International Centre for Allied Health Evidence

University of South Australia

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*i*CAHE JC Critical Appraisal Summary

Journal Club Details

Journal Club location	ECH
JC Facilitator	Bronwyn K
JC Discipline	Physiotherapy

Clinical Scenario

What are the short-term & long-term effects of sub-optimal sleep patterns on cognition, in older adults living in the community?

Review Question/PICO/PACO

P older community-dwelling adults

I reduced sleep (?< 6 hours)

C normal sleep

O cognition eg MMSE, MOCA. ?or QOL

Article/Paper

Lim ASP, Kowgier M, Yu L, Buchman AS and Bennett DA 2013, 'Sleep Fragmentation and the Risk of Incident Alzheimer's Disease and Cognitive Decline in Older Persons', *Sleep*, vol. 36, no. 7, pp. 1027-1032.

Please note: due to copyright regulations CAHE is unable to supply a copy of the critically appraised paper/article. If you are an employee of the South Australian government you can obtain a copy of articles from the DOHSA librarian.

Article Methodology: Cohort Study

Click here to access critical appraisal tool

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Ques No.	Yes	Can't Tell	No	Comments
1	✓			**Was the purpose stated clearly?** The study aimed to test the hypothesis that sleep fragmentation in community-dwelling older adults is associated with the risk of incident AD and the rate of cognitive decline.
2	✓			**Was relevant background literature reviewed?** The authors have cited previous studies that demonstrated association between sleep disruption and cognitive impairment and neurodegeneration, however recognize that to date the research has been of cross-sectional design, not the gold standard for research looking at risk factors – longitudinal, prospective cohort study design.
3	✓			**Describe the study design. Was the design appropriate for the study question?** The study used a prospective cohort design. In a prospective cohort study, a group of individuals with common characteristics are assembled and followed over time. It involves determining exposure (e.g. sleep fragmentation) who are free of the outcome of interest (e.g. Alzheimer's Disease (AD)) and evaluate participants for incident events (i.e. AD and cognitive decline) that occur over time. The objective of cohort studies is to compare the risk for an outcome or outcomes (e.g. AD or cognitive decline) that are defined by exposure status (e.g. sleep fragmentation). As such, this type of design is appropriate to address the aims of the current study.
4	✓ ✓			**Was the sample described in detail?** The study participants were described in table 1. **Describe ethics procedures. Was informed consent obtained?** The study was conducted in accordance with the latest version of the Declaration of Helsinki and was approved by the Institutional Review Board of Rush University Medical Center. Written informed consent was obtained from all subjects.
5	✓			**Were the outcome measures reliable? Were the outcome measures valid?** As discussed in the discussion the outcome measures used were appropriate *Objective non-intrusive measurements of sleep fragmentation were obtained over relatively long periods of time (up to 10 days) in participants' usual environments, avoiding confounding by poor recall or misperception (which can be a problem with self-report sleep function) while also avoiding perturbation of subjects' natural sleep behavior by the recording apparatus (a problem with polysomnography) and*

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				averaging out the effects of day-to-day variability and validated, *a rigorous, standardized, well characterized, and well-validated cognitive test battery, allowing a high degree of certainty regarding measurement of cognitive status and diagnosis of AD*.
6	✓ ✓			**Results were reported in terms of statistical significance?** The results were reported in terms of statistical significance. *Bottom line result*: An individual with high sleep fragmentation (90th percentile) had a 1.5-fold risk of developing AD as compared with someone with low sleep fragmentation (10th percentile). The association of sleep fragmentation with incident AD did not vary along demographic lines and was unchanged after controlling for potential confounders including total daily rest time, chronic medical conditions, and the use of common medications which can affect sleep. In a linear mixed effect analysis, a 0.01 unit increase in sleep fragmentation was associated with a 22% increase in the annual rate of cognitive decline relative to the average rate of decline in the cohort (Estimate = -0.016, SE = 0.007, P = 0.03). **Were the analysis method(s) appropriate?** Yes **What was the clinical importance of the results? Were differences between groups clinically meaningful?** Journal Club to Answer.
8	✓			**Did any participants drop out from the study?** Of 958 subjects with valid actigraphy and cognitive testing, 64 were excluded due to clinical dementia (see below) at the time of actigraphy testing, and a further 157 did not have a 2nd follow-up cognitive assessment, either because they died before follow-up testing (18 participants) or had not been in the study long enough (139 participants). This left 737 participants included in these analyses.
9	Journal Club to answer			**What did the study conclude? Conclusions were appropriate given study methods and results?**
10				**What do the study findings mean to practice (i.e. clinical practice, systems or processes)?**
11				**What are your next steps? (e.g. evaluate clinical practice against evidence-based recommendations; organise the next four journal club meetings around this topic to build the evidence base; organize training for staff, etc.)**

12		**What is required to implement these next steps?**

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