saw horizontal people and thought "It can't be: they walk under my feet*"" (Sanson et al., 2021).

"*The room was unstable and doors and windows kept moving*" (Svenningsen et al., 2016).

Patients sensed the modification of the environment from a sensory perspective, so it was not just the physical aspects of the surroundings that changed. Memory stories frequently featured colours.

"*Like I was just looking up at this white space but then it became colourful – peaceful and colourful all the time… and sort of like rainbow colours*" (Magarey & McCutcheon, 2005).

The meta-summary processes

Tables 2 and 3 display the *meta*-summary process. The studies by Noguchi et al. (2020) (Noguchi et al., 2020) and Svenningsen et al. (2016) (Svenningsen et al., 2016) presented the highest code intensity (21.2 %), while Minton & Carryer's (2005) (Minton & Carryer, 2005) reported the lowest (3.0 %) code intensity, as shown in Table 2. Furthermore, the most frequent code across studies were 'Be with a

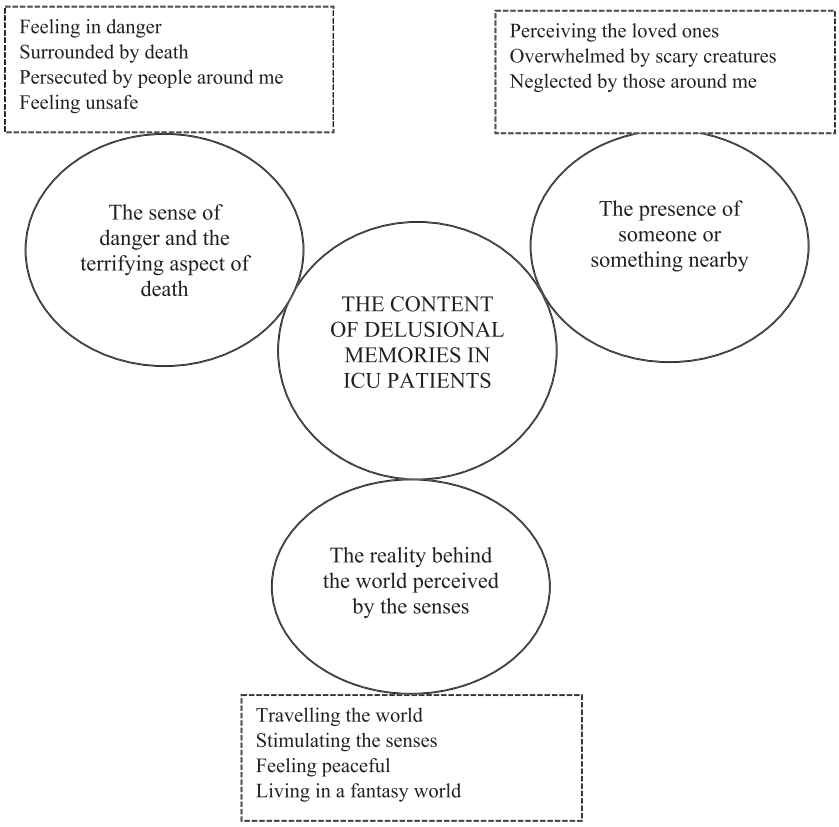

Fig. 2. Patients' reports about delusional memories in Intensive Care Unit. ICU, Intensive Care Unit.

family member' with an intensity of 35.7 %, followed by 'Being threatened' (28.6 %) (Table 3). Conversely, several codes were reported less frequently, including for example 'Be concerned of dying', 'Being part of a tribe', 'Fantastic places', and 'Thinking of Jesus', which were all reported with the same frequency of 7.1 %.

Discussion

This systematic review offers a novel interpretation of the findings on the delusional memories that patients shared during their stays in the ICU. The depth of a patient's experience described as delusional shows the significance of a delusion that the person experiencing it believes to be a real event (Cutting & Musalek, 2015; Kiran & Chaudhury, 2009).

In contrast to the recent review by Maartmann-Moe et al. (2021), which aimed at identifying patients' memories, recollections, or similar concepts of their ICU stay, our study focuses specifically on delusion-like memories (e.g., hallucinations and unreal experiences). As the research strategies were different, only three studies are considered by both (Löf et al., 2006; Minton & Carryer, 2005; Roberts & Chaboyer, 2004).

Even if some delusions were described as fantastic or peaceful, this study identifies a prevalence of negative feelings perceived as delusional memories. A sense of danger, persecution, uncertainty, loneliness, and recurring bad memories are perceived as existing realities, thus altering the real perception of the stay in the ICU. In a modern ICU, patients are frequently kept awake to participate in the care received and to reduce negative outcomes, such as long intubation time and long recovery (Devlin et al., 2018): Altering the understanding of the surroundings can reduce patients' participation in the care. Factual memories, defined as vivid recollections of real events (such as endotracheal tube aspirations), are considered to reduce the impact of delusional memories because they recall real life and allow patients perceive the difference between reality and unreality (Jones et al., 2001). As delusions are listed among the symptoms that characterise delirium, nurses and doctors must prevent delirium, recognise it, and support all multidisciplinary measures recommended to decrease its occurrence (e.g., light cycles, presence of family members). Therefore, when attending to the patients' needs, it is imperative for the HCPs to understand if they are experiencing delusional memories and to draw their attention to reality by explaining what is happening and the characteristics of the surroundings that could be neglected in the patients' view.

Ringdal et al. (2010) found an association between delusional memories and a lower Health Related Quality of Life (HRQoL) in trauma patients discharged from the ICU during the extended recovery: The more intrusive the memory, the lower the HRQoL score (Ringdal et al., 2010). Memories can return during the recovery period after a stay in the ICU, which brings patients back to their experiences in the ICU; even symptoms of posttraumatic stress disorder, anxiety, and depression are higher in patients experiencing such memories (Nouwen et al., 2012).

Giving patients the opportunity to have a better understanding of reality and, in time, recollect reality is fundamental for intensive care workers to reduce long-term negative outcomes. An important tool to help patients recall their real experiences in the ICU can be a diary where nurses, doctors, and caregivers can describe the factual reality patients live in while in the ICU. Diaries are helpful in reducing long-term psychological outcomes and improving the quality of life (Barreto et al., 2021). The mainstream opinion today is that diaries can attend to the prevalent and predictive symptoms of delusional traumatic memories and have the power to replace delusion with a factual narrative. HCPs and family members can support a patient's recovery by writing about their reality, and in the follow-up period they can help the patient remember their experiences to reduce the likelihood of delusional memories. During their stay in the ICU, patients' diaries were always at their bedside and patients were allowed to read their diaries during the stay if they wished (Sayde et al., 2020). After discharge, the diaries remain in the patient's possession. For those who survive their hospitalisation, the diary provides a basic chronology of events and a symbol

Table 2
Meta-summary of codes: code intensity in the included studies.

Studies (n = 14)	Codes (n = 33)	Intensity (%)
Cleasson et al. (2005)	Being chased	2/33 (6.0 %)
	Being hunted	
Guttormson (2014)	Being threatened	3/33 (9.0 %)
	Having an accident	
	To travel	
Herbst & Drenth (2012)	Be concerned of died	2/33 (6.0 %)
	Thinking of Christo	
Löf et al. (2006)	Be with a family member	4/33 (12.1 %)
	Being attacked	
	Being tortured	
	Having an accident	
Magarey & McCutcheon (2005)	Be with a family member	4/33 (12.1 %)
	Being threatened	
	Colourful spaces	
	Seeing fantastic creatures	
Minton & Carryer (2005)	Being tortured	1/33 (3.0 %)
Noguchi et al. (2020)	Be to funerals	7/33 (21.2 %)
	Being in war	
	Being punished	
	Being with animals	
	Hear sounds	
	Hear voices	
	To smell	
Ringdal et al. (2008)	Be with a family member	4/33 (12.1 %)
	Having an imaginary friend	
	Hear voices	
	To fly	
Roberts & Chaboyer (2004)	Being part of a tribal people	4/33 (12.1 %)
	Being threatened	
	To float	
	To smell	
Roberts et al. (2006)	Being threatened	5/33 (15.2 %)
	Being with animals	
	Dangerous staff	
	To kill	
	Walking on clouds	
Sanson et al. (2021)	Being with fictional characters	3/33 (9.0 %)
	Fantastic places	
	To fight	
Sheen & Oates (2005)	Be with a family member	6/33 (18.2 %)
	Colourful spaces	
	Dangerous staff	
	Seeing fantastic creatures	
	To be ignored	
	To travel	
Svenningsen et al. (2016)	Be with a family member	7/33 (21.2 %)
	Being with animals	
	Dangerous staff	
	Not being in control	
	Nurses go to party	
	To travel	
	To kill	
Wade et al. (2015)	Feeling of not be cared	4/33 (12.1 %)
	Have an accident	
	Seeing fantastic creatures	
	To fight	

Table 3
Meta-summary of codes: frequency across studies.

Codes (n = 33)	Studies (n = 14)	Frequency (%)
Be concerned of died	Herbst & Drenth (2012)	1/14 (7.1 %)
Be to funerals	Noguchi et al. (2020)	1/14 (7.1 %)
Be with a family member	Löf et al. (2006)	5/14 (35.7 %)
	Magarey & McCutcheon (2005)	
	Ringdal et al. (2008)	
	Sheen & Oates (2005)	
	Svenningsen et al. (2016)	
Being attacked	Löf et al. (2006)	1/14 (7.1 %)
Being chased	Claesson et al. (2005)	1/14 (7.1 %)
Being hunted	Claesson et al. (2005)	1/14 (7.1 %)
Being in war	Noguchi et al. (2020)	1/14 (7.1 %)
Being part of a tribal people	Roberts & Chaboyer (2004)	1/14 (7.1 %)
Being punished	Noguchi et al. (2020)	1/14 (7.1 %)
Being tortured	Löf et al. (2006)	2/14 (14.3 %)
	Minton & Carryer (2005)	
Being threatened	Guttormson (2014)	4/14 (28.6 %)
	Magarey & McCutcheon (2005)	
	Roberts & Chaboyer (2004)	
	Roberts et al. (2006)	
Being with animals	Noguchi et al. (2020)	3/14 (21.4 %)
	Roberts et al. (2006)	
	Svenningsen et al. (2016)	
Being with fictional characters	Sanson et al. (2021)	1/14 (7.1 %)
Colourful spaces	Magarey & McCuctcheon (2005)	2/14 (14.3 %)
	Sheen & Oates (2005)	
Dangerous staff	Roberts et al. (2006)	3/14 (21.4 %)
	Sheen & Oates (2005)	
	Svenningsen et al. (2016)	
Fantastic places	Sanson et al. (2021)	1/14 (7.1 %)
Feeling of not be cared	Wade et al. (2015)	1/14 (7.1 %)
Have an accident	Guttormson (2014)	3/14 (21.4 %)
	Löf et al. (2006)	
	Wade et al. (2015)	
Having an imaginary friend	Ringdal et al. (2008)	1/14 (7.1 %)
Hear sounds	Noguchi et al. (2020)	1/14 (7.1 %)
Hear voices	Noguchi et al. (2020)	2/14 (14.3 %)
	Ringdal et al. (2008)	
Not being in control	Svenningsen et al. (2016)	1/14 (7.1 %)
Nurses go to party	Svenningsen et al. (2016)	1/14 (7.1 %)
Seeing fantastic creatures	Margarey & McCutcheon (2005)	3/14 (21.4 %)
	Sheen & Oates (2005)	
	Wade et al. (2015)	
To be ignored	Sheen & Oates (2005)	1/14 (7.1 %)
To fight	Sanson et al. (2021)	2/14 (14.3 %)
	Wade et al. (2015)	
To float	Roberts & Chaboyer (2004)	1/14 (7.1 %)
To fly	Ringdal et al. (2008)	1/14 (7.1 %)
To kill	Roberts et al. (2006)	2/14 (14.3 %)
	Svenningsen et al. (2016)	
To smell	Noguchi et al. (2020)	2/14 (14.3 %)
	Roberts & Chaboyer (2004)	
To travel	Guttormson (2014)	3/14 (21.4 %)
	Sheen & Oates (2005)	
	Svenningsen et al. (2016)	
Thinking of Christo	Herbst & Drenth (2012)	1/14 (7.1 %)
Walking on clouds	Roberts et al. (2006)	1/14 (7.1 %)

of the support they received during their stay in the ICU.

This review offers some suggestions for how to undertake a future research agenda. Various tools are proposed to be implemented to evaluate patients' memories of their time spent in the intensive care unit (e.g., the ICU Memory [ICUM] tool [Capuzzo et al., 2004]). It is particularly noteworthy that there was no quantitative research indicating the relationship between delusional memories, their antecedents (e.g., stay in the ICU and infections), and outcomes that were largely documented (e.g., PTSD). More explanations of the delusions and how the individuals reconciled them following ICU survival are also required.

Limitations

This qualitative synthesis has some limitations. First, the majority of the studies were performed in Europe, while four were from Australia and New Zealand (Magarey & McCutcheon, 2005; Minton & Carryer, 2005; Roberts & Chaboyer, 2004; Roberts et al., 2006). There is only one study from a low-income country (Herbst & Drenth, 2012). Furthermore, even if the findings are consistent with those available in the literature, additional information is required since a number of cultural factors can affect how patients and their families view delusional memories. Additionally, primary studies included heterogeneous settings possibly with different professional practises, which affected the transferability of the findings at international level. Second, the available data span over almost two decades (2004–2021), a period in which many advances were made in the field of intensive care nursing. Third, since the objective of the present study was to identify patients' perceptions of their experience regarding delusional memories, clinical and

organizational factors threatening their quality of care did not emerged, as patients in the ICU stay did not report them. Lastly, a disadvantage may be a certain degree of partiality in the authors' own work. One possible reading of the findings of the selected studies is what we provide in our presentation of the qualitative *meta*-synthesis. However, the purpose of the *meta*-synthesis was to offer a novel reconceptualization of the interpretive findings. Then, the integration that prevents the risk of over- or underweighting findings was achieved by estimating effect sizes, which contributes to the study's strength.

Conclusions

This study provided an in-depth description of the vividness and meaningfulness that delusional memories have in patients' perceptions. Most memories brought up feelings of threat, torture, and care by dangerous personnel. Memories of being with a family member, travelling, and encountering fantastic creatures were also prominent.

A thorough understanding of the events that patients remember can help identify the causes, signs, and effects of this phenomenon and provide appropriate support when needed. All healthcare providers, including nurses and physicians, must continue to humanise patient care by emphasising family involvement and communication with patients through verbal and written accounts of actual events during an ICU stay.

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Ethical statement

Not applicable.

CRediT authorship contribution statement

Matteo Danielis: . **Francesca Movio:** Data curation, Formal analysis, Writing – original draft. **Giorgia Milanese:** Data curation, Formal analysis, Writing – original draft. **Elisa Mattiussi:** Data curation, Formal analysis, Methodology, Supervision, Writing – original draft, Writing – review & editing.

Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.iccn.2023.103617.

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