Community-based programmes to promote use of bicycle helmets in children aged 0-14 years: a systematic review

CRD summary
This review assessed the effectiveness of community-based interventions to increase the use of bicycle helmets in children. The authors concluded that interventions did increase helmet use and reduce bicycle-related head injury, but the interventions themselves were poorly described. Overall, this was a well-conducted review but a more cautious conclusion may have been appropriate given the limited quality of the included studies.

Authors' objectives
To assess the effectiveness of community-based interventions to increase the use of bicycle helmets in children.

Searching
MEDLINE (1966 to 2003), CINAHL (1982 to 2003) and PsycINFO (1872 to 2003) were searched using the reported search terms. The reference lists of identified studies and relevant systematic reviews were screened. Two journals (Injury Prevention and Accident Analysis and Prevention) were also searched (1995 to 2002).

Study selection
Study designs of evaluations included in the review
Studies with a community or historical control were eligible for inclusion.

Specific interventions included in the review
Studies of community-based interventions to increase the use of bicycle helmets were eligible for inclusion. The review defined these as interventions that used more than one strategy and targeted the whole community or groups of individuals in a community. The included studies used a variety of different interventions, such as targeted and mass media education of children and their parents, the promotion of and mandatory wearing of helmets, the seizure of bicycles when riders were not wearing helmets, and reducing the price of helmets. Most studies used combinations of these interventions.

Participants included in the review
Studies of children were eligible for inclusion.

Outcomes assessed in the review
Studies that assessed injury rates or changes in bicycle helmet use were eligible for inclusion. In the included studies, helmet use was assessed using self-report by children and through observation, while injury rates were assessed using hospital data.

How were decisions on the relevance of primary studies made?
The authors did not state how the studies were selected from identified titles and abstracts. Two reviewers independently examined the final selection of studies.

Assessment of study quality
Studies were assessed for the quality of their execution, although the criteria used were not explicitly reported. Two reviewers independently assessed validity.

Data extraction
Two reviewers independently extracted the data. Any disagreements were resolved with the aid of a third reviewer.

**Methods of synthesis**

How were the studies combined?
The studies were grouped by type of control group and combined in a narrative.

How were differences between studies investigated?
Some differences between the studies were discussed in the text, while others were evident from tables of study characteristics.

**Results of the review**

Thirteen studies with a control group were included. These were reported in 16 publications. There were seven studies with a community control (targeting populations exceeding 0.8 million in total), five studies with a historical control (over 100,000 children targeted), and one study that used another group of schools matched by location and demographics as the control (3,428 children).

Quality of study execution.

Methodological flaws included the following: measurement of baseline rates of helmet use at different times of the year for comparison groups; lack of an adjustment for differences between intervention groups; results based on children’s self-report of helmet wearing or based on a small number of observed children; lack of baseline data on helmet wearing; and failure to take account of secular trends and other factors, such as changes in motor vehicle usage, when reporting the results.

Studies with a community control.

All of the studies showed some improvements in the observed rates of helmet use. In addition, one study showed a reduction in injuries, one study found a reduction in head injuries as a proportion of bicycle-related injuries, and another showed a reduction in medically treated head injuries.

Studies with a historical control.

All of the studies showed some improvements in the observed rates of helmet use, but in some studies the improvements were only modest. In addition, two studies showed a reduction in head injuries and other bicycle injuries, while another showed a decrease in hospital admissions for bicycle-related head injuries.

Studies using another group of matched schools as the control.

The single study identified found an increase in helmet use in the intervention schools.

**Cost information**

One study set in Canada reported that a community-based programme was cost-effective ($0.70 per child). No other details were reported.

**Authors’ conclusions**

Community-wide interventions to increase helmet wearing were found to increase helmet use and reduce bicycle-related head injuries in the populations targeted, but none of the studies adequately described the interventions.

**CRD commentary**

The review addressed a clear question that was defined in terms of the participants, intervention, outcomes and study design. Several relevant sources were searched, but there were no attempts to minimise publication bias and it was
unclear whether any language limitations had been applied. The authors conducted the data extraction and validity assessment procedures in duplicate in order to minimise reviewer errors and bias. However, the methods used to select studies were not described in full, so it was unclear whether similar steps had been taken at the study selection stage. The criteria used to assess the quality of study execution were not reported. The narrative synthesis of the studies was appropriate given the diversity of the studies, and the synthesis included a discussion of some of their methodological flaws. Overall, this was a well-conducted review, but a more cautious conclusion might have been appropriate given the apparently limited quality of the included studies.

Implications of the review for practice and research
Practice: The authors stated that helmet wearing can be introduced across communities as a practical and acceptable means of reducing head injuries in young cyclists.

Research: The authors stated that there is a need for adequate reporting of successful interventions.

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