Endogeneity bias in the relationship between sleep and mental health

Jose A. Martínez¹ and Laura Martínez¹

¹Business Management Department, Universidad Politécnica de Cartagena. C/ Real

December 11, 2023
In a recent published paper, Kahn (2023) [1] studied the relationship between sleep and mental health among pregnant women in Saudi Arabia. Using a sample of 110 individuals, and after applying a stepwise regression model, they found that insomnia and fatigue were significant predictors of depression and anxiety. However, not considering the reciprocal relationships between some of the concepts analyzed is a major concern for acknowledging the validity of results.

Kahn (2023) [1] predicted depression and anxiety from some variables related to sleep, considering both insomnia and fatigue as determinants of mental health (depression and anxiety), although they recognized as a limitation the inability of determining a causal relationship between poor sleep and mental health issues.

However, [1] did not take into consideration an important feature of these types of variables which is essential to achieving statistical analysis; the reciprocal relationships among them. There is ample support in the literature regarding the reciprocal relationships between insomnia and depression [2,3,4,5,6,7,8], and regarding the bidirectional relationship between insomnia and anxiety [7,9,10,11].

A reciprocal relationship invalidates results of linear regression achieved by [1] because of the endogeneity issue. A reciprocal relationship between the dependent and an independent variable is a form of endogeneity called simultaneity. Endogeneity occurs when a determinant of the dependent variable is correlated with the error term in the model, and it causes model misspecification. Therefore, regression parameters estimated are biased [12,13] and, consequently, results are seriously questioned. The importance of addressing endogeneity is well explained in [14], being a part of the editorial policy in the most rigorous academic journals.

Therefore, the main conclusion reached by [1]: “pregnant women who have poor sleep quality are more likely to have mental health issues, including anxiety and despair”, could be reversed by, for example: pregnant women who have mental health issues are more likely to have poor sleep quality. To deepen into these relationships, it would be necessary to re-analyze data, using instrumental variables to address endogeneity.

In sum, [1] addressed interesting research problem in a sample of pregnant women in Saudi Arabia. The valuable effort made by collecting data of several questionnaires for evaluating the results of sleep and mental health was shadowed by the flawed statistical method employed. Consequently, interpretation of results is questionable.

References
   https://doi.org/10.1053/smrv.1999.0075
   https://doi.org/10.1016/j.neures.2023.04.006
   https://doi.org/10.1016/j.sleep.2016.03.014
   https://doi.org/10.5665/sleep.3388
   https://doi.org/10.1016/j.jad.2022.11.002
   https://doi.org/10.1007/s12144-021-02373-4
   https://doi.org/10.1177/0149206320960533
   https://doi.org/10.1016/j.leaqua.2010.10.010