Reviewer's report

Title: Perception versus polysomnographic assessment of sleep in CFS and non-fatigued controls: results from a population-based study

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Reviewer: Eva Libman

Reviewer's report:

General
Strengths
The research question posed by the authors is well defined: what is the relationship between subjective and objective measures of sleep quality in individuals with CFS and non-fatigued controls? Evaluation of sleep characteristics and quality in people with CFS is relatively new in CFS research, and is of potentially major theoretical and important practical interest.

The methodology is well described. The present study is part of a series derived from the same large data set. It incorporates some novel features, e.g. taking alerting and sedating medication use into account in the analyses. The manuscript is clearly written.

Weaknesses

1. The most important problem is that the subjective data and the polysomnographic data do not correspond to the same time period. The only way one could accurately compare self-report experiential material and objective sleep patterns reflected by PSG and sleep laboratory observation is to have the participant report on exactly the night during which the objective sleep parameters were assessed. This is usually done by sleep diary completed the morning after the overnight study. As a consequence of this important omission, the title of the paper is not accurate.

2. An additional point related to subjective measurement in this study, is only retrospective questionnaires were used. It is known that on-going (i.e. diary measures) and retrospective questionnaires yield different data for the same experience. Symptoms in CFS are also somewhat cyclical in nature, and again this could only be captured by using sleep diaries for some consecutive number of days or weeks.

3. With respect to the objective data, the study did demonstrate that participants with CFS and controls did not differ in gross sleep architecture and parameters. Even without doing a spectral analysis of the PSG data (which might have revealed the illusive correlates of CFS-related sleep complaints), one could have noted alpha intrusions, which would indicate some subtler undermining of sleep quality. Since alpha/delta sleep has long been of interest in the related condition of fibromyalgia, and somewhat more recently in CFS, it was a bit surprising that this was not reported in this study.

4. Both participants with CFS and controls appear to spend at least 1 hour of nocturnal wakefulness during the measured sleep period (if one adds the times for SOL and WASO). The data suggest that both samples have similarly mild sleep disruption; rather both have equally non problematic sleep. This again highlights how essential it is to have both samples report on their perceived sleep lab sleep quality.

5. A more minor point is that there was no information about the timing of the sleep lab experience. Were participants awakened early (as is usual clinical practice), and sent home? This would have make a difference to the total sleep time measure, particularly since individuals with CFS often sleep late in the morning.

6. The fact that the MSLT did not reflect sleep deprivation in participants with CFS is not surprising. Individuals who report insomnia typically have difficulty falling asleep in the daytime as well.

Major Compulsory Revisions (that the author must respond to before a decision on publication can be reached)

It is difficult to specify how the methodology can now be modified to reflect measurement of the same time period for both subjective and objective measurement.

Minor Essential Revisions (such as missing labels on figures, or the wrong use of a term, which the author can be trusted to correct)
Discretionary Revisions (which the author can choose to ignore)

**What next?:** Reject because scientifically unsound

**Level of interest:** An article of importance in its field

**Quality of written English:** Acceptable

**Statistical review:** No, the manuscript does not need to be seen by a statistician.

**Declaration of competing interests:**

I declare that I have no competing interests