AUTHORS' RESPONSE (NOVEMBER 28, 2017) TO THE LETTER TO THE EDITOR CONCERNING THE PAPER "SCREENING COMMERCIAL DRIVERS FOR OBSTRUCTIVE SLEEP APNEA: VALIDATION OF STOP-BANG QUESTIONNAIRE"

Dear Editor,

We would like to thank the author of the letter to the Editor [1] for his interest in our manuscript entitled "Screening commercial drivers for obstructive sleep apnea: Validation of STOP-Bang questionnaire" published in the "International Journal of Occupational Medicine and Environmental Health" in 2017 [2].

We appreciate the constructive criticism of the author of the letter. We have addressed each of his concerns as outlined below.

The initial concern is about the response to the item 1 and 3 of the STOP-Bang (snoring, tiredness, observed apnea, high blood pressure, body mass index (BMI), age, neck circumference, male gender), which relate to snoring and breathing cessation during sleep, and in respect of which the author of the letter has taken the stand that answers to both questions are difficult to obtain using a self-administered questionnaire, citing a similar letter to the editor [3]. In that letter, Kawada has raised the issue of possible underestimation or overestimation of obstructive sleep apnea (OSA) in case answers to questions on snoring and breathing cessation in the STOP-Bang are missing.

We agree with the author that this could be a significant issue. In our manuscript we reported the results of the STOP-Bang translation and validation study in the sample of commercial drivers. Our subjects had been tested and retested after several months, and on both occasions we had not experienced any issues of missing responses to the items in the subjective (STOP) part of the STOP-Bang screening model. We had only seen a somewhat lower level of the test–retest agreement on questions about snoring (Cohen's κ = 0.8), which was reported in the manuscript.

We are aware that the items 1 and 3 are based on the information that subjects obtain from their partners, spouses or family members, but almost all self-reported questionnaires for OSA screening include similar if not identical items, which have proven their validity through many studies [4].

The second concern is that the diagnosis of OSA is based on the apnea-hypopnea index (AHI) ≥ 15 and AHI ≥ 30 events/h of sleep. We respectfully have to disagree. In the Material and Methods (Polysomnography) section as well as in the Results section of the manuscript, we clearly identified that OSA was diagnosed if the AHI was equal or greater than 5 events/h of

sleep. Polysomnography revealed the presence of OSA (AHI ≥ 5) in 57% of the subjects. Eleven patients had a moderate form of OSA and 12 had severe OSA. The predictive parameters of the STOP-Bang for subjects with different OSA categories were shown in the Table 2 [2].

We used the receiver operating characteristic (ROC) curve and Youden index (J) for determining the best cut-off value for moderate and severe OSA while the target population in that study included commercial drivers.

As explained in our manuscript, the current EU directive 2014/85/EU [5], governing the issue of OSA and fitness to drive, indicates that all amateur and commercial drivers must be screened for OSA risk. Drivers found to be in the high risk of moderate and severe OSA must be further examined and treated; hence our strong focus on these levels of OSA severity. The data on appropriateness of screening for (not diagnosing) moderate or severe OSA with the STOP-Bang questionnaire may be found in several studies covering varied target populations (general population, sleep clinic, commercial drivers), as explained by the questionnaire author [6].

In our study we also clearly identified the issue of low specificity of the STOP-Bang and the potential solutions for that issue.

We agree with the author of the letter that there are further possibilities of improving the predictive properties of the STOP-Bang questionnaire, including body type (apple vs. pear), serum bicarbonates level, alternative scoring models, etc., [6,7], but in our study, the main focus was on translation and validation of the original STOP-Bang scoring model in the population of the commercial drivers.

In our opinion, this paper has shed some light on the subject of usefulness of the standard OSA screening questionnaire in the population of commercial drivers. There is a strong need for further research in the area of OSA screening of commercial drivers in order to alleviate the burden of traffic accidents worldwide.

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