Journal of Acute Care Occupational Therapy
Volume 5, Issue 2

Volume 5 Issue 2 Original Research

Delirium in the ICU: Prevalence and Opportunities for Occupational Therapy

Authors

Veronique Munier, OTD, OTR/L

Dana M. Howell, PhD, OTD, OTR/L, FAOTA

Renee Causey-Upton, PhD, OTD, OTR/L, CLA, FAOTA

Author Contact Information

Veronique Munier

Veronique_munier@yahoo.com

Recommended Citation

Munier, V., Howell, D.M., & Causey-Upton, R. (2023). Delirium in the ICU: Prevalence and Opportunities for Occupational Therapy. *Journal of Acute Care Occupational Therapy, 5*(2), 1-23. https://doi.org/10.64517/KDDZ8041

This original research is brought to you for free and open access. It has been peer-reviewed and accepted for inclusion in Journal of Acute Care Occupational Therapy by an authorized editor for this journal. For more information, please contact journalofacutecareOT@gmail.com.

Abstract

Background

Delirium affects 30% of patients in the intensive care unit and has been associated with increased length of stay and mortality. Occupational therapy shows promise to mitigate delirium and improve outcomes in the intensive care unit.

Methods

This retrospective chart review sought to estimate the prevalence of delirium, calculate the rate of assessment, and describe occupational therapy services in a medical intensive care unit to offer insight into opportunities for occupational therapy intervention addressing cognitive dysfunction (or delirium). The design was a retrospective chart review. Data was collected from the charts of 100 patients in one intensive care unit in the fall of 2021.

Results

The prevalence for delirium was 20%, which could be influenced by insufficient monitoring. During the study, 93 patients were monitored for delirium by nursing, and 6 were monitored by occupational therapists. Occupational therapy services were performed in 47 of the 100 cases reviewed, with mobilization being the most common intervention (44 cases), compared to activities of daily living (34 cases) and cognitive function (14 cases). Occupational therapy chart documentation included statements regarding delirium screening or intervention in 8 cases. The median number of days between admission and the first occupational therapy intervention was 4 with a wide variation (1 to 26 days).

Conclusion

The study highlights opportunities for occupational therapists to monitor and mitigate delirium in the intensive care unit, by screening for delirium using a variety of tools, documenting delirium intervention, integrating cognitive retraining, promoting early intervention, and performing early mobility.

Keywords: delirium, intensive care unit, occupational therapy

Background

Delirium is a behavioral syndrome characterized by an abrupt onset of inattention, decreased awareness of the environment, and changes in cognition and/or perception (American Psychiatric Association, 2013) that develops over hours or days. It is known to affect patients in the intensive care unit (ICU) in particular. Previous studies have established the prevalence of delirium in the ICU at 30% (Krewulak et al., 2020; Salluh et al., 2015) or as high as 53% during early waves of COVID-19 (Pun et al., 2021).

Although it is usually temporary, delirium correlates with important clinical outcomes such as mortality and length of stay and can be a symptom of sepsis (Krewulak et al., 2020; Salluh et al., 2015; Zhang et al., 2013). Delirium may interfere with participation in rehabilitation services (Kamdar et al., 2016). Although there is no pharmaceutical intervention approved for delirium, non-pharmaceutical interventions show promise, including early detection, early mobility, and occupational therapy (OT) intervention (Álvarez et al., 2017; Deemer et al., 2020; Herling et al., 2018; Kang et al., 2018; Sahawneh & Boss, 2021).

Occupational therapists (OTs) have developed intervention strategies and training programs to improve delirium management in the ICU as well as other settings (Álvarez et al., 2017; Evangelist & Gartenberg, 2016; Heyman, 2022; Laxton & Morrow, 2020; Lee et al., 2020; Pozzi et al., 2020; Rains & Chee, 2017; Schweickert et al., 2009; Tobar et al., 2017; Weinreich et al., 2017). More could be done to increase the dissemination and implementation of these strategies. For example, a recent study on OT's perception of their engagement in this area suggested that the role of OT with

older adults experiencing delirium (in a variety of settings) remains emerging rather than established, with therapists perceiving a lack of confidence in their skills and recognition from colleagues (Strecker & Hitch, 2021).

This exploratory research study sought to explore delirium assessment and intervention in a 12-bed ICU in a small (200 bed) urban hospital. The researchers' objectives included: 1) estimate the prevalence of delirium; 2) calculate the rate of delirium assessment; and 3) describe the characteristics and components of OT services.

Methods

The researchers received university Institutional Review Board approval prior to commencement of data retrieval with a retrospective chart review. To recruit, the investigator surveyed the electronic patient board daily to include each new patient admitted to the ICU. For each case, a random identification number was assigned and a medical record number was noted (no personal or protected health data were used). Data for the study, such as positive symptoms of delirium as well as OT services initiated or implemented were recorded in a separate document by each participant's random identification number. All retrieved data was recorded and stored electronically as well as saved on a portable drive kept in a locked drawer with the principal investigator. The principal investigator was a full-time OT at the study site and recorded all the data.

To assess delirium, the nurses were required to use the Intensive Care Delirium Screening Checklist (ICDSC) daily on all ICU patients. The ICDSC rates patients for hallmarks of delirium including altered consciousness and hallucinations, on a scale of 0

to 8 where a score higher than 4 suggests delirium. This tool has good psychometric properties (sensitivity = 0.87, specificity = 0.91) (Bergeron et al., 2001; Ho et al., 2020).

The principal investigator selected cases based on a single criterion: adults admitted to the study site's ICU between September 1st and October 31st 2021. Age, diagnosis, co-morbidities were not considered during the selection. One exclusion criteria was used regarding age limit, as patients below the age of 18 were not included in the data recording or analysis. A data extraction tool was designed as an Excel spreadsheet to collect age range, diagnosis, days in the ICU, days in the hospital, occurrence of delirium as assessed by the Intensive Care Delirium Screening Checklist (ICDSC), days of OT services, content of OT intervention, and occurrence of missed OT visits.

After data collection was completed, the principal investigator calculated delirium prevalence and rate of delirium assessment, means and median values based on normal distribution. After reading therapy notes, the principal investigator created categories to describe the components of OT intervention and calculate frequency for each.

Results

Demographic information

The median age of participants was 53 years old, with a range from 23 to 99 years. The most prevalent diagnoses during the data collection period were COVID-19 pneumonia (n=41, 41%), pneumonia (other) (n=19, 19%), withdrawal syndrome from substance use (n=8, 8%), and exacerbation of congestive heart failure and/or chronic

obstructive pulmonary disease (n=8, 8%). Length of stay ranged from 1 to 66 days, with a mean of 9 days. Thirty-three (n=33) patients died during their admission.

Prevalence of Delirium and Rate of Delirium Assessment in the ICU

The prevalence of delirium was 20% (n=20) including individuals who later died during hospitalization. To assess delirium screening compliance, the principal investigator compiled the number of days with at least one delirium assessment, all patients combined (737 days) and compared it to the number of days in the ICU, all patients combined (931 days). Delirium was assessed 80% of total ICU days. For a different perspective, the investigator also looked at the proportion of ICU patients assessed for delirium. Of all 100 patients, 93 were assessed at least once for delirium by nursing during their ICU stay.

Occupational Therapy Services

During the study time, 53% (n=53) of the 100 patients received a physician's order for OT services. Of those 53 patients, 89% (n=47) received services in the ICU while 11% (n=6) were deemed ineligible for services because of medical instability or inability to participate. 72% (n=34) of those 47 patients who received OT services in the ICU moved out of the ICU but remained in the hospital and continued to receive services on the ward. For this study, all OT sessions delivered to participants were included in the data considered, even those occurring after a patient had left the ICU although separate categories were created in the description.

OTs provided 251 sessions, with 42% (105 sessions) performed in the ICU, and 58% (146 sessions) performed in a non-critical telemetry unit. In addition, therapists attempted to see patients (but were not able to provide services for a variety of reasons,

discussed later in the article) on 85 occasions: 67 times in the ICU and 18 times in the non-critical telemetry unit.

The content of OT sessions was derived from therapy notes and further analyzed according to setting, separating ICU intervention from non-critical hospital intervention. Table 1 represents the number of occurrences for each intervention, as well as a more detailed description for each category. Note that more than one intervention can occur in a single therapy session (for example, standing and lower body dressing).

Table 1

Types of Intervention and Number of Occurrences for Each Intervention

Category	Intervention Detail	ICU	Non-critical unit
Mobility	Sitting edge of bed	71	136
	Standing	32	88
	Walking (to chair, in hallway)	58	123
TOTAL MOBILITY		**161**	**347**
ADLs	Upper body dressing	3	10
	Lower body dressing	14	28
	Grooming	31	27
	Bathing	1	10
	Toileting	6	13
	Self-feeding	0	5
TOTAL ADLS		**55**	**93**
Cognition	Delirium screen	8	0
	Re-orientation and stimulation	21	9
TOTAL COGNITION		**29**	**9**
Upper Extremities	Arm exercises	23	27
TOTAL UE		**23**	**27**
Other	Breathing technique	10	0
	Leisure, games	0	5
TOTAL OTHER		**10**	**5**

Note. UE= upper extremity

The most frequent interventions for both the ICU and the non-critical unit were focused on mobility (e.g., sitting edge of bed, standing, walking). A total of 161 mobility

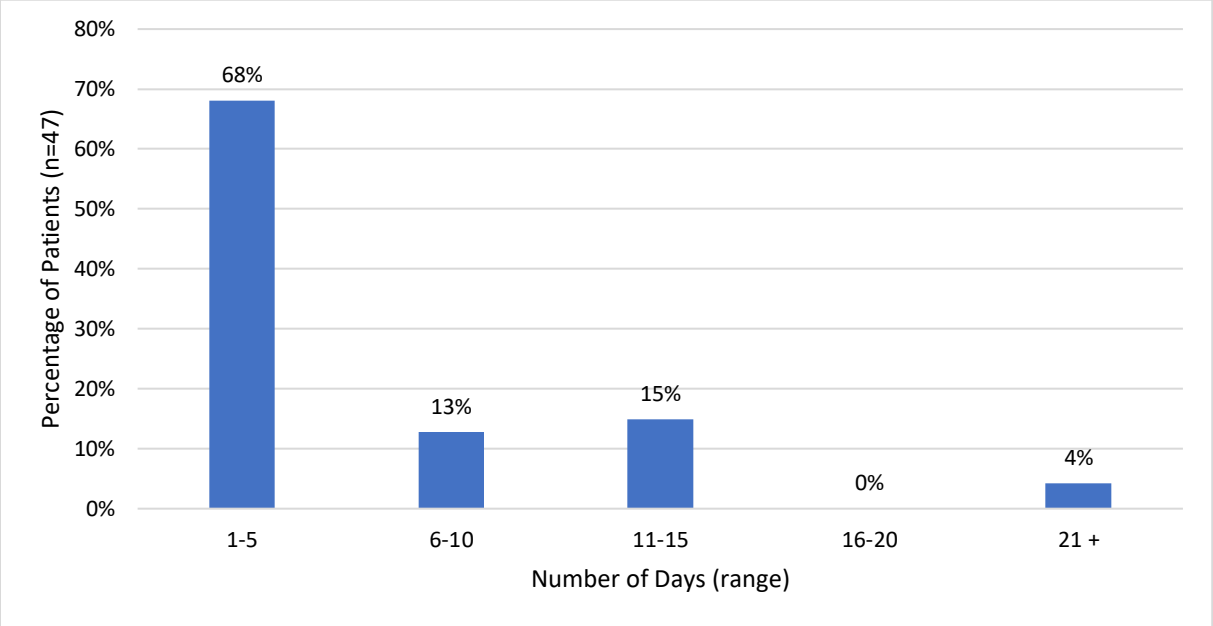
interventions in the ICU, and 347 mobility interventions out of ICU were performed. Following mobility, activity of daily living (ADL) training was the most common intervention with 55 occurrences in the ICU, and 93 out of the ICU. Therapists performed cognitive screening and stimulation 29 times in the ICU, versus 9 times out of the ICU, and addressed upper extremity exercises 23 times in the ICU, versus 27 times out of the ICU. Therapists were more likely to perform re-orientation/cognitive stimulation activities in the ICU than on the ward. Ward-based interventions (no occurring in the ICU) included bathing, self-feeding, and engagement in leisure tasks.

The prevalence of co-treatment with physical therapy was 54% (n=57 of 105 sessions) for the ICU and 70% (n=102 out of 146 sessions) for the ward. A majority (92%, n=146 out of 159) of the co-treatments contained a mobility intervention. Reasons for co-treating include fall risk, physical effort, and patient activity tolerance.

The median number of days a patient had been in the hospital before receiving services from an occupational therapist was 4 days, with a range of 1 to 26 days. Of note, 12 patients were seen 8 or more days after their admission to the ICU, and 2 patients were seen on day 25 of their ICU admission. Figure 1 provides a visualization of the distribution.

Figure 1

Percentage of Patients per Number of Days Before Occupational Therapy Services



There was a total of 85 documented attempts to provide OT services. 62 attempts were made in the ICU and the remaining 23 attempts were made on the unit. Table 2 organizes the attempts according to setting (ICU or unit).

Table 2

Reasons for Missed Visits

Reason	ICU	Unit
Medically unstable	26	4
Intubated	16	0
Low arousal	8	6
Unavailable	6	7
Agitated	4	0
Confused	1	0
Refused	1	6

The most common reasons for a missed visit (attempt) in the ICU were medical instability and endotracheal intubation. Medical instability was most often determined by nursing and documented by therapists in the following manner, “nursing requests holding due to medical instability/poor respiratory status/poor prognosis”. On the non-ICU floors, patients most often missed an OT session because they were unavailable, were difficult to arouse, or because they refused.

Discussion

Delirium

Identifying factors influencing the development of delirium remains challenging but early detection is thought to be crucial (Chen et al., 2020). Studies prior to COVID-19 reported a prevalence rate of 30% of delirium in the ICU, with prevalence increasing to around 50% during the pandemic (Krewulak et al., 2018; Pun et al., 2021; Salluh et al., 2010). The calculated rate of delirium was 20%, which may point to inadequate monitoring. Nurses monitored patients on 80% of days rather than the study setting’s standard of 100%. It is also possible that delirium was missed by nursing during assessment. At least one research study estimated that nurses can fail to detect delirium in up to 75% of the cases (Rice et al., 2011). In this sample, one of the reasons for missed delirium detection cases may have been the use of a tool (the ICDSC) that relies on verbal occurrences. 52% of patients were deemed impossible to score at least once, either because of lethargy or inability to communicate. Other tools available, such as the Confusion Assessment Method for the ICU (CAM-ICU), may offer greater sensitivity to detect delirium, and the involvement of other disciplines such as OT may increase compliance (Evangelist & Gartenberg, 2016; Laxton & Morrow, 2020).

The presence of delirium may have affected the provision of OT services. Medical instability was the main reason for holding therapy services, which may or may not carry an additional diagnosis of delirium. However, the sessions missed because of "low arousal" (8), "agitation" (4) or confusion (1), may be attributed to delirium, since they reflect known aspects of delirium presentation and since those reasons were more common in the ICU. This may indicate that a small number of sessions (13) were not performed specifically because of delirium, and that the presence of delirium has the potential to affect participation in therapy services as was suggested in one systematic review (Johnson et al., 2020).

Occupational Therapy Intervention

Although OTs did not specify in their documentation that they were targeting delirium, they provided mobility and ADL training services which are known to reduce days of delirium (Schweickert et al., 2009). In addition, there were 21 instances of re-orientation/cognitive stimulation interventions and 8 instances of delirium assessment which suggested that OTs were integrating principles of delirium management in their practice. It could also be argued that in order to provide any OT services, a therapist usually attempts communication which constitutes a form of re-orientation. Evidence suggests that regular engagement in cognitive stimulation through OT services may mitigate delirium and a recent review of OT services in the ICU (Álvarez et al., 2017; Costigan et al., 2019) reported that cognitive interventions should be integral to practice in the ICU.

The number of days a patient is in the ICU before receiving OT services should be no more than 7 days, according to a recent expert analysis, to avoid serious

complications from immobility and lack of stimulation (Menges et al., 2021). In this study, the median was 4 days, with a variation of 1 to 26 days, and with 12 patients being seen 8 days after admission in the ICU. It is possible that the high proportion of patients with a COVID-19 diagnosis may have influenced these results, due to the acuity of the disease in the time of the study.

The emphasis on mobility may have affected how soon services could take place, since movement carries increased risk for falls and since patients with orotracheal intubation were not mobilized in this ICU. It should be noted that current practice standards and research (Devlin et al., 2018; Menges et al., 2021) do not consider intubation, in itself, as a counter-indication for the provision of therapy services or for mobility. However, local hospital practices vary. Emphasis on other modes of intervention, such as re-orientation, the development of a program for early intervention with intubated patients, and the integration of a more comprehensive approach to delirium mitigation as outlined in expert guidelines may encourage earlier intervention (Balas et al., 2018). The high proportion of sessions devoted to mobility is consistent with a recent survey of OT intervention in the ICU (Heyman, 2022). Early mobility is considered an important strategy for mitigation of delirium (Balas et al., 2018). But so are ADL retraining and cognitive intervention (Álvarez et al., 2017; Tobar et al., 2017), which were also performed by OTs during this study. This suggests flexibility and opportunity for OTs to develop approaches to delirium mitigation outside of mobility, and support an occupation-based approach, as OTs incorporate self-care and leisure within sessions. The American Occupational Therapy Association Commission on Practice

(2022) recently drafted a position paper on critical care and OT practice, acknowledging the opportunity for OT to grow in this area.

Limitations

There were several limitations noted by the researchers. Firstly, the study design (a retrospective chart review) carries limitations. The timing of the data collection was determined out of convenience and coincided with an increase in patients being admitted with COVID-19 during one of the acute waves of the disease (a confounding factor for the development of delirium). This approach has influenced the results towards increased acuity, limited participation in OT services and increased difficulty performing delirium screening. Secondly, the investigators recognize limitations related to insufficient exclusion criteria. For example, some delirium researchers exclude cases of delirium caused by alcohol withdrawal (Trogrlić et al., 2015). Patients with poor prognosis and/or who expired during their admission were considered to have the same potential for participation in OT services as other patients and may therefore have been misclassified. Thirdly, the use of electronic records made it challenging to find information on OT intervention specifically for delirium, and may have influenced how therapists document their interventions, since delirium assessment was not part of the standard template.

Implications for Practice

There is potential for increased OT involvement within the ICU medical team to support daily screening for delirium. Current literature recommends consistent use of standardized cognitive screens for assessment of arousal for all ICU patients (Balas et al., 2018; Bell, 2009; Hodgson et al., 2014; Lai et al., 2017; Li et al., 2013; Menges et

al., 2021; Schweickert et al., 2009). OTs are well positioned to assess arousal and facilitate early occupation-based interventions for these patients. Whereas nurses at the study site were required to use the ICDSC, OTs could choose a tool based on the needs of the individual patient. For example, the CAM-ICU may be better suited for patients unable to communicate and is also the most commonly used tool for the care of acutely ill geriatric patients (Cuevas-Lara et al., 2019). A more consistent effort from OTs to assess delirium and communicate their findings may help increase monitoring rate while building a team approach to delirium management.

Interdisciplinary programs for delirium management generally recommend approaches that fit well within OT's scope of practice, such as frequent re-orientation (integrating familiar objects), sensory modulation, sleep intervention, and family involvement in care (Sahawneh & Boss, 2021). Although mobility is considered a valid strategy for mitigation of delirium, it is usually seen as part of a comprehensive program that includes other elements (Balas et al., 2018; Sahawneh & Boss, 2021).

In the literature, there continues to be limited knowledge about delirium and its management, a challenge for medicine and nursing (Palacios-Ceña et al., 2016). OTs have a distinct role to increase their presence and value in the ICU setting as providers of education on delirium to a variety of stakeholders, such as family members, and other health care professionals. Although most delirium education is focused on nursing staff, there has been a recent interest in the value of education for OTs to help decrease interprofessional barriers and improve delirium monitoring and intervention (Duggan et al., 2021; Foidel et al., 2020; Heyman et al., 2022; Lee et al., 2020). Future research should focus on identifying opportunities for developing specific OT intervention for

delirium prevention and mitigation as well as assessing the value of the intervention specific to patient short and long-term functional outcomes.

Conclusion

Delirium affects 30% of the ICU population and is associated with increased risk for mortality (Krewulak et al., 2020; Salluh et al., 2015). Furthermore, delirium can have a negative impact on patient's function and participation in everyday occupations. Non-pharmaceutical strategies, such as the ones outlined in expert guidelines, have garnered attention in recent years for their potential to mitigate delirium. The OT profession is well positioned to contribute to this effort of preventing and mitigating delirium. The development of specific OT intervention approaches is essential for treating functional decline associated with delirium. The findings from this study describe OT intervention sessions included early mobility, ADL re-training, and cognitive stimulation and strategy implementation, and highlight current gains and opportunities for OTs in the ICU.

References

Álvarez, E. A., Garrido, M. A., Tobar, E. A., Prieto, S. A., Vergara, S. O., Briceño, C. D., & González, F. J. (2017). Occupational therapy for delirium management in elderly patients without mechanical ventilation in an intensive care unit: A pilot randomized clinical trial. *Journal of Critical Care*, *37*, 85–90. https://doi.org/10.1016/j.jcrc.2016.09.002

American Occupational Therapy Association Commission on Practice. (2022). Critical care and occupational therapy practice (draft position statement). https://www.aota.org//media/a309c83eda5a46bc99bccdd78c0fd3e5.ashx?utm_source=Critical%20Care%20Feedback%20082922&utm_medium=email&utm_campaign=Feedback%20Requested%3A%20Critical%20Care%20and%20OT%20Practice%20Position%20Statement

American Psychiatric Association. (2013). *Diagnostic and statistical manual of mental disorders* (5th ed.). https://doi.org/10.1176/appi.books.9780890425596

Balas, M. C., Weinhouse, G. L., Denehy, L., Chanques, G., Rochwerg, B., Misak, C. J., Skrobik, Y., Devlin, J. W., & Fraser, G. L. (2018). Interpreting and implementing the 2018 Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption Clinical Practice Guideline. *Critical Care Medicine*, *46*(9), 1464–1470. https://doi.org/10.1097/CCM.0000000000003307

Bell, L. (2009). Achieving early mobility in mechanically ventilated patients. *American Journal of Critical Care*, *18*(3), 222–222. https://doi.org/10.4037/ajcc2009313

Bergeron, N., Dubois, M.-J., Dumont, M., Dial, S., & Skrobik, Y. (2001). Intensive Care Delirium Screening Checklist: Evaluation of a new screening tool. *Intensive Care Medicine*, *27*(5), 859–864. https://doi.org/10.1007/s001340100909

Chen, J., Yu, J., & Zhang, A. (2020). Delirium risk prediction models for intensive care unit patients: A systematic review. *Intensive & Critical Care Nursing*, *60*, 102880. https://doi.org/10.1016/j.iccn.2020.102880

Costigan, F. A., Duffett, M., Harris, J. E., Baptiste, S., & Kho, M. E. (2019). Occupational therapy in the ICU: A scoping review of 221 documents. *Critical Care Medicine, 47*(12), e1014–e1021. https://doi.org/10.1097/CCM.0000000000003999

Cuevas-Lara, C., Izquierdo, M., Gutiérrez-Valencia, M., Marín-Epelde, L., Zambom-Ferraresi, F., Contreras-Escámez, B., & Martínez-Velilla, N. (2019). Effectiveness of occupational therapy interventions in acute geriatric wards: A systematic review. *Maturitas*, *127*, 43–50. https://doi.org/10.1016/j.maturitas.2019.06.005

Deemer, K., Zjadewicz, K., Fiest, K., Oviatt, S., Parsons, M., Myhre, B., & Posadas-Calleja, J. (2020). Effect of early cognitive interventions on delirium in critically ill patients: A systematic review. *Canadian Journal of Anesthesia/Journal Canadien d'anesthésie*, *67*(8), 1016–1034. https://doi.org/10.1007/s12630-020-01670-z

Devlin, J. W., Skrobik, Y., Gélinas, C., Needham, D. M., Slooter, A. J. C., Pandharipande, P. P., Watson, P. L., Weinhouse, G. L., Nunnally, M. E., Rochwerg, B., Balas, M. C., van den Boogaard, M., Bosma, K. J., Brummel, N. E., Chanques, G., Denehy, L., Drouot, X., Fraser, G. L., Harris, J. E., … Alhazzani, W. (2018). Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU. *Critical Care Medicine*, *46*(9), e825–e873. https://doi.org/10.1097/CCM.0000000000003299

Duggan, M. C., Van, J., & Ely, E. W. (2021). Delirium assessment in critically ill older adults: Considerations during the COVID-19 pandemic. *Critical Care Clinics*, *37*(1), 175–190. https://doi-org.libproxy.eku.edu/10.1016/j.ccc.2020.08.009

Evangelist, M., & Gartenberg, A. (2016). Toolkit for developing an occupational therapy program in the ICU. *SIS Quaterly Practice Connections*, *1*(1), 20–22. https://higherlogicdownload.s3-external-1.amazonaws.com/AOTA/77be2231-102b-9879-7a95f67cd545d8e_file.pdf?AWSAccessKeyId=AKIAVRDO7IEREB57R7MT&Expires=1689259578&Signature=AglQG9x0edzQOuAAK%2FvMsgHfkV8%3D

Foidel, S. E., Birrer, C. M., Stinogel, A. K., & Krusen, N. E. (2020). Delirium in acute care: Occupational therapists' perspectives, experiences, and practice implications. *Journal of Acute Care Occupational Therapy*, *3*(1), 1–25. https://jacotorg.files.wordpress.com/2020/07/foidel-et-al._-original-research_summer-2020.pdf

Herling, S. F., Greve, I. E., Vasilevskis, E. E., Egerod, I., Bekker Mortensen, C., Møller, A. M., Svenningsen, H., & Thomsen, T. (2018). Interventions for preventing intensive care unit delirium in adults. *Cochrane Database of Systematic Reviews*, *2019*(1). https://doi.org/10.1002/14651858.CD009783.pub2

Heyman, K. (2022). Training on intensive care unit related Delirium: An education topic. *Journal of Acute Care Occupational Therapy*, *41*(1), 1–39. https://jacotorg.files.wordpress.com/2022/02/jacot_volume-4_issue-1_-winter-2022-_heyman-1.pdf

Ho, M., Montgomery, A., Traynor, V., Chang, C., Kuo, K. N., Chang, H., & Chen, K. (2020). Diagnostic performance of delirium assessment tools in critically ill patients: A systematic review and meta-analysis. *Worldviews on Evidence-Based Nursing*, *17*(4), 301–310. https://doi.org/10.1111/wvn.12462

Hodgson, C. L., Stiller, K., Needham, D. M., Tipping, C. J., Harrold, M., Baldwin, C. E., Bradley, S., Berney, S., Caruana, L. R., Elliott, D., Green, M., Haines, K., Higgins, A. M., Kaukonen, K.-M., Leditschke, I. A., Nickels, M. R., Paratz, J., Patman, S., Skinner, E. H., Young, P.J., Zanni, J.M., Denehy, L., Webb, S. A. (2014). Expert consensus and recommendations on safety criteria for active mobilization of mechanically ventilated critically ill adults. *Critical Care*, *18*(6), 658. https://doi.org/10.1186/s13054-014-0658-y

Johnson, D., Maylin, E., Hayes, L., Hair, C., & Sahathevan, R. (2020). A systematic review of the impact of delirium on allied health interventions: A surprising lack of data. *Neurology Asia*, 6. http://neurology-asia.org/articles/neuroasia-2020-25(1)-001.pdf

Kamdar, B.B., Combs, M.P., Colantuoni, E., King, L.M., Niessen, T.M., Neufeld, K.J., Collop, N.A., & Needham, D.M. (2016). The association of sleep quality, delirium, and sedation status with daily participation in physical therapy in the ICU. *Critical Care*, 20(1), article 261. https://doi.org/10.1186/s13054-016-1433-z

Kang, J., Lee, M., Ko, H., Kim, S., Yun, S., Jeong, Y., & Cho, Y. (2018). Effect of nonpharmacological interventions for the prevention of delirium in the intensive care unit: A systematic review and meta-analysis. *Journal of Critical Care*, *48*, 372–384. https://doi.org/10.1016/j.jcrc.2018.09.032

Krewulak, K. D., Stelfox, H. T., Ely, E. W., & Fiest, K. M. (2020). Risk factors and outcomes among delirium subtypes in adult ICUs: A systematic review. *Journal of Critical Care*, *56*, 257–264. https://doi.org/10.1016/j.jcrc.2020.01.017

Lai, C.-C., Chou, W., Chan, K.-S., Cheng, K.-C., Yuan, K.-S., Chao, C.-M., & Chen, C.-M. (2017). Early mobilization reduces duration of mechanical ventilation and intensive care unit stay in patients with acute respiratory failure. *Archives of Physical Medicine and Rehabilitation*, *98*(5), 931–939. https://doi.org/10.1016/j.apmr.2016.11.007

Laxton, L., & Morrow, M. (2020). The role of occupational therapy in delirium detection and management for critically ill clients. *SIS Quarterly Practice Connections*, *5*(2), 27–29. https://www.aota.org/publications/sis-quarterly/rehabilitation-disability-sis/rdsis-5-20

Lee, C. D., Chippendale, T. L., & McLeaming, L. (2020). Postoperative delirium prevention as standard practice in occupational therapy in acute care. *Physical & Occupational Therapy in Geriatrics*, *38*(3), 264–270. https://doi.org/10.1080/02703181.2020.1740374

Li, Z., Peng, X., Zhu, B., Zhang, Y., & Xi, X. (2013). Active mobilization for mechanically ventilated patients: A systematic review. *Archives of Physical Medicine and Rehabilitation*, *94*(3), 551–561. https://doi.org/10.1016/j.apmr.2012.10.023

Menges, D., Seiler, B., Tomonaga, Y., Schwenkglenks, M., Puhan, M. A., & Yebyo, H. G. (2021). Systematic early versus late mobilization or standard early mobilization in mechanically ventilated adult ICU patients: Systematic review and meta-analysis. *Critical Care*, *25*(1), 16. https://doi.org/10.1186/s13054-020-03446-9

Palacios-Ceña, D., Cachón-Pérez, J. M., Martínez-Piedrola, R., Gueita-Rodriguez, J., Perez-de-Heredia, M., & Fernández-de-las-Peñas, C. (2016). How do doctors and nurses manage delirium in intensive care units? A qualitative study using focus groups. *BMJ Open*, *6*(1), e009678. https://doi.org/10.1136/bmjopen-2015-009678

Pozzi, C., Lanzoni, A., Lucchi, E., Salimbeni, I., DeVreese, L. P., Belleli, G., Fabbo, A., & Morandi, A. (2020). Activity-based occupational therapy intervention for delirium superimposed on dementia in nursing home setting: A feasibility study. *Aging Clinical and Experimental Research*, *32*(5), 827–833. https://doi.org/10.1007/s40520-019-01422-0

Pun, B. T., Badenes, R., Heras La Calle, G., Orun, O. M., Chen, W., Raman, R., Simpson, B.-G. K., Wilson-Linville, S., Hinojal Olmedillo, B., Vallejo de la Cueva, A., van der Jagt, M., Navarro Casado, R., Leal Sanz, P., Orhun, G., Ferrer Gómez, C., Núñez Vázquez, K., Piñeiro Otero, P., Taccone, F. S., Gallego Curto, E., … Pandharipande, P. P. (2021). Prevalence and risk factors for delirium in critically ill patients with COVID-19 (COVID-D): A multicentre cohort study. *The Lancet. Respiratory Medicine*, *9*(3), 239–250. https://doi.org/10.1016/S2213-2600(20)30552-X

Rains, J., & Chee, N. (2017). The role of occupational and physiotherapy in multi-modal approach to tackling delirium in the intensive care. *Journal of the Intensive Care Society*, *18*(4), 318–322. https://doi.org/10.1177/1751143717720589

Rice, K. L., Gomez, M., & Foreman, M. D. (2011). Nurses' recognition of delirium in the hospitalized older adult. *Clinical Nurse Specialist, 13*, 299-311.

Sahawneh, F., & Boss, L. (2021). Non-pharmacologic interventions for the prevention of delirium in the intensive care unit: An integrative review. *Nursing in Critical Care*, *26*(3), 166–175. https://doi.org/10.1111/nicc.12594

Salluh, J. I. F., Han Wang, Schneider, E. B., Nagaraja, N., Yenokyan, G., Damluji, A., Serafim, R. B., & Stevens, R. D. (2015). Outcome of delirium in critically ill patients: Systematic review and meta-analysis. *British Medical Journal*, *350*(8011), h2538–h2538. https://doi.org/10.1136/bmj.h2538

Schweickert, W. D., Pohlman, M. C., Pohlman, A. S., Nigos, C., Pawlik, A. J., Esbrook, C. L., Spears, L., Miller, M., Franczyk, M., Deprizio, D., Schmidt, G. A., Bowman, A., Barr, R., McCallister, K. E., Hall, J. B., & Kress, J. P. (2009). Early physical and occupational therapy in mechanically ventilated, critically ill patients: A randomised controlled trial. *Lancet*, *373*, 1874-1882. https://doi.org/10.1016/S0140-6736(09)60658-9

Strecker, C., & Hitch, D. (2020). Perceptions of current occupational therapy practice with older adults experiencing delirium. *Australasian Journal on Ageing, 40*(3), e190-e198. https://doi.org/10.1111/ajag.12882

Tobar, E., Alvarez, E., & Garrido, M. (2017). Cognitive stimulation and occupational therapy for delirium prevention. *Revista Brasileira de Terapia Intensiva*, *29*(2). https://doi.org/10.5935/0103-507X.20170034

Trogrlić, Z., van der Jagt, M., Bakker, J., Balas, M. C., Ely, E. W., van der Voort, P. H., & Ista, E. (2015). A systematic review of implementation strategies for assessment, prevention, and management of ICU delirium and their effect on clinical outcomes. *Critical Care*, *19*(1), 157. https://doi.org/10.1186/s13054-015-0886-9

Weinreich, M., Herman, J., Dickason, S., & Mayo, H. (2017). Occupational therapy in the intensive care unit: A systematic review. *Occupational Therapy in Health Care*, *31*(3), 205–213. https://doi.org/10.1080/07380577.2017.1340690

Zhang, Z., Pan, L., & Ni, H. (2013). Impact of delirium on clinical outcome in critically ill patients: A meta-analysis. *General Hospital Psychiatry*, *35*(2), 105–111. https://doi.org/10.1016/j.genhosppsych.2012.11.003