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# Worldwide ABCDEF (Assessing Pain, Both Spontaneous Awakening and Breathing Trials, Choice of Drugs, Delirium monitoring/management, Early exercise/mobility, and Family Empowerment) Survey

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Dr. A.J.C. Slooter works on the development of an EEG-based delirium monitor, any (future) profits of this technology will be used for future scientific research only.

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## Abstract

**Objective—**To assess the knowledge and use of the ABCDEF bundle to implement the Pain, Agitation, Delirium (PAD) guidelines.

**Design—**Worldwide On-line Survey.

**Setting—**Intensive care.

**Intervention—**A cross-sectional online survey using the Delphi method was administered to intensivists worldwide, to assess the knowledge and use of all aspects of the ABCDEF bundle (Assessment, prevention and management of pain; spontaneous awakening and Breathing trials; Choice of analgesia and sedation; Delirium assessment; Early mobility and exercise and Family engagement and empowerment.)

**Measurement and Main Results—**There were 1521 respondents from 47 countries, 57% had implemented the ABCDEF bundle, with varying degrees of compliance across continents. Most of the respondents (83%) used a scale to evaluate pain. SATs and SBTs are performed in 66% and 67% of the responder ICUs respectively. Sedation scale was used in 89% of ICUs. Delirium monitoring was implemented in 70% of ICUs, but only 42% used a validated delirium tool. Likewise, early mobilization was “prescribed” by most but 69% had no mobility team and 79% used no formal mobility scale. Only 36% of the respondents assessed ICU acquired weakness. Family members were actively involved in 67% of ICUs, however only 33% used dedicated staff to support families and only 35% reported that their unit was open 24 hours/day for family visits.

**Conclusions—**The current implementation of the ABCDEF bundle varies across individual components and regions. We identified specific targets for quality improvement and adoption of the ABCDEF bundle. Our data reflect a significant but incomplete shift towards patient- and family-centered ICU care in accordance with the PAD guidelines.

### Keywords

ABCDEF; Pain evaluation; Spontaneous Awakening and Breathing Trials; sedation; delirium monitoring/management; early exercise/mobility; family empowerment; critical care; intensive care

## INTRODUCTION

Survivors of critical illness often experience persistent physical, mental, and cognitive impairment.(1–5)Inadequately treated pain, excessive sedation, delirium and reduced mobilization have emerged as risk factors for acute muscle wasting and weakness, persisting physical dysfunction and cognitive decline. To aid adoption of the SCCM’s Pain, Agitation, Delirium (PAD) guidelines, an evidence-based multicomponent and interprofessional team management strategy, known as ABCDEF bundle (Assess, prevent, and manage pain; Both Spontaneous Awakening Trials (SATs) and Spontaneous Breathing Trials (SBTs); attention to the Choice of analgesia and sedation; Delirium monitoring and management; Early mobility and exercise; and Family engagement and empowerment) has been developed and implemented in thousands of ICUs.(6–9)Each component of the ABCDEF bundle addresses a target practice in the ICU independently associated with patient safety or patient-centered outcomes. (10–26) For example, multiple studies have demonstrated the efficacy of implementing combined SATs and SBTs to shorten duration of mechanical ventilation and

ICU length of stay.(10–13) To date, the ABCDEF bundle approach has been evaluated in only a few countries and some reports are available on the individual components.(27–33) Results vary widely across different countries and jurisdictions.(34)

Evaluation of the current state of understanding and implementation of the ABCDEF bundle would help future knowledge translation efforts and identify targets for quality improvement initiatives. We thus employed an international, web-based survey to assess (1) knowledge of the ABCDEF bundle and (2) differences in the use of each component across the world.

## METHODS

We conducted a worldwide survey of intensivists (i.e., physicians) endorsed by the European Society of Intensive Care Medicine (ESICM). The survey instrument described the ABCDEF bundle and then probed eight domains with a total of 41 questions (Supplemental Digital Content 1). Sixty-eight questions were initially created by A.M. and S.P. and were then reduced to 41 using a Dephi method by a steering committee (SC), who were asked to rate each question on a Likert Scale ranging from “retain” to “exclude.” The survey was then pretested by the SC, who provided written feedback on *Face validity, Content Validity and Criterion Validity*. Lastly, the instrument was *pilot tested* by the SC, evaluating duration, flow, relevance and acceptability, and questions were screened for redundancy, relevance and clarity. *Clinical sensitivity testing* was completed by the steering committee using a 7-question instrument (Supplemental Digital Content 2: Appendix 1), and *Test-Retest Reliability* was assessed by the SC who repeated duplicate surveys within 4 weeks. The local ethics committee reviewed the study and waived the need for approval.

### Survey administration

The survey and a cover letter were distributed to members of ESICM and other national and regional intensive care societies between March 1st and September 15th 2016 via Lime Survey (Lime Survey GmbH, Hamburg, Germany). To expand survey distribution and improve response rate, SC members sent reminder emails with a cover letter, and a web-based advertisement was sent to the following societies: ESICM, the Italian Society of Anesthesia, Analgesia, Reanimation and Intensive Care (SIAARTI), the Indian Society of Critical Care Medicine, the Japanese Society of Critical Care Medicine, and the Australasian and New Zealand Intensive Care Society.

The survey was open and anonymous, and the database was securely maintained at the University of Brescia (www.anestbs.com). Question sequence was randomized to avoid bias. Date, total time and single item time of compilation were recorded. The computer IP address of the respondent was recorded to avoid duplicate entries. The Checklist for Reporting Results of Internet E-Surveys (CHERRIES) checklist was used to report the data.(35)

### Data analysis

Only complete questionnaires were included in the final analysis. Aggregated responses are reported as frequencies and percentages. Continuous data are reported as mean (SD). For test-retest analysis, Chi-square test for nominal data, Spearman rho for ordinal data and

Pearson r for interval data were used. Analyses were performed with Stata 13.0 (STATA Corp, College Station, USA) software.

## RESULTS

We received 1,521 completed questionnaires from respondents in Europe (N=607), South America (N=265), Asia (N= 441), North America (N= 120), Oceania (N=45), and Africa (N= 43). The most represented countries were Italy (N=371, 24%), followed by India (N=250, 16%) and Brazil (N=159, 10%) (Supplemental Digital Content 2: Appendix 2, Figure 1 and Appendix 3). The characteristics of the respondents are listed in Table 1. Just over half of respondents reported implementing the pain, agitation and delirium (PAD) guidelines (56.2%) and the ABCDEF bundle (56.6%). Overall, the ABCDEF bundle implementation was greater in non academic hospitals, in open/semiopen ICUs, and in ICU with larger annual admissions (Supplemental Digital Content 2: Appendix 4).

### (A) Assess, prevent, and manage pain

Though responses varied geographically, most respondents (83%) reported using a scale to evaluate pain (Table 2 and Supplemental Digital Content 2: Appendix 5, Figure 2). The pain scale reported to be most widely used were the visual analogic scale (VAS) (54%) and the numerical rating scale (NRS) (54%). Only 56% of the respondents reported using preemptive analgesia before nursing procedures. The preferred analgesics were morphine (78%), fentanyl (79%) and paracetamol (69%) alone or in combination.

### (B) Both SAT and SBT

Two-thirds or respondents reported performed SATs, most often once daily (59%) but with wide geographic variation (Table 2 and Supplemental Digital Content 2: Appendix 5, Figure 2). Similarly, 67% of respondents reported using SBTs. Only 42% of respondents reported using a coordinated protocol synchronizing SAT and SBT (i.e., a “wake up and breathe” protocol), most often performed by physicians (27%) or nurses (15%).

### (C) Choice of analgesia and sedation

Respondents (61%) most often reported using the Richmond Agitation Sedation Scale (RASS) to evaluate the level of arousal, followed by the Ramsey scale (22%) (Table 2 and Supplemental Digital Content 2: Appendix 5, Figure 2). Just over one-third of respondents reported using a sedation protocol. The sedation protocols reported typically (90%) focus on using minimal or no sedation with avoidance of benzodiazepines. When treating an agitated patient, most respondents reported they evaluate pain first, and then delirium before considering using sedation.

### (D) Delirium

Half of the respondents estimate that 30% or less of patients in their ICU have delirium (Table 3 and Supplemental Digital Content 2: Appendix 5, Figure 2). One-third of respondents do not routinely monitor delirium, whereas 40% report they assess patients for delirium once a day, and 30% report doing so more than once a day, with substantial variation across continents. More than half (58%) of the respondents do not use specific

tools to monitor delirium, though they acknowledge the need for delirium monitoring. Among those who use a tool, CAM-ICU is preferred (83%) followed by the ICDSC (17%).

When delirium is identified, 74% of respondents would investigate potential causes, but significant heterogeneity was reported in the sequence of diagnostic methods used; the preferred combination was neurological examination followed by a review of medications, laboratory tests and infection screening. Respondents reported rarely using neuroimaging, electroencephalography, and evoked potentials to investigate delirium. Just under half of respondents believe that delirium could affect mortality, ICU and hospital length of stay, ICU cost, family burden or cognitive impairment.

Among non pharmacological interventions to promote sleep, respondents most commonly (28%) prefer optimizing ambient light, timing of drug administration, and noise. Alternatively, 58% of respondents reported prescribing drugs to promote sleep, with benzodiazepine alone (11%) being the preferred agent (data not shown).

When managing delirium, 58% of respondents reported they do not use a protocol, and 65% reporting using haloperidol, most often (44%) as a single dose. Atypical antipsychotics are used by 53% respondents, either as a first approach (39%) or when haloperidol is not effective (42%). Respondents report consulting a specialist in 64% of delirium cases, usually (63%) in the most challenging cases.

### (E) Early Mobilization and Exercise

Just over one-third of respondents reported they routinely assess patients for intensive care unit acquired weakness (ICUAW), most often using the Medical Research Council (MRC) scale (49%) or an electrophysiological evaluation (41%) (Table 4 and Supplemental Digital Content 2: Appendix 5, Figure 2). From 73% to 91% of respondents, depending on the continent, report prescribing early mobilization, though they report rarely using a specific mobility scale (21%). Approaches reported consisted of combined passive range of motion (PROM), active physiotherapy, and ambulation (32%). Cycleergometry (14%) and neuromuscular electrical stimulation (6%) were infrequently reported. One-third (31%) reported having a mobility team, consisting of a physical therapist (33%) or physical therapist and ICU nurses (17%) or physical therapist, respiratory therapist and ICU nurses (12%) (Supplemental Digital Content 2: Appendix 6). 65% of the respondents who reported the use of early mobilization used specific scales to evaluate delirium

### (F) Family

Of the respondents, 65% report that their unit is not open 24 hours per day for family visitation, 74% report that family member visits are allowed <5 hours/day (Table 5; Supplemental Digital Content 2, Appendix 5, Figure 2). Eighty-one percent of respondents report they explain delirium to family members, with 13% reporting they usie booklets. Family members are actively involved in 67% of the cases but only 33% of the ICUs use dedicated staff to support families. When family members are actively involved, there is a higher prevalence of interventions to reduce and treat delirium (Supplemental Digital Content 2: Appendix 7) and interestingly this remained the same for early exercise and

mobilization, independent of the nurse patient ratio. (Supplemental Digital Content 2: Appendix 8)”

## DISCUSSION

This is the first worldwide survey to assess the knowledge and use of the ABCDEF bundle. Of 1,521 respondents in 47 countries, 57% reporting implementing the bundle. The large majority (83%, 89% and 70%) reported evaluating pain, sedation and delirium in their ICU, though only 42% reporting using a validated delirium tool. Almost two-thirds reported using SATs and SBTs. Most report prescribing early mobility, but few report having designated mobility teams. Though family members were reported to be actively involved in most ICUs, few had dedicated staff to help family or incorporate family indecision making.

Though previous surveys and point prevalence studies have evaluated the use of the ABCDEF approach in the management of critically ill patients,(6–8)our investigation is the first international survey to assess use of the full ACBDEF bundle rather than focus on single components.(27–33)A multicenter European survey found that 80% of ICUs reported routinely monitoring pain, with 93% using a validated tool for pain assessment.(27)The most frequently used pain score was the VAS (63%) followed by the NRS (57%). Alternatively, an Australian point prevalence study found pain was assessed only in 46% of 569 patients in 41 ICUs.(28)We found similar reported rates in Europe although we observed higher rates of pain monitoring in Oceania compared to the previous Australasian study, though this might be related to an over-estimation of the actual assessment.(28)

Our finding that 84% of respondents in Asia report using SATs and SBTs is consistent with data from a recent survey from India.(29)Our findings regarding use of SATs and SBTs in Europe (47% and 50%) are also consistent with previously reported data.(27)

Our responses from intensivists in Asia, Australia and Europe are comparable to those in previous surveys assessing use of sedation scales.(27–29)In an Australian point prevalence study, routine sedation scale use was recorded in 63% of invasively ventilated patients.(28) In a European Survey, routine sedation monitoring was reported in 88% of the ICUs, with most reporting use of RASS (54%), Ramsay (27%), or SAS (6%).(27)

In a survey of Indian ICUs, 58% of respondents reported routinely monitoring sedation level, with the Ramsay being most often used (56%) followed by RASS (19%). Nearly all (95%) respondents reported using midazolam for sedation, followed by propofol (68%), and dexmedetomidine (60%); fentanyl was the most common analgesic agent used (47 %).(29)In our study, 35% of respondents reported they do not use sedation protocols, especially those in Africa, Europe and Oceania.

A survey conducted by the Indian Society of Critical Care Medicine found that 35% of intensivists reported assessing for delirium, using validated scales in only 22% of the cases (most commonly the CAM-ICU).(29) Similarly, a multicenter European Survey round that only 56% of respondents reported screening patients for symptoms of delirium.(27) In an Australian point prevalence study, routine assessment of delirium occurred in only 3% of patients.(28)In our study, delirium evaluation was reported to be much higher than in

previous reports in Asia (81%) and in Australia (69%),(27–29)which could reflect overestimation on the part of respondents but might also reflect a change in clinical practice. CAM-ICU was reported to be the most widely used delirium monitoring tool, though 58% of respondents reported they do not use a tool, particularly those in Africa (86%), Oceania (36%) and South America (21%).

Though its efficacy remains in question (36), haloperidol is used to treat delirium and/or minimize the use of sedatives. Respondents to a European survey reported antipsychotics were the most frequently used agents for delirium treatment although it was not clear if this choice was related to treatment of psychotic symptoms or agitation.(27)

Two point prevalence studies across 116 German hospitals reported that only 8% of ventilated patients received out-of-bed mobility, and only 3% of patients in 38 Australian/NewZealand ICUs achieved sitting at the edge of the bed with none standing, transferring to chair or walking.(30, 31) A recent point-prevalence study across 42 United States ICUs reported 32% of adult patients with acute respiratory failure (and 26% of ventilated patients) received physical/occupational therapy.(32)An Indian survey reported higher mobilization levels(86% at the bed side, 70% to a wheel chair and 67% limited ambulation).(29)Our results suggest a discordance in intent and resources for mobilization. Although 91% of respondents report prescribing early mobilization, only 36% say they evaluate for ICU-AW and 31% report having a dedicated mobility team. Additionally, there is significant variability in the composition of ICU mobility teams, with only a minority including a physical therapist, occupational therapist, nurses and physicians.

Despite broad consensus that liberalization of visiting hours in the ICU improves the care and experience of patients and families (37, 38), a recent multicenter Brazilian survey reported only 3% of the ICUs had liberal visitation policies.(39) Among 289 French ICUs, only 24% were open for family visits 24 hours per day.(40)Similarly, most of our respondents (65%) reported their units are not open 24 hours per day, with most ICUs (74%) open from 5 hours per day or less. Despite evidence of the benefit of family engagement, it remains unclear how family involvement should be structured.(41)

Our study has strengths and limitations. This is the first worldwide survey to explore the knowledge of the ABCDEF bundle and its use in clinical practice. The study provides detailed information about each component of ABCDEF, thus improving our understanding of the practices worldwide.. The precise response rate cannot be precisely determined due to the difficulties in conducting such a wide spread web-based survey, and there is a potential for selection bias due to the method of survey distribution. However, our survey respondents covered a broad range of age groups, clinical experience and types of ICUs, including both teaching and non-teaching hospitals of various sizes. Consequently, our data reflects the broad spectrum of clinical practice across regions and estimates the range of current clinical practice. Additionally, our results suggest which elements of the bundle are the least implemented, thus providing targets for quality improvement initiatives, as well as those which need better infrastructural support for implementation.

This survey was limited to physicians, hence we are unable to compare the responses with that of the other ICU staff e.g. nurses, physical therapists etc., who may have a different perspective and play an important role in the implementation of the ABCDEF bundle. An inherent limitation of "self reporting" is that the reliability of individual responses cannot be ensured. There is also a possibility of having several participants from the same institution, which may result in multiple same or similar responses. Another limitation, which is not in our control, is the higher number of responses collected from single countries, potentially reflecting the care practices in those specific countries rather than the continent. Despite these limitations, this survey provides a fair idea about the knowledge and use of the ABCDEF bundle, which may help plan future research and improved strategies for implementation.

## CONCLUSIONS

Just over decade ago the majority of ICUs were closed to family members, practicing heavy sedation and patient immobilization. Our data reflect a dramatic yet incomplete cultural shift towards a patient- and family-centered ICU liberation strategy. There remains a compelling need for greater implementation of the ABCDEF bundle, particularly concerning the management of sedation, full appreciation and assessment of delirium and application of early mobility. An open ICU visitation policy is still rare, and there is a growing need to improve interaction with family members.

## Supplementary Material

Refer to Web version on PubMed Central for supplementary material.

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**Table 1**

Characteristics of 1,521 responders and ICU settings.

| *Variables* | *N (percentage)* |
|---|---|
| **Age** | |
| 25–35 | 314 (21) |
| 36–45 | 585 (38) |
| 46–55 | 368 (24) |
| 56–65 | 223 (15) |
| >65 | 20 (2) |
| **Years of clinical experience** | |
| 5–10 | 399 (32) |
| 11–20 | 476 (40) |
| >20 | 365 (29) |
| **Specialty** | |
| Anesthesiology | 603 (40) |
| Critical Care | 488 (32) |
| Internal Medicine | 190 (13) |
| Pulmonary Medicine | 115 (8) |
| Other | 87 (6) |
| Surgery | 38 (3) |
| **Hospital** | |
| General hospital | 522 (34) |
| Private hospital | 197 (13) |
| University hospital | 421 (28) |
| University affiliated general hospital | 363 (24) |
| Other | 18 (1) |
| **Type of Intensive Care Unit (ICU)** | |
| Burn Unit | 4 (0.2) |
| Cardiac ICU | 43 (3) |
| Coronary ICU | 1 (0.1) |

| *Variables* | *N (percentage)* |
|---|---|
| Mixed ICU | 862 (57) |
| Medical ICU | 312 (21) |
| Neurological ICU | 41 (3) |
| Surgical ICU | 170 (11) |
| Trauma ICU | 24 (2) |
| Transplant ICU | 12 (1) |
| Other | 52 (3) |
| **ICU setting** | |
| Closed ICU | 841 (55) |
| Open ICU | 183 (12) |
| Semi-closed | 487 (32) |
| Other | 10 (1) |
| **ICU number of beds** | |
| 0–10 | 481 (32) |
| 10–20 | 642 (42) |
| >20 | 398 (26) |
| **Patients admitted per year** | |
| 301–500 | 442 (34) |
| 501–1000 | 431 (33) |
| >1000 | 353 (27) |
| Not available | 78 (6) |
| **Ventilated patients**[a] | |
| 51–70% | 567 (37) |
| ≤50% | 579 (38) |
| >70% | 346 (23) |
| Not available | 29 (2) |
| **ICU length of stay** | |
| 0–5 days | 710 (47) |
| 6–10 days | 552 (36) |

| *Variables* | *N (percentage)* |
|---|---|
| 11–15 days | 135 (9) |
| 16–20 days | 57 (4) |
| 21–25 days | 20 (1) |
| 26–30 days | 24 (2) |
| >30 days | 23 (2) |
| **Nurse: patients ratio (day)** | |
| 1:1 | 164 (11) |
| 1:2 | 976 (64) |
| 1:3 | 270 (18) |
| 1:4 | 111 (7) |
| **Nurse: patients ratio (night)** | |
| 1:1 | 117 (8) |
| 1:2 | 677 (44) |
| 1:3 | 527 (35) |
| 1:4 | 200 (13) |

[a]Percentage of patients receiving invasive mechanical ventilation over the total number of ICU patients

**Table 2**

Assess, prevent, and manage pain (A); spontaneous awakening trials (SAT) and spontaneous breathing trials (SBT) (B); Choice of analgesia and sedation (C).

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| **Assess, prevent, and manage pain (A)** | | | | | | | |
| **Do you use protocol for pain treatment?** | | | | | | | |
| No | 31 (72) | 114 (26) | 256 (42) | 45 (38) | 29 (64) | 110 (42) | 585 (38) |
| Yes | 12 (28) | 327 (74) | 351 (58) | 75 (63) | 16 (36) | 155 (59) | 936 (62) |
| **Do you use any scale to evaluate pain in your unit?** | | | | | | | |
| No | 26 (60) | 40 (9) | 103 (17) | 8 (7) | 15 (33) | 60 (23) | 252 (16) |
| Yes | 17 (40) | 401 (91) | 504 (83) | 112 (93) | 30 (67) | 205 (77) | 1269 (83) |
| **Scale used to evaluate pain** * | | | | | | | |
| CPOT | 0 (0) | 46 (11) | 52 (10) | 70 (65) | 6 (20) | 41 (20) | 215 (17) |
| BPS | 1 (6) | 140 (35) | 129 (26) | 14 (13) | 1 (3) | 53 (26) | 338 (27) |
| NRS | 11 (65) | 224 (56) | 292 (58) | 50 (45) | 18 (60) | 94 (46) | 689 (54) |
| VAS | 5 (29) | 272 (68) | 284 (56) | 21 (19) | 12 (40) | 86 (42) | 680 (54) |
| FPS | 7 (41) | 80 (20) | 99 (20) | 19 (17) | 9 (30) | 39 (19) | 253 (20) |
| NVPS | 2 (12) | 7 (2) | 52 (10) | 19 (17) | 3 (10) | 17 (8) | 100 (8) |
| **Do you use preemptive analgesia before nursing procedure?** | | | | | | | |
| No | 32 (74) | 154 (27) | 92 (15) | 13 (11) | 2 (4) | 69 (26) | 362 (24) |
| Yes | 6 (14) | 370 (66) | 315 (52) | 29 (24) | 11 (24) | 124 (47) | 855 (56) |
| At nurse’s discrection | 5 (12) | 37 (7) | 200 (33) | 78 (65) | 32 (71) | 71 (27) | 423 (28) |
| **Drugs used for pain treatment** * | | | | | | | |
| Fentanyl | 7 (16) | 386 (69) | 402 (66) | 118 (98) | 44 (98) | 242 (92) | 1199 (79) |
| Hydromorphone | 1 (2) | 14 (2) | 23 (4) | 102 (85) | 8 (18) | 6 (2) | 154 (10) |
| Morphine | 21 (48) | 310 (55) | 523 (86) | 84 (70) | 41 (91) | 203 (77) | 1182 (78) |
| Methadone | 4 (9) | 4 (1) | 42 (7) | 20 (17) | 14 (31) | 59 (22) | 143 (9) |
| Remifentanyl | 4 (9) | 112 (20) | 376 (62) | 1 (1) | 8 (18) | 68 (26) | 569 (37) |
| Paracetamol | 37 (86) | 282 (50) | 506 (83) | 44 (37) | 43 (96) | 142 (54) | 1054 (69) |

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| NSAIDs | 37 (86) | 291 (52) | 327 (54) | 54 (45) | 24 (53) | 86 (33) | 819 (54) |
| **Spontaneous awakening trials (SAT) and spontaneous breathing trials (SBT) (B)** | | | | | | | |
| **Do you perform SAT?** | | | | | | | |
| No | 33 (77) | 71 (16) | 322 (53) | 7 (6) | 18 (40) | 62 (23) | 513 (34) |
| Yes | 10 (24) | 370 (84) | 285 (47) | 113 (94) | 27 (60) | 203 (77) | 1008 (66) |
| **How many times do you perform SAT?** | | | | | | | |
| As many times as possible | 1 (10) | 51 (14) | 52 (18) | 10 (9) | 5 (19) | 27 (13) | 146 (15) |
| Every nurse's shift | 0 (0) | 26 (7) | 20 (7) | 9 (8) | 0 (0) | 1 (1) | 56 (6) |
| I perform a sedation minimization strategy | 3 (30) | 49 (13) | 76 (27) | 16 (14) | 10 (37) | 39 (19) | 193 (19) |
| Once a day | 6 (60) | 241 (65) | 134 (47) | 73 (65) | 9 (33) | 133 (66) | 596 (59) |
| Other | 0 (0) | 3 (1) | 3 (1) | 5 (4) | 3 (11) | 3 (2) | 17 (2) |
| **Do you perform SBT?** | | | | | | | |
| No | 27 (63) | 71 (16) | 304 (50) | 4 (3) | 32 (71) | 58 (22) | 496 (32) |
| Yes | 16 (37) | 370 (84) | 303 (50) | 116 (97) | 13 (29) | 207 (78) | 1025 (67) |
| **Choice of analgesia and sedation (C)** | | | | | | | |
| **Scale used to evaluate sedation** * | | | | | | | |
| MAAS | 2 (5) | (1) | 2 (0.3) | 1 (1) | 1 (2) | 1 (0.4) | 11 (1) |
| None | 33 (77) | 25 (6) | 100 (16) | 0 (0) | 1 (2) | 3 (1) | 162 (11) |
| Other | 1 (2) | 1 (0.2) | 8 (1) | 3 (3) | 0 (0) | 1 (0.4) | 14 (1) |
| RASS | 5 (12) | 273 (62) | 290 (48) | 108 (90) | 37 (82) | 214 (81) | 927 (61) |
| Ramsey | 2 (5) | 120 (27) | 186 (31) | 1 (1) | 1 (2) | 26 (10) | 336 (22) |
| SAS | 0 (0) | 18 (4) | 21 (3) | 7 (6) | 5 (11) | 20 (8) | 71 (5) |
| **Do you follow protocol for sedation in your unit?** | | | | | | | |
| No | 36 (83) | 87 (20) | 312 (51) | 20 (17) | 22 (49) | 59 (22) | 536 (35) |
| Yes | 7 (16) | 354 (80) | 295 (49) | 100 (83) | 23 (51) | 206 (78) | 985 (65) |
| **If yes, have you adopted a minimal or no sedation strategy?** | | | | | | | |
| No | 3 (43) | 34 (10) | 31 (11) | 9 (9) | 5 (22) | 20 (10) | 102 (10) |
| Yes | 4 (57) | 320 (90) | 264 (89) | 91 (91) | 18 (78) | 186 (90) | 883 (90) |
| **Do you attempt to minimize the use of benzodiazepines in your patients?** | | | | | | | |

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| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| No | 9 (21) | 38 (9) | 91 (15) | 3 (3) | 1 (2) | 14 (5) | 156 (10) |
| Yes | 34 (79) | 403 (91) | 516 (85) | 117 (98) | 44 (98) | 251 (95) | 1365 (90) |
| **In a restless and agitated patient who screened positive at delirium assessment, how do you approach the sedation strategy after clinical evaluation?** | | | | | | | |
| Delirium first→Pain→Sedation | 2 (5) | 31 (7) | 62 (10) | 10 (8) | 4 (9) | 28 (11) | 137 (9) |
| Delirium→Sedation→Pain | 3 (7) | 9 (2) | 22 (4) | 4 (3) | 1 (2) | 3 (1) | 42 (3) |
| None | 4 (9) | 2 (0.5) | 24,00 (4) | 0 (0) | 3 (7) | 4 (2) | 37 (2) |
| Other | 0 (0) | 2 (0.5) | 2,00 (0.3) | 4 (3) | 3 (7) | 0 (0) | 11 (1) |
| Pain→Delirium→Sedation | 13 (30) | 177 (40) | 247 (41) | 62 (52) | 14 (31) | 159 (60) | 672 (44) |
| Pain→Sedation→Delirium | 13 (30) | 171 (39) | 170 (28) | 31 (26) | 18 (40) | 52 (20) | 455 (30) |
| Sedation→Pain→Delirium | 8 (19) | 49 (11) | 80 (13) | 9 (8) | 2 (4) | 19 (7) | 167 (11) |

Data are expressed as number (percentage).

Abbreviations: CPOT: Critical-Care Pain Observation Tool (CPOT); BPS: Behavioral Pain Scale; FPS: Faces Pain Scale; NVPS: Adult Non-Verbal Pain Scale; NSAIDs: Nonsteroidal anti-inflammatory drugs. *SAT* Spontaneous Awakening trial, *SBT* Spontaneous Breathing trial.

[*] **Multiple responses were possible.**

**Table 3**

Delirium management (D)

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| **Do you routinely monitor delirium in your unit?** | | | | | | | |
| Never | 23 (54) | 84 (19) | 276 (45) | 5 (4) | 14 (31) | 54 (20) | 456 (30) |
| More than once a day | 4 (9) | 125 (28) | 122 (20) | 94 (78) | 19 (42) | 87 (33) | 451 (30) |
| Once a day | 16 (37) | 232 (53) | 209 (34) | 21 (18) | 12 (27) | 124 (47) | 614 (40) |
| **Which tools do you routinely use to assess delirium?** | | | | | | | |
| CAM-ICU | 6 (14) | 310 (90) | 259 (90) | 131 (88) | 28 (64) | 205 (78) | 536 (35) |
| ICSDC | 0 | 15 (4) | 23 (8) | 13 (9) | 0 (0) | 1 (0.4) | 102 (7) |
| None | 36 (86) | 18 (5) | 5 (2) | 5 (3) | 16 (36) | 56 (21) | 883 (58) |
| **Do you generally investigate the potential causes of delirium in your patients?** | | | | | | | |
| No | 7 (16) | 101 (23) | 199 (33) | 18 (15) | 10 (22) | 54 (20) | 389 (26) |
| Yes | 36 (84) | 340 (77) | 408 (67) | 102 (85) | 35 (78) | 211 (80) | 1132 (74) |
| **In you experience, how many patients have delirium in your ICU?** | | | | | | | |
| 0–10% | 20 (47) | 98 (22) | 128 (21) | 10 (8) | 5 (11) | 36 (14) | 297 (20) |
| 11–30% | 19 (44) | 217 (49) | 310 (51) | 48 (40) | 24 (53) | 127 (48) | 745 (50) |
| 31–60% | 4 (9) | 116 (26) | 145 (24) | 45 (38) | 14 (31) | 89 (34) | 413 (27) |
| >60% | 0 (0) | 10 (2) | 24 (4) | 17 (14) | 2 (4) | 13 (5) | 66 (4) |
| **Do you prescribe earplugs to your patients?** | | | | | | | |
| No | 41 (95) | 305 (69) | 541 (89) | 91 (76) | 29 (64) | 243 (92) | 1250 (82) |
| Yes | 2 (5) | 136 (31) | 66 (11) | 29 (24) | 16 (36) | 22 (8) | 271 (18) |
| **Do you use non-pharmacological interventions to promote sleep in your unit?** | | | | | | | |
| Drug Time Optimization | 4 (10) | 30 (7) | 47 (8) | 4 (4) | 2 (5) | 34 (14) | 121 (8) |
| Drug Time Optimization and Noise Reduction | 1 (3) | 5 (1) | 30 (5) | 6 (5) | 0 (0) | 6 (2) | 48 (3) |
| Light Optimization | 6 (15) | 118 (27) | 72 (12) | 10 (9) | 1 (2) | 42 (17) | 249 (17) |
| Light Optimization and Drug Time Optimization | 0 (0) | 22 (5.1) | 52 (9) | 6 (5) | 3 (7) | 33 (13) | 116 (8) |
| Light Optimization, Drug Time Optimization and Noise Reduction | 9 (23) | 82 (19) | 204 (35) | 39 (34) | 17 (42) | 59 (23) | 410 (28) |
| Light Optimization and Noise Reduction | 6 (15) | 144 (33) | 125 (21) | 24 (21) | 12 (30) | 48 (19) | 359 (24) |

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| Noise Reduction | 13 (33) | 31 (7) | 62 (10) | 26 (23) | 6 (15) | 30 (12) | 168 (11) |
| **Do you use protocols for the management of delirium?** | | | | | | | |
| No | 37 (86) | 179 (41) | 439 (71) | 58 (48) | 33 (73) | 130 (49) | 876 (58) |
| Yes | 6 (14) | 262 (59) | 168 (28) | 62 (52) | 12 (27) | 135 (51) | 645 (42) |
| **How do you use haloperidol to manage delirium in your unit?** | | | | | | | |
| None | 6 (14) | 29 (7) | 44 (7) | 16 (13) | 6 (13) | 11 (4) | 112 (7) |
| Prevention of Delirium | 2 (5) | 2 (0.5) | 13 (2) | 0 (0) | 0 (0) | 3 (1) | 20 (1) |
| Prevention of Delirium + Sedatives Minimization | 0 (0) | 4 (1) | 9 (2) | 0 (0) | 0 (0) | 3 (1) | 16 (1) |
| Sedatives Minimization | 2 (5) | 20 (5) | 40 (7) | 6 (5) | 0 (0) | 8 (3) | 76 (5) |
| Treatment of Delirium Episode | 27 (63) | 351 (80) | 368 (61) | 58 (48) | 33 (73) | 148 (56) | 985 (65) |
| Treatment of Delirium Episode + Prevention of Delirium | 1 (2) | 10 (2) | 36 (6) | 3 (3) | 2 (4) | 10 (4) | 62 (4) |
| Treatment Delirium Episode + Prevention of Delirium + Sedatives Minimization | 2 (5) | 9 (2) | 31 (5) | 6 (5) | 0 (0) | 16 (6) | 64 (4) |
| Treatment of Delirium Episode + Sedatives Minimization | 3 (7) | 16 (4) | 66 (11) | 31 (26) | 4 (9) | 66 (25) | 186 (12) |
| **Do you use quetiapine or other atypical antipsychotic for delirium with agitation?** | | | | | | | |
| No | 36 (84) | 248 (56) | 342 (56) | 14 (12) | 15 (33) | 63 (24) | 718 (47) |
| Yes | 7 (16) | 193 (44) | 265 (44) | 106 (88) | 30 (67) | 202 (76) | 803 (53) |
| **In which situation do you require a specialist consultation (i.e. psychiatrist, neurologist, geriatrician)?** * | | | | | | | |
| All cases | 12 (28) | 70 (16) | 42 (7) | 2 (3) | 2 (4) | 12 (5) | 141 (9) |
| Most challenging cases of delirium | 31 (72) | 337 (76) | 370 (61) | 62 (52) | 21 (47) | 144 (54) | 965 (63) |
| Alcohol withdrawal syndrome | 14 (33) | 203 (46) | 73 (12) | 9 (8) | 4 (9) | 51 (19) | 354 (23) |
| Post-traumatic stress disorder | 14 (33) | 195 (44) | 110 (18) | 25 (21) | 8 (18) | 55 (21) | 407 (27) |
| Never | 2 (5) | 12 (7) | 125 (21) | 39 (32) | 17 (38) | 68 (26) | 263 (17) |

Data are expressed as number (percentage).

*Multiple responses were possible.

**Table 4**

Early mobilization and exercise (E)

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| **Do you evaluate ICU-acquired muscle weakness in your Unit? (N, %)** | | | | | | | |
| No | 27 (63) | 322 (73) | 384 (63) | 84 (70) | 19 (42) | 136 (51) | 972 (64) |
| Yes | 16 (37) | 119 (27) | 223 (37) | 36 (30) | 26 (58) | 129 (49) | 549 (36) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| **Do you prescribe early mobilization to your patients? (N, %)** | | | | | | | |
| No | 3 (7) | 45 (10) | 59 (10) | 4 (3) | 4 (9) | 18 (7) | 133 (9) |
| Only in non-ventilated patients | 1 (2) | 29 (7) | 65 (11) | 9 (8) | 8 (18) | 24 (9) | 136 (9) |
| Yes | 39 (91) | 367 (83) | 483 (80) | 107 (89) | 33 (73) | 223 (84) | 1252 (82) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| **Do you use an ICU mobility scale for goal-directed early mobilization? (N, %)** | | | | | | | |
| No | 31 (72) | 326 (74) | 466 (77) | 58 (48) | 36 (80) | 179 (68) | 1096 (79) |
| Yes | 9 (21) | 70 (16) | 82 (14) | 58 (48) | 5 (11) | 68 (26) | 292 (21) |
| Total | 40 | 396 | 548 | 116 | 41 | 247 | 1388 |
| **Do you have a dedicated mobility team in your ICU? (N, %)** | | | | | | | |
| No | 38 (88) | 346 (78) | 402 (66) | 83 (69) | 31 (69) | 152 (57) | 1052 (69) |
| Yes | 5 (12) | 95 (22) | 205 (34) | 37 (31) | 14 (31) | 113 (43) | 469 (31) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| | | | | | | | |

Data are expressed as number (percentage).

**Table 5**

Family involvement (F).

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| **Is your unit open 24 hours per day to family members visit? (N, %)** | | | | | | | |
| No | 25 (58) | 234 (53) | 490 (81) | 21 (18) | 9 (20) | 204 (77) | 983 (65) |
| Yes | 18 (42) | 207 (47) | 117 (19) | 99 (82) | 36 (80) | 61 (23) | 538 (35) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| **How many hours is your unit open to family members if not 24 hours per day?** | | | | | | | |
| 0–5 hours | 18 (72) | 213 (91) | 314 (64) | 2 (10) | 0 (0) | 176 (87) | 723 (74) |
| 5–10 hours | 2 (8) | 5 (2) | 36 (7) | 11 (52) | 0 (0) | 4 (2) | 58 (6) |
| 10–15 hours | 0 (0) | 1 (0.4) | 6 (1) | 1 (5) | 2 (22) | 1 (0.5) | 11 (1) |
| 15–20 hours | 5 (20) | 15 (6) | 134 (27) | 2 (10) | 4 (44) | 23 (11) | 183 (19) |
| >=20 hours | 0 (0) | 0 (0) | 0 (0) | 5 (24) | 3 (33) | 0 (0) | 8 (1) |
| **Do you generally explain to family members what delirium is? (N, %)** | | | | | | | |
| No | 16 (37) | 87 (20) | 122 (20) | 16 (13) | 11 (24) | 32 (12) | 284 (19) |
| Yes | 27 (63) | 354 (80) | 485 (80) | 104 (87) | 34 (76) | 233 (88) | 1237 (81) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| **Do you use booklets or training material to improve delirium knowledge among family members? (N, %)** | | | | | | | |
| No | 41 (95) | 392 (89) | 549 (90) | 74 (62) | 37 (82) | 236 (89) | 1329 (87) |
| Yes | 2 (5) | 49 (11) | 58 (10) | 46 (38) | 8 (18) | 29 (11) | 192 (13) |
| Total | 43 | 441,00 | 607 | 120 | 45 | 265 | 1521 |
| **Do you involve family member in the delirium management? (N, %)** | | | | | | | |
| No | 20 (47) | 111 (25) | 255 (42) | 26 (22) | 8 (18) | 74 (28) | 494 (33) |
| Yes | 23 (53) | 330 (75) | 352 (58) | 94 (78) | 37 (82) | 191 (72) | 1027 (67) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |
| **Do you use dedicated staff for managing the relationship with family members? (N, %)** | | | | | | | |

| Variables | Africa N=43 | Asia N=441 | Europe N=607 | North America N=120 | Oceania N=45 | South America N=265 | Total N=1521 |
|---|---|---|---|---|---|---|---|
| No | 28 (65) | 239 (54) | 511 (84) | 82 (68) | 32 (71) | 127 (48) | 1019 (67) |
| Yes | 15 (35) | 202 (46) | 96 (16) | 38 (32) | 13 (29) | 138 (52) | 502 (33) |
| Total | 43 | 441 | 607 | 120 | 45 | 265 | 1521 |

Data are expressed as number (percentage).