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Comparison of Pain Assessment Tools for Non-verbal Adult Critical Care Patients; A Systematic Review and Meta-analysis

Sözel İletişim Kuramayan Yetişkin Yoğun Bakım Hastalarında Kullanılan Ağrı Ölçeklerinin Karşılaştırılması: Sistematik Bir Literatür İncelemesi

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Abstract

Aim: The study aimed to compare the evidence regarding the Behavioral Pain Scale, the Critical Care Pain Observation Tool, and the Nonverbal Pain Scale, which are widely used in nonverbal adult critically ill patients.

Methods: This systematic review conducted searching databases; MEDLINE, OVID, Google Scholar, Science Direct, Scopus and PubMed from 2010 to 2024. In the study where the mnemonic PICOS method was used to define the eligibility criteria, a total of 224 studies were examined and 14 studies were found to meet the eligibility criteria. The reviewed studies were evaluated with compatibility and usability classifications.

Findings: Research has verified that the Behavioral Pain Scale, the Critical Care Pain Observation Tool, and the Nonverbal Pain Scale are legitimate and reliable scales for assessing pain in patients who cannot communicate verbally. Pain assessment tools were generally similar in terms of compatibility and usability.

Conclusion: The most appropriate scales for hemodynamically impaired critical care patients were found to be the Behavioral Pain Scale and the Critical Care Pain Observation Tool. Since there are only two studies comparing NVPS with BPS and CPOT, it is recommended that more evidence-based studies should be conducted with NVPS and pain should be assessed together with sedation for effective pain management.

Keywords: Critically ill, intensive care, nonverbal communication, pain assessment

Öz

Amaç: Bu çalışmanın amacı, sözel iletişim kuramayan yetişkin yoğun bakım hastalarında yaygın olarak kullanılan Davranışsal Ağrı Ölçeğini, Kritik Bakım Ağrı Gözlem Aracı'nı ve Sözel Olmayan Ağrı Ölçeği'ni kullanan, kanıta dayalı çalışmaların sonuçlarını karşılaştırmaktır.

Yöntemler: Bu araştırma metodolojik bir sistematik derlemedir. Çalışmada, MEDLINE, OVID, Google Scholar, Science Direct, Scopus ve PubMed veri tabanlarında 2010-2024 arasındaki çalışmalar kullanıldı. Uygunluk kriterlerini tanımlamak için anımsatıcı PICOS yönteminden yararlanılan çalışmada, toplam 224 çalışma incelenmiş olup, 14 çalışmanın uygunluk kriterlerini karşıladığı görüldü. İncelenen çalışmalar uyumluluk ve kullanılabilirlik sınıflandırmaları ile değerlendirildi.

Bulgular: Araştırmalar, Davranışsal Ağrı Ölçeği, Kritik Bakım Ağrı Gözlem Aracı ve Sözel Olmayan Ağrı Ölçeğinin sözel olarak iletişim kuramayan hastalarda ağrıyı değerlendirmek için geçerli ve güvenilir ölçekler olduğunu doğruladı. Ağrı değerlendirme araçları, genel olarak uyumluluk ve kullanılabilirlik açısından benzerdi.

Sonuç: Hemodinamisi bozulmuş kritik bakım hastaları için en uygun ölçeklerin; Davranışsal Ağrı Ölçeği ve Kritik Bakım Ağrı Gözlem Aracı olduğu saptandı. NVPS'yi BPS ve CPOT ile karşılaştıran yalnızca iki çalışma olduğundan, NVPS ile daha fazla kanıta dayalı çalışmanın yapılması ve etkili ağrı yönetimi için ağrının sedasyon ile birlikte değerlendirilmesi önerilmektedir.

Anahtar Kelimeler: Ağrı değerlendirmesi, kritik hasta, sözsüz iletişim, yoğun bakım

INTRODUCTION

Patients cared for in the intensive care unit (ICU) may have undergone major surgery and/or have impaired hemodynamics and consciousness. In addition to the current health status of these critically ill patients, diagnostic and therapeutic interventions can cause pain due to tissue damage.[1-5] In literature, patients were found to experience pain at a rate ranging from 50-77%, not only during activity or intervention, but also at rest.[6-8] The critical care patients are exposed to multiple painful procedures, pain must be optimally assessed to be visible.[1,2,9] Although pain is objectively assessed in nonverbal patients, pain is difficult to perceive in nonverbal patients pain due to ventilatory support, altered consciousness, or sedation.[1,8] The American Society for Pain Management Nursing considers critical care patients as a group of patients who may have difficulty reporting pain.[10] Therefore, special strategies and great affords are needed in the pain assessment of critical care patients.

In the current literature, there are various scales that can be used for adult patients treated in the ICU and who are unable to communicate verbally due to mechanical ventilation or impaired consciousness. These scales include behavioral responses such as facial expressions, body movements, and muscle tension during pain. In addition, some observational scales include physiological parameters.[4,8,11,12] Behavioral pain scales commonly used in unconscious or ICU patients in the literature are the Behavioral Pain Scale (BPS), the Critical Pain Observation Tool (CPOT), and the Nonverbal Pain Scale (NVPS).[10,13,14]

Using valid and reliable tools in pain assessment improves the quality of care and patient outcomes with optimal pain management.[3,10] However, physiological parameters along with arterial blood pressure, oxygen saturation, and pulse rate included in a few behavioral pain scales are not robust signs for pain assessment[4,13,15,16] due to the fact that physiological parameters are altered by medical conditions (hypovolemia, sepsis, electrolyte imbalance, etc.), anxiety, drugs and body movements.[15] Comparison of scales from the literature for relevance and usability will promote healthcare professionals in assessing pain. As a matter of fact, although there are many pain rating scales in the literature, healthcare professionals are unaware of the existence and appropriateness of these scales for specific patient groups in the ICU.[17] Recent studies support the need for systematic, quality, and objective pain assessment in the ICU to improve patient clinical outcomes.[4,8,18] Therefore, the availability, relevance, and prevalence of the BPS, CPOT, and NVPS scales, which are widely used among currently available scales, should be assessed in nonverbal patients in the intensive care units.[19, 20] The aim of this study was to compare the results of evidence-based studies commonly used BPS, CPOT, and NVPS in nonverbal critical care adult patients. The following questions were sought in the studies that compared scales used to assess pain in nonverbal patients:

Q1: Has the pain scale been selected considering the patient's condition?

Q2: Was pain assessment performed before and after painful procedures?

Q3: Has sedation score been evaluated in unconscious patients?

Q4: Were correlation analysis employed to assess the study's findings?

Q5: Did the study calculate Cronbach's coefficient α to assess the internal consistency of the scales?

Q6: Has the Kappa coefficient (K) been calculated for inter-rater reliability?

Q7: Were the scales different in terms of compatibility and availability?

Q8: Has the nurse's preference for the scale been tested?

METHODS

Study Design: This systematic review and meta-analysis was guided by the following research question: How appropriate are three behavioral scales, BPS, CPOT and NVPS, for assessing pain in intubated patients admitted to the ICU? PRISMA guidelines were followed in reporting the study.[21]

Inclusion and Exclusion Criteria: The Memorable PICO(S) methodology was employed to establish the inclusion criteria for the study. The mnemonic PICO(S):

P: Adult patients older than 18 years on mechanical ventilation

I: Procedural nursing intervention

C: Behavioral pain scales

O: Utility / Convenience / Prevalence

S: The studies in which two or three of the BPS, CPOT and NVPS tools were compared in nonverbal critical care adult patients were included.

The following exclusion criteria were established: case reports, correspondence, commentary, reviews, theses, overviews, conference abstracts, systematic reviews, validity and reliability studies, and studies using scales other than those mentioned for pain severity assessment. The studies in which two different types of scales (revised or shortened version) were compared were also not included. Patients with advanced neuromuscular disease or paralyzed conscious patients were also excluded from the study.

Data Sources: MEDLINE, OVID, Google Scholar, Science Direct, Scopus and PubMed databases were used from 2010 to 2024 (April) in this study.

Search Strategy: Based on the research questions, the search strategy consists of four keywords. Keywords were defined using the terms Medical Subject Headings (MeSH). These terms included "pain measurement" AND "mechanical ventilation" AND “unconsciousness” AND “patient”.

In line with the inclusion criteria, the databases were systematically scanned for studies published between December 2022 and April 2024. The process of identifying studies included in the systematic review is illustrated by the PRISMA flowchart (Figure 1).

In analyzing the results obtained from the databases, duplications were identified utilizing the Microsoft Excel program and extracted by the researcher (XX). The titles and abstracts of the acquired studies were assessed by two independent researchers (XX and XX) in accordance with the eligibility criteria previously determined. When there was any uncertainty about the inclusion status of the reviewed study, the study was left to full-text review. Studies that potentially met the eligibility criteria underwent full-text review and thorough examination by the inclusion/exclusion criteria, with inappropriate publications being excluded. Results of the combined meta-analysis were evaluated, studies in doubt of relevance were reviewed with their full text, and the results were discussed again with third party evaluators (XX).

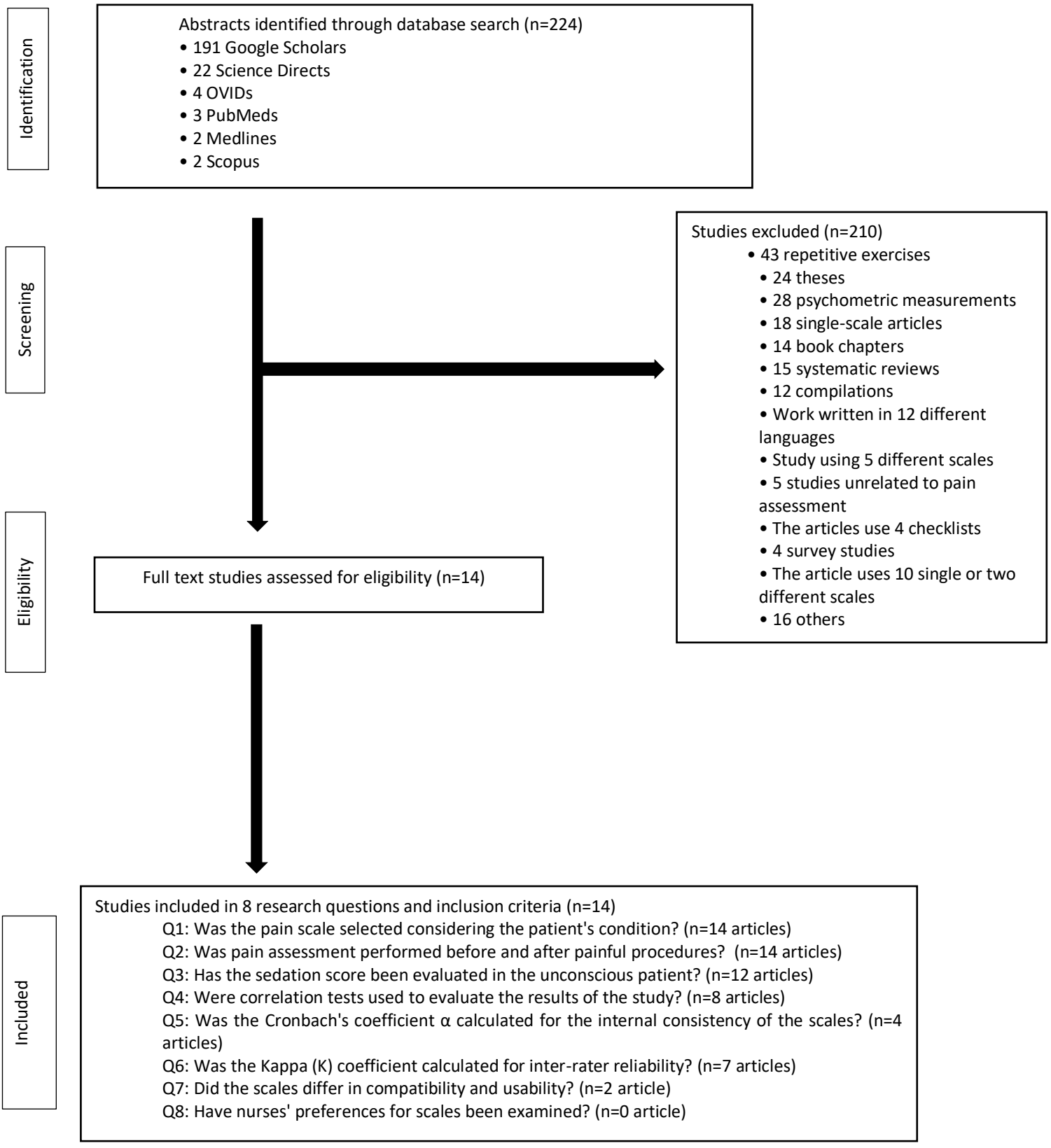
The quality of all article findings included in the research was graded using a method developed by the Joanna Briggs Institute, JBI Levels of Evidence.[22] Two researchers (XX and XX) independently evaluated the quality of each included article. Disputes were resolved through discussion and consensus, and when no agreement could be reached, a solution was provided by consulting a third independent evaluator (XX). Studies that were determined to be of low quality as a result of the evaluation were not excluded, and the findings were interpreted considering this situation.

The reviewers (XX and XX) are not the author of any selected articles. Hence there is no conflict of interest. Efforts were made to minimize the impact of reporting bias by using a comprehensive screening strategy. Not including “gray literature” and “clinical trial records” in the literature review poses a risk in terms of reporting bias in systematic review.

RESULTS

The initial search yielded 224 abstracts. After screening the titles and abstracts and removing duplicate entries, 14 articles in complete textual content have been removed withinside the systematic review. The study selection process was reported using a PRISMA flow diagram (Figure 1).

Figure 1. Study selection results using a PRISMA flow diagram



All studies included in the review were prospective observational studies with a cross-sectional design and were published between January 2010 and April 2024. Studies showed level 3-4 evidences according to SORT criteria. The sample included intubated and mechanically ventilated patients who were not able to self-report pain in the ICUs. The aim of comparing scales was to determine suitability of the scales for pain assessment in critically ill adults unable to self-report. Pain assessment tool was chosen considering the medical condition of the patient in all studies. Patients with progressive neuromuscular disease or paralyzed and conscious patients were also excluded from all studies. All of the articles were assessed pain during both at rest and a painful procedure.[23-36] For data analysis, 8 articles used Spearman or Pearson correlation,[23,24,26,29,34-37]4 articles evaluated internal consistency using by Cronbach's α coefficient,[26,29,31,32] 7 articles measured inter-rater reliability using by weighted kappa (K) coefficient.[23,27,29,30,33,35,37] Pain assessment tools were similar in terms of compatibility and usability, except two studies.[33,35] Severgnini et al.[33] reported that BPS was found to be more specific (91.7%) than CPOT (70.8%), but less sensitive (BPS 62.7% and CPOT 76.5%). The combination of both tools was recommended to improve accuracy pain assessment. Waladani et al.[35] found that CPOT had a better agreement level than NVPS (Kappa= .915 and .381 for CPOT and NVPS, respectively). It was observed that nurses' preferences for the scales were not examined in all studies (Table 1).

Table 1: Overview of the studies included in the systematic review (n=14)

Study, country	Level of Evidence	Objectives	Design, sample	Use of cognitive / sedation scores	Setting	Findings
Bahramnezhad et al., 2023, Iran [37]	*Level 3.e	Pain severity of patients in intensive care was evaluated using BPS and CPOT	The analytical-longitudinal study, mechanically ventilated ICU patients (n=60)	RASS, APACHE II, GKS	Pain intensity was evaluated in patients during suctioning in three positions once daily during the first 3 days of patient hospitalization *-5 min before the procedure, during the procedure, and 20 min after the procedure*	A significant Spearman correlation coefficient of –0.27 was obtained for both scales in the duration of ICU stay ($p < .05$) Spearman test showed a significant negative correlation between pain scales and the duration of mechanical ventilation in ICU patients ($p < .05$).
Wojnar-Gruszka et al., 2022, Poland[34]	*Level 3.e	Analyzed the usefulness of the BPS and CPOT scales in assessing pain among patients with varying degrees of sedation	Observational study, mechanically ventilated and sedated ICU patients (n=81)	RASS	The study was conducted by 3 trained observers 3 times a day *-each measurement at rest, during painful nursing interventions, and after the intervention*	Spearman correlation, between CPOT and BPS scores; Before intervention r= .695 ($p< .001$), During intervention r= .907 ($p< .001$), After intervention r= .622 ($p< .001$). A strong correlation was observed between the outcomes of both scales at every stage of the study. (R = .622– .907).

Nazari et al., 2022, Iran[30]	*Level 3.e	Compare the diagnostic value of CPOT and BPS for pain assessment among unconscious patients	Cross-sectional study, unconscious patients in ICU (n=45)	GCS, RASS	Two experienced nurses trained in the use of pain assessment tools simultaneously used CPOT and BPS independently. *-during a nociceptive procedure (position change) and a nonnociceptive procedure (noninvasive blood pressure measurement)*	The Mann–Whitney U test revealed that the mean scores of CPOT and its facial expression, body movement, and muscle tension dimensions during the nociceptive procedure were significantly greater than that of the nonnociceptive procedure ($p < .05$). The mean scores of BPS and its facial expression and upper limb movement dimensions during the nociceptive procedure were significantly greater than for the nonnociceptive procedure ($p < .05$) Both CPOT and BPS differentiated between nociceptive and nonnociceptive procedures although the effect size for all significant differences between the two procedures was rather small ($p < .05$). The interrater Lin's CCC values during nonnociceptive and nociceptive procedures were, respectively, .67 and .62 for CPOT and .74 and .88 for BPS. The weighted kappa values of CPOT and BPS and their dimensions were from .24 to .70 and from .43 to .82, respectively.
Kontou et al., 2022, Greece[28]	*Level 4.b	Pain was evaluated using BPS and CPOT before, during and after procedures that may be painful in the intensive care unit.	Prospective cohort study, critically ill patients on mechanical ventilation (n=28)	The severity of the disease was assessed by APACHE II and SOFA. However, no cognitive/ sedation tool was identified	The CPOT and BPS were measured by a researcher. *-Before, during and 15 minutes after painful procedure (position changing, endotracheal suction, central venous catheter insertion, physiotherapy, dressing changing and oral care*	The differences in the values of BPS, CPOT and all vital signs except SpO2 between: (a) during and before and (b) during and after the potentially painful stimuli were statistically significant ($p< .001$) Increased pain in ICU patients was successfully assessed by the BPS and CPOT and correlated to worse outcomes, which the administration of extra analgesia might improve.

Ito et al., 2022, Japan[25]	*Level 4.b	Evaluate pain severity in critically ill patients on mechanical ventilation using the BPS and CPOT	Retrospective observational study, Critically ill patients on mechanical ventilation (n=34)	RASS	The BPS and CPOT was evaluated at rest and on turning by a researcher observer who had completed a course at an external medical institution.	The Wilcoxon signed-rank test showed significant elevations in both BPS and CPOT scores (p= .000 for the BPS and CPOT) “on turning” compared with those “at rest”.
Waladani et al., 2021, Indonesia [35]	*Level 4.b	Determine the suitability of pain assessment using CPOT and NVPS in ICU.	Descriptive cross-sectional design, ICU patients (n=50)	Somnolent and stupor consciousness level patients were included in the study however the measurement tool was not specified	The CPOT and NVPS were measured at the time of positioning and at rest. The observers assessing pain were not specified in the study.	Spearman correlation, r= .319 between CPOT and NVPS scores at rest. Spearman correlation, r= .534 between CPOT and NVPS scores at positioning. Weighted Κ coefficients were found .915 (good) and .381 (fair) for CPOT and NVPS, respectively.
Darmanto et al., 2020, Indonesia[23]	*Level 3.e	Validate suitability the use of CPOT and BPS in intubated ICU patients.	Observational analytic with cross sectional design, Intubated patients (n=50)	GCS	One Anesthesiology and Intensive Therapy student was assessed the BPS and CPOT simultaneously during two testing periods — *before and after painful procedure (suctioning)*.	Weighted Κ coefficients were found .435 (moderate) and .248 (fair) before and after painful procedure, respectively. The CPOT and BPS scores showed highly correlated before and after painful procedures (*Pearson correlation r=.644 and r=.610, p< .05*).
Gomarverdi et al., 2019, Iran[24]	*Level 4.b	Compare the severity of pain measured by two scales — BPS and CPOT during invasive and noninvasive procedures.	Cross-sectional design, ICU patients (n=90)	GCS	The BPS and CPOT administered during standard daily care procedures (*body position change, secretion suctioning, mouthwash, and respiratory physiotherapy*) and in resting state. The pain was measured by one trained expert nurse to decrease inter-observer variations.	Spearman correlation range was .85- .97 between the BPS and CPOT in all procedures.

Klein et al., 2018, Brazil[27]	*Level 3.e	Validate of the CPOT and BPS by comparing behavioral scores in critically ill adults.	Prospective cohort study, critically ill patients (n=168)	GCS	Pain was assessed during standardized nociceptive stimulation by pressure algometry (SNSPA) and turning. Two nurses assessed the CPOT and BPS scores independently during four testing times — baseline at rest, after SNSPA with a pressure of 14 kgf/cm^2, during turning, and 15 min after turning.	During SNSPA, weighted Ƙ coefficients (95% CI) of CPOT and BPS scores were .96 (.95-.97) and .96 (.94-.97) (p< .001), respectively. During SNSPA, weighted Ƙ coefficients (95% CI) of CPOT and BPS scores were .96 (.94- .97) and .94 (.92-.95) (p< .001), respectively. Discriminative validation was supported with higher CPOT and BPS scores during SNSPA or turning in comparison to baseline (p< .001).
Rijkenberg et al., 2017, The Netherlands[32]	*Level 3.e	Compare the reliability, internal consistency, and discriminant validation of the BPS and the CPOT in mechanically ventilated patients after cardiac surgery.	Prospective, observational cohort study, Intubated and mechanically ventilated cardiac patients (n=72)	RASS	Two nurses assessed the BPS and CPOT independently during four testing periods — *rest, nonpainful procedure (oral care), rest, and a painful procedure (turning)*. The interrater reliability of the BPS and CPOT was recorded for all analyzed patients, with a total of 1152 assessments (72 patients X 2 raters X 4 different times X 2 scales)	The ICC values of the BPS and CPOT for all assessments were equal: .74 (95% CI .68-.79). During rest, the ICC values of both pain scales were lower than those during oral care and turning. Cronbach α values for the BPS and CPOT of both nurses during turning were .62 (nurse 1), .59 (nurse 2), and .65 (nurse 1), .58 (nurse 2), respectively.

Severgnini et al., 2016, Italy[33]	*Level 3.e	Compare the CPOT and BPS for pain evaluation in both conscious and unconscious patients.	Prospective observational study, critically ill mechanically ventilated patients (n=101)	GCS, SAS	Pain evaluation was performed in conscious and unconscious patients before, during, and 20 min after nursing care. A total of 303 consecutive observations during 3 days after ICU admission.	BPS was found to be more specific (BPS 91.7% and CPOT 70.8%) than CPOT, but less sensitive (BPS 62.7% and CPOT 76.5%). Weighted K coefficients: .69, .64, and .66 before, during, and after nursing care, respectively. BPS showed a statistically significant difference during nursing care (*unconscious Z = −10.68, p < .0001*) and after nursing care (*unconscious Z = −11.15, p < .0001*). Similar results were observed in CPOT (*during: unconscious Z = −10.62, p < .0001; after, unconscious Z = −11.36, p < .0001*).
Rijkenberg et al.,2015, Netherlands[31]	*Level 3.e	Compare the discriminant validation and reliability of the CPOT and BPS in mechanically ventilated patients on a mixed-adult ICU.	Prospective observational cohort study, mechanically ventilated patients (n=68)	RASS	All ICU nurses were trained to use the BPS and CPOT before pain assessment. The interrater reliability of the BPS and CPOT was recorded for all analyzed patients, with a total of 1088 assessments (68 patients X 2 raters X 4 different times X 2 scales).	The ICC values of the BPS: .74 (95% [CI], .68-.79) The ICC values of the CPOT for all assessments: .75 (95% [CI], .69-.79). Cronbach α values for the BPS and CPOT were .70 and .71 during turning, respectively.

Liu et al.,2015, China[29]	*Level 3.e	Compare the reliability and validity of the CPOT and BPS in a sample of Chinese critically ill patients.	Prospective observational study, critically ill patients (n=117)	RSS	Pain was assessed before and during painful procedure — *suctioning and nonpainful routine care procedure (NIBP-noninvasive blood pressure measurement)*. A total of 608 observational pain assessments were conducted at rest before and during the two procedures. First author and one registered nurse with 6 years of ICU experience assessed the CPOT and BPS.	Scores of the CPOT and the BPS during the painful procedures (P1) were both significantly higher than those during the nonpainful procedures (NP1) (*Z= −14.352, p< .001; Z= −14.440, p< .001, respectively*). Cronbach α values for the CPOT and BPS were .795 and .791, respectively. Overall weighted Κ coefficients between the two raters of the CPOT and BPS were .973 and .955, respectively. Spearman correlation scores for the CPOT and BPS were found as r=.951, p< .001.
Juarez et al., 2010, ABD[26]	*Level 3.e	Assess the reliability and validity of BPS and revised NVPS.	Methodological study, mechanically ventilated adult patients (n=200)	MAAS	Pain assessments were measured by two nurses independently during both at rest and after a painful procedure — *patient positioning*. Each patient observation resulted in 4 assessments by each nurse (*BPS at rest, NVPS at rest, BPS after positioning, and NVPS after positioning*) for a total of 8 assessments per patient.	Substantial interrater reliability during positioning (ICC= .68 for the BPS and ICC= .70 for the NVPS). Good internal consistency (Cronbach α= .70 for the BPS and Cronbach α= .75 for the NVPS). Both scales showed a significant change in pain score from baseline compared with after positioning (BPS, Z=-11.125, p= .000; NVPS, Z=-11.425, p= .000). Spearman correlation, r=.69 at rest and r=.77 after positioning for nurse investigator scores between the BPS and NVPS.

*Joanna Briggs Institute, JBI Levels of Evidence
Abbreviations: **GCS**, Glasgow Coma Scale; **MAAS**, Motor Activity Assessment Scale; **RASS**, Richmond Agitation and Sedation Scale; **SAS**, Sedation Agitation Scale; **RSS**, Ramsay Sedation Scale; **APACHE II,** Acute Physiology and Chronic Health Evaluation II; **SOFA**, Sequential Organ Failure Assessment.

DISCUSSION

Behavioral pain scales have been found to have limited use in critical care patients who are unconscious, under severe sedation and analgesic. There is no consensus for pain assessment in this patient group.[10,32] Therefore, the study examined evidence-based study results comparing commonly used pain assessment scales (BPS, CPOT, and NVPS) in nonverbal critical care patients. BPS, CPOT and NVPS are commonly used valid and reliable tools for pain assessment in nonverbal critical care patients.[10-40]

BPS and CPOT were compared in 12 of the 14 studies included in the current study. These study results concluded that both scales had sufficient validity and reliability in nonverbal critical care patients.[22-24,26-28,30-32,34,36] In literature, many studies found a statistically significant difference between pain scores during painful and nonpainful procedures in ICU patients,[40,41] while no one study conducted with patients having different levels of sedation and analgesia were found.[41]

The scales have been scrutinized, revealing their merits and limitations. The current study demonstrated that in a study conducted by Severgnini et al.[33], it was determined that the BPS exhibited higher specificity but lower sensitivity compared to the CPOT. Similar findings were noted in several studies found that BPS was a more applicable tool,[20,30] valid and reliable[19] than CPOT to assess pain in critical care patients. However, Darmanto et al.[23] advocates the use of CPOT in intubated patients with more detail. Rijkenberg et al.[31] stated that CPOT can be preferred in terms of discriminant confirmation in the patient group who has no pain. These discrepancies may be related to pain measurement time points, type of painful and nonpainful procedures, and sample size.

The feasibility of BPS has been accepted, especially in patients who are monitored and sedated on invasive mechanical ventilation (IMV), who are unconscious and unable to report pain. Intubated patients can be assessed for compliance with ventilation. On the other hand, CPOT includes an extracted pronunciation index and can be used in extubated patients unlike BPS.[40] In order to maintain the pain assessment with an identical scale throughout extubation and intubation, CPOT stands out among the behavioral pain scales for its use. When the studies in this review are examined in general, no distinctions in terms of compatibility and availability between BPS and CPOT were identified.

There were only two studies comparing NVPS with BPS and CPOT in our study.[26,35] As a result of this study, no superiority of the NVPS and BPS to each other was determined.[26] However, NVPS should be used with caution in hemodynamically unstable patients because this scale includes behavioral symptoms as well as important parameters such as pain. For example, it may be inaccurate to evaluate tachycardia as a symptom of pain in hypovolemic patients. For this reason, high-evidence studies have shown that vital signs cannot be considered the sole indicator of pain assessment.[15,16] The current study also demonstrated that CPOT had a better agreement level than NVPS in a study by Waladani et al.[35] Similarly, one study found that among eight pain assessment tools, CPOT had the best validity.[42-45] CPOT includes some indicators including facial expression, muscle tension and compliance with ventilator.[24] Research findings proving the superiority of CPOT can be associated with the fact that the scale is more effective in assessing pain severity because it includes the mentioned indicators.

In mechanically ventilated patients, the level of consciousness or sedation should be assessed concomitantly with pain.[44] In the studies we reviewed, the patient's level of consciousness and sedation was evaluated using a scale such as GCS, MAAS, RASS, SAS, RSS. In a study by Faust et al.[45], effective pain management was achieved with low sedation level by using RSS and CPOT together in critical care patients. Similarly, Bardwell et al.[46] prepared a bundle in which CPOT and RSS were used together to manage the extubation process.

BPS, CPOT and NVPS are considered important and useful by healthcare professionals in the assessment of pain in ICUs because they are easy to use and remember.[20,40] In summary, the studies reported that a strong correlation was found between the BPS and CPOT, especially correlation coefficients were higher during painful procedures.[28,33-34,36] For accurate pain assessment and diagnosis, it is recommended to use behavioral pain scales together with sedation scales and to conduct experimental studies.[15,32,35]

CONCLUSION

BPS and CPOT are highlighted as having the strongest evidence for assessing pain in hemodynamically unstable patients. Because of there were only two studies comparing NVPS with BPS and CPOT, more evidence based studies are recommended. Consistent use of these tools can optimize pain management and enhance the patient experience in critical care settings. Additionally, incorporating measures of pain and sedation scores can contribute to more effective pain control strategies.

Ethics Committee Approval: Since there is a document review, ethics committee approval is not required.

Peer-review: Externally peer-reviewed.

Author Contributions: Concept – SE; Design – SE, YYA, PK; Literature review – YYA, PK; Evaluation of results – SE, YYA, PK; Writing the article – SE, YYA, PK

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