

# Do Hourly Neuro Exams Lead to Sleep Deprivation and ICU Delirium: A Research Review

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## INTRODUCTION & SIGNIFICANCE

- The established protocol in Neurosurgical Intensive Care Units (NSICU) entails performing hourly neurological examinations throughout a patient's duration of stay to detect any indications of neurological decline.
- Delirium commonly occurs as a neuropsychiatric complication among patients in NSICU and may be attributed to sleep deprivation resulting from being awakened hourly for neurological examinations.
- The presence of delirium presents hurdles in patient management, correlating with prolonged hospitalization, and heightened morbidity and mortality rates.
- The consequences of sleep deprivation encompass delirium and impaired cognitive abilities, which impede neurological healing processes.

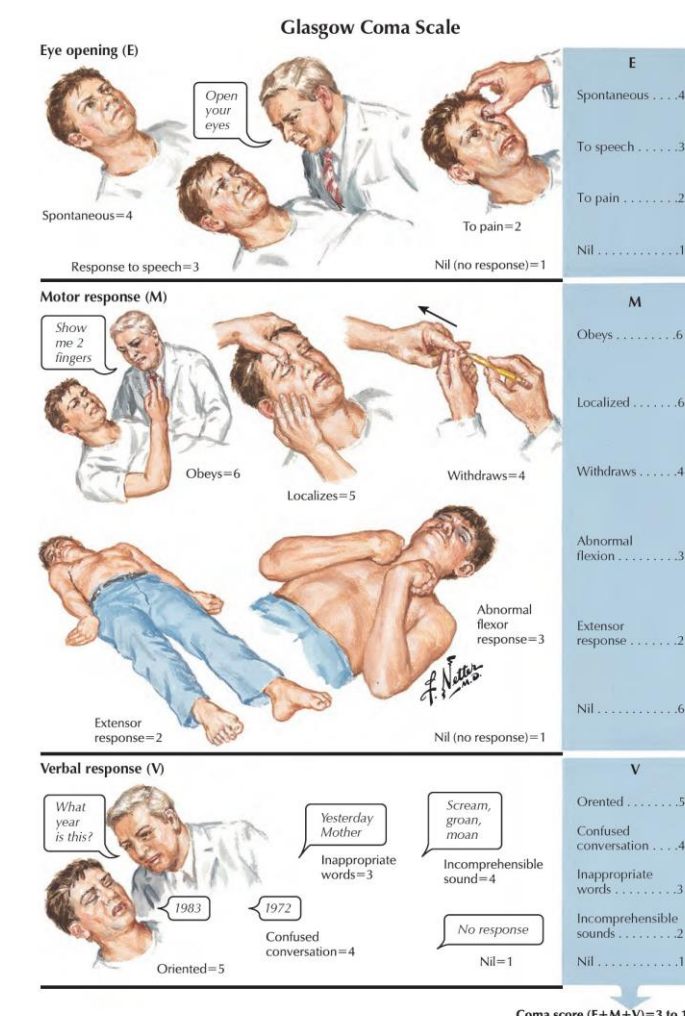


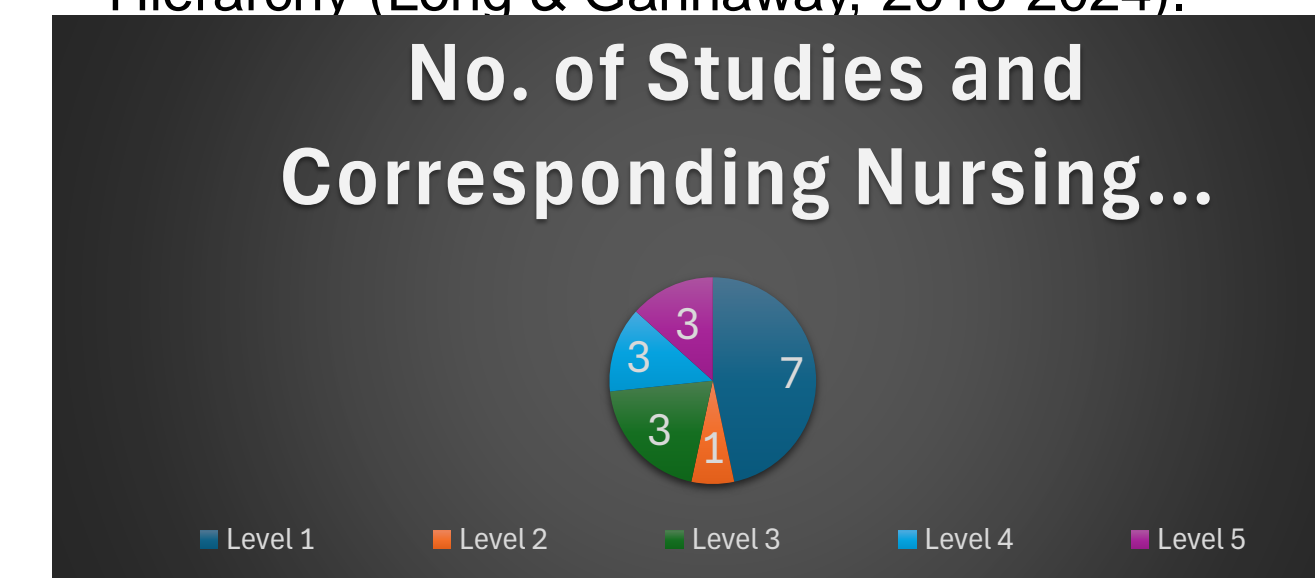
Image 1. How to calculate a Glasgow Coma Scale (GCS) score. Copyright 2016 Elsevier Inc. All rights reserved. www.netterimages.com

## METHODOLOGY

- A structured critical review of the literature was conducted employing methodologies outlined by Long & Gannaway (2015-2024).
- A systematic literature search to gather the highest-level published evidence, utilizing four primary literature databases: Cochrane Library, Medline, CINHAL, and PubMed. Additionally, bibliographic mining techniques were employed. The search utilized key terms: "delirium" and "neuro check" or "neurological assessment," or "neuro assessment."
- The search parameters were restricted to the timeframe of 2018-2024.
- Inclusion criteria included studies involving adults in an ICU receiving neuro checks, delirium, and sleep deprivation.
- Exclusion criteria included those studies without full text available.

## RESULTS

- A total of 67 articles were identified, each underwent critical analysis using evaluative check list PRISMA according to published appraisal guidelines. Among the 67 articles, four were duplicates, leaving 15 meeting the inclusion criteria for the research review.
- Findings from these 15 studies were analyzed, compared, and categorized into different levels of evidence using Nursing Levels of Evidence Hierarchy (Long & Gannaway, 2015-2024).



## LITERATURE SYNTHESIS

- The highest-level evidence available indicates a notable association between sleep deprivation, delirium occurrence, and the frequency of neurological examinations in NSICU patients.
- Seven systematic reviews (SR), and two lower-level studies place emphasis on identification, prevalence, and underlying factors contributing to delirium (Brunetti et al., 2023; Chang et al., 2019; Kappen et al., 2021; Kishore & Cusimano, 2021; Miranda et al., 2018; Patel et al., 2018; Shaw et al., 2019; Stokholm et al., 2019; Wu et al., 2022).
- Evidence from a SR and several lower-level studies pointed out sleep disturbances from routine neurological exams as factors interfering with sleep patterns leading to delirium development (Brunetti et al., 2023; Chang et al., 2019; Chotal et al., 2023; Kishore & Cusimano, 2021; LaBuzetta et al., 2023; McLaughlin et al., 2018).
- Evidence from several lower-level studies including three retrospective studies, underscores the crucial role of neurological exams in the NSICU for promptly detecting a decline in neurological status. These assessments may inadvertently contribute to the onset of delirium by interfering with sleep (Bryant et al., 2022; Chotal et al., 2023; LaBuzetta et al., 2021; LaBuzetta et al., 2023; McLaughlin et al., 2018).
- CAM-ICU and the ICDSC are valid tools used to assess and diagnose delirium in critically ill patients. The tools differ in design but are equally as effective at detecting delirium (Larsen et al., 2018; Miranda et al., 2018).

## CLINICAL IMPLICATIONS

- Decreasing the frequency of neuro exams in stable patients allows for longer periods of uninterrupted sleep, promoting better rest and potentially improving outcomes
- Minimizing disturbances during the night may decrease the incidence of delirium leading to better cognitive function and shorter hospital stays
- Reducing the frequency of neuro exams in stable patients allow the nurse to reallocate time and resources to other critical tasks

## CONCLUSIONS

- This research review, while constrained, suggests a significant correlation between sleep deprivation, the occurrence of delirium, and the frequency of neurological examinations among patients in the NSICU.
- The current body of research indicates a gap in understanding the ideal timing for reducing the frequency of examinations and determining the optimal duration between each assessment.
- Identifying a middle ground allowing for the timely detection of crucial neurological changes while mitigating the risk of sleep deprivation and subsequent onset of delirium is of importance.
- Additional investigation is warranted to refine protocols and guidelines, ultimately optimizing patient care and outcomes in the NSICU set

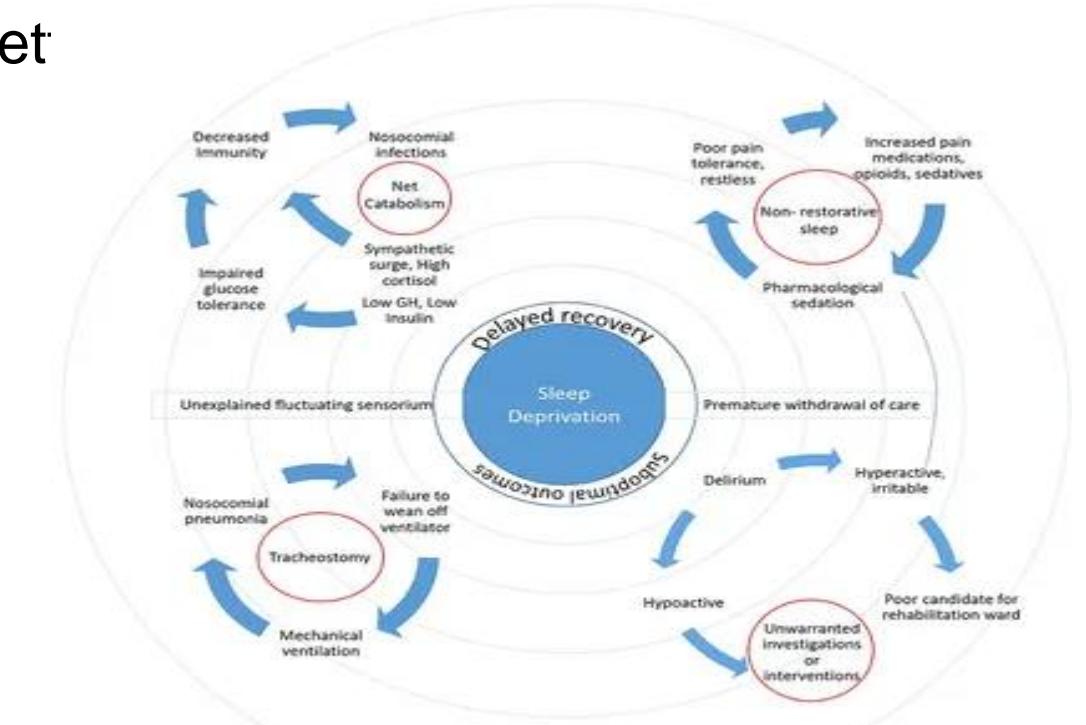
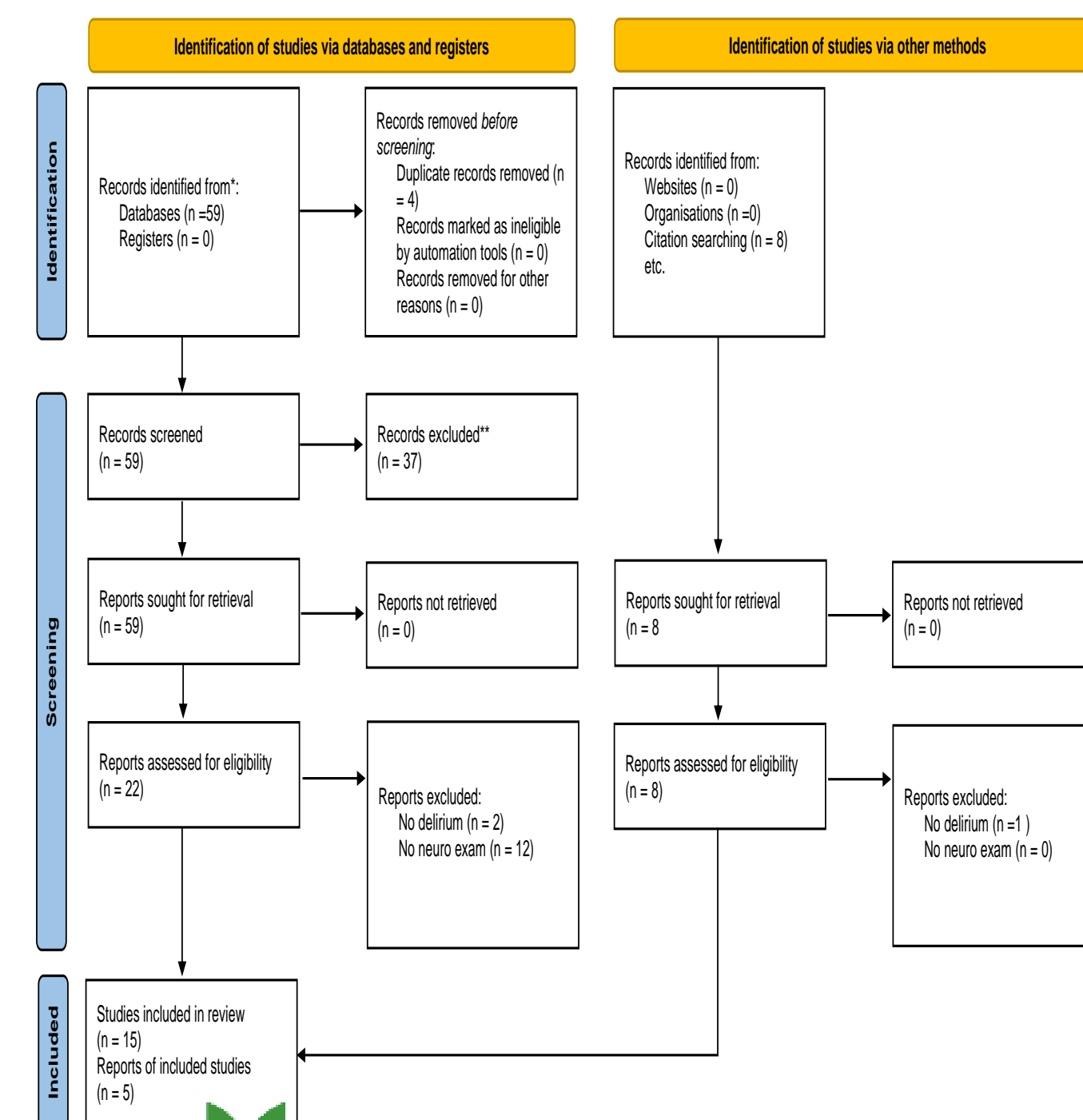


Image : The ripple effect of sleep deprivation highlights the complex interactions and far-reaching consequences on patient outcomes (Kishore & Cusimano, 2021)

## RESEARCH QUESTION

"In neurosurgical patients with a stable neurological exam 48 hours after admission, does the continuation of hourly neurological examinations compared to those patients with a progressive decrease in the frequency of neurological examinations lead to a higher incidence of ICU delirium over the course of their ICU stay?"

## LITERATURE SEARCH FLOW DIAGRAM



Consider, if feasible to do so, reporting the number of records identified from each database or register searched (rather than the total number across all databases/registers). If the reason for any exclusion is unclear, it should be stated by a human and how many records were excluded by automation tools.  
 From: Page MJ, McKenzie DE, Bossuyt P, Boutron I, Hoffmann TC, Mulrow CD, et al. The PRISMA 2020 statement: an updated guideline for reporting systematic reviews. BMJ 2021;372:n71. doi:10.1136/bmj.n71. For full text see: https://www.prisma-statement.org