Systematic reviews of bicycle helmet research

This review included 22 studies, including three individually randomised controlled trials, six cluster randomised controlled trials, 12 controlled before-after studies and one trial with concurrent controls; random-effects models were used to pool data from individual studies in meta-analysis. Generally, the programs seemed to be effective (OR 2.30, 95% CI 1.37 to 3.85), with a greater effect for community-based studies and those providing free helmets than for those providing subsidised helmets and for those set in schools. None of the studies examined the impact of the program on injury rates. No adverse events were recorded but the review authors’ caution that it is possible that interventions to promote cycle helmet wearing may reduce cycling, with negative health effects.

Bicycle helmet legislation is another important intervention introduced in many high income countries to increase helmet wearing. The systematic review by Macpherson and Spinks, published in 2007, examined the effectiveness of bicycle helmet legislation on bicycle-related injury and helmet use. To ensure that other environmental and legislative changes including changes in cycling rates, improved bicycle paths and lower vehicle speed limits were taken into account, this review had stringent methodologic criteria to ensure that only studies with a concurrent control group were included. Only three of the five controlled time series analyses included in the review examined the impact of helmet legislation on head injuries, with two finding a significant protective effect. The third study reported a non-significant decline in the proportion of head injuries compared with other bicycle-related trauma. Helmet use was found to increase significantly from between 45% and 84% with the introduction or enforcement of helmet legislation.

None of the studies included in the review measured pre- and post-legislation cycling participation rates, and so it was not possible to comment on the potential adverse effect of helmet legislation. The review authors concluded that based on the best available evidence, there appeared to be a protective effect of bicycle helmet legislation against head injury among cyclists, but that there was an important need for future evaluative research to include appropriately concurrent control groups, to measure actual helmet use, and to record cycling participation rates.

So where to from here? There is good evidence that bicycle helmets are effective in reducing head and facial injury in the event of a crash, and that helmet legislation is also likely to be effective at a population level, although high quality controlled research must continue. We know that non-legislative interventions are effective in increasing helmet wearing rates in children, particularly community-based programs that provide free helmets. However, there is a steep socioeconomic gradient for injuries to cyclists, with higher mortality rates for children from deprived backgrounds; yet the review by Royal et al was not able to identify the best way to increase wearing rates in this population. Further research that addresses such questions is clearly important.

Furthermore, cyclists are also vulnerable road users at increased risk in low and middle income countries: in Delhi, India, cyclists constitute 5% of the trips but 14% of total road traffic injury related deaths, but otherwise all of the research on bicycle helmets has been conducted in high income countries. It seems likely, given its potential cost effectiveness as an intervention to reduce head injury, that helmet legislation may also useful in low and middle income countries where cycling is common. Although it seems plausible that helmets would work equally effectively in such settings, there is a need for high quality controlled intervention studies examining both effectiveness in relation to head injury but also effective mechanisms for increasing wearing rates, including management of helmet quality and supply and issues relating to enforcement.

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