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Research Article

Cognitive impairment in intensive care unit patients: A qualitative exploration through observations and interviews

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ABSTRACT

Objectives: Many patients experience cognitive impairments while being admitted to an intensive care unit due to critical illness affecting their well-being and rehabilitation. Little is known about how patients experience cognitive impairments. This study aimed to explore patients' and relatives' experiences of patients' cognitive impairments while in the intensive care unit.

Research methodology: A multi-centre qualitative study, inspired by Ricoeur's phenomenological-hermeneutic approach, was conducted at four intensive care units at two hospitals in Denmark. Data collection encompassed participant observation and semi-structured single or dyadic interviews with 20 patients and 15 relatives, conducted in the intensive care units. The Consolidated Criteria for Reporting Qualitative Research checklist was used.

Findings: Four themes emerged during the analysis: 'Having a hazy memory and a foggy brain', 'Frustrations due to difficulties in speaking', 'An altered sense of self' and 'A feeling of disconnect between body and mind'. In the intensive care unit, patients experienced multiple cognitive impairments across several cognitive domains, significantly affecting their overall well-being.

Conclusions: The findings provided a nuanced exploration of how patients in the intensive care unit grapple with cognitive impairments, leaving them feeling exposed and vulnerable due to increased dependency and loss of dignity. Relatives' presence and help was a huge support during admission.

Implications for clinical practice: This study highlights patients' and relatives' experiences of patients' cognitive impairments in the intensive care units. There is a need for nurses and allied healthcare professionals to address and manage reduced cognition in intensive care unit patients. This is particularly important to underpin recovery and rehabilitation processes, improve quality of life and optimise patients' return to everyday life. Future research must investigate how and when intensive care patients would benefit from preventive initiatives and initiatives to support recovery and rehabilitation of cognitive impairments.

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Introduction

Patients who survive critical illness in intensive care units (ICUs) often suffer from post-intensive care syndrome (PICS) (Hiser et al., 2023). PICS is defined as a *"new or worsening impairment in physical, cognitive, or mental health status arising after critical illness and persisting beyond acute care hospitalization"* (Needham et al., 2012). Especially cognitive impairments are frequently unrecognised post-ICU complications, which can seriously affect patients' quality of life (QoL) and well-being for months or years following critical illness (Muradov et al., 2021). Cognitive impairments encompass a spectrum of domains, including memory, attention, executive function, mental processing, speed, language and visuospatial ability (American Psychological Association, 2023; Needham et al., 2012). Studies have found a prevalence of cognitive impairment exceeding 70 % at ICU discharge, with approximately 50 % persisting years later (Nedergaard et al., 2017; Wolters et al., 2013).

Cognitive impairment in ICU patients can arise due to e.g. hypotension, glucose dysregulation, hypoxia, sepsis, respiratory failure and renal replacement therapy (Lee et al., 2020). Furthermore, risk factors encompass elements such as the patient's environment, advanced age, premorbid health conditions, cognitive baseline and delirium (Kohler et al., 2019; Rawal et al., 2017).

Our current understanding of the timing and nature of these impairments during ICU admission is limited. However, a recent review by Alrø et al. (2022) highlights that patients commonly encounter a diverse range of cognitive impairments due to critical illness, with notable emphasis on significant memory deficits both during and after the critical illness period (Alrø et al., 2022).

PICS can also affect relatives, a condition known as PICS-Family (PICS-F). Relatives are at increased risk for developing anxiety, acute stress, post-traumatic stress disorder, depression and complicated grief when their loved ones are critically ill (Davidson & Harvey, 2016). Relatives can have difficulties understanding critical illness and managing the patients' newly acquired cognitive impairments (Bench et al., 2015). They need information about cognitive impairments and how to support the patient's recovery and return to community life (Bench et al., 2015; Czerwonka et al., 2014). Developing interventions supporting the recovery and rehabilitation process based on a patient- and family-centred (PFCC) approach seems essential (Park et al., 2018).

Cognitive impairments also challenge the nurse-patient interaction in the ICU by hampering the establishment of shared attention and subsequently fostering mutual understanding. This becomes even more apparent when patients are grappling with cognitive impairments (Karlsen et al., 2019). In-depth knowledge of patients' and relatives' experiences of patients' cognitive impairments is also important for identifying, addressing and managing cognitive impairments throughout the ICU stay as well as during the subsequent phases of recovery and rehabilitation.

Objectives

To explore patients' and relatives' experiences of patients' cognitive impairments while in the ICU.

Methods

Design

Participant observation and semi-structured single or dyadic interviews using a phenomenological-hermeneutic approach were used to collect varied data from patients and relatives on the phenomenon 'cognitive impairments in the ICU'. The study is reported in accordance with the Consolidated Criteria for Reporting Qualitative Research checklist (COREQ) (Supplementary File 1) (Tong et al., 2007).

Setting

In this multi-centre study, we collected data from high-dependency ICUs (level II and III) with a total of 53 medical and surgical beds at two hospitals in Denmark. The ICUs had nurse-patient ratios of 1:1 during day shifts and 1:1 or 1:2 during night shifts. Due to reduced or no sedation being increasingly favoured, a substantial proportion of patients are maintaining wakefulness and the potential for interaction (Olsen et al., 2020; Strøm et al., 2010).

Ethical approval

The study complied with the Declaration of Helsinki and the guidelines from the Nordic Nursing Research Foundation. According to Danish law, formal ethical approval of qualitative studies is not required (Danish Legislation-LBKnr.1338, 2020). The study was registered with the legal office in the Central Denmark Region (file no. 1–16-02–286-21). Potential participants were invited to participate by an ICU staff nurse. Before the study commenced, the participants received oral and written information from the lead author. This information encompassed the study's aim, assurance of confidentiality, the process of anonymisation of identity, the voluntary nature of participation and the right to withdraw from the study at any time before granting written consent. The consent process was conducted during each interaction and recording.

Participants

The participants included both patients and relatives, selected through purposeful sampling to achieve variation on the experience and rich descriptions of the phenomenon termed 'cognitive impairments in ICU'. Sampling variation for patients encompassed a range of factors, including gender, age, occupational status, mechanical ventilation days and admission days in ICU (Table 1). The patients were asked to identify an adult relative who wanted to participate and was able to communicate in Danish (Table 2).

Patient inclusion criteria were adults (>17 years) admitted to the ICU, able to understand and communicate in Danish, mechanical ventilation (MV) > 24 h, a negative score on the Confusion Assessment Method for ICU (CAM-ICU) and level of consciousness was assessed using a Richard Agitation Sedation score (RASS), and only awake, unsedated patients, scoring 0 or −1 were approached for inclusion. The exclusion criteria were severe brain damage, alcohol and drug abuse, dementia and delirium.

Data collection

Data collection took place from September 2021–January 2023, and consisted of participant observation and interviews with patients and relatives in the ICU or immediately after discharge from the ICU to a general ward (GW).

Participant observation was inspired by Spradley (Spradley, 1980). Field notes were written by hand during the observation and transcribed shortly after each observation. Participant observation and interviews were conducted by the lead author using both active, moderate and passive positions adapted to each situation (Spradley, 1980). Participant observation was conducted during day and evening shifts when the patients were awake observing activities, interactions and communication with the healthcare professionals and relatives. Field notes contained both descriptive and reflective notes. The descriptive notes reflected e.g. the setting, the people entering the room, the interactions, the feelings, the atmosphere; whereas the reflective notes encompassed e.g. what was learned from each participant observation so the process in during participant observation was moving from descriptive observation to focused observation and then to selective observation.

Besides informal interviews during participant observation (Spradley, 1980, 2013), both patients and their relatives were invited to participate in a formal interview. These interviews took the form of

Table 1
Characteristics of included patients.

No.	Sex	Age	Type of admission	MV (days)	ICU LOS (days)	RASS	CAM-ICU	Observation (setting/ min.)	Interview (type/min./setting)
P1	M	71	Gastric	2	6	0/-1	Neg.	(Day 1) ICU: 205 min.	Informal interview Formal dyadic interview 15 min./ICU
P2	F	61	Pulmonary	11	10	0	Neg.	(Day 1) ICU: 260 min. (Day 3) ICU/GW: 65 min.	Informal interview Formal semi-structured interview 9 min./ ICU
P3	F	60	Gastric	27	35	0	Neg.	(Day 1) ICU: 210 min. (Day 4) GW: 25 min.	Informal interview Formal semi-structured interview 10 min./ ICU
P4	F	72	Cardiac	12	15	0	Neg.	(Day 1) ICU: 45 min.(Day 2) ICU: 65 min.(Day 3) ICU: 10 min.	Informal interview
P5	F	48	Cardiac	19	67	0/-1	Neg.	(Day 1) ICU: 65 min.(Day 2) ICU: 60 min.(Day 3) GW: 25 min.	Informal interview Formal semi-structured interview 15 min./ GW
P6	M	44	Gastric	10	31	0/-1	Neg.	(Day 1) ICU: 240 min. (Day 4) ICU: 35 min.	Informal interview Formal semi-structured interview 10 min./ ICU
P7	M	77	Cardiac	33	39	0	Neg.	(Day 1) ICU: 175 min. (Day 7) ICU: 20 min.	Informal interview
P8	M	77	Cardiac	22	25	0	Neg.	(Day 1) ICU: 20 min.(Day 2) ICU: 10 min.(Day 6) ICU: 30 min.(Day 7) ICU: 165 min.	Informal interview Formal semi-structured interview 25 min./ICU
P9	M	51	ENT	6	10	0	Neg.	(Day 1) ICU: 200 min. (Day 2) ICU: 30 min.	Informal interview Formal semi-structured interview 13 min./ICU
P10	F	70	Pulmonary	4	4	0/-1	Neg.	(Day 1) ICU 70 min.(Day 2) GW 30 min.	Informal interview Formal semi-structured interview 11 min./GW
P11	F	70	Gastric	7	21	0/-1	Neg.	(Day 1) ICU: 240 min. (Day 2) ICU: 160 min.	Informal interview Formal semi-structured interview 13 min./ICU
P12	F	55	ENT	10	10	0/-1	Neg.	(Day 1) ICU: 90 min.(Day 2) ICU: 60 min.(Day 4) GW: 30 min.	Informal interview (written)Formal semi-structured interview (written) 20 min./ICU
P13	F	74	Pulmonary	2	6	0	Neg.	(Day 1) ICU: 60 min.(Day 2) GW: 20 min.	Informal interview Formal dyadic interview 21 min./ICU
P14	F	52	Trauma	35	47	0	Neg.	(Day 1) ICU: 45 min.(Day 2) ICU/GW: 45 min.(Day 3) GW: 15 min.	Informal interview Formal semi-structured interview 15 min./ICU
P15	M	71	Pulmonary	37	29	0	Neg.	(Day 1) ICU: 30 min.(Day 2) ICU: 50 min.	Informal interview Formal semi-structured interview 13 min./ICU
P16	F	78	Pulmonary	3	8	0	Neg.	(Day 1) ICU: 20 min.(Day 2) ICU: 50 min.(Day 5) GW: 40 min.	Informal interview
P17	F	24	Neuro	38	42	0	Neg.	(Day 1) ICU: 225 min. (Day 3) GW: 20 min.(Day 10) GW: 20 min.	Informal interview Formal semi-structured interview 24 min./ICU
P18	M	59	Gastric	5	11	0/-1	Neg.	(Day 1) ICU: 90 min.(Day 11) GW: 50 min.	Informal interview Formal semi-structured interview 11 min./ICU
P19	M	52	Gastric	160	198	0	Neg.	(Day 1) ICU: 50 min.(Day 3) ICU: 90 min.(Day 21) GW: 15 min.(Day 25) GW: 15 min.(Day 27) GW: 75 min.	Informal interview Formal semi-structured interview 10 min./GW
P20	M	42	Trauma	11	27	0	Neg.	(Day 1) ICU: 135 min. (Day 4) ICU: 20 min.(Day 6) ICU: 20 min.(Day 10) ICU: 20 min.	Informal interview Formal semi-structured interview 20 min./ICU

LOS = Length of stay, ICU = Intensive care unit, GW = General ward, ICU/GW = Observed during transition, RASS score = Richmond Agitation Sedation Scale, CAM-ICU = Confusion Assessment Method, ENT = Ear-nose-throat.

Day = The days the patients were approached by the lead author.
Drop-out (n) = 2.

Table 2
Characteristics of included relatives.

No.	Sex	Age	Relation	Interview (type/min./setting)
R1	F	69	Wife	Dyadic interview 15 min./ICU
R2*	None			
R3	F	37	Daughter	Single semi-structured interview 12 min./ICU
R4*	None			
R5	M	52	Boyfriend	Single semi-structured interview 17 min./ICU
R6	F	40	Wife	Single semi-structured interview 24 min./GW
R7	F	77	Wife	Single semi-structured interview 9 min./ICU
R8	F	67	Wife	Single semi-structured interview 16 min./ICU
R9	F	56	Wife	Single semi-structured interview 11 min./ICU
R10	M	34	Son	Single semi-structured interview 17 min./GW
R11	M	69	Husband	Single semi-structured interview 17 min./ICU
R12*	None			
R13	F	47	Daughter	Dyadic interview 21 min./ICU
R14	F	54	Sister in law	Single semi-structured interview 5 min./ICU
R15*	None			
R16*	None			
R17	M	26	Husband	Single semi-structured interview 21 min./GW
R18	F	59	Wife	Single semi-structured interview 33 min./GW
R19	F	51	Wife	Single semi-structured interview 40 min./ICU
R20	F	69	Mother	Single semi-structured interview 21 min./ICU

Relatives (n = 15).
ICU = Intensive care unit, GW = General ward.
* Did not participate owing to Covid-19 visitor restrictions, long distance, work or did not want to participate.

either individual semi-structured sessions or a dyadic interview based on the participants' preferences. Most patients were recently extubated or weaned from MV, while one patient was still receiving MV via an oral tube. This patient could move her lips and communicate in writing. The interviews were audio recorded and conducted using an interview guide by the lead author (Svend & Steinar, 2015) (Table 3). The interview guide was developed based on research literature and clinical experience, pilot tested by two research nurses, approved by the research team and adjusted during the interviews. The interviews were transcribed verbatim by the lead author and two nursing students and all data material was checked by the lead author.

Table 3
Examples from the interview guide.

Interview question for patients*
• Can you describe if your cognitive capacity is functioning normally, similar to how it typically does, even here in the ICU?
• Can you describe how you experience cognitive impairment in the ICU?
• Can you describe how you experience these cognitive changes?
• Can you describe how you manage these cognitive impairments in the ICU?
Interview question for relatives*
• How would you describe her/his cognitive impairments?
• How do you experience her/his cognitive impairments?
• How do you manage her/his cognitive impairments?

*All participants were explained about cognitive impairments in general terms before being interviewed.

Data analysis

To gain in-depth understanding of the phenomenon, the observational and interview data were analysed together using a phenomenological-hermeneutic method inspired by Ricoeur and operationalised by Dreyer and Pedersen (Dreyer & Pedersen, 2009) (Table 4). Following Ricoeur's theory, *"what has to be interpreted in a text is what it says and what it speaks about"* (Ricoeur, 1973). This analysis method encompasses three steps: a naïve understanding, a structural analysis and a critical analysis and discussion (Dreyer & Pedersen, 2009). First, an initial understanding and interpretation of the whole text was obtained. Second, in the structural analysis, the reader moves from an understanding of "what was said" to an in-depth understanding of "what the data speaks about". In the final step, a critical analysis and discussion based on relevant research literature about intensive care and theory e.g. the ABCDE bundle and the PFCC approach, a deeper understanding of the phenomenon studied is obtained. Moving dialectically back and forth between the parts and the whole across the three interpretive phases, this process yields novel insights and new knowledge. The data was stored in the latest version of the software program NVivo (QRS International Pty Ltd., Victoria, Australia) for analysis by the lead author. The analysis was secured and reviewed by the last author PD.

Findings

We included patients (n = 20) and relatives (n = 15). Two of the approached patients declined participation because of lack of energy. The included patients and relatives reflected variation in all characteristics (Tables 1 and 2).

Participant observation lasted between 80 and 400 min per patient (3,825 min/63,75 h in total). Interviews with patients lasted 9–25 min; with relatives, 5–40 min.

Structural analysis

Four themes emerged from patients and relatives in the analysis: '*Having a hazy memory and a foggy brain*', '*Frustrations due to difficulties in speaking*', '*An altered sense of self*' and '*A feeling of disconnect between body and mind*'.

Having a hazy memory and a foggy brain

For some patients, memory problems, especially in short-term memory, were experienced both in the beginning and throughout admission.

Table 4
Example of the interpretation steps in data analysis.

Citation / What it says	Meaning / What it speaks about	Theme
'I cannot remember having a visit from my girls. You get a form of dementia when you are in here'. *'I did not know where I was and I did not understand anything. I was feeling foggy and there were many days, where I did not know what happened'.* *'I did not know which day it was. If it was Monday, Tuesday… The days just flowed together'.*	Patients experienced memory problems, such as cognitive impairments, in the ICU. They experienced memory problems as a form of dementia or something like a foggy brain. Patients expressed confusion about where they were, what had happened to them and which week day it was.Memory problems were hard for the patients to comprehend, which led to feelings of frustration and discouragement during their ICU admission.	Having a hazy memory and a foggy brain.

> *'A patient was lying in his bed looking out of the window. He was saying: 'I remember their faces, but I cannot always remember their names. That is difficult for me. So frustrating and embarrassing'. He nodded his head. 'But I have to keep practicing'. His wife had placed an electronic photo frame on the bedside table to help him'* (field note P19).

Memory problems were hard for the patients to comprehend, and made them annoyed and discouraged. They were experienced as a form of dementia or like a foggy brain. *'I cannot remember having a visit from my girls. You get a form of dementia when you are in here'* (P2). A foggy brain was experienced as *'I did not know where I was and I did not understand anything. I was feeling foggy and there were many days where I did not know what happened'* (P15). Constantly oscillating between being clear or unclear. Also, thinking was influenced by all the stimuli, disruptions and people in the ICU environment. Days flowed together. *'I did not know which day it was. If it was Monday, Tuesday… The days just flowed together'* (P8). A day and night care plan (describing daily routines specific to each patient) helped patients keep track. *'He is tired and confused. He thinks it is difficult to keep track of everything. He wants to have a plan* (R6). Healthcare professionals explaining their routines and actions continuously were valued.

Relatives supported the establishment of a systematic approach to keeping track of everything. *'When he cannot grasp what the nurse or physician says, I ask them to repeat it* (R18). During ICU rounds, the relatives filled in with helpful questions and explanations, which many patients could not. *'I am here all the time supporting him. He called last night because he was in a bad mood and confused. So me and our daughter came visiting him and made him calm down'* (R1). Having relatives during the ICU admission was helpful and perceived as a resource. Relatives found it more feasible to keep a sense of perspective because of the many hours they spent by the bedside. *'I am writing everything about his pathway on my iPad'* (R1).

The process of rebuilding and improving patients' cognitive abilities, once taken for granted, was described with a sense of enthusiasm and determination. However, patients acknowledged the necessity of patience and of taking one day at a time with support from relatives.

Frustrations due to difficulties in speaking

Episodes of incoherent speech occurred in many different situations and in diverse ways, posing a substantial challenge to patients' communication and interaction with their relatives and with healthcare professionals. Speaking difficulties in the time following extubation were experienced as cognitive impairment. Patients experienced instances of word-finding difficulty; they could recognise a familiar everyday object, yet struggled to retrieve the right word.

> '*The patient's mouth was moving and she was mumbling something. Her hands were animated, a lot. Her daughter tried to help. 'Do you need me to find the word, mother?' She refused and tried again. She stuttered faint sounds and looked at her daughter. She waved her arms in resignation*' (field note P + R13).

An incoherent way of speaking became a reality and was further compounded by sensations of haziness and tiredness. *'Sometimes there is no coherence in what she says. Sometimes there is, but sometimes it is pointless and complete nonsense'* (R11). Also, the presence of indistinct and feeble voices, along with the effort required for articulation, were exhausting and affected patients' speaking. Latent time and losing one's thread were experienced as annoying, and receiving help was experienced as a failure.

Some relatives resorted to lip reading to compensate for the speaking difficulties. Depending on the surplus of energy, the patients alternated between trying hard to express themselves and giving up. Some patients had much on their minds but were incomprehensible, necessitating relatives to engage in a process of trying to guess the answer. *'He speaks so fast. It is very difficult to understand it. Sometimes he makes little noises, then it is easier to guess. It is getting better day by day'* (R8). The speaking problems caused frustration and demanded patience from all parties.

Relatives reacted with concern, fearing the possibility of a lasting impairment, even though they better understood that patients' speech was affected just after extubation. However, when healthcare professionals explained that the condition was transient, it reassured the relatives and made them able to support the patients by showing patience and giving them time and space to concentrate when speaking.

An altered sense of self

Cognitive impairments made the patients experience a form of altered self. This experience was influenced by both internal and external factors during the admission. Patients were feeling confused, dazed and being a shadow of their former self and, therefore, concerned about *'who am I'*. Especially during the first days, patients asked questions like; *'where am I'*, *'what happened'* and *'is this normal';* and later on, *'which day is it'*, *'how long should I stay here'* and *'when can I come home'*. Relatives often tried to help by answering questions, correcting misunderstandings and thereby supported the patient's sense of self.

External factors, such as countless sounds, people and disruptions in the ICU environment, affected patients in various ways and some patients experienced the ICU like a *'cartoon'* (P11) or a *'madhouse'* (P2). A patient expressed: '*It bumbles and bumbles. I feel trapped. I need to go outside to have some fresh air, but I need to be able to put on some clothes'* (P2). However, other patients found it soothing with background noise and knowing that they were not alone. Making eye contact with healthcare professionals when they entered the room was important and made patients hold on to themselves. However, some patients closed their eyes to have peace and rest; others turned their heads away because they were not capable of managing to be in the madhouse.

> *'A nurse entered the room. The patient turned his head towards her and tried to make eye contact. His eyes followed her actions and movements. He said afterwards: 'If I cannot make eye contact, I do not know what is happening to me. It scares me'* (field note P6).

Being confined to bed and trapped in the ICU altered their self. Patients described *'I felt like I was lying in a coffin'* (P11) and *'I don't know who I was, and where I was and if I was supposed to be here. I'm feeling so confused'* (P8). Some patients described how they found a spot, e.g. a power outlet, to focus on to be oriented about the room and their own location.

Some patients saw unreal things and had nightmares. Some also experienced mood swings and some lost their inhibitions. Patients' altered self was distressing for their relatives, evoking concern. Therefore, some relatives resorted to humour and jargon to mask their discomfort and navigate the situation, while others sought solace in the healthcare professionals' explanations and guidance.

A feeling of disconnect between body and mind

Loss of coordination, concentration, feeling of tiredness and weakness were described as overwhelming, intimidating and affecting patients' attention during admission. Especially, the treatment and rehabilitation proved to be challenging, long and exhausting and described as *'It is a big mess and you do not know what you are getting into'* (P2). Patients experienced that their mind and body existed as separate entities. Gripping and holding onto things, e.g. a cup, suddenly became difficult. Some patients felt that they could not see their fingertips, and some were trying to reach something that was not there.

> *'The patient was lying in his bed watching the television. He did not know what he was watching. The television was just running. He was coughing up phlegm. He tried to get a napkin, using his pincer grasp. After several attempts, he succeeded. Then, he tried to hit the bin but missed it. This happened three times. Then he reached out for a glass of water. It took him some time to get a grip on the glass and bring it to his mouth. He spilt on his shirt. Now he looked at me'* (field note P19).

Coordinating one's physical actions with their mental intentions

posed challenges, giving rise to feelings of frustration and a sense of degradation. *'It's like I have to start all over from being a toddler again'* (P6). Using different technologies such as smartphones and computers was challenging in the beginning, especially remembering functionalities and hitting the keys. When the television was running, it was hard to focus and concentrate. *'It has to be slow television like children's programmes or a football match; otherwise it just flickers'* (P18).

Some relatives were initially resistant to acknowledge cognitive impairments in the patients. Nonetheless, they recognised that the body and mind had changed, underscoring the need for rehabilitation. The relatives also experienced frustration. Patients and relatives were feeling fear and uncertainty regarding which condition the patients would return to: *'I want him back in good condition. Just want to live a normal life again'* (R18). Nevertheless, some patients showed persistence and motivation to recover and rehabilitate: *'I will be back'* (P1). The encouragement and reinsurance provided by relatives played a crucial role in facilitating the process of reestablishing coordination and collaboration between body and mind.

Discussion

The findings show that ICU admission has a multifaceted impact on patients across several cognitive domains. These effects encompass having a hazy memory and a foggy brain, being frustrated due to difficulties in speaking, having an altered sense of self and a feeling of disconnect between body and mind while in the ICU. Having a hazy memory and a foggy brain was also found in a study where survivors reconstructed their time in the ICU, describing the challenges of having a foggy brain and how their memory was gone, which affected their ability to spell or write words (Thurston et al., 2020). In our study, frustrations due to difficulties in speaking concerned both patients and relatives. A similar finding is described in a study about nurse-patient communication, where frustration is a predominant experience affecting the interaction (Holm & Dreyer, 2018). Communication difficulties represent an emotional challenge and a substantial impediment that greatly affects patients' well-being in the ICU (Rose et al., 2014). In the present study, patients had an altered sense of self. According to a review, patients' experiences of well-being when being cared for in the ICU are multidimensional and intertwined, encompassing both facilitators and barriers (Kristin et al., 2022). Among the barriers identified, environmental disturbances were notable, including confusion arising from the blurring of night and day, unfamiliar lights, alarms, frightening visuals and room temperature variations and a sense of uncertainty related to time and space (Kristin et al., 2022). Embracing the ongoing shift towards humanising the ICU environment could potentially contribute to alleviating cognitive impairments. This endeavour may gain further traction through the enforcement of a regulatory framework mandating humanised care for ICU patients (Kvande et al., 2022). In the present study, patients were feeling a disconnect between body and mind. In line with Berntzen et al. (2020), we also found that patients experienced being deprived of a functioning body and a functioning mind, leading to loss of comfort and integrity and feelings of dependency and indignity. Patients struggled to keep their wits and maintain connection to the real world (Berntzen et al., 2020). Utilising basic stimulation holds promise in alleviating the sense of detachment between the body and mind (Egerod et al., 2009).

The present study underscores the impact of cognitive impairments on patients, emphasising the pivotal role of understanding these impairments for patients, relatives and healthcare professionals alike. This understanding is vital to effectively identify, address and optimise management of cognitive impairments.

Systematic screening for cognition may be an important element in managing cognitive impairments (Tingey et al., 2022). However, there is no currently standardised routine for cognitive screening within the ICU (Honarmand et al., 2020; Mikkelsen et al., 2020). Moreover, to the best of our knowledge, there is no evidence-based practice stipulating how to prevent cognitive impairment. However, recommendations intended at preventing delirium are also associated with improving patients' cognition (Devlin et al., 2018). Furthermore, evidence suggests that early rehabilitation via cognitive training is feasible and safe in the ICU, although the precise clinical impact is yet unknown (Wassenaar et al., 2018).

Managing cognitive impairments in the ICU should be conducted using a multidisciplinary approach based on evidence, such as, e.g., the ABCDEF bundle (Marra et al., 2017). Family engagement is an important aspect of the bundle, encompassing incorporating the family's wishes, concerns and questions and soliciting its active involvement (Marra et al., 2017). In the current study, relatives were supportive and present during ICU rounds. Moreover, they provided important information about patients' baseline cognitive status, which is essential for identifying, addressing and managing cognitive impairments (Tingey et al., 2022). According to the National Institute for Health and Care Excellence (NICE) guideline, families should be involved, and communication during admission must be two-way (NICE, 2009). In this present study, healthcare professionals' explanations and guidance played an important role in instilling a sense of calmness among relatives, facilitating relatives' support for patients. PFCC interventions may also contribute to improve interaction and collaboration with patients and families and reduce stress associated with critical illness involving cognitive impairments during and after the ICU stay (Goldfarb et al., 2020; Park et al., 2018). However, the nurse-patient interaction is challenging, requiring nurses to navigate the interface between uncertain scenarios and various needs (Laerkner et al., 2015). Healthcare professionals should tailor their approach to patients' cognitive abilities, which is essential in all communication and in all interactions (Hanifa et al., 2023; Karlsen et al., 2019).

Methodological considerations and limitations

Using triangulation for data collection in the form of participant observation and interviews in a multi-centre setting provided rigour and variation to the lived experience of cognitive impairments. Using single semi-structured, dyadic and informal interviews provided variation and thereby strengthened the data collection. Conducting participant observation within a complex and busy environment demanded a deep understanding of the field, making it possible for the lead author to be in the right place at the right time for both observation and informal interviews. However, it is imperative to acknowledge any pre-understandings in order observation (Spradley, 1980; Sundberg et al., 2021). The transition between various observation positions, timeframes and shifts was orchestrated in respect of the patients' care, treatment and well-being. Among all participants the sampling reflected variation; nevertheless, more females than males participated. Transferability is shown in Tables 1 and 2. Among the approached patients, only two declined study participation. Limitations as to reliability may occur as data collection was performed in a Danish setting with a 1:1 ratio in day shifts and treatment with no or less sedation.

The use of NVivo facilitated the Ricoeurian dialectic process, enabling navigation between the whole and the parts. This approach ensured structure, transparency and rigour in the analytical process. A critical approach strengthened the discussion and provided a new and deeper understanding of the phenomenon.

Conclusion

This study provides new in-depth knowledge about patients' and relatives' experiences of patients' cognitive impairments while in the ICU. The patients experienced multiple cognitive impairments within several domans. Patients grappled with a spectrum of challenges encompassing 'Having a hazy memory and a foggy brain', 'Frustrations due to difficulties in speaking', 'An altered sense of self' and 'A feeling of disconnect between body and mind'. These experiences could erode

comfort and self-esteem, triggering feelings of dependency and indignity within the ICU setting. The nuanced findings show how the cognitive impairments exposed patients and made them feel vulnerable and experiencing an altered sense of self. Relatives' presence and help during the admission was a huge support for patients. For healthcare professionals, understanding patients' cognitive impairments is important for identifying, addressing and managing cognitive impairments; and for humanising the environment in a holistic way. Furthermore, in-depth knowledge of cognitive impairments is important to ensure that the subsequent recovery and rehabilitation process is tailored to prioritise QoL and adaptable to everyday life.

Authors' contributions

The idea for the PhD study originated from PD. The research study was conducted by ABA, HS, HKN, HIJ and PD. The qualitative data collection with participant observation and interviews was undertaken by ABA. Data was analysed and interpreted by ABA, and later on consolidated with PD and HS. ABA secured the methodology in consolidation with the other authors.

Furthermore, ABA made substantial contributions to the study regarding drafting of the manuscript, whereas HS, HKN, HIJ and PD revised the manuscript critically and contributed with substantial improvements. Thus, all authors were involved in all phases of the manuscript and the final approval was provided by all. Each author agreed to being accountable for all aspects of the manuscript.

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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.

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