



**Gdański Uniwersytet Medyczny**  
**Wydział Nauk o Zdrowiu**  
**z Instytutem Medycyny Morskiej i Tropikalnej**

**Rozprawa doktorska na stopień doktora w dziedzinie nauk  
medycznych i nauk o zdrowiu w dyscyplinie nauk o zdrowiu**

**Wiedza, bariery i praktyka pielęgniarstwa  
w opiece nad pacjentem z delirium w Oddziale  
Intensywnej Terapii**

*ang. Nurse knowledge, barriers and practice in the care of patients with delirium in the  
Intensive Care Unit*

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*Pragnę z całego serca podziękować wszystkim osobom,*

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*ukazanie tajników badań naukowych w pielęgniarstwie.*

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## 1. WYKAZ STOSOWANYCH SKRÓTÓW

<b>OIT</b>	-	Oddział Intensywnej Terapii
<b>ABCDEF</b>	<i>Assess, Prevent, and Manage Pain; Both Spontaneous Awakening Trials and Spontaneous Breathing Trials; Choice of analgesia and sedation; Delirium: Assess, Prevent, and Manage; Early mobility and Exercise; Family engagement and empowerment</i>	Ocena, zapobieganie i zarządzanie bólem; Próby spontanicznego przebudzenia, próby spontanicznego oddychania; Wybór analgezji i sedacji; Delirium: Ocena, zapobieganie, postępowanie; Wczesna mobilność i ćwiczenia; Zaangażowanie rodziny i wzmocnienie jej pozycji.
<b>NICE</b>	<i>National Institute for Health and Care Excellence</i>	Narodowy Instytut Doskonałości Zdrowia i Opieki
<b>CAM-ICU</b>	<i>Confusion Assessment Method Intensive Care Unit</i>	Metoda Oceny Splątania na Oddziale Intensywnej Terapii
<b>ICDSC</b>	<i>Intensive Care Delirium Screening Checklist</i>	Lista kontrolna Delirium na Oddziale Intensywnej Terapii
<b>NEECHAM</b>	<i>The Neelon and Champagne Confusion Scale</i>	-
<b>Nu-DESC</b>	<i>Nursing Delirium Screening Scale</i>	Pielęgniarska Skala Oceny Delirium
<b>CTD</b>	<i>Cognitive Test for Delirium</i>	Test Poznawczy dla Zaburzeń Świadomości
<b>PAIDS</b>	<i>Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption</i>	Ból, pobudzenie/sedacja, delirium, bezruch i zaburzenia snu
<b>HMG-CoA</b>	<i>3-hydroxy-3-methyl-glutaryl-coenzyme A reductase</i>	Reduktaza 3-hydroksy-3-metyloglutarylokoenzymu A

<b>EBM</b>	<i>Evidence-Based medicine</i>	Medycyna oparta na dowodach
<b>PICOS</b>	<i>Population, Intervention, Comparison, Outcomes and Study design</i>	Populacja, interwencja, porównanie, wyniki i projekt badania
<b>JBI</b>	<i>The Joanna Briggs Institute</i>	-
<b>PCC</b>	<i>Population, Concept, Context</i>	Populacja, koncepcja, kontekst
<b>PRISMA-ScR</b>	<i>Reporting Items for Systematic Reviews and Meta-analysis for Scoping Reviews</i>	-
<b>TRAPD</b>	<i>Translation, Review, Adjudication, Pretest and Documentation</i>	Tłumaczenie, przegląd, orzekanie, badanie wstępne i dokumentacja
<b>PTPAiIO</b>	-	Polskie Towarzystwo Pielęgniarstwa Anestezjologicznego i Intensywnej Opieki
<b>OIPiP</b>	-	Okręgowa Izba Pielęgniarek i Położnych
<b>rho</b>	<i>Spearman's correlation coefficient</i>	Współczynnik korelacji rang Spearmana
<b>AWS</b>	<i>Alcoholic withdrawal syndrome</i>	Alkoholowy zespół abstynencyjny
<b>DRS</b>	<i>Delirium Rating Scale</i>	Skala oceny delirium
<b>CIWA</b>	<i>Clinical Institute Withdrawal Assessment for Alcohol</i>	Skala nasilenia alkoholowego zespołu abstynencyjnego

## 2. WYKAZ PRAC WCHODZĄCYCH W SKŁAD ROZPRAWY DOKTORSKIEJ

W skład niniejszej rozprawy doktorskiej wchodzi następujące publikacje:

1. Lange, S.; Mędrzycka-Dąbrowska, W.; Friganović, A.; Oomen, B.; Krupa, S. Non-Pharmacological Nursing Interventions to Prevent Delirium in ICU Patients—An Umbrella Review with Implications for Evidence-Based Practice. *J. Pers. Med.* 2022, 12, 760. <https://doi.org/10.3390/jpm12050760>
2. Lange, S\* (autor korespondencyjny); Mędrzycka-Dąbrowska, W.; Friganović, A.; Religa, D.; Krupa, S. Family experiences and attitudes toward care of ICU patients with delirium: A scoping review. *Front Public Health.* 2022 23; 10:1060518. doi: 10.3389/fpubh.2022.1060518
3. Lange, S\* (autor korespondencyjny); Mędrzycka-Dąbrowska, W.; Tomaszek, L.; Wujtewicz, M.; Krupa, S. Nurses' knowledge, barriers and practice in the care of patients with delirium in the intensive care unit in Poland—A cross-sectional study. *Front. Public Health.* 2023 11:1119526. doi: 10.3389/fpubh.2023.1119526

**Tabela 1.** Wskaźniki biometryczne publikacji

Rok publikacji	Nazwa czasopisma	Tytuł pracy	Typ badania	IF	MEiN
2022	Journal of Personalized Medicine	Non-Pharmacological Nursing Interventions to Prevent Delirium in ICU Patients—An Umbrella Review with Implications for Evidence-Based Practice.	Przegląd parasolowy (ang. <i>Umbrella review</i> )	3,508	70
2022	Frontiers in Public Health	Family Experiences and Attitudes Towards Care of ICU Patients with Delirium: A Scoping Review	Przegląd zakresu (ang. <i>Scoping review</i> )	6.461	70
2023	Frontiers in Public Health	Nurses' knowledge, barriers and practice in the care of patients with delirium in the intensive care unit in Poland—A cross-sectional study.	Praca oryginalna (ang. <i>Original Research</i> )	6.461	70
<b>Razem</b>				<b>16,43</b>	<b>210</b>

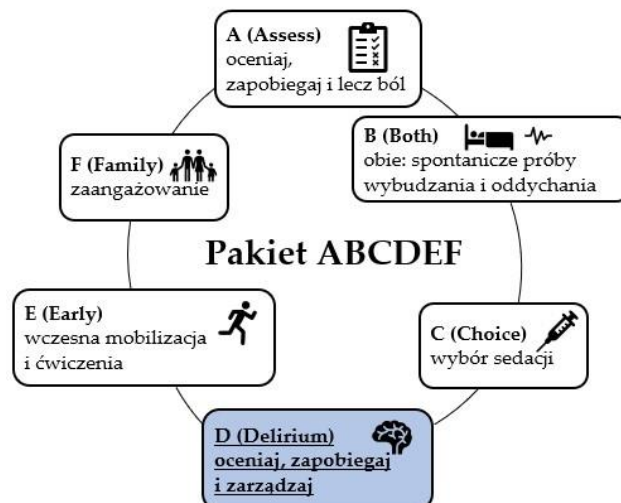
### 3. WPROWADZENIE

#### 3.1. Definicja, podtypy i czynniki ryzyka delirium

Delirium zwane również majaczeniem, jest definiowane jako ostre zaburzenie poznawcze, któremu towarzyszą wahania stanu psychicznego oraz zaburzenia uwagi i świadomości [1,2]. U pacjentów oddziałów intensywnej terapii (OIT) jest to powikłanie związane z wieloma niekorzystnymi konsekwencjami. Negatywnie wpływa na wyniki leczenia pacjentów, jest niezależnym predyktorem śmiertelności, wydłuża czas pobytu na OIT i powoduje zaburzenia funkcji poznawczych [3–5].

W celu optymalizacji procesu leczenia oraz powrotu do zdrowia pacjentów OIT, stworzony został pakiet opieki ABCDEF (Rycina1). Jest on opartym na dowodach naukowych przewodnikiem dla personelu medycznego, który zawiera jasno określone elementy, które umożliwiają objęcie pacjentów OIT wszechstronną opieką z wykorzystaniem multidyscyplinarnego zespołu oraz rodziny pacjentów. Pakiet ABCDEF obejmuje: ocenę, zapobieganie i leczenie bólu (**A**ssess, **P**revent, and **M**anage **P**ain), próby samoistnego przebudzenia (**B**oth Spontaneous Awakening Trials, **S**AT) i próby oddychania spontanicznego (Spontaneous Breathing Trials, **S**BT), wybór środka przeciwbólowego i sedacji (**C**hoice of analgesia and sedation), delirium: ocena, zapobieganie i leczenie (**D**elirium: **A**ssess, **P**revent, and **M**anage), wczesną mobilizację i ćwiczenia (**E**arly mobility and **E**xercise) oraz wzmocnienie zaangażowania i udział rodziny (**F**amily engagement and empowerment) [6].

Rycina 1. Pakiet ABCDEF [6]



Źródło: Opracowanie własne

Szacuje się, że delirium dotyka nawet do 80% pacjentów oddziałów intensywnej terapii [7,8]. Dokładna przyczyna majaczenia wciąż nie jest do końca jasna, ale etiologia jest najprawdopodobniej wieloczynnikowa [9]. W diagnostyce różnicowej i określeniu potencjalnych przyczyn majaczenia, często w praktyce klinicznej, stosowany jest algorytm I WATCH DEATH (Tabela 2) [10,11].

**Tabela 2.** Algorytm I WATCH DEATH [10,11]

Potencjalna przyczyna	Diagnostyka różnicowa
Infections (Infekcje)	HIV, sepsa, zapalenie płuc
Withdrawal (Odstawienie)	Alkohol, barbiturany, środki uspokajająco-hipnotyczne
Acute metabolic (Ostry metabolizm)	Kwasica, alkalozą, zaburzenia elektrolitowe, niewydolność wątroby, niewydolność nerek
Trauma (Urazy)	Zamknięty uraz głowy, udar cieplny, pooperacyjny, ciężkie oparzenia
CNS disease (Choroby Ośrodkowego Układu Nerwowego - OUN)	Ropień, krwotok, wodogłowie, krwakię podtwardówkowy, zakażenie, napady, udar, guzy, przerzuty, zapalenie naczyń, zapalenie mózgu, zapalenie opon mózgowych, kiła
Hypoxia (Hipoksja)	Anemia, zatrucie tlenkiem węgla, niedociśnienie, niewydolność płuc lub serca
Deficiencies (Niedobory)	Witamina B12, folian, niacyna, tiamina
Endocrinopathies (Endokrynopatie)	Hiper/hipoadrenokortycyzm, hiper/hipoglikemia, Obrzęk śluzowaty, nadczynność przytarczyc
Acute vascular (Ostra choroba naczyniowa)	Encefalopatia nadciśnieniowa, udar mózgu, arytmia, wstrząs
Toxins/drugs (Toksyne, leki)	Leki na receptę, nielegalne narkotyki, pestycydy, rozpuszczalniki
Heavy metals (Metale ciężkie)	Ołów, mangan, rtęć

**Źródło:** Opracowanie własne

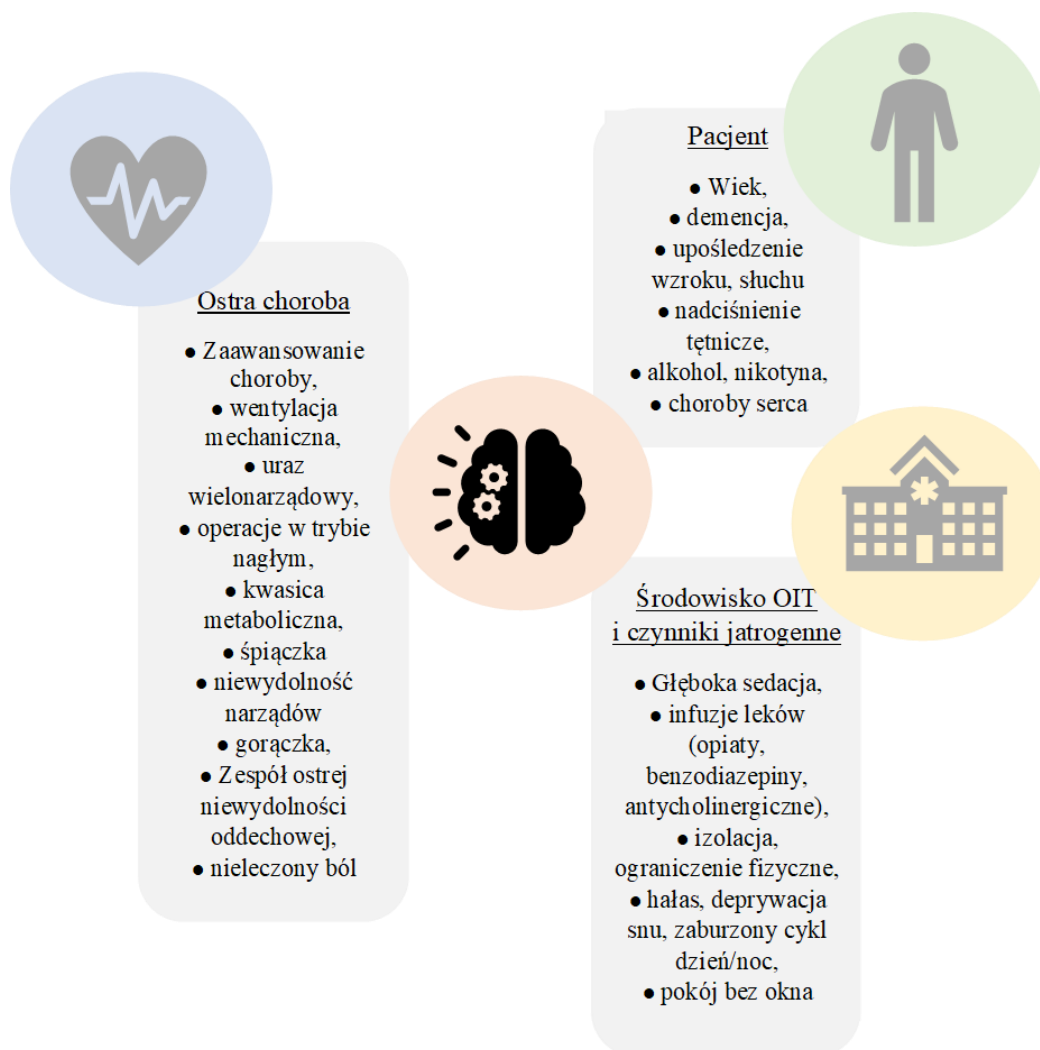
Wyróżniamy trzy podtypy delirium: hipoaktywne, hiperaktywne oraz mieszane. W oddziale intensywnej terapii najczęściej występuję postać hipoaktywna, która charakteryzuje się sennością, spowolnieniem ruchowym i wycofaniem społecznym. Jednak z uwagi na cichy przebieg kliniczny, postać ta zostaje najrzadziej wykrywana przez klinicystów. Delirium hiperaktywne objawia się pobudzeniem, agresją,



dezorientacją, halucynacjami oraz zwiększoną liczbą ruchów spontanicznych. Postać mieszana występuje, kiedy stan pacjenta oscyluje pomiędzy podtypem hiperaktywnym i hipoaktywnym [8,12–14]. Niestety w wielu przypadkach delirium wciąż pozostaje niezdiagnozowane lub błędnie interpretowane przez personel medyczny [13].

Pacjenci oddziałów intensywnej terapii są szczególnie narażeni na wystąpienie delirium ze względu na ciężkość choroby i ekspozycje na środowisko OIT (na przykład sedacja, hałas urządzeń medycznych, unieruchomienie), a zagrożenie to może być dodatkowo nasilone przez między innymi mózgową niewydolność metaboliczną, obwodowe zapalenie, neurozapalenie oraz zaburzenia równowagi neuroprzekazników [15]. Dodatkowo istnieją czynniki ryzyka, które predysponują do wystąpienia majaczenia. Są one związane z chorobą, pacjentem oraz czynnikami środowiskowymi lub jatrogennymi, co ukazuje rycina 2 [12].

**Rycina 2.** Czynniki ryzyka delirium [12,16]



**Źródło:** Opracowanie własne

Ze względu na dużą częstość występowania tego powikłania u krytycznie chorych pacjentów, wydłużonym przebiegiem choroby oraz upośledzeniem funkcji poznawczych, delirium jest istotnym problemem zdrowia publicznego [12]. Przeprowadzona przez Goldberg et al., metaanaliza 24 badań, która obejmowała 3562/6987 pacjentów, którzy doświadczyli majaczenia, wykazała, że powikłanie to jest istotnie związane z wystąpieniem długotrwałego upośledzenia funkcji poznawczych [17]. Inne długoterminowe konsekwencje związane z majaczeniem to: większe prawdopodobieństwo wypisania do miejsc innych niż dom, potrzeba długoterminowej opieki w wyspecjalizowanych ośrodkach opiekuńczych, ograniczenie funkcji motorycznych oraz większa długotrwała niepełnosprawność [18–20].

### **3.2. Opieka pielęgniarska i prewencja majaczenia**

Właściwa ocena, identyfikacja pacjentów z grupy ryzyka najbardziej narażonych na wystąpienie majaczenia, a także wdrożenie nefarmakologicznych działań prewencyjnych są najskuteczniejszymi sposobami, aby nie dopuścić do wystąpienia tego powikłania [21,22]. Delirium charakteryzuje się nagłym początkiem zmian w stanie neuropsychologicznym pacjenta. Z uwagi na to, że pielęgniarki świadczą niemal stałą opiekę nad swoimi pacjentami, są w stanie zaobserwować początkowe zmiany w zachowaniu pacjenta. W związku z powyższym są idealnymi osobami do zarządzania delirium w OIT. Wczesne rozpoznanie majaczenia jest kluczowym elementem prewencji rozwoju majaczenia, dlatego jego codzienna ocena z zastosowaniem zwalidowanych narzędzi jest istotnym punktem opieki nad pacjentem hospitalizowanym w OIT. Ponadto, ocena pod kątem ryzyka wystąpienia majaczenia i identyfikacja pacjentów, którzy są najbardziej narażeni na jego wystąpienia pozwala na wdrożenie interwencji, które koncentrują się na minimalizacji modyfikowalnych czynników ryzyka. Narodowy Instytut Doskonałości Zdrowia i Jakości Opieki (NICE, ang. *National Institute for Health and Care Excellence*) wydał zalecenia dotyczące zapobiegania majaczeniu u osób dorosłych, którzy znajdują się w grupie ryzyka. Zalecenia te zaprezentowane zostały w tabeli 3 [22].

**Tabela 3.** Zalecenia NICE dot. zapobiegania majaczeniu u osób z grupy ryzyka [22]

<b>Interwencje</b>	
<b>Identyfikacja pacjentów z grupy ryzyka</b>	<ul style="list-style-type: none"> <li>• Upewnić się, że pacjenci zagrożeni majaczeniem znajdują się pod opieką zespołu pracowników ochrony zdrowia, którzy znają tę osobę.</li> <li>• Unikać przemieszczania osób w obrębie oddziałów/pomieszczeń oraz pomiędzy nimi, chyba że jest to absolutnie konieczne.</li> <li>• Osoby z grupy ryzyka ocenić pod kątem czynników klinicznych przyczyniających się do rozwoju majaczenia, w ciągu 24 godzin od przyjęcia.</li> <li>• Na podstawie wyników tej oceny zapewnić wieloskładnikową interwencję dostosowaną do indywidualnych potrzeb danej osoby.</li> </ul>
<b>Kompetentny personel medyczny</b>	<ul style="list-style-type: none"> <li>• Wieloskładnikowy, indywidualny pakiet interwencji powinien być realizowany przez wielodyscyplinarny zespół, który jest przeszkolony w zapobieganiu delirium.</li> </ul>
<b>Zaburzenia funkcji poznawczych/deorientacja</b>	<ul style="list-style-type: none"> <li>• Zapewnić odpowiednie oświetlenie i wyraźne oznakowanie otoczenia.</li> <li>• Umieścić w widocznym dla pacjenta miejscu zegara, kalendarza.</li> <li>• Rozmawiać i orientować osoby narażone na rozwój majaczenia co do miejsca w którym się znajdują, własnej osoby oraz roli personelu jaką pełni w opiece nad pacjentem.</li> <li>• Zapewnić zajęcia stymulacyjne funkcji poznawczych (np. poprzez przywoływanie wspomnień).</li> <li>• Zapewnić regularne odwiedziny rodziny/bliskich.</li> </ul>
<b>Odwodnienie/zaparcia</b>	<ul style="list-style-type: none"> <li>• Zapewnić odpowiednią ilość spożycia płynów, aby zapobiec odwodnieniu - zachęcanie osoby do picia.</li> <li>• Rozważyć płynoterapię dożylną, jeśli to konieczne.</li> <li>• Zasięgnąć porady przy zarządzaniu bilansem płynów, u osób z chorobami współistniejącymi (np. niewydolnością serca lub przewlekłą chorobą nerek).</li> </ul>
<b>Hipoksja</b>	<ul style="list-style-type: none"> <li>• Ocenić hipoksję i w razie potrzeby zoptymalizować wysycenie tlenem, w zależności od potrzeb klinicznych.</li> </ul>
<b>Zapobieganie zakażeniom</b>	<ul style="list-style-type: none"> <li>• Identyfikować i leczyć zakażenia.</li> <li>• Unikać niepotrzebnego cewnikowania.</li> <li>• Wdrożyć procedury kontroli zakażeń, zgodnie z wytycznymi NICE dotyczącymi zakażeń związanych z opieką zdrowotną.</li> </ul>
<b>Aktywizacja i wczesna mobilizacja</b>	<ul style="list-style-type: none"> <li>• Zachęcać pacjentów do mobilizacji wkrótce po operacji (w razie potrzeby zapewnić odpowiednie pomoce do chodzenia, które powinny być zawsze dostępne).</li> <li>• Zachęcać wszystkie osoby (w tym te, które nie mogą chodzić) do wykonywania aktywnych ćwiczeń zakresu ruchu.</li> </ul>
<b>Ból</b>	<ul style="list-style-type: none"> <li>• Oceniać ból.</li> <li>• Identyfikować niewerbalne oznaki bólu (szczególnie u osób z trudnościami w komunikacji np. osoby z tracheostomią, demencją).</li> </ul>

	<ul style="list-style-type: none"> <li>• Wdrożyć i weryfikować odpowiednie leczenie bólu u każdej osoby, u której stwierdzono lub podejrzewa się ból.</li> </ul>
<b>Optymalizacja leków</b>	<ul style="list-style-type: none"> <li>• Przeprowadzić przeglądu leków u pacjentów przyjmujących wiele leków, biorąc pod uwagę zarówno rodzaj, jak i liczbę leków.</li> </ul>
<b>Odżywianie</b>	<ul style="list-style-type: none"> <li>• Stosować się do zaleceń dotyczących odżywiania (wytyczne NICE dotyczącej wsparcia żywieniowego dla dorosłych)</li> <li>• Zapewnić protezy zębowe oraz ich właściwe dopasowanie (w przypadku osób posiadających protezy zębowe)</li> </ul>
<b>Zmysły</b>	<ul style="list-style-type: none"> <li>• Usunąć wszelkie odwracalne przyczyny upośledzenia zmysłów np. usunąć zalegającą woskowinę w uchu, zapewnić osobą, które korzystają, aparaty słuchowe, okulary.</li> <li>• Kontrolować prawidłowe funkcjonowanie sprzętu pomocniczego.</li> </ul>
<b>Higiena snu</b>	<ul style="list-style-type: none"> <li>• Unikać zabiegów i interwencji pielęgniarstwa/medycznych w godzinach nocnych – jeśli to możliwe.</li> <li>• Planować podaż leków, w taki sposób, aby nie zakłócać snu.</li> <li>• Ograniczyć hałas do minimum w czasie snu pacjenta.</li> </ul>

**Źródło:** Opracowanie własne na podstawie.

### 3.3. Wybrane narzędzia do oceny delirium

Obecnie istnieje kilka metod oceny majaczenia u pacjentów OIT. Wybrane narzędzia zostały zaprezentowane w tabeli 4. Jednak, na podstawie badań walidacyjnych większość wytycznych, u krytycznie chorych pacjentów, zaleca stosowanie metody oceny splątania na OIT - CAM-ICU lub listy kontrolnej delirium na OIT – ICDSC [12,22,23].

**Tabela 4.** Wybrane narzędzia do oceny majaczenia w OIT

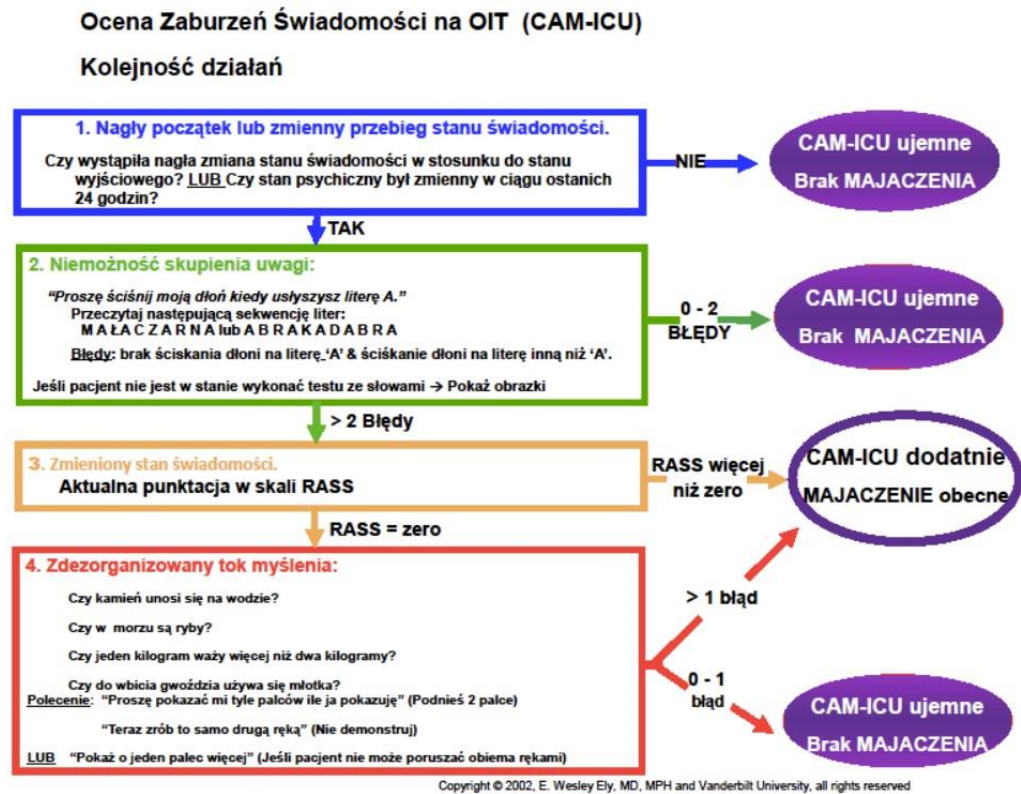
Skala	Opis	Oceniane cechy
<b>Confusion Assessment Method Intensive Care Unit (CAM-ICU) [24]</b>	<ul style="list-style-type: none"> <li>✓ Narzędzie do wykrycia majaczenia na oddziale intensywnej opieki medycznej, szczególnie u pacjentów niewerbalnych (zaintubowanych).</li> </ul>	Ostry początek lub zmienny przebieg, nieuwaga, dezorganizacja myślenia, zmieniony poziom świadomości
<b>Intensive Care Delirium Screening Checklist (ICDSC) [25]</b>	<ul style="list-style-type: none"> <li>✓ Narzędzie do badania delirium na OIT dla pacjentów zaintubowanych lub niezaintubowanych,</li> <li>✓ oparte na kryteriach DSM-IV,</li> <li>✓ ICDSC może być stosowane jeden lub więcej razy dziennie.</li> </ul>	Zmieniony poziom świadomości, nieuwaga, dezorientacja, halucynacje/urojenia/psychozy, pobudzenie lub opóźnienie psychoruchowe, nieprawidłowa mowa lub nastrój, zaburzenia cyklu snu/budzenia, fluktuacja objawów
<b>The Neelon and Champagne</b>	<ul style="list-style-type: none"> <li>✓ Skala przesiewowa delirium,</li> <li>✓ może być stosowany na każdej zmianie w ciągu 24 godzin,</li> </ul>	Uwaga, polecenie, orientacja, wygląd, motoryka, funkcje werbalne, funkcje życiowe,

<b>Confusion Scale (NEECHAM) [26]</b>	<ul style="list-style-type: none"> <li>✓ ocenia zdolność pacjenta do przetwarzania informacji, a także wszelkie zmiany funkcji poznawczych lub objawy ostrej dezorientacji</li> </ul>	nasylenie tlenem, trzymanie moczu
<b>Nursing Delirium Screening Scale (Nu-DESC) [27]</b>	<ul style="list-style-type: none"> <li>✓ Narzędzie przesiewowe przeznaczone dla pielęgniarek,</li> <li>✓ stosowana pod koniec zmiany w celu identyfikacji pacjentów z majaczeniem,</li> <li>✓ Oceniający odnoszą się do zachowania, którego byli świadkiem,</li> <li>✓ Nu-DESC może być oceniany jeden lub więcej razy dziennie.</li> </ul>	Dezorientacja, nieodpowiednie zachowanie, niewłaściwa komunikacja, halucynacje, opóźnienie psychomotoryczne
<b>Cognitive Test for Delirium (CTD) [28]</b>	<ul style="list-style-type: none"> <li>✓ Narzędzie mające na celu rozpoznanie majaczenia na OIT, które skupia się na funkcjach poznawczych.</li> <li>✓ krótki i łatwy do stosowania u pacjentów, którzy są zaintubowani lub w inny sposób ograniczeni funkcjonalnie,</li> <li>✓ instrument ten nie jest idealny do codziennej oceny.</li> </ul>	Orientacja, podzielność uwagi, pamięć, rozumienie, czujność
<b>Rapid Clinical Test for Delirium (4AT) [29]</b>	<ul style="list-style-type: none"> <li>✓ Narzędzie do oceny delirium, które może być wykorzystane w warunkach klinicznych,</li> <li>✓ 4AT nie jest dostosowane do oceny pacjentów w stanie znacznej senności lub pobudzenia.</li> <li>✓ test 4AT może być stosowany przy pierwszym kontakcie z pacjentem lub w innych momentach, kiedy podejrzewa się wystąpienie majaczenia.</li> </ul>	Czujność, orientacja, uwaga, ostra zmiana lub przebieg zmienny

**Źródło:** Opracowanie własne

Narzędzie CAM-ICU zostało dostosowane do oceny majaczenia u pacjentów OIT i może być wykorzystane u pacjentów, którzy są zaintubowani, nie mogą posługiwać się mową oraz u pacjentów sedowanych, z wykluczeniem osób w stanie śpiączki. Umożliwia dokonanie oceny w czasie około dwóch do pięciu minut, wykorzystując ustrukturyzowany format. Ocenie podlegają cztery podstawowe cechy majaczenia: ostry początek/zmieniony stan psychiczny, nieuwagę, dezorientację myślenia i zmieniony poziom świadomości. Kolejność działań została ukazana na rycinie 3. Uznaje się, że wynik CAM-ICU jest pozytywny, gdy u pacjenta występują objawy oceniane przez cechę 1 i 2, oraz albo cechę 3 albo 4. Narzędzie zostało zwalidowane i zaadaptowane do polskich warunków [12,30,31].

Rycina 3. Metoda Oceny Splątania na OIT (CAM-ICU) [30]



Źródło: Kofis K. et al., Metoda oceny splątania na Oddziale Intensywnej Terapii (CAM ICU). Pełny podręcznik szkoleniowy. Marzec 2014

Lista kontrolna delirium na OIT – ICDSC, służy do oceny pacjentów pod kątem ośmiu oznak/objawów majaczenia (zmieniony poziom świadomości, nieuwaga, dezorientacja, halucynacje/urojenia/psychozy, pobudzenie lub opóźnienie psychoruchowe, nieprawidłowa mowa lub nastrój, zaburzenia cyklu snu/budzenia, fluktuacja objawów) w trakcie zmiany pielęgniarstwa. Jeśli pacjent spełnia kryteria w ocenie danego objawu otrzymuje 1 punkt. Liczba punktów 4 lub więcej oznacza pozytywny wynik dla majaczenia [12,31]. Narzędzie zostało zwalidowane i przetłumaczone na ponad 20 języków, w tym również na język polski [25].

### 3.4. Postępowanie farmakologiczne

Pierwszy krok w postępowaniu farmakologicznym powinien obejmować dokonanie oceny aktualnie przyjmowanych przez pacjenta leków, ukierunkowane na identyfikację tych, które mogą powodować lub nasilać majaczenie. Niewłaściwe stosowanie leków przeciwbólowych oraz uspokajających może paradoksalnie

powodować wzrost pobudzenia u pacjentów z majaczeniem, gdy działanie tych leków słabnie. Często stosowane w OIT leki opioidowe i benzodiazepiny w leczeniu majaczenia, mogą w rzeczywistości pogorszyć funkcje poznawcze oraz nasilić majaczenie. Dlatego też, dokonanie analizy leków przyjmowanych przez pacjenta może skutkować optymalizacją farmakoterapii poprzez usunięcie bądź zmniejszenia dawki leków, które mogą nasilać problem majaczenia [21].

Aktualne wytyczne praktyki klinicznej dotyczące profilaktyki i leczenia bólu, pobudzenia/sedacji, delirium, bezruchu i zaburzenia snu u dorosłych pacjentów na OIT (PAIDS, ang. *Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption*) odradzają rutynowe stosowanie haloperidolu, atypowych leków przeciwpsychotycznych, deksmedetomidyny, inhibitora reduktazy  $\beta$ -hydroksy  $\beta$ -metyloglutarylo-koenzymu A (HMG-CoA, tj. statyny) lub ketaminy w celu zapobiegania delirium [23].

Powyższe wytyczne, nie zalecają również rutynowego stosowania haloperidolu, atypowego leku przeciwpsychotycznego lub statyn w leczeniu majaczenia. U pacjentów, którzy doświadczają znacznego niepokoju (lęk, strach, urojenia, omamy), pobudzenia i stają się zagrożeniem dla siebie lub otoczenia, zaleca się jedynie krótkotrwałe stosowanie haloperidolu lub leku przeciwpsychotycznego. Długotrwałe stosowanie leków przeciwpsychotycznych może powodować znaczącą zachorowalność, dlatego też leki te powinny być stosowane do czasu ustąpienia niepokojących objawów [21,23].

U dorosłych pacjentów OIT wentylowanych mechanicznie, gdy wystąpienie majaczenia uniemożliwia odzwyczajenie go od respiratora lub ekstubację, wytyczne PAIDS sugerują zastosowanie deksmedetomidyny. Zalecenie to zostało wydane na podstawie pojedynczego badania randomizowanego, obejmującego 21 500 pacjentów OIT wentylowanych mechanicznie. W badaniu tym zastosowanie deksmedetomidyny (vs placebo) wiązało się z niewielkim, ale statystycznie istotnym wzrostem liczby godzin wolnych od respiratora w ciągu pierwszych 7 dni po randomizacji do badania. Stosowanie deksmedetomidyny nie miało wpływu ani na długość pobytu na oddziale intensywnej terapii lub w szpitalu, ani na miejsce wypisu ze szpitala [32]. Eksperti stwierdzili, że korzyści zastosowania deksmedetomidyny u pacjentów OIT wentylowanych mechanicznie z pobudzeniem, które uniemożliwia odzwyczajenie go od respiratora lub ekstubację przewyższają nad potencjalnymi niepożądanymi konsekwencjami związanymi z jej stosowaniem. W związku z powyższym wydane zostało warunkowe

zalecenie wspierające jej stosowanie w wąskiej populacji krytycznie chorych dorosłych. U pozostałej grupy pacjentów OIT z delirium rola deksmedetomidyny pozostaje niejasna [23].

Badania sugerują możliwe korzyści z zastosowania melatoniny i jej antagonistów w zmniejszeniu częstości delirium u pacjentów OIT. Jednak z uwagi na małą próbę badawczą, zastosowanie melatoniny wymaga dalszych wyjaśnień [33,34].

Badania wykazały korelację między niedoborem tiaminy, a wystąpieniem majaczenia [35]. Istnieje potencjalna korzyść z suplementacji tiaminą w zakresie częstości występowania majaczenia. Jednak ze względu na niewielką liczbę badań nie można wyciągnąć jednoznacznych wniosków, w jaki sposób i z jakim skutkiem wdrożyć profilaktykę i leczenie majaczenia tiaminą [36–38].



#### **4. CELE ROZPRAWY DOKTORSKIEJ**

Celem pracy była:

1. Identyfikacja nefarmakologicznych interwencji zapobiegających delirium u pacjentów OIT oraz ukazanie innych potencjalnych korzyści z zastosowania tych metod.
2. Przedstawienie doświadczeń i postaw rodziny/opiekunów pacjentów OIT, u których w trakcie hospitalizacji zdiagnozowano delirium.
3. Ocena wiedzy i praktyki klinicznej pielęgniarek dotyczącej delirium.
4. Identyfikacja czynników związanych z wiedzą pielęgniarek.
5. Określenie barier w skutecznej kontroli delirium.

Niniejsze cele realizowano w ramach opublikowanego cyklu prac.

## 5. OMÓWIENIE PUBLIKACJI WCHODZĄCYCH W SKŁAD ROZPRAWY DOKTORSKIEJ

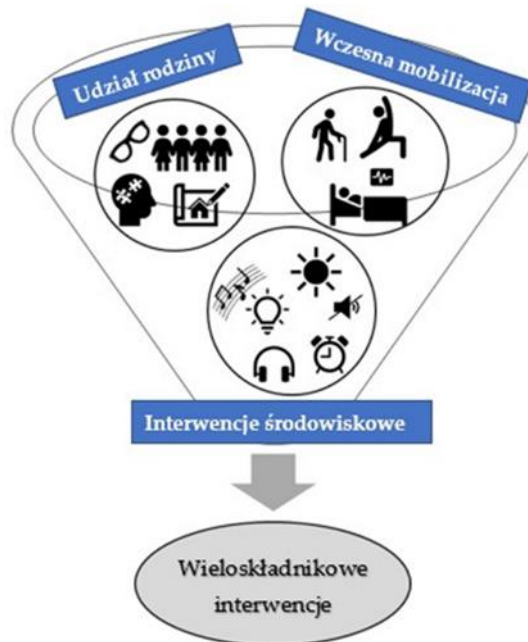
**Pracę doktorską stanowi cykl trzech artykułów naukowych opublikowanych w czasopismach ze współczynnikiem IF (dwie prace przeglądowe oraz jedna praca oryginalna).**

Punktem wyjścia dla podjętych badań była praca o charakterze przeglądowym: Lange S, Mędrzycka-Dąbrowska W, Friganović A, Oomen B, Krupa S. *Non-Pharmacological Nursing Interventions to Prevent Delirium in ICU Patients-An Umbrella Review with Implications for Evidence-Based Practice*. J Pers Med. 2022 May 7;12(5):760.

Wyniki badań medycyny opartej na dowodach (EBM, ang. Evidence-Based medicine) nie zidentyfikowały skutecznej metody farmakologicznej zarówno w zapobieganiu, jak i leczeniu delirium [39]. Ponad to, stosowane w leczeniu środki farmakologiczne wiążą się z ryzykiem wystąpienia skutków ubocznych. W związku z powyższym powinny być one stosowane, gdy metody nefarmakologiczne zawiodą, a pacjent staje się zagrożeniem dla siebie lub otoczenia [40]. Preferowanym podejściem jest wdrożenie nefarmakologicznych interwencji, które zminimalizują czynniki ryzyka wystąpienia majaczenia i nie dopuszczą do jego rozwoju [22,41]. Dlatego też, celem pracy była identyfikacja nefarmakologicznych interwencji zapobiegających majaczeniu u pacjentów oddziałów intensywnej terapii oraz ukazanie innych potencjalnych korzyści z zastosowania tych metod. Do osiągnięcia powyższego celu, w pracy zastosowano metodologię przeglądu parasolowego. W badaniach medycznych przegląd parasolowy to analiza przeglądów systematycznych/metaanaliz. Przeszukano pięć baz danych (PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library). Zastosowano ścisłe kryteria włączenia i wykluczenia badań zgodnie z PICOS (Patient, Intervention, Comparison, Outcomes, Study type). Ekstrakcja danych została oparta na wytycznych Instytutu Joanny Briggs (JBI, ang. *The Joanna Briggs Institute*) dla przeglądów parasolowych [42]. Ostatecznie do analizy włączonych zostało czternaście przeglądów systematycznych. W powyższej pracy wykazano, iż nefarmakologiczne interwencje pielęgniarskie mogą być skuteczne w zapobieganiu i skracaniu czasu trwania delirium u pacjentów oddziałów intensywnej terapii. Ze względu na wieloczynnikową etiologię

majaczenia, wieloskładnikowe interwencje niefarmakologiczne są najbardziej obiecującą metodą (Rycina 4). Co więcej, w wielu badaniach wykazały one najwyższą skuteczność.

**Rycina 4.** Wieloskładnikowe, niefarmakologiczne interwencje



**Źródło:** Opracownie własne

Pozytywne efekty uzyskano poprzez połączenie interwencji z zakresu wczesnej mobilizacji, zaangażowania rodziny, stymulacji poznawczej i sensorycznej oraz interwencji środowiskowych. Pojedyncze interwencje z zakresu terapii światłem, choć nie przynoszą jednoznacznych rezultatów to w połączeniu z innymi interwencjami, np. redukcją hałasu, stosowaniem muzyki, masek na oczy i zatyczek do uszu, mogą przynieść korzystne rezultaty i wspierać rytm okołodobowy pacjentów. Jeśli chodzi o zaangażowanie rodziny, korzystne efekty może przynieść wdrożenie projektów edukacyjnych na temat delirium, wprowadzenie modelu elastycznych odwiedzin oraz reorientacji akustycznej opracowanej przez członka rodziny. Zwiększenie zaangażowania rodziny w czynności, takie jak orientacja pacjenta w dacie, miejscu i przestrzeni, omawianie bieżących wydarzeń rodzinnych oraz zapewnienie urządzeń pomocniczych, których pacjent używa na co dzień (aparat słuchowy, okulary), stymulacja procesów poznawczych, orientacyjnych i pamięciowych. Zaangażowanie rodziny pacjenta jest ważnym elementem profilaktyki delirium. Dodatkową korzyścią z włączenia rodziny jest poprawa postrzegania przez rodziny pracy personelu medycznego [43].

Dzięki uzyskanym wynikom, opracowane zostały następujące implikacje dla praktyki klinicznej [43]:

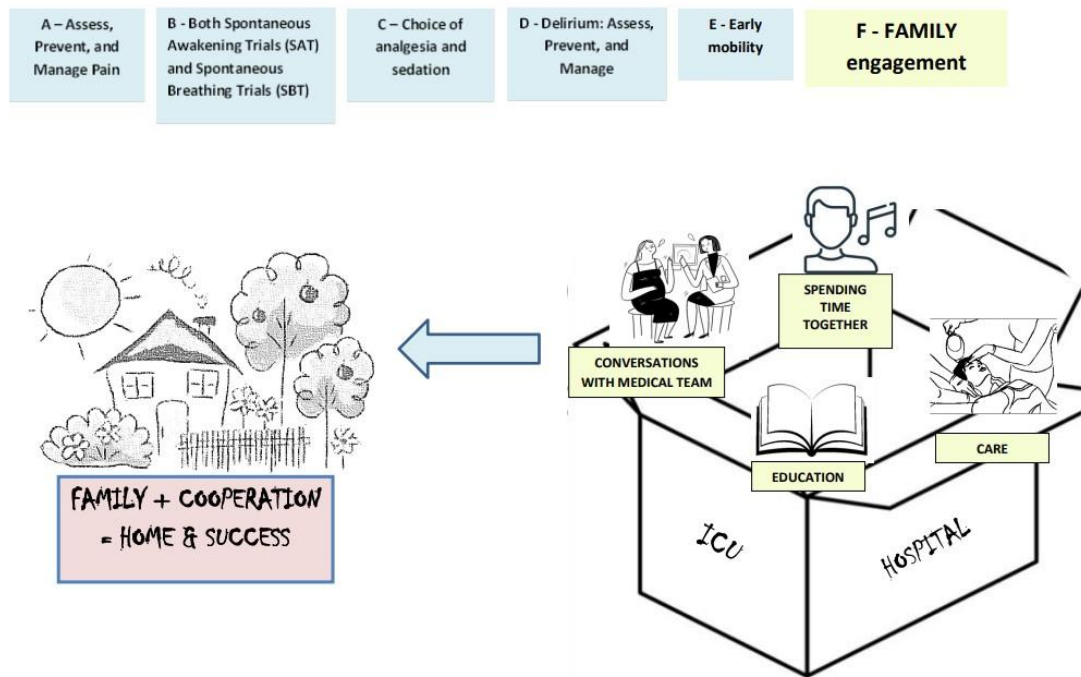
- Wieloczynnikowe interwencje nefarmakologiczne powinny być wdrażane w praktyce klinicznej w schemacie zapobiegania delirium na OIT.
- Wczesna mobilizacja, ćwiczenia poznawcze i rehabilitacja całego ciała – fizjoterapia, terapia zajęciowa, wczesne poruszanie się i przenoszenie z łóżka na krzesło — może mieć pozytywne skutki.
- W sprawie zaangażowanie rodziny, rekomendujemy wprowadzenie projektów edukacyjnych na temat delirium dla rodziny, wdrożenie rozszerzonego modelu odwiedzin i reorientacji akustycznej opracowanej przez członka rodziny. Poprzez drobne czynności, takie jak zorientowanie pacjenta w dacie, miejscu i przestrzeni, omawianie bieżących wydarzeń rodzinnych oraz zapewnienie urządzeń pomocniczych, z których korzysta pacjent na co dzień (aparaty słuchowe, okulary) rodzina może stymulować procesy poznawcze, orientacyjne i pamięciowe.
- W celu poprawy rytmu okołodobowego pacjenta korzystne może być połączenie pojedynczych interwencji środowiskowych, np. redukcja hałasu, użycie muzyki, maski na oczy i zatyczki do uszu oraz zarządzanie światłem.
- Opieka ukierunkowana na zapobieganie majaczenia powinna obejmować zaangażowanie wielodyscyplinarnego zespołu, w którego skład wchodzi: pielęgniarki, lekarze, fizjoterapeuci, psychologowie i terapeuci zajęciowi.

Kolejna praca przeglądowa: [Lange, S\\*](#); Mędrzycka-Dąbrowska, W.; Friganović, A.; Religa, D.; Krupa, S. *Family experiences and attitudes toward care of ICU patients with delirium: A scoping review*. Front Public Health. 2022 Nov 23; 10:1060518. doi: 10.3389/fpubh.2022.1060518, stanowiła analizę dostępnej literatury na temat doświadczeń i postaw rodziny/opiekunów pacjentów OIT, u których w trakcie hospitalizacji zdiagnozowano majaczenie.

Jak wykazano w pierwszej pracy, wdrożenie nefarmakologicznych interwencji zapobiegających majaczeniu, między innymi z udziałem rodziny, zmniejsza częstość

występowania tego powikłania [43]. Zaangażowanie rodziny w proces opieki nad pacjentem (F) na oddziale intensywnej terapii zostało również dodane do pakietu ABCDEF (Rycina 5) [6].

**Rycina 5.** Rodzina jako część pakietu ABCDEF



**Źródło:** doi: 10.3389/fpubh.2022.1060518

W związku z powyższym zrozumienie doświadczeń i postaw opiekunów może przyczynić się do opracowania interwencji pielęgniarskich z udziałem rodzin pacjentów, zapewnić wsparcie, edukację oraz poprawę relacji między personelem medycznym, a rodzinami pacjentów. Ostatecznie może mieć to pozytywny wpływ na opiekę nad pacjentem OIT z delirium oraz poprawę samopoczucia pacjentów i ich rodzin. Do osiągnięcia celu pracy zastosowano metodę przeglądu zakresu (ang. *Scoping Review*), aby stworzyć mapę pojęć istotnych dla zaangażowania bliskich w opiekę nad pacjentami krytycznie chorymi z delirium. Przegląd zakresu sporządzono zgodnie z metodami opisanymi w podręczniku metodycznym JBI dla przeglądów zakresu oraz stosując zalecenia zawarte w wytycznych Preferred Reporting Items for Systematic Reviews and Meta-analysis for Scoping Reviews (PRISMA-ScR) [44]. Dokonano przeszukania baz danych (PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library). Do zidentyfikowania odpowiednich badań, zastosowano schemat Populacja/Koncepcja/Kontekst (PCC, ang. *Population/Concept/Context*). Ostatecznie do

przeglądu włączono 13 artykułów opisujące doświadczenia i postawy rodziny/opiekunów pacjentów OIT, u których rozwinęło się majaczenie podczas hospitalizacji. Spośród włączonych badań osiem było badaniami jakościowymi, trzy badaniami ilościowymi, a dwa były przeglądami (jeden przegląd systematyczny i jeden przegląd integracyjny).

Analiza powyższych badań wykazała, że rodzina/opiekunowie pacjentów OIT są osobami, które mogą dostarczyć informacji na temat początkowych objawów majaczenia u pacjentów OIT. Krewni chcą być zaangażowani w opiekę nad pacjentem z delirium, ale wymaga to poprawy niektórych aspektów opieki, takich jak: brak świadomości, wiedzy rodziny/opiekunów na temat majaczenia, poprawa edukacji i komunikacji z personelem medycznym. Rozpoznawanie delirium przez rodziny jest dopuszczalne i wykonalne. Zaangażowanie rodziny może powodować u nich zwiększony lęk, ale ten aspekt wymaga dalszych badań.

Implikacje dla praktyki klinicznej [45]:

- Trudności w opiece nad bliskim z delirium często wynikają z braku wiedzy na temat majaczenia. Zapewnienie rodzinie edukacji w tym zakresie jest zatem kluczowe.
- Edukacja rodziny/krewnych z zastosowaniem broszur informacyjnych, filmów edukacyjnych jest skuteczna, ale powinna być uzupełniona o bezpośrednią rozmowę z personelem medycznym, co jest metodą najbardziej preferowaną przez rodziny.
- Edukację należy prowadzić już na początku przyjęcia pacjenta na oddział intensywnej terapii.
- Oprócz edukacji teoretycznej, rodziny potrzebują wsparcia emocjonalnego ze strony personelu medycznego (np. pielęgniarki, która opiekuje się ich bliskim).
- Komunikacja między personelem medycznym, a rodziną powinna opierać się na jasnych komunikatach dotyczących oczekiwań z obu stron i mieć otwarty dialog.
- Istnieje obawa, że zaangażowanie rodziny w wykrycie objawów delirium może powodować stres, należy zatem zaoferować rodzinom wsparcie profesjonalisty, np. psychologa.

W pracy oryginalnej: Lange, S\*; Mędrzycka-Dąbrowska, W.; Tomaszek, L.; Wujtewicz, M.; Krupa, S. *Nurses' knowledge, barriers and practice in the care of patients with delirium in the intensive care unit in Poland—A cross-sectional study*. Front. Public Health. 2023 11:1119526. doi: 10.3389/fpubh.2023.1119526, podjęto próbę oceny wiedzy i praktyki klinicznej pielęgniarek dotyczącej delirium, identyfikację czynników związanych z wiedzą pielęgniarek, a także określenia barier w skutecznej kontroli majaczenia.

Wytyczne NICE oraz PAIDS zalecają rutynowe badania przesiewowe w kierunku majaczenia u pacjentów przebywających na OIT przy użyciu zatwierdzonych narzędzi do oceny delirium [22,23]. Badanie przeprowadzone w 2016 roku przez Kotfis et al., wśród polskich oddziałów intensywnej terapii wykazało, że większość oddziałów nie stosuje się do międzynarodowych wytycznych dotyczących sedacji i delirium, a zaledwie 11,9% jednostek zadeklarowało, że monitoruje majaczenie [46]. Pielęgniarki wydają się być odpowiednimi osobami do wykrywania majaczenia. Jednak badania wykazują, że niewiele z nich dokonuje oceny tego stanu w swojej codziennej praktyce. Wśród barier można wyróżnić między innymi: brak wsparcia medycznego dla narzędzi przesiewowych, brak wiedzy na temat majaczenia, błędne przekonanie, że narzędzia są skomplikowane, trudność w ocenie zaintubowanych i sedowanych pacjentów oraz czasochłonność [47]. Ocena poziomu wiedzy pielęgniarek OIT na temat delirium, może wskazać obszar ewentualnych braków w edukacji oraz wdrożenie programów edukacyjnych dla personelu OIT. Z kolei identyfikacja barier w zakresie oceny majaczenia, może pomóc we wdrożeniu procesów naprawczych celem poprawy praktyk dotyczących majaczenia w oddziałach OIT.

Badanie przekrojowe zostało przeprowadzone w oddziałach intensywnej terapii w Polsce. Badanie zostało zarejestrowane na stronie ClinicalTrials.gov (NCT05384964), a na jego przeprowadzenie uzyskano zgodę Niezależnej Komisji Bioetycznej ds. Badań Naukowych GUMed (Nr NKBBN/267/2022). Populację docelową badania stanowił personel pielęgniarski pracujący w OIT w Polsce. Zakładając, że populacja pielęgniarek zatrudnionych w oddziałach intensywnej terapii w Polsce wynosi 9174 osób (dane uzyskane od Konsultanta krajowego w dziedzinie Pielęgniarstwa Anestezjologicznego i Intensywnej Opieki), oszacowano, że aby skonstruować 95% przedział ufności z marginesem błędu 5%, biorąc pod uwagę proporcję populacji 50%, 369 osób stanowił będzie minimalną wielkość próby, żeby uzyskać wyniki istotne statystycznie. Ostatecznie

do badania włączono 371 ankiet. Badanie zostało przeprowadzone w oparciu o dwa kwestionariusze: *Nurses' Knowledge of Delirium* oraz *Nursing Practices and Perceptions Towards Delirium in the Intensive Care Unit* [48,49]. Na wykorzystanie obu narzędzi badawczych uzyskano zgody autorów kwestionariuszy. Tłumaczenie na język polski zostało przeprowadzone zgodnie z procedurą Translation, Review, Adjudication, Pretest and Documentation (TRAPD) [50]. W obu wersjach wprowadzono niewielkie zmiany sformułowań, aby poprawić trafność znaczenia i dostosować do polskich potrzeb/realiów. Zbieranie danych odbywało się w okresie maj-sierpień 2022 r. Z uwagi na trwającą pandemię Covid-19, w początkowym etapie kwestionariusz ankiety rozsyłany był elektronicznie za pośrednictwem stron internetowych między innymi: Polskiego Towarzystwa Pielęgniarek Anestezjologicznych i Intensywnej Opieki, Okręgowych Izb Pielęgniarek i Położnych oraz komunikatorów społecznościowych. Następnie po uzyskaniu zgody prezesów/dyrektorów szpitali, kwestionariusze zostały przekazane osobiście do pielęgniarek oddziałowych OIT, celem rozpowszechnienia ich wśród pielęgniarek. Pielęgniarki, które deklarowały wypełnienie kwestionariusza online, zostały poinformowane, aby nie wypełniały go ponownie. Wypełnione arkusze zostały umieszczone w zapieczętowanych kopertach i odebrane od pielęgniarek oddziałowych. Następnie uzyskane wyniki poddane zostały analizie statystycznej przy użyciu programu STATISTICA v.13.3. (TIBCO Software Inc. (2017), Kraków, Polska). Wartości  $p$  mniejsze niż 0,05 uznane były za istotne statystycznie. Do analizy włączono dane ankietowe 324 pielęgniarek (mediana wieku 42 [32; 50] lat) i 47 mężczyzn (mediana wieku 36 [30; 44] lat) opiekujących się pacjentami w OIT. Mediana stażu pracy badanych wynosiła 11 lat. Zdecydowana większość badanych posiadała tytuł magistra pielęgniarstwa (57,9%). Około 40% ( $n = 144$ ) personelu pielęgniarstwa deklarowało, że ukończyło zarówno program szkolenia kwalifikacyjnego, jak i specjalizacyjnego w dziedzinie Pielęgniarstwa anestezjologicznego i intensywnej opieki. Większość respondentów była zatrudniona w szpitalach uniwersyteckich (47,7%) oraz w województwie pomorskim ( $n = 161$ ; 43,4%) i podkarpackim ( $n = 106$ ; 28,6%). Mediana liczby łóżek na oddziale intensywnej terapii wynosiła 10. Natomiast 12-godzinne zmiany były najczęściej zgłaszane przez personel pracujący na OIT (75,2%).

Warto podkreślić, że wyższy odsetek pielęgniarek z tytułem magistra był zatrudniony w szpitalu uniwersyteckim niż w pozostałych szpitalach (75,1% vs. 42,3%;  $\chi^2 = 41,04$ ;  $p < 0,0001$ ). Pielęgniarki z tytułem magistra były młodsze od tych, które



miały niższy poziom wykształcenia (mediana 37 [32; 48] lat vs. 43 [33; 51] lat;  $Z = -2,43$ ;  $p = 0,0147$ ).

Wiedza pielęgniarek na temat delirium wahała się od 3/37 punktów do 30/37 punktów - mediana wiedzy ogólnej wynosiła 16 [13; 20] punktów. Stwierdzono istotną różnicę w medianie wiedzy ogólnej pomiędzy kobietami i mężczyznami (17 [13; 20] vs. 14 [12; 18];  $Z = 2,93$ ;  $p = 0,003$ ). Respondenci z tytułem magistra pielęgniarstwa prezentowali istotnie wyższe wyniki w zakresie wiedzy na temat majaczenia niż osoby, które posiadały tytuł licencjata pielęgniarstwa oraz pielęgniarki dyplomowane (mediana 18 [14; 21] vs. 15 [12; 19];  $Z = 4,71$ ;  $p < 0,0001$ ). Ponadto pielęgniarki, które były zatrudnione w szpitalu uniwersyteckim, wykazywały wyższe wyniki wiedzy niż pielęgniarki zatrudnione w innych szpitalach (mediana 18 [14; 21] vs. 15 [12; 18];  $Z = -4,64$ ;  $p < 0,0001$ ). Stwierdzono ujemną korelację między wiedzą, a wiekiem ( $\rho: -0,17$ ;  $t = -3,41$ ;  $p = 0,0007$ ) oraz dodatnią między wiedzą, a liczbą łóżek w OIT ( $\rho: 0,19$ ;  $t = 3,80$ ;  $p = 0,0002$ ). Staż pracy nie miał wpływu na wiedzę pielęgniarek ( $p > 0,05$ ).

Deficyt wiedzy dotyczył definicji delirium - tylko 52,3% ( $n = 194$ ) badanych wiedziało, że szybka dezorientacja, zmiana stanu psychicznego, dezorganizacja myślenia i zmieniony poziom świadomości jest definicją delirium. Pielęgniarki nie mają wiedzy, że majaczenie związane jest z wyższą śmiertelnością. 56,9% ( $n=211$ ) badanych poprawnie wskazało, że pacjenci z delirium mają wyższy wskaźnik śmiertelności. Najmniej prawidłowych odpowiedzi respondenci udzielili na pytania dotyczące czynników ryzyka wystąpienia majaczenia takie jak: „upośledzenie słuchu zwiększa ryzyko wystąpienia delirium” ( $n= 91$ ; 24,5%), „demencja jest największym czynnikiem ryzyka wystąpienia delirium” ( $n=93$ ; 25,1%), „u pacjenta poddanego zabiegowi złamanej szyjki kości udowej ryzyko wystąpienia delirium jest takie samo jak u pacjenta poddanego wymianie stawu biodrowego” ( $n=100$ ; 26,9%), „cukrzyca jest wysokim czynnikiem ryzyka wystąpienia delirium” ( $n=104$ ; 28,0%). „pacjent z zaburzeniami widzenia jest w grupie zwiększonego ryzyka wystąpienia delirium” ( $n=100$ ; 28,6%). Badani nie posiadali wiedzy na temat narzędzi służących do oceny majaczenia, takich jak CAM ( $n = 205$ ; 55,3%). Pielęgniarki posiadały stosunkowo większą wiedzę na temat stosowania skali AWS ( $n = 261$ ; 70,3%) i bardzo dobrą na temat stosowania skali DRS ( $n = 342$ ; 92,2%).

Czynniki zidentyfikowane w analizie wieloczynnikowej jako istotne determinanty lepszej wiedzy na temat majaczenia (dodatnie współczynniki regresji) obejmowały tytuł magistra pielęgniarstwa (vs. pielęgniarki dyplomowane, licencjat pielęgniarstwa), płeć żeńską oraz pracę w szpitalu uniwersyteckim (vs. innym). Natomiast wiek pielęgniarek ujemnie korelował z ich wiedzą. Model ten wyjaśniał 12% wariacji wiedzy pielęgniarek. Nie stwierdzono związku między liczbą łóżek w oddziale, a wiedzą na temat delirium ( $p > 0,05$ ).

131 (35,3%) ogółu badanych przyznało, że oddziały, na których pracują, posiadają protokoły/wytyczne sedacji, ale tylko co trzeci badany z tej grupy ( $n = 42$ ) deklarował, że w protokole określono częstotliwość, z jaką należy oceniać delirium. Zaledwie 61 (16,4%) pielęgniarek zadeklarowało, że ocenia delirium często lub zawsze, natomiast 133 (35,8%) respondentów robi to rzadko, a 177 (47,7%) nie ocenia nigdy. Co najmniej dwukrotnego pomiaru tego parametru dokonywała grupa 62 (40,2%) pielęgniarek. Należy zauważyć, że ocena sedacji jest powszechną praktyką w oddziałach OIT – tylko 14,3% ( $n = 53$ ) respondentów nigdy nie mierzyło tego stanu.

Pielęgniarki oceniały obecność symptomów wskazujących na majaczenie na podstawie: umiejętności stosowania się pacjenta do poleceń ( $n = 194$ ; 52,3%), powiązania wydarzeń ( $n = 172$ ; 46,4%), stosując skalę CAM ( $n = 89$ ; 24%) lub CIWA ( $n = 77$ ; 20,7%), oraz listę kontrolną do badań przesiewowych ( $n = 64$ ; 17,2%). Sporadycznie konsultacji udzielał psychiatra ( $n = 133$ ; 35,8%) – co dziewięta badana pielęgniarka potwierdziła, że konsultacja psychiatryczna miała miejsce jeden raz w ciągu jej 12 godzinowego dyżuru.

Nie stwierdzono istotnego związku między żadnym z wymienionych powyżej elementów praktyki klinicznej dotyczącej delirium, a rodzajem szpitala i wykształceniem badanych pielęgniarek ( $p > 0,05$ ).

Najistotniejszą barierą, w opinii pielęgniarek, był brak obowiązku przeprowadzania badań przesiewowych w kierunku delirium. Następnie brak pewności co do swoich umiejętności w zakresie stosowania narzędzi oceny delirium oraz trudności do zinterpretowania majaczenia u pacjentów zaintubowanych.

53,1% ( $n = 197$ ) pielęgniarek nigdy nie było edukowanych w zakresie kontroli delirium. Częściej nie były edukowane pielęgniarki dyplomowane i z tytułem licencjata niż z tytułem magistra (63,5% vs. 45,6%;  $\chi^2 = 11,60$ ;  $p = 0,0007$ ). Jedynie co piąta

pielęgniarka (20,7 %; n = 77) miała możliwość zdobycia wiedzy na temat delirium w toku studiów pierwszego i drugiego stopnia na kierunku pielęgniarstwo. Zaledwie 10,5% (n = 39) mogło zapoznać się z problemem delirium dzięki procedurom obowiązującym w szpitalu lub/i poprzez uczestnictwo w szkoleniach wewnątrzszpitalnych. 24% (n = 89) respondentów korzystało z innych form kształcenia, przy czym odsetek pielęgniarek z tytułem magistra był większy niż pielęgniarek z niższym wykształceniem (27,9% vs. 18,6%;  $\chi^2 = 4,30$ ;  $p = 0,38$ ). Rodzaj szpitala, w którym zatrudnione były pielęgniarki nie miał związku z edukacją na temat delirium ( $p > 0,05$ ).

Badania wykazały, że ocena majaczenia u pacjentów na OIT jest marginalizowana przez personel pielęgniarstwa. Pielęgniarki, wskazując kolejność parametrów ocenianych u tych pacjentów, uznały, że najważniejszymi są ocena poziomu świadomości (mediana 2 [1; 3]) i bólu (mediana 2 [1; 3]), a następnie ocena w kierunku obecności pobudzenia (mediana 3 [2; 3]) i delirium (mediana 3 [1; 4]). Najmniej istotnym elementem oceny było sprawdzenie czy urządzenia inwazyjne są umieszczone prawidłowo (mediana 4 [2; 5]).

Ponad 80% z personelu pielęgniarstwa słusznie uważa, że delirium jest problemem niedostatecznie rozpoznany w OIT i wymaga aktywnej interwencji ze strony personelu medycznego. Niestety równie wysoki odsetek pielęgniarek błędnie postrzega, że leczenie przeciwpsychotyczne powinno być pierwszą interwencją u wszystkich pacjentów z delirium (około 80%), prawdopodobnie dlatego, że w opinii pielęgniarek pacjenci ci są najczęściej pobudzeni (70,6%).

Aby porównać, czy istnieje związek pomiędzy postrzeganiem delirium przez pielęgniarki, a zmiennymi socjodemograficznymi, liczbą łóżek w oddziale i wiedzą zsumowano liczbę poprawnych odpowiedzi (wyższa liczba punktów oznacza lepsze postrzeganie). Analiza statystyczna wykazała, że mediana poprawnych odpowiedzi w całej badanej grupie wynosiła 4 [4; 5]. Pielęgniarki z wykształceniem magisterskim ( $Z = 4,38$ ;  $p < 0,0001$ ), zatrudnione w szpitalu uniwersyteckim ( $Z = -7,02$ ;  $p < 0,0001$ ), w wieku poniżej 40 lat ( $Z = 3,93$ ;  $p < 0,0001$ ) i stażem pracy do 10 lat ( $Z = 2,18$ ;  $p = 0,0236$ ) lepiej postrzegały problem majaczenia niż pielęgniarki z niższym wykształceniem, pracujące w innych szpitalach, starsze niż 40 lat i pracujące dłużej niż 10 lat. Odnotowano istotną statystycznie korelację pomiędzy postrzeganiem delirium,

a liczbą łóżek w oddziale ( $\rho = 0.27$ ;  $t = 5.40$ ;  $p < 0.0001$ ) i wiedzą na temat delirium ( $\rho = 0.31$ ;  $t = 6.25$ ;  $p < 0.0001$ ).

Podsumowując wyniki, badanie przekrojowe wykazało, że polskie pielęgniarki OIT posiadają deficyt wiedzy na temat delirium, a większość z nich nigdy nie miała zapewnionej edukacji na ten temat. Ponadto praktyki w zakresie monitorowania i oceny majaczenia nie są zgodne z międzynarodowymi zaleceniami. Delirium jest stanem marginalizowanym przez pielęgniarki OIT i nadal nie jest rutynowo oceniane w oddziałach intensywnej terapii, a zwalidowane narzędzia nie są przez nie stosowane. Wyniki badania ujawniły również pewne bariery w powyższym zakresie, które wskazują obszary wymagające poprawy w obecnych praktykach dotyczących delirium. Przede wszystkim, pielęgniarki w swoich oddziałach nie są zobowiązane do oceny majaczenia. Należałoby zatem opracować i wdrożyć jasną politykę i procedury postępowania z delirium w oddziałach intensywnej terapii. Zaintubowani pacjenci i brak zaufania pielęgniarek do umiejętności stosowania narzędzi oceny majaczenia są również barierami w ocenie delirium. Wskazuje to na potrzebę wdrożenia programów edukacyjnych obejmujących zarówno szkolenie teoretyczne, jak i praktyczne z udziałem pacjentów.

Na podstawie powyższego badania powstały następujące implikacje dla praktyki klinicznej [51]:

- Ze względu na deficyt wiedzy pielęgniarek na temat delirium i znaczną rozbieżność między praktyką, a międzynarodowymi zaleceniami, należałoby wdrożyć programy edukacyjne na OIT, które obejmowałyby zarówno wiedzę teoretyczną i praktyczne przeszkolenie w posługiwaniu się zwalidowanymi narzędziami przy łóżku pacjenta.
- Ponadto, zmian wymaga polityka szpitalna oraz procedury, które powinny opierać się na międzynarodowych wytycznych dotyczących zarządzania, monitorowania i oceny majaczenia w oddziałach intensywnej terapii.

## 6. PODSUMOWANIE

Delirium jest częstym powikłaniem u pacjentów hospitalizowanych w oddziałach intensywnej terapii, które negatywnie wpływa na wyniki leczenia, wydłużając czas wentylacji mechanicznej, pobyt w OIT oraz zwiększając śmiertelność [3]. Dodatkowo badania wykazały, że wystąpienie majaczenia powoduje rozwój zaburzeń funkcji poznawczych u pacjentów po hospitalizacji w OIT. W ostatnich latach nastąpił dynamiczny postęp w zakresie możliwości wykrywania delirium. Opracowane zostały międzynarodowe wytyczne i zalecenia, których celem jest zmniejszenie częstości występowania tego powikłania u pacjentów krytycznie chorych [22,23]. Jednak, badania naukowe nie zidentyfikowały jednoznacznej i skutecznej farmakologicznej metody leczenia majaczenia. Ponadto, środki farmakologiczne wiążą się z wystąpieniem działań ubocznych, które mogą niekorzystnie wpłynąć na pacjenta [39]. Należy podkreślić, iż właściwa ocena oraz identyfikacja pacjentów z grupy ryzyka najbardziej narażonych na wystąpienie delirium, a także wdrożenie niefarmakologicznych działań prewencyjnych są najskuteczniejszymi sposobami, aby nie dopuścić do wystąpienia tego powikłania [46].

Myślą przewodnią mojej rozprawy doktorskiej była ocena wiedzy personelu pielęgniarskiego na temat delirium, ukazanie aktualnych praktyk w opiece nad pacjentem z delirium oraz identyfikacja barier, które uniemożliwiają właściwą ocenę i monitorowanie delirium.

W pierwszej pracy przeglądowej zwrócono uwagę na niefarmakologiczne interwencje, które okazały się skuteczne w prewencji i skracaniu czasu trwania majaczenia. Ze względu na wieloczynnikową etiologię delirium, wieloskładnikowe interwencje niefarmakologiczne są najbardziej obiecującą metodą. Pozytywne efekty wykazały połączenie interwencji z zakresu wczesnej mobilizacji, zaangażowania rodziny, stymulacji poznawczej i sensorycznej oraz interwencji środowiskowych. Pojedyncze interwencje z zakresu terapii światłem, choć nie przynoszą jednoznacznych rezultatów to połączeniu z innymi interwencjami, np. redukcją hałasu, stosowaniem muzyki, masek na oczy i zatyczek do uszu, mogą przynieść korzystne rezultaty i wspierać rytm okołodobowy pacjentów. Rodzina pacjenta jest ważnym elementem profilaktyki delirium i powinna być zaangażowana w proces terapeutyczny, a dodatkową korzyścią z włączenia

rodziny jest poprawa postrzegania przez rodziny pracy personelu medycznego. Co zostało ukazane w pracy przeglądowej [43].

Aby zgłębić temat zaangażowania rodziny w opiekę nad pacjentem z delirium, przeprowadzono kolejny przegląd literatury, w którym skoncentrowano się na doświadczeniach i postawach rodzin wobec włączania ich w opiekę nad swoim bliskim. W pracy tej ukazano, iż rodzina/opiekunowie pacjentów OIT są osobami, które mogą dostarczyć informacji na temat początkowych objawów majaczenia. Krewni chcą być zaangażowani w opiekę nad pacjentem z delirium, ale wymaga to korekty niektórych aspektów opieki, takich jak: brak wiedzy rodziny na temat majaczenia, zapewnienie edukacji i poprawa komunikacji z personelem medycznym [45]. Jednym z badań włączonych do powyższego przeglądu, było badanie jakościowe „*Patients’ and Relatives’ Experiences of Delirium in the Intensive Care Unit — A Qualitative Study*”, w którym brałam udział jako członek zespołu badawczego [52].

W kontynuacji rozważań celem mojej pracy była empiryczna ocena wiedzy i praktyki klinicznej pielęgniarek dotyczącej delirium, identyfikacja czynników związanych z większą wiedzą pielęgniarek oraz określenie barier w skutecznej kontroli majaczenia w opiece nad pacjentem w OIT. W pracy oryginalnej wykazano, że personel pielęgniarski pracujący w OIT posiada deficyt wiedzy na temat delirium zarówno, w zakresie samego znaczenia, jak również metod jego oceny oraz czynników ryzyka wystąpienia. Należy jednak podkreślić fakt, że większość personelu nigdy nie została przeszkolona w tym zakresie. Determinantami wpływającymi na wiedzę okazały się tytuł magistra pielęgniarstwa, płeć żeńska oraz praca w szpitalu uniwersyteckim. Badania wykazały również, że 35.3% ogółu respondentów wskazało, że oddziały, na których pracują, posiadają protokoły sedacji. Jednak tylko co trzeci badany z tej grupy deklarował, że w protokole określono częstotliwość, z jaką należy oceniać delirium. Majaczenie jest stanem marginalizowany przez personel pielęgniarski OIT oraz nie jest rutynowo oceniany przy zastosowaniu zwalidowanych skal. Wynika to z pewnych barier, które również zostały ukazane w powyższej pracy i są to między innymi: brak obowiązku do przeprowadzania badań przesiewowych w kierunku majaczenia, trudności do zinterpretowania delirium u pacjentów zaintubowanych, a także brak pewności co do swoich umiejętności w zakresie stosowania narzędzi do jego oceny. Powyższe wyniki wskazują na konkretne obszary, które wymagają zmian na rzecz poprawy opieki pielęgniarskiej w opiece nad pacjentem z delirium [51].

Ukazane w cyklu prac wyniki badań, które składają się na rozprawę doktorską stanowią rozszerzenie dotychczasowej wiedzy na temat nefarmakologicznych metod, które mogą w skuteczny sposób zmniejszyć częstość występowania i czas trwania majaczenia. Zwrócono również uwagę na istotną rolę rodziny w opiece nad pacjentem z delirium. Ponad to, wyniki badania oryginalnego, ukazują poziom wiedzy personelu pielęgniarskiego na temat majaczenia, dają wgląd w aktualne praktyki pielęgniarskie oceny i monitorowania delirium u pacjentów oddziałów intensywnej terapii w Polsce oraz wskazują bariery utrudniające wdrożenie prawidłowych praktyk zgodnych z międzynarodowymi zaleceniami.

Przedstawione w pracach wyniki, choć obarczone są pewnymi ograniczeniami, które należy wziąć pod uwagę, wskazują na obszary, które wymagają zmian oraz ukazują istotne dane, które mogą przyczynić się do stworzenia optymalnego modelu opieki pielęgniarskiej nad pacjentem z delirium w oddziale intensywnej terapii.

## 7. STRESZCZENIE

Delirium jest definiowane jako ostre zaburzenie poznawcze, któremu towarzyszą wahania stanu psychicznego oraz zaburzenia uwagi i świadomości. U pacjentów oddziałów intensywnej terapii jest to powikłanie związane z wieloma niekorzystnymi konsekwencjami. Negatywnie wpływa na wyniki leczenia pacjentów, jest niezależnym predyktorem śmiertelności, wydłuża czas pobytu na oddziale intensywnej terapii i powoduje zaburzenia funkcji poznawczych. Szacuje się, że dotyka ono nawet do 80% pacjentów oddziałów intensywnej terapii.

Myślą przewodnią mojej rozprawy doktorskiej była ocena wiedzy personelu pielęgniarskiego na temat delirium, ukazanie aktualnych praktyk w opiece nad pacjentem z delirium oraz identyfikacja barier, które uniemożliwiają właściwą ocenę i monitorowanie delirium.

W pierwszej pracy przeglądowej zwrócono uwagę na nefarmakologiczne interwencje, które okazały się skuteczne w prewencji i skracaniu czasu trwania delirium. Ze względu na wieloczynnikową etiologię majaczenia, wieloskładnikowe interwencje nefarmakologiczne są najbardziej obiecującą metodą. Zaangażowanie rodziny pacjenta jest ważnym elementem prewencji delirium.

W kolejnej pracy przeglądowej skoncentrowano się na doświadczeniach i postawach rodzin wobec włączania ich w opiekę nad bliskim, u którego w trakcie hospitalizacji zdiagnozowano majaczenie. W pracy tej wykazano, iż członkowie rodziny są osobami, które mogą dostarczyć informacji na temat początkowych objawów delirium i chcą być zaangażowani w opiekę nad pacjentem, ale wymaga to korekty niektórych barier.

W badaniu przekrojowym, przeprowadzonym wśród 371 pielęgniarek OIT w Polsce, wykazało, że ponad połowa pielęgniarek nigdy nie była edukowanych w zakresie kontroli delirium. Skutkuje to deficytem wiedzy na temat objawów, czynników ryzyka i powikłań związanych z tym powikłaniem u pacjentów OIT. Stopień magistra pielęgniarstwa, płeć żeńska oraz praca w szpitalu uniwersyteckim były pozytywnie skorelowane z wiedzą pielęgniarek. Delirium jest marginalizowanym stanem u pacjentów OIT. Tylko 16,4% pielęgniarek ocenia delirium rutynowo, a zwalidowane skale są rzadko stosowane. Barrierami w skutecznej kontroli majaczenia są przede wszystkim: brak wymogu oceny, trudności w ocenie delirium u pacjentów



zaintubowanych oraz brak pewności pielęgniarek co do swoich umiejętności stosowania narzędzi oceny jego oceny.

Ukazane w cyklu prac wyniki badań, które składają się na rozprawę doktorską stanowią rozszerzenie dotychczasowej wiedzy na temat nefarmakologicznych metod, które mogą w skuteczny sposób zmniejszyć częstość występowania i czas trwania delirium. Zwrócono uwagę na istotną rolę rodziny w opiece nad pacjentem z delirium. Ponad to, wyniki badania, ukazują poziom wiedzy personelu pielęgniarzkiego na temat majaczenia, dają wgląd w aktualne praktyki pielęgniarzkie oceny i monitorowania delirium u pacjentów oddziałów intensywnej terapii w Polsce oraz wskazują bariery utrudniające wdrożenie prawidłowych praktyk zgodnych z międzynarodowymi zaleceniami.

**Słowa kluczowe:** delirium, nefarmakologiczne interwencje, opieka skoncentrowana na rodzinie, ocena delirium, praktyka pielęgniarzka oparta na dowodach naukowych

## 8. SUMMARY

Delirium is defined as an acute cognitive disorder accompanied by fluctuations in mental status and disturbances in attention and consciousness. In intensive care unit patients, it is a complication associated with many adverse consequences. It negatively affects patient outcomes, is an independent predictor of mortality, prolongs the length of stay in the intensive care unit and causes cognitive impairment. It is estimated to affect up to 80% of ICU patients.

The main thrust of my dissertation was to assess nursing staff's knowledge of delirium, demonstrate current practices in caring for patients with delirium, and identify barriers that prevent the proper assessment and monitoring of delirium.

In the first review, we highlighted non-pharmacologic interventions that have proven effective in preventing and reducing the duration of delirium. Due to the multifactorial etiology of delirium, multicomponent nonpharmacological interventions are the most promising method. Involving the patient's family is an important part of delirium prevention.

The following review paper focused on the experiences and attitudes of families toward involving them in the care of a relative diagnosed with delirium during hospitalization. This paper showed that family members are persons who can provide information about the initial symptoms of delirium and want to be involved in the patient's care, but this requires correcting some barriers.

A cross-sectional study of 371 ICU nurses in Poland found that more than half of the nurses had never been educated about delirium control. This results in a deficit of knowledge about the symptoms, risk factors and complications associated with this complication in ICU patients. Master's degree in nursing, female gender and working in a university hospital were positively correlated with nurses' knowledge. Delirium is a marginalized condition in ICU patients. Only 16.4% of nurses routinely assess delirium, and validated scales are rarely used. Barriers to effective control of delirium are primarily the lack of an assessment requirement, the difficulty of assessing delirium in intubated patients, and nurses' lack of confidence in their ability to use tools to assess it.

The results of the studies that consist of the dissertation, presented in the series of papers, are an extension of previous knowledge on non-pharmacological methods that

can effectively reduce the incidence and duration of delirium. The key role of the family in the care of a patient with delirium is highlighted. In addition, the results of the study, show the level of knowledge of nursing staff about delirium, provide insight into current nursing practices for assessing and monitoring delirium in intensive care unit patients in Poland, and indicate barriers to implementing correct practices in line with international recommendations.

**Key words:** delirium, non-pharmacological interventions, family-centered care, delirium assessment, Evidence-Based Nursing Practice

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**PUBLIKACJE WŁĄCZONE DO ROZPRAWY  
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Review

# Non-Pharmacological Nursing Interventions to Prevent Delirium in ICU Patients—An Umbrella Review with Implications for Evidence-Based Practice

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**Abstract:** Delirium in ICU patients is a complication associated with many adverse consequences. Given the high prevalence of this complication in critically ill patients, it is essential to develop and implement an effective management protocol to prevent delirium. Given that the cause of delirium is multifactorial, non-pharmacological multicomponent interventions are promising strategies for delirium prevention. (1) Background: To identify and evaluate published systematic review on non-pharmacological nursing interventions to prevent delirium in intensive care unit patients. (2) Methods: An umbrella review guided by the Joanna Briggs Institute was utilized. Data were obtained from PubMed, Scopus, EBSCO, Web of Science, Cochrane Library, and Google Scholar. The last search was conducted on 1 May 2022. (3) Results: Fourteen reviews met the inclusion criteria. Multicomponent interventions are the most promising methods in the fight against delirium. The patient's family is an important part of the process and should be included in the delirium prevention scheme. Light therapy can improve the patient's circadian rhythm and thus contribute to reducing the incidence of delirium. (4) Conclusions: Non-pharmacological nursing interventions may be effective in preventing and reducing the duration of delirium in ICU patients.

**Keywords:** non-pharmacological interventions; delirium; ICU; systematic review

## 1. Background

Delirium is defined as an acute cognitive impairment accompanied by fluctuations in mental status and altered attention and awareness [1,2]. This disorder is frequently caused by acute illness, trauma, surgery, adverse drug reactions, or drug withdrawal. The exact cause of delirium is still unclear, but the etiology is thought to be multifactorial [3]. Delirium has an adverse effect on patient outcomes, is an independent predictor of mortality, increases ICU length of stay, and causes cognitive impairment [4,5]. It is estimated that delirium affects up to 80% of patients in intensive care units [6]. One of the major determinants of delirium is old age [7]. In addition, risk factors include severity of illness, previous dementia, malnutrition, emergency surgery or trauma prior to ICU admission, mechanical ventilation, and anxiety [8–10]. There are also risk factors that are modifiable. These are mostly environmental variables such as lack of visible daylight, immobilization,

isolation, noise, lack of information about the tasks performed, inadequate patient care by the medical staff, untreated pain, and use of some medications [9,11,12].

Evidence-based medicine (EBM) analyses have not identified an effective pharmacological intervention for the prevention and treatment of delirium [13]. Therefore, there is a need to develop a safe and effective strategy. The preferable methods are non-pharmacological interventions [14,15]. The possible benefit of melatonin and its antagonists has been reported, but clinical data are inconclusive, and this intervention needs further study [16–18]. Studies have identified a correlation between thiamine deficiency and delirium [19]. There is a potential benefit of thiamine supplementation on the prevalence of delirium. However, due to the small number of studies, no clear conclusions can be drawn on how and with what effect to implement the prevention and treatment of delirium with thiamine [20–22].

Studies on use of non-pharmacological interventions in patients in non-ICU wards have shown a reduction in the incidence of delirium [23–25].

### 1.1. Aim

To identify effective non-pharmacological interventions for the prevention of delirium in ICU patients and identify other potential benefits of these methods.

### 1.2. What Is Already Known about the Topic?

- Delirium is a common complication of hospitalization among ICU patients.
- It has an impact on treatment outcomes, increases mortality, and prolongs hospitalization and cognitive impairment.
- Delirium still remains undiagnosed among ICU patients.
- Patient assessment for delirium is still not common practice in all countries.

### 1.3. What This Paper Adds?

- Non-pharmacological nursing interventions can be effective in preventing and reducing the duration of delirium in ICU patients.
- Multi-component interventions have the highest efficacy.
- The family is an important part of the prevention of delirium.
- Light therapy can improve the patient's circadian rhythm.
- Improving sleep quality may reduce the incidence of delirium.
- Medical staff should be aware of and implement the practice of delirium assessment in patients in intensive care units.

## 2. Methods

An umbrella review methodology was used to identify and evaluate published systematic reviews on non-pharmacological nursing interventions to prevent delirium in intensive care unit patients. In medical research, an umbrella review is a review of systematic reviews or meta-analyses. They can also be called review reviews, systematic review summaries, or review syntheses. Umbrella reviews are among the highest bodies of medical evidence available today [26,27]. Therefore, to answer the research question, we decided to conduct this type of review.

### 2.1. Review Questions

What are effective non-pharmacological nursing interventions to prevent delirium in intensive care unit patients?

### 2.2. Search Strategy

Two authors systematically searched the following databases: PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library databases. The following keywords were used: "ICU", "critical care", "critical illnesses", "non-pharmacological interventions", "multi-component interventions", "earplugs", "noise reduction", "eye masks", "lighting control", "education", "orientation", "cognitive therapy", "bright light therapy", "music therapy",

“physical therapy”, “early mobilization”, “exercise”, “delirium”, “delirium prevention”, “systematic review”. Keywords with their combinations using AND or OR were entered. All publications were examined by title and abstract to exclude irrelevant records. Second, a manual search of the Internet using Google Scholar was conducted to find additional systematic reviews. Any discrepancies were resolved through discussion with the four researchers, and at the end of the selection process, full agreement was reached on the articles to be included. Data including author (first), aim, participants, interventions, results, and findings were extracted from all eligible studies. The initial search was from inception to 20 March 2022, with a final search on 1 May 2022. The reviews were included if all the following criteria were satisfied.

2.3. Inclusion and Exclusion Criteria

Studies published in the English language were included. The inclusion and exclusion criteria were developed according to the PICOS criteria for including or excluding articles in the umbrella review (Table 1).

**Table 1.** PICO criteria used to develop the research question and include or exclude studies.

PICO	Inclusion Criteria	Exclusion Criteria	Keywords	Search Strategies
Patients	Adults (>18 years), ICU patients	Adults patients of other units, children, ICU children	ICU, critical care, critical illnesses	ICU OR critical care OR critical illnesses
Interventions	Non-pharmacological interventions	Pharmacological interventions, mixed interventions, only focusing on screening delirium	Non-pharmacological interventions, multicomponent interventions, earplugs, noise reduction, eye masks, lighting control, education, orientation, cognitive therapy, bright light therapy, music therapy, physical therapy, early mobilization, exercise	Non-pharmacological interventions OR multicomponent interventions OR earplugs OR noise reduction OR eye masks OR lighting control OR education OR orientation OR cognitive therapy OR bright light therapy OR music therapy OR physical therapy OR early mobilization OR exercise

**Table 1.** *Cont.*

PICO	Inclusion Criteria	Exclusion Criteria	Keywords	Search Strategies
Comparison	Usual care, any comparator or including no comparator	n/a	Delirium, delirium prevention	Delirium OR delirium prevention
Outcomes	Delirium-related data (e.g., reducing the incidence of delirium, shortening the duration of delirium)	n/a	n/a	n/a
Study design	Systematic review	Other types of reviews	Systematic review	Systematic review

n/a—not applicable.

**2.4. Data Collection**

The data extraction form, based on the JBI umbrella review guidelines [28], was used, and the most important information in the studies was included. This extraction was undertaken by two reviewers independently. The information collected from the reviewers comprised the following: author (first), type of review, methodology/search strategy, and number of studies included. The results of data collection are presented in Table 2. The following data were collected from the studies included in the reviews: author (first), aim, participants, interventions, results, and findings. The results are presented in Table 4.

**Table 2.** Results of data collection.

Author (First)	Type of Review	Methodology/Search Strategy	Number of Studies Included	In-Or Excluded (Comment)
Zhang, H. [29]	A systematic review and meta-analysis	Literature searches: MEDLINE, EMBASE, CINAHL, Cochrane Library, reference lists, “Google Scholar”. Type of studies: RCTs. Time: before August 2012	38	Excluded—No ICU patients
Rivosecch, R.M. [25]	An evidence-based systematic review	Literature searches: MEDLINE and EMBASE. Type of studies: RCTs, prospective RCTs, CCTs. Time: from 1946 to 15 October 2013	17	Excluded—Not only ICU patients
Litton, E. [30]	A systematic review and meta-analysis	Literature searches: MEDLINE, EMBASE, the Cochrane Central Register of controlled trials. Type of studies: Interventional studies. Time: period between 1966 and May 2015	9	Included
Bannon, L. [31]	A systematic review of quantitative and qualitative research	Literature searches: MEDLINE, EMBASE, CINAHL, Web of Science, AMED, PsycINFO, Cochrane Library. Type of studies: RCTs, CCTs. Time: n/d	n/d	Excluded—Protocol

**Table 2.** *Cont.*

Author (First)	Type of Review	Methodology/Search Strategy	Number of Studies Included	In-Or Excluded (Comment)
Martinez, F. [23]	A systematic review and meta-analysis	Literature searches: PubMed/MEDLINE, EMBASE, PsycINFO, CINAHL, Cochrane Library, CENTRAL, LILACS, SciELO, grey literature Type of studies: Randomized trials. Time: from inception to 31 December 2012.	7	Excluded—No ICU patients
Luther, R. [32]	A systematic review of quantitative studies	Literature searches: Academic Search Complete, CINAHL Plus with Full Text, E-Journals, MEDLINE Complete, PsycARTICLES, PsycINFO. Type of studies: RCTs, and a cohort-based design. Time: 2006–2016	6	Included—Without melatonin study
Locihová, H. [33]	A systematic review	Literature searches: CINAHL, PubMed, SCOPUS. Type of studies: RCTs, CCTs. Time: 1990–2015	19	Included
Nassar Junior, A.P. [34]	A systematic review and meta-analysis	Literature searches: Medline, Scopus, Web of Science. Type of studies: Observational and randomized studies. Time:	16	Included
Kang, J. [35]	A systematic review and meta-analysis	Literature searches: MEDLINE, Cochrane Library, CINAHL, PsycINFO, EMBASE. Type of studies: cohort studies, RCTs, CBA, and CCT Time: between 2007 and 2016.	35	Included
Herling, S.F. [36]	Review	Literature searches: ENTRAL, MEDLINE, Embase, BIOSIS, International Web of Science, Latin American Caribbean Health Sciences Literature, CINAHL. Type of studies: RCTs. Time: from 1980 to 11 April 2018	12 (4 non-pharmacological interventions)	Included—Only non-pharmacological interventions analyzed
Bannon, L. [31]	A systematic review and meta-analysis	Literature searches: MEDLINE, EMBASE, CINAHL, Web of Science, PsycINFO, AMED, Cochrane Library. Type of studies: RCTs. Time: up to March 2018	15	Included
Janssen, T.L. [37]	A systematic review and meta-analysis	Literature searches: PubMed (Medline OvidSP), Embase, Cochrane Centre, Web of Science. Type of studies: RCTs, CBA. Time: in March 2018	35	Excluded—No ICU patients

Table 2. Cont.

Author (First)	Type of Review	Methodology/Search Strategy	Number of Studies Included	In-Or Excluded (Comment)
Deng, L. [38]	A systematic review and network meta-analysis	Literature searches: PubMed, Embase, CINAHL, Cochrane Library. Type of studies: RCTs and cohort studies. Time: the end of June 2019	26	Included
León-Salas, B. [39]	A systematic review with meta-analysis	Literature searches: MEDLINE, EMBASE, Web of Science, Cochrane Central Register of Controlled Trials. Type of studies: RCTs. Time: 2015 to March 2019.	49	Excluded—Not only ICU patients
Ludolph, P. [40]	A systematic review	Literature searches: PubMed and CENTRAL. Type of studies: RCTs and cluster RCTs. Time: without any time constraints	8	Excluded—Not only ICU patients
Liang, S. [41]	A systematic review and meta-analysis	Literature searches: MEDLINE, CINAHL, EMBASE, Cochrane CENTRAL, Web of Science, PsycINFO, Chinese electronic databases. Type of studies: RCTs, CCTs, CBA. Time: until September 2020	34	Included
Ekeozor, C.U. [42]	A systematic review and meta-analysis	Literature searches: MEDLINE, EMBASE, PsycINFO, OpenGrey, Web of Science, reference lists of journals. Type of studies: RCTs, observational studies, and non-randomized CTs. Time: from inception to 12 February 2020	59	Excluded—No ICU patients
de Foubert, M. [43]	A systematic review	Literature searches: CINAHL, MEDLINE, EMBASE, Cochrane Library, Google Scholar, BMJ quality reports. Type of studies: randomized and quasi-experimental designs. Time: from January 2009 to February 2020.	18	Excluded—No ICU patients
Lee, Y. [44]	A systematic review of randomized controlled trials	Literature searches: PubMed, CINAHL, Embase, Cochrane Central Register of Randomized Controlled Trials. Type of studies: prospective RCTs. Time: up to 27 January 2021	9	Excluded—Not only ICU patients

**Table 2.** *Cont.*

Author (First)	Type of Review	Methodology/Search Strategy	Number of Studies Included	In-Or Excluded (Comment)
Burry, L.D. [45]	A systematic review and network meta-analysis	Literature searches: MEDLINE, Embase, PsycINFO, CINAHL, Web of Science, Cochrane Library, Prospero, WHO international clinical trial. Type of studies: RCTs. Time: from inception to 8 April 2021	80 (25 studies of non-pharmacological interventions)	Included—Only non-pharmacological interventions analyzed
Saritas, S. [46]	A systematic review	Literature searches: Cochrane, CINAHL, PsycINFO, PubMed, EMBA Type of studies: Quasi-experimental, experimental, RCTs. Time: October 2013 and March 2020	13	Included—Without melatonin study
Qin, M. [47]	A systematic review and meta-analysis	Literature searches: PubMed, Embase, MEDLINE, Cochrane Library. Type of studies: RCTs, CBA, and cohort trials. Time: up to September 2021	6	Included
Chen, T-J. [48]	A systematic review and network meta-analysis.	Literature searches: PubMed, EMBASE, CINAHL, Cochrane CENTRAL, ProQuest Dissertations and Theses A&I. Type of studies: RCTs. Time: from the inception to December 2021	29	Included
Liu, J. [49]	A systematic review and meta-analysis	Literature searches: China National Knowledge Infrastructure Database, Excerpta Medica database, PubMed, Cochrane Central Register of Controlled Trials, Wan Fang, Cumulative Index of Nursing and Allied Health Literature. Type of studies: RCTs. Time: from January 2012 to December 2021.	n/d	Excluded—Protocol
Bohart, S. [50]	A systematic review and meta-analysis	Literature searches: MEDLINE, EMBASE, Cochrane Central Register of Controlled Trials, CINAHL, PsycINFO, and Web of Science, hand searched the reference lists of relevant reviews and original trials and searched for unpublished and ongoing studies, and grey literature in Opengrey.eu, and ClinicalTrial.gov. Type of studies: RCTs. Time: n/d	9	Excluded—None of the included studies assessed the number of coma- and delirium-free days in ICU.



**Table 2.** *Cont.*

Author (First)	Type of Review	Methodology/Search Strategy	Number of Studies Included	In-or Excluded (Comment)
Xu, H. [51]	Systematic review and meta-analysis	Literature searches: PubMed, MEDLINE, Cochrane Library, Chinese National Knowledge Infrastructure (CNKI), China Biology Medicine Disc (CBMD), Wanfang Database, and Western Biomedical Journal Database. Type of studies: RCTs. Time: from the establishment to 28 June 2021	7	Included

RCTs—Randomized controlled trial; CCTs—Controlled clinical trial; CBA—Before-and-after studies; PHE—Phenomenological; n/d—no data.

**2.5. Quality Assessment**

The methodology for JBI umbrella reviews was followed [28]. Two authors assessed the methodological quality of the reviews for inclusion using the JBI Critical Appraisal Checklist for Systematic Reviews and Research Syntheses, which provides a checklist with 11 criteria (Q1–Q11). Each question must be answered yes, no, uncertain, or not applicable. The results of this evaluation are presented in Table 3 [52].

**Table 3.** Critical appraisal results for included studies using the URARI.

Study	Q1	Q2	Q3	Q4	Q5	Q6	Q7	Q8	Q9	Q10	Q11
Litton, E. [29]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a
Bannon, L. [31]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Luther, R. [32]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Locihová, H. [33]	Y	Y	Y	Y	U	U	U	Y	Y	Y	Y
Nassar, A.P. [34]	U	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a
Kang, J. [35]	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a	n/a
Herling, S.F. [36]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Deng, L.XX [38]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Liang, S. [41]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
Burry, L.D. [45]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a
Saritas, S. [46]	Y	Y	Y	Y	Y	U	Y	n/a	N	n/a	n/a
Qin, M. [47]	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a	n/a
Chen, T.J. [48]	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	n/a
Xu, C. [51]	U	Y	Y	Y	Y	Y	Y	Y	Y	n/a	Y

Y—Yes, N—No, U—Unclear, n/a—not applicable Q1: Was the review question clearly and explicitly stated? Q2: Were the inclusion criteria appropriate for the review question? Q3: Was the search strategy appropriate? Q4: Were the sources and resources used to search for studies adequate? Q5: Were the criteria for appraising studies appropriate? Q6: Was the critical appraisal independently conducted by two or more reviewers? Q7: Were there methods to minimize errors in data extraction? Q8: Were the methods used to combine studies appropriate? Q9: Was the likelihood of publication bias assessed? Q10: Were recommendations for policy and/or practice supported by the reported data? Q11: Were the specific directives for new research appropriate?

**3. Results**

A total of 1305 records was initially obtained from the databases: PubMed—383, Scopus—10, EBSCO—179, Web of Science—276, Cochrane Library—139, and Google Scholar—318. After discarding duplicates and selecting titles and abstracts, 1279 were excluded, leaving 26 articles that were analyzed full text. Of these, 12 were excluded for



failing to meet the inclusion criteria or the objective of the umbrella review. Fourteen reviews met the inclusion criteria [31,32,34,35,41–46,53,54]. The results are presented in Figure 1.

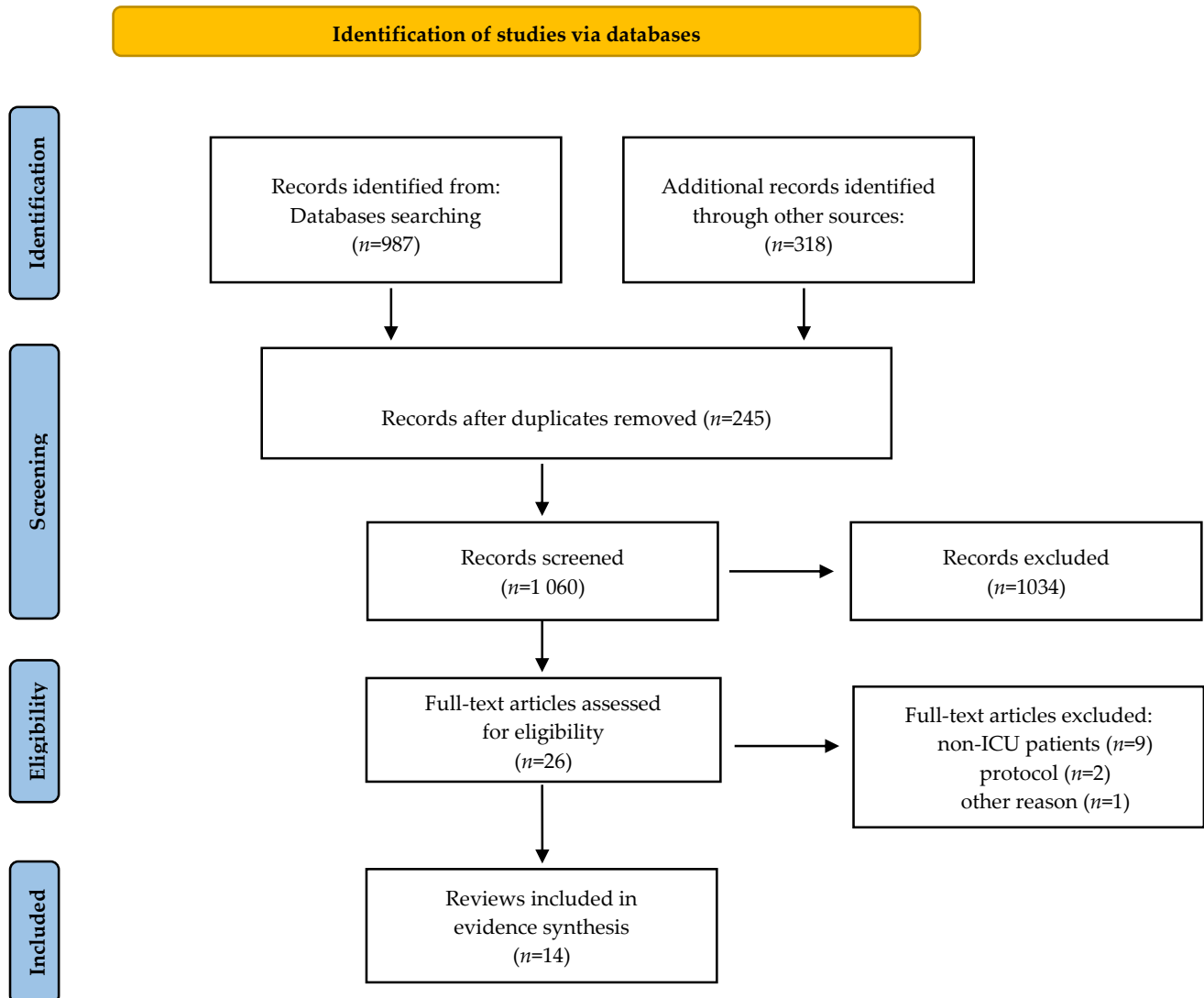


Figure 1. PRISMA flow diagram [38].

The review focused on non-pharmacological interventions used in ICUs for delirium. We excluded a number of reviews that analyzed pharmacological interventions or in which non-ICU patients were the study participants. However, we acknowledge that two publications reviewed studies of both pharmacological and non-pharmacological methods [35,45]. Given the clear classification of methods in these reviews, we decided to include them in our review. We only considered analyzing non-pharmacological methods. In the reviews by Luther et al. and Saritas et al. on non-pharmacological interventions, the authors included one study each using melatonin/ramelteon [32,46]. We also decided to include these reviews, excluding the melatonin/ramelteon studies.

### 3.1. Main Findings and Conclusions of the Reviews

Table 4 summarizes the main findings of the umbrella review.

**Table 4.** Tabular presentation of qualitative findings of the umbrella review.

Author (First)	Aim	Participants	Interventions	Results	Findings
Litton, E. [30]	To assess the efficacy of earplugs as an ICU strategy for reducing delirium	Adult patients admitted to a critical care environment.	Earplugs—as an isolated intervention (3 studies). Earplugs—as a part of a bundle with eye shades alone (2 studies) or earplugs, eye shades, and additional sleep noise abatement strategies (4 studies).	Earplug placement = RR of 0.59 (95% CI, 0.44–0.78). Hospital mortality: earplug placement was associated with an RR of 0.77 (95% CI, 0.54–1.11).	Earplugs in patients admitted to the ICU, either isolation or as part of a bundle of sleep hygiene improvement, is associated with a significant reduction in risk of delirium.
Luther, R. [32]	To understand whether implementation of chronotherapy within the critical care setting can reduce the prevalence of delirium	Adult patients (18+ years). Critical care settings.	DLA—Controlled dynamic light application; BLT—Bright light therapy; MINI 1—Multi-component non-pharmacological interventions: reduction of lighting and noise; MINI 2—frequent patient orientation, use of music, ear plugs/eye shades, reduction in noise, and use of natural light/dimmed lighting in evening.	DLA: Delirium occurred in 137 of 361 (38%) vs. 123 of 373 (33%) control. BLT: Reductions in delirium occurrence in the groups receiving BLT (collectively 2/16 BLT versus 10/17 control). MINI: Delirium occurred 55 of 167 (33%) pre-intervention (MINI 1) vs. 24 of 171 (14%) post-intervention ( $p < 0.001$ ). Duration of delirium reduced from 3–4 days pre vs. 1–2 days post ( $p = 0.021$ ). Mean sleep efficiency index and increased sleep quality increased. Patients with high sleep efficiency index scores demonstrated significantly reduced risk of delirium. MINI2: Delirium occurred in 10 of 81 (12%) vs. 25 of 79 (31.25%) control ( $p < 0.006$ ). Duration of delirium was also significantly reduced.	Chronotherapy can reduce the incidence of delirium within critical care.
Locihová, H. [33]	To comment on the effectiveness of selected non-pharmacological interventions and to provide a basis for discussion of whether these measures may have an impact upon the improvement of the short-term (reduction of delirium, shortening of hospitalization time) and long-term outcomes.	Patients in ICUs.	Plugs; Eye mask; Plugs and eye mask; Plugs, mask, and music	Earplugs: Cox regression analysis revealed a reduction in the risk of early development of delirium and confusion by 53%. Earplugs + eye mask + relaxing music: confirmed a statistically significant reduction in the delirium incidence of the investigated interventions: pre-phase: (22%), cf. post-phase (49%; OR: 0.46, 95% CI: 0.23–0.89, $p = 0.02$ ) and confirmed a statistically significant difference in the occurrence of the daily delirium-free status in patients in the pre-phase (43%) cf. post-phase (48%; OR: 1.64, 95% CI: 1.04–2.58, $p = 0.03$ ). Earplugs + eye mask: confirmed a statistically significant reduction in the incidence of postoperative disorientation in the intervention group (control group 14%, cf. intervention group 0%, $p = 0.01$ ).	The examined interventions reduce the incidence of delirium significantly.

**Table 4.** *Cont.*

Author (First)	Aim	Participants	Interventions	Results	Findings
Nassar Junior, A.P. [34]	To synthesize data on outcomes related to patients, family members, and ICU professionals by comparing flexible vs. restrictive visiting policies in ICUs.	ICU-patients, family members, ICU-professionals.	Flexible visiting policies.	Two studies evaluated the frequency of delirium (354 patients). The flexible visiting policy was associated with a reduced frequency of delirium (OR, 0.39; 95% CI, 0.22–0.69; I2 = 0%).	Flexible ICU visiting hours have the potential to reduce delirium.
Kang, J. [35]	To examine the effect of nonpharmacological interventions that are used in the prevention of ICU delirium.	Adult patients (>18 years) admitted to an ICU of various types (ICU, MICU, SICU in five studies (14.3%), MICU and SICU in cardiac ICU, traumatic, and cardiac care unit).	MLT—multicomponent interventions; PEI—physical environment interventions; DIS—daily interruption of sedation, exercise; PE—patient education; AWS—automatic warning system; CHI—cerebral hemodynamics improvement; FP—family participation; SR—sedation reduction.	The effect sizes of non-pharmacological interventions for onset of delirium and duration of delirium were statistically significant. The effect sizes for length of ICU stay and ICU mortality were not statistically significant. The effect size in relation to the occurrence of delirium was statistically significant only for MLT.	MLTs significantly reduced the occurrence of delirium but did not significantly shorten the duration of delirium.
Herling, S.F. [36]	To assess existing evidence for the effect of preventive interventions on ICU delirium, in-hospital mortality, the number of delirium-, coma-, and ventilator-free days, length of stay in the ICU and cognitive impairment.	Adult medical or surgical ICU patients	Physical or cognitive therapy interventions or both, environmental interventions with changes in light or sound/hearing (earplugs), and nursing care intervention.	Physical and cognitive therapy versus standard care: no effect of the intervention; Early mobilization and occupational therapy: positive effects of the intervention time on return to independent function and ventilator-free days and duration of delirium within the first 28 days of hospital stay. Environmental intervention versus standard care: no significant difference between groups. Preventive nursing care interventions: no effect on the event rate of ICU delirium, in-hospital mortality, and on length of ICU stay.	Physical, cognitive, and occupational therapy interventions may have a potential for preventing or reducing the duration of delirium.

**Table 4.** *Cont.*

Author (first)	Aim	Participants	Interventions	Results	Findings
Bannon, L. [31]	To evaluate the effect of non-pharmacological interventions versus standard care on incidence and duration of delirium in critically ill patients.	ICU patient populations including medical surgical and mixed medical and surgical.	Physical and physical with occupational therapy; bright light therapy; range of motion exercises; earplugs; multicomponent orientation and cognitive stimulation protocol; multicomponent occupational therapy including positioning, cognitive training, and relative involvement; a mirrors intervention; multicomponent targeting risk factors for delirium; protocolized weaning and daily sedation interruption; reorientation using family voice; and paired awakening and breathing.	Incidence of delirium: BLT and individual interventions showed no significant effect between groups. Duration of delirium: MLT physical therapy and various individual interventions showed no significance. Family voice reorientation showed a beneficial effect.	Only family voice reorientation showed a beneficial effect on delirium duration.
Deng, L. [38]	To compare non-pharmacological interventions in their ability to prevent delirium in critically ill patients.	Adult patients (>18 years) admitted to ICU of any type.	CHI—cerebral hemodynamic improving; PEI—physical environment intervention; SR—sedation reduction; FP—family participation; EP—exercise program; MLT—multicomponent interventions; UC—usual care.	The most effective intervention in reducing the incidence of delirium was: FP (94%), EP (74%), MLT (68%), CHI (58%), PEI (26%), and SR (18%). In terms of reduction in in-hospital mortality, EP ranked highest (97.2%), followed by: MLT (73.2%), CHI (35.8%), PEI (34.8%), and SR (31.8%). Although not statistically significant, MLT ranked first in both reducing the number of days of delirium (78.6%) and reducing the length of stay in the intensive care unit (71.2%).	MLT are promising; FP has also shown promise as an intervention in reducing the incidence of delirium (still needs further study).
Liang, S. [41]	To determine the effects of non-pharmacological interventions on preventing delirium and improving critically ill patients' clinical, psychological, and family outcomes.	Adult patients (>18 years) admitted to an ICU of various types (surgical, medical, trauma, or cardiac ICUs or a high-dependency unit). Studies involving ICU patients with a history of neurological disorders were excluded.	EM—early mobilization; FP—family participation; PE—patient education; M—music; SP—sleep promotion; PEI—physical environment intervention; MLT—multicomponent interventions; UC—usual care.	MLT had a higher OR than single component interventions. EM in the combined analyses showed a statistically significant effect on reducing the incidence of delirium and duration. FP-analysis pooled showed a statistically significant effect on reducing the incidence of delirium. Additionally, pooled analysis of three of these studies showed a positive effect on LOS in the intensive care unit. There was a statistically significant effect of music on reducing the incidence of delirium (M). Pooled analysis showed that PE caused a statistically significant reduction in the incidence of delirium. The use of earplugs reduced the risk of delirium or disorientation by 53% (SP).	MLT should be a priority for the prevention of delirium in the ICU in clinical practice; FP and EM can be effective non-pharmacological methods for the prevention of delirium in ICU patients.

**Table 4.** *Cont.*

Author (first)	Aim	Participants	Interventions	Results	Findings
Burry, LD. [45]	To compare the effects of prevention interventions on delirium occurrence in critically ill adults.	Critically ill adults ( $\geq 16$ years of age in an ICU of any type or high-acuity unit).	Occupational therapy, Early physical therapy daily, Early physical therapy + cognitive exercises, Music, Eye mask + ear plugs + routine night care, Family intervention, Multi-component strategies, Mirrors, Noise reduction, refurbished rooms with suspended ceiling and low frequency sound absorption, Family intervention, orientation training/supervision (memory guidance), therapeutic engagement (cognitive stimulation) and sensory control (e.g., glasses and hearing aids), Delirium prevention protocol including screening for delirium risk factors, subsequent cognitive assessment and orientation, environmental management and therapeutic intervention, Interprofessional early mobilization protocol, Bright light therapy, Standard post-stroke care, therapeutic activities twice daily based on the Hospital Elder Life Program and assessment of anticholinergic burden and medication risk, ABCDE bundle daily.	Pairwise comparisons for single or multicomponent non-pharmacological interventions found no differences compared to standard care for ICU or hospital length of stay, except for mobilization with occupational or physical therapists compared to standard care.	Single and multicomponent non-pharmacological interventions did not connect to any evidence networks to allow for ranking and comparisons as planned; pairwise comparisons did not detect differences compared to standard care.
Saritas, S. [46]	To prepare a systematic review with articles that tested the effectiveness of non-pharmacological interventions towards preventing delirium at adult intensive care units.	Patients hospitalized at secondary or tertiary institutions' adult ICUs.	MLT—multicomponent, PE—patient education, HI—hormone intervention, PEI—physical environment intervention, TI—therapeutic intervention, APS—automated preventive system, QDS—quitting daily sedation and exercise.	All interventions were effective. The multicomponent intervention was statistically significantly effective in terms of reducing/preventing delirium.	The interventions had important effects regarding delirium management, but only the MLT application was significant

**Table 4.** *Cont.*

Author (first)	Aim	Participants	Interventions	Results	Findings
Qin, M. [47]	To evaluate the effects of family intervention on the incidence and duration of delirium, length of ICU stay, and duration of ventilation in ICU patients.	Adult ICU patients.	Orientation—memory clues delivered by family members, family members’ voices, flexible visitation, or standard family visitation.	Family intervention was associated with a 24% lower risk of delirium. Family intervention reduced the number of delirium days.	Family intervention was associated with a lower risk of delirium and fewer delirium days, but it did not affect the length of ICU stay, the duration of ventilation, or patient mortality.
Xu, H. [51]	Impact of cognitive exercise on the incidence of delirium in ICU inpatients.	Adult patients with delirium in the ICU.	Cognitive exercise	The duration of delirium in the treatment group and routine group was significantly different ( $Z = 3.24$ , $MD = -1.99$ , 95% CI: $-3.20, -0.79$ , $p = 0.001$ ). That cognitive exercise significantly shortened the length of hospital stay in ICU patients with delirium ( $Z = 10.84$ , $MD = -2.10$ , 95% CI: $-2.48, -1.72$ , $p < 0.00001$ ).	Cognitive exercises can reduce the incidence and duration of delirium in ICU inpatients and shorten the length of hospitalization.
Chen, T-J. [48]	To compare the effects of non-pharmacological interventions by combining direct and indirect evidence of the incidence and duration of delirium in intensive care units.	Adults (age $\geq 18$ years) in ICU.	EC—environment control; CA—clinical adjustment; PA—physical activity; HE—health education; Multi_A, B, C, D—multicomponent A, B, C, D; LT = light therapy; FM = fluid management; EM—early mobilization, FV—family visit, EE—eye mask and earplugs, EEM—eye mask, earplugs, and melatonin, PHE—preoperative health education.	Multi_A significantly reduced delirium incidence risk compared to routine care (OR = 0.12, 95% CI = 0.02 to 0.83) and was ranked best based on the findings of SUCRA (87.4%).	Multicomponent non-pharmacological interventions are the most effective intervention for ICU delirium prevention but not ICU delirium duration.

### 3.2. Effects of Non-Pharmacological Nursing Interventions

Due to the presence of heterogeneous interventions in the literature, the authors decided to classify the effects of non-pharmacological nursing interventions into four main groups, which were named as follows: multicomponent non-pharmacological interventions (MLT), early mobilization (EM), family participation (FP), and environment interventions (EI). The rationale for the selection of each subtheme is presented below.

### 3.3. Multi-Component Non-Pharmacological Interventions

Luther et al., in their review, identified two non-pharmacological multicomponent interventions such as light and noise reduction and frequent patient orientation, listening to music, use of glasses, earplugs/eye covers, noise reduction, and use of natural light/darkened lighting in the evening, which were found to be effective in reducing the incidence and duration of delirium [28]. Furthermore, in the review by Kang et al., multicomponent interventions were found to be the most effective in reducing the incidence of delirium but not significant in reducing its duration. In this review, multicomponent interventions included combining some of the nine interventions or using a bundle of ABCDE [35]. The analysis in the review by Deng et al. showed that MLT was most effective in reducing the number of days of delirium and reducing ICU stay, although these results were not statistically significant. MLT was the third most effective in reducing the incidence of delirium and the second most effective in reducing in-hospital mortality [38]. The effect of multicomponent interventions in the review by Liang et al. was statistically significant in the combined analysis for the outcomes—reduction in incidence and duration of delirium, length of ward stays, and mortality [41]. According to a review by Chen et al., a multicomponent intervention consisting of seven complexes such as physical activity, family participation, cognitive stimulation, reorientation, sensory stimulation, environmental control, clinical adjustment, reorientation, sensory stimulation, environmental control, and clinical adjustment as a whole was the most effective intervention in preventing delirium in intensive care units. Interestingly, multicomponent interventions that did not include early mobilization and family participation did not show a statistically significant effect on reducing the incidence of delirium (multitreatment B: i.e., health education, reorientation, effective communication, environment control, and clinical adjustment; C: i.e., reorientation, effective communication, environment control, and clinical adjustment; D: i.e., reorientation, environment control, relaxation, and early mobilization; E: i.e., cognitive stimulation, reorientation, and family participation) [48].

### 3.4. Early Mobilization

In a review by Liang et al., seven studies analyzed the impact of early mobilization. The analysis showed positive effects in reducing the incidence (five studies) and reducing the duration of delirium (four studies). This evidence was assessed as of moderate reliability [41]. In contrast, Chen et al. found that physical activity alone did not significantly prevent delirium in the intensive care unit. However, physical activity combined with family participation had a greater effect on reducing delirium [48]. We identified one review that examined the effect of cognitive exercise on the duration of delirium in ICU patients. The meta-analysis results showed that cognitive exercise significantly reduced the incidence of delirium and the length of hospital stay in ICU patients with delirium [51].

### 3.5. Family Participation

An analysis by Qin et al. showed that family intervention was associated with a 24% lower risk of delirium and fewer days of delirium. However, it had no effect on the length of intensive care unit stay, duration of ventilation, or patient mortality [47]. One study included in a review by Bannon et al. showed a statistically significant difference in the duration of delirium between the patient's reorientation with the voice of the family, and the voice of the unknown and the control group [31]. The analysis by Deng et al., on the

other hand, found that family participation was the most effective intervention in reducing the incidence of delirium, followed by EP, MLT, CHI, PEI, and SR [38]. Of the studies in the Liang et al. review, five included family involvement. Four of these measured the incidence of delirium, and the outcome showed a significantly statistical effect on reducing the incidence of delirium (moderate confidence evidence). In addition, an analysis of three of the studies also showed a positive effect on the length of stay in the ICU, although the reliability of the evidence was assessed as very low [41]. A review by Nassar Junior et al. compared flexible and restrictive visiting policies in intensive care units. Two studies assessed the incidence of delirium in a total of 354 patients. Flexible visiting policies were associated with a lower incidence of delirium [34].

### 3.6. Environmental Interventions

In a review by Luther et al., studies relating to bright light therapy (BLT) and the use of dynamic light therapy (DLT) as single interventions showed no statistically significant differences in the incidence of delirium, although BLT therapy showed a positive effect on improving the circadian rhythm of patients [32]. In the Herling et al. review, two studies with environmental interventions (earplugs and lighting) were analyzed. In both studies, no significant differences were found with relation to the incidence of delirium [36]. A review of studies by Litton et al. found that implementation of sleep hygiene interventions, including the use of earplugs in patients admitted to the ICU, was associated with a significant reduction in the risk of delirium [30]. These outcomes agree with the review of Locihová et al. that confirm that the interventions of earplugs, eye masks, and relaxing music reduce the incidence of delirium significantly [33]. In a review by Liang et al., two studies analyzed the effect of music on the incidence of delirium. The results showed a significant effect on reducing the incidence of delirium [41].

## 4. Discussion

The incidence of delirium in ICU patients is a complication that is associated with many adverse consequences. It negatively affects not only cognitive function but also the outcomes of treatments of ICU patients and generates extremely high costs [25,51]. Due to the high incidence of this complication in critically ill patients, it is necessary to develop and implement an effective management scheme to prevent delirium [54]. Given that the cause of delirium is multifactorial, non-pharmacological multicomponent interventions are promising strategies for the prevention of delirium [55].

In the total effect analysis, non-pharmacological interventions in the review by Kanga et al. were found to be statistically significant for the onset and duration of delirium [35]. Sahawneh et al., in their integrative review, found a positive effect of non-pharmacological interventions in all eight quantitative studies, although four studies used only a single component intervention. Therefore, it can be speculated that a combination of some single interventions may have an even better effect [56]. Similarly, in the Liang et al. study, comparison of all non-pharmacological interventions, in a pooled analysis, with the control group showed a significant effect on reducing the incidence and duration of delirium and length of stay in the ICU. The reliability of this evidence was rated as low. In addition, multicomponent interventions had a higher odds ratio (OR) than single component interventions [41]. This supports the hypothesis that combining single interventions is a more effective strategy. Saritas et al. noted that all interventions from their study were effective, although not sufficient. Therefore, they also recommend the use of multicomponent methods [46]. Bannon et al. reported that although there is insufficient evidence that single or multifactorial interventions are effective, multicomponent interventions may be more reliable [31].

Herling et al. noted that physical, cognitive, and occupational therapy interventions have the potential to prevent or shorten the duration of delirium [36]. Schweitckert et al. studied the impact of early physical and occupational therapy on critically ill patients. The study showed that whole-body rehabilitation, consisting of discontinuation of sedation



and physical and occupational therapy in the earliest days of critical illness, resulted in better functional outcomes at hospital discharge, shorter duration of delirium, and more ventilator-free days compared with standard care [54]. Xu et al. found a positive effect of cognitive exercise to reduce the duration of delirium and the length of hospital stay in ICU patients with delirium [51]. At the time of writing the Herling et al. review, several studies that may have influenced perceptions of early mobilization of ICU patients for delirium prevention were in progress [36,57,58]. We reached out to the authors of these studies. Unfortunately, in the final study by Wright et al., the effect of more intensive physical rehabilitation on delirium was not assessed in either primary or secondary outcomes [57]. In the review by Doiron et al., only two studies were included that reported the number of days spent in the ICU and the number of days in hospital with delirium [58]. The results of one study have already been cited [59]. In contrast, in the results of the second study, no difference was found between the groups [60]. However, the results of a study by Chen et al. showed that a multicomponent intervention that included early mobilization combined with family participation and other non-pharmacological interventions significantly reduced the incidence of delirium in the intensive care unit [48].

Single light therapy interventions have shown inconclusive results. However, a study by Engwall et al. showed the benefit of using a lighting system specifically tailored to supporting patients' circadian rhythms on patients' psychological well-being. Patients described bright light as healthy, pleasant, and having a positive effect on their mood and sense of security [61]. Additionally, in the review by Luther et al., the effects of MLT and light therapy (BLT and DLA) on circadian rhythm were assessed [32]. The study by Guo et al. showed a statistically-significant increase in melatonin and a decrease in cortisol in postoperative nocturnal urine levels in the MLT intervention group. These results suggest an improvement in the circadian rhythm with multicomponent interventions [62]. On the other hand, a study by Ono et al. showed better circadian cycle outcomes in the BLT treatment group [63]. The results from this review may therefore suggest that the use of these two methods in combination may increase their effectiveness in improving patients' circadian rhythms and thus contribute to the prevention of delirium [32]. Although the Kang et al. analysis also found no significant effect of environmental interventions on the incidence and duration of delirium, it should be noted that single environmental interventions were components of multicomponent interventions [35]. Similarly, in the Herling et al. review, the study found no significant effect of earplug use or lighting on the incidence of delirium. However, it was observed that in patients sleeping with earplugs, delirium occurred later [36]. In contrast, this contradicts the results of the Litton et al., review, in which the placement of earplugs in patients admitted to the intensive care unit, either alone or as part of a sleep hygiene improvement package, was associated with a significant reduction in the risk of delirium [30]. The potential positive effect of using earplugs and eye masks on improving sleep quality and reducing the incidence of delirium was also demonstrated in a review by Locihová et al. [33].

Family involvement in the patient care process (F) in the ICU was a recent addition to the ABCDEF packet [64]. Deng et al., in their review, conducted a network meta-analysis that showed FP to be the most effective intervention in reducing the incidence of delirium, followed by EP, MLT, CHI, PEI and SR. [31]. In the Bannon et al. review, only family voice reorientation had a beneficial effect on delirium duration [36]. This suggests that the family may be an important part of the strategy to fight delirium in ICUs. Reviews of the literature by Qin et al. and Pabón-Martínez et al. confirmed that family interventions reduced the incidence of delirium [46,65]. Interventions for family participation in delirium prevention, in the Pabón-Martínez et al. scoping review, included flexible visiting hours, and direct and indirect (via audio-media) reorientation of the patient in the ICU. The study reported an association between flexible visiting and a reduction in the incidence of delirium. Other benefits of flexible visiting and patient reorientation were increased delirium-free days, reduced delirium duration, reduced incidence of infections, and reduced length of hospital stay [66]. Similarly, the review by Nassar Junior et al.

found that flexible visiting policies were associated with a lower incidence of delirium. In addition, flexible visits were associated with a lower severity of anxiety symptoms among ICU patients. Involving the family in the therapeutic process had positive effects, not only for the ICU patients but also for the family itself [34]. This is consistent with a study by Kleinpell et al., which found that after implementing a project to promote and involve families in the intensive care unit, family members reported statistically significant increases in overall satisfaction, satisfaction with decision-making, and satisfaction with quality of care [67]. At the same time, we would also like to point out and agree with the researchers Chen et al. that the implementation of multifactorial interventions may put additional workloads on ICU nurses. Therefore, a multidisciplinary team should be involved in the care [48].

## 5. Conclusions

Non-pharmacological nursing interventions may be effective in preventing and shortening the duration of delirium in ICU patients. Due to the multifactorial etiology of delirium, multicomponent non-pharmacological interventions are the most promising methods. Moreover, they have shown the highest efficacy in many studies. The patient's family is an important part of delirium prevention and should be involved in the therapeutic process. An additional benefit of including the family is to improve the families' perceptions of the work of the medical staff. Light therapy may improve the patient's circadian rhythm and thus reduce the incidence of delirium.

The most desirable aspect of patient-centered care for delirium is risk minimization and prevention. Medical staff should be aware of and implement delirium assessment practices and methods to minimize the risk of delirium in intensive care unit patients.

## 6. Implications for Practice

Non-pharmacological multifactorial interventions should be implemented in clinical practice in a scheme to prevent delirium in the ICU. Early mobilization, cognitive exercise, and rehabilitation of the whole body—physical therapy, occupational therapy, early movement, and transfer from bed to chair—can have positive effects. Regarding family involvement, we recommend introducing delirium education projects for the family, an extended visitation model, and acoustic reorientation developed by a family member. Through small activities such as orienting the patient to the date, place, and space; discussing current family events; and providing assistive devices that the patient uses every day (hearing aid, glasses), the family can stimulate cognitive, orientation, and memory processes. Single light therapy interventions, although not showing clear results, in combination with other interventions, e.g., noise reduction, use of music, eye masks, and ear plugs, can show beneficial results and support the circadian rhythm of patients. Care focused on delirium prevention should include the involvement of a multidisciplinary team including nurses, doctors, physiotherapists, psychologists, and occupational therapists.

## 7. Implications for Future Research

The studies that were included in the reviews mainly focused on the effect of non-pharmacological interventions on outcomes such as incidence, duration of delirium, length of hospital stay, and mortality. We suggest that future studies should also consider the impact of non-pharmacological interventions on patients' short- and long-term cognitive function outcomes. Multifactorial interventions have been shown to be effective in reducing the incidence of delirium, but it is not always clear which combination of interventions led to the effect. Future studies should clearly specify which single interventions were combined. In addition, we suggest that future research should focus on combining single interventions, which have shown potential benefits against delirium, e.g., bright light therapy, into multicomponent interventions.

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# Family experiences and attitudes toward care of ICU patients with delirium: A scoping review

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**Introduction:** The family has an important role in the care of the ICU patient. Research shows that the implementation of non-pharmacological interventions to prevent delirium, including interventions with the family, can reduce the incidence of delirium. The aim of this review was to search the available literature about the experiences and attitudes of family/carers of ICU patients diagnosed with delirium during hospitalization.

**Methods:** A scoping review method was used to map terms relevant to the involvement of relatives in the care of critically ill patients with delirium. To identify studies, the following databases were searched: PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library. The database search was ongoing from 15 July 2022, with a final search on 4 August 2022.

**Results:** Thirteen articles reporting on the experiences and attitudes of family/carers of ICU patients who developed delirium during hospitalization were included in the scoping review. Of the included studies, eight were qualitative studies, three were quantitative studies and two were reviews (systematic review and integrative review). The studies were conducted in North America, Europe, South Africa, and Asia. Our findings show that carers experienced adverse effects associated with delirium in ICU patients such as stress, anxiety, embarrassment, uncertainty, anger, shock. Families/relatives need both emotional and informational support from medical staff.

**Conclusion:** Relatives want to be involved in the care of the delirium patient, although this needs improvement in some aspects of care such as: lack of awareness, family/relatives knowledge of delirium, improved education, and communication with medical staff. Recognition of delirium by families is acceptable and feasible. Family involvement may induce an increased anxiety, but this aspect needs further research.

## KEYWORDS

family, experiences, delirium, ICU, scoping review

## Introduction

Patients' families have an important role in ICU patient care. They are often involved in the decision-making process as representatives of critically ill patients, support their relatives and are the link between the patient and the ICU medical staff. Patient Centered Care (PCC) and Family Centered Care (FCC) is increasingly being implemented and desired in the hospital setting. The PCC and FCC model of care involves patient care that takes into account and respects the patient's beliefs, values and preferences, and involves the family in the process of caring for the relative (1, 2). Family involvement in the patient care process (F) in the intensive care unit has been added to the ABCDEF package. The ABCDEF package is an evidence-based approach to the holistic management of critically ill patients, with the focus on optimizing recovery and patient outcomes in the ICU and engaging and empowering patients and families during hospitalization. It includes: (1) Assess, Prevent, and Manage Pain, (2) Both Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT), Choice of analgesia and sedation, (3) Delirium: Assess, Prevent, and Manage, (4) Early mobility and Exercise, and (5) Family engagement and empowerment (Figure 1) (3, 4). Studies showed that greater compliance with the ABCDEF package was independently associated with improved clinical outcomes (5). ICU patients are at particular risk of developing delirium during hospitalization. It is estimated to occur in up to 80% of ICU patients (6). Studies show that implementing non-pharmacological interventions to prevent delirium, including interventions with the family, can reduce the incidence of delirium (7–9). Understanding the experiences and attitudes of carers can contribute to the development of nursing interventions with patient families, provide support, education and improve the relationship between medical staff and patient families. In addition, highlighting the role that ICU nurses play in their relationships with families/relatives of delirious ICU patients may result in increased staff awareness, which may ultimately have a positive impact on the care of delirious ICU patients and improve the wellbeing of patients and their families.

## Objectives and rationale

The aim of the scoping review was to search the available literature about the experiences and attitudes of family/carers of ICU patients diagnosed with delirium during hospitalization. Of particular interest were the experiences of relatives because these people are increasingly involved in the care of critically ill patients and the risk of delirium is high in ICU patients. The research questions (RQs) for our scoping review are as follows:

1. What is the family's experience of caring for ICU patients with delirium?

2. What is the attitude of the family toward the care of an ICU patient with delirium?

## Methods

### Study design

We chose the scoping review method because we wanted to map terms relevant to the involvement of relatives in the care of critically ill patients with delirium. Scoping reviews are a relatively new approach to synthesizing evidence, and there is currently little guidance on deciding between a systematic review and a scoping approach during the synthesis of evidence, especially when the literature has not yet been comprehensively reviewed or shows a large, complex or heterogeneous nature that cannot be subject to a more thorough systematic review (10).

We conducted the scoping review according to the methods described in the Joanna Briggs Institute Methodology Manual for Scoping Reviews (11), and using the recommendations of the Preferred Reporting Items for Systematic Reviews and Meta-analysis for Scoping Reviews (PRISMA-ScR) guidelines (12) (available on request from the corresponding author).

### Inclusion criteria

To identify important aspects related to family experiences and attitudes toward care of ICU patients with delirium, we developed research questions that clearly define the Population, Concept and Context (PCC) of the scoping review.

### Population

Studies whose participants were family or carers of patients admitted to the intensive care unit who were diagnosed with delirium during the hospital stay were included in the review.

In this scoping review, adults were defined as those who were aged 18 years or older.

Family was defined as people who are related to patients by blood or marriage, and carers/relatives were defined as people who accompanied patients during their stay in the ICU.

### Concept

The object of interest was the experiences and attitudes of family members/carers whose relatives experienced delirium while in the ICU stay. This included research on the experiences and readiness of relatives to be involved in the care of an ICU patient with delirium. In addition, we also included studies on the impact of caring for an ICU patient with delirium on the occurrence of anxiety and depression symptoms.

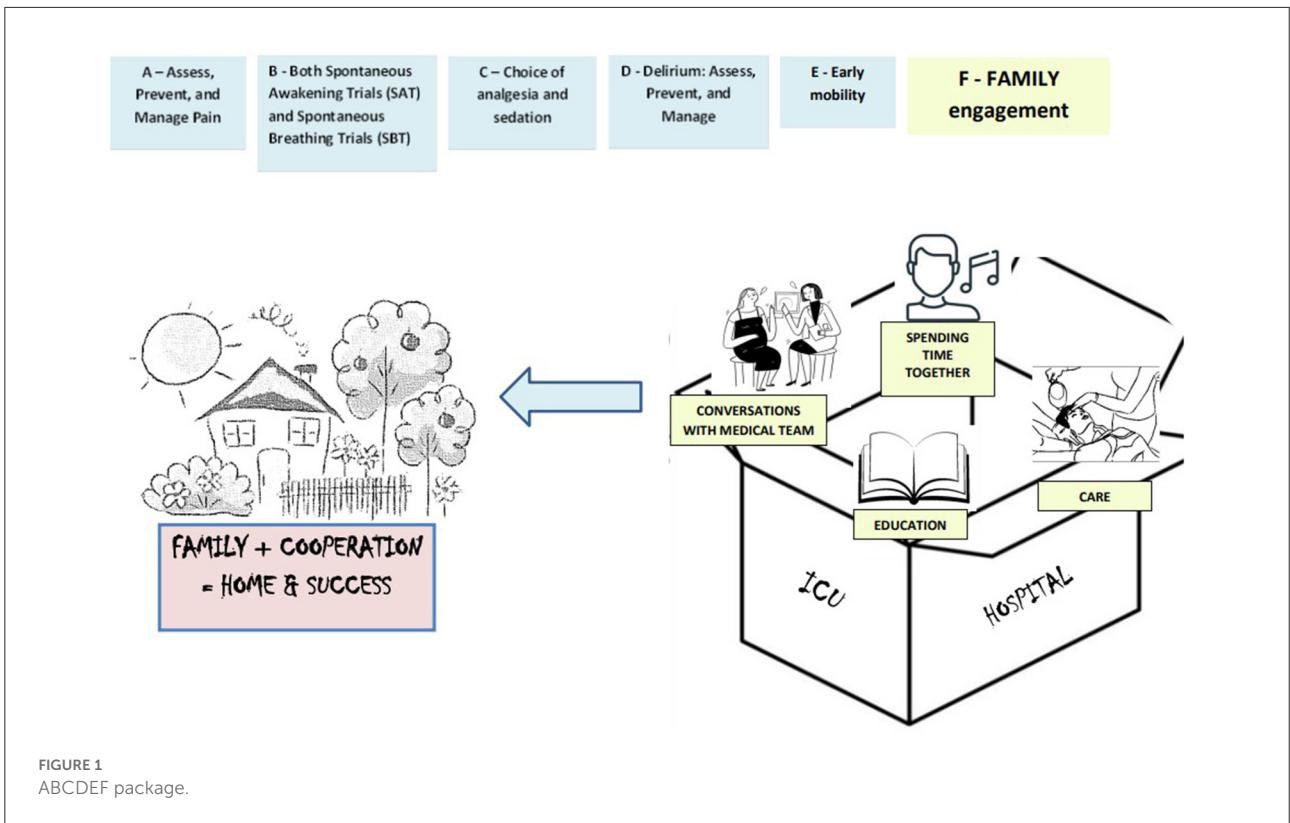


FIGURE 1  
ABCDEF package.

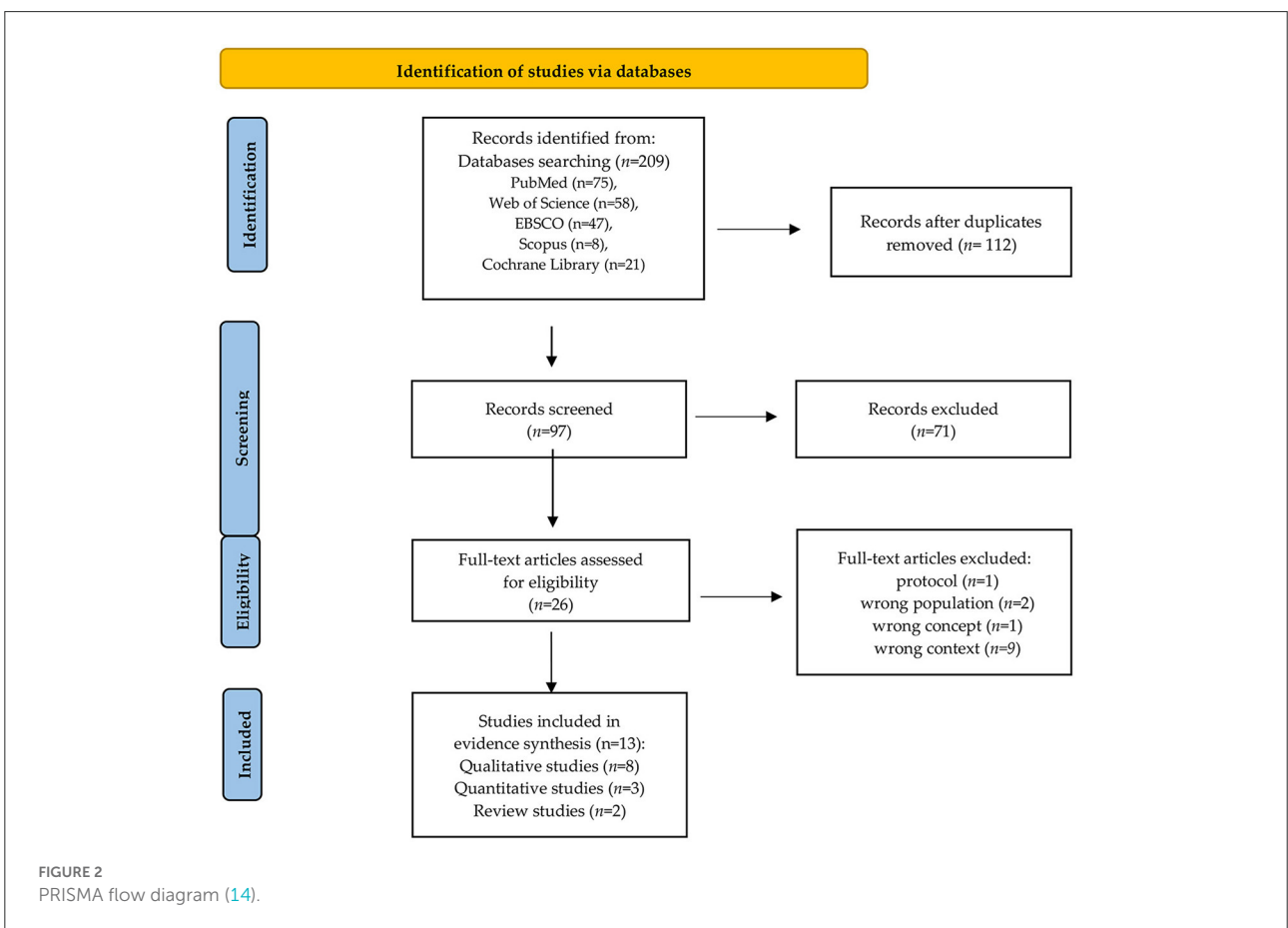


FIGURE 2  
PRISMA flow diagram (14).



## Context

Studies to be included in the review had to be conducted in the adult intensive care unit.

## Types of studies

Quantitative and qualitative studies of any design or methodology were included in this review. Secondary evidence sources—literature reviews and systematic reviews—were also included.

## Exclusion criteria

Studies that took place in non-ICUs or children's ICUs were excluded from the scoping review. Studies in which the concept did not involve delirium and the experiences and attitudes of the family toward the care of an ICU patient with delirium were also rejected. In addition, studies published before 2017 and in a language other than English were excluded from the scoping review.

## Search strategy

Two authors systematically searched the following databases: PubMed, Scopus, EBSCO, Web of Science, and Cochrane Library. The following keywords were used: “care givers”, “family”, “experience”, “attitudes”, “delirium”, “delirium prevention”, “ICU”, “critical ill”. Keywords with their combinations using AND or OR were entered. The search was limited to studies published between 2017 and 2022. All publications were examined by title and abstract to exclude irrelevant records. Any discrepancies were resolved through discussion with the researchers, and at the end of the selection process, full agreement was reached on the articles to be included. The database search was ongoing from 15 July 2022, with a final search on 4 August 2022.

## Extraction of data

The data extraction form, based on the JBI scoping review guidelines (11), was used, and the most important information in the studies was included. Data extraction, which is referred to in the scoping review as “data charting” (13) was undertaken by two reviewers independently. To identify relevant studies, we used the Population-Concept-Context (PCC) framework. Information extracted from included studies included: First author, and year, country, study design, aim of the study, inclusion (PCC) and exclusion criteria, results, and findings. Reviews are considered eligible if all the following

criteria are met. The authors performed the extraction using Microsoft Excel.

## Critical appraisal process

The purpose of this scoping review was to collate the information that has been published on family experiences and attitudes toward care of ICU patients with delirium. We did not critically appraise the individual sources of evidence. For a scoping review, it is acceptable to review the current evidence without considering the methodological assessment of the included studies (13).

## Results

Our scoping review identified 209 articles, from which 13 articles reporting the experiences and attitudes of family/carers of ICU patients who developed delirium during hospitalization were included (Figure 2). Of the included studies, eight were qualitative studies (15–22), three were quantitative studies (23–25), and two were reviews (one systematic review and one integrative review) (26, 27). The studies were conducted in North America ( $n = 5$ ), Europe ( $n = 4$ ), South Africa ( $n = 1$ ), Asia ( $n = 1$ ). To reach the purpose, qualitative studies mostly used the semi-structured interview method. In quantitative research, questionnaires were used: Sour Seven, Patient Health Questionnaire 9 (PHQ-9), Generalized Anxiety Disorder 7 (GAD-7) and original survey questionnaires. The results and conclusions are presented in Tables 1–3.

## Discussion

In this review, we identified 13 studies regarding the experiences and attitudes of families/carers of ICU patients who experienced delirium during hospitalization, published between 2017 and 2022. Our findings show that carers experienced adverse effects associated with delirium in ICU patients such as stress, anxiety, embarrassment, uncertainty, anger, shock. Families/ relatives need both emotional and informational support from medical staff. Relatives want to be involved in the care of a patient with delirium, but this requires removing some of the barriers such as: lack of family knowledge and awareness of delirium, improved education, and communication with medical staff. Research shows that the use of delirium assessment tools designed for the family is feasible and acceptable to medical staff. Family involvement may induce an increased anxiety but this aspect needs further research. The included studies support family involvement in the care of ICU patients with delirium.

Research shows that the family ('F') is important in the care of the ICU patient, therefore experts have included the family in the ABCDE package developed (5). Critical illness

TABLE 1 Characteristics and findings of qualitative study included in scoping review.

References	Country	Study design	Participants	Findings
Lange et al. (15)	Poland	Qualitative study (semi-structure interviews)	8 family members	<ul style="list-style-type: none"> <li>✓ Inadequate education and information,</li> <li>✓ The benefit of obtaining prior information,</li> <li>✓ Surprise, shock, and anger at the change in a relative's behavior.</li> </ul>
Leigh et al. (16)	Canada	Qualitative descriptive study (focus groups)	3 family members	<ul style="list-style-type: none"> <li>✓ Family detection of delirium is feasible and of value for patient care and coping by family members.</li> <li>✓ Actively involving family members in delirium detection at the bedside may improve outcomes and experiences for both patients and family members.</li> </ul>
Huang et al. (17)	Taiwan	Qualitative descriptive study (semi-structure interviews)	20 family caregivers	<ul style="list-style-type: none"> <li>✓ Uncertainty among family caregivers of patients with delirium in ICUs can lead to feelings of fear and anxiety.</li> </ul>
Pandhal et al. (18)	England	Qualitative descriptive study (semi-structure interviews)	9 relatives	<ul style="list-style-type: none"> <li>✓ Lack of understanding about delirium amongst family members and how they could have supported delirium management.</li> <li>✓ Families were keen to be involved in delirium.</li> <li>✓ Interventions such as video-ICU delirium education have been found to be effective in educating family members about delirium management.</li> </ul>
Hume (19)	South Africa	Qualitative study (semi-structured interviews, unstructured observation and and focus groups)	2 family members	<ul style="list-style-type: none"> <li>✓ The negative impact of the physical environment and pacing culture in intensive care.</li> <li>✓ Damaging mistrust</li> </ul>
Bohart et al. (20)	Danish	Qualitative study (semi-structure interviews)	11 relatives	<ul style="list-style-type: none"> <li>✓ Lack of knowledge about delirium,</li> <li>✓ Delirium as a second order problem,</li> <li>✓ Lack of information on delirium by medical staff.</li> <li>✓ Varied nature of delirium and different ways of dealing with it</li> </ul>
Page et al. (21)	UK	Qualitative study (in-depth interviews)	15 family members	<ul style="list-style-type: none"> <li>✓ Relatives experience the events associated with ICU hospitalization (including those associated with delirium) in a very real and ingraining manner.</li> <li>✓ Family members may experience a different version of a critical illness episode than their relatives (patients).</li> </ul>
Smithburger et al. (22)	United States	Qualitative study (purposeful sampling, interview)	10 family members	<ul style="list-style-type: none"> <li>✓ Families of ICU patients want to be involved in the care and prevention of delirium.</li> <li>✓ Need for communication between family and nursing staff</li> </ul>

affects not only the patient himself, but also his family members and other caregivers (e.g., partners, friends) who participate in the care process of the ICU patient. Therefore, learning about the experiences and attitudes of these people is fundamental

to recognizing their needs and involving them in the care process (3). The PCC and FCC model of care, which involves taking into account the wishes, needs, questions, concerns of patients and their families, is increasingly desirable in the care of

TABLE 2 Characteristics and findings of quantitative study included in scoping review.

References	Country	Study design	Participants	Findings
Poulin et al. (23)	Canada	A cross-sectional study	147 family caregivers	Family caregivers of critically ill adults with delirium frequently experience clinically significant anxiety and are significantly more likely to report frequently worrying too much about different things.
Smithburger et al. (24)	United States	A cross-sectional study	60 family members	Patients' families can be a valuable resource to engage when implementing delirium-prevention activities in the ICU, according to health care providers and family members
Rosgen et al. (25)	Canada	A cross-sectional study	147 patient-caregivers	Caregiver-detected patient delirium was associated with increased depression and anxiety symptoms in family caregivers of critically ill patients.

TABLE 3 Characteristics and findings of review study included in scoping review.

References	Study design	Included studies	Participants	Findings
Boehm et al. (26)	A systematic review and qualitative meta synthesis	14 articles	364 participants inc. 70 family members	<ul style="list-style-type: none"> <li>✓ The experience of delirium has emotional, cognitive, physical, relational, spiritual, and situational implications for patients and family members.</li> <li>✓ Less attention is focused on the interventions that patients and their families perceive as beneficial in alleviating this suffering.</li> </ul>
Assa et al. (27)	An integrative review	7 studies	633 family caregivers	<ul style="list-style-type: none"> <li>✓ Family caregivers experienced adverse outcomes related to delirium in patients in the ICU (e.g., distress, anxiety, depression, anger, shock, uncertainty, dissatisfaction).</li> <li>✓ Family Caregivers' needs: informational support, emotional support from health care professionals effective communication.</li> </ul>

critically ill patients (1). Family members/carers often become surrogates and participate in decision-making regarding ICU patients. As family/carers/relatives are the people who know the patient best they are able to indicate the patient's likes and preferences, but can also more easily identify changes in the patient's behavior that may be indicative of delirium symptoms (16). It is therefore important that the family's opinion is heard and taken into account in the decision-making process (28). The positive impact of family involvement has been shown even during traumatic events such as cardiopulmonary resuscitation (CPR). In a study by Jabre et al. (29), it was shown that family presence during CPR was associated with positive outcomes on psychological variables, did not interfere with medical efforts and did not increase stress in the medical team or cause medico-legal conflicts.

A study by Leigh et al. (16) showed that medical staff, patients, and carers think it is feasible for family members to detect delirium. The family, who know the patient, their behavior and manner, can provide valuable information about subtle changes in the patient's behavior. Which can positively influence patient care. Similarly, in a study by Smithburger et al. (24) most medical staff (93% of doctors and all nurses) believed that the family could be involved in delirium prevention. Family involvement will result in increased time spent on delirium

prevention activities, which may result in a reduced incidence of delirium in the ICU.

Our findings suggest that family/relatives of ICU patients want to be involved in delirium-related activities (16, 18, 22). In addition, family involvement in care by performing tasks such as delirium assessment, non-pharmacological interventions to prevent delirium, provide family members with a sense of purpose and may be a protective mechanism to reduce their stress related to their relative's critical illness (18). Similarly, in the Smithburger et al. (22) study, family/relatives were willing to engage in non-pharmacological interventions to prevent delirium. Moreover, the family felt that their presence and interventions such as: reading newspapers, news, providing items that patients used on a daily basis, e.g., electric shaver, calendar, and boards to help them communicate, had a positive impact on the patient, particularly during an episode of delirium.

Both medical staff, patients and family are of the opinion that relatives can and should be involved in delirium prevention activities, but there are several barriers that should be considered (16, 18, 24). The most important of these is the low level of knowledge and awareness of delirium among family members (15, 16, 18, 20). The results of a study by Bohart et al. (20) showed that delirium is an unknown term to relatives, there is little knowledge about it and delirium symptoms are taken as

a natural consequence of critical illness and are not a primary concern in ICU care. Similarly, in a study by Lange et al. (15) families assigned delirium symptoms as a consequence of anesthesia. In the Leigh et al. (16) study, focus group participants (including family) unanimously reported that families were likely to have moderately low to low levels of knowledge about delirium. Patients and their families confessed that they learned about delirium by searching the Internet or reading brochures given to them by the research team. In the Pandhal (18) study, participants said that a lack of knowledge about delirium and critical illness made it difficult to meet a relative staying in the ICU. At the same time, they highlighted the fact that understanding delirium would facilitate the patient's mental health recovery. Which was also expressed by family and patients in the study by Lange et al. (15).

According to families and relatives, one of the barriers was inadequate communication between medical staff and carers (15–19, 22). Families often feel uncertain about the interventions they are allowed to perform with their relative. This is due to the lack of clear communication from bedside nurses. Increasing the comfort of families would be influenced by an invitation from nurses to participate in care (22). Another study by Smithburger et al. (24) found that only 28% of participants were discussed with medical staff about participating in delirium prevention activities. Similarly, in a study by Huang et al. (17), in which difficulties in decision-making were due to caregivers' lack of knowledge about the patient's medical needs, as well as limited time to communicate with staff. The opportunity to talk and get information from medical staff about delirium brings relief to the family (15, 20). In a study by Bohart et al. (20) participants who received information from staff about delirium described it as a relief. This helped them to understand the changes in their relative's behaviors. This was also noted by participants in the Lange et al. (15) study. In a study by Smithburger et al. (24) participants found talking to a bedside nurse about the patient's concerns to be the best strategy for reducing the discomfort of involvement in care. In a qualitative meta-analysis by Boehm et al. (26) it was shown that patients and family members valued simple, empathic interpersonal communication and clinician interventions related to delirium as a means of relieving distress.

An important facilitating factor for family involvement, according to families and relatives, is education. Families feel the need and want to be educated about delirium (15–18, 20). The best way to educate according to families in the Huang et al. (17) study, was a one-on-one conversation with a medical professional. Similarly, in the Smithburger et al. (22) study, 55% of participants indicated that one-on-one education with a healthcare professional was the best approach. Video education was found to be an effective education intervention. This allowed family members to absorb information at their own speed while avoiding the workload of staff (18). Indirect education, using written information about delirium, brochures, is also an acceptable form (20). However, families emphasize the need

for dialogue with medical staff. This will enable a thorough understanding of the clinical context of delirium (16, 20).

Families experience negative emotions related to the occurrence of delirium in their relatives such as: stress, anxiety, embarrassment, uncertainty, anger, shock (15, 27). Consequently, their needs are not only focused on providing informational but also emotional support. The results of studies on the impact and detection of delirium on the occurrence of symptoms of stress, anxiety and depression in relatives of patients are unclear (25). On the one hand, the outcome of delirium detected by the caregiver was related to the severity of anxiety symptoms such as: "Feeling nervous, anxious or tense"; "Inability to stop or control worry" (23). In the Rosgen et al. (25) study, 26.5% of family carers reported clinical symptoms of depression and, 35.4% reported clinical symptoms of anxiety. The results of the study showed a significant but variable association between delirium detected by families and symptoms of depression and anxiety. In contrast, other studies suggest that family assistance and involvement in ICU care tasks can give family members a sense of purpose, be supportive and serve as a protective mechanism to reduce stress (30). In a study by Smithburger et al. (24) the family's comfort level with non-pharmacological interventions to prevent delirium such as light management, use of earplugs, eye curtains, cognitive stimulation, reorientation, playing music, providing glasses, hearing aids were assessed. The results showed an overall median for all activities of 9, where 10 represented total comfort. In addition, participants in this study did not consider barriers such as fear of having an intravenous catheter or tube removed to be a source of stress for them. Among the best ways to reduce the discomfort of participating in care, 68% of families/relatives reported talking with the nurse. This highlights the need for increased awareness among nursing staff about delirium and their role as educators for the patient and their families.

A high incidence of delirium is also observed in non-ICU wards (31). Many of the non-pharmacological interventions with the family used in ICUs can also be successfully implemented in other hospital wards. Providing patients with daily living equipment (glasses, hearing aids), equipment to improve sleep quality (earplugs, blindfolds), and stimulating cognitive function by providing current newspapers, radio, talking to relatives about family events can be interventions in which patients' families will be involved.

## Limitations

Some important studies may have been omitted from the search and selection process due to limitations on publication date (studies from 2017) and language (English). The studies included in the review were conducted in different regions,

so the cultural aspect and the general policies of the ICU environment in the country should be considered.

## Conclusion

Family/carers of ICU patients are the people who can provide information about the initial symptoms of delirium in ICU patients. Relatives want to be involved in the care of a patient with delirium, but this needs improvement in some aspects of care such as: lack of awareness, family/relatives' knowledge of delirium, improved education, and communication with medical staff. Recognition of delirium by families is acceptable and feasible. Involvement of the family may result in an increased anxiety, but this aspect needs further research.

## Implications for research

Further research on the experiences of families and ICU patients related to delirium are needed. Understanding the perspective and experiences of patients and their families related to an episode of delirium is an important part of the management of delirium. Conducting additional interviews could potentially reveal added information, perspectives, experiences of delirium. Additionally, future research should consider the psychological aspect of the impact of family involvement in the care and detection of delirium in their relatives.

## Implications for practice

Difficulties in caring for patients with delirium often result from a lack of knowledge of delirium by family/relatives. It is crucial to provide education in this area. Educating the family/relatives with ready-made brochures or videos is effective but should be complemented by a direct conversation with

medical staff, which is the method most preferred by families. Education should be conducted at the beginning of the patient's stay in the ICU. In addition to theoretical education, families need emotional support from the medical staff (e.g., by talking to the nurse at the patient's bedside), which bring them relief, alleviate anxiety, and reduce discomfort. Communication between medical staff and the family should be based on clear communication of expectations from both sides and have an open dialogue. There is a concern that family involvement in detecting symptoms of delirium can be a stressor, so these people should be offered support from a professional such as a psychologist.

## Author contributions

Conceptualization and methodology: SL, WM-D, and SK. Formal analysis: SL and SK. Writing—original draft preparation: SL, WM-D, AF, and SK. Writing—review and editing: SL, WM-D, AF, DR, and SK. Supervision: DR and SK. All authors have read and agreed to the published version of the manuscript.

## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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# Nurses' knowledge, barriers and practice in the care of patients with delirium in the intensive care unit in Poland—A cross-sectional study

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**Background:** Delirium is a cognitive disorder that occurs with high frequency in patients in intensive care units and affects patient outcomes. Despite recommendations for monitoring and assessing delirium in the ICU, studies show that it is still not routinely assessed and often remains undiagnosed or misinterpreted as dementia or depression.

**Aim:** The aim of this study was (1) to assess nurses' knowledge and clinical practices regarding delirium, (2) to identify the factors associated with nurses' knowledge, and (3) to define barriers to effective control of delirium.

**Methods:** A cross-sectional study was conducted among 371 ICU nurses in Poland.

**Results:** 53.1% of nurses had never been educated on delirium control resulting in a deficit in knowledge of delirium symptoms, risk factors and complications associated with delirium in ICU patients. Master's degree in nursing (vs. Registered nurses + Bachelor's), female gender, and working in university hospital (vs. other) were positively correlated with nurse's knowledge, while age had a negative impact on knowledge. Delirium is a marginalized state in ICU patients, only 16.4% of nurses assessed delirium routinely and 35.8% assessed delirium occasionally, rarely using validated scales. Barriers to effective delirium control were primarily the lack of a requirement to assess delirium, the difficulty of assessing delirium in intubated patients and nurses' lack of confidence in their ability to use delirium assessment tools.

**Conclusions:** There is an urgent need to educate nurses about delirium and to make delirium assessment obligatory in clinical practice. The area of change should also include a hospital policy on delirium monitoring and management. The study was registered on [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT05384964).

## KEYWORDS

delirium, knowledge, delirium assessment, nursing practice, barriers, ICU, evidence-based nursing practice

## 1. Introduction

Delirium is defined as an acute cognitive disorder accompanied by fluctuations in mental status and disturbances in attention and consciousness (1, 2). The exact cause of delirium is unclear, but the etiology is thought to be multifactorial (3). Of the 28 risk factors defined by Wu et al. pain, use of physical coercion, respiratory disease, sleep deprivation and surgery were considered the most modifiable. In contrast, non-modifiable risk factors included age and gender (4). According to studies the prevalence of delirium ranges from 32 to 80% (5–7). This complication adversely affects patient outcomes, increasing ICU length of stay, mortality and causing the development of cognitive impairment after ICU hospitalization (8–11). There are three subtypes of delirium: hypoactive, hyperactive, and mixed. In the ICU, the most common form is hypoactive, which is characterized by reduced motor activity, reduced alertness and sleepiness (7, 12). However, due to its silent clinical presentation, this form is the least identified by clinicians (13). Hyperactive delirium is manifested by an increased number of spontaneous movements that are aimless, uncontrolled, and ineffective. The mixed form occurs when the patient's condition oscillates between hyperactive and hypoactive delirium (13).

Prevention and early detection of delirium is key to improving ICU patient safety and provides an opportunity to implement appropriate interventions to reduce its adverse effects (14). Delirium, as a medical diagnosis, often remains unrecognized or misinterpreted by medical staff in critically ill patients, despite the availability of validated tools for the assessment of delirium, such as: Cognitive Test for Delirium, abbreviated Cognitive Test for Delirium, Confusion Assessment Method for the Intensive Care Unit (CAM-ICU), Intensive Care Delirium Screening Checklist (ICDSC), Neelon and Champagne Confusion Scale (NEECHAM), and the Delirium Detection Score (DDS), Nursing Delirium Screening Scale (NuDESC) (12).

Clinical Practice Guidelines for the Prevention and Management of Pain, Agitation/Sedation, Delirium, Immobility, and Sleep Disruption in Adult Patients in the ICU (PADIS) in Adult Patients in the ICU and National Institute for Health and Care Excellence (NICE) recommend routine screening for delirium in intensive care unit patients using validated tools (15, 16). Unfortunately, researchers report a lack of adherence to these recommendations in clinical practice both worldwide (17) and in Poland (18). A study conducted in 2016 by Kotfis et al. provides evidence that the problem of delirium is ignored among Polish patients hospitalized in the ICU—only 11.9% of wards declared that they monitor this adverse condition (18). In contrast, the results of a study reported by Krupa et al., conducted among a group of 45 nurses in a cardiac intensive care unit, suggest that nurses lack knowledge of the factors that contribute to the development of delirium, are not able to communicate with such patients and, above all, do not know the consequences of the actions they take (19). Unfortunately, gaps in knowledge regarding delirium control in ICUs are not only the domain of Polish nurses. Similar problems are noted by researchers among nurses employed in

ICUs, e.g., in the United Kingdom, Australia or Jordan (20–22). Among the barriers to good clinical practice in delirium are the following: knowledge deficit, lack of organizational and management support, misconception that tools are complex, difficulty in assessing intubated and sedated patients, and time-consuming (23).

To our knowledge, there are no data available on the knowledge and actual practices of Polish ICU nurses regarding delirium assessment and potential barriers to delirium assessment. An assessment of the level of knowledge of ICU nurses on delirium may indicate an area of possible gaps in education and implementation of educational programs for ICU staff. In turn, identification of barriers to delirium assessment, may help to implement corrective processes to improve delirium practices in ICUs.

### 1.1. Aims

The aim of this study was (1) to assess nurses' knowledge and clinical practices regarding delirium, (2) to identify the factors associated with nurses' knowledge, and (3) to define barriers to effective control of delirium.

## 2. Methods

### 2.1. Study design

This cross-sectional study was conducted in intensive care units in Poland. The study was registered on [ClinicalTrials.gov](https://clinicaltrials.gov) (NCT05384964).

### 2.2. Participants selection

The target population of the study was nursing staff working in adult intensive care units in Poland. Nurses of non-Polish nationality and those working in neonatal intensive care units (NICUs) were excluded from the study.

### 2.3. Research tools

The survey questionnaire aimed at ICU nurses included: socio-demographic data and two questionnaires: Nurses' Knowledge of Delirium—created by Hare et al. (24), and Nursing Practices and Perceptions Toward Delirium in the Intensive Care Unit—developed by Devlin et al. (25). The original questionnaires were written in English and were translated into Polish according to the Translation, Review, Adjudication, Pretest and Documentation (TRAPD) procedure (26). Minor wording changes have been made in both versions to improve relevance and adapt to Polish needs/realities. The authors of the original questionnaires have agreed to their use.

The questionnaire Nurses' Knowledge of Delirium consists of two parts. In the first, participants indicated the correct answer to



questions related to the definition of delirium and the tools used to detect each state. In the second part, participants had to answer “agree,” “disagree,” or “don’t know” to a series of 28 statements. Fourteen of these statements related to delirium, its presentation and management, and 14 statements related to delirium risk factors. It should be noted that this questionnaire, according to information from one of its authors, has been used in various countries around the world and has been translated into nine languages other than English. A questionnaire sheet with the correct answers was also obtained from the authors of the original version (24). The scores, which were the sum of the correct answers to the questions in the nurses’ knowledge area, ranged from 0 to 37 points.

The Questionnaire Nursing Practices and Perceptions Toward Delirium in the Intensive Care Unit consists of two parts. In the first part, participants indicated answers to questions about sedation and delirium assessment. The questions then focused on practices/perceptions toward delirium and its assessment, including identification of potential barriers to delirium assessment. The questionnaire was developed through a deliberate series of steps that included item generation and construction, followed by pilot testing and refinement (25).

## 2.4. Data collection

Data collection took place between May and August 2022. Due to the ongoing COVID-19 pandemic, at the initial stage the survey questionnaire was distributed electronically *via* the website of the Polish scientific society of anesthesia and ICU nurses, social media (Email, WhatsApp, Facebook). Then, after obtaining approvals from hospital heads/directors, the questionnaires were hand-delivered to ICU ward nurses for distribution to nurses. Nurses who declared that they had completed the questionnaire online were informed not to complete it again. The completed sheets were compacted into sealed envelopes and collected from the ward nurses.

## 2.5. Ethical considerations

The study was approved by the Independent Bioethics Committee for Scientific Research of the Medical University of Gdansk (Approval Number: NKBBN/267/2022).

## 2.6. Statistical analysis

Results were expressed as absolute numbers and percentages (categorical variable) or mean, median, upper, and lower quartile (continuous date). To assess associations between categorical variables the Chi-square test was used. Intergroup differences for continuous data were estimated by Mann-Whitney test. The Shapiro-Wilk test was used to detect departures from normality. Spearman’s correlation coefficient ( $\rho$ ) was used to measure the dependent relationship between two continuous variables. It was interpreted as negligible ( $<0.1$ ), weak (0.1–0.39), moderate (0.4–0.69), strong 0.7–0.89, and very strong (0.9–1.0) (27).

Multivariable linear regression models were calculated to find the relationships between the nurse’s knowledge and independent variables (gender, age, job seniority, education level, type of hospital, number of beds in an ICU wards). Independent variables with the  $p$ -value  $\leq 0.1$  in simple linear regression models were selected introduced into the forward stepwise regression (equal probability value for entry and removal was 0.05). The assumptions for calculating multiple regression were met (a linear relationship between the dependent variable and each of the independent variables, no multicollinearity—the Variance Inflation Factor  $<1.5$ , homoscedasticity—White test  $p > 0.05$ , multivariate normality—Shapiro–Wilk test  $p > 0.05$ ) (28). The results of all multivariable regression models were presented as standardized regression coefficients ( $\beta$ ) and their 95% confidence intervals (CI), partial  $R^2$ .

The statistical analyses were conducted using STATISTICA v.13.3. [TIBCO Software Inc. (2017), Krakow, Poland]. A  $p$ -value  $< 0.05$  were statistically significant.

## 3. Results

### 3.1. Characteristics of participants

A total of 382 questionnaires were collected. One hundred and three responders completed the questionnaire electronically and 279 completed the questionnaire on paper. Due to incomplete questionnaires, 11 questionnaires were rejected. Ultimately, 371 questionnaires were included in the study. Table 1 shows the sociodemographic characteristics of subjects. The analysis included survey data of 324 female nurses [median aged 42 (32; 50) years] and 47 male nurses [median aged 36 (30; 44) years] caring for the patients in the ICU. Median job seniority of the study subjects was 11 years. The vast majority of responders had a master’s degree in nursing (57.9%). Approximately 40% ( $n = 144$ ) of the nursing staff declared that they had completed both qualification and specialization training program in “Anesthesiology nursing and intensive care”. Most responders were employed in a university hospital (47.7%), and in the Pomorskie ( $n = 161$ ; 43.4%) and Podkarpackie ( $n = 106$ ; 28.6%) provinces. The median number of beds in the ICU was 10. Twelve-hour shifts were most frequently reported by staff working in the ICU (75.2%).

It is worth emphasizing that a higher percentage of nurses with a master’s degree was employed in the university hospital than other hospitals (75.1 vs. 42.3%;  $\chi^2 = 41.04$ ;  $p < 0.0001$ ). Nurses with a master’s degree were younger than those who had lower education level [median 37 (32; 48) years vs. 43 (33; 51) years;  $Z = -2.43$ ;  $p = 0.0147$ ].

### 3.2. Nurses’ knowledge of delirium

Nurses’ knowledge of delirium varied from 3/37 points to 30/37 points—the median of overall knowledge was 16 (13; 20) points. There was significant difference in median of overall knowledge between female and male nurses [17 (13; 20) vs. 14 (12; 18);  $Z = 2.93$ ;  $p = 0.003$ ]. Respondents with a master’s degree in nursing presented significantly higher scores in terms of knowledge of delirium than those who had a bachelor’s degree in nursing and

TABLE 1 Sociodemographic characteristics of subjects.

Parameter		
Age (years)		41 [32; 50]
Job seniority (years)		11 (5,20)
Gender <i>n</i> (%)	Female	324 (87.3)
	Male	47 (12.7)
Education, <i>n</i> (%)	Registered nurse	50 (13.5)
	Bachelor's in nursing	106 (28.6)
	Master of science in nursing	215 (57.9)
Type of postgraduate education program in "Anesthesiology nursing and intensive care", <i>n</i> (%)	Specialization program—completed	224 (60.4)
	Specialization program—during training	69 (18.6)
	Qualification training program—completed	197 (53.1)
	Qualification training program—during training	35 (9.4)
	Other training program—completed	34 (9.2)
Type of hospital, <i>n</i> (%)	University hospital	177 (47.7)
	Other: e.g., municipal, provincial	194 (52.3)
Number of beds in wards of the ICU		10 (8,12)
Shift length	8-h shifts	40 (10.8)
	12-h shifts	279 (75.2)
	24-h shifts	52 (14.0)

Results presented as absolute numbers (percentages) or median [upper and lower quartile]; ICU, Intensive Care Unit.

registered nurses [median 18 (14; 21) vs. 15 (12; 19);  $Z = 4.71$ ;  $p < 0.0001$ ]. Furthermore, nurses who were employed at university hospital showed higher knowledge scores than those employed in other hospitals [median 18 (14; 21) vs. 15 (12; 18);  $Z = -4.64$ ;  $p < 0.0001$ ]. A weak negative correlation was found between the knowledge and age ( $\rho = -0.17$ ;  $t = -3.41$ ;  $p = 0.0007$ ), and positive between the knowledge and the number of beds in ICU ( $\rho = 0.19$ ;  $t = 3.80$ ;  $p = 0.0002$ ). Job seniority did not turn out to be associated with nurses' knowledge ( $p > 0.05$ ).

The knowledge deficit concerned the definition of delirium—only 52.3% ( $n = 194$ ) of responders knew that rapid disorientation, change in mental state, disorganized thinking and altered level of consciousness is a definition of delirium. Nurses are not aware that delirium is associated with higher mortality rates—56.9% ( $n = 211$ ) had knowledge on this subject. The least correct answers were given by responders to questions about risk factors for delirium such as: "Hearing impairment increases the risk of delirium" ( $n = 91$ ; 24.5%), "Dementia is the greatest risk factor for delirium" ( $n = 93$ ; 25.1%), "A patient having a repair of a fractured neck of femur has the same risk for delirium as a patient having an elective hip replacement" ( $n = 100$ ; 26.9%), "Diabetes is a high risk factor for

TABLE 2 Nurses' knowledge of delirium.

Statement	Correct answers
**Fluctuation between orientation and disorientation is not typical of delirium	184 (49.6)
*Symptoms of depression may mimic delirium.	156 (42.0)
**Treatment for delirium always includes sedation.	224 (60.4)
**Patients never remember episodes of delirium	160 (43.2)
** A Mini Mental Status Examination (MMSE) is the best way to diagnose delirium.	140 (37.7)
** A patient having a repair of a fractured neck of femur has the same risk for delirium as a patient having an elective hip replacement.	100 (26.9)
**Delirium never lasts for more than a few hours.	288 (77.6)
*The risk for delirium increases with age.	175 (47.2)
*A patient with impaired vision is at increased risk of delirium.	106 (28.6)
*The greater the number of medications a patient is taking, the greater their risk of delirium	191 (51.5)
** A urinary catheter <i>in situ</i> reduces the risk of delirium	277 (74.7)
**Gender has no effect on the development of delirium	140 (37.7)
*Poor nutrition increases the risk of delirium.	209 (56.3)
*Dementia is the greatest risk factor for delirium.	93 (25.1)
*Males are more at risk for delirium than females.	153 (41.2)
**Diabetes is a high-risk factor for delirium.	104 (28.0)
*Dehydration can be a risk factor for delirium.	259 (69.8)
*Hearing impairment increases the risk of delirium.	91 (24.5)
**Obesity is a risk factor for delirium.	196 (52.8)
** A patient who is lethargic and difficult to rouse does not have a delirium.	211 (56.9)
**Patients with delirium are always physically and/or verbally aggressive.	185 (49.9)
**Delirium is generally caused by alcohol withdrawal.	109 (29.4)
*Patients with delirium have a higher mortality rate.	211 (56.9)
** A family history of dementia predisposes a patient to delirium.	133 (35.8)
*Behavioral changes in the course of the day are typical of delirium.	203 (54.7)
* A patient with delirium is likely to be easily distracted and/or have difficulty following a conversation.	300 (80.9)
*Patients with delirium will often experience perceptual disturbances.	298 (80.3)
* Altered sleep/wake cycle may be a symptom of delirium.	233 (62.8)

\*I agree.

\*\*I disagree; Results presented as absolute numbers (percentages).

delirium" ( $n = 104$ ; 28.0%), "A patient with impaired vision is at increased risk of delirium" ( $n = 100$ ; 28.6%) (Table 2).

The study subjects lacked knowledge regarding to tools used to assess delirium such as CAM ( $n = 205$ ; 55.3%). The nurses had relatively better knowledge of the use of the AWS scale ( $n = 261$ ; 70.3%), and very good of the use of the DRS scale ( $n = 342$ ; 92.2%).

### 3.2.1. Determinants of nurses' knowledge of delirium

Factors identified on multivariable analysis (Table 3) as significant determinants of better knowledge of delirium (positive regression coefficients) included master's degree in nursing (vs. Registered nurses + Bachelor's), female gender, and working in university hospital (vs. other). However, nurses' age negatively correlated with their knowledge. This model explained 12% of variance in nurses' knowledge. There was no association between the number of beds in a ward and knowledge of delirium ( $p > 0.05$ ).

### 3.3. Clinical practices concerning delirium

One hundred and thirty-one (35.3%) of the total responders acknowledged that the wards where they work have sedation protocols/guidelines, but only one in three responders in this group ( $n = 42$ ) declared that the protocol specified the frequency with that delirium should be assessed. Only 61 (16.4%) nurses declared that they assess delirium often or always, while 133 (35.8%) responders do so rarely and 177 (47.7%) never. It should be noted that assessment of sedation is a common practice in ICUs—only 14.3% ( $n = 53$ ) of responders never measured this parameter. Nurses assessed the presence of symptoms indicative of delirium based on: the patient's ability to follow commands ( $n = 194$ ; 52.3%), relating events ( $n = 172$ ; 46.4%), using the CAM scale ( $n = 89$ ; 24%) or CIWA ( $n = 77$ ; 20.7%), and the screening checklist ( $n = 64$ ; 17.2%). Occasionally, consultations were provided by a psychiatrist ( $n = 133$ ; 35.8%)—one in nine nurses surveyed confirmed that a psychiatric consultation had taken place once during her 12-h duty period. There was no significant association between any of the above elements of clinical practice regarding delirium and the type of hospital and education of the nurses surveyed ( $p > 0.05$ ).

### 3.4. Barriers to effective control of delirium

Table 4 shows the barriers to adequate delirium control in the ICU (the lower the mean and median the more important the barrier). The most significant barrier in the nurses' opinion was the lack of requirement for delirium screening.

### 3.5. Nurses' education of delirium

53.1% ( $n = 197$ ) of nurses had never been educated in delirium control. Registered nurses and bachelor's degree nurses were more often not educated than those with a master's degree (63.5 vs. 45.6%;  $\chi^2 = 11.60$ ;  $p = 0.0007$ ). Only one in five nurses (20.7%;  $n = 77$ ) had the opportunity to learn about delirium during their first and second degree nursing studies. Only 10.5% ( $n = 39$ ) were able to learn about delirium through hospital procedures and/or by attending in-hospital education. Twenty-four percent ( $n = 89$ ) of responders had used other forms of training, with a higher proportion of nurses with a master's degree than colleagues with less education (27.9 vs. 18.6%;  $\chi^2 = 4.30$ ;  $p = 0.38$ ). The type of hospital where the nurses were employed was not related to delirium education ( $p > 0.05$ ).

### 3.6. Nurses' perception of delirium and delirium care

The study showed that the assessment of delirium in ICU patients is marginalized by nursing staff. When indicating the order of the parameters assessed in these patients, nurses felt that assessing the level of consciousness [median 2 (1; 3)] and pain [median 2 (1; 3)] were the most important, followed by assessing for the presence of agitation [median 3 (2; 3)] and delirium [median 3 (1; 4)]. The least important part of the assessment was to check that invasive devices were placed correctly [median 4 (2; 5)].

Figure 1 shows the perception of the ICU nurses regarding delirium. More than 80% of them rightly believed that delirium is an under-recognized problem in the ICU and requires active intervention by medical staff. Unfortunately, an equally high percentage of nurses wrongly perceive that antipsychotic treatment should be the first intervention for all patients with delirium (about 80%), probably because, in the nurses' opinion, these patients are most often agitated (70.6%).

## 4. Discussion

The results of the study showed that nurses caring for adult patients in Polish ICUs have a large knowledge deficit in delirium

TABLE 3 Multiple linear regression analysis for variables predicting for nurses' knowledge of delirium.

Factors	Simple regression $\beta$ (95% CI)	Multiple regression $\beta$ (95% CI)	Partial $R^2$
Master of Science in Nursing; reference category: Registered Nurse + bachelor's in nursing	0.25 (0.15–0.35)**	0.19 (0.08–0.29)**	0.04
Female gender	0.17 (0.07–0.27)*	0.16 (0.07–0.26)**	0.03
Age	−0.17 (−0.27 to −0.06)*	−0.14 (−0.24 to −0.04)*	0.02
University hospital; reference category: municipal + provincial + other	0.24 (0.14–0.34)**	0.13 (0.02–0.31)*	0.01
Number of beds in a ward	0.16 (0.06–0.28)*	Model $R^2 = 0.12$ , $F_{(4,365)} = 13.77$ ; $p < 0.0001$	

$\beta$ , standardized regression coefficient; CI, confidence interval;  $R^2$ , adjusted coefficient of determination.

\* $p < 0.05$ .

\*\* $p < 0.001$ .

The assumptions for calculating multiple regression were met: test White's:  $p = 0.68$ ; test Shapiro-Wilks:  $p = 0.35$ , the Variance Inflation Factor  $< 1.3$ .

TABLE 4 Barriers to effective nurses' control of delirium.

Statement	M	Me(Q <sub>25</sub> ; Q <sub>75</sub> )
Nurses are not required to screen for delirium in my ICU.	1.5	1 (1; 2)
Difficult to interpret in intubated patients.	1.7	1 (1; 2)
Do not feel confident in my ability to use delirium assessment tools.	1.8	2 (1; 2)
Inability to adequately document delirium assessments.	1.8	2 (1; 2)
Inability to complete assessment in the sedated patient.	1.8	2 (1; 2)
Not enough time to perform assessment (too time consuming).	1.9	2 (1; 3)
Physicians already complete delirium assessments.	2.0	2 (1; 3)
Do not feel that using delirium assessment tool improves outcome.	2.1	2 (2; 3)
Delirium assessment tools are too complex to use.	2.2	2 (2; 3)

Results presented as mean and median (upper and lower quartile).

control and do not follow good clinical practice in this area. The lack of obligation to assess delirium is the most important barrier to its adequate monitoring.

#### 4.1. Nurses' knowledge of delirium

Despite the increasing interest, available guidelines, and recommendations for the assessment of delirium in ICUs, delirium still remains a marginalized condition and often undiagnosed or misinterpreted by medical staff. It is important to highlight the fact that the prevention and early detection of delirium is key to improving the safety and outcome of ICU patients and provides an opportunity to implement appropriate pharmacological and non-pharmacological interventions to reduce its adverse effects (14). Due to their almost continuous presence and contact with the ICU patient, nurses are the right persons to manage delirium. However, as the study shows, nurses do not have enough knowledge on the topic.

In our study, nurses had difficulty both defining delirium and identifying risk factors. Only 52.3% knew that acute confusion, fluctuating mental state, disorganized thinking, altered level of consciousness, were characteristics that could indicate the development of delirium in ICU patients. In contrast, only one in four nurses were aware that dementia was the most important risk factor for delirium. Nurses were also unaware that delirium was associated with higher mortality. The results may suggest that the majority of ICU nurses might be unable to either correctly identify patients at higher risk of delirium or implement appropriate non-pharmacological interventions that may reduce the risk of developing it (e.g., by providing hearing aids and reading glasses). Furthermore, the responders had no knowledge of tools to assess delirium, such as CAM. Which, in turn, may suggest that staff are

not adequately educated on the diagnosis of delirium using the relevant tools. Our results are consistent with a study by Elliott et al. of medical staff in three UK hospitals, in which 42% did not know that delirium in the intensive care unit was associated with higher 6-month mortality, and a high level of knowledge of the definition of delirium was demonstrated by 67% of nursing staff (20).

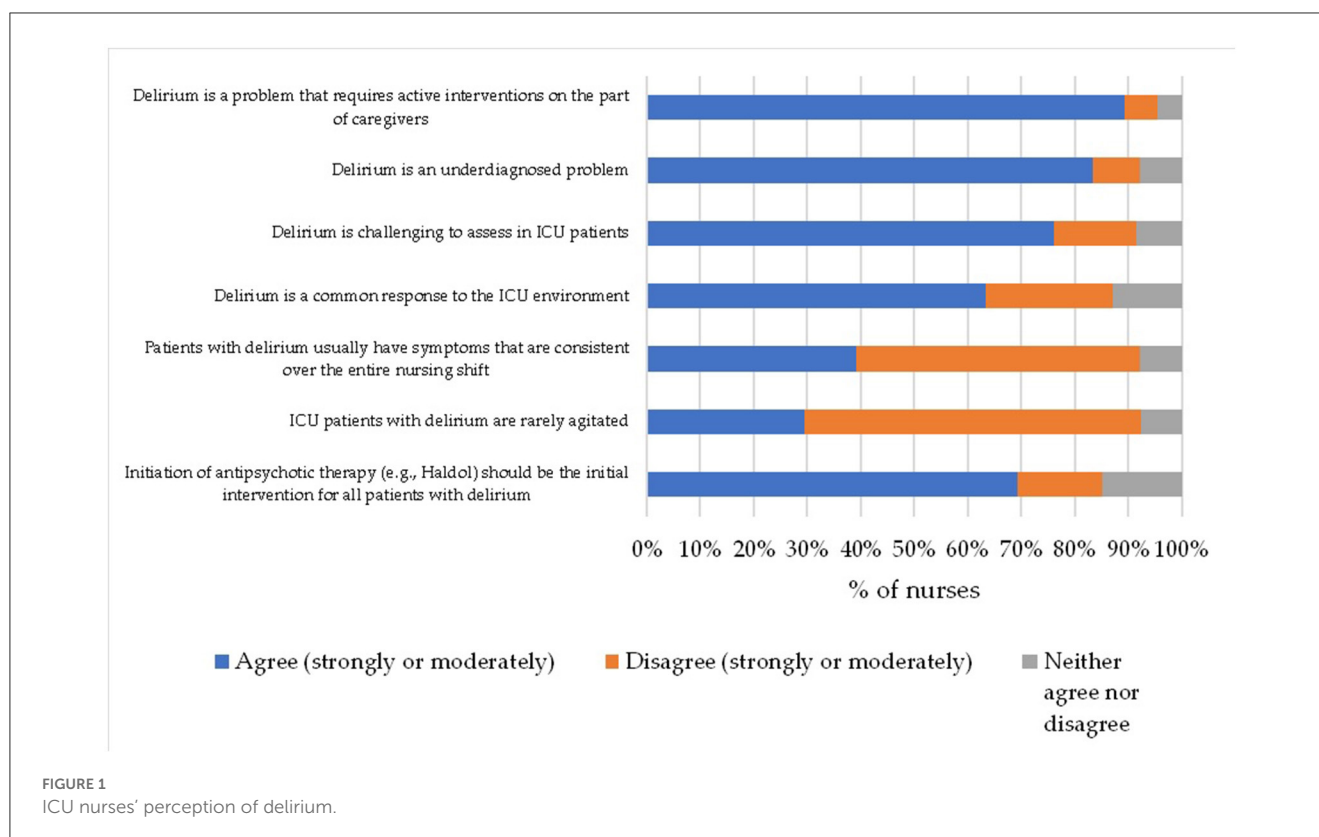
In addition, our study showed that the determinants that positively influenced knowledge levels were master's degree education, female gender, and employment in university hospitals. Similar relationships between knowledge and gender are reported by Hamdan-Mansour et al. (22). However, the authors cited above do not find a statistically significant association between knowledge and age of nurses (22), in contrast to our study in which we noted a negative correlation between these variables. Perhaps this correlation is due to the different education system in Poland or the easier accessibility of younger nurses to up-to-date knowledge using medical databases and EBM (Evidence-Based Medicine). As in our study, the results obtained by Rowley-Conwy, showed that higher levels of education were also associated with higher levels of knowledge (29).

Given these results, there is a need to disseminate educational materials on delirium to ICU nurses and to create a group of specialists who would be responsible for implementing and promoting recommendations on prevention and care of ICU patients with delirium and educating medical staff. We also recommend the organization of regular conferences, webinars, which will be an effective way to promote and update knowledge about delirium.

#### 4.2. Clinical practices concerning delirium

Although assessment of sedation is quite common in ICUs, few of these protocols specify the frequency with which delirium should be assessed. Compared to a study from 2016 conducted by Kotfis et al. among Polish ICU heads, slightly more nurses declared that they assess delirium in their patients often or always (16.4 and 10.9%) (18). Almost half of the responders reported that they never assess delirium in their ICU patients. The results of the Devlin et al. study, among American ICU nurses, also showed that significantly more nurses routinely assess sedation than delirium (98 vs. 47%) (25). In a study by Özsaban et al. among Turkish nurses, it was shown that routine assessment of delirium is performed by 67.8% of ICU nurses (30). Sedation/delirium assessment practices in the above countries are much more common than in Poland. These results are worrying due to the fact that, since 2016, despite the availability of educational materials translated into Polish, validation, and adaptation of delirium assessment scales to Polish conditions, delirium monitoring still remains at a very low level. Comparable results were obtained in a study by Glynn et al. conducted among ICU nurses from Ireland. 19.9% said that their sedation protocol specifies the frequency with which delirium should be assessed, and only 17.9% of nurses reported conducting delirium screening in the ICU (31).

In our study, nurses' assessment of delirium was most often based on the patient's ability to follow instructions (52.3%), recounting events (46.4%). Similar to our study, Irish ICU nurses



also indicated that they most frequently assessed delirium based on the patient's ability to follow commands and through agitated related events (37.1%) (31). This is consistent with the results of a study by Devlin et al. in which the preferred method of assessing delirium was also based on ability to follow commands (78%) (25). Use of the validated CAM-ICU tool, in our study, was reported by only 24% of respondents. These results are consistent with those obtained by Özsaban et al. who found that only 14.7% of Turkish ICU nurses used a validated tool to assess delirium (30), while in the Rowley-Conwy study, 38.7% used the CAM-ICU to assess delirium (29). This may indicate that, despite the availability of tools such as CAM-ICU or NuDESC PL, which have been recognized as reliable for use in Poland, there is still a low prevalence of delirium assessment tools. This may be due to inadequate education. It is important to highlight the fact that the non-use of dedicated tools for delirium assessment, may result in a high rate of unrecognized delirium, in particular the hypoactive subtype.

### 4.3. Barriers to effective control of delirium

The most significant barriers, in the assessment of delirium, identified in our study according to nurses were: "In my intensive care unit, nurses are not required to screen for delirium," "Delirium is difficult to interpret in intubated patients," and "I do not feel confident in my skills in using delirium assessment tools". Difficulty in assessing delirium in intubated patients is a common barrier reported by nurses in other studies (32). For example, in the Devlin

et al. study, 38% of responders considered the intubated patient to be a barrier, in the Özsaban et al. study the percentage was 66.1%, and in the Rowley-Conwy et al. 58.1% (25, 29, 30). Similarly, in the Scott et al. study, which assessed the effectiveness and feasibility of the CAM-ICU tool before and after delirium education and practical training, intubated patients continued to be the most commonly reported barrier (44 vs. 42.5%) (33). Uncertainty about their ability to use tools to assess delirium is also a barrier reported by nurses in another study (34). This may be due to a lack of knowledge of delirium assessment tools and a lack of training in their practical use. One barrier resulting from the working environment revealed in our study was the lack of obligation for nurses to perform delirium assessments. This highlights the need to implement clear policies and procedures for delirium assessment in ICUs. On the opposite of Devlin et al.'s study, the least important barrier in our study was found to be "The delirium assessment tools are too complex to use". This result should be interpreted with some caution because it may be due to a lack of common use of delirium assessment tools and not a real perception that they are easy to use.

### 4.4. Nurses' education of delirium

Despite, the high prevalence of delirium among critically ill patients, more than half of the nurses had never been educated in delirium control. Only one in five nurses had the opportunity to gain experience about delirium during their nursing studies. Few nurses were able to learn about delirium through hospital



procedures and/or by attending in-hospital education. This is in line with a study by Devlin et al. which found that nurses received little or no education about delirium and this mainly took place in university lectures rather than as practical education at the bedside (25). Similarly, in other studies, the majority of nurses never received any education about delirium (20, 29). Although the theme of delirium is addressed during university education of nurses, the results may suggest that insufficiently. Moreover, the results obtained once again support the need for a change in ward policy regarding delirium and the need for management to implement training programs for ICU staff. In the Scott et al. study, it was shown that after delirium training and practical training in the use of CAM-ICU, nursing staff awareness of delirium and its negative impact on patient outcomes increased (33).

#### 4.5. Nurses' perception of delirium and delirium care

Our study showed that the assessment of delirium in ICU patients is a state marginalized by nursing staff. Less important than the assessment of delirium appeared to be only checking that invasive devices are placed properly. According to the nurses, the most important are the assessment of the level of consciousness and the assessment of pain. These results are similar to those obtained by Devlin et al. Among the conditions that nurses considered important for routine care were altered level of consciousness (44%), presence of pain (23%) in first place. Routine assessment of delirium, in the above study, was considered least important (3%) (25). The above results may indicate a lack of awareness among nursing staff that delirium is a state that occurs acutely and that systematic assessment enables its early detection and the implementation of appropriate interventions. The majority of nurses (89%) from our study rightly believe that delirium is an underrecognized problem in the ICU and requires active intervention from caregivers. An equally high proportion of nurses believe that antipsychotic treatment should be the first intervention for all patients with delirium (around 80%). Wynikać to może z faktu, że w opinii pielęgniarek pacjentów ci sa najczęściej pobudzeni (70.6%). Although, in fact, studies suggest that hyperactive delirium in which patients are agitated is relatively rare in ICU patients. Similar views were expressed by nurses in the Devlin et al. study, who disagreed that patients with delirium are rarely agitated and that initiating antipsychotic treatment (e.g., Haloperidol) should be the first intervention in all patients with delirium (25). This may again be due to a lack of education about delirium, its subtypes, symptoms, and the use of both pharmacological and non-pharmacological interventions. As suggested by the results from our study, which reported a statistically significant correlation between perceptions of delirium and knowledge of delirium and the number of beds in the unit.

## 5. Conclusions

Polish ICU nurses have a knowledge deficit on delirium, and most of them have never had any education on the topic. Moreover, practices in monitoring and assessing delirium are not in compliance with international recommendations. Delirium is a condition marginalized by nurses in ICU patients and is still not routinely assessed in ICUs, and validated tools are not used by nurses. This study also revealed some barriers to the above and may identify areas for improvement in current delirium practices. Firstly, nurses in their units are not required to assess delirium. A clear policy and procedures for delirium management in ICUs would therefore need to be developed and implemented. Intubated patients and nurses' lack of confidence in their ability to use delirium assessment tools are also barriers to delirium assessment. This demonstrates the need to implement educational programs that include both theoretical and practical training at the patient's bedside.

## 6. Limitations

Our study has several limitations that need to be considered. Firstly, data were obtained from all provinces in Poland, unfortunately the fact that single responses were collected from some provinces remains a limitation. Therefore, the results cannot be generalized, but they do provide some insight into current data on delirium care in the ICU and target areas for change. Second, the survey was voluntary in nature; therefore, most people who were interested in the topic of delirium were able to participate in the survey. Thirdly, the survey was anonymous and a survey questionnaire was used as the tool. Therefore, a certain responder bias must be assumed that the results obtained may be overestimated compared to real practice.

## 7. Implications for practice

Due to the deficit in nurses' knowledge of delirium and the significant discrepancy between practice and international recommendations in delirium management, it would be advisable to implement educational programs in ICUs that include both theoretical knowledge and practical training in the use of validated scales at the patient's bedside. In addition, hospital policies and the creation of procedures based on international recommendations for the monitoring and management of delirium in ICUs also need to be changed.

## Data availability statement

The original contributions presented in the study are included in the article/supplementary material, further inquiries can be directed to the corresponding author.

## Ethics statement

The studies involving human participants were reviewed and approved by Independent BioEthical Committee for Scientific Research of the Medical University of Gdansk. The patients/participants provided their written informed consent to participate in this study.

## Author contributions

Conceptualization, methodology, and visualization: SL and WM-D. Formal analysis: LT and SL. Writing original draft preparation: SL, WM-D, and LT. Writing—review and editing: SL, WM-D, LT, and SK. Supervision: MW. All authors have read and agreed to the published version of the manuscript.

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## Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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