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Letter to the Editor

Before Attributing Poor Sleep Quality to e-Cigarette Consumption, All Factors Influencing Sleep Performance must be Included in the Analysis

Josef Finsterer
Neurology & Neurophysiology Censer, Vienna, Austria

Corresponding Author: **Josef Finsterer**

Letter to the Editor

We read with interest the article by Jeong *et al*. on the relationship between e-cigarette use and sleep quality in 159,505 Korean adults. Participants were categorized as dual users, exclusive e-cigarette users, conventional cigarette smokers, ex-smokers, and non-smokers, and their sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI) [1]. Poor sleep quality was found in 34.2% of participants. Ex-smokers, conventional cigarette smokers, e-cigarette users, and dual users were identified as predictors of poor sleep quality [1]. The authors concluded that both exclusive and dual e-cigarette use were associated with poor sleep quality, independent of smoking history and cumulative exposure [1]. The study is interesting, but some points warrant further discussion.

Firstly, sleep quality depends not only on smoking or e-cigarette use, but on numerous other influencing factors [2]. These include endogenous and exogenous factors such as genetic predisposition, personality type, stress management skills, comorbidities (e.g., restless legs syndrome, pain, shortness of breath, COPD, asthma, SAS, epilepsy, heart failure, pain syndrome, depression, neurosis, psychosis), sleep habits (e.g., fixed or variable bedtime, sleep aids (reading, television, music, airing out the bedroom), removal and switching off of all devices that generate electromagnetic radiation), acute and chronic stress (e.g., type of work, noise, light, vibrations, drafts, insects, pets, earthquakes, bed type, children, partner, electrosmog, nighttime light pollution, cell phone towers, relationships with neighbors, socioeconomic status, local, regional, national, and geopolitical conditions), diet, time of last meal or fluid intake, concurrent use of medications, consumption of alcohol, adrenergic stimulants or illegal drugs, and dietary supplements [2]. As long as these disruptive factors, which can significantly affect sleep quality, are not taken into account, the results obtained may not be reliable.

Secondly, sleep quality may also depend on cerebral imaging findings, which were not reported [3]. Therefore, it is crucial to include cerebral morphology in the analysis. Of particular interest is how many participants had a history of vascular events, infectious or inflammatory brain diseases, immunological disorders, traumatic brain injuries, or malignant diseases.

The third point is that sleep quality was not objectively assessed using polysomnography [1]. Since the PSQI has several limitations [4], it would have been useful to examine whether the PSQI results are indeed representative and reliable. The PSQI has several inherent limitations. As it is a retrospective instrument, it relies on participants' memories, making it susceptible to reporting biases, such as underestimating sleep latency or overestimating total sleep duration, particularly in participants with cognitive impairments and those unaccustomed to documenting their sleep. The PSQI is also poorly suited to capturing acute, nocturnal variations, as it is designed to measure habitual sleep over a one-month period. The PSQI also fails to capture nightmares or shallow sleep, as these are not adequately represented by the score [4]. The PSQI may not adequately capture sleep irregularities, particularly in shift workers or individuals with circadian rhythm disorders. It does not effectively measure sleep depth and recovery, may not detect hypersomnia because it focuses on insomnia, and may neglect daytime sleepiness [4]. Another disadvantage of the PSQI is its inconsistent factor structure, which varies depending on the population group (e.g., athletes, older adults, or psychiatric patients). Furthermore, the PSQI correlates only weakly with objective measurements [5]. It may reflect a person's general mood, mental health, or cognitive state rather than their actual sleep parameters. Because the 19-item PSQI questionnaire is time-consuming, it can lead to respondent fatigue and thus to missing data and inaccurate answers.

Before attributing poor sleep quality to the use of e-cigarettes, all factors influencing sleep performance must be included in the analysis and the PSQI results must be replaced by objective measures of sleep performance.

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