

INPLASY PROTOCOL

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None declared.

INTRODUCTION

Review question / Objective: With various intraocular lens (IOL) power calculation formulas available in the clinical settings, which one could provide better accuracy still yielded inconclusive results. We

therefore aimed to perform a meta-analysis to compare the accuracy of IOL power calculation formulas in pediatric cataract patients.

Condition being studied: Pediatric cataract accounts for 5-20% of global childhood

Accuracy of intraocular lens power calculation formulas in pediatric cataract patients: a systematic review and meta-analysis

Zhong, Y¹; Yu, Y²; Li, J³; Lu, B⁴; Li, S⁵; Zhu, Y⁶.

Review question / Objective: With various intraocular lens (IOL) power calculation formulas available in the clinical settings, which one could provide better accuracy still yielded inconclusive results. We therefore aimed to perform a meta-analysis to compare the accuracy of IOL power calculation formulas in pediatric cataract patients.

Condition being studied: Pediatric cataract accounts for 5-20% of global childhood blindness. Refractive outcomes, which are crucial in postoperative visual performance, are mainly influenced by surgical procedure, biometrical measurement, and intraocular lens (IOL) power calculation accuracy.

INPLASY registration number: This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 23 September 2021 and was last updated on 23 September 2021 (registration number INPLASY202190077).

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METHODS

Participant or population: Pediatric cataract patients who underwent cataract extraction and primary posterior chamber IOL implantation were included.

Intervention: Adopted one of the IOL power calculation formula (Holladay 1, Holladay 2, Hoffer Q, SRK/T, and SRK II).

Comparator: Another type of the target IOL power calculation formula (Holladay 1, Holladay 2, Hoffer Q, SRK/T, and SRK II).

Study designs to be included: Observational cohort studies.

Eligibility criteria: 1) Pediatric cataract patients who underwent cataract extraction and primary posterior chamber IOL implantation; 2) at least two types of the target IOL power calculation formula (Holladay 1, Holladay 2, Hoffer Q, SRK/T, and SRK II) were compared; 3) either prediction error (PE) or absolute prediction error (APE) (with 95% confidence intervals, CI) provided.

Information sources: The databases of PubMed, Web of Science, and EMBASE were systematically searched for observational cohort studies published through 2021.

Main outcome(s): Prediction error (PE) and absolute prediction error (APE) (with 95% confidence intervals, CI) among different formulas used to calculate intraocular lens power.

Additional outcome(s): None.

Data management: The data was extracted in a standardized data collection from each included publication.

Quality assessment / Risk of bias analysis: Quality Assessment of Diagnostic Accuracy Studies (QUADAS-2).

Strategy of data synthesis: Mean difference (MD) and their corresponding 95% CIs between different IOL power calculation formulas were synthesized.

Subgroup analysis: Subgroups were divided and analyzed according to age (<24 months or 24~60 months) and axial length (<22 mm or 22~24.5 mm).

Sensitivity analysis: Sensitivity analyses were performed by omitting one study at a time and calculating a pooled estimate for the remainder of the studies to evaluate whether the results were affected markedly by a single study. Publication bias was evaluated by the application of Egger's linear regression test and Begg's rank correlation test with significance set to $P < 0.10$.

Language: English.

Country(ies) involved: China.

Other relevant information: None.

Keywords: pediatric cataract, calculation formula, intraocular lens power, prediction error.

Contributions of each author:

Author 1 - Yueyang Zhong - The author performed literature search, data collection, statistical analysis, and drafted the manuscript.

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Author 2 - Yibo Yu - The author performed literature search, data collection, and statistical analysis.

Author 3 - Jinyu Li - The author contributed to statistical analysis.

Author 4 - Bing Lu - The author drafted the manuscript.

Author 5 - Su Li - The author drafted the manuscript.

Author 6 - Yanan Zhu - The author conceived and designed the study and revised the manuscript.