

Assess Nursing Performance during Implementation of Care Bundle for Critically Ill Patients

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Abstract

Background: Long-term morbidity, cognitive impairment and hospitalization-associated disability are common occurrence in the survivors of critical illness, with significant consequences for patients and for the caregivers. ABCDEF bundle compliance and outcomes including hospital survival and delirium-free and coma-free days in community hospitals. **Aim of the study:** Assess nurses' performance during implementation of care bundle for critically ill patients through the following (1) assess nurses' knowledge regarding implementation of care bundle for critically ill patients (2) assess nurses' practice during implementation of care bundle for critically ill patients. **Research design:** A descriptive design was used in the study. **Subject:** A convenient sample of 80 nurses working at medical ICU in Ain-Shams University Hospital. **Setting:** The study was conducted in medical ICU at Ain-shams University Hospital affiliated to Ain Shams University Cairo/Egypt. **Tools of data collection:** Two tools were developed by the investigator and utilized for data collection (1) Self-administered questionnaire to assess nurses' knowledge regarding care bundle for critically ill patients (2) An observational checklist to assess nurses' practice during implementation of care bundle for critically ill patients. **Results:** Revealed that 72.5% of the studied nurses had unsatisfactory level of knowledge, 77.5 % of the studied nurses had unsatisfactory practices regarding implementation of care bundle for critically ill patients. **Conclusion:** There was a lack of knowledge and practice regarding implementation of care bundle for critically ill patients. **Recommendation:** Establish periodical in-service training program to improve nurses' performance regarding implementation of care bundle for critically ill patients.

Keywords Care Bundle, Critically ill patients, Nurses' Performance, Knowledge and Practice

Introduction:

A 'bundle of cares' comprises a set of interventions that, when performed collectively, improve the effectiveness and quality of patient care (Sosnowski *et al.*, 2021). The ABCDEF bundle or care bundle **A** (Assess, prevent, and manage pain; **B** Both Spontaneous Awakening Trials (SATs) and Spontaneous Breathing Trials (SBTs); **C** Choice of analgesia and sedation; **D** Delirium monitoring and management; **E** Early mobility and exercise; and **F** Family engagement and empowerment) has been developed and implemented in thousands of Intensive Care Units (ICUs) (Morandi *et al.*, 2017).

Critically ill patients experience a mixture of distressing symptoms during their

hospital stay including pain, agitation, delirium, weakness, and sleep deficit. The ABCDEF bundle is a gathering of six elements which represents an evidence-based approach for clinicians to optimize patients' recovery and outcomes in ICU (Devlin *et al.*, 2018).

So, Patients admitted to intensive care units (ICUs) often experience pain, over sedation, prolonged mechanical ventilation, delirium, and weakness. These conditions are important in that they often lead to protracted physical, neurocognitive, and mental health sequelae now termed postintensive care syndrome. Changing current ICU practice will not only require the adoption of evidence-based interventions but the development of effective

and reliable teams to support these new practices (*Barnes-Daly et al., 2017*).

Critically ill patients managed with the Awakening and Breathing Coordination, Delirium monitoring/ management, and Early exercise/mobility bundle spent three more days breathing without assistance, experienced less delirium, and were more likely to be mobilized during their ICU stay than patients treated with usual care (*Balas et al., 2014*).

It is clear that evidence-based and supportive ICU care synchronized with treatment of the underlying disease should be the standard of care to prevent weakness and disabilities in patients after resolution of their critical illness (*Singer et al., 2019*).

Imagine using critical bundle in an environment where all patients undergoing mechanical ventilation are alert, calm, and delirium free. Nurses play a unique role in the implementation of ABCDE as they are critical to all requirements for successful implementation. Registered nurses lead protocol-guided sedation efforts that include daily spontaneous awakening trials and measurement of delirium and sedation/agitation using validated instruments. The nurse is also the communication link between each of the other staff (*Balas et al., 2012*).

The multifold potential benefits of these recommended strategies outweigh minimal risks of costs and coordination. Ultimately, the ABCDEF bundle is one path to well-rounded patient care and optimal resource utilization resulting in more interactive ICU patients with better pain control, who can safely participate with their families and healthcare providers in higher-order physical and cognitive activities at the earliest point in their critical illness (*Marra et al., 2017*).

The Nursing Performance during implementation rate for the elements of the ABCDEF bundle, other supportive ICU care measures, and implementation-associated structures were investigated in this study.

Significance of the Study:

The ABCDEF bundle helps guide well-rounded patient care and optimal resource utilization resulting in more interactive ICU patients with better controlled pain, can safely participate in higher-order physical and cognitive activities at the earliest point in critical illness (*Marra et al., 2017*).

Bundles also help to create reliable and consistent care systems in hospital settings since it is simple (three to five elements), clear, and concise. In addition to creating safer patient care environments, the implementation of bundles also promotes multi-disciplinary collaboration since it should be developed collaboratively and consensus obtained with strong clinician engagement and endorsement (*Wasserman & Bearman, 2018*).

Critical illness is a life threatening multisystem process that can result in significant morbidity or mortality in most patients. It is a stressful and traumatic experience that can have lasting effects on the health of patients and families, even months after discharge from the ICU. So, nurse's role in implementing ABCDEF bundle is very important and positive for the critically ill patients and it depends on the patients' length of stay. Interventions that reduce ICU and improve recovery after critical illness are major importance to public health (*Jones et al., 2010*).

Aim of the study

To assess nurses' performance during implementation of care bundle for critically ill patients through the following:

- 1) Assessing of nurses' level of knowledge about implementation of care bundle "ABCDEF bundle" for critically ill patients.
- 2) Assessing of nurses' level of practice regarding implementation of care bundle "ABCDEF bundle" for critically ill patient.

Subjects and Methods

Technical design:

The technical design includes the setting of the study, subjects and tools for data collection.

Setting:

This study will be conducted in medical ICU at Ain-shams University Hospital affiliated to Ain Shams University.

Subjects:

Convenience sample of (80) nurses working at medical ICU at Ain-shams University Hospital affiliated to Ain Shams University.

Tools for data collection:

Data were collected using the following tools:

Tool (I): Self administered questionnaire (Appendix I):

It was developed by the investigator in a simple Arabic language based on recent and relevant literatures and included the following parts:

• **Demographic characteristics of the study nurses:** it included (age, gender, qualifications, clinical experience and attend any training courses).

• **Nurses' knowledge assessment questionnaire:** it included the following items:

Care bundle definitions and items of care bundle, different pain scales, signs of pain, Spontaneous Awakening and Breathing Trials protocol, pain medications, sedatives used, definition of delirium, signs of delirium, advantages and disadvantages of early mobility, family engagement criteria and time. The questionnaire consisted of 28 questions in the form of multiple choices questions (MCQ) and were divided into eight sections as follow:

- **Section 1:** Questions about definition and content of ABCDEF bundle (Two MCQs) Q (1-2).
- **Section 2:** Questions about Assessment, prevention and management of pain (Six MCQs) Q (3-8).
- **Section 3:** Questions about Spontaneous Awakening and breathing trials (Four MCQs) Q (9-12).
- **Section 4:** Questions about Choice of analgesics and sedatives characteristics, Scales and medications (Six MCQs) Q (13-18).

- **Section 6:** Questions about Delirium prevention and management (Five MCQs) Q (19-23).
- **Section 7:** Questions about Early Mobility (Three MCQs) Q (24-26).
- **Section 8:** Questions about Family Engagement (Two MCQs) Q (27-28).

❖ **The scoring system:**

- The total score of patients' knowledge assessment was categorized as follows:
- Satisfactory for a total grade $\geq 85\%$ of the maximum score [24-28].
- Unsatisfactory level for a total grade is $< 85\%$ of the maximum score less than 23 degree.

Tool (II):• **An observational checklist (Appendix II):**

It was developed and filled by the investigator to assess nurses' practices during implementation of care bundle for critically ill patients. It included the following items: Assess nurses' practice during Pain assessment for conscious patients using Numerical Rating Scale (NRS), Pain assessment for unconscious patients using Behavioural Pain Scale (BPS), Both Spontaneous Awakening and Breathing Trials for ventilated patients using Spontaneous Awakening Trials (SAT) and Spontaneous Breathing Trials (SBT) protocol, Choice of analgesics using Richmond Agitation Sedation Scale (RASS), Delirium assessment using (Confusion Assessment Method-ICU) CAM-ICU, Early Mobilization for conscious patients and unconscious patients, and Family Engagement in caring with patients during their stay in ICU. The checklist consisted of 110 item, and were divided into eight sections as follow:

- **Section 1:** Assessment, Prevention, and management of pain.
 - a. Assessment of pain for conscious patients using BPS (9 steps).
 - b. Assessment of pain for unconscious patients USING NPS (8 steps).
- **Section 2:** Both Spontaneous Awakening Trial (7 steps) and Breathing Trials (10 steps).
- **Section 3:** Choice of sedation and analgesia using RASS (6 steps).
- **Section 4:** Delirium assessment using CAM-ICU algorithm (25 step).

- **Section 5:** Early mobility
 - a. Using passive range of motion exercise for unconscious patients (20 step).
 - b. Early mobility for conscious patients (12 step).
- **Section 6:** Family Engagement (13 step).

❖ **The scoring system:**

- In relation to nurses' practices, each step was scored as not done "0" and "1" for done correctly.
- Satisfactory for a total grade $\geq 85\%$ of the maximum score [93 degree out of 110 degree].
- Unsatisfactory for a total grade $<85\%$ of the maximum score less than 93 degree.

❖ **The scoring system:**

In relation to nurses' knowledge, each question was scored as "0" for incorrect and "1" for correct answer

In relation to nurses' practices, each step was scored as not done "0" and "1" for done correctly.

Operational design:

It includes the preparatory phase, content validity, pilot study and field work.

A. Preparatory phase:

This phase was conducted through reviewing of the related literature, different studies related to the present study and theoretical knowledge of various aspects of the topic using books, articles, the internet, periodical and magazines to develop the study tools for data collection.

B. Face and Content Validity:

- Face validity aimed at inspecting the items to determine whether on face of it the tool measures what it supposed to measure.
- Content validity was conducted to determine whether the tools cover the aim, test its appropriateness, relevance, correction and clearance through a jury of (7) experts (1) professors, (3) Assistant professors, (2) lecturers and (1) ICU Doctor) of Medical Surgical Nursing from the Faculty of Nursing, Ain Shams University critical care nursing. Their opinions were elicited regarding the

tools format layout, consistency and scoring system.

C. Reliability

Testing reliability of proposed tools was done statistically by alpha Cronbach test for the following:

Questionnaire sheet = 0.82

Observational checklist = 0.78.

D. Pilot study:

It was applied on 10% of the subjects to test the applicability and clarity of the tools, as well as to estimate the time needed to fill in the tools. Necessary modifications were done for the used tools and nurses included in the pilot study were excluded from the sample group.

E. Field work:

The collection of data of the current study lasted over a period of 3 months; starting in January 2021 and ending in March 2021, through the following phases:

- The purpose and nature of the study were explained to gain their acceptance and support.
- The investigator obtained oral consents from nurses who accepted to share in the study.
- The investigator visited the selected settings during the morning and the afternoon shifts (9.00 am to 3.00 pm).
- The involved 80 nurse were informed individually about the purpose and nature of the study.
- The data collected by the investigator 3 days/per week morning and afternoon shifts.
- The average number of nurses who are assessed by the investigator was two to three nurses per day.
- Observational checklist took about 1-1.30 hour and practice during their routine with patients and questionnaire took 30-40 minutes during their free

III- Administrative design

Before starting data collection, an official letter was issued from the Faculty of Nursing, Ain Shams University to the director of medical ICU to obtain their approval and assistance in conducting the study. Purpose of

the study was explained to the head nurse of the departments of the hospital under the study.

Ethical consideration:

All ethical issues were taken into consideration during all phases of the study. The ethical research considerations in this study included the following:

- Ethical approval was obtained from the Scientific Ethical Committee of Ain Shams University.
- An informed consent was obtained from nurses to participate in the study.
- The investigator was maintained the confidentiality and anonymity of the subjects.
- The nurse had the right to withdraw from the study at any time without giving any reason. Ethics, values, culture and beliefs were respected.

IV. Statistical design:

The collected data were organized, categorized, tabulated and analyzed using the Statistical Package for Social Sciences (SPSS 26).

Table (1): Distribution of nurses' knowledge level regarding care bundle for critically ill patients (N=80).

Item	Unsatisfactory		Satisfactory	
	N°	%	N°	%
a-Assessment, prevention and management of pain	40	50.0	40	50.0
b- Both Spontaneous Awakening Trials and spontaneous breathing trials	46	57.5	34	42.5
c- Choice of analgesics and sedatives	47	58.75	33	41.25
d- Assessment, prevention and management of delirium	52	65.0	28	35.0
e- Early movement	68	85.0	12	15.0

Results:

Table (1): reveals that 50% of the studied nurses had satisfactory level of knowledge regarding assessment, prevention and management of pain. 57.5% had unsatisfactory level of knowledge regarding Both Spontaneous Awakening Trials and spontaneous breathing trials, 58.75% had unsatisfactory level of knowledge regarding choice of analgesics and sedatives, 65% had unsatisfactory level of knowledge regarding assessment, prevention and management of delirium, and 85% of them had unsatisfactory level of knowledge regarding early movement respectively.

Table (2): clarifies that 33.7% of the studied nurses had satisfactory level of practice regarding assessment of pain for conscious patients using numerical rating scale, 93.7% had unsatisfactory level of practice regarding Using SAT and SBT protocol, RASS, and CAM-ICU algorithm. Moreover, 78.75% of them had unsatisfactory level of practice regarding early mobility for unconscious patients, 73.75% had unsatisfactory level of practice regarding range of motion exercise, and 72.5% of them had unsatisfactory level of practice regarding family engagement and empowerment.

Table (2): Distribution of nurses' level of practice regarding bundle care for critically ill patient (N=80).

Item	Unsatisfactory		Satisfactory	
	N°	%	N°	%
Assessment of Pain for conscious patients using numerical rating scale	53	66.3	27	33.7
Assessment of pain for unconscious patients using behavioral pain scale	70	87.5	10	12.5
Using spontaneous awakening trial and breathing trial protocol	75	93.7	5	6.3
Richmond agitation sedation scale (RASS)	75	93.7	5	6.3
Using Confusion Assessment Method-ICU algorithm	75	93.7	5	6.3
Early mobility for unconscious patients	63	78.75	17	21.25
Early mobility for conscious patients	59	73.75	21	26.25
Family engagement and empowerment	58	72.5	22	27.5

Discussion

Regarding Knowledge of critical bundle the current study had revealed that near to three quarters of the studied nurses had satisfactory level of knowledge regarding definition of care bundle. And about two thirds of them had satisfactory knowledge regarding components of care bundle. This is may be due to that more than half of the studied nurses are highly educated, and freshly graduated.

This result in agreement with *Pinto & Biancofiore, (2016)* who studied "The ABCDEF bundle: A survey of nurses' knowledge and attitudes in the intensive care units of a national teaching hospital in Italy" and reported that only the 41.6% of the respondents declared to be aware of the bundle. *Liang et al., (2021)* who stated that almost 50% of the involved ICU nurses were unaware of the ABCDEF care bundle.

Also, in the current study showed that half of the studied nurses had unsatisfactory level of knowledge regarding assessment, prevention and management of pain. This may be due to that there was no guidance for using the scale.

This finding in agreement with *Ayenew et al., (2021)* in a study titled "Nurses' knowledge, practice, and associated factors of pain assessment in critically ill adult patients at public hospitals, Addis Ababa, Ethiopia" who found that 16% of nurses had adequate knowledge on pain assessment in critically ill patients. Also, *Alkhatib et al., (2020)* in a study entitled Pain management knowledge and

attitudes of healthcare professionals in primary medical centers" who reported that healthcare professionals have a low level of knowledge and negative attitudes toward pain management.

Regarding knowledge about SAT and SBT more than half of studied nurses had satisfactory level of knowledge. This may be due to that it's the doctors role to perform SAT and SBT.

Also, in the current study near to two thirds of nurses had unsatisfactory knowledge about Choice of analgesics and sedatives, more than two thirds had satisfactory level about scales used to evaluate sedatives, and the properties of the ideal sedative. This may be due to that they are familiar with the medication used in ICU.

This result is in disagreement with *Kahsay & Pitkajarvi, (2019)* in a study entitled "Emergency nurses knowledge, attitude and perceived barriers regarding pain Management in Resource-Limited Settings: cross-sectional study" and found that the emergency nurses' knowledge and attitude regarding pain management were poor.

Also, This result is not in agreement with *Bakhru et al., (2014)* in a study titled "An International Survey of Early Mobilization Practices " reported that there were a lack of knowledge about levels of awareness of sedated patients, and *Ortiz et al., (2015)* a study entitled "Nurses' and Nursing Students' Knowledge and Attitudes regarding Pediatric Pain " who reported that many participants had the wrong idea or knowledge that several NSAIDs such as indomethacin, ketorolac, and metamizol are opioids.

Considering knowledge of studied nurses about Assessment, prevention and management of delirium, this study stated that about two third of the study group had unsatisfactory knowledge regarding management of delirium in critical patients. This is may be due to that there was no identified delirium management protocol.

This finding are in agreement with *Ribeiro et al (2015)*, about the " Knowledge of nurses about delirium in critical patients: collective subject discourse " and reported that came out of this study, a lack of knowledge from intensive care nurses was noticed, and *Hare et al., (2008)* "A questionnaire to determine nurses' knowledge of delirium and its risk factors" who found that nurses' knowledge of delirium was generally inadequate.

Also, this study in the same line with *Christensen, (2014)* his study about "An exploratory study of staff nurses' knowledge of delirium in the medical ICU: An Asian perspective" who found that the ICU nurses demonstrated limited knowledge of the signs and symptoms of delirium.

Nurses must be aware of the need to improve their practices through training on the topic. Being aware that delirium is a serious issue and that it may increase mortality, among other complications, makes it possible to implement effective actions for early prevention .that cognitive assessment in general and delirium in particular be incorporated into nursing education.

The current study illustrates that the majority of studied nurses had unsatisfactory level of knowledge regarding early mobility and exercise .This may be due to lack of education training programs and resources that provide them about importance of early mobility and exercise for critically ill patients, and the nurses always overloaded with many tasks inside ICU.

This finding in agreement with *Mary et al., (2018)* about the "Improving Nurses Knowledge and Attitude regarding Early Mobilization of Post-Operative Patients" revealed that that the knowledge of surgical nurses in pre-survey section needs to modify

and enhanced their knowledge about early mobilization in post-operative patients.

This finding in disagreement with *Gilson, (2019)* in a study title "Promoting early mobility of patients in the intensive care unit" which showed that nurses' knowledge improvement in perceptions of knowledge of Early mobility from 47% before education to 88% after education.

As regards to studied nurses` knowledge about family engagement and empowerment, the finding of this study revealed that half of the studied nurses had unsatisfactory level of knowledge regarding tangible family engagement and empowerment. This may be due to ICU restrictions and decreased numbers of visiting hours, and nurses had not considered family members as co-operating partners.

This result is not in agreement with *Abd El Wareth and Elcokany, (2019)* in a study entitled "Perception of Intensive Care Unit Nurses toward Family Engagement in Patients' Care" who found that patients' hygiene is the top reported aspect of engagement followed by oral feeding, distraction activities and assisting with ambulation. Also, *Chen et al., (2021)* who reported that a critical care nurse, and family members performing early mobilization twice daily during family visits. The clinical outcomes of patients were improved by a multidisciplinary team including the patient's family.

From the investigator point of view, ABCDEF bundle is a recent medical terminology to health care provider and even if nurses have a part of knowledge, each part of ABCDEF bundle is applied separately from each other.

The current study revealed that two third of the studied nurses had unsatisfactory level of practice regarding pain assessment for conscious patients using NRS. And the majority of them had unsatisfactory level of practice regarding pain assessment using BPS. This is may be due to staff shortage and workload and they didn't have enough time to complete patient assessment.

This result in agreement with *Alzghoul and Abdullah, (2016)*, in a study entitled "Pain management practices by nurses: an application of the knowledge, attitude and practices (KAP) model" who found that the nurses tended to have a moderate level of pain management practices.

Also, this result in disagreement with *Alnajjar et al., (2021)* in a study entitled " Pain Assessment and Management in Intensive Care Unit: Nurses' Practices, Perceived Influencing Factors, and Educational Needs" who reported that 60% used pain assessment tools for patients able to report pain and 50% for those who unable to report pain , and *Liu et al., (2021)* a study titled "ABCDEF Bundle and Supportive ICU Practices for Patients With Coronavirus Disease 2019 Infection: An International Point Prevalence Study" who found that most nurses used The Numerical Rating Scale, Critical-care Pain Observation Tool, and Behavioral Pain Scale were used as pain-assessment tools.

From the investigator point of view, critically ill patients cannot describe their pain level correctly for conscious patients, and comatose patients did not complain. So, the nurses sometimes did not depend on the scales that evaluate pain level.

Concerning nurses' practice regarding SAT and SBT, the current study revealed that most of the studied nurses had unsatisfactory practices. This is may be due to that application of such protocols not available in ICU.

This result in agreement with *Liu et al., (2021)* who found that both spontaneous awakening and breathing trials implemented for only 28% of the patients, and *Miller et al., (2015)* a study titled "ABCDE, but in that order? A cross-sectional survey of Michigan intensive care unit sedation, delirium, and early mobility practices" reported that only 12% of the studied nurses implemented the SAT protocol.

This result in disagreement with *Morandi et al., (2017)* in a study entitled "Worldwide ABCDEF Assessing Pain, Both Spontaneous Awakening and Breathing Trials, Choice of Drugs, Delirium monitoring/management, Early exercise/mobility, and Family Empowerment Survey" who stated that SATs and SBTs are performed in 66%

and 67%. And *Miller et al., (2013)* in a study entitled " Diverse attitudes to and understandings of Spontaneous Awakening Trials (SAT): results from a statewide quality improvement collaborative " who reported that less than half of respondents reported regular SAT use.

The current study revealed that most of studied nurses had unsatisfactory level of practice concerning Richmond RASS. This is may be due to that the studied nurses had tasks limit and inadequate communication between nurses and physicians.

This result in disagreement with *Liu et al., (2021)* who reported that the Richmond Agitation-Sedation Scale was used with 52% with sedated patients. Also, *Morandi et al., (2017)* stated that Sedation scale was used in 89% of ICUs.

Regarding assessment, prevention and management of delirium this study illustrated that most of studied nurses had unsatisfactory level of practice in their ICU. This is may be due to that they not identify, and prevent the first stages of delirium, they only identify hyperactive delirium.

This consistent with *Ely et al., (2004)* in a study entitled "Delirium as a predictor of mortality in mechanically ventilated patients in the intensive care unit" who found that only 16% of surveyed critical care professionals used a specific tool for delirium monitoring. *Huang et al., (2021)* his research about "Implementation of the awakening and breathing trials, choice of drugs, delirium management, and early exercise/mobility bundle in the pediatric intensive care unit of tertiary hospitals in southwestern China: a cross-sectional survey" reported that A total of 80.4% of healthcare professionals never performed screening of delirium.

Also, *Kudchadkar et al., (2014)* in his study entitled "Sedation, sleep promotion, and delirium screening practices in the care of mechanically ventilated children: a wake-up call for the pediatric critical care community " found that only 2% of healthcare professionals routinely conducted screening of delirium twice a day. *Lemiengre et al., (2006)* in a study entitled" Detection of delirium by bedside

nurses using the confusion assessment method" who found that bedside nurses had difficulties recognizing the features of acute onset, fluctuation, and altered level of consciousness.

But the result is not in agreement with *Morandi et al., (2017)* found that Delirium monitoring was implemented in 70% of ICUs, but only 42% used a validated delirium tool.

As regard of nurses' level of practice regarding early mobility, in the current study illustrates that more than three quarters and about three quarters of studied nurses had unsatisfactory level for performing exercise for conscious and unconscious patients. This defect of practice may be due to shortage of nursing staff.

This result in the same line with *Morandi et al., (2017)* who reported that 69% had no mobility team and 79% used no formal mobility scale and *Liu et al., (2021)* who found that only 4% of nurses perform early mobility and exercise.

This result is not in agreement with *Miller et al., (2015)* who found that 36% of nurses not having early mobility as an active goal in their units.

About investigator point of view mobility intervention when done correctly lead to fewer falls, ventilator-associated events, pressure ulcers, fewer delirium days, lower sedation levels, and improved functional independence.

Also, in the current study about three quarters of the studied nurses had unsatisfactory level of practice regarding family engagement. This is may be due to infection control measures and policies that prevent entrance of relatives inside ICU.

This finding in agreement with *Liu et al., (2021)* which found that family engagement and empowerment implemented by 16% of nurses. *Chen et al., (2021)* who reported that a critical care nurse, and family members performing early mobilization twice daily during family visits and with *Morandi et al., (2017)* who found that family members were actively involved in 67% of ICUs.

The investigator point of view family members must be engaged in the plan of care and implementation of any services to their patients.

Considering Nurses' practice about Care bundle for critically ill patients, The present study revealed that more than three quarters of the studied nurses had unsatisfactory level of practice regarding care bundle for critically ill patients .This may be due to lack of decision making in using protocol of care in ICU and nurses only apply doctors' orders and no in-service training courses about care bundle for critically ill patients.

This result in agreement with *Boehm et al., (2017)* his study entitled Perceptions of Workload Burden and Adherence to ABCDE Bundle Among Intensive Care Providers showed that, for each unit, the compliance of the ABCDE bundle was reduced by 53% as the.

This result is not in agreement with *Huang et al., (2021)* who stated that the overall awareness rate of the ABCDE bundle was 53.7%. The awareness rate of the ABCDE bundle was 56.4% in Sichuan, 47.4% in Guizhou, and 55.8% in Yunnan.

From the investigator point of view, The ABCDEF bundle represents one method of approaching the organizational changes that create a culture shift in the treatment of ICU patients. The multifold potential benefits of these recommended strategies outweigh minimal risks of costs and coordination. Ultimately, the ABCDEF bundle is one path to well-rounded patient care and optimal resource utilization resulting in more interactive ICU patients with better pain control, who can safely participate with their families and healthcare providers in higher-order physical and cognitive activities at the earliest point in their critical illness.

Conclusion

Based on the findings of this study it can be concluded that the present study reveals that about three quarters of the studied nurses had an unsatisfactory total level of knowledge, and more than two third of them had unsatisfactory practices regarding the ABCDEF bundle for critically ill patients. There is a statistically

significant relationship between total satisfactory level of knowledge and practices regarding the use of the (ABCDE) bundle for critically ill patients.

Recommendations

On the light of current study, the following recommendations are suggested:

- Establish periodical in-services training program to improve nurses' performance regarding implementation of care bundle for critically ill patients.
- Develop procedure book for nurses regarding implementation of care bundle for critically ill patients especially for newly nurses' staff.
- There is a need to establish policies, procedures, and protocols for family engagement in ICUs. An assessment tool to determine family willingness to be actively participating in their patients' care and the aspects of care they can be engaged in should be available.
- Future researches are recommended to examine factors affecting on the implementation of care bundle for critically ill patients.
- The study should be replicated on large probability samples in order to generalize the results.

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