

Letter

How much sleep apnea is too much?

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See related research by Togo *et al.*, <http://arthritis-research.com/content/10/3/R56>, and related letter by Rapoport *et al.*, <http://arthritis-research.com/content/11/4/410>

Events of breathing interruption are universally observed during sleep. Togo and colleagues [1], in a study to identify respiratory and movement sleep disorders in chronic fatigue syndrome (CFS) patients with and without fibromyalgia (FM), employed an apnea-hypopnea index (AHI) of 18 events per hour as the normal limit and reported an absence of diagnosable sleep-disordered breathing (SDB). They utilized 18 events per hour as being a threshold 'sufficient to account for excessive daytime sleepiness' and did not report the observed AHI. An institutional task force established five events per hour as the normal AHI limit, based on an ample literature review. The Wisconsin Sleep Cohort Study provides evidence that an AHI ranging from 0.1 to 5 events per hour is enough to increase the risk of developing high blood pressure by 42% [2]. From an AHI of 0.1 to one of 18 events per hour, which cut-off point should be used in FM research? Should it be derived from the emergence of symptoms, from literature reviews, or from hypertension research?

Our group has shown that 50% of women, with any degree of SDB, present with FM [3]. Adrenergic stimulus is a potential cause of FM through the model of sympathetically maintained neuropathic pain syndrome [4,5] and the central sensitization model [6]. Intermittent hypoxia and arousals induced by SDB might be the missing link between sympathetic hyperactivity and FM [7]. From the Wisconsin Sleep Cohort Study data [2], one can infer that even an AHI >0.1 events per hour may be important when considering the potential effect of SDB on sympathetic activity.

Sympathetic hyperactivity has been associated with metabolic syndrome as well as with sleep apnea. Interestingly, in Table 2 of Togo and colleagues' paper [1] the body mass index of the group with CFS + FM is 3.4 kg/m² higher than that of the group with CFS alone - equivalent to

about 10 kg heavier - a biologically significant difference from the perspective of SDB. The chance of beta error (the error committed in accepting the null hypothesis) in stating that this difference is non-significant in their sample is greater than 50%. Despite the low statistical power, we believe that Togo and colleagues' results support the concept of fragmented sleep having a stressor role and a possible effect on FM. Their data warrant additional research on the influence of sympathetic hyperactivity on FM.

In answering our initial question, we emphasize that any number of SDB events that may influence the autonomic nervous system may be non-trivial. Until evidence-based knowledge is available, we advocate that even the lowest AHI should be reported when probing the role of disturbed sleep within the context of pain syndromes.

Competing interests

The authors declare that they have no competing interests.

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AHI = apnea-hypopnea index; CFS = chronic fatigue syndrome; FM = fibromyalgia; SDB = sleep-disordered breathing.