Australian Critical Care 32 (2019) 299–305

Contents lists available at ScienceDirect

Australian Critical Care

journal homepage: www.elsevier.com/locate/aucc

Research paper

# Nurses' and physicians' approaches to delirium management in the intensive care unit: A focus group investigation

M.O. Collet, RN, MSc (Health) [a, b, *]
T. Thomsen, RN, MSN, PhD [c, d]
I. Egerod, RN, MSN, PhD [a, b, d]

[a] Department of Intensive Care 4131, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen OE, Denmark
[b] Centre for Research in Intensive Care, Tagensvej 22, 2200 Copenhagen N, Denmark
[c] Abdominal Centre, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen OE, Denmark
[d] University of Copenhagen, Health and Medical Sciences, Blegdamsvej 3, 2200 Copenhagen N, Denmark

ARTICLE INFORMATION

*Article history:*
Received 5 April 2018
Received in revised form
1 June 2018
Accepted 8 July 2018

*Keywords:*
Delirium
Focus groups
Intensive care unit
Hermeneutics
Nursing care
Pharmacological action
Qualitative research

ABSTRACT

*Background:* Delirium in the intensive care unit (ICU) is common, but reliable evidence-based recommendations are still limited.
*Objectives:* The aim of our study was to explore nurses' and physicians' experiences and approaches to ICU delirium management.
*Method:* Our study had a qualitative multicentre design using interdisciplinary focus groups and framework analysis. Participants were strategically selected to include nurses and physicians with experience in delirium management at five ICUs in four out of five regions in Denmark.
*Results:* We conducted eight focus group interviews with 24 nurses and 15 physicians; median ICU experience was 9 years (range 1–35). The main issues identified were (1) the decision to treat or not to treat ICU delirium based on delirium phenotype, (2) the decision to act based on experience or evidence, and (3) the decision to intervene using nursing care or medications. ICU delirium was treated with pharmacological interventions in patients with signs of agitation, hallucinations, and sleep deprivation. The first choice of agent was haloperidol or olanzapine. Agitated and combative patients received benzodiazepines, propofol, or dexmedetomidine. Calm delirious patients were managed with non-pharmacological solutions. Physicians recommended pro re nata (PRN) orders to prevent over medication, whereas nurses opposed PRN orders with the fear that it would increase their responsibilities.
*Conclusion:* Our study described an algorithm of contemporary delirium management in Danish ICUs based on qualitative inquiry. When evidence-based solutions are unclear, nurses and physicians rely on personal experience, collective experience, and best available evidence to determine which patients to treat and what methods to use to treat ICU delirium. Delirium management still needs clear objectives and guidelines with evidence-based recommendations for first-line treatment and subsequent treatment options.


## 1. Background

Delirium is a common syndrome in the intensive care unit (ICU) and a physiological consequence of a medical condition, medication use, intoxication, or caused by multiple etiologies.[1] It manifests as a disturbance in attention and awareness.[2] The prevalence of delirium in the ICU is 25%–80% with the higher prevalence in mechanically ventilated patients[3,4] and is associated with longer ICU and hospital stay and increased 6-month mortality[5–7] and morbidity.[8] These complications present a financial burden in health care and have a negative impact on public health.[9] Delirium has been classified in three motoric subtypes as hyperactive (1.6%), hypoactive (43.5%), and mixed (54.9%).[10] The neuropathogenesis is unclear, but several mechanisms have been associated with delirium such as dopamine excess or acetylcholine deficiency, sleep deprivation, sepsis, ageing, and certain pharmacological agents.[11]

* Corresponding author at: Department of Intensive Care 4131, Copenhagen University Hospital, Rigshospitalet, Blegdamsvej 9, 2100 Copenhagen OE, Denmark.
*E-mail addresses:* marie.oxenboell-collet@regionh.dk (M.O. Collet), Thordis.thomsen@regionh.dk (T. Thomsen), Ingrid.egerod@regionh.dk (I. Egerod).

https://doi.org/10.1016/j.aucc.2018.07.001
1036-7314/

Current recommendations for managing delirium include pharmacological and non-pharmacological strategies, but effective evidence-based interventions for the prevention and treatment of delirium are lacking. Several guidelines exist, and both the pain, agitation, and delirium guideline and the ABCDEF bundle (Assess, prevent and manage pain; Both spontaneous awakening trials and spontaneous breathing trials; Choice of sedation/analgesia; Delirium monitoring and management; Early mobility and exercise; and Family engagement and empowerment), including systematic mobilisation and cognitive assessment, recommend interventions for management of delirium to reduce days with delirium and mechanical ventilation.[12,13] Early detection and routine delirium assessment are recommended to reduce ICU delirium. Validated screening tools, performed by non-psychiatrists, such as the Confusion Assessment Method for the Intensive Care Unit (CAM-ICU) and the Intensive care Delirium Screening Checklist have been developed.[14,15] While delirium screening has been widely implemented, studies demonstrate poor adherence to delirium guidelines.[16,17]

In the absence of evidence-based treatment options for ICU delirium, nurses and physicians often rely on their personal experiences and preference.[18] Although the detection and treatment of delirium has been promoted as an interdisciplinary task,[19] we lack qualitative studies that describe actual practice.[20] The aim of our study was to explore nurses' and physicians' experiences and approaches to managing ICU delirium.

## 2. Methods

Our study had a multicentre qualitative design using focus group methodology with interdisciplinary participants. We used an inductive pragmatic framework for data collection and analysis.[21] For complete and transparent reporting, this manuscript has been prepared with the Consolidated criteria for reporting qualitative research (COREQ) Checklist to include description of study methods, context, findings, analysis, and interpretations.[22] The study was embedded in a larger study investigating pharmacological interventions of delirium in ICU patients: [http://www.cric.nu/aid-icu-national-pricipal-investigators/].

### 2.1. Participants and recruitment

Participants were nurses and physicians from five mixed medical–surgical ICUs (8–28 beds) at regional and university hospitals in four out of five regions of Denmark. A nurse manager at each unit helped us to select participants who were ICU nurses or physicians with some experience in delirium management. To ensure maximum variation, we strategically selected participants who were part of a delirium workgroup (delirium experts) in two focus groups.

### 2.2. Context

Contemporary practice in Danish ICUs is minimal sedation unless specifically indicated.[23] Non-pharmacological interventions such as enabling sleep, rest, mobilisation, and family presence are considered part of standard nursing care. All units in our study had guidelines in place recommending systematic use of delirium screening tools.

### 2.3. Data collection

We conducted eight focus group interviews in August to November 2015. The methodology was chosen to enable comfortable discussion of a controversial topic among colleagues to obtain deeper insight into the problem under investigation.[24,25] One focus group was a homogeneous group of nurses and another of physicians. Six focus groups were heterogeneous with nurses and physicians together. We constructed a semistructured interview guide based on clinical experience and relevant literature.[26] The key questions were "What medications are you familiar with and use to treat ICU delirium?" and "What non-pharmacologic interventions are you familiar with?" (Box 1). All interviews were moderated by the first author who had experience in planning, facilitating, and analysing focus group interviews. Two observers took notes without active participation and assisted the moderator in discussion and debriefing after each interview. Interviews were conducted in a room near the ICU and lasted 28–55 min. The interviews were digitally recorded and professionally transcribed verbatim.

### 2.4. Data analysis

Our process of analysis followed the five stages of the framework method.[21] Inductive coding was performed line by line, and an initial coding matrix was constructed. During indexing, data were arranged according to the matrix. During the charting stage, we categorised data from physicians, nurses, and experts. During the mapping stage, the final matrix was constructed.[21] We used

**Box 1**
Questioning Route.

Opening question

- Please present yourselves with your name, title, and how long you have worked in ICU.

Introductory questions

- Please describe a satisfactory experience of managing a patient with ICU delirium.
- Please describe an unsatisfactory experience of managing a patient with ICU delirium.

Transition questions

- What medications are you familiar with and use to treat ICU delirium?
- What non-pharmacologic interventions are you familiar with?

Key Questions

- What medications do you prefer for the treatment of ICU delirium?
- If you were to treat a patient today, what intervention would you choose?

Ending Questions

- How would you choose to administer haloperidol, fixed, or PRN dose?
- What dosage in milligrams would you choose?
- In your opinion, what is the best way to manage ICU delirium?
- Do you have additional comments or questions?

computer software NVivo, version 10, (QRS International Pty Ltd, Doncaster, Victoria, Australia) to organise our data.[27]

### 2.5. Our preconceptions

Preconceptions (prejudices) are regarded in Gadamerian hermeneutics as conditions of understanding.[28] The authors discussed their preconceptions and used them as a resource for the analysis to reduce potential bias. The research team consisted of a primary investigator (doctoral student), two clinical study nurses, and two experienced qualitative researchers. The teams' experience and knowledge were rooted in health and nursing science, with core values of establishing a close relationship for interacting with individual patients and relatives. During analysis, the research team supplemented and contested each other's views and negotiated consensus on the final interpretation of the results. This contributed to the trustworthiness of our results.[29]

### 2.6. Ethical considerations

Each participating ICU management team approved the study in accordance with the Danish Data Protection Agency. All participants consented to participate after receiving verbal and written information on the study. Participants were assured that participation was voluntary and that all data were handled confidentially.

## 3. Findings

We conducted eight focus group interviews at five ICUs with a total of 24 nurses and 15 physicians (28 females and 11 males) with median ICU experience of 9 years (range 0–35) (Table 1).

### 3.1. Main themes

Initial inductive coding resulted in 33 codes that were reduced to four themes. After further analysis and condensation, the authors agreed on three themes and six subthemes: (1) Too treat or not to treat (calm patient and agitated patient), (2) Protocolised practice (personal preferences and protocolised practice), and (3) Care or cure (non-pharmacological approaches and pharmacological approaches) (Table 2).

#### 3.1.1. Too treat or not to treat

The participants in our study agreed that contemporary practice included the integration of delirium screening tools and regular patient assessment to detect delirium. The delirium phenotype as calm (hypoactive) or agitated (hyperactive) was essential for the decision to treat or not to treat (Fig. 1). If the patient appeared calm and compliant, no further action was deemed necessary. If the patient was either agitated or calm, hallucinated, and sleep deprived (>24 h), pharmacological intervention was considered.

**Table 2**
Themes and subthemes.

| Themes | Subthemes |
|---|---|
| To treat or not to treat | Calm patient<br>Agitated patient |
| Experience versus evidence | Personal preferences<br>Protocolised practice |
| Care or Cure | Non-pharmacological approaches<br>Pharmacological approaches |

*3.1.1.1. Calm patient.* Calm and compliant patients were considered harmless and not in need of pharmacological intervention as they did not pose any danger to themselves or the staff. The participants adopted a stance of beneficence in arguing that unnecessary pharmacological intervention should be avoided to reduce the potential risk of adverse effects caused by prolonged use and potential side-effects. If a calm patient demonstrated hallucinations or lack of sleep within the past 24 h, pharmacological interventions were considered.

> *"If a patient is calm and accepts ICU treatment, I think we're happy. The goal is to avoid sedatives. It's okay that the patient still shows other symptoms of delirium." (Physician FG5).*

*3.1.1.2. Agitated patient.* The participants regarded agitated patients as potentially dangerous and therefore in need of immediate pharmacological intervention. The advantages and disadvantages were discussed, including negative side-effects of sedatives and antipsychotics. In cases of severe agitation and combativeness and unresponsiveness to antipsychotic treatment, participants agreed that sedatives should be used to subdue the patient. An expert participant stressed that reducing the duration of delirium was a sign of success.

> *"… suddenly the patient was out of bed, found a pair of scissors, cut the electrical cords, and threatened the staff … he ended up getting a complete cocktail of propofol, fentanyl, clonidine, and midazolam … he got the whole package … it lasted a week … we had to use the whole arsenal." (Expert nurse, FG4).*

> *"I feel I've failed when I have to sedate a patient with delirium." (Expert physician, FG 8).*

**Table 1**
Participant demographics and contextual information.

| Focus group | Duration in minutes | Participants RN/MD | Sex F/M | Years in ICU median (range) | Location | First choice |
|---|---|---|---|---|---|---|
| FG 1 | 35 min. | 5/0 | 4/1 | 6 (3–8) | University Hospital A | Haloperidol |
| FG 2 | 37 min. | 0/5 | 3/2 | 5 (1–10) | University Hospital A | Haloperidol |
| FG 3 | 40 min. | 3/2 | 3/2 | 7 (1–15) | University Hospital A | Haloperidol |
| FG 4 | 28 min. | 1[a]/1 | 1/1 | 9 (7–10) | University Hospital B | Olanzapine |
| FG 5 | 33 min. | 4/2 | 5/1 | 6 (1–15) | University Hospital B | Olanzapine |
| FG 6 | 41 min. | 4/2 | 5/1 | 23 (9–35) | Regional Hospital C | Haloperidol |
| FG 7 | 37 min. | 3/1 | 3/1 | 24 (9–30) | Regional Hospital D | Haloperidol |
| FG 8 | 55 min. | 4/2[a] | 4/2 | 13 (5–16) | University Hospital E | Haloperidol |
| Total | 5.1 h | 24/15 (N = 39) | 28/11 | 9 (1–35)<br>RN 9 (1–30)<br>MD 15 (1–35) | | |

FG = focus group; RN = nurse; MD = physician, F = female, M = male; ICU = intensive care unit..
First choice = first choice per protocol medication for delirium management.
[a] Expert participant.

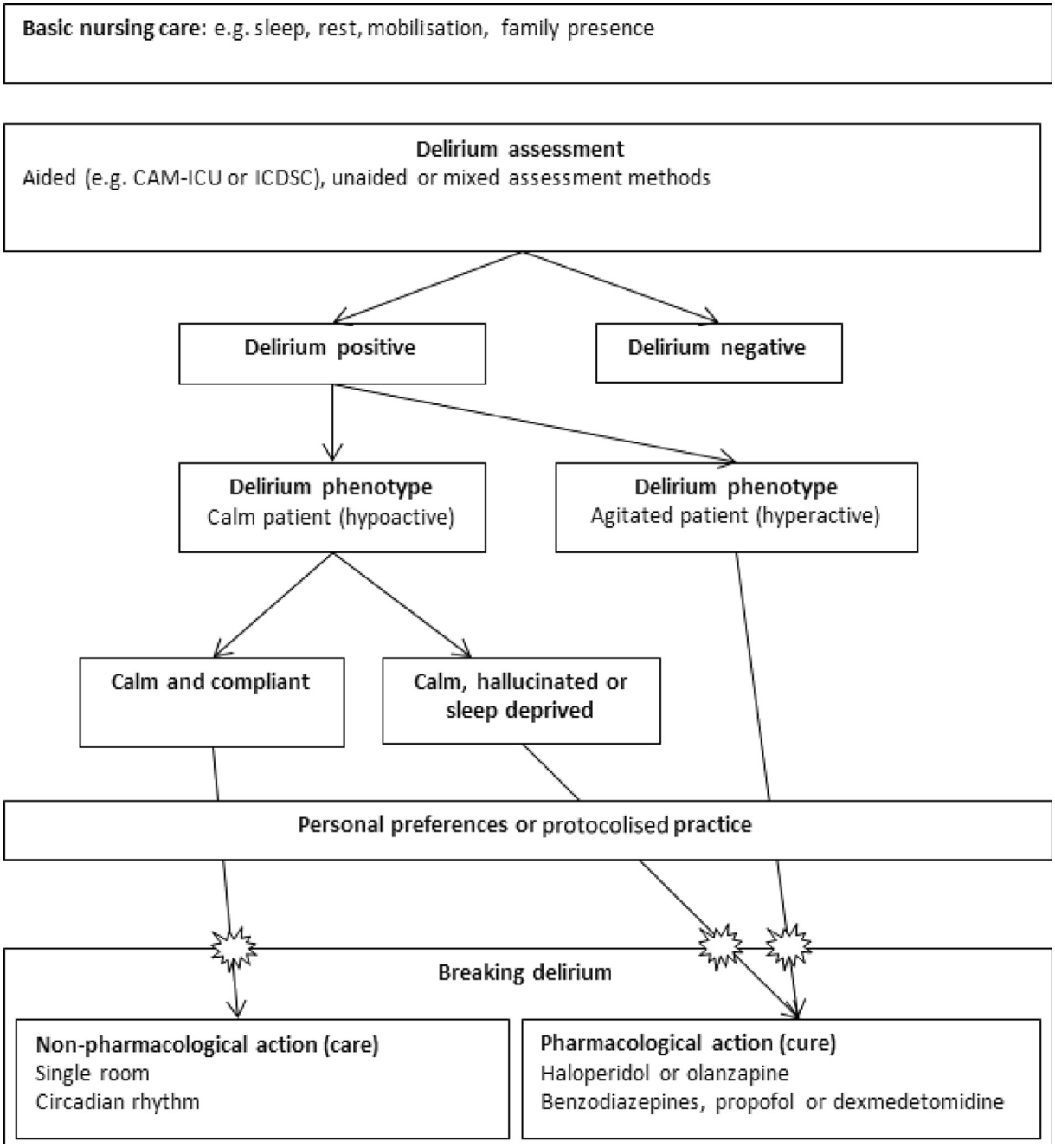


**Fig. 1.** Algorithm of delirium management. CAM-ICU = Confusion Assessment Method for the Intensive Care Unit; ICDSC = Intensive Care Delirium Screening Checklist.

*3.1.2. Experience versus evidence*

The participants relied on different combinations of experience or evidence to manage delirium. In situations with weak evidence or lack of recommendations, delirium management depended on the decision of the individual clinician.

> *"Yes, it's a BAD experience when our treatments vary so much that it depends on what nurses and doctors are on duty; so some days the patients get A LOT of medications—it could be haloperidol or something—and other days they might get nothing because we think it's bad for the patient." (Physician FG2)*

*3.1.2.1. Personal preferences.* The participants were more reliant on personal preferences if the protocol failed to provide evidence-based recommendations. Personal preferences were based on personal experiences and shared knowledge in the unit. The participants agreed that both non-pharmacological and pharmacological interventions were needed to manage delirium. When deciding to medicate, antipsychotics or sedatives were often preferred, even if they were not the per protocol first choice (Table 1).

> *"One of the first things, if (the patients) don't sleep and are CAM-ICU positive, is to relatively quickly start with 5 mg (haloperidol) …" (Physician, FG4)*

In *hypoactive delirium* (calm and compliant patient), physicians preferred not to medicate in order to minimise the long-term risks of polypharmacy and continued use of standing orders. Over

medication was avoided to enable assessment of signs of delirium and pain.

In *hyperactive delirium* (agitated patient), most nurses and physicians preferred haloperidol based on personal experience. If the patient was unresponsive to the first line of treatment, the second choice was also dependent on personal preferences. The participants had positive experiences using dexmedetomidine for overnight sedation although it was not recommended in the protocol. In cases of severe agitation, infusions of benzodiazepines or propofol were used to induce sleep, even during the day. Non-pharmacological strategies, such as moving a patient to a single room or mobilising to a chair, were based on individual preferences of the staff.

*3.1.2.2. Protocolised practice.* The delirium protocol was considered useful for patients with predictable responses. Although haloperidol was the first choice in many protocols, some physicians avoided its use for fear that it would postpone symptoms and increase agitation at a later time. Physicians preferred PRN orders over standing orders to reduce the risk of over medication, but they rarely documented the reason. Nurses, however, preferred standing orders, because PRN orders shifted the responsibility for delirium management from physicians to nurses.

> *"We actually have a guideline for using haloperidol … but we don't use it systematically, I would say" (Nurse FG6)*

*3.1.3. Care or cure*

When caring for a delirious patient, the participants wanted to "break delirium". Metaphorically this suggests that delirium was perceived as a condition that could be "conquered" by nursing care or medication. The ideal was integration of the two approaches, but medications were the first choice in dangerous situations.

> *"When the patient is agitated, I wish to 'break' delirium." (Physician, FG 6).*

*3.1.3.1. Non-pharmacological approaches.* All participants agreed that non-pharmacological solutions were basic to the tenets of good nursing care. One of the primary non-pharmacological interventions was to support the circadian rhythm of the patient. The institutional day–night rhythm was out of sync with the natural rhythm of the patient. Initiatives to support the patient's circadian rhythm included the provision of a private room and individualised early mobilisation, when possible.

> *"Nurses prefer a non-pharmacological approach. It feels right, and it's a natural part of nursing care." (Nurse, FG5)—All agreed by nodding their heads.*

*3.1.3.2. Pharmacological approaches.* Pharmacological approaches were chosen for delirious and agitated patients. Haloperidol was the first choice in six of the eight units in the study. If haloperidol was ineffective, the second choice depended on the severity of agitation. In severe cases, benzodiazepines or propofol were used to immediately sedate the patient. In less severe cases, dexmedetomidine was used to "break" delirium and let the patient sleep during the night. One unit recommended olanzapine as the first choice of medication. The remaining units recommended benzodiazepines as second choice and reserved haloperidol for hallucinating patients. Nurses preferred to use dexmedetomidine at night if the physician agreed. We have consolidated our findings in an algorithm depicting the participants' practice of delirium management (Fig. 1). The figure is descriptive, not prescriptive.

> *"When the patient has already become agitated, it's difficult to use non-pharmacologic interventions." (Physician FG5)—Nurses nodded in agreement.*

> *"In MY experience (dexmedetomidine) induces better sleep than small doses of haloperidol and letting the patient drift in and out of sleep throughout the night." (Nurse FG1)*

## 4. Discussion

The main issues identified in our study were (1) the decision to treat or not to treat delirious ICU patients based on the delirium phenotype, (2) the decision to act on the basis of experience or evidence, and (3) the decision to intervene using nursing care or medications. Our main results are depicted in an algorithm of contemporary delirium management at Danish ICUs (Fig. 1). The intention to "break" delirium suggested that health professionals considered delirium as a condition amenable to treatment. When deciding to medicate, haloperidol or olanzapine were the first line of per protocol agents, but the actual choice depended on the experience and preferences of the individual clinician.

Our first theme was to determine what patients to treat depending on the delirium phenotype. Our participants were treated if patients showed signs of agitation, hallucinations, or sleep deprivation and avoided pharmacological agents in calm and compliant patients. The rationale was to avoid over medication, but more evidence is needed regarding best way to manage hypoactive delirium. Studies have shown that hypoactive delirium might be associated with a poorer prognosis than hyperactive delirium.[30] Independent of age, gender, comorbidity, dementia, and delirium severity, mortality is higher in hypoactive patients at 1-year follow-up than hyperactive patients.[31] Moreover, hypoactive delirium is more likely to be overlooked, and the long-term outcomes are worse than in patients with agitated delirium.[32] The well meant beneficent approach to hypoactive delirium might therefore be relevant to discuss in future protocols and training of ICU professionals.

Our second theme was to determine whether to base decisions primarily on experience or evidence. This theme draws on the principles of evidence-based practice, described by Sackett (1996) as "the conscientious, explicit, and judicious use of current best evidence in making decisions about the care of individual patients".[33] The cornerstones of evidence-based practice have been described as external evidence, clinical judgement, local information, and patient preferences.[34] The findings in our study support the supposition that decisions are based on many kinds of knowledge as the clinician strives to make the best decision for (or with) the individual patient. A sounder evidence-base, however, is still needed for the recommendations in updated delirium protocols.

Our third theme was to determine whether to manage delirium by care or cure. Nursing care is in its essence, the backdrop for treatment and healing, while ensuring basic patient needs. According to Nightingale, nurses must put the patients in the best condition for nature to act upon them.[35] As such, Nightingale's environmental nursing model stresses the importance of managing air, ventilation, noise, light, nutrition, cleanliness, and bedding among elements that support nature's healing powers.[36] These are all potential means to delirium management by supporting rest and sleep and letting nature take its course. The 14 fundamental human needs identified by Henderson expand these elements, e.g. breathing, eating and drinking, elimination, moving, sleeping, avoiding injury, etc.[37] We recognise many of the fundamental

needs as management measures against delirium, but when basic nursing care is inadequate, medical treatment might become necessary to manage delirium. New potential avenues of treatment combine the principles of care and cure, such as melatonin to maintain the circadian rhythm.[38] The participants in our study used dexmedetomidine as overnight sedation for agitated patients. We question this approach as the best solution because dexmedetomidine might not induce the type of natural sleep required to restore the brain in non-healthy adults.[39] More knowledge is needed on the types of sleep obtained and their restorative effects in ICU patients. The ongoing Basel ProDex trial compares dexmedetomidine and propofol as overnight sedation in hyperactive and mixed delirious patients and might provide the evidence needed.[40] When breaking delirium, the treatment goal becomes a matter of urgency, suggesting that ICU delirium can be alleviated or cured in the matter of days or hours. New insights from follow-up studies of ICU patients show long-term cognitive and health-related problems after ICU delirium.[8,41] Trials into the prevention of delirium are emerging. As such, the REDUCE trial has shown that low dose haloperidol is ineffectual in delirium prevention.[42] More knowledge is needed to know how best to respond to ICU delirium to prevent the long-term consequences.

When choosing pharmacological solutions, our participants disagreed on the use of PRN orders. Physicians regarded PRN orders as a practical solution, but nurses viewed them as an unwelcome shift in responsibility. This might be explained by a similar study, where physicians regarded delirium as a low priority area of intensive care medicine that could be relegated to nurses.[43] Although delirium causes long-term suffering, it has remained low priority compared to more life-threatening issues in ICU.[20,43] It was suggested by Zamoscik et al. that the low priority given to delirium screening is a cultural issue in ICU.[43] The participants in our study did not regard delirium as a low priority per se but described the lack of reliable evidence for its treatment as the main barrier to delirium management. Research has supported our findings that delirium management often varies according to the individual clinicians attending to the patient.[20] This is a modifiable factor that can be improved by large-scale international studies providing direction to the best practice in delirium management.

Our study was limited by the small sample size inherent to qualitative studies, but credibility (internal validity) was increased by a relatively large number of focus groups and the use of established research methodology. Social desirability bias might have affected the interviews because many participants knew the moderator, but potential bias was reduced by pursuing description of clinical experience. Trustworthiness was increased by maximum variation of participants, and credibility was supported by investigator triangulation during the course of the study.

## 5. Conclusion

Our study described an algorithm of contemporary delirium management in Danish ICUs based on qualitative inquiry. When evidence-based solutions are unclear, nurses and physicians rely on personal experience, collective experience, and best available evidence to determine which patients to treat and what methods to use to treat ICU delirium. Delirium management still needs clear objectives and guidelines with evidence-based recommendations for first-line treatment and subsequent treatment options.

## Authors' contributions

All authors have contributed substantially to the design, analysis, and interpretation of data and in drafting the article and approved the version for submission in Australian Critical Care. The first author performed data acquisition.

## Acknowledgements

The authors wish to thank the Innovation Foundation Denmark for contributing to fund the AID-ICU study. They wish to thank the following for their contributions to the data collection: Jenny Hall, Prylle Karlsen, and Henriette G. Henrichsen of Department of Intensive Care, Copenhagen University Hospital, Rigshospitalet, Denmark; Simone Engdahl of Department of Cardiothoracic Anaesthesiology, University Hospital Rigshospitalet, Copenhagen, Denmark; and Christina Storm of Acute Medical Admission Unit, Frederiksberg Hospital, Copenhagen, Denmark.

## Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.aucc.2018.07.001.

## References

[1] Pandharipande PP, Ely EW, Arora RC, Balas MC, Boustani MA, La Calle GH, et al. The intensive care delirium research agenda: a multinational, interprofessional perspective. Intensive Care Med June 2017. https://doi.org/10.1007/s00134-017-4860-7.

[2] Boustani M, Rudolph J, Shaughnessy M, Gruber-Baldini A, Alici Y, Arora RC, et al. The DSM-5 criteria, level of arousal and delirium diagnosis: inclusiveness is safer. BMC Med 2014;12(1):141. https://doi.org/10.1186/s12916-014-0141-2.

[3] Ely EW, Shintani A, Truman B, Speroff T, Gordon SM, Harrell Jr FE, et al. Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit. J Am Med Assoc 2004;291(14):1753–62. https://doi.org/10.1001/jama.291.14.1753.

[4] Collet MO, Caballero J, Sonneville R, Bozza FA, Nydahl P, Schandl A, et al. Prevalence and risk factors related to haloperidol use for delirium in adult intensive care patients: the multinational AID-ICU inception cohort study. Intensive Care Med May 2018. https://doi.org/10.1007/s00134-018-5204-y.

[5] Salluh JI, Soares M, Teles JM, Ceraso D, Raimondi N, Nava VS, et al. Delirium epidemiology in critical care (DECCA): an international study. Crit Care 2010;14(6):R210. https://doi.org/10.1186/cc9333.

[6] Klein Klouwenberg PMC, Zaal IJ, Spitoni C, Ong DS, van der Kooi AW, Bonten MJ, et al. The attributable mortality of delirium in critically ill patients: prospective cohort study. BMJ 2014;349:g6652. http://www.pubmedcentral.nih.gov/articlerender.fcgi?artid=4243039&tool=pmcentrez&rendertype=abstract [Accessed 10 March 2015].

[7] Mehta S, Cook D, Devlin JW, Skrobik Y, Meade M, Fergusson D, et al. Prevalence, risk factors, and outcomes of delirium in mechanically ventilated adults. Crit Care Med 2015;43(3):557–66. https://doi.org/10.1097/CCM.0000000000000727.

[8] Pandharipande PP, Girard TD, Jackson JC, Morandi A, Thompson JL, Pun BT, et al. Long-term cognitive impairment after critical illness. N Engl J Med 2013;369(14):1306–16. https://doi.org/10.1056/NEJMoa1301372.

[9] Milbrandt EB, Deppen S, Harrison PL, Shintani AK, Speroff T, Stiles RA, et al. Costs associated with delirium in mechanically ventilated patients. Crit Care Med 2004;32(4):955–62. http://www.ncbi.nlm.nih.gov/pubmed/15071384 [Accessed 19 April 2015].

[10] Peterson JF, Pun BT, Dittus RS, Thomason JW, Jackson JC, Shintani AK, et al. Delirium and its motoric subtypes: a study of 614 critically ill patients. J Am Geriatr Soc 2006;54(3):479–84. https://doi.org/10.1111/j.1532-5415.2005.00621.x.

[11] Maldonado JR. Neuropathogenesis of delirium: review of current etiologic theories and common pathways. Am J Geriatr Psychiatry 2013;21(12):1190–222. https://doi.org/10.1016/j.jagp.2013.09.005.

[12] Barr J, Fraser GL, Puntillo K, Ely E, Gélinas C, Dasta JF, et al. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit. Crit Care Med 2013;41(1):263–306. https://doi.org/10.1097/CCM.0b013e3182783b72.

[13] Barnes-Daly MA, Phillips G, Ely EW. Improving hospital survival and reducing brain dysfunction at Seven California Community Hospitals: Implementing PAD guidelines via the ABCDEF bundle in 6,064 patients. Crit Care Med 2017;45(2):171–8. https://doi.org/10.1097/CCM.0000000000002149.

[14] Soja SL, Pandharipande PP, Fleming SB, Cotton BA, Miller LR, Weaver SG, et al. Implementation, reliability testing, and compliance monitoring of the confusion assessment method for the intensive care unit in trauma patients. Intensive Care Med 2008;34(7):1263–8. https://doi.org/10.1007/s00134-008-1031-x.

[15] Kalabalik J, Brunetti L, El-Srougy R. Intensive care unit delirium: a review of the literature. J Pharm Pract 2014;27(2):195–207. https://doi.org/10.1177/0897190013513804.
[16] Devlin JW, Bhat S, Roberts RJ, Skrobik Y. Current perceptions and practices surrounding the recognition and treatment of delirium in the intensive care unit: a survey of 250 critical care pharmacists from eight states. Ann Pharmacother 2011;45(10):1217–29. https://doi.org/10.1345/aph.1Q332.
[17] Devlin JW, Fong JJ, Howard EP, Skrobik Y, McCoy N, Yasuda C, et al. Assessment of delirium in the intensive care unit: nursing practices and perceptions. Am J Crit Care 2008;17(6):555–65. quiz 566, http://www.ncbi.nlm.nih.gov/pubmed/18978240 [Accessed 25 March 2013].
[18] Oxenbøll-Collet M, Egerod I, Christensen V, Jensen J, Thomsen T. Nurses' and physicians' perceptions of confusion assessment method for the intensive care unit for delirium detection: focus group study. Nurs Crit Care 2018;23(1):16–22. https://doi.org/10.1111/nicc.12254.
[19] Egerod I, Albarran JW, Ring M, Blackwood B. Sedation practice in Nordic and non-Nordic ICUs: a European survey. Nurs Crit Care 2013;18(4):166–75. https://doi.org/10.1111/nicc.12003.
[20] Palacios-Ceña D, Cachón-Pérez JM, Martínez-Piedrola R, Gueita-Rodriguez J, Perez-de-Heredia M, Fernández-de-las-Peñas C. How do doctors and nurses manage delirium in intensive care units? A qualitative study using focus groups. BMJ Open 2016;6(1), e009678. https://doi.org/10.1136/bmjopen-2015-009678.
[21] Gale NK, Heath G, Cameron E, Rashid S, Redwood S. Using the framework method for the analysis of qualitative data in multi-disciplinary health research. BMC Med Res Methodol 2013;13(1):117. https://doi.org/10.1186/1471-2288-13-117.
[22] Tong A, Sainsbury P, Craig J. Consolidated criteria for reporting qualitative research (COREQ): a 32-item checklist for interviews and focus groups. Int J Qual Health Care 2007;19(6):349–57. https://doi.org/10.1093/intqhc/mzm042.
[23] Fonsmark L, Hein L, Nibroe H, Bundgaard H, de Haas I, Iversen S, et al. Danish national sedation strategy. Targeted therapy of discomfort associated with critical illness. Danish Society of intensive care medicine (DSIT) and the Danish society of anesthesiology and intensive care medicine (DASAIM). Dan Med J 2015;62(4):C5052. C5052 [pii].
[24] Kitzinger J. Qualitative research. Introducing focus groups. BMJ 1995;311(7000):299–302. http://www.ncbi.nlm.nih.gov/pubmed/7633241 [Accessed 14 July 2017].
[25] Coenen M, Stamm TA, Stucki G, Cieza A. Individual interviews and focus groups in patients with rheumatoid arthritis: a comparison of two qualitative methods. Qual Life Res 2012;21(2):359–70. https://doi.org/10.1007/s11136-011-9943-2.
[26] Krueger RA, Casey MA. Focus groups. A practical guide for applied research. 4th ed. SAGE; 2009.
[27] Richard L. Handling qualitative data: a practical guide. 2005. ISBN 0-7619-4259-9.
[28] Gadamer H-G. In: Marshall DG, editor. Truth and method. 2nd ed. New York: Continuum; 1989. https://mvlindsey.files.wordpress.com/2015/08/truth-and-method-gadamer-2004.pdf [Accessed 28 July 2017].
[29] Malterud K. Qualitative research: standards, challenges, and guidelines. Lancet 2001;358(9280):483–8. https://doi.org/10.1016/S0140-6736(01)05627-6.
[30] Inouye SK, Westendorp RG, Saczynski JS. Delirium in elderly people. Lancet 2014;383(9920):911–22. https://doi.org/10.1016/S0140-6736(13)60688-1.
[31] Kiely DK, Jones RN, Bergmann MA, Marcantonio ER. Association between psychomotor activity delirium subtypes and mortality among newly admitted post-acute facility patients. J Gerontol A Biol Sci Med Sci 2007;62(2):174–9. http://www.ncbi.nlm.nih.gov/pubmed/17339642 [Accessed 14 November 2017].
[32] Marcantonio ER. Postoperative delirium. J Am Med Assoc 2012;308(1):73–81. https://doi.org/10.1001/jama.2012.6857.
[33] Ellis C. Evidence-based practice: a personal journey from scepticism to pragmatism. J Psychiatr Ment Health Nurs 2005;12(6):739–44. https://doi.org/10.1111/j.1365-2850.2005.00887.x.
[34] Rycroft-Malone J, Seers K, Titchen A, Harvey G, Kitson A, McCormack B. What counts as evidence in evidence-based practice? J Adv Nurs 2004;47(1):81–90. https://doi.org/10.1111/j.1365-2648.2004.03068.x.
[35] Hegge M. Nightingale's environmental theory. Nurs Sci Q 2013;26(3):211–9. https://doi.org/10.1177/0894318413489255.
[36] George J. Nursing Theories: the base for professional nursing practice. In: George Julia B, editor. Version details - Trove. 5th ed. New Jersey: Prentice Hall; 2002. https://trove.nla.gov.au/work/6194162?q&sort=holdings+desc&_=1514969458224&versionId=40561630 [Accessed 3 January 2018].
[37] Henderson V. ICN basic principles of nursing care. London: International Council of Nurses; 1960. http://www.worldcat.org/title/icn-basic-principles-of-nursing-care/oclc/70459521 [Accessed 3 January 2018].
[38] Luther R, McLeod A. The effect of chronotherapy on delirium in critical care – a systematic review. Nurs Crit Care May 2017. https://doi.org/10.1111/nicc.12300.
[39] Akeju O, Hobbs LE, Gao L, Burns SM, Pavone KJ, Plummer GS, et al. Dexmedetomidine promotes biomimetic non-rapid eye movement stage 3 sleep in humans: a pilot study. Clin Neurophysiol 2018;129(1):69–78. https://doi.org/10.1016/j.clinph.2017.10.005.
[40] Hollinger A, Ledergerber K, Von Felten S, Suttor R, Rüegg S, Gantner L, et al. Comparison of propofol and dexmedetomidine infused overnight to treat hyperactive and mixed ICU delirium: a protocol for the Basel ProDex clinical trial. BMJ Open 2017;7(7), e015783. https://doi.org/10.1136/bmjopen-2016-015783.
[41] Mitchell ML, Shum DHK, Mihala G, Murfield JE, Aitken LM. Long-term cognitive impairment and delirium in intensive care: A prospective cohort study. Australian Critical Care; July 20, 2017. http://www.ncbi.nlm.nih.gov/pubmed/28736089 [Accessed 20 March 2018].
[42] van den Boogaard M, Slooter AJC, Brüggemann RJM, Schoonhoven L, Beishuizen A, Vermeijden JW, et al. Effect of haloperidol on survival among critically ill adults with a high risk of delirium. J Am Med Assoc 2018;319(7):680. https://doi.org/10.1001/jama.2018.0160.
[43] Zamoscik K, Godbold R, Freeman P. Intensive care nurses' experiences and perceptions of delirium and delirium care. Intensive Crit Care Nurs 2017;40:94–100. https://doi.org/10.1016/j.iccn.2017.01.003.