COMMENTARY

Alcohol, bicycling, and head and brain injury: a study of impaired cyclists' riding patterns


Authors' abstract

Objective
The aim of the study was to examine the interactions between alcohol, bicycle helmet use, experience level, riding environment, head and brain injury, insurance status, and hospital charges in a medium-sized city without an adult helmet law.

Methods
A study of adult bicycle accident victims presenting to a regional trauma center over a 1-year period was undertaken. Data were collected at the bedside regarding helmet use, alcohol use, experience level, location and type of accident and prevailing vehicle speed (for road accidents), and presence and degree of head or brain injury.

Results
Two hundred patients 18 years or older were enrolled from December 2006 through November 2007. Alcohol use showed a strong correlation with head injury (odds ratio, 3.23; 95% confidence interval, 1.57-6.63; P = .001). Impaired riders were less experienced, less likely to have medical insurance, rarely wore helmets, were more likely to ride at night and in slower speed zones such as city streets, and their hospital charges were double (all P values <.05).

Conclusions
Alcohol use leads to a host of unsafe bicycling practices, increased head and brain injuries, and costs to the cyclist and community. The interrelated characteristics of the riding patterns of the cyclists who use alcohol might help target interventions.

Related paper/Peer criticism
A peer-reviewed commentary was published in the same journal: Bicycle helmets benefits might be overestimated. (Robinson, 2010)

BHRF Commentary

Subjects
This was a study of all bicycle accidents to adults (18 years or older) presenting to a major trauma center in the 12 months commencing 1 December 2006. The center treats 80,000 patients per year, serving an area with population of 1.2 million. There were a total of 200 cycling injuries, suggesting that only a small proportion of the injuries treated at the trauma center involve injuries to cyclists.

Head injuries
Although 36.4% of cyclists had head injuries (HI), only 20 cyclists (10.1%) had some form of brain injury – mild, 17 cyclists (8.6%, Glasgow Coma Scale, GCS, 13-15 ); moderate, 1 cyclist (0.5%, GCS 9-12) and severe, 2 cyclists (1%, GCS 8 or less). The 2 cyclists with severe brain injury were alcohol-impaired, having blood alcohol levels of 285 and 146 mg/dl. The maximum legal blood alcohol for driving is 80 mg/dl.
Alcohol-affected cyclists

The authors of the study concluded: “Alcohol use leads to a host of unsafe bicycling practices, increased head and brain injuries, and costs to the cyclist and community.” Of 40 alcohol-affected cyclists, 57.5% had head injuries, compared to 29.5% of cyclists who had not used alcohol, a highly significant difference (Tables 1 & 2, P<0.001).

Only one alcohol-affected patient wore a helmet, suffering a head, but not brain, injury. The contradictory data in Table 3 (showing 57.5% of alcohol-affected and 29.5% of other cyclists were not head injured) is assumed to be a careless mistake in the rows labels of Table 3, not picked up either by the authors, or during the peer-review process.

Cases not involving alcohol - helmets made no difference

Including 9 patients with unknown alcohol-status in the not-affected category, there were 69 helmeted and 82 nonhelmeted cyclists who had not used alcohol. Of these, 21 helmeted and 27 non-helmeted cyclists were head injured. Thus there was no real difference in head injury rates of helmet wearers (30.4% HI) and non-wearers (32.9%).

The paper doesn’t report helmet wearing of the 13 brain-injured cyclists who had not consumed alcohol. However, additional information from a press release by the authors of this paper (cited in the peer-reviewed commentary - Robinson, 2010) shows that brain injury rates of helmeted (5 out of 69) and non-helmeted (8 out of 82) were similar.

Did other studies misinterpret the link between alcohol and non-helmet use?

The effect of alcohol (odds ratio 3.23, P=0.001) is derived mainly from comparing HI rates of non-helmeted cyclists who hadn’t used alcohol with non-helmeted cyclists who had. If no information on alcohol use had been collected, the effect might have mistakenly been attributed to lack of helmets. This begs the question: could other studies have confused the effects of alcohol and not wearing helmets?

Several published papers warn that misleading conclusions can result from comparing self-selected groups (SSG) – people choosing a health or safety measure (e.g. use of protective equipment, or hormone replacement therapy) with those who chose otherwise. A systematic review of recent highly-cited research (published in 2005) considered 39 studies that assigned subjects randomly to treatments, and 6 comparing SSG (Ioannidis, 2005).

Only 5% of the 39 randomized studies were contradicted by subsequent research, with an additional 15% showing smaller benefits in follow-up studies than originally claimed (Ioannidis, 2005). In contrast, 67% of the self-selected group studies have been contradicted by subsequent research and for another the benefit was much lower than originally claimed. Thus only one of the 6 SSG studies was actually found to be correct.

Ethics

To guard against future failures, epidemiologists reconsidered their methods and learned important lessons: 1) do not turn a blind eye to contradiction; 2) do not be seduced by mechanism; 3) suspend belief and 4) maintain scepticism (Petitti, 2004).

These lessons suggest that caution should be applied to the interpretation of all SSG studies. Unfortunately, the authors of this study did not suspend belief, and even failed to check their work carefully enough to correct a glaring mistake in the row labels of Table 3 – head injury counts by alcohol use – leaving it unchanged from an earlier poster report (Crocker 2010b). This obvious error was not picked up by the journal’s peer review process, suggesting that the reviewers also failed to understand that the results of SSG studies are often misleading and, if not checked thoroughly, may be totally incorrect.

A press release (Seaton, 2008) (removed by the authors, after the commentary on their paper was submitted for peer-review) claimed: “preliminary results of a year-long study that indicates cyclists are nearly twice as likely to...
suffer a brain injury if they are not wearing a bicycle helmet”. A similar, but weaker, claim was made in the published paper: “Although our data set did not find significance in relative risk of cycling without helmet (most likely due to small sample size), it did show a trend consistent with previous studies…”

To make such claims when head injury rates of non-alcohol-affected patients were 30.4% (helmeted) and 32.9% (non-helmeted) seems downright deceptive.

Rather than claiming that the evidence justifies laws compelling cyclists to wear helmets (discouraging cheap, environmentally-friendly transport, healthy exercise and reducing safety in numbers), the authors might instead have considered whether alcohol was a possible confounding factor in other studies that claimed substantial benefits of helmets.

A total of 1 moderate and 12 mild brain injuries in cyclists who had not consumed alcohol (including 5 to helmeted cyclists) were observed in a year-long study of all accidents to adult cyclists at a trauma centre serving 1.2 million people. Road safety campaigns to reduce alcohol use of both cyclists and motorists, as well as encouraging cycling to achieve health and environmental benefits and increase safety in numbers, are therefore likely to achieve much greater benefits than promoting cycle helmets.

References

Crocker 2010b

Poster report associated with study. . External Link
http://www.lobv.org/docs/bicycle_poster.pdf

Ioannidis, 2005


Petitti, 2004

http://ije.oxfordjournals.org/cgi/content/full/33/3/461

Robinson, 2010


Seaton, 2008

http://www.seton.net/about_seton/news/2008/05/29/while_umc_brackenridge_research_links_bicycle_helmets_and_injury_alcohol_use_determined_more_dangerous.

The Bicycle Helmet Research Foundation (BHRF), an incorporated body with an international membership, exists to undertake, encourage and spread the scientific study of the use of bicycle helmets. Also to consider the effect of the promotion and use of helmets on the perception of cycling in terms of risk and the achievement of wider public health and societal goals.

BHRF strives to provide a resource of best-available factual information to assist the understanding of a complex subject, and one where some of the reasoning may conflict with received opinion. In particular BHRF seeks to provide access to a wider range of information than is commonly made available by those that take a strong helmet promotion stance. It is hoped that this will assist informed judgements about the
pros and cons of cycle helmets.

For more information, please visit www.cyclehelmets.org.

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