INPLASY

Effects of Parent-Targeted Interventions Implemented in Hospitals on the Utilization of Child Restraint Systems: A Systematic Review and Meta-Analysis

Corresponding author:
Xiu-ling Yang

ratyxl2003@163.com

Author Affiliation:
Qingdao University.

Kou, ZR; Sun, YR; Xv, XH; Yv, TF; Zhang, X; Yang, XL.

ADMINISTRATIVE INFORMATION

Support - None.

Review Stage at time of this submission - Completed but not published.

Conflicts of interest - None declared.

INPLASY registration number: INPLASY202510056

Amendments - This protocol was registered with the International Platform of Registered Systematic Review and Meta-Analysis Protocols (INPLASY) on 17 January 2025 and was last updated on 17 January 2025.

INTRODUCTION

Review question / Objective To evaluate the effectiveness of parent-targeted child restraint systems (CRS) interventions in hospital settings, we conducted a review and meta-analysis of relevant evidence and explored potential intervention regulatory factors.

Condition being studied Traffic injuries to children caused by motor vehicle crashes are a significant public health problem. Due to physiological and developmental differences, children are more susceptible to injuries in motor vehicle crashes than adults, which may lead to lifelong cognitive impairment and disability. Prior research has shown that most child injuries related to motor vehicle crashes are preventable, and a key element in minimizing these injuries is the utilization of child restraint systems (CRS).

CRS, including five-point restraint car seats and booster seats, effectively prevents injuries to child passengers by reducing their body displacement in motor vehicle crashes. Current evidence indicates that when properly used, CRS can reduce the risk of fatal injuries to infants under 1 year old by approximately 71% in the event of motor vehicle crashes. For children aged 1 to 4, the risk of fatal injuries can be reduced by approximately 54% to 80%. Despite the widespread adoption of CRS laws in various countries and regions aimed at promoting CRS use, inappropriate restraints for child passengers are still common.

The most effective approach to improve the use of CRS is to change parents' views and attitudes towards its use Parents play a critical role in ensuring the safety of their children as their cognitive, motivational, and behavioral abilities significantly impact the use of CRS. Hospitals serve as crucial places for parents to obtain health guidance regarding their children's safety, and several countries have incorporated CRS promotion into clinical practice or expert consensus within the public health sector.

Various interventions have been carried out in hospitals to investigate strategies for increasing

CRS utilization. However, due to diversity in intervention settings, methods and designs, the effectiveness of these interventions and the most effective approaches for parents remain uncertain.

METHODS

Participant or population Parents are involved in parent-targeted interventions implemented in hospitals.

Intervention Parent-targeted interventions in hospitals.

Comparator The effect of interventions on the utilization of CRS.

Study designs to be included (I) studies that included parent-targeted interventions implemented in hospitals; (II) the objective of the studies was to assess the effect of interventions on the utilization of CRS; (III) studies reported the use of CRS; (IV) studies were published in either Chinese or English.

Eligibility criteria Exclusion criteria: (I) repeated publication; (II) summary, comment, or minutes of meetings; (III) full-text unavailable.

Information sources We searched PubMed, EMBASE, Cochrane Library, Web of Science, EBSCO, and CNKI for articles published from their inception to March 2024 to retrieve potential studies. In addition, we conducted a comprehensive review of the references listed in the retrieved meta-analyses to ensure that no omissions occurred.

Main outcome(s) The research included 12 articles, with a total of 36, 939 participants included in the meta-analysis. All studies focused on parent-targeted interventions in hospital settings to enhance the use of CRS, excluding other types of child caregivers.
A meta-analysis was conducted on the included articles, revealing heterogeneity among the studies (I2=81%). The random-effects model was used for the meta-analysis. After implementing the intervention measures, the CRS utilization rate in the intervention group was 1.73 times higher than that in the control group (OR=1.73, 95%CI=1.28-2.33, P<0.001), indicating that hospital-based parent-targeted interventions have increased CRS use.

Quality assessment / Risk of bias analysis Two researchers independently evaluated the risk of bias in all included studies using the Cochrane tool. The bias evaluation criteria include: (1) random sequence generation; (2) allocation concealment; (3) blinding of subject and staff; (4) blinding of the outcome assessor; (5) incomplete outcome data; (6) selective reporting; (7) other sources of bias. Each study was evaluated according to "low risk" or "high risk", and if the study does not report methods, it is evaluated as "uncertain".

Strategy of data synthesis We used the DerSimonian and Laird methods to conduct the random-effects meta-analysis to determine the association between hospital-based parent-targeted interventions and the use of CRS. Joint odds ratio (OR) estimates were obtained using fixed and random-effects models. Heterogeneity in effect sizes across studies was evaluated using Cochran's Q and I2 statistics. Random-effects models were utilized in cases of heterogeneity (I2 > 50% or chi-square P-value < 0.05). Potential sources of heterogeneity were identified through meta-regression analysis. Subgroup analyses were performed based on the age range of children, intervention settings, intervention tools, intervention design, and availability of free CRS. Sensitivity analysis was conducted using the sequential elimination method. All analyses were conducted using Stata version 18.0, with a 2-tailed α value of 0.05.

Subgroup analysis Subgroup analyses were performed based on the age range of children, intervention settings, intervention tools, intervention design, and availability of free CRS.

Sensitivity analysis We used the sequential elimination method for sensitivity analysis within the random-effects model. The pooled results of the remaining studies were consistent even after sequentially excluding each reference (P<0.05), indicating that the analysis outcomes are stable against significant changes caused by variations in the number of studies, thus demonstrating the robustness of the results.Sensitivity analysis was conducted using the sequential elimination method.

Country(ies) involved China.

Keywords Parent-targeted interventions; Hospital; Child restraint system; meta-analysis.

Contributions of each author
Author 1 - Zhi-ru KOU - Drafted the manuscript.
Email: 2311725786@qq.com
Author 2 - Ya-ru SUN - The author provided statistical expertise.

Email: sunyaru98@163.com

Author 3 - Xiao-han XU - The author contributed to the development of the selection criteria, and the risk of bias assessment strategy.
Email: xuxiaohan0329@163.com

Author 4 - Teng-fei YV - Manuscript writing and Critical revisions for important intellectual content.
Email: yutengfei370283@163.com

Author 5 - Xi ZHANG - Data analysis.
Email: zhangx992021@163.com

Author 6 - Xiu-ling YANG -The author read, provided feedback and approved the final manuscript.
Email: ratyxl2003@163.com