



Correspondence

Allergic sensitization and sleep in children with asthma



Esteban et al¹ investigated the association between increased allergic sensitization and sleep outcomes in 196 urban schoolchildren, aged 7 to 9 years, with persistent asthma. By hierarchical regression analysis, the number of positive allergy test results significantly predicted variability in sleep efficiency. In addition, variability in forced expiratory volume in 1 second was a significant moderator in the association between number of positive allergy test results and variability in sleep efficiency. I have some concerns about their study with special reference to statistical validity.

First, the authors assumed that the number of positive allergy test results was normally distributed. From the data in their table 2, I suspect that logarithmic transformation of this independent variable is needed for conducting multiple (hierarchical) regression analysis to clarify the dose-response relationship. Alternatively, classifying the number of positive allergy test results into 3 groups can be used for logistic regression analysis, if sleep outcome as a dependent variable can be binary converted.² Statistical significance between the number of positive allergy test results and variability in sleep efficiency is not strong, especially in children with decreased value of forced expiratory volume in 1 second. Because asthma severity and sleep disordered breathing are speculated to be related to variability in sleep efficiency, these factors should be included into independent variables to know the association between

the number of positive allergy test results and variability in sleep efficiency.

Second, the authors mentioned racial and ethnic difference in allergic sensitization and sleep. By increasing the number of samples, ethnicity should be evaluated by multivariate analysis.

Third, coefficients of determination (adjusted R^2) by all the independent variables to predict variability in sleep efficiency should be presented. In addition, there is a rule that more than 10 samples in each independent variable are needed for multiple regression analysis,³ and inclusion criteria of independent variables for the hierarchical regression analysis should be precisely described.

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References

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Disclosures: Author has nothing to disclose.

Authors' response



We appreciate the comments on our manuscript. Our study¹ investigated the association between allergic sensitization and sleep outcomes in a sample of urban children with persistent asthma. In response to the submitted comments, we would like to clarify our rationale for the specific data analyses mentioned.

In reference to our assumption that the number of positive skin test results was normally distributed, we attempted a log transformation of the number of positive allergy test results. However, this transformation did not significantly affect the distribution of the random variable. With a sample size of 196, the normality assumption was less of a concern for us given the large sample size and the fact that the SD was less than the mean. The number of allergy

tests was also a continuous variable and not categorized as suggested for 2 reasons: (1) interest was in understanding the effects of a single additional positive allergy test result rather than the difference between arbitrary groups (of the number of positive allergy test results) and (2) power would be reduced as the result of categorizing a continuous variable. Although we agree with the commenter that logistic regression would be appropriate if interest had been in predicting binary sleep outcomes, the outcome of interest in this case was a continuous measure of sleep. Again, forcing this variable to be binary, which is not how these sleep outcomes are typically examined, would reduce power and the ability to answer the research question we were interested in. Furthermore, our interest was in understanding and interpreting effect sizes rather than the degree of statistical significance, which is a function of more than just the strength of a relationship (but also, for example, on the sample size).

Moreover, we considered the option of forcing particular variables into the model (eg, asthma severity) but chose to take a more

Disclosures: Authors have nothing to disclose.

Funding Sources: This study was supported grant R01 HD057220 from the Eunice Kennedy Shriver National Institute of Child Health and Human Development (Dr Koinis-Mitchell, principal investigator).

<https://doi.org/10.1016/j.anaai.2017.10.014>

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systematic, data-driven approach to selecting confounders: consider covariates to be variables significantly associated with both the predictor and outcome. Furthermore, multivariate analysis was certainly another option we considered for analyzing ethnic differences, but we chose to explore these associations using correlation analysis and analysis of variance, which were reasonable given the sample size and distribution of the predictor/outcome. Finally, adjusted R^2 values were presented for potential moderators because they were used to compare nested models with and without the moderator included.

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