

# LETTER TO THE EDITOR (NOVEMBER 15, 2017) CONCERNING THE PAPER “SCREENING COMMERCIAL DRIVERS FOR OBSTRUCTIVE SLEEP APNEA: VALIDATION OF STOP-BANG QUESTIONNAIRE”

Dear Editor,

I read the article entitled “Screening commercial drivers for obstructive sleep apnea: Validation of STOP-Bang questionnaire” by Popević et al., published in the “International Journal of Occupational Medicine and Environmental Health” in 2017 [1]. The authors conducted a validation study of the STOP-Bang (snoring, tiredness, observed apnea, high blood pressure, body mass index (BMI), age, neck circumference, and male gender) questionnaire considering sleep polysomnography to be the gold standard of obstructive sleep apnea (OSA). The authors recruited 100 male commercial drivers, aged 24–62 years old. Sensitivity and specificity for apnea-hypopnea index (AHI)  $\geq 15$  ranged 91–74% and 75.3–90.9%, respectively, using the receiver operating characteristic curve analysis. The authors recommend the STOP-Bang questionnaire as a screening tool for OSA, and I have some concerns about their study.

Firstly, I understand that a simple screening procedure utilizing a questionnaire is needed to identify patients with OSA. However, the response to item 1 and 3, which relate to snoring and breathing cessation during sleep, is sometimes difficult to obtain using a self-administered questionnaire [2]. The lack of response to these 2 items of the STOP-Bang questionnaire should be discussed in the article.

Secondly, the authors presented sensitivity and specificity by setting AHI  $\geq 15$  and AHI  $\geq 30$  as the gold standards of OSA. I understand that AHI  $\geq 15$  reflects moderate to severe OSA, and AHI  $\geq 30$  reflects severe OSA. When compared with AHI  $\geq 30$ , AHI  $\geq 15$  was extensively screened by the STOP-Bang questionnaire by exploring the max value of the Youden index. I think that it is inappropriate to recommend screening of severe OSA by means of the STOP-Bang questionnaire.

Finally, the STOP-Bang questionnaire exhibited superior screening ability as compared to several other related questionnaires [3], although the screening ability of the STOP-Bang questionnaire for OSA differs with differences of population characteristics [4]. In addition, the report indicated that adding a body type item to the STOP-Bang questionnaire improved prediction for OSA, especially with respect to the moderate to severe OSA [5]. The effect of aging on the prevalence of OSA with the STOP-Bang questionnaire may be partly related to the content of an item [6], and physiological measurement for OSA should be considered to improve the screening ability of the STOP-Bang questionnaire.

**Key words:**

Obstructive sleep apnea, Questionnaire, Validity, STOP-Bang, Commercial drivers, Screening

**ACKNOWLEDGMENTS**

I appreciate the members of the Department of Hygiene and Public Health, Nippon Medical School, Tokyo, Japan, for their comments.

**REFERENCES**

1. Popević MB, Milovanović A, Nagorni-Obradović L, Nešić D, Milovanović J, Milovanović APS. Screening commercial drivers for obstructive sleep apnea: Validation of STOP-Bang questionnaire. *Int J Occup Med Environ Health*. 2017;30(5):751–61, <https://doi.org/10.13075/ijomeh.1896.00906>.
2. Kawada T. Obstructive sleep apnea, excessive daytime sleepiness, and adherence to antihypertensive treatment: Questionnaire survey. *J Clin Hypertens (Greenwich)*. 2017;19(12):1383, <https://doi.org/10.1111/jch.13082>.
3. Nagappa M, Liao P, Wong J, Auckley D, Ramachandran SK, Mementsoudis S, et al. Validation of the STOP-Bang questionnaire as a screening tool for obstructive sleep apnea among different populations: A systematic review and meta-analysis. *PLoS One*. 2015;10(12):e0143697, <https://doi.org/10.1371/journal.pone.0143697>.
4. Abrishami A, Khajehdehi A, Chung F. A systematic review of screening questionnaires for obstructive sleep apnea. *Can J Anaesth*. 2010;57(5):423–38, <https://doi.org/10.1007/s12630-010-9280-x>.
5. Sangkum L, Klair I, Limsuwat C, Bent S, Myers L, Thammasitboon S. Incorporating body-type (apple vs. pear) in STOP-BANG questionnaire improves its validity to detect OSA. *J Clin Anesth*. 2017;41:126–31, <https://doi.org/10.1016/j.jcline.2016.12.019>.
6. Dubey A, Bajaj DK, Mishra A, Singh BP, Gupta V, Kant S, et al. Obstructive sleep apnea risk for driving license applicants in India – A community based study. *Int J Occup Med Environ Health*. 2017;31(1):25–36, <https://doi.org/10.13075/ijomeh.1896.01021>.

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