INPLASY PROTOCOL

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Corresponding author:
Hongsheng Bi

hongshengbi@126.com

Author Affiliation:
Affiliated Eye Hospital of Shandong University of Traditional Chinese Medicine.

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None declared.

Analysis of risk factors of myopia onset in children: A systematic review and meta-analysis

Yu, MK[1]; Hu, YY[2]; Wu, ZY[3]; Xu, ZH[4]; Liu, Y[5]; Shao, Z[6]; Yang, ZP[7]; Liu, GY[8]; Bi, HS[9].

Review question / Objective: **The purpose of our systematic review is to evaluate the risk factors that may be related to the onset of myopia.**
Condition being studied: **Myopia has been an important global public health and socioeconomic problem. In recent decades, the prevalence of myopia in children has increased significantly, especially in East Asia and Southeast Asia. As a result, myopia is an important risk factor for other vision-threatening diseases such as glaucoma, myopic maculopathy, and retinal detachment. As the degree of myopia increases, the relative risk of these diseases will increase sharply. There is compelling evidence that environmental and genetic factors are involved in the etiology of myopia. However, the cause of the onset and progression of myopia (short-sightedness) still lacks sufficient evidence.**

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 18 April 2022 and was last updated on 18 April 2022 (registration number INPLASY202240109).

INTRODUCTION

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METHODS

Search strategy: The search stategy will be provided in Appendix.

Participant or population: Myopic children from 6 years old to 18 years old.

Intervention: Not applicable.

Comparator: Not applicable.

Study designs to be included: Cohort studies.

Eligibility criteria: We will include cohort studies that have assessed the association between risk factors and myopia. We will encompass all studies of myopic children from 6 years old to 18 years old. Studies that reported any one of the following outcomes will be included.

Information sources: Two authors(YY Hu and MK Yu) will comprehensively search published studies from their inception to April 2022: PubMed, the Cochrane Library, EMBASE, Chinese National Knowledge Infrastructure Database (CNKI), VIP Chinese Science and Technique Journals Database, and Wanfang Database. We will also search two clinical study registration networks(clinical trials.gov and Chinese clinical trial registry). The references of retrieved articles will be screened to identify other potentially relevant articles.

Main outcome(s): The outcomes will include heredity factors(refractive status of parents, the education of mother, etc), personal factors (age, gender, ethnicity, intelligence quotient(IQ), school, household income, etc), the parameters of eyes(axial length, cycloplegic spherical equivalent degree(SE), etc), environment factors(second-hand smoking environments, etc), behavior factors(the information of near work time, outdoor activity time, the distance and time of reading, etc).

Additional outcome(s): The outcomes will include heredity factors(refractive status of parents, the education of mother, etc), personal factors (age, gender, ethnicity, intelligence quotient(IQ), school, household income, etc), the parameters of eyes(axial length, cycloplegic spherical equivalent degree(SE), etc), environment factors(second-hand smoking environments, etc), behavior factors(the information of near work time, outdoor activity time, the distance and time of reading, etc).

Quality assessment / Risk of bias analysis: The quality of the included cohort studies will be assessed by the Newcastle-Ottawa Scale (NOS) checklist. It consists of eight sections and divides the studies with a scale of scores of 0 to 8 from poor to high quality, respectively. The studies can be divided into three levels of scoring: (5 or less: poor quality), (5-6: medium quality), (7 to 8: high quality).

Strategy of data synthesis: Stata (Version 12.0, Stata Corporation, College Station, TX, USA) will be used to analyze our data. We only conduct meta-analyses of pooled study outcomes if the studies provided sufficient data and no clinical heterogeneity. Otherwise, the results will be presented with a narrative summary. The summary measure will use the risk ratio (RR) with 95% confidence interval (CI) to determine associations between risk factors and myopia.

Subgroup analysis: The heterogeneity analysis will be performed by using the Cochrane software I2 test for statistical analysis. When heterogeneity is not significant (I2<50%), the fixed-effect model will be used to process the data. When heterogeneity is significant (I2≥50%), we will use the random-effects model. The

following potential sources of heterogeneity (The location of research; Whether cycloplegia; The definition of myopia, etc) may be considered to perform. The heterogeneity analysis will be performed by using the Cochrane software I2 test for statistical analysis. When heterogeneity is not significant (I2<50%), the fixed-effect model will be used to process the data. When heterogeneity is significant (I2≥50%), we will use the random-effects model. The following potential sources of heterogeneity (The location of research; Whether cycloplegia; The definition of myopia, etc) may be considered to perform. We will perform a sensitivity analysis to assess the robustness of the meta-analysis by excluding more than one risk of high bias or two or more risks of unknown bias by item.

Sensitivity analysis: We will perform a sensitivity analysis to assess the robustness of the meta-analysis by excluding more than one risk of high bias or two or more risks of unknown bias by item.

Country(ies) involved: China.

Keywords: Myopia; Factors; Onset; Meta analysis; Children.

Contributions of each author:

Author 1 - Mingkun Yu.
Email: yumingkun163@163.com
Author 2 - Yuanyuan Hu.
Email: yyhu0616@163.com
Author 3 - Ziyun Wu.
Email: wuziyun0327@163.com
Author 4 - Zihang Xu.
Email: 840688922@qq.com
Author 5 - Yi Liu.
Email: liuyi123shine@163.com
Author 6 - Zhen Shao.
Email: shaozhenvision@163.com
Author 7 - Zhipeng Yang.
Email: yangzhipeng1998@outlook.com
Author 8 - Guoyong Liu.
Email: liugy0324@163.com
Author 9 - Hongsheng Bi.
Email: hongshengbi@126.com