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A World-wide Prevalence Study on Delirium Assessments and Presence of Protocols

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Delirium Assessments and Protocols

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FUNDING: none

DATA SHARING: we share data on reasonable request

CONTRIBUTIONS: All authors have made substantial contributions: PN, KL, GB, JB, MB, GC, CRC, ME, MG, GH, MH, KK, TM, AM, RKN, ESO, MOC, MCP, HL, RH made substantial contributions to (1) the conception and design of the study, acquisition of data, or analysis and interpretation of data; PN, KL, GB, JB, MB, GC, CRC, ME, MG, GH, MH, KK, TM, AM, RKN, ESO, MOC, MCP, HL, RH made substantial contributions to (2) drafting the article or revising it critically for important intellectual content; PN, KL, GB, JB, MB, GC, CRC, ME, MG, GH, MH, KK, TM, AM, RKN, ESO, MOC, MCP, HL, RH made substantial contributions to (3) final approval of the version to be submitted.

Manuscript data

Word Limit: 2,879 / 3,500

Abstract: 243 / 275

Figures & Tables: 6/4-6

References: 78/75

Supplement: 1

Reporting guideline: STROBE

IRB: yes, reported in section methods

Registration: yes, reported in section methods

Study Protocol: available on www.wdad-study.center

A World-wide Prevalence Study on Delirium Assessments and Presence of Protocols

ABSTRACT

BACKGROUND

The worldwide extend of delirium management protocols is unknown.

OBJECTIVE

To assess the impact of delirium management protocols on delirium-related care.

DESIGN

Worldwide one-day point prevalence study.

SETTING

Crossectional online survey including hospitals, rehabilitation facilities, and nursing homes.

PATIENTS

Patients of all age groups, assessable for delirium.

INTERVENTIONS

None.

MEASUREMENTS

Participating clinicians reported the prevalence of delirium, use of validated assessment tools, ward level data the presence of protocols, delirium-awareness interventions, non-pharmacological and pharmacological interventions, and ward/unit-specific barriers.

RESULTS

Data from 44 countries, 1,664 wards/units, and 36,048 patients were analyzed. Validated delirium assessments were used in 66.7% (n=1,110) of wards/units,18.6% (n=310) used personal judgement or no assessment, and 10% (n=166) used other assessment methods. Using validated delirium

assessments, 42.9% (n=15,458) of patients were assessed, of which were delirium positive in 18% (n=2,788/15,458) in the morning and in 17.7% (n=2,454/13,860) in the evening. A delirium management protocol was reported in 66.8% (n=1.094) of wards/units; these wards/units were more likely to report the use of a valid delirium assessment by Odds Ratio (OR) 6.97 (95%Confidence Intervall(CI) 5.289-9.185) along with 14 other delirium-related factors.

LIMITATIONS

Clinicians were recruited in a snowball-system, delirium data were self-reported by clinicians, and others.

CONCLUSION

Wards/units that reported the presence of delirium management protocols had a higher probability of using validated delirium assessments tools to assess for delirium. The presence of delirium management proctocols also increased the likelihood of evidence-based non-pharmacological and pharmacological interventions for delirium.

PRIMARY FUNDING SOURCE

None.

Keywords: Assessments; Delirium; Encephalopathy; Patient safety; Protocols; Quality improvement

BACKGROUND

Delirium is a clinical syndrome produced by an acute encephalopathy and characterized by an abrupt onset, fluctuation, deficits in attention, and other cognitive impairments (1). Delirium is precipitated by one or more physical disorders, interventions or medications (2). Delirium causes are manifold and result from predisposing and triggering factors (3, 4). It is a common complication of patients in hospitals, affecting up to 23% of older patients on medical wards, 25% of those who had a stroke, 32% in intensive care units (ICU), 70% with mechanically ventilation (MV), and 88% in palliative units (5, 6). Consequences of delirium are plentiful and follow a dose-response relationship including a risk of increased hospital length of stay, increased mortality, impaired rehabilitation, permanent cognitive disturbances, institutionalization, and costs and burden for caregivers (7).

The management of delirium including assessment, prevention, treatment, and interprofessional collaboration has developed over many years (8), leading to complex and highly effective prevention concepts such as the ABCDEF bundle in critical care or the HELP program for older patients on wards (9-11). However, clinical implementation of delirium management still remains challenging, due to barriers such as lack of time and staff, missing interprofessional collaboration, lack of knowledge, and others (12, 13). Also routine assessment of delirium is heterogenous implemented and ranges from 18% to over 90% (12, 14-32).

The Covid-19 crisis stressed the healthcare system and the delivery of evidence-based delirium management (33-35). Delirium management was difficult to deliver as in previous periods, and the progress that were made in delirium prevention and treatment in the years before the pandemic are suspected to be lost (36, 37). Delirium management needs more awareness and action. The aim of this study was a worldwide delirium prevalence study on the World Delirium Awareness Day on March 15th 2023, to determine factors associated with increased use of validated delirium assessment tools and presence of delirium management protocols. In addition, we sought to determine whether the presence of delirium management protocols was associated with differences in non-pharmacological and pharmacological preventions and treatments, and delirium-related barriers.

METHODS

This is the secondary analysis of a worldwide, cross-sectional, one-day point prevalence study on World Delirium Awareness Day (WDAD) March 15th 2023 (38). The study was approved by the

Institutional Review Board of the University Mannheim (2022-617) and registered by the German Clinical Trials Register (DRKS00030002, https://drks.de/search/de/trial/DRKS00030002). The report of this study is in line with the Strengthening the Reporting of Observational Studies in Epidemiology STROBE Statement(39) (Supplement Table E3).

Design

This was a worldwide prevalence study on delirium and related structures and processes. Details of this study can be read elsewhere (38). Participating clinicians from hospitals, rehabilitation facilities, or nursing homes and other, reported the number of delirious and non-delirious patients in their wards/units on WDAD, March 15th 2023, at 8.00 a.m. in the morning and 8.00 p.m. in the evening. We did not collect any specific patient level data, since risk factors have been researched extensively and we focused on assessment and implementation (40). This study was planned as an anonymous survey to enable a high rate of participation. Data collected included numbers of patients, types of delirium assessments, presence of delirium management protocols, involved clinicians, delirium awareness activities, non-pharmacological and pharmacological interventions, and ward/unit specific barriers.

The four Principal Investigators (PIs) [PN, KL, HL, RH] launched a website (www.wdad-study.center), uploaded the study documents, and recruited clinicians. National coordinators distributed the survey in their countries, recruited local clinicians from single/multiple wards/units, and took care of national regulations. The PIs held frequent online meetings to train national coordinators, share and translate documents, and coordinate the study. There was no external funding for this study.

Setting and population

Participating clinicians were leading physicians, nurses, or their representatives from single or multiple wards/units. All in-patients in acute hospitals on different levels, rehabilitation facilities, weaning centers, palliative centers, or nursing homes were included. Included patients were of all age groups, from all disciplines, and all types of wards/units, including Emergency Departments (ED), Intensive Care Units (ICU), High Acuity Units, Intermediate Care Units (IMC), and general wards. Excluded were patients from the anesthesia/operation theatre, home care, and ambulatory care. Recruitment of participants was performed via professional organizations, personal and social networks.

Data collection

The survey covered fourteen sections containing 39 questions about the country, sociodemographic data of participants, hospitals, and ward/unit specific data. Further questions were about the presence of delirium-related protocols; delirium awareness interventions such as posters, lectures, providing pocket cards, and others; non-pharmacological interventions for prevention and therapy applied for >50% of delirious patients; pharmacological interventions applied for >50% of delirious patients; pharmacological management; and barriers against sufficient delirium management. For assessing delirium prevalence, participants reported delirium assessments such as validated assessment (out of a list of 21 assessments, e.g. Confusion Asssessment Method, 4AT, and others), no or subjective assessments, or other assessments; frequency of assessment; assessing profession; delirium prevalence at 8.00 a.m. in the morning and 8.00 p.m. in the evening. To enhance data collection in this worldwide survey, participants reported the number of present patients on the ward/unit at both time points, the number of non-delirious and delirious patients.

Statistical analysis

Nominal data are frequency (n) and percentage (%). Metrical, normally distributed data were reported as mean and standard deviation, non-normally distributed data as the median and interquartile range (IQR). Ordinal data are reported in its modus. Inferential tests were conducted using Chi-squared test, with a doubled-sided $p<0.05$.

For calculation of the probability of using validated delirium assessments, Odds Ratio (OR) and 95% Confidence Intervals (95%CI) were calculated by Chi^2, to analyze factors related to a dichotomous variable with a) use of any valid assessments vs. b) non assessment or personal judgement; and to analyze factors associated with the presence of delirium management protocols. We analyzed differences in delirium prevalence, pharmacological and non-pharmacological interventions, management, and barriers. Multicollinearity was assessed by calculation of variance inflation factor (VIF), with VIF >10 indicating considerable multicollinearity (41). Missing data are reported.
The analysis was carried out with IBM SPSS Statistics for Windows 27 (IBM Corp., Armonk, New York, USA).

RESULTS

Data from 44 countries (all continents, n=1,664 wards/units, n=36,048 patients) were collected. Validated assessments were used in 66.7% (n=1,110) of wards/units. In wards/units reporting the use of validated delirium assessments, 42.9% (n=15,458) of patients were assessed, of which were delirium positive in 18% (n=2,788/15,458) in the morning and in 17.7% (n=2,454/13,860) in the evening. The top-five reported delirium assessments were CAM-ICU (n=335 (20.1%)), 4AT (n=317 (19.1%)), CAM (n=150 (9.0%)), Intensive Care Delirium Screening Checklist (n=90 (5.4%)), and personal judgement/no assessments (n=373 (22.4%)), with a significant different use in the type of wards/units (p<0.001) (Figure 1, and supplement Table E1, Table E2). Out of all 1,664 wards/units, 66.8% (n=1,094) reported use of a protocol for delirium management

The reported use of validated delirium assessment tool

Of all wards/units, 66.7% (n=1110) used 18 different validated delirium assessment tools, 18.6% (n=310) used personal judgement or no assessments, and 10% (n=166) used other assessments, which was a mix of other valid delirium assessment methods under special circumstances (i.e., Supplement Table E1). The latter group was excluded from this analysis and compared valid assessments vs. personal judgement or no assessments.

The wards/units that reported the presence of a delirium management protocol were significantly more likely to also report the use of a valid delirium assessment tool compared to no or subjective assessment merthods (OR 6.97, [95%CI 5.289, 9.185]), Figure 2. Upon examining this relationship further, the presence of protocols for delirium management vs. no protocols showed a significant association with the use of validated delirium assessments [89.5% (853/953) vs. 55% (257/467), p<0.001]. There was no multicollinearity between the presence of delirium protocol and the use of valid delirium assessment or other variables (VIF < 10). In wards/units using validated assessments, the reported presence of a protocol for delirium management vs no protocol had no significant impact on the reported rate of delirious patients in the morning [12.5% (0% to 32%) vs. 11.1% (0% to 33.3%), p=0.707] or in the evening [13.8% (0% to 30%) vs. 11.1% (0% vs. 37.5%), p=0.681].

Additional reported characteristics that increased the likelihood of assessment with a validated tool included the presence of a protocol for a daily wake-up trials (specific to the ICU) (OR 3.7 (95%CI 2.273 to 6.024), p<0.0001), at least one education training during the last year about delirium (OR 3.57

(95%CI 2.698 to 4.729), p<0.0001), reporting and communication of delirium screening rate (OR 3.52 (95%CI 2.458 to 5.031), p<0.0001), and others (Figure 2).

Reported presence of a delirium management protocol

The reported presence of a protocol for delirium management was significantly associated with multiple non-pharmacological and pharmacological interventions, management, and reported barriers. These are outlined below.

Multiple non-pharmacological delirium interventions such as presence of trained delirium experts (OR 3.4; 95%CI 2.2 to 5.3), informing patients about delirium (OR 3.3; 95%CI 2.6 to 4.2), or less physical restraints (OR 0.5; 95%CI 0.4 to 0.6), and others (Figure 3);

Less use of pharmacological interventions such as haloperidol (OR 0.680, 95%CI 0.555 to 0.834) or diazepam (OR 0.590, 95%CI 0.443 to 0.786), and increased strategy of reducing delirogenic drugs (OR 2.025, 95%CI 1.598 to 2.567) or evaluation by a specialist (OR 2.924, 95%CI 2.239 to3.819), and others (Figure 4);

Different pharmacological management such as treating specific symptoms of patients (OR 2.7; 95%CI 2.2 to 3.4), discussion with patients in most cases (OR 2.6; 95%CI 1.9 to 3.6), and includes recommendations for withdrawal of deliriogenic drugs (OR 1.9; 95%CI 1.6 to 2.5), and others (Figure 5);

Different reported barriers in wards/unit with present protocol. Having a protocol for delirium management is associated with higher odds of reporting less barriers and more frequent delirium assessments (OR 2.3; 95%CI 1.6 to 3.5), but also barriers such as shortage of staff (OR 1.6; 95%CI 1.3 to 2.0), or having patients difficults to assess (OR 1.6; 95%CI 1.278 to 2.004), and others (Figure 6).

DISCUSSION

In this worldwide, one-day point delirium prevalence study on World Delirium Awareness Day March 15th 2023, including data from 44 countries, over 1,600 wards/units and 36,000 patients, validated delirium tools were used in two thirds of wards/units. The use of validated assessments was strongly associated with the reported presence of a protocol for delirium management. On wards/units that reported the presence of a protocol for delirium management were more likely to also report evidence-based non-pharmacological delirium interventions, improved use and management of pharmacological interventions, and different barriers towards delirium management.

Use of validated delirium assessments

In total, clinicians from two thirds of participating wards/units reported using validated delirium assessment tools for delirium. The use of validated delirium assessment tools compared to personal judgement inceases the chances for identifying delirium and initiating appropriate treatment(42). Previous studies found routine clinical screening rates with validated assessments between 10% and 66% and our survey is in line with these data (12, 16, 29, 30, 35, 43-45). We found several factors associated with the increased use of validated delirium assessment tools including the presence of a protocol for delirium management, delirium education, reporting the delirium rate back to teams, presence of delirium experts, and resources such as posters, pocket cards, and others. These factors were also used and reported in implementation projects and studies, e.g., for implementing delirium management bundles, increasing the use of validated assessments up to >90% (24, 46-49). Hence, these reported factors may serve as facilitators for increasing and sustaining the delirium assessment rates in clinicial practice. Other important factors may be national Delirium Clinical Care Standards or guidelines that encourage systematic delirium care (45) The heterogeneity in the use of validated instruments for diagnosing delirium in the present study might be explained by several factors such as lack of consensus for the best validated instrument in all health care settings (50); varying resource availability in terms of training, staff, monitoring, or equipment (51-53); specific patient populations or clinical scenarios such as pediatric vs geriatric assessments or acute vs. long term care (28, 54, 55); differences across disciplines, cultures, and nations (56); and implementation challenges such as interprofessional cooperation, time constraints, competing clinical priorities, and workflow considerations, which may impact the selection and consistent use of assessments, too (29, 47, 57). Future studies should explore the impact of these facilitating factors, for identifying appropriate strategies for better implementation.

Routine monitoring of delirium in hospitalized patients reduces the in-hospital mortality, likely due to the early detection of ongoing pathological processes, leading to early brain failure, detection, and further treatments of underlaying conditions (42). Hence, frequent screening of delirium with validated assessments is an essential, potentially life-saving procedure (5).

The goal of the clinician-initiated event of the WDAD targets delirium awareness and aims to increase the use of validated delirium assessments in practice. We hope that our project will contribute

to the increasing delirium-awareness and support clinicians in the use of validated assessments. This project will be repeated in subsequent years, and can provide a baseline for all researchers and clinicians who implement validated delirium assessment tools to evaluate progress.

Delirium protocols

Protocols for delirium management were present on two-thirds of participating wards/units. This is similar to other multinational studies, ranging between 35-71% (29, 44, 55, 58). Implementation of protocols usually increases quality of care and improves related outcomes (59). In our study we could not find significant differences in delirium prevalence in wards/units with vs. without delirium management protocols. This lack of difference may be explained by the use of a validated delirium assessment tool. In units that use a validated method, an increased percentage of delirious patients who are identified by clinicians by validated assessments and who may have been without valid assessments, unless these patients receive appropriate treatment (60-64); contrary, the implementation of delirium protocols and its related prevention measures might have led to a decreased percentage of patients becoming delirious (46, 65-67). Future studies should focus on further examining these factors and associated interactions to increase understanding.

In this worldwide prevalence study, delirium protocols were strongly associated with improved non-pharmacological interventions, improved use and management of pharmacological interventions, and different barriers against delirium management. These aspects may serve as indicators for future quality improvement projects, such as mandatory delirium teaching in academic courses of physicians and nurses. The presence of delirium protocols was associated with increased chances of informing patients about delirium (indicating a more patient-centered approach (68)), less physical restraints (indicating improved prevention and education (69-71)), less use of haloperidol and diazepam (indicating changing evidence for pharmacological agents (72-74)), reducing delirogenic drugs and based on individual symptoms (indicating improved pharmacological management (75)), recommendations for withdrawal of drugs related to delirium treatment (indicating avoidance of discharge of patients with continuing on these medications (76, 77)), and finally different barriers such as having lack of awareness, missing knowledge or not knowing appropriate pharmacological interventions, indicating likely cultural changes (12). These factors might have been part of the delirium management protocols as guidelines recommend it. The presence of delirium protocols might indicate an improved quality of

care and a cultural shift to a more evidence-based treatment and personalized care in line with current guidelines and recommendations (68, 78, 79).

Strength and Limitations

There are several limitations. First, due to answers in this survey were given by participating clinicians and were not verified externally by research assistants; contrary there were no incentives for best delirium care and the bias might be considerable. Second, we tested relationships between variables and can exclude a severe multicollinearity, but we did not test subgroups where multicollinearity may exist, e.g. in ICU or nursing home facilities; future analyses will allow to estimate the effect of this bias. Third, using the design of a one-day point prevalence study does only allow to analyze associations between variables, not causation; hence any conclusions about the relationship between variables should be considered with caution.

This study also has several strengths. First, it is a very large cross-sectional, worldwide prevalence study that reports the use of delirium-management in different settings and areas in the world and increasing the chances for generalizability of the results. Second, this survey's results can serve as a template for performing future quality improvement projects for delirium management to identify and convince barriers to delirium management. Third, due to the multicentric approach, the bias of local culture can be neglected in this approach, enabling a very general view on delirium management. And fourth, this study likely contributes to the awareness of delirium screening and therefore increased the number of patients that were screened; which is of course also the aim of WDAD.

CONCLUSIONS

The use of validated delirium assessment tools are strongly associated with the presence of protocols for delirium-management on wards/units, likely due to the content of protocols including recommendations of assessments. The presence of a protocol for delirium management are associated with improved non-pharmacological delirium interventions such as presence of delirium experts, extended family visiting times, or less physical restraints. The use of delirium protocols improves the management of pharmacological interventions, such as using less haloperidol or diazepam or treating specific symptoms of patients. Barriers against delirium management might change with the implementation of a protocol, e.g. the barrier of lack of knowledge is reduced. The quality of care seems

to be more symptom- and patient-centered, indicating a culture change to a humanization of delirium care.

ACKNOWLEDGEMENTS

The authors would like to gratefully acknowledge the following participating clinicians for supporting the 2023 WDAD Study Team and survey: Breel Montaser (**Afghanistan**); Mariana Ojeda; Ana Maria Mazzola; Ana Paula Cirese; Maria Eugenia Teran; Evangelina Pereyra Zamora; Giuliano Gaudenzi;Daniela Olmos; Sanchez Natalia Elizabeth; Mariela Mogadouro; Matias Cattoni; Maria Belen Frate; Monica Quinteros; Miguel Ángel Salas ;Carlos Nahuel Brito (**Argentina**); Barbara Cass; Donna Wheeldon; Emma Ham; Hannah Zhang; Isabelle Brewer; Kate Baptist; Kate Lipson; Myfanwy Guay; Nisha Kuzhuvelil; Sonia Hiam; (**Australia**); Mata Alexander; Patrik Heindl (**Austria**); Barbara Flynn; Brooke Blythe; Christine MacDonald; Dori-Ann Martin; Eric Sy; Eugene E. Mondor; Gabriela Costa; Jennifer Armstrong; Kari France; Katherine Kissel; Kevin Iwaasa; Kirsten Deemer; Natalia Jaworska; Oleksa Rewa; Sebastien Roulier; Shibi George; Susan Anderson; Tanya Mailhot; Trudy Eggleton (**Canada**); Fernando Tirapegui (**Chile**); Ann-Kirstine Hansen; Anne-Dorte Krapper; Anders Hudsen Madsen; Anne Højager Nielsen; Anschelilka Pedersen; Bianca Bech; Camilla Bekker; Charlotte Riis; Edel Laursen; Eva Laerkner; Janet Froulund Jensen; Karina Jakobsen; Kristine Mildahl Kjaergaard; Laura Krone Larsen; Lene Lehmkuhl; Lone Høilund Kristiansen; Linette Thorn; Marie Damgaard Winther , Maja Søndergaard Nielsen; Martin Schultz; Monica Baunbæk; Mette Gryholt Fenger; Anna Palmen; Pernille Reck Miller; Rikke Salomon; Sally Jakobsen; Sanne Thers Lauritzen; Susanne Fischer; Tina Tang Fredenslund (**Denmark**); Dalia Talaat Ragheb; Ahmed Allam; Ahmed.H.Elmasry; Aiman Al-Touny; Aliae Mohamed Hussein; Ali Wael; Ali Aldarraji; Ahmed Abdelhalim; Bassam Fahmy; Dinah Nabil; Ahmed Abdelrahman; Rana Ahmed Adel; Hossam Mohamed Saad Ali; Islam Galal Sayed; Kyrillos Wassim; Mohamed Ahmed Adel (**Egypt**); Alexander Kaestner; Lisa Fink (**Germany**); Aggeliki Detta; Tsioka Agorista; Anna Efthymiou;

Archontia Mahairidou; Artemis Vekrakou; Athanasiou Paraskevi; Christina Lymperatou; Christos Ntiakalis; Konstantinous Kyriakoulis; Eftychia Kourtelessi; Eleni Spiropoulou; Evangelia Michail Michailidou; Evi Tsigou; Gkika Dimitra; Georgios Papathanakos; Ioannis Andrianopoulos; Aikaterini Sakagianni; Aikaterini Katsogianni; Theodora Katsarou; Maria Bolaki; Maria Laskou; Maria Gianiki; Iliana Tryfonidou;Lampros Banos;Maria Panoutsopoulou; Anastasia Zagorianou; Niki Rouvali; Nektaria Xirouchaki; Panagiotis Poulikakos;Eirini Papagiorgiou; Mantzafleri Peristera Eleni; Mpoutzouka Eleni; Stiliani Andreadou; Kyriaki Kolovou; Vasiliki Karaouli; Panagiota Stamou; Stavros Mantzoukis; Theodora Soulele; Athanasia Tsirogianni; Theodoros Aslanidis; Theofilia Theodoridou; Apostolos Bakas; Myrto Tzimou; Vasiliki Chantziara; Zisopoulou Vasiliki (**Greece**); Ghanshyam Yadav; Abhishek Kumar; Amit Goel; Arun Sharma; Biswanath Sahoo; Anil Kumar; Manish Gupta; Meraj Ahmad; Nikhil Kothari; Trishita Saha; Garima Mishra; Gaurav Pandey; Jacob George; Kalai selvan; Lalit Singh; Mohan Gurjar; Madhusudan Kalluraya; Syed Nabeel Muzaffar; Prashant Mohan; Ritu Singh; Rupali Patnaik; Shiiv Shanker Tripathi; Vijay Sundarsingh; Vipin Kumar Singh (**India**); Hussein Al-Najjar; Istevan Khazmi (**Iraq**); Ann Prendergast; Ann Sheehan; Anna Doherty Walsh; Anne-Marie Daly; AnnJane Kelly; Caoimhe McManus; Catherine Condon;Diane Kell; Diarmaid Semple, Lousie Owens, Tara Connaughton, Katie Morris; Michael Dowling; Edel Byrne; Eleanor Morris; Hafsah Ali; Siofra Hearne; Leona Bannon; Louise Kelly; Margaret Sheehan Velthuysen; Natalie McEvoy; Niamh Annmarie O'Regan; Oisin Hannigan; Olive Vereker; Patrick Doyle; Paul Claffey; Paul McElwaine; Colm Ryan; Suzanne Laffan (**Ireland**) Miriam Abuhazira (**Israel**); Clara Agostino; Yanely Sarduy Alonso; Ilaria Bandera; Enrico Brunetti; Luca Bucciarelli; Monica Cadei; Antonio Ciambrone; Alessandro Di Risio; Rosa Filipelli; Luigi Francioni; Alessandro Galazzi; Barbara Gamba; Simona Gentile; Emma Giovannini; Angela Iurlaro; Maria Legierska; Alessandro Monesi; Giulia Principato; Daniela Quattrochhi; Daniela Perelli Ercolini; Sabina Perelli Ercolini; Daniela Petronela Radeanu; Carla Recupero; Alessandro Reggiani; Antonella Risoli; Barbara Romagnoli; Loretta Ruggeri; Elena Trotta; Valentina Viani (**Italy**); Hidenori Kasuya; Ayaka Sakamoto; Daisuke Kawakami; Haruki Ishizuki; Masaru Matsumoto; Go Haraguchi Sakakibara; Hayami Hajime; Shigeaki Inoue; Kawabata Jun; Koji Yamashita; Kenzo

Ishii; Maiko Nakamura; Kensuke Nakamura;Tomomi Furumaya; Nobuo Sato; Shinichiro Ohshimo; Takero Terayama; Takumi Nagao; HIidenori Sumita ;Yoshitaka Aoki; Yuuki Ozaki (**Japan**); Aya Omar Mohammad Alaqtash; Joud Mwaffq Hussein Sharadga; Ahmad Omar Abu Hamideh; Anas Aljaiuossi; Saleh Ali Mohammed Ba Shammakh; Dima Rahhal; Hasan Mohammad Haj Freej Husam Emad Ibrahim Matalqah; Mohammad Emad Moh'd Abu Hussein; Dana Jehad Samardali; Razan Waleed Yaseen (**Jordan**); Abdullah Tarboush (**Kuwait**); Hiba Hamdar (**Lebanon**); Akram Alkaseek; Ayman Abu Khutwah; Abdualmalek Algomaty; Abdulrhaman Jaber; Ahmed Mohamed Alsaedi; Aisha Bojazyah; Amani Mohammed Senousi Shehab: Asma Moftah; Aya Fageir; Ali Kredan; Fairouz Mohammed Mustafa Alghadamisi; Fatoom Alowjali; Tasneem Mohammed Abu Bakr Ali; Hajar Alkokhiya Aldare;Hamida El Magrahi; Heba Khalifa Mohammed;Hibah Bileid Bakeer; Mabroukah Omar; Marwa Morgom; Mohammad Yahmad; Rabab Mohammed Salim Alkurghali; Saifaleslam Elsahli; Sarah Alfaqaih; Talat Ahmed Abu Salem; Zaynab Omar Aldayri (**Libya**); Luis Antonio Gorordo-Delsol; Karen Selene Rivera Martínez (**Mexico**); Linda Smulders; Mirjam de Graaf; Nienke Golüke; Puck de Lange (**Netherlands**); Himali Aickin; Jane Walton; Lijo John Tharakan; Melania Tele; Richard Worrall **(New Zealand**); Anita Dahl; Antonija Petosic; Bjørn Erik Neerland; Brita Fosser Olsen; Hans Frank Strietzel; Inga Akeren; Kristin Naustdal; Marja Wanne Hoff; Mette Dokken; Mona Morland; Rutt Katrine Bollingmo; Renate Ramfjord; Silje Bådsvik; Stian Søllesvik Qvam;Trine Sortland Triumf (**Norway**); Moustafa Kotb Elmala (**Oman**); Luis Daniel Umezawa Makikado (**Peru**); Margarida Ferreira Sousa; Ana Filipa Pires; Antero do Vale Fernandes; Carla Araújo Costa; Carla Margarida Coelho Marques Abrantes Teixeira Claro da Fonseca; Ana Maria Pina de Albuquerque; Liliana Filipa Pires Pereira (**Portugal**); Chul Park; Dae-sang Lee; Sua Jo; Uiwon Ko; Chi-Min Park; Ire Heo; Tae Wan Kim; Hohyung Jung; Byunghyuk Yu; Hak-Jae Lee; Jae Kyeom Sim; Donghoon Kim; Song-I Lee; Sua Kim (**Korea**); Águeda Ojados Muñoz; Ana Maria Del Saz Ortiz;Ana María Prieto de Lamo; Ana Pardo; AsuncionVergara Sanchez; Beatriz de Ramon Rodriguez; Beatriz Oliver Hurtado; Cándido Pardo Rey; Concepcion Ruiz Iniesta; Esther Aguirre Recio; Federico Minaya González; Jennifer Carolina Figueroa Falconí; Felix Martin Gonzalez; Francisco Luis Pérez Caballero; Sofia Garcia-Manzanedo; Gina Rognoni

Amrein; Gemma Rialp; Inmaculada Georgia Garcia Gomez; Jesus Caballero; Jesus Priego; Jose Luis Perez Vela; Josep Trenado Álvarez; Lorenzo Lopez; Lorena-Zoila Peiró Ferrando; Luis J. Yuste Domínguez; Manuela Garcia Sanchez; Maria Riera-Sagrera; Marina Orantes Pozo; Eulalia; Romero Granados; Maria Luisa Navarrete Rebollo; Maria Cruz Martin; Elena Martínez Quintana; Miguel A. Gonzalez Gallego; Monica Garcia Simon; Mercedes Ibarz; Mireya Molina Cortés; Gabriel Heras La Calle; Sol Fernández Gonzalo; Marta Yagüe-Huertas; Nuria Martinez Sanz; Francisca Pino Sánchez; Hipolito Perez Molto; Eva Benveniste Perez; Paula Rodriguez Pedreira; Paolo Cardenas Campos; Maria del Pilar Eugenio Robaina; Jose M Gomez; Susana Temprano Vazquez; Tomas Munoz-Martinez (**Spain**); Eliana Almasri; Shahd Adnan Alhindi (State of Palestine); Abdalelah Salah Mohammed Hussein; Ibrahim Adel; Abdalsalam Saleh Mohammed Mussa; Essam Eldien Abuobaida; Ibrahim Mutwakil Gamal Ahmed; Lina Sameer; Mariam Alazraa Mohamed; Rashad Abdallah Esmaeel; Mohammed Faroug Abdulmajeed Al-awadh; Nidhal Isameldin Abdalla Siddig; Osama Gamal Nubi; Watfaa Siddeg (**Sudan**);Yvonne Kröger; Agnieszka Wysocka; Ana Patricia da Silva Morais; Andrea Gagliardi; Arnaud Forestier; Bettina Foord; Bettina Vessaz; Celine Lomme; Christian Emsden; Esther Naef; Lilith Stalder;Luca Cioccari; Nadja Annen ;Natalie Leuenberger; Pascale Schaub; Regula Pfäffli Scheurer; Stephan Dinkler; Samanta Septinus; Sandra Haubner; Sheila Matti; Sibylle Fischbacher; VIvianne Chanez; Yvonne Seiffert (**Switzerland**); Hala Bakro; Sami Sannoufa (**Syria**); Sana Landolsi (**Tunesia**); Monzir Mohamedelmahdi Ali Salih (**UAE**); Alison McCulloch; Amy Conley; Andrew McCleary; Anne-Maree Robinson; Antonia Hargadon-Lowe; Cara Hammond; Carolyn Green; Claire Sturrock; Conor James McCann; Craig Stewart; Dawn Goodacre; Dervla Carroll; Diane Brisbane; Drew Crooks; Fahed Gareb; Effie Dearden; Eldilla Rizal; Elisabeth Sullivan; Ellie McIntosh; Emma Williamson; Felicity Baines; Fiona Tullo; James Yeado; Matthew Turner; Jamil Marhatta; Jasmine Hart; Jennifer Lonnen; Jiajin Kwong; Katie Murray; Katrina R. Bell; Kirsty Houston; Laura Tous Sampol; Laura Elizabeth Henderson; Lindsay Kenworthy; Martin Cowie;Mary Melville; Pam D'Silva; Rosie Cervera-Jackson; Rachael; Sarah Thomson; Sofia Cuevas-Asturias; Tabitha Brough; Victoria Richmond; Wan Norshuhada Wan Montil; Will Boatman; Zoe Spence (**United Kingdom**); Cynthia Bell; Christina Bohl; Dale

M. Needham; Dianne Bettick; Evelyn Ivy Mwangi; Lillian Banchero; Whitney Smith (**United States**).

Conflict of interests

The following co-authors have listed conflicts of interest: H.L. is funded by the NIA 1AGK23076662-02, serves as a board member and 2023 conference co-chair for the American Delirium Society, and serves as the web committee chair for the American Thoracic Society, Nursing Assembly. She has received royalties for keynote addresses at nursing conferences in 2022 and received a travel scholarship to attend the 2023 DECLARED conference in Sydney, Australia. G.C. is the President of the Australian Delirium Association. M.G. has received royalties for the edited books (Manual of ICU Procedures, Textbook of Ventilation Fluids, Electrolytes, and Blood Gases) from the publisher Jaypee Brothers Medical Publishers and has received financial support to attend the Annual Conference of Indian Society of Critical Care Medicine. G.H.C. has spoke on Humanization of Healthcare (Pfizer) and was supported by Pfizer to attend the COMMEC 2022 meeting. E.S.O. is supported by NIH/NIA funding (unrelated to this manuscript), received honoraria to present at the Edmund Beacham Annual Current Topics in Geriatrics, has patents issued or pending, and was the 2022 President of the American Delirium Society. M.O.C. received funding unrelated to this manuscript from Novo Fonden, Lundbeck Funden, and Dagmar Marshells Fond. R.V.H received support from OrionPharma to attend meetings and/or travel.

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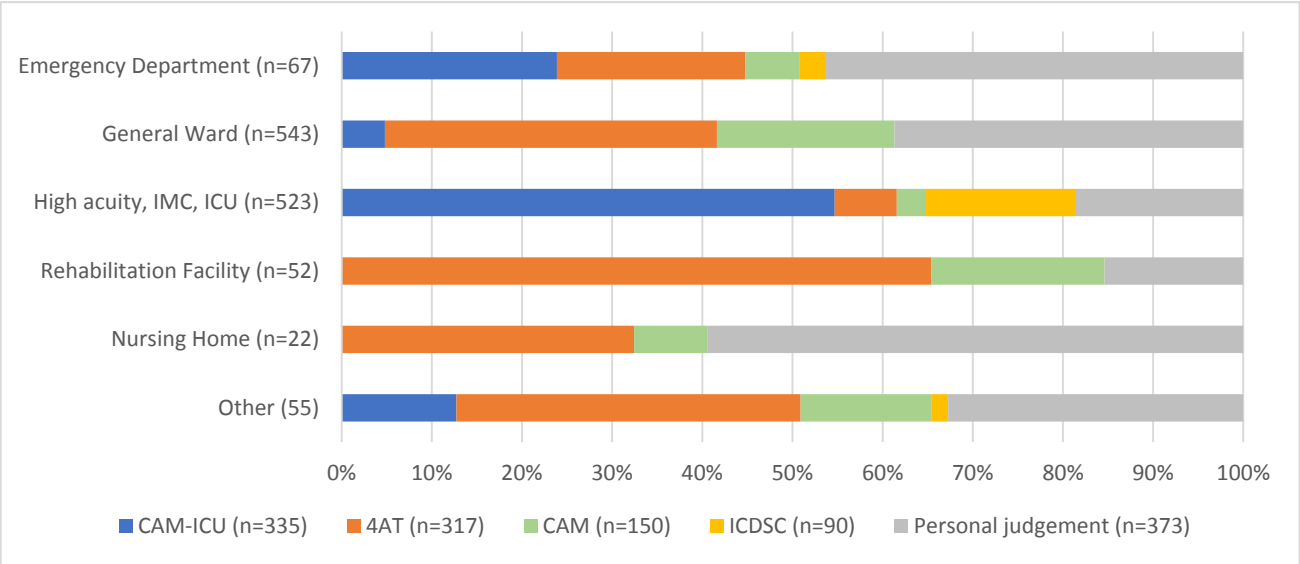
Figure 1: Use of top five delirium assessments, depending on type of wards/units



Abbreviations: CAM Confusion Assessment Method; CAM-ICU Confusion Assessment Method for the Intensive Care Unit; ICDSC Intensive Care Delirium Screening Checklist; IMC Intermediate Care Unit; ICU Intensive Care Unit;

Figure 2: Odds Ratios for using validated delirium assessments, based on present protocols and delirium awareness interventions.

Item	OR	95% Confidence Interval		p
		Low	High	
Protocol for delirium management	6.970	5.289	9.185	<0.001
Protocol for Spontaneous Awakening Trial	3.700	2.273	6.024	<.0001
Delirium education	3.572	2.698	4.729	<0.001
Delirium screening rate	3.517	2.458	5.031	<0.001
Pocketcards	2.965	1.936	4.542	<0.001
Protocol for sedation	2.947	2.215	3.920	<0.001
Delirium flyer for staff	2.794	1.970	3.962	<0.001
Delirium experts	2.521	1.826	3.482	<0.001
Informational posters	2.347	1.702	3.236	<0.001
Protocol for Spontaneous Breathing Trial	2.180	1.522	3.123	<0.001
Protocol for families	1.754	1.284	2.395	<0.001
Protocol for pain	1.678	1.253	2.247	<0.001
Protocol for physical restraints	1.577	1.208	2.057	<0.001
Protocol for mobility	1.540	1.191	1.990	<0.001
Protocol for ICU diaries	1.526	1.010	2.306	0.046
Protocol for sleep	1.428	0.978	2.085	0.074
Structured handover	1.242	0.962	1.604	0.099
Protocol for nutrition	1.056	0.817	1.366	0.693
Protocol for dementia	1.053	0.767	1.447	0.810

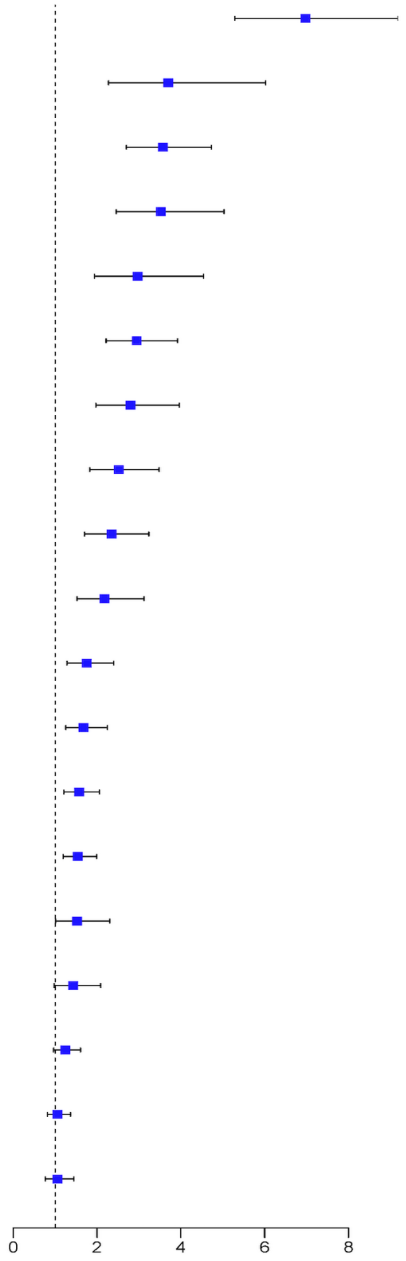


Figure 3: Odds Ratios for use of non-pharmacological delirium interventions in wards/units with vs. without protocol for delirium management

Item	OR	95% Confidence Interval		p
		Low	High	
Trained experts	3.437	2.221	5.319	<0.001
Informing patients	3.281	2.583	4.168	<0.001
Ear plugs, sleep glasses	3.134	2.288	4.292	<0.001
Glasses, hearing aids	2.826	2.290	3.488	<0.001
Pain management	2.797	2.097	3.730	<0.001
Verbal re-orientation	2.726	2.198	3.381	<0.001
Cognitive stimulation	2.574	2.090	3.170	<0.001
Mobilization	2.338	1.819	3.005	<0.001
Animal assisted therapy	2.312	1.253	4.236	<0.006
Team rounds	2.305	1.867	2.845	<0.001
Daily goals	2.225	1.756	2.820	<0.001
Open visiting times	2.101	1.710	2.581	<0.001
Adequate Fluids	2.016	1.576	2.579	<0.001
Providing day-/Night rhythm	1.915	1.560	2.350	<0.001
Sitter	1.890	1.455	2.454	<0.001
Avoidance bladder tubes	1.775	1.435	2.195	<0.001
Family information	1.705	1.390	2.091	<0.001
None-disturbed sleep	1.539	1.255	1.886	<0.001
Family engagement	1.528	1.245	1.875	<0.001
Ground-leveled beds	1.271	0.972	1.662	0.084
Activities in groups	1.099	0.753	1.604	0.703
Going outside	1.043	0.791	1.375	0.779
Bed Boarders	0.761	0.620	0.935	0.010
Physical restraints	0.529	0.421	0.664	0.001

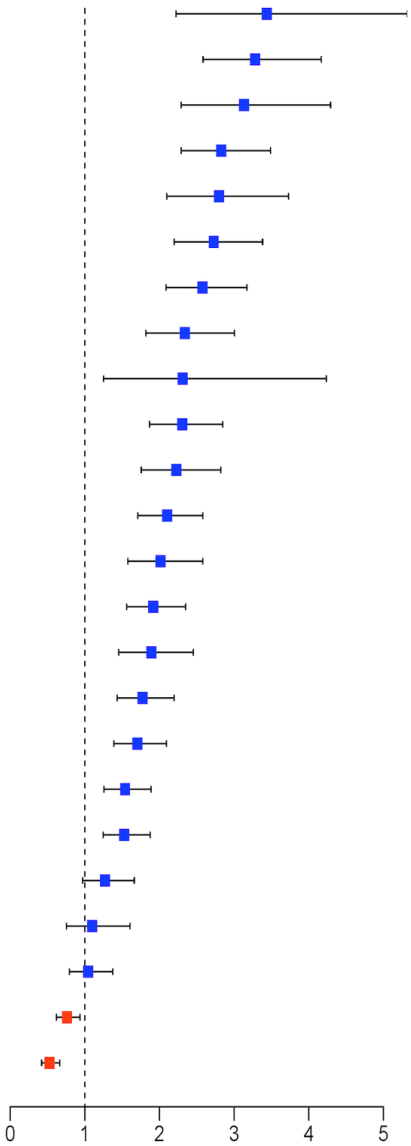


Figure 4: Odds Ratios for pharmacological delirium interventions in wards/units with vs. without protocol for delirium management

Item	OR	95% Confidence Interval		p
		Low	High	
Distraneurin	4.483	1.032	19.471	0.028
Evaluation by specialist	2.924	2.239	3.819	0.001
Melatonin	2.045	1.502	2.785	0.001
Reducing of delirogenic drugs	2.025	1.598	2.567	0.001
Dexmedetomidine	1.379	1.080	1.761	0.011
Clonidine	1.375	1.023	1.848	0.036
Quetiapine	1.314	1.064	1.622	0.013
Risperidone	1.296	1.009	1.663	0.047
Melperone	1.098	0.707	1.706	0.740
Beta-Blockers	0.952	0.626	1.448	0.830
Lorazepam	0.923	0.732	1.162	0.515
Midazolam	0.806	0.605	1.074	0.156
I do not know	0.781	0.540	1.129	0.209
Levodopa	0.689	0.350	1.356	0.284
Haloperidol	0.680	0.555	0.834	0.001
Phenobarbital	0.654	0.330	1.297	0.273
Diazepam	0.590	0.443	0.786	0.001

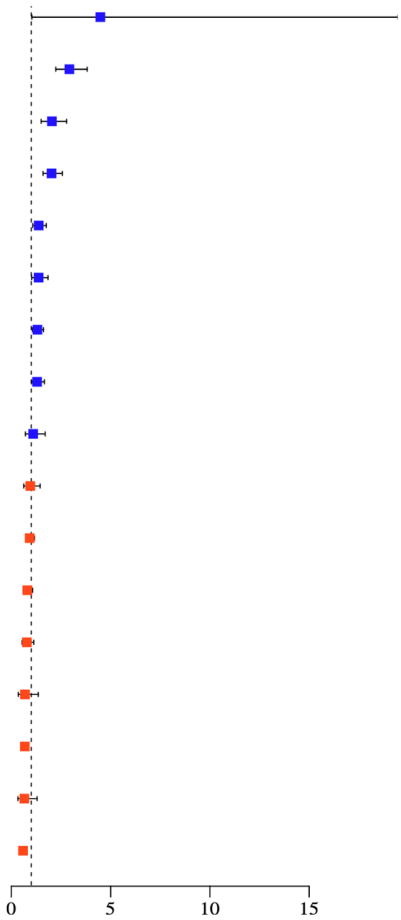


Figure 5: Odds Ratios for pharmacological management in wards/units with vs. without protocol for delirium management

Item	OR	95% Confidence Interval		p
		Low	High	
Is based on a written protocol*	5.492	4.109	7.340	0.001
Depends on specific symptoms of each patient*	2.744	2.227	3.380	0.001
Is discussed with patients in most cases*	2.642	1.946	3.587	0.001
Is discussed with families in most cases*	2.622	2.075	3.314	0.001
Includes pharmacologists*	2.131	1.612	2.817	0.001
Includes recommendations for withdrawal drugs*	1.959	1.562	2.456	0.001
Is reported in handovers*	1.864	1.518	2.289	0.001
Is a more individual approach*	1.619	1.320	1.985	0.001
Includes psychiatrist or liaison team	1.138	0.905	1.432	0.297
Is a more general approach	0.779	0.616	0.983	0.039
None of the above*	0.281	0.156	0.506	0.001

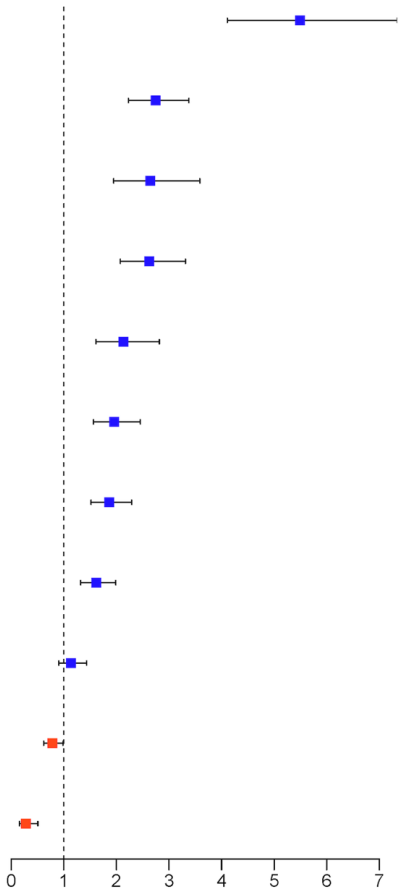


Figure 6: Odds Ratios for barriers against delirium management in wards/units with vs. without protocol for delirium management

Item	OR	95% Confidence Interval		p
		Low	High	
We have no barriers, delirium is assessed*	2.330	1.570	3.456	0.001
Shortage of personnel/staff*	1.610	1.313	1.974	0.001
Patients who difficult for assessment*	1.600	1.278	2.004	0.001
Inter-professional conflicts	1.303	0.830	2.046	0.272
Other problems are more challenging	1.199	0.908	1.584	0.211
Communication gaps btw. professions	1.149	0.923	1.430	0.224
Lack of time to educate and train staff	1.012	0.826	1.239	0.918
Not enough motivated staff	0.895	0.696	1.152	0.399
Missing attitude	0.843	0.650	1.093	0.202
Leadership does not support	0.839	0.585	1.204	0.348
Lack of pharm. interventions	0.804	0.531	1.218	0.328
Lack of awareness	0.743	0.603	0.917	0.006
No cost/resources for promotion	0.718	0.556	0.928	0.013
Lack of non-pharm. interventions	0.705	0.554	0.896	0.005
Missing knowledge*	0.687	0.558	0.845	0.001
No appropriate scores for delirium*	0.236	0.178	0.312	0.001