# Sleep quality in diabetic patients depends on numerous influencing factors

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Dear Editor,

We read with interest the article by Saparwan et al. on a cross-sectional study of sleep quality in 319 patients with type 2 diabetes using the Malaysian version of the Pittsburgh Sleep Quality Index (PSQI-M) with a cut-off of >5 for poor sleep quality and Depression Anxiety Stress Scale-21 (DASS-21).[1] The mean PSQI-M was 4.04, and 23% had poor sleep quality.[1] Poor sleep quality has been associated with Indian ethnicity, separation or widow status, nocturia and depression.[1] It was concluded that the prevalence of poor sleep quality was lower compared to other studies and could be improved with improved treatment of all etiological factors.[1] The study is impressive, but some points should be discussed.

Although the exclusion criteria included shift work, travelling across time zones within a month, pregnant women, breastfeeding mothers, type-1 diabetes, mental illness or taking psychotropic medication of any kind, a sleep disorder diagnosed before diabetes and patients with endocrine disorders (e.g. thyroid disease), chronic glucocorticoid use and heart failure, several other factors that influence sleep quality were not taken into account, and corresponding patients were obviously not excluded.

Poor sleep quality is multi-causal and can also be due to neurological disease such as seizures from diabetic encephalopathy,[2] ischemic stroke due to diabetic macro-angiopathy,[3] Parkinson disease,[4] restless legs, neuropathic pain in patients with diabetic polyneuropathy, cardiac arrhythmias, peripheral artery disease due to diabetic microangiopathy, lung disease such as chronic obstructive pulmonary disease (COPD),[8] sleep apnea syndrome, urological diseases such as pollakisuria or nocturia, orthopedic disease (e.g. musculoskeletal pain), gastroenterological disease (e.g. nausea, gastritis, reflux), immunological disease such as arthritis, colitis, Crohn's disease, or due to other concomitant diseases.

Sleep quality also depends heavily on lifestyle and exogenic factors, such as eating habits, timing of water and food intake, taking illegal drugs and the use of adrenergic stimulants, such as nicotine, caffeine, cola, Red Bull or abuse of alcohol. The noisy sleeping place, humidity, the noisy workplace, the personality structure and the pattern of social interactions were also not taken into account. These potentially influencing cofactors must be included in the analysis and require detailed discussion.

Another strong factor influencing sleep quality that is not considered is current medication. Although those taking psychotropic drugs such as hypnotics, sedatives, antidepressants, neuroleptics or steroids were excluded from the study, there are several other drugs that can affect sleep quality, such as adrenergic drugs, antiepileptics, anti-Parkinson drugs, beta-blockers, choline-esterase inhibitors (e.g. donepezil, rivastigmin, galantamine), decongestants and medicines containing caffeine. In order to assess whether other co-medications affected sleep quality or not, it is important to know how many of the included patients were taking one of these medications.

A limitation of the study is that the test–retest variability of the PSQI-M and DASS-21 was not assessed. In particular, depression scores can vary significantly between different tests at different times.

In summary, the excellent study has limitations that should be addressed before drawing final conclusions. Clarifying the weaknesses would strengthen the conclusions and could improve the study. Poor sleep quality in diabetics may be due not only to hormonal imbalances that increase appetite, blood sugar and insulin resistance and can lead to obesity and poor blood sugar control but also to several other complications of diabetes or co-morbidities. Neurological co-morbidities in particular can have a strong influence on sleep hygiene. Therefore, it is recommended that diabetics with poor sleep quality undergo neurological evaluation, including cerebral imaging, electroencephalography and nerve conduction studies, and screen their current medication for side effects such as sleep disturbance.

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## REFERENCES

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