Sarcouncil Journal of Internal Medicine and Public Health

ISSN(Online): 2945-3674

Volume- 03| Issue- 04| 2024

Letter to the Editor **Received:** 22-07-2024| **Accepted:** 02-08-2024 | **Published:** 24-08-2024

Regular Exercise May Not Be the Only Factor that Determines Sleep Quality in Epilepsy Patients

Josef Finsterer

MD, PhD. Neurology Dpt., Neurology & Neurophysiology Center, Vienna, Austria, Orcid: 0000-0003-2839-7305

Keywords: sleep, epilepsy, exercise, seizures

LETTER TO THE EDITOR

We read with interest Mueller, *et al*'s article on a review of 23 studies that analysed the influence of exercise on sleep quality in epilepsy patients [Mueller, C. *et al*., 2024]. The aim of the review was to find out in how many studies sleep was an outcome parameter and to what extent physical exercise improves sleep quality in epilepsy patients [Mueller, C. *et al*., 2024]. Four studies were found that analysed direct (n=2) or indirect (n=2) training effects on sleep [Mueller, C. *et al*., 2024]. Of the two reports that assessed sleep directly, one reported small nonsignificant improvements in subjective sleep quality and no improvements in objective sleep quality in children after 12 weeks of walking and the other reported no benefits in subjective sleep quality after 12 weeks of combined aerobic strength, and flexibility training in adults [Mueller, C. *et al*., 2024]. It was concluded that research into the impact of regular exercise on sleep quality in epilepsy patients is needed [Mueller, C. *et al*., 2024]. The study is compelling but some points require discussion.

The first point is that sleep quality may depend not only on regular exercise, but on many other influencing factors. These were not taken into account in the study, which is why the results should be interpreted with caution. In addition to physical activity, the sleep quality in epilepsy patients can depend on the type of epilepsy and the type of seizures. If seizures occur primarily at night, sleep disturbances can occur. Generalised seizures will affect sleep more than focal seizures.

In general, sleep quality can depend on internal or external factors. Internal factors include comorbidities, levels of acute and chronic stress, personality type, and genetic background. A number of comorbidities can disrupt sleep. These include all diseases due to impairment of the central nervous system (e.g. pituitary dysfunction, Parkinson disease, restless leg syndrome, sleep apnea syndrome), lung disease (e.g. asthma, infections, chronic bronchitis), cardiac disease (e.g. heart failure, malignant ventricular arrhythmias, high blood pressure), gastrointestinal disease (e.g. diarrhoea, constipation, bloating), and a number of non-specific symptoms such as pain, fever, or autonomic disturbances. For example, patients with acute or chronic pain that occurs at night may experience sleep disturbances. Epilepsy patients with high cortisol levels may experience intermittent sleep.

External factors that determine sleep quality are the level of surrounding electro-smog, air quality, humidity, temperature, noise, brightness of the environment, vibrations, presence or absence of insects or other animals in the bedroom, relationship with neighbours living in the next apartment, and several others. Sleep quality can also depend heavily on current medication. Several of the anti-seizure drugs may have a sedating effect, which may improve sleep quality and sleep duration. It is also important to know how many of the patients in the included studies took hypnotics, sedatives, neuroleptics, antidepressants, or illicit drugs. It should also be mentioned how many regularly drank alcohol, coffee, cola, black tea, or Red Bull.

A second point is that in most included studies, sleep quality was assessed only using scores, not objective measurements obtained in a sleep laboratory. Because subjective sleep quality can differ greatly from objective measures, studies that only subjectively assessed sleep quality should have either been excluded from the review or compared with studies in which sleep quality was assessed objectively.

In summary, the interesting study has limitations that put the results and their interpretation into perspective. Clarifying these weaknesses would strengthen the conclusions and could improve the study. Sleep quality in epilepsy patients may

***Corresponding Author:** Josef Finsterer

DOI- https://doi.org/10.5281/zenodo.**13370271**

depend not only on the level of regular exercise, but on numerous other factors that should be considered before recommending regular exercise as a sleep improver to epilepsy patients.

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Source of support: Nil; **Conflict of interest:** Nil.

Cite this article as:
Finsterer, J. "Regular Exercise May Not Be the Only Factor that Determines Sleep Quality in Epilepsy Patients." *Sarcouncil Journal of Internal Medicine and Public Health* 3.4 (2024): pp 13-14.

Publisher: SARC Publisher