

## In Response to Comment on “Associations Between Headache (Migraine and Tension-Type Headache) and Psychological Symptoms (Depression and Anxiety) in Pediatrics”

### To the Editor:

We appreciate your interest in our recently published article, “Associations between headache (migraine and tension-type headache) and psychological symptoms (depression and anxiety) in pediatrics: A systematic review and meta-analysis” (1).

In our analysis, the Children’s Depression Inventory scores were found to be significantly higher in the migraine group than in the control group. However, the results were heterogeneous, as shown in Fig. 2(A) of the original article. Consequently, we used a random-effects model to conduct a meta-analysis according to the standardized process for carrying out such analyses. However, with heterogeneous results, the possibility of uncertainty in the overall effect size remains. Given that some degree of uncertainty is inherent in any effect size estimation, even with homogeneous results, it would be expected to be amplified in scenarios with heterogeneous data. Nevertheless, despite the observed heterogeneity in results, additional analyses are not always necessary. In the letter by Chen et al., the authors provided a 95% prediction interval through additional analyses. For the effect size of the results in Figure 2(A) of the original article, the 95% prediction interval was  $-0.5$  to  $1.44$ . Since this interval includes  $0$ , there is a high probability that there is no significant

difference between the migraine and control groups. However, it should be noted that prediction intervals tend to be wider for smaller sample sizes (2). Moreover, if the assumption of normality is not met, the prediction interval results can be distorted (2). Therefore, solely relying on a prediction interval to interpret an effect size in the face of heterogeneous meta-analysis results is potentially risky.

If the meta-analysis results are heterogeneous, they should be analyzed using the random-effects model according to the standardized process for conducting meta-analyses. The effect size is then interpreted accordingly. Subsequently, through additional analyses, prediction intervals can be calculated, and researchers can refer to them in the result description alongside the overall effect size calculated through the meta-analysis. The prediction interval should be used only as a reference and not be heavily relied upon.

Min Cheol Chang, MD  
Department of Rehabilitation Medicine, College of  
Medicine, Yeungnam University, Daegu, Republic  
of Korea  
E-mail: wheel633@ynu.ac.kr

### REFERENCES

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