Interdisciplinary Journal of Acute Care
Volume 4, July/December 2023, Issue 2, pp.64-76
Journal homepage: www.ijac.lums.ac.ir

Applying Delirium Assessment Instruments in Intensive Care Units: A Narrative Review

Azita Sabzipour[1], Elham Sepahvand[2], Parastou Kordestani-Moghadam[3], Bijhan Kaboudi[4]

[1] USERN office, Department of Nursing and midwifery, Lorestan university of medical sciences, Khorramabad, Iran
[2] School of Nursing and Midwifery, Social Determinants of Health Research Center, Lorestan University of Medical Sciences, Khorramabad, Iran.
[3] Critical Care and Emergency Nursing, Faculty of Nursing & Midwifery, Lorestan University of Medical Sciences, Khorramabad, Iran
[4] Cardiovascular Research Center, Kermanshah University of Medical Sciences, Kermanshah, Iran.

ABSTRACT

Delirium is a prevalent acute-onset neuropsychiatric disorder affecting individuals across all age groups, with its presence in critically ill patients serving as a significant warning sign. This study aimed to review the application of delirium assessment instruments in intensive care units. A narrative literature review was conducted by searching the SID, IRANDOC, PubMed, Scopus, and Web of Science databases using related MeSH and Free Text terms, including "Delirium Scale," "Intensive Care Unit," "Screening," and "Cognitive Disorder." The primary inclusion criteria were full-text published articles in English and Persian between 1990 and 2024. The review identified 56 delirium screening and diagnostic instruments, many of which focus on issues such as sleep disturbances, inattention, acute onset, or fluctuating periods of cognitive changes. These instruments have been psychometrically evaluated in different countries, each exhibiting varying degrees of validity and reliability in diagnosing, screening, and assessing delirium. To enhance the effectiveness of these instruments, it is recommended to validate their psychometric properties across diverse populations in Iran.

Keywords: Cognitive Disorder, Delirium Instrument, Intensive Care Unit, Screening

Introduction

Delirium is one of the most acute and prevalent cognitive disorders, particularly among elderly patients hospitalized in Intensive Care Units (ICUs) [1, 2]. Prior to 1980, various terms, including acute cerebral failure, acute confusional state, acute organic syndrome, postoperative psychosis, central nervous system toxicity, toxic psychosis, ICU psychosis, brain dysfunction, and encephalopathy, were commonly used to describe delirium [3, 4]. As outlined in the fifth edition of the American Psychiatric Association's Diagnostic and Statistical Manual of Mental Disorders (DSM-5), delirium is characterized by an acute onset of consciousness alteration and cognitive disturbances [5]. The frequent psychological symptoms include mood disturbances, perceptual distortions, and behavioral abnormalities, while common neurological signs consist of tremors, asterixis (flapping tremor), nystagmus, motor incoordination, and urinary incontinence [6, 7]. These symptoms typically present in a fluctuating manner, emerging acutely and persisting for several hours to days.

Annually, more than 2.6 million individuals in the US (more than five cases per minute) develop delirium. The prevalence of delirium varies from 19% among postoperative patients to 82% among those who are entirely dependent on mechanical ventilation. The development of delirium is associated with prolonged hospitalization, extended ICU stays, elevated medical and hospitalization expenses, long-term complications such as cognitive impairment, increased admission rates to long-term care facilities, and, ultimately, heightened mortality rates. The primary approach to managing delirium involves identifying and

* *Coresponding Author:* Parastou Kordestani-Moghadam
Faculty of Nursing & Midwifery, Lorestan University of Medical Sciences, Khorramabad, Iran; Email: kparastou@yahoo.com
DOI: 10.22087/ijac.2023.477949.1019

addressing its underlying causes [8-11]. Although the diagnosis of delirium is primarily the physician's responsibility, accurate detection requires substantial clinical expertise and experience. Due to the fluctuating nature of symptoms, ICU nurses, who spend more time at the patient's bedside, are best suited to recognize delirium and notify the treating physician [8]. Given that more than half of delirium cases are preventable, employing validated and reliable assessment instruments improves diagnostic precision, allowing the medical team to administer the most effective treatment [12]. In recent years, a variety of delirium screening instruments have been developed to facilitate the diagnosis of delirium across diverse patient populations, including those in nursing homes, hospital wards, ICUs, and, more recently, emergency departments. In the absence of appropriate diagnostic tools, delirium remains undiagnosed in up to 75% of patients [13, 14]. As with many clinical instruments, there is ongoing debate regarding the efficacy of these tools. With the advancement in understanding delirium and the updates to the Diagnostic and Statistical Manual of Psychiatric Disorders (DSM) by the American Psychiatric Association and the International Classification of Diseases (ICD), these assessment instruments continue to evolve. The selection of an appropriate tool is influenced by several factors, including patient cooperation, the time available for training, and the completion of forms [9, 15-17].

All delirium screening instruments possess unique characteristics, varying in sensitivity, specificity, validity, and reliability, which can be applied across different patient populations depending on patient conditions and hospital settings. Each instrument evaluates and screens different subtypes of delirium, with specific advantages and limitations based on the patient's clinical status. John et al. assessed the validation of delirium assessment instruments and concluded that these instruments differ in their approach to assessing consciousness and the inclusion of a specific cutoff score for delirium diagnosis. It is crucial to ensure that each instrument can effectively evaluate patients with varying levels of consciousness while remaining user-friendly [18].

Furthermore, Devlin et al. examined delirium screening instruments and confirmed the use of various tools in critically ill adults. However, they identified significant differences in the quality and validation of these instruments, their ability to detect different subtypes of delirium, their effectiveness in identifying hypoactive delirium, and their practical application. The prevalence of delirium is influenced by multiple factors, including patient demographics, care settings, study methods, and variations in predisposing events [19].

Therefore, based on the reviewed studies, improving clinical outcomes necessitates preventive measures against delirium, early detection using valid and reliable screening instruments, and timely treatment of underlying causes in patients exhibiting delirium risk symptoms. Familiarity with different delirium screening and diagnostic instruments is a critical first step in accurate diagnosis and optimal patient care. Achieving this objective requires increasing awareness and developing and implementing validated and user-friendly assessment instruments [20]. Accordingly, the present study aimed to introduce and evaluate the application of specialized delirium assessment instruments in the ICU.

Materials and Methods

A narrative literature review was conducted in the Persian databases of SID and IRANDOC. The English databases of PubMed, Scopus, Web of Science (WoS) databases, and Google Scholar motor engine using related MeSH and Free Text words, including Delirium Scale, Intensive Care Unit, Reliability, Validity, Psychometric, Screening, and Cognitive Disorder. The retrieved data and findings were analyzed to fulfill the study objective, which focused on reviewing ICU delirium screening and diagnostic instruments.

This review study included all Persian and English articles addressing delirium diagnosis and screening. The inclusion criteria consisted of peer-reviewed research articles that examined delirium diagnostic instruments in Persian and English with full-text availability, published between 1990 - 2022. The exclusion criteria included studies published in languages other than Persian and English. To ensure a high-quality review, all retrieved articles were assessed, non-relevant studies were removed, and reference lists of selected articles were screened to identify additional relevant studies. Two independent researchers analyzed the content of articles to enhance reliability.

The initial narrative literature search retrieved 134 articles on delirium assessment and screening instruments. After eliminating studies that failed to meet the research objectives, 120 relevant articles were selected for in-depth analysis. A structured content analysis form was then developed to summarize key findings from each article. The extracted data were systematically recorded in a standardized form and were subsequently analyzed and discussed (See Appendix 1).

Results

After reviewing 51 selected studies, the most widely used instruments for delirium screening and severity assessment among nurses and physicians were classified into three main categories: screening, diagnosis, and severity assessment, which are explained below.

The instruments for screening delirium include the Delirium Observation Screening Scale/Delirium Scale, Global Attentiveness Rating, Intensive Care Delirium Screening Checklist, NEECHAM Confusion Scale, Nursing Delirium Screening Scale, Pediatric Anesthesia Emergence Delirium Scale, Clinical Assessment of Confusion—A and B, and CAM.

The diagnostic instruments for delirium are CAM-ICU, CAM, Delirium Rating Scale-revised version, Diagnostic instruments Delirium Symptom Interview, Memorial Delirium Assessment Scale, Pediatrics CAM-ICU, and Saskatoon Delirium Checklist.

The instruments used to assess the severity of delirium include the Delirium Index, Delirium Severity Scale, Delirium-O-Meter, and Memorial Delirium Assessment Scale.

The instruments only used for cognitive function assessment are Mini Mental Status Examination (MMSE), Montreal Cognitive Assessment (MOCA), and Abbreviated Mental Test (AMT).

The instruments for assessing motoric symptoms are the Delirium Motor Checklist, Delirium Motor Symptom Scale, Memorial Delirium Assessment Scale, Motoric Items of Delirium Rating Scale, DRS-R-98, and Richmond Agitation and Sedation Scale (RASS).

Delirium Observation Screening Scale

DOSS is a 25-item scale designed to assist nurses in detecting early symptoms of delirium during routine patient care. The scale was later refined to 16 items, as 13 items are applied based on the presence or absence of symptoms, accompanied by appropriate explanations to assess symptom severity. In comparison, the remaining three items hold diagnostic significance. Delirium severity is rated from 0 (no impairment) to 3 (severe impairment). A score above 15 or a total score exceeding 18 indicates the presence of delirium and a higher severity level of the condition [17].

Nursing Delirium Screening Scale

Nu-DESC is a five-item screening instrument used by a nurse to assess delirium-related symptoms, including inappropriate behavior and communication, hallucinations, and psychomotor retardation, requiring only a few minutes to complete. Each item is scored on a three-point scale (0–2), with a total score ranging from 0 to 10. A score of two serves as the diagnostic cutoff point for delirium. The Nu-DESC is recognized as one of the most sensitive postoperative delirium screening instruments in surgical wards, with a sensitivity of 85.7% and a specificity of 86.8% [19, 21].

NEECHAM Confusion Scale

This tool is an observational bedside assessment tool developed by Tillon and Champagne to evaluate patients' behavioral and cognitive functions. This nine-item scale is categorized into three primary domains, including information processing (attention, task execution, and orientation), behavior (appearance, movement, and speech), and physiological control (vital signs, oxygen saturation, and urinary control). The total score ranges from 0 (minimal responsiveness) to 30 (normal function). A score of 27–30 indicates normal cognitive function, 25-26 suggests possible delirium (a higher risk of delirium despite the absence of confusion), 20-24 signifies mild confusion, and 0-19 reflects confusion. Further, scores below 20 indicate moderate to severe delirium, while scores between 20 - 24 denote mild delirium. A score of 26 or higher confirms the absence of delirium with preserved cognitive function. The assessment process takes approximately 8–10 minutes to complete. However, the scale is not specifically designed for ICU settings and cannot be applied to intubated patients until they are extubated. Additionally, scoring nine items, summing various domains, and interpreting the results can be time-consuming. A notable advantage of NEECHAM is that it requires only a single daily assessment, whereas the DOS scale requires assessments over three consecutive shifts [17, 22].

Delirium Detection Score (DDS)

DDS is an eight-item observational screening tool with a total score of 56, designed to quantify delirium severity, particularly among ICU patients (both intubated and non-intubated). It was developed by Otter et al. as a modified version of the Clinical Institute Withdrawal Assessment for Alcohol. The tool assesses key delirium specificities, including agitation, anxiety, hallucinations, orientation, seizures, tremors, paroxysmal sweating, and sleep-wake cycle disturbances. Depending on symptom severity, each criterion is scored 0, 1, 4, or 7. Despite demonstrating acceptable inter-rater reliability, the tool exhibits relatively low sensitivity (67%) and specificity (75%) [17, 22]. In contrast to other instruments, such as CAM-ICU, although its accuracy is less dependent on patient motivation, it has certain limitations. The modified DDS demonstrates good compatibility with the domains of hyperactive delirium. However, it lacks criteria for identifying patients with hypoactive delirium or cognitive impairment. Further, this instrument can evaluate varying degrees of delirium and serve as a diagnostic scale [18, 23].

Confusion Assessment Method for the Intensive Care Unit (CAM-ICU)

This instrument was developed by Inouye et al., based on the original CAM tool, to assess delirium in intubated patients. The instrument has a 95–100% sensitivity and high internal consistency (0.75–0.95), requiring 1 - 2 minutes for completion and extending to 3 - 5 minutes [24, 25]. However, this instrument does not assess disease severity. The CAM-ICU assesses specific features of delirium using binary (yes/no) responses, indicating the presence or absence of delirium. The evaluated specificities include the acute onset with fluctuating symptoms (determined by the presence or absence of symptoms), inattention or impaired concentration (identified when more than two errors occur in letter recognition tasks), changes in consciousness and awareness level (assessed using the RASS), disorganized and incoherent thought process (evaluated through simple instructions combined with numerical tasks, where more than one error is considered indicative of cognitive impairment). A positive diagnosis of delirium requires the presence of both the first and second specificities and the third or fourth specificity [26]. The first step in utilizing the CAM-ICU instrument is assessing the patient's consciousness level using the standard 10-point RASS. Patients scoring -4 or -5 on the RASS cannot be assessed for delirium, and evaluation using the CAM-ICU instrument should be postponed later [24, 27].

Intensive Care Delirium Screening Checklist (ICDSC)

This observational instrument developed by Bergeron et al. [17] applicable to both intubated and non-intubated patients who are

unresponsive, as well as patients with psychiatric disorders, neurological injuries, dementia, hypoactive delirium, and mild or subsyndromal delirium. Scoring is based on DSM-IV-TR criteria, including the altered level of consciousness, inattention, disorientation, hallucinations/delusions, psychosis, agitation or psychomotor retardation, speech with inappropriate effect, and sleep-wake cycle disturbances. The ICDSC evaluates eight domains of delirium-related symptoms over 8 - 24 hours, using a binary (present/absent) scoring system based on specific clinical signs and symptoms of delirium [9, 28, 29]. A total score greater than 3 indicates the presence of delirium [17]. The first step in ICDSC assessment involves evaluating the patient's consciousness level using five categories (A–E). Patients classified under Category A or B (requiring intense stimulation to respond or being unresponsive) are considered comatose or lethargic, and the assessment is terminated at this stage. Category C includes drowsy patients requiring mild to moderate stimulation to respond, earning one point. Category D represents an alert or sleep state in which patients can be easily aroused from sleep, which is considered normal and does not receive a score. Category E consists of hypervigilance patients receiving one point. The maximum total score is 8, and nurses or physicians collect data at the bedside during routine patient care. The tool demonstrates high sensitivity (99%) and low specificity (64%), leading to a false-positive rate for delirium (36%), which can contribute to underdiagnoses of delirium. Therefore, ICDSC is best suited as a screening instrument rather than a diagnostic one, and psychiatric consultation is recommended in cases of a positive delirium score [17, 18, 23, 30].

Delirium Rating Scale–Revised-98

DRS-R98 is available in multilingual translations and revalidation. The scale consists of two subscales, one for diagnosing delirium and another for assessing its severity [31]. Although the instrument was primarily designed to evaluate delirium symptoms over the past 24 hours, DRS-R98 can also be applied over variable periods, ranging from hours to weeks. Its sensitivity to changes over time makes it suitable for longitudinal research and pharmacological intervention studies [32]. This 16-item scale has a maximum score of 46, ranging from 0 (normal) to 3 (severe impairment). The tool exhibits high reliability, sensitivity, and specificity across neuropsychiatric populations and hospitalized patients. The scale demonstrated high reliability, sensitivity, and specificity among neuropsychiatric and general hospital populations [31, 33]. Each severity item is rated on a four-point scale, reflecting no impairment, mild, moderate, or severe function, respectively. The assessment process, involving direct patient examination based on multi-source data collection (consultation with nurses and caregivers), typically takes 10 - 15 minutes [17, 34]. The severity scale scores range from 0 to 39, with higher scores indicating more severe delirium. A severity score between 8-15 categorizes a patient as having subsyndromal delirium, while a severity scores above 15 or a total scale score of 18 confirms a delirium diagnosis. Compared to the DRS instrument, the DRS-R98 includes an additional item for attention/concentration and another for thought process impairment. The cognitive domain has been replaced by five distinct components: language, orientation, three-dimensional perception, and short-term and long-term memory. The psychomotor behavior item has been transformed into motor agitation and motor retardation, while primary perceptual disturbances and hallucinations have been consolidated into a single item [17, 33]. The DRS-R98 is widely used for delirium diagnosis in mixed neuropsychiatric populations, including dementia, depression, and schizophrenia. It exhibits high reliability, validity, sensitivity, and specificity [32].

Cognitive Test for Delirium (CTD)

CTD is the first specialized diagnostic instrument designed based on the DSM-IV-TR criteria to assess the clinical symptoms of delirium. With 100% sensitivity and 95% specificity, the CTD allows for repeated patient assessments developed for ICU patients. The instrument assesses non-verbal executive

cognitive functions associated with the non-dominant hemisphere of the brain. It evaluates five key domains of delirium symptoms, namely orientation, attention span, memory, comprehension, and alertness, within 10–15 minutes. The CTD effectively differentiates delirium from other neuropsychiatric conditions, including dementia, depression, and schizophrenia [30, 35, 36]. Among the available instruments, CTD, DRS, and DRS-R98 are the only instruments that can distinguish delirium from dementia while assessing a broad range of neuropsychiatric symptoms and multiple cognitive domains [37, 38]. The CTD was initially designed for critically ill patients requiring mechanical ventilation. However, it has been validated for other hospitalized groups, including patients with traumatic brain injury [32]. Each item in the CTD is scored between 0-6, with a maximum score of 30. The test requires patients to follow commands in response to questions. Higher scores indicate better cognitive function, whereas below 19 suggests impaired cognition. [28, 32]. The test advantages include ease of training and administration, rapid completion time, applicability to intubated and non-intubated patients, and usability across all hospital settings. By early detection of delirium, the CTD facilitates timely intervention, thereby reducing hospitalization duration, costs, complications, and ultimately mortality. Research indicated that delirium severity is higher in patients with comorbid dementia than in those with delirium alone, which is reflected in higher DRS-R98 severity scores and lower CTD scores [30, 35, 38].

Confusion Assessment Method (CAM)

CAM is one of the most widely used instruments in the world, employing a simple nine-item system that evaluates acute onset and fluctuating course, attention deficits, disorganized thinking, altered level of consciousness, disorganization, memory impairment, perceptual disturbances, psychomotor agitation/retardation, and altered sleep-wake cycle. Clinical data can be collected through open-ended questions. After conducting a structured interview with the patient, the CAM algorithm, with four sub-algorithms, requires a guide such as the Mini-Mental State Examination (MMSE) [17].

The entire CAM instrument and CAM algorithm take approximately 20 and 5 minutes to complete, respectively. The sensitivity and specificity of each instrument vary considerably depending on experience, training, the type of information available (observations), and accurate cognitive tests. Given the low reliability of CAM in clinical settings, the initial and ongoing training, along with competency validation of the instrument, is strongly recommended [39].

Mini-Mental State Examination (MMSE)

MMSE is a cognitive assessment instrument commonly used to evaluate suspected dementia among elderly individuals. The test assigns one point for each correct answer. Scores are based on various cognitive functions such as orientation, registration, attention and calculation, recall, and language/routine, with the maximum scores of 10, 3, 5, 3, and 9. A score between 24–30 indicates no cognitive impairment, 18–23 denotes mild cognitive impairment, and a score between 0–17 suggests severe cognitive deficits. Although the MMSE is useful for rapid assessments in medical settings, it fails to provide detailed information regarding which specific cognitive domains are impacted [40-42].

Discussion and Conclusion

The established standards recommended repeated assessment of patients by psychiatrists using DSM-IV-TR criteria. However, this approach is impractical for critically ill patients in ICU, exposed to specific conditions and invasive monitoring, including intubation, sedatives, mechanical ventilation, isolation. [3, 26]. These patients require continuous 24-hour monitoring, and conducting classical psychiatric interviews for them is both complex imp,ractical, and time-consuming[33]. Therefore, using objective, reliable, and repeatable diagnostic instruments with good inter-rater agreement, supported by

trained healthcare professionals familiar with delirium symptoms, can facilitate the rapid and systematic diagnosis of delirium. According to guidelines and evidence, patients should be evaluated and monitored regularly, at least once per shift, using validated instruments.

Limitations of the study

One of the limitations of the present study was the lack of access to all relevant articles on delirium screening and diagnosis due to sanctions. The objective of evaluating patients for delirium was to find existing evidence regarding the impact of interventions for preventing ICU delirium, reducing the duration of coma/delirium, lowering treatment costs, decreasing ICU length of stay, and reducing hospital mortality. Since nurses are present at the patient's bedside most of the day and delirium often fluctuates, they can play a crucial role in the timely detection and identification of delirium symptoms.

Acknowledgments

This study was part of a Master's thesis for validating one of the diagnostic tools for delirium. We would like to express our sincere gratitude to the Research Deputy of Lorestan University of Medical Sciences for their financial support of this project.

References

1. Leslie DL, Inouye SK. The importance of delirium: economic and societal costs. Journal of the American Geriatrics Society. 2011 Nov;59:S241-3.

2. Inouye SK, Westendorp RG, Saczynski JS. Delirium in elderly people. The lancet. 2014 Mar 8;383(9920):911-22.

3. Gill CS, Dailey SF, Karl SL, Minton CA. DSM-5-TR Learning Companion for Counselors. John Wiley & Sons; 2024 Mar 20.

4. Spitzer RL. Values and assumptions in the development of DSM-III and DSM-III-R: an insider's perspective and a belated response to Sadler, Hulgus, and Agich's" On values in recent American psychiatric classification". The Journal of nervous and mental disease. 2001 Jun 1;189(6):351-9.

5. Slooter AJ, Van De Leur RR, Zaal IJ. Delirium in critically ill patients. Handbook of clinical neurology. 2017 Jan 1;141:449-66.

6. Sadock BJ. Kaplan & Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry. Philadelphia, PA: Wolters Kluwer; 2015.

7. European Delirium Association daniel. davis@ ucl. ac. uk, American Delirium Society. The DSM-5 criteria, level of arousal and delirium diagnosis: inclusiveness is safer. BMC medicine. 2014 Dec;12:1-4.

8. Torshizi M, Hekmatpou D, Sharbafchi MR, Afshar H, Ayati MM. Reliability and validity of the persian version of intensive care delirium screening checklist in detection of delirium in intensive care units. Journal of Isfahan Medical School. 2016 Jul 22;34(383):536-46.

9. Hart RP, Levenson JL, Sessler CN, Best AM, Schwartz SM, Rutherford LE. Validation of a cognitive test for delirium in medical ICU patients. Psychosomatics. 1996 Nov 1;37(6):533-46.

10. Sadock BJ, Sadock VA. Kaplan & Sadock's concise textbook of clinical psychiatry. Lippincott Williams & Wilkins; 2008.

11. Jackson P, Khan A. Delirium in critically ill patients. Critical care clinics. 2015 Jul 1;31(3):589-603.

12. Barr J, Fraser GL, Puntillo K, Ely EW, Gélinas C, Dasta JF, Davidson JE, Devlin JW, Kress JP, Joffe AM, Coursin DB. Clinical practice guidelines for the management of pain, agitation, and delirium in adult patients in the intensive care unit: executive summary. American Journal of Health-System Pharmacy. 2013 Jan 1;70(1):53-8.

13. Spronk PE, Riekerk B, Hofhuis J, Rommes JH. Occurrence of delirium is severely underestimated in the ICU during daily care. Intensive care medicine. 2009 Jul;35:1276-80.

14. Van Eijk MM, Van Marum RJ, Klijn IA, De Wit N, Kesecioglu J, Slooter AJ. Comparison of delirium assessment tools in a mixed intensive care unit. Critical care medicine. 2009 Jun 1;37(6):1881-5.

15. Blazer DG, van Nieuwenhuizen AO. Evidence for the diagnostic criteria of delirium: an update. Current Opinion in Psychiatry. 2012 May 1;25(3):239-43.

16. ICD W. Classification of mental and behavioural disorders. Clinical descriptions and diagnostic guidelines Geneve: World Health Organization. 1992.

17. Grover S, Kate N. Assessment scales for delirium: A review. World journal of psychiatry. 2012 Aug 22;2(4):58.

18. Waters C. Delirium in the intensive care unit: a narrative review of published assessment tools and the relationship between ICU delirium and clinical outcomes. Journal of the Intensive Care Society. 2008 Apr;9(1):46-50.

19. Franco JG, Trzepacz PT, Sepúlveda E, Ocampo MV, Velásquez-Tirado JD, Zaraza DR, Restrepo C, Giraldo AM, Serna PA, Zuluaga A, López C. Delirium diagnostic tool-provisional (DDT-Pro) scores in delirium, subsyndromal delirium and no delirium. General Hospital Psychiatry. 2020 Nov 1;67:107-14.

20. Faria RD, Moreno RP. Delirium in intensive care: an under-diagnosed reality. Revista Brasileira de terapia intensiva. 2013;25:137-47.

21. Poulsen LM, Estrup S, Mortensen CB, Andersen-Ranberg NC. Delirium in intensive care. Current anesthesiology reports. 2021 Sep 3:1-8.

22. van den Boogaard MH, Pickkers P, Schoonhoven L. Assessment of delirium in ICU patients; a literature review. Netherlands J Crit Care. 2010 Feb 1;14(1):10-5.

23. Godfrey A, Conway R, Leonard M, Meagher D, Ólaighin G. A classification system for delirium subtyping with the use of a

commercial mobility monitor. Gait & posture. 2009 Aug 1;30(2):245-52.

24. Grover S, Avasthi A. Clinical practice guidelines for management of delirium in elderly. Indian journal of psychiatry. 2018 Feb 1;60(Suppl 3):S329-40.

25. Gusmao-Flores D, Salluh JI, Chalhub RÁ, Quarantini LC. The confusion assessment method for the intensive care unit (CAM-ICU) and intensive care delirium screening checklist (ICDSC) for the diagnosis of delirium: a systematic review and meta-analysis of clinical studies. Critical care. 2012 Aug;16:1-0.

26. Boettger S, Garcia Nuñez D, Meyer R, Richter A, Rudiger A, Schubert M, Jenewein J. Screening for delirium with the Intensive Care Delirium Screening Checklist (ICDSC): a re-evaluation of the threshold for delirium. Swiss medical weekly. 2018;148:w14597.

27. Detroyer E. Nursing aspects of delirium prevention and detection in hospitalized patients..

28. Coyer FM, Wheeler MK, Wetzig SM, Couchman BA. Nursing care of the mechanically ventilated patient: What does the evidence say?: Part two. Intensive and critical care nursing. 2007 Apr 1;23(2):71-80.

29Gusmao-Flores D, Salluh JI, Dal-Pizzol F, Ritter C, Tomasi CD, Lima MA, Santana LR, Lins RM, Lemos PP, Serpa GV, Oliveira J. The validity and reliability of the Portuguese versions of three tools used to diagnose delirium in critically ill patients. Clinics. 2011;66:1917-22.

30. Devlin JW, Fong JJ, Fraser GL, Riker RR. Delirium assessment in the critically ill. Intensive care medicine. 2007 Jun;33:929-40.

31. Franco JG, Ocampo MV, Velásquez-Tirado JD, Zaraza DR, Giraldo AM, Serna PA, López C, Zuluaga A, Sepúlveda E, Kean J, Trzepacz PT. Validation of the Delirium Diagnostic Tool-Provisional (DDT-Pro) with medical inpatients and comparison with the confusion assessment method algorithm. The Journal of neuropsychiatry and clinical neurosciences. 2020 Jul;32(3):213-26.

32. Meagher D, Adamis D, Trzepacz P, Leonard M. Features of subsyndromal and persistent delirium. The British Journal of Psychiatry. 2012 Jan;200(1):37-44.

33. Meagher DJ, O'Connell H, Leonard M, Williams O, Awan F, Exton C, Tenorio M, O'Connor M, Dunne CP, Cullen W, McFarland J. Comparison of novel tools with traditional cognitive tests in detecting delirium in elderly medical patients. World Journal of Psychiatry. 2020 Apr 19;10(4):46.

34. Kean J, Trzepacz PT, Murray LL, Abell M, Trexler L. Initial validation of a brief provisional diagnostic scale for delirium. Brain injury. 2010 Sep 1;24(10):1222-30.

35. Delp S, Mei W, Spies CD, Neuner B, Aldecoa C, Bettelli G, Bilotta F, Sanders RD, Kramer S, Weiss B. Clinical practice in the management of postoperative delirium by Chinese anesthesiologists: a cross-sectional survey designed by the European Society of Anaesthesiology. Journal of International Medical Research. 2020 Jun;48(6):0300060520927207.

36. Trzepacz P. The delirium rating scale-revised-98: Comparison with the delirium rating scale and the cognitive test for delirium (vol 13, pg 229, 2001). Journal of neuropsychiatry and clinical neurosciences.2001;13(3):433.

37. Gupta N, de Jonghe J, Schieveld J, Leonard M, Meagher D. Delirium phenomenology: what can we learn from the symptoms of delirium?. Journal of psychosomatic research. 2008 Sep 1;65(3):215-22.

38. Jabbar F, Leonard M, Meehan K, O'Connor M, Cronin C, Reynolds P, Meaney AM, Meagher D. Neuropsychiatric and cognitive profile of patients with DSM-IV delirium referred to an old age psychiatry consultation-liaison service. International psychogeriatrics. 2011 Sep;23(7):1167-74.

39. Mulkey MA, Roberson DW, Everhart DE, Hardin SR. Choosing the right delirium assessment tool. Journal of Neuroscience Nursing. 2018 Dec 1;50(6):343-8.

40. Sessler CN, Gosnell MS, Grap MJ, Brophy GM, O'Neal PV, Keane KA, Tesoro EP, Elswick R. The Richmond Agitation–Sedation Scale: validity and reliability in adult intensive care unit patients. American journal of respiratory and critical care medicine. 2002 Nov 15;166(10):1338-44.

41. Brummel NE, Vasilevskis EE, Han JH, Boehm L, Pun BT, Ely EW. Implementing delirium screening in the ICU: secrets to success. Critical care medicine. 2013 Sep 1;41(9):2196-208.

42. Beglinger LJ, Mills JA, Vik SM, Duff K, Denburg NL, Weckmann MT, Paulsen JS, Gingrich R. The neuropsychological course of acute delirium in adult hematopoietic stem cell transplantation patients. Archives of clinical neuropsychology. 2011 Mar 1;26(2):98-109.

43. Trzepacz PT, Meagher DJ, Wise MG. Neuropsychiatric aspects of delirium.

44. Sadock BJ. Kaplan & Sadock's synopsis of psychiatry: behavioral sciences/clinical psychiatry. Philadelphia, PA: Wolters Kluwer; 2015.

45. Carvalho JP, Almeida AR, Gusmao-Flores D. Delirium rating scales in critically ill patients: a systematic literature review. Revista brasileira de terapia intensiva. 2013;25:148-54.

46. Luetz A, Heymann A, Radtke FM, Chenitir C, Neuhaus U, Nachtigall I, Von Dossow V, Marz S, Eggers V, Heinz A, Wernecke KD. Different assessment tools for intensive care unit delirium: which score to use?. Critical care medicine. 2010 Feb 1;38(2):409-18.

47. Khan BA, Perkins AJ, Gao S, Hui SL, Campbell NL, Farber MO, Chlan LL, Boustani MA. The confusion assessment method for the ICU-7 delirium severity scale: a novel delirium severity instrument for use in the ICU. Critical care medicine. 2017 May 1;45(5):851-7.

48. Otter H, Martin J, Bäsell K, Von Heymann C, Hein OV, Böllert P, Jänsch P, Behnisch I, Wernecke KD, Konertz W, Loening S. Validity and reliability of the DDS for severity of delirium in the ICU. Neurocritical care. 2005 Apr;2:150-8.

49. Trzepacz PT. The Delirium Rating Scale: its use in consultation-liaison research. Psychosomatics. 1999 May 1;40(3):193-204.

50. Rajabpour Nikfam M, Ghanbari Khanghah A, Khaleghdoost Mohammadi T, Kazemnezhad Leili E, Ashraf A. Study of predictors of delirium incidence in hospitalized patients in intensive care units. Journal of Holistic Nursing and Midwifery. 2016 Sep 10;26(3):25-35.

51. Keykha A, Ramezani M, Amini S, Saki A, Heydari A. Psychometric Properties Persian Version of Nursing Delirium Screening Scale. Iranian Journal of Psychiatric Nursing (IJPN) Original Article. 2021 Dec;9(5).

52. Jannati Y, Sohrabi M, Bagheri-Nesami M. Delirium and its diagnostic tools: a new approach to nursing. Clinical Excellence. 2013 Sep 15;1(2):85-96.

Apendix1. Summary of Diagnostic and Screening Tools for Delirium in Clinical Research

Author (year)	Tool Type	Use	Research Community	Conclusion
American Psychiatric Association (2013)	DSM-IV Diagnostic Criteria	Diagnostic	The updated version of the DSM includes significant changes in the criteria and classification of mental disorders compared to previous editions, assisting psychiatrists and mental health professionals in providing more accurate diagnoses and offering a scientific basis for clinical research and treatments. DSM-5 serves as a reliable resource for researchers in the fields of epidemiology, clinical psychology, and therapeutic practices. It aids in the identification and better understanding of patterns of mental disorders and responses to treatments.	The DSM-5 serves as the main reference for diagnosing mental disorders, enhancing the accuracy of related diagnoses and treatments. The updates and changes in this version allow researchers and professionals to better analyze disorders and treatment methods. Given the growing importance of mental health in modern societies, the continuous updating and development of the DSM to meet the evolving needs of the psychiatric community is crucial[3].
Spitzer RL [2001)	DSM-III, DSM-III-R	Diagnostic	This research examines screening and diagnostic tools in psychiatry, with the study population including individuals with mental disorders and mental health professionals.	The discussed screening and diagnostic tools are highly effective and reliable in identifying various disorders. Proper utilization of these tools and a focus on appropriate training in treatment centers are vital, as they can improve the diagnostic and therapeutic process for mental disorders and significantly enhance the quality of mental health services [4].
Edaddua U(2014)	CAM, DRS, DSM-IV	Diagnostic	This article discusses diagnostic tools based on DSM-5 criteria for identifying delirium, including assessments of alertness levels in patients with delirium and mental health professionals.	Considering the clinical complexity of delirium, employing broader criteria can improve the identification and management of this disorder in patients, especially among vulnerable elderly individuals, thereby preventing more adverse effects and ultimately enhancing patient safety, particularly in at-risk populations [7].
Torshizi (2016)	ICDSE	Screening	This study is a quantitative design involving hospitalized patients in the ICU. It evaluates the reliability and validity of the Persian version of the ICDSC for identifying delirium in patients admitted to intensive care units.	The Persian ICDSC is a valid and reliable tool with strong internal consistency and high correlations for assessing delirium in ICU patients. It is useful for the early identification of delirium and aids in its management and treatment[8].
Hart RP (1996)	CTD, DSM-IV	Diagnostic	This article examines and validates the cognitive test for delirium and assesses its accuracy in identifying this condition compared to diagnoses made by specialized physicians.	The cognitive test's high accuracy and ability to diagnose delirium have been introduced as a reliable method for assessing the cognitive status of patients in the ICU. Due to the importance of early diagnosis of this condition, this tool is a useful instrument for identifying delirium in ICU patients[9].
Sadock BJ (2008)	DSM, ICD, Clinical Interview, s and Scales, ec	Diagnostic	This work briefly and effectively provides information on various mental disorders, assessment methods, therapeutic approaches, and the latest research advancements. Given its clinical approach, this work is designed to improve mental health professionals' understanding and professional performance.	This book is considered a reliable and comprehensive resource in psychiatry. It details mental disorders, diagnostic criteria, and therapeutic approaches, focusing on accurate diagnosis and scientific information. This makes it an essential source in clinical and research fields and potentially plays an important role in enhancing specialized knowledge in psychiatry[10].
Jackson P (2015)	MMSE, RASS, DRS, CAM, NPI	Diagnostic	This article examines the phenomenon of delirium, particularly in patients with acute illnesses who are under special care in ICU settings. It focuses on the diagnostic and screening tools and protocols used to identify this condition.	Given the serious consequences of this condition on recovery and survival, special attention to diagnostic protocols and intervention methods is essential for accurately identifying causes and employing appropriate preventive measures, which can positively impact clinical outcomes, especially in critical care[11].
Barr J (2013)	Clinical Guidelines, RASS, CAM-ICU, NRS , BPS	Clinical	This article reviews and presents clinical guidelines for the simultaneous management of pain, agitation, and delirium in hospitalized adult patients in the ICU. The authors emphasize the importance of a multidisciplinary approach, which includes medical teams, nursing staff, and psychosocial support.	Effective management of pain, agitation, and delirium in ICU requires the implementation of comprehensive and evidence-based clinical guidelines. These guidelines can help reduce complications arising from these conditions and improve clinical outcomes. Therefore, enhancing awareness and training of medical personnel regarding assessment and management methods for these conditions is essential [12].

Spronk PE (2009)	Diagnostic	NU-DESC, DRS, RASS, CAM-ICU	This study examines the prevalence of delirium in hospitalized patients in the ICU and emphasizes that the diagnosis of this condition is often seriously overlooked during daily care periods.	Improving assessment methods and awareness of delirium signs can lead to timely diagnosis and effective management of delirium among healthcare staff, potentially reducing complications associated with this condition and improving patient care quality and clinical outcomes[13].
Van Eijk M(2009)	Diagnostic	RASS, ICD CAM-ICU, NEECHAM	This study compares the efficacy of various delirium assessment tools and their accuracy and sensitivity in diagnosing delirium in patients with different medical conditions and care needs in a mixed intensive care unit.	various assessment tools have different levels of accuracy and sensitivity, and the appropriate selection of assessment tools is crucial for improving the diagnosis and management of this condition.Systematically using effective tools in healthcare institutions leads to better clinical outcomes[14].
Blazer DG (2012)	Diagnostic	DSM-IV, DSM-5	In this article, the authors review and update evidence related to the diagnostic criteria for delirium, aiming to evaluate and analyze the most recent evidence and research regarding these criteria and their ability to assist in the accurate diagnosis of this disorder.	According to results and recent modifications in the criteria, diagnostic accuracy and differentiation of delirium from other cognitive disorders have been improved. Additionally, early diagnosis and prompt intervention lead to reduced clinical side effects of delirium and improved health quality for individuals[15].
WHO (1992)	Diagnostic	ICD-10, DSM, Clinical Interviews, Questionnaires	This book is introduced by the WHO for mental health professionals, psychiatrists, and researchers, including diagnostic guidelines, classification, and description of mental and behavioral disorders, to standardize diagnoses globally and facilitate more effective assessment and treatment of mental disorders in clinical and research settings.	The World Health Organization, using ICD-10, provides a standardized and comprehensive framework emphasizing the importance of international consensus on diagnostic criteria for mental disorders. It states that ICD-10 can enhance the quality of mental healthcare globally by accurately describing disorders, providing diagnostic guidelines, and facilitating the diagnostic process[16].
Grover S(2012)	Mostly	Systematic Review, CAM, DRS, CAM-ICU, MDAS	This review study aims to collect and critique various existing delirium assessment tools in the scientific literature in such a way that the strengths and weaknesses of each are identified. Researchers examined assessment tools, including standardized scales, using collected data based on accuracy, reliability, and ease of use.	different tools have their specific advantages, and the appropriate selection of each depends on the clinical context and patient needs. Choosing the right tool for assessing delirium depends on the clinical context and specific patient characteristics, which can significantly impact the treatment process and management of patients. Therefore, physicians need to be familiar with these tools to provide more effective treatments for their patients[17].
Van DBM(2010)	Diagnostic	CAM-ICU, RASS, DRS, MMSE, NU-DESC	This literature review aims to identify and analyze various delirium assessment tools and methods, such as CAM-ICU and DSM-5, in ICU patients, examining their accuracy and applicability in clinical practice.	The importance of continuous and accurate assessment of delirium and the use of systematic protocols for identifying this disease enables better identification and, consequently, more effective therapeutic measures. Treatment centers should pay attention to standardized tools in diagnosing and managing delirium[18].
Franco J (2020)	Diagnostic	CAM, RASS, DDT-Pro Tool-	This study examines the efficacy and effectiveness of the DDT-Pro tool scores in identifying types of delirium and the absence of delirium in hospitalized patients and compares its results with control groups.	DDT-Pro can accurately diagnose delirium and identify subsyndromal delirium, positively affecting clinical and therapeutic diagnosis at various levels. This tool can assist physicians in better identifying patients at risk for delirium and taking appropriate actions[19].
Waters C(2008)	Diagnostic	S-CAM, CAM-ICU, RASS, Mood and Cognition	This article critiques and reviews published delirium assessment tools and analyzes existing assessment tools and the relationship between delirium in ICU patients and clinical outcomes.	The presence of delirium can negatively impact recovery and treatment outcomes, leading to prolonged recovery periods and increased treatment costs. The author emphasizes the importance of accurately identifying and assessing delirium in ICU and suggests that treatment centers should use standardized assessment tools [20].
Faria Rdsb(2013)	Diagnostic	RASS, CAM-ICU, DRS	This article examines the status of delirium, which is a common complication in patients hospitalized in the ICU that can negatively impact treatment outcomes and patient survival. citing evidence that delirium is consistently overlooked in these patients and can lead to misdiagnosis and inadequate treatment.	Delirium in ICU patients is a serious and complex condition that requires more attention. Timely and effective diagnosis can yield more positive outcomes for patients. Training healthcare personnel on identifying delirium and implementing appropriate protocols can significantly improve care quality and reduce post-hospitalization complications in the ICU[21].
Poulsen LM(2021)	Diagnostic	CAM-ICU, RASS, DRS, NPI	This article examines delirium, identifying its causes and risk factors, prevention, and treatment methods. Delirium is a common cognitive disorder in patients hospitalized in the ICU.	Delirium is associated with adverse outcomes, including increased mortality, longer hospital stays, and a higher likelihood of long-term complications. Improving the identification, prevention, and management of delirium can help enhance the quality of care and clinical outcomes for patients[22].

Godfrey A(2009)	Commercial, Data Analysis	CAM, Motion Monitors -	Diagnostic	Development of a systematic approach to classify types of delirium based on movement patterns using a motion monitor. The collected data were analyzed to identify specific movement characteristics associated with different types of delirium, employing a new classification system to examine various subgroups of delirium using motion monitoring.	Implementing a classification system based on motion monitoring allows for a better understanding of the different types of delirium, potentially leading to more effective management strategies for affected individuals. However, further research is recommended to validate this system and explore its clinical applications in various health contexts[23].
Grover S(2018)	Assessment	CAM, ICDSC, Risk	Diagnostic	This article provides a comprehensive set of clinical guidelines for managing delirium in elderly patients. Given this condition's increased mortality and complications, these guidelines aim to improve clinical outcomes through standardized approaches.	The clinical guidelines used in this article provide a structured framework for managing delirium in elderly patients. They aim to improve care and outcomes for this vulnerable group through increased awareness and promotion of evidence-based approaches[24].
Gusmao-Flores(2012)		CAM-ICU, ICDSE	Diagnostic	This study was ameta-analysis of clinical articles related to delirium assessment methods and the accuracy of delirium diagnosis using CAM-ICU and ICDSC tools in ICU patients. The results related to these methods' sensitivity, specificity, and diagnostic accuracy were extracted and analyzed.	According to the results, both tools are highly accurate in identifying delirium, but the CAM-ICU tool is more effective and sensitive in identifying delirium than the ICDSC. Overall, both tools are helpful in diagnosing delirium and can assist in improving the diagnosis and management of delirium in patients hospitalized in the ICU[25].
Boettger S(2018)	Auxiliary Tools	ICDSE, Clinical Examination,	Screening	his study examines and reevaluates the diagnostic threshold (validity and reliability) of delirium and determines new cutoff points for more effective screening of patients using the ICDSC checklist. Data related to ICU patients who underwent screening with ICDSC for a specified period were analyzed and compared.	This study emphasizes the need to review the diagnostic thresholds for delirium using ICDSC and highlights the importance of healthcare providers being aware of potential changes in screening outcomes. Changes in cutoff points can be associated with improved delirium diagnosis and consequently enhance clinical care and patient outcomes, as adjusting thresholds can identify more patients with delirium[26].
Detroyer E(2017)	Staff Training	CAM, DSM-IV, Clinical Criteria, Care Protocols,	Screening	This systematic review examines various nursing aspects and methods for preventing and identifying delirium in hospitalized patients. Delirium is a serious and common complication that can arise due to underlying diseases, medications, and environmental conditions. Additionally, prevention strategies are discussed.	According to the results, nurses play a significant role in delirium, and training and enhancing their awareness and skills regarding delirium can assist in early identification and appropriate intervention. Furthermore, implementing prevention strategies, including improving sleep, maintaining physical activities, and encouraging social interactions among hospitalized individuals, is highly important[27].
Gusmao-Flores (2011)		DRS, CAM, CAM-ICU	Diagnostic	This article examines the validity and reliability of three delirium diagnostic tools in Portuguese within a specific clinical population hospitalized in the ICU. The researchers used statistical methods to assess content validity, construct validity, and temporal reliability.	The results showed that the translated Portuguese versions of these tools achieved a significant degree of validity and reliability, making them useful tools for diagnosing delirium in critically ill patients and contributing to enhancing the quality of care for these patients[29].
Devlin JW(2007)	Observations	CAM, CAM-ICU, RASS, Clinical	Diagnostic	This article systematically reviews published articles to examine and analyze various methods for assessing delirium in hospitalized ICU patients and to investigate the significance and impact of this condition on patient clinical outcomes. The relationships between delirium and risk factors, clinical outcomes, and length of hospital stay were also examined.	According to the results, delirium in ICU patients is a common and significant clinical issue that can have serious negative impacts. Various tools exist for diagnosing delirium that can help improve the identification and management of this condition. The authors emphasize that continuous delirium assessment in critically ill patients is essential and that using valid and reliable tools can facilitate faster diagnosis and more effective treatment[30].
Franco JG(2020)		CAM, DDT-Pro	Diagnostic	This study evaluates the accuracy and reliability of the DDT-Pro tool and compares it with the CAM tool in hospitalized medical patients, also comparing its performance to CAM. A cross-sectional study design was used, and data were collected from hospitalized patients. The researchers simultaneously measured and analyzed the sensitivity, specificity, and accuracy of DDT-Pro and CAM in a sample of patients.	The study's results indicate that DDT-Pro is reliable and accurate in identifying delirium in hospitalized patients and can be an effective option in the clinical assessment of delirium. Additionally, comparisons showed that this tool performs similarly or even better than CAM in terms of specificity and sensitivity and is recommended as a valid method for diagnosing delirium in medical patients[31].
Meagher D(2012)		CTD, DRS-R-98	Diagnostic	This study aims to distinguish between subsyndromal delirium and persistent delirium, highlighting their clinical features, treatment impacts, and potential risks associated with these forms of delirium. The authors conducted a thorough review and analysis of the existing literature and clinical data on delirium, focusing on cases that do not fully meet the criteria for delirium but still exhibit significant cognitive disturbances.	The findings indicate that both subsyndromal and persistent delirium present unique challenges in clinical practice. Subsyndromal delirium is often overlooked, leading to inadequate treatment and monitoring, while persistent delirium is associated with longer hospital stays, increased mortality, and worse prognoses. Identifying the features and impacts of both delirium types is crucial for managing and improving patient outcomes. This study emphasizes the need for clinical vigilance in recognizing these conditions to provide appropriate care and interventions[32].

Meagher DJ(2020)	Diagnostic	MMSE, CAM, NEECHAM, CTD, MOCA	This article compares the effectiveness and performance of new delirium identification tools as complementary or alternative solutions to traditional cognitive tests in elderly patients. Modern tools show higher sensitivity and specificity in identifying delirium than traditional cognitive assessments, leading to more timely interventions and management of the condition in clinical environments.	The findings indicate that integrating new diagnostic tools into clinical practice can enhance the identification of delirium in elderly medical patients, ultimately leading to earlier diagnosis and improved care. New tools can be effective complements or replacements for traditional cognitive tests; however, these results require further validation in larger and more diverse populations[33].
Kean J(2010)	Diagnostic	Clinical Data, Cognitive Tests, CAM, DRS	This cross-sectional study aims to evaluate the validity and develop a temporary and concise diagnostic scale for the rapid identification of delirium in patients at risk of developing it. This scale can assist physicians in clinical environments. The validity and accuracy of this scale were then compared with other standard tools.	The results indicate that the designed temporary scale has acceptable sensitivity and accuracy in diagnosing delirium and performs well compared to other existing tools. This makes it an effective instrument for the rapid identification of delirium and assists physicians in better managing this condition clinically[34].
Delp S(2020)	Diagnostic	Focuses on collecting and analyzing information	management practices for postoperative delirium vary significantly, with some preventive and therapeutic methods used not aligning with international standards. This highlights the need for improvements in training and clinical protocols for managing postoperative delirium among Chinese anesthesiologists.	This study emphasizes that further training and establishing more precise protocols for managing postoperative delirium are essential and can help improve patient outcomes[35].
Gupta N(2008)	Diagnostic	Delirium Assessment, Structured Interviews, CAM, DRS, Self-Report Scales	The article aims to explore and analyze the phenomenological aspects of delirium, focusing on the various symptoms experienced by patients. This condition encompasses a range of symptoms, and the experience of delirium is often individual-dependent and can vary among individuals based on various factors. The study analyzes data related to patients with delirium and examines their symptoms and signs using clinical statistics and imaging studies.	The findings indicate that the symptoms of delirium include significant changes in thinking, awareness, and behavior. These examinations aid in more accurate identification of symptoms and contribute to a deeper understanding of the delirium process and its significance in clinical care. A better understanding of this phenomenon can help improve diagnostic and treatment methods for this condition and underscores the need for special attention to clinical signs and symptoms in managing patients with delirium[37].
Jabbar F(2011)	Diagnostic	DSM-IV	In this study, the authors examine the neuropsychological and cognitive characteristics of patients with delirium according to DSM-IV criteria and analyze the correlations between these features and the clinical and demographic factors of patients referred to geriatric psychiatric consultation services.	The findings indicated that patients with delirium have significant deficits in cognitive domains, including memory, attention, and executive and cognitive processes. These findings emphasize the importance of conducting comprehensive assessments of the mental and cognitive health of elderly patients with delirium to consider more appropriate treatments for them[38].
Mulkey MA(2018)	Screening	CAM, DSS, MMSE, AL (Attention Level)	This article discusses important considerations in selecting the appropriate tool for assessing delirium in clinical practice.This study examined CAM and DRS tools based on ease of use, validity, validation, and applicability in different patient groups, considering their specific advantages and limitations.	According to the article's recommendations, the selection of a tool should align with clinical needs, the patient population, and the environments in which care is provided. The appropriate selection of tools for identifying and managing delirium ultimately leads to improved clinical outcomes for patients[39].
Sessler (2002)	Diagno	RASS	This study examined the consistency and validity of the RASS scale as a tool for assessing the level of consciousness and behavior of agitated or calm patients in hospitalized adults in the ICU.	RASS can serve as a standardized and reliable tool for assessing patients' levels of consciousness, as it effectively identifies differences between various levels of consciousness. Consequently, it can contribute to better, more intelligent care delivery[40].
Brummel NE(2013)	Screening	CAM-ICU, RASS, MMSE, MOCA	This article examines how to implement and analyze effective strategies for successfully screening delirium in the ICU and investigates the factors that contribute to the success of this process and improve clinical outcomes for patients. The study includes data collection from various hospitals and intensive care units implementing delirium screening protocols.	Keys to success include staff training, the use of simple and efficient tools for screening delirium among treatment team members, and the implementation of standardized procedures and follow-up of results over time, which contribute to better identification and management of delirium. Overall, implementing all effective measures can positively impact patient management and reduce complications associated with delirium[41].
Beglinger LJ(2011)	Both	CAM, Neuropsychological Tests, Clinical Evaluation	This descriptive study identifies and analyze cognitive complications arising from acute delirium in adult patients undergoing stem cell transplantation and examine neuropsychological trends throughout the hospitalization period. Neuropsychological assessments were regularly conducted during the hospitalization	Acute delirium is one of the common complications in patients undergoing stem cell transplantation, which can have detrimental effects on cognitive function and quality of life. Identifying and managing this disorder before severe complications arise is deemed essential. The research results can assist physicians and nurses in caring for transplant patients by enhancing awareness and training in this area to implement appropriate intervention strategies[42].

Trzepacz P(2001)	Diagnostic	CTD, DRS-R-98, DRS	This research was conducted on a group of patients with acute and chronic disorders in various medical fields. Researchers aimed to investigate and assess the presence of delirium in these patients.	The results indicate that DRS-R-98 has greater accuracy and reliability in diagnosing and assessing delirium severity compared to the tools studied in the research. Therefore, this scale is recommended as a key tool for improving the diagnosis and management of delirium in clinical settings[43]
Sadock BJ(2015)	Both	MMSE, Psychometric Tests, Performance	This work describes and elucidates various mental disorders, related theories, and treatment models, and principles of behavioral sciences. It also elaborates on different diagnostic tools and therapeutic methods. This makes it useful for professionals in the mental health field, contributing to the enhancement of knowledge and professional skills in this area.	Screening and diagnostic tools for mental disorders help in the initial identification of at-risk individuals, while diagnostic tools are designed to accurately determine the type and severity of the disorder. Effective use of these tools in clinical practice leads to improved diagnostic accuracy and patient treatment management. Therefore, mental health professionals must be familiar with these tools [44].
Carvalho (2013)	Screening	Systematic Review	In this article, patients with acute consciousness disorders and delirium, especially those under intensive medical care in the ICU, were examined using delirium assessment scales.	The selection of the appropriate scale based on the clinical characteristics of the patient and environmental conditions, as well as the necessity of having standardized guidelines and national consensus regarding the assessment and management of delirium in ICU patients, has been strongly emphasized[45].
Luetz A(2010)	Screening	CAM-ICU, DDS, NU-DESC	This study examines various delirium assessment tools in hospitalized patients with acute conditions requiring complex treatments in the ICU.	Selecting the appropriate tool can aid in better diagnosing and managing this condition. The authors emphasize the necessity of having clear guidelines and standardized strategies for applying these tools [46].
Khan BA(2017)	Diagnostic	CAM-ICU	This study introduces and evaluates the CAM-ICU-7 scale, aiming to develop and validate this tool to assess the severity of delirium better than existing scales and assist healthcare providers in diagnosing and managing patients.	The CAM-ICU-7 is presented as a valid and reliable tool for measuring the severity of delirium. It has the potential to provide more effective strategies for managing delirium and reducing its associated complications, which can enhance treatment and care methods for patients. This tool can serve as a new basis for future research and clinical applications[47].
Otter H(2005)	Diagnosti	DDS	This study examines the validity and reliability of the DDS tool as a clinical instrument for measuring the severity of delirium in patients hospitalized in the ICU.	DDS is a valid tool for diagnosing and measuring the severity of delirium in patients in the ICU and can be beneficial in clinical processes and future research[48].
Trzepacz PT(1999)	Diagnostic	DRS	The author examines the DRS scale and its application in psychiatric consultation research in this article. The author details the framework of the tool, its components, and its scoring system, its use in various studies and its validity and reliability in clinical and research settings.	The delirium assessment scale is a practical and effective tool for evaluating delirium in consultation with psychiatry, contributing to improving patient care and treatment outcomes. However, ongoing research is necessary to enhance this scale and explore its potential applications in various clinical populations[49].
Rajabpour Nikfam M (2016)	Diagnostic	CAM, ICDSC	This cross-sectional study aims to identify and examine factors that may predict delirium or trigger its onset in patients hospitalized in ICU settings.	Factors such as age, type of underlying disease, length of stay, and certain physical and cognitive characteristics can influence the onset of delirium. Identifying and being aware of these predictive factors can assist healthcare providers in better-managing patients with delirium and preventing its complications[50].
Keykha A (2021).	Screening	Nu-DESC	This study examines the psychometric properties of the Persian version of Nu-DESC, determines the quality of measurement of the scale, ensures the effectiveness of the tool, and examines its validity and reliability as a tool for identifying delirium in patients.	The Persian version of this scale, in addition to being valid and reliable, holds significant practical value in clinical settings and is an effective tool for identifying delirium in patients. This can assist nursing staff in the early diagnosis and management of this condition[51].
Jannati Y (2013)	Diagnostic	CAM, DRS, NU-DESC, DOS	This research aims to increase nurses' awareness about delirium, diagnostic tools, and the importance of using these tools to identify delirium and create new approaches in the nursing profession.	The authors analyze and review the diagnostic tools available in the literature.[52].