

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

RUNNING TITLE

Delirium Assessments and Protocols

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ABSTRACT

BACKGROUND

Delirium is a common complication of older people in hospitals, rehabilitation, and long-term facilities.

OBJECTIVE

To assess the worldwide use of validated delirium assessment tools and the presence of delirium management protocols.

DESIGN

Secondary analysis of a worldwide one-day point prevalence study on World-Delirium-Awareness-Day 2023, March 15th.

SETTING

Cross-sectional online-survey including hospitals, rehabilitation and long-term facilities.

METHODS

Participating clinicians reported data on delirium, the presence of protocols, delirium assessments, 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 analysed. 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. A delirium management protocol was reported in 66.8% (n=1,094) of wards/units. The presence of protocols for delirium management varied across continents, ranging from 21.6% (on 21/97 wards/units) in Africa to 90.4% (235/260) in Australia, similar to the use of validated delirium assessments with 29.6% (29/98) in Africa to 93.5% (116/124) in North America. Wards/Units with a delirium management protocol (n=1,094/1,664, 66.8%) were more likely to use a validated delirium test than those without a protocol (Odds Ratio (OR) 6.97 (95%Confidence Intervall(CI) 5.289-9.185)). The presence of a delirium protocol increased the chances for valid delirium assessment and likely, evidence-based interventions.

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.

Keywords: Assessments; Delirium; Encephalopathy; Patient safety; Protocols; Quality improvement; Older People.

Keypoints

- Analysis of data from 44 countries, 1,664 wards/units, and 36,048 inpatients revealed that delirium is a common phenomenon.
- Wards/units with delirium management protocols had a higher likelihood of using validated delirium assessments.
- Across continents is a large variability on the presence of protocols for delirium management and the use of valid delirium assessments.
- Implementation of protocols for delirium management might increase the likelihood for the use of validated, frequent delirium assessment, and use of evidence-based prevention and treatment interventions.

BACKGROUND

Delirium is a clinical syndrome produced by an acute encephalopathy and characterised 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 especially in older patients in hospitals, ranging from 23% to 88% across settings such as medical wards, intensive care units (ICU), and palliative units [5, 6]. Consequences of delirium are plentiful and more severe delirium is associated with worse outcomes including a risk of increased hospital length of stay, increased mortality, impaired rehabilitation, permanent cognitive disturbances, 24-hour long-term care unit placement, 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 Hospital Elder Life Programme (HELP) on wards [9-11]. However, routine assessment of delirium ranges from 18% to over 90%, and implementation of delirium management and still remains challenging, due to barriers such as lack of time and staff, missing interprofessional collaboration, lack of knowledge, and others [12, 13][12, 14-33].

The Covid-19 crisis stressed the healthcare system and the delivery of evidence-based delirium management [34-36]. Delirium management was difficult to deliver as in previous periods, and the progress that was made in delirium prevention and treatment in the years before the pandemic are suspected to be lost [37, 38]. Delirium management needs more awareness and action. The aim of this study was 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 [39]. The Principal Investigators and co-investigators obtained Ethics and IRB approvals from their sites. The study has been registered in the German Registry for Clinical Trials (DRKS00030002). The report of this study is in line with the

(Supplement Table E3).

Design

This was a secondary analysis of a worldwide survey on delirium and related structures and processes [39]. A call for participation has been distributed via Social Media (Twitter/X), professional networks, and personal contacts. Potential national coordinators could register themselves on a website. National coordinators distributed the survey on the study day in their national networks. Participating clinicians, who were team leaders or their representatives 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 [41]. 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, RvH] launched a website (www.wdad-study.center), uploaded the study documents including a questionnaire of the survey, 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, prolonged-ventilation weaning centres (PWC), 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 organisations, 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. Participants reported delirium assessments such as validated assessment (out of a list of 21 assessments, e.g. Confusion Assessment Method, 4AT, and others), no or subjective assessments, or other assessments.

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 Chi² test of independency, particularly when analysing the association between two categorical variables, estimating a 0.05 significance level with a) use of any valid assessments vs. b) non assessment or personal judgement; and to analyse factors associated with the presence of delirium management protocols. We analysed 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 [42]. 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. Out of all these wards/units, 66.8% (n=1,094) reported use of a protocol for delirium management, and 66.7% (n=1110) used 18 different validated delirium assessment tools (Table E1). The presence of protocols for delirium management vs. no protocols showed a significant association with the use of validated delirium assessments [78% (853/1,094) vs. 45.1% (257/570), $p < 0.001$].

In total, 18.6% (n=310) used personal judgement or no assessments, and 10% (n=166) used other assessments. The presence of protocols for delirium management varied across continents, ranging from 21.6% (on 21/97 wards/units) in Africa to 90.4% (235/260) in Australia (Figure 1). The use of validated delirium assessments ranged from 29.6% (29/98) in Africa to 93.5% (116/124) in North America. The presence of delirium protocols varied also across countries and different types of wards/units (Table E2). There is a difference between the presence of protocols and use of validated assessments, ranging from 0.9% in Europe to -28.4% in South America (Figure 1).

Insert Figure 1 here

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 different use in the type of wards/units (Figure 2).

Insert Figure 2 here

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 reported use of validated delirium assessment tool

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 methods (OR 6.97, [95%CI 5.289, 9.185]), Figure 1. There was no multicollinearity between the presence of delirium protocol and the use of valid delirium assessment or other variables such as any protocol or structure (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 E1).

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 E2);

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 to 3.819), and others (Figure E3);

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 E4);

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 difficult to assess (OR 1.6; 95%CI 1.278 to 2.004), and others (Figure E5).

DISCUSSION

In this worldwide study 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 increases the chances for identifying delirium and initiating appropriate treatment [43]. 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, 36, 44-46]. The implementation and use of assessment tools have a large and relevant variability in practice [33]. 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, 47-50]. Hence, these reported factors may serve as facilitators for increasing and sustaining the delirium assessment rates in clinical practice. Other important factors may be national Delirium Clinical Care Standards or guidelines that encourage systematic delirium care [46]. 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 [51]; varying resource availability in terms of training, staff, monitoring, or equipment [33, 52-54]; specific patient populations or clinical scenarios such as acute vs. long term care [28, 33, 55, 56]; differences across disciplines,

cultures, and nations [57]; 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, 48, 58]. Future studies should explore the impact of these facilitating factors, for identifying appropriate strategies for better implementation.

Routine monitoring of delirium in hospitalised 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 underlying conditions [43]. 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, 45, 56, 59]. Implementation of protocols usually increases quality of care and improves related outcomes [60]. In our study we could not find significant differences in delirium prevalence in wards/units with vs. without delirium management protocols. This 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 is likely, whereas the percentage of delirium might be decreased due to personal judgement [61-65]; contrary, the implementation of delirium protocols and its related prevention measures might have limited effects on delirium prevention at admission, but might lead to a decreased percentage of patients becoming delirious during their stay [47, 66-68]. Future studies should focus on further examining these factors and associated interactions to increase understanding.

In this worldwide 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 [69]), less physical restraints (indicating improved prevention and education [70-72]), less use of haloperidol and diazepam (indicating changing evidence for pharmacological agents [73-75]), reducing delirogenic drugs and based on individual symptoms (indicating improved pharmacological management [76]), recommendations for withdrawal of drugs related to delirium treatment (indicating avoidance of discharge of patients with continuing on these medications [77, 78]), 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 association of the presence of a protocol and other delirium-related intervention might not be surprising or rated as a single factor, leading to a change. The *absence* of a delirium protocol might be seen as indicator for an issue for patients' safety and disinterest in delirium care. [69, 79, 80]. Future research might include a deeper and comparing insight into the presence of delirium protocols, its content, actuality, purpose, evidence, and legal background

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 worldwide survey does only allow to analyse 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 study that reports the use of delirium-management in different settings and areas in the world and increasing the chances for generalisability 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. Fourth, we cannot

exclude a recruitment bias by participation of delirium-interested sites, leading to a higher rate of protocols and related processes and structures than actually given. And finally, 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 is 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 humanisation of delirium care.

Data Sharing: we share data on reasonable request

Declaration of Conflicts of Interest: 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

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Figure 1: Variation in delirium protocols and valid delirium assessments

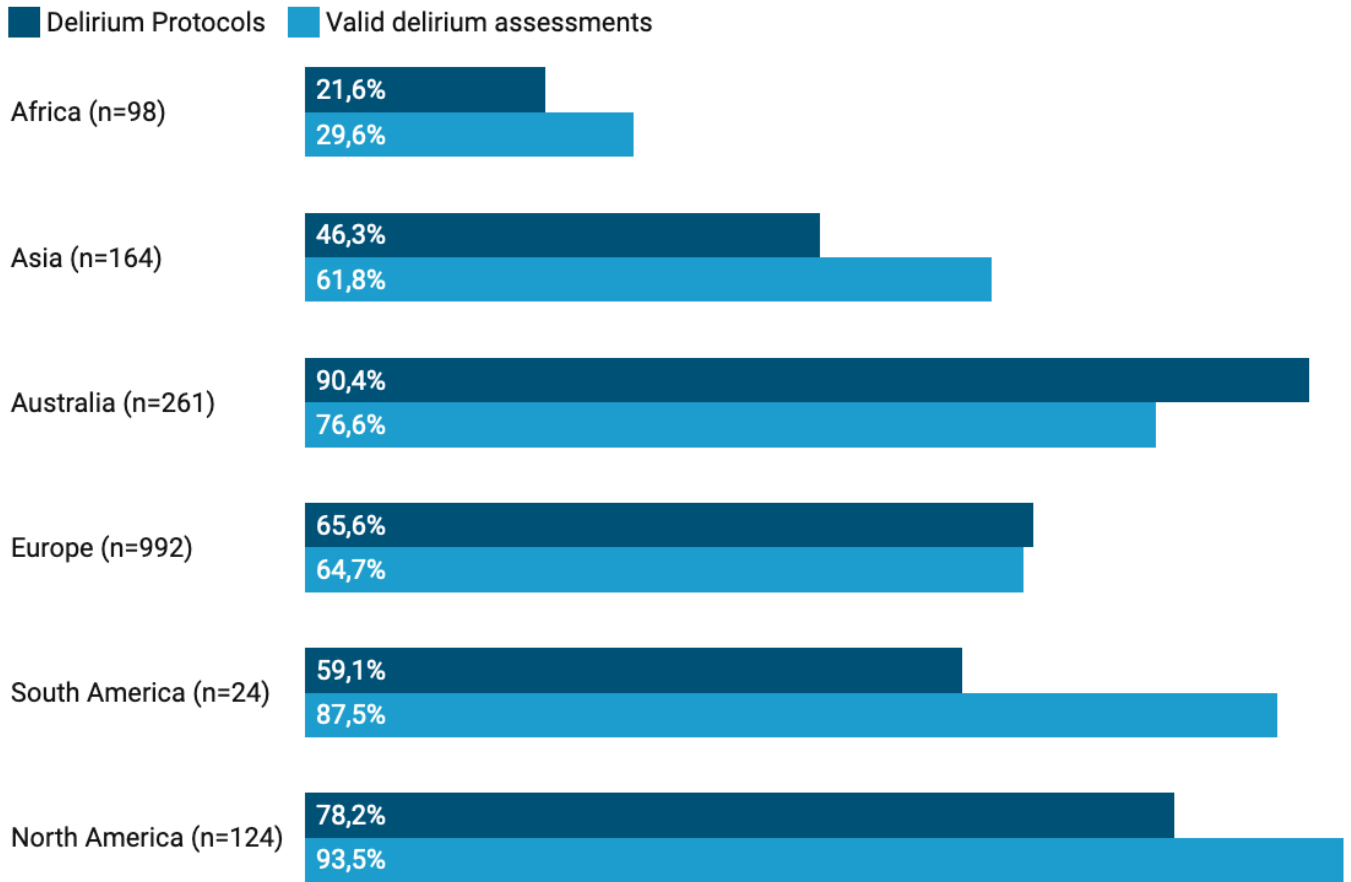
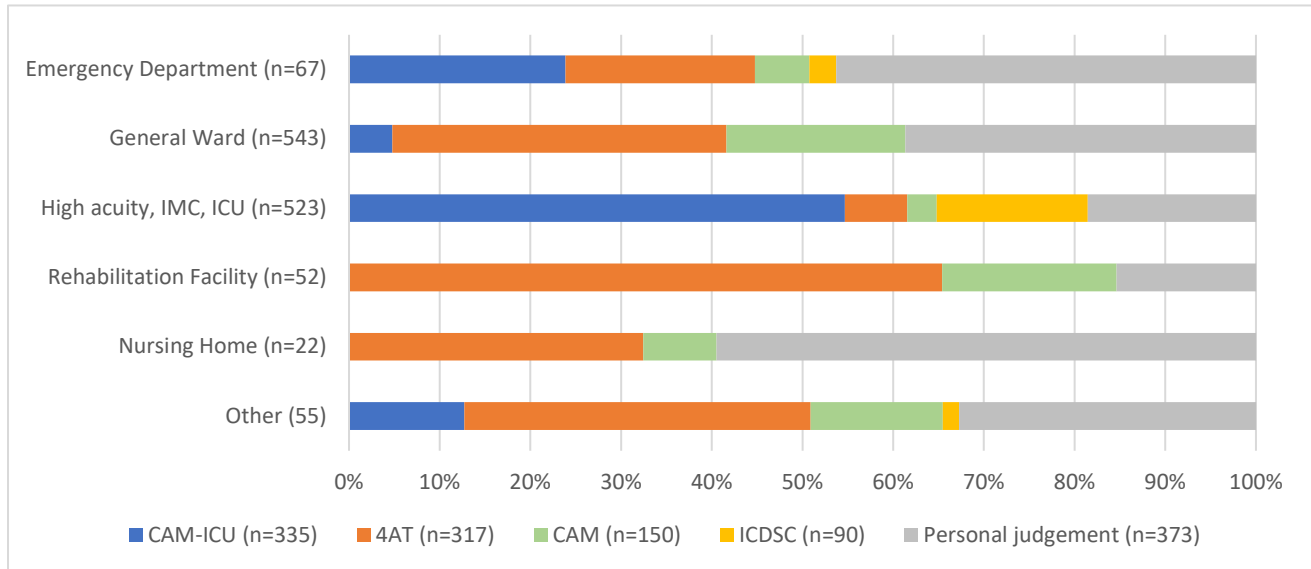


Figure 2: Use of top five delirium assessments, depending on type of wards/units



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;

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

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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; Oisín 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 Ciabrone; Alessandro Di Risio; Rosa Filipelli; Luigi

Francioni; Alessandro Galazzi; Barbara Gamba; Simona Gentile; Emma Giovannini; Angela Iurlaro; Maria Legierska; Alessandro Monesi; Giulia Principato; Daniela Quattrocchi; 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; Hidenori 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 Jihad 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 Mofteh; 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; Asuncion Vergara 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 Cioccaro; Nadja Annen; Natalie Leuenberger; Pascale Schaub; Regula Pfäffli Scheurer; Stephan Dinkler; Samanta Septinus; Sandra Haubner; Sheila Matti; Sibylle Fischbacher; Vlvianne 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 Banchemo; Whitney Smith (**United States**).