



Altered Mental Status: An Exploration of Definitions and Descriptors in the Literature

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Objectives: To examine the use of “altered mental status” in studies addressing states of shock, by reviewing published English literature. We explored how the term is defined and described in the literature, and alternative words/phrases used. **Background:** Assessment of mental status is crucial for patients in shock and life-threatening conditions. The term “altered mental status” is being used inconsistently, and varied means of assessment have been reported, which may have implications for critical care nurses’ training and implementation of clinical practice guidelines. **Methods:** A systemized literature review based on targeted searches in CINAHL and MEDLINE, with predefined eligibility criteria. Primary studies, reviews and case studies were included. **Results:** Based on eligibility criteria, 92 articles were included (48 primary studies, 32 case reports, 12 review articles). Glasgow Coma Scale (GCS) was most frequently used to define “altered mental status” followed by the terms “unconsciousness”, “confusion” “coma” and “disorientation”. Changes in consciousness were described in a variety of expressions, i.e. decreased level of consciousness, change in awareness, and GCS. **Conclusion:** There is no universal definition for altered mental status. More work is needed towards an accurate definition standardization of use of related terms, and consensus on the most valid assessment methods in order to identify patients with high risk for deterioration.

Keywords: altered mental status, shock, definitions, descriptors, literature review

INTRODUCTION

Altered mental status is often observed among patients with life-threatening conditions. The term is used in several clinical practice guidelines as one of the most important signs, which clinicians need to pay attention to. However, definitions of “altered mental status” vary across guidelines. For example, “altered mentation” is listed as one of the three criteria of qSOFA (Quick SOFA), which has been developed to detect patients with suspected sepsis outside the intensive care unit (ICU) (Singer et al., 2016). “Altered mentation” in qSOFA is defined as Glasgow Coma Scale (GCS) less than 15, which is widely used as a measure of consciousness in acute care settings (American College of Surgeons, 2012). Mixed

use of the terms “mental status” and “consciousness” is also noted in European clinical guidelines. A consensus paper of heart failure management recommends mental status to be used as an indicator of hypoperfusion (Mebazaa et al., 2015). Such mental status is assessed using the Alert, Voice, Pain, Unresponsive (AVPU) scale. The AVPU is also used in the 2010 European council of resuscitation guideline (Deakin et al., 2010), however, there it is referred to as an assessment of consciousness. A question arises if “mental status” and “consciousness” are synonyms and could, therefore, be used interchangeably without creating confusion in clinical practice. This has implications for both education and training, as well as for the clarity and uptake of clinical

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practice guidelines and research evidence. Moreover, nonstandardized terminology may interfere with inter- and intra-disciplinary communication, handoff processes and have implications for patients' safety (Törnvall & Jansson, 2017).

If mental status is synonym to level of consciousness, "altered mental status" may be synonym to "altered level of consciousness." However, some guidelines include other terms than decreased level of consciousness for altered mental status. The Advanced Trauma Life Support (ATLS) manual edited by the American College of Surgeons adopts a classification system to determine the severity of hemorrhage (American College of Surgeons, 2012). One of the determinants, "CNS/mental status," is scored according to patient's anxiety and confusion levels. The levels are "slightly anxious," "mildly anxious," "anxious, confused," and "confused, lethargic" from mild to severe conditions. Anxious may not be considered decreased level of consciousness.

The term "altered mental status" seems to be used inconsistently in the literature. Nonetheless, mental status is one the most important variables to assess in patients with life-threatening conditions. This study aims to examine the use of "altered mental status" in studies addressing patients with shock, by reviewing published English literature. Specifically, we explored (a) how "altered mental status" is defined and/or described in the literature, and (b) alternative words/phrases used for "altered mental status."

METHODS

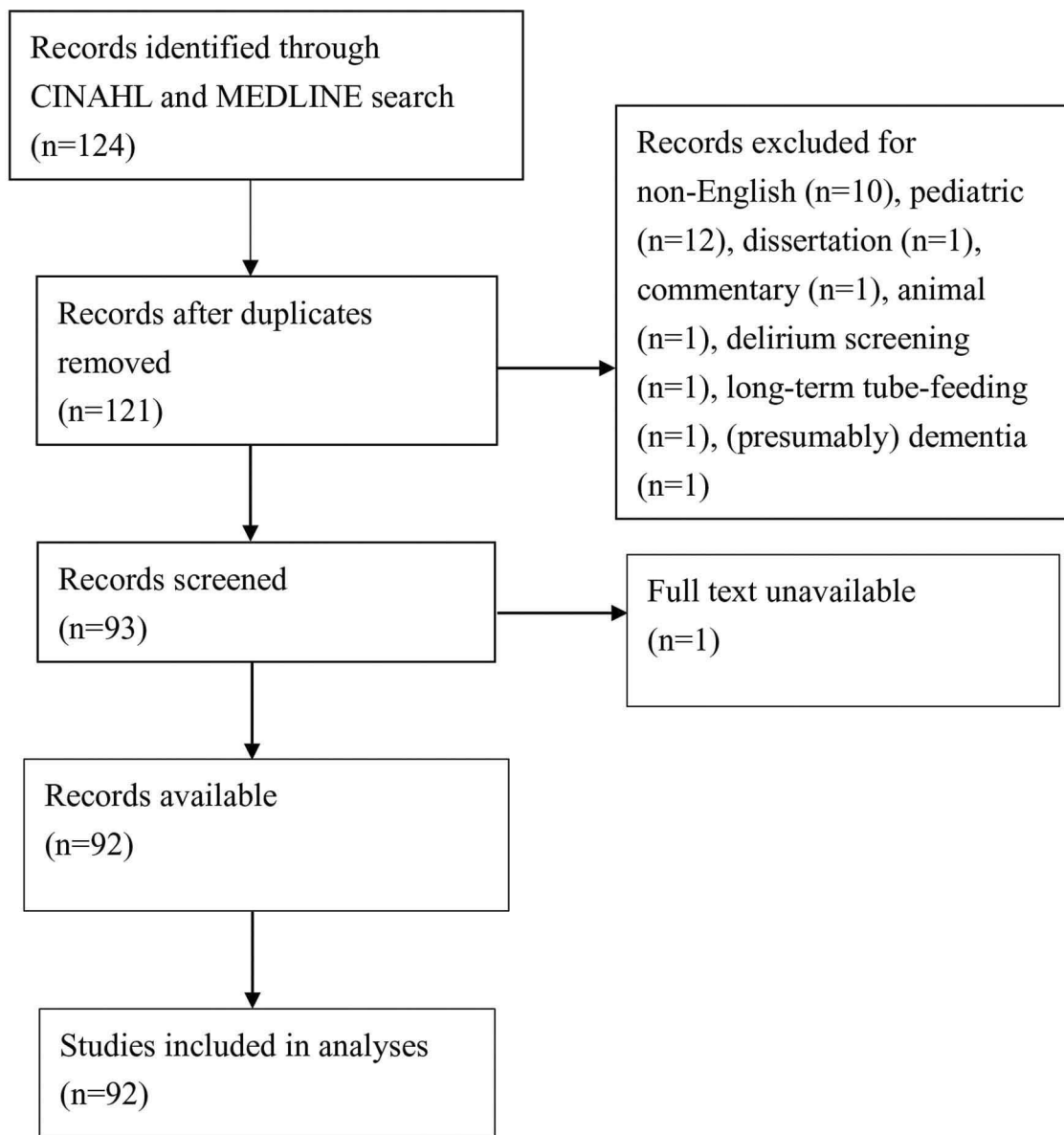
A literature search was conducted using CINAHL and MEDLINE databases for key words of "altered mental status" and "shock" as of December 22, 2017 and after a preliminary analysis, the search was updated on June 25, 2020. These databases were selected because this literature review focused on medical and nursing literature. Inclusion decisions were made by the first author based on prespecified criteria. Inclusion criteria

included: primary studies, original articles, and case reports targeting acutely ill adults with life-threatening conditions. Clinical practice guidelines were not included because they were considered secondary sources and they might not reflect the authors' original conception of "altered mental status." We did not apply limits for publication date, as potential chronological trends of the articles may have implications for the study results. Since this study examined the use of the English term "altered mental status," articles in any language other than English language were excluded. Cognitive function may affect manifestations and descriptions of "altered mental status" so that articles addressing a pediatric population, delirium screening, and dementia were excluded. Moreover, since this study focused on the acutely ill population, an article on long-term tube-fed patients was also excluded. Doctoral dissertations were not considered to be published articles and commentaries were not considered as original work and were excluded. We did not account for the methodological quality of studies, since our objective was to assess the use of terminology, rather than study findings. Articles were examined for the following research questions:

- a) Is the definition of "altered mental status" clearly stated?
- b) How "altered mental status" is defined?
- c) How "altered mental status" is described?
- d) What alternative words/phrases are used for "altered mental status"?

In order to answer these questions, we extracted and listed any terms and phrases used to define "altered mental status" from abstracts and manuscripts. Extracted terms were captured in an extraction table in an Excel file. Then, we manually counted terms used in the definition. Although it is common practice to summarize the characteristics of the identified studies, we did not consider this as essential for the present study, since the focus was on the use of terms, rather than the methods and study results.

Figure 1. Screening flow chart.

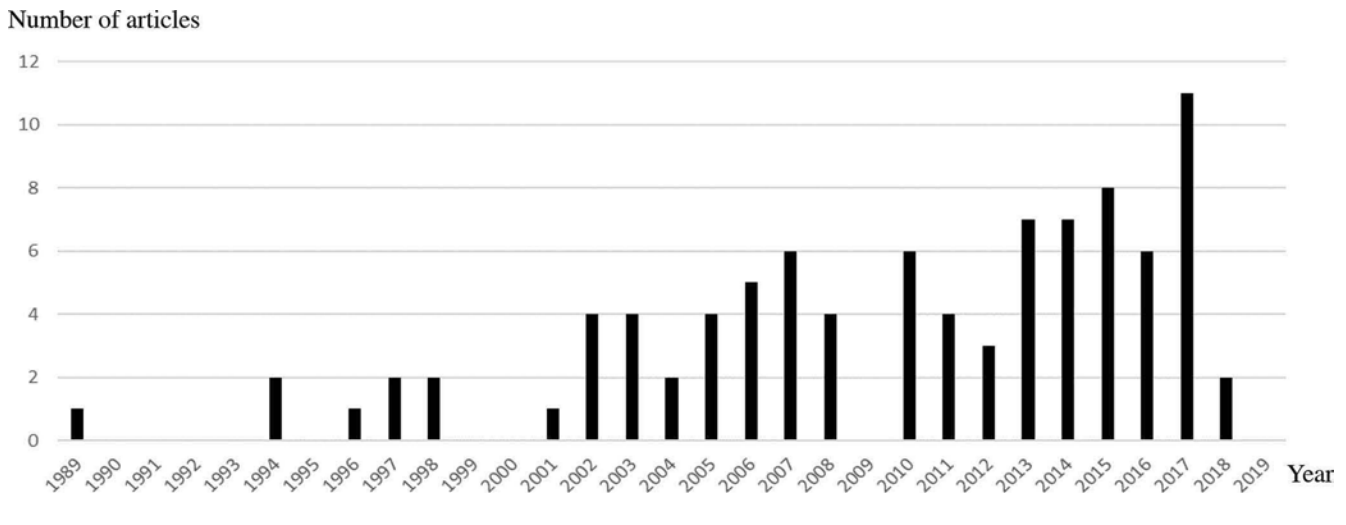


If the articles did not clearly define “altered mental status,” sentences or phrases which described the patients’ related behaviors were extracted. Alternative terms for “altered mental status” were determined when different terms were used interchangeably with “altered mental status.” Frequencies of the alternative terms among the sample articles were counted. Descriptors and alternative terms were recorded and counted in the same way as definitions. All extractions were performed by the first author.

RESULTS

Initial searches retrieved 124 articles. After employing the eligibility criteria, 92 articles were included in this review. The search and inclusion decision process is presented in Figure 1. There were 32 case reports, 12 review articles, and 48 original research papers. Patient populations addressed in the identified articles, included sepsis as the most frequent (20 articles), followed by hemorrhage, poisoning, pneumonia (5 articles each) and pulmonary embolism, intoxication, and

Figure 2. Published year of sample articles.



trauma (4 articles each). All these conditions can lead to shock states, which captures our target population. Publication year ranged from 1989 to 2018 (Figure 2).

Definitions

None of the case reports define “altered mental status” specifically, and only one review article provides a clear definition (Long et al., 2017). It defines it as GCS \leq 13. Among the original articles, 18 articles (37.5%) defined “altered mental status.” Terms used in these articles are listed in Table 1. GCS was most frequently used to define “altered mental status.” Four articles solely used GCS and others used it in combination with other terms. A definitive score for the GCS was provided in four articles. Two articles defined a GCS of less than 15 as indicative of “altered mental status,” one defined the cutoff as less than 13, and one as less than 12 or a decrease of 3 points.

The second most frequently used terms in definition was “confused/confusion” and “coma/comatose.” “Consciousness/unconsciousness,” “orientation/disorientation” were the next, and all of them were used with other terms. Twelve terms were used only once in the identified articles. One article used the Altered Mental Status Score (AMSS) as a single indicator to define “altered mental status” (Cole et al., 2018). No article used

AVPU score which is the simplified version of GCS, and is often used in clinical guidelines (Deakin et al., 2010).

Descriptors

Five articles not only provided definitions but also used some words or phrases to describe the patients with “altered mental status.” Thirty-eight articles, of which the majority were case reports, included descriptions of patients’ altered behavior, signs, and symptoms. Most of the articles used multiple words or phrases to describe the manifestations of “altered mental status.” Descriptions of the behaviors of patients with “altered mental status” were examined and categorized. Terms related to “consciousness” were used to describe “altered mental status” of shock patients in 16 articles. Changes in consciousness were described in a variety of expressions, that is, decreased level of consciousness, change in awareness, and GCS. Two articles used multiple terms related to consciousness such as coma and GCS.

Fourteen articles characterized the patients’ behavior as confusion. Among them, 12 articles used “confusion” or “confused” whereas two articles described the patients’ confused behaviors using other terms such as “make incomprehensible noise” and “disorganized behavior.” The

TABLE 1. Terms Used to Define “Altered Mental Status”

Terms in definitions	Frequency
GCS	7
< 15	2
≤13	1
< 12 or decrease in 3	1
not specified	3
Confusion, confused	5
Coma, comatose	4
Consciousness, unconsciousness	4
Orientation, disorientation	4
Response, responsiveness, unresponsiveness	3
Altered mentation/mental status	2
Lethargic, lethargy	2
Syncope	2
Delirium	2
AMSS score	1
Abnormal behavior	1
Agitation	1
Alertness	1
Arousability	1
Dementia	1
Drowsy	1
Mental obtundation	1
Mental retardation/disability	1
Organic brain syndrome	1
Seizure	1
Stupor	1
Somnolence	1

patient’s arousability including drowsiness, somnolence, and lethargy were also used to explain the manifestation of “altered mental status.” Disorientation was also found among patients with “altered mental status.” One case study reported that the patient was partially disoriented. The patient was oriented to person and place, but not to time. All descriptions are listed in Table 2.

Alternative Expressions

There were terms or phrases interchangeably used with “altered mental status.” Some are only different order or parts of speech, such as altered mentation and mental status alteration. The term

“altered/alteration” was replaced by “change” as a neutral term or terms indicating negative direction, such as impairment and deterioration. “Mental status” was replaced by other words. “Consciousness” was the most frequently used, but “neurologic” and “cognitive” were also used.

DISCUSSION

To the extent of our knowledge, this is the first study exploring definitions and descriptors of “altered mental status” in published literature. Our results highlight the variability in defining and describing “altered mental status.” Calls for

TABLE 2. Frequently Used Terms to Describe Patients' Behavior

Terms	Number of articles
Consciousness/ GCS	13
Confusion	12
Disorientation/ disorientation	11
Agitation	9
Responsiveness	7
Lethargy	4
Combative	4
Delirious/ delirium	3
Arousability	3
Drowsiness	3

standardization of medical terminology in critical care research and practice have been ongoing (Singh & Ferguson, 2009). In nursing, the standardization of terminology has been explored as a tool for the improvement of nursing communication and patients' outcomes (Törnvall & Jansson, 2017), and the need to incorporate standardized nursing terminology in electronic health records has been emphasized (Ali & Sieloff, 2017). Use of specific terminology can affect the choice and/or conceptual development of assessment tools, and can therefore affect patient outcomes. Moreover, varied terminology can affect the implementation and translation of clinical practice guidelines across different practice settings and countries.

According to the findings of this review, the most frequently used tool to define "altered mental status" was GCS. GCS consists of three dimensions: Eye opening, Best verbal response, and Best motor activity. Definition of a concept by reference to another concept only increases the confusion, especially since specific, albeit varied, cutoff points are proposed in the literature. Use of a cutoff point denotes that "altered mental status" is considered as a dichotomous phenomenon, either mental status is altered or not. This is in contradiction with the fact that "consciousness," in itself regarded mostly as a graded phenomenon (Windey & Cleeremans, 2015), is the most

commonly used descriptor. Moreover, orientation and confusion, again mostly regarded as graded phenomena, are also used to describe "altered mental status." Despite its widespread use, no conceptual analyses of "altered mental status" were identified, so its contents and conditions remain not well defined, as well whether it is an all-or-non phenomenon.

Assessment approaches are also unclear. Only one article used a scale designed specifically to quantify "altered mental status." This scale, the AMSS, was developed by Martel et al. (2005) based on Observer's Assessment of Alertness/Sedation Scale (OAA/S) (Chernik et al., 1990) and Behavioral Activity Rating Scale (BARS)TM (Swift et al., 2002). The OAA/S was developed to quantify the level of sedation. It is a four-item scale, "Responsiveness," "Speech," "Facial expression," and "Eyes." The range of each item differs. "Responsiveness" is rated from 1 to 5, "Speech" is rated from 2 to 5, and "Facial expression" and "Eyes" are rated from 3 to 5 where the largest number indicates alert and the smaller numbers indicate deeper sedation. It is measured as the composite score which is the lowest score of the four items. The BARSTM is developed to evaluate the level of agitation and the effect of pharmacological therapy for psychotic agitated patients. It is a single-item scale ranging from difficult or unable to arouse:1, asleep, but responds normally to verbal or physical contact:2, drowsy, appears sedated:3, quiet and awake (normal level of activity):4, signs of overt (physical or verbal) activity, calms down with instruction:5, extremely or continuously active, not requiring restraint:6, and violent, requires restraint:7. The AMSS is four-item scale as same as OAA/S but the range of measurement is expanded to agitated state. Therefore, the range of each item is wider than OAA/S. Each item of the AMSS is assigned from -4 as the deepest sedated state to +4 as the most agitated state. Although it is not clearly stated, the AMSS is also measured as the composite score of OAA/S. Hence, use of AMSS/ OAA/S introduces yet another level of uncertainty, as "altered mental status" is now conceptualized in terms of

sedation and agitation. Indeed, since the OAA/S is lengthy, the shorter version namely sedation assessment tool (SAS) was developed. The SAS consists of two items, responsiveness and speech. Ranges of these items are also reduced to 5 from 7.

However, a question arises about the need of quantification. The AMSS and other preceding scales were developed to titrate sedatives for agitated patients. Assuming the “altered mental status” is used as a screening indicator for shock, grading may not be necessary. A simple checklist with minimum items may be helpful for quick assessment of mental status of preshock patients in busy emergency departments. On the other hand, when conducting clinical research studies on “altered mental status,” quantification may be beneficial. For example, association of the degree of “altered mental status” and shock severity and effects of nursing intervention to alleviate “altered mental status” need to be explored in the future.

Dimensions of “Altered Mental Status”

Descriptions of “altered mental status” imply multiple dimensions of alteration. Dimensions of alteration may be categorized into: (a) cognitive impairment, (b) suppressed mental activities, and (c) aggravated mental activities. Impaired cognition has been described as disorientation or confusion. Acute cognitive impairment is also seen in delirium. It is unknown whether cognitive impairments of shock patients and delirium patients are same or not. Differences of cognitive impairment of shock patients and delirium patients, if any, may help clinicians to detect preshock states of patients at risk. Comparative studies to reveal these differences are warranted.

Both suppressed and aggravated phenotypes were found in the reviewed literature. A relationship between phenotype and pathologic conditions was not determined in this review. Patients with some pathologic conditions may be prone to become agitated while other patients may be prone to become lethargic. Furthermore, some

patients may exhibit aggravated mental activities and may progress to depressed mental activities. Conditions and stages related to those phenotypes need to be clarified. Although multiple studies revealed a significant association between “altered mental status” and mortality (Fernández-Sabé et al., 2003; Garcia-Vidal et al., 2008; Kataja et al., 2017; Pintado et al., 2002; Shih et al., 1996), which phenotype, if any specific, is related to mortality is unknown. Once specific characteristics of “altered mental status” related to mortality become clarified, high risk patients with a variety of potentially life-threatening illnesses may be more accurately predicted.

This study contains some strengths and limitations. One of the strengths is the breadth of the review; which identified over 90 articles covering a wide variety of pathologies. This extensive literature base reveals a comprehensive picture of the use of “altered mental status.” However, since the review was conducted by a single researcher, it is possible that some definitions or descriptors might have been overlooked. We hope that these preliminary results will stimulate discussion about this topic among critical care nurses, and will prompt for more standardized use of terms describing altered mentation in high risk patients.

CONCLUSION

“Altered mental status” is seen among patients with a variety of life-threatening conditions. It is usually considered as a change in level of consciousness. There is no universal definition for “altered mental status.” A scale quantifying “altered mental status” was identified, but this may introduce more confusion, due to reference to sedation/ agitation. More work is needed toward an accurate definition, standardization of use of related terms, and consensus on the most valid assessment methods in order to identify patients with high risk for deterioration. For example, an interview study with clinicians may reveal why they choose to use the term “altered mental status” at the bedside. A Delphi study may

be needed to attain consensus on assessment findings which can be expressed by the term “altered mental status.” More importantly, a simple and clinically relevant assessment tool is still lacking in order to quantify “altered mental status” for comparative and hypothesis testing research studies.

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