Author’s response to reviews

Title: Factors associated with myopia in Korean children: Korea National Health and Nutrition Examination Survey 2016–2017 (KNHANES VII)

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Author’s response to reviews:

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Nabin Paudel, Ph.D
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Dear Paudel,

First of all, we would like to express our appreciation to the reviewers for providing us with many suggestions, which helped us improve our manuscript entitled “Factors associated with myopia in Korean children: Korea National Health and Nutrition Examination Survey 2016–2017 (KNHANES VII)”.


We also found some critical comments that make our manuscript to be suitable for publication in BMC Ophthalmology. The manuscripts reviewed by a professional native English-speaking editor. Hereafter, we attach our point-by-point responses to the reviewers’ comments. I hope the revised manuscript will better meet the publication requirement of the BMC Ophthalmology.

Sincerely,

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Reviewer 1

The purpose of this study was to evaluate the prevalence and risk factors associated with myopia and high myopia in children in South Korea. A total of 983 children (reduced from 1,237) age 5-18 years were evaluated. Myopia and high myopia were defined as a spherical equivalent (SE) ≤-0.5 D and SE ≤-6.0 D. The association between refractive errors and potential risk factors for myopia was analyzed. Both Ophthalmic examinations and a survey were used. Statistical analyses were performed correctly using the SAS survey procedure, to reflect the complex sampling design and sampling weights of KNHANES, and to provide representative national prevalence estimates. The procedures included unequal probabilities of selection, oversampling, and non-response such that inferences could be made about Korean adult participants. KNHANES sampling was weighted by adjusting for oversampling and nonresponses. Potential risk factors were correctly assessed by subject, not by eye. Age, gender, BMI, presence of parental myopia, time spent on near work activities, household income, and accompanying disease (atopic dermatitis, allergic rhinitis, asthma, sinusitis, otitis media, ADHD, etc., were analyzed as possible risk factors for pediatric myopia using univariate logistic regression. Factors with P<0.2 were simultaneously adjusted in a multivariable logistic regression analysis.

The results are interesting. The mean subject age was 12.2±0.2 years, and mean refractive error was -1.84±2.38. Among all the subjects, 643 (65.4%) had myopia, and 68 (6.9%) had high myopia. In a univariate analysis, the representative value (mean, median) of age and BMI sequentially increased with increased myopia level (non myopia - low myopia - high myopia), and was statistically significant (P<0.001). Not surprisingly, the participants with parental myopia (P=0.016) and increased time spent on near work activities (P=0.033) had increased risk
of myopia in a similar manner. Prior histories of accompanying disease, such as atopic dermatitis or sinusitis, as diagnosed by a doctor, were also found to be possible factors influencing the development of pediatric myopia. These are interesting observations. In the adjusted multivariate model, older age and parental myopia were significantly associated with myopia. Not surprisingly, yet worth publishing. According to this analysis, 1 additional year of age was associated with a 1.27-fold higher risk for myopia, and a 1.44-fold higher risk for high myopia, compared with children 1 year younger. In a similar manner, children with myopic parents had 1.84-fold greater risk for myopia and 3.48-fold greater risk for high myopia than children without myopic parents. Higher BMI was significantly associated with high myopia. Although the effect of BMI on development of myopia is still controversial, the authors offer reasonable comment on that in the Discussion section, giving also reference to other studies from the literature.

The authors candidly admit that there are several limitations in this study. For example, refractive errors were not evaluated under cycloplegic conditions, which could bias the results in younger subjects, who tended to have a more active accommodative response than older subjects. Also, the KNHANES is a cross-sectional study, so the results cannot guarantee a causal relationship.

The conclusion is correct, and indeed, further studies are required to reveal causal relationships. Thank you for careful comment. As you commented, the parental factors are well-known risks for developing myopia. However, the effect of BMI was not clear, that was one of our agonizing part. It’s glad to hear that the possible explanation in the discussions was reasonable. Further study would be needed to clear the causable effect.

Reviewer 2

I understand that the study is a cross-sectional study to evaluate Factors associated with Myopia in Korean Children

a very important type of research

very important risk factors to be analyzed were included in the study

sample size could be larger but not a major defect in the study

but there is a major defect which is the core of diagnosis of myopia in children which should be based on Cycloplegic refraction

Most of the diagnosed cases at this age group with myopia could be normal after cycloplegia so the incidence of myopia concluded by the study should be more than the real percentage it is not only a limitation in the study to be mentioned in the discussion; it is the core of the diagnosis upon which the percentage and incidence of the disease is concluded so the mistake affects the main conclusion
Thank you for your important comment for the question pressing for serious consideration.

We agree with the reviewer that the refractive error which was measured without cycloplegia, may lead to the overestimation of the prevalence of myopia, especially in the young age group; However, the association of the refractive errors and aging, parental myopia are robust and consistent throughout all analyzes. We focused our attention to get the much higher incidence and prevalence, increasing tendency and possible modifiable factor for developing myopia and high myopia, which directly related to amblyopia or other myopia related complications in individual level, increasing socio-economic burden at a national level. We carefully consider the key messages of our conclusion- the more children has risks related to myopia in our country, BMI might be a modifiable factor, near work time is significantly not associated in our analysis- are still has power. The KNHANES is not designed specifically for an ophthalmological evaluation of the children, but it enrolled about 1,000 children with various informs, the results of studies using prior data (2008-2012)[1-2] are consist with our results (2016-2017). Moreover, the difference between auto-refraction and cycloplegic refraction is closely related within 1 diopter according to the previous report [3]. This level of agreement is not surprising because, while lack of cycloplegia leads to an over-estimation of myopia, the biggest problem with noncycloplegic refractions concern the under-estimation of hyperopia and the resulting errors in estimation of mean spherical equivalent.[4] Even then, the cycloplegic refraction is definitely required to assess refractive error in the children, the researchers including authors should continue their efforts to get the exact results with cycloplegic refractions in this type of studies. We added these comment to the discussion section (Page 13, line 4-13).

We deeply appreciate your time and effort for our manuscript.


