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Safety riding program and motorcycle-related injuries in Thailand

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ABSTRACT

A retrospective cohort study was conducted in Thailand from 2007 to 2009 to evaluate the efficacy of a safety riding program in preventing motorcycle-related injuries. A training group of motorcyclists were certified by the Asia-Pacific Honda Safety Riding Program in either 30-h instruction (teaching skills, riding demonstration) or 15-h license (knowledge, skills, and hazard perception) courses. The control group consisted of untrained motorcyclists matched on an approximately 1:1 ratio with the training group by region and date of licensure. In total, there were 3250 subjects in the training group and 2963 in the control group. Demographic data and factors associated with motorcycle-related injuries were collected. Motorcycle-related injuries were identified using the Road Injuries Victims Protection for injuries claims and inpatient diagnosis-related group datasets from the National Health Security Office. The capture–recapture technique was used to estimate the prevalence of injuries. Multivariate analysis was used to identify factors related to motorcycle-related injuries. The prevalence of motorcycle-related injuries was estimated to be 586 out of 6213 riders (9.4%) with a 95% confidence interval (CI): 460–790. The license course and the instruction course were significantly associated with a 30% and 29% reduction of motorcycle-related injuries, respectively (relative risk 0.70, 95% CI: 0.53–0.92 and 0.71, 95% CI: 0.42–1.18, respectively). Other factors associated with the injuries were male gender and young age. Safety riding training was effective in reducing injuries. These training programs differ from those in other developed countries but display comparable effects. Hazard perception skills might be a key for success. This strategy should be expanded to a national scale.

1. Introduction

Motorcycle-related injuries contribute more than 50% of road traffic injuries in low- and middle-income countries that have a high proportion of motorcycles in road traffic (Hyder et al., 2007). Motorcyclists experienced orthopedic (Amin et al., 2011) and head injuries 20 times as often as four-wheel vehicle drivers (Haworth and Mulvihill, 2005) with a high mortality rate that partially resulted from poor riding practices (Stella et al., 2002). Most motorcyclists start riding at a young age with limited supervision. Immature and risky behavior are most likely the main causes of riding injuries (Wong et al., 2010). The provision of knowledge and riding practice might be important tools to prevent this problem (French et al., 2009).

Safety riding programs have been established in many countries for decades (Amoran et al., 2005; Baldi et al., 2005; Blanchard and Tabloski, 2006; Braver et al., 2007; Haworth and Mulvihill, 2005; Reeder et al., 1996). However, the effect of riding programs has varied from the successful reduction of road traffic injuries to an increase in such injuries (Kardamanidis et al., 2010). Comprehensive learning steps may start from the learner permit, intermediate, and license courses (Haworth and Mulvihill, 2005; Reeder et al., 1996). After graduating from licensing, riders must be under supervision up to two years depending on regulations, which vary from country to country (Austroads, 1999; Braver et al., 2007). These data were primarily collected in countries that have a small number of motorcycle users, such as Australia, New Zealand, England, and the USA (Kardamanidis et al., 2010). The applicability of the data to developing countries might be limited because of different contextual factors, i.e., a high number of motorcyclists, different road conditions and different degrees of law enforcement.

A safety riding program has been implemented in Thailand since 1989. The program has instructed up to 10 million registered motorcyclists. However, there has been no evidence to support the program's advantages in minimizing injuries or its adverse

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Fig. 1. License course practical skills.

consequences. We conducted this study to evaluate the effect of the safety riding program. The results might be useful to inform policy decisions on the prevention of motorcycle crashes in Thailand and developing countries.

2. Materials and methods

A retrospective cohort study was conducted in Thailand from December 2007 to June 2009. This analytic study was initially started from two groups of exposed and unexposed risk factors in the past. Then, the outcomes that have already occurred were retrieved (Hennekens and Buring, 1987). We focused only on the Asia-Pacific (AP) Honda Safety Riding Program, which is the best available systematized safety riding program in our setting according to stakeholder perception. Other safety riding programs were provided by the Department of Land Transportation and individual training agents and consisted of 5-h knowledge, a 10-h riding skills course without a riding simulator, a hazard perception test, and teaching skills. The AP Honda Safety Riding Program was established in 1989 and has educated more than 10 million trainees (62.5% of the total number of registered motorcyclists). The multi-facetted courses include 15-min pre-delivery safety advice (P.D.S.A.) for new customers, 2-h instruction and 1-day basic courses for students and general motorcyclists, a 15-h license course for students and general riders, and a 30-h instruction course for trainers and dealer staff. The license course was our particular interest because it permitted riders as young as 15 years old to ride unattended. It was taken into account that the instruction course is perceived as the best available rider training program in Thailand.

2.1. Safety riding program

2.1.1. License course

This course provided a 15-h training program for a license permit on a voluntary basis. The applicant should have reached the age of 15 years old. The program consisted of training in standard knowledge and practical skills as determined by the Department of Land Transport. The 5-h knowledge-training segment included traffic law, motorcycle maintenance, riding techniques, safe riding, and hazard perception using riding simulators. The 10-h practical-skills segment (Fig. 1) included preparing, maneuvering and controlling the motorcycle; gear-changing; normal and quick-stop braking; negotiating curves, a pylon slalom, and S-, L-, and figure-8 courses; riding on an inclined plane, a bridge, and a narrow road; intersections; balancing; and transporting a passenger.

Fig. 2. Riding simulators.

After graduation, the riders receive a temporary license. One year later, they automatically receive a full license.

2.1.2. Instruction course

This course was only offered to full-license applicants, such as soldiers, policemen, government officers, rider-training instructors and dealer staff. It was aimed to increase teaching abilities, first-aid knowledge, and riding demonstration. All the applicants were trained to detect potential road traffic hazards using riding simulators and instructed in practical riding skills for a total of 30 h (Fig. 2).

2.2. Study population

The training group consisted of riders who received certificates from the AP Honda Safety Riding Program in the license or the instruction course between 2005 and 2007 to allow for at least one year's experience prior to recruitment into the study. Riders aged less than 15 years old at the time of training were excluded because they were not entitled to apply for a rider license. A control group, whose members were at least 15 years old, was matched one-to-one to the training group by region and date of licensure within the same consecutive year. Controls with invalid or unidentified ID numbers from the Department of Land Transport database were excluded. This study was approved by the Institutional Ethics Review Board.

2.3. Study factors and outcomes

The study factors were age, gender, region of licensure, date of licensure, history of riding training, date of training, and training course. The outcomes were the number of motorcycle-related injuries, traffic law violations, the date and time of injuries, the injury severity (minimal injury, hospital admission, and intensive care unit admission), and the number of hospital admissions. Additional data, such as riding behavior and self-reported injuries, were collected by mailed questionnaires from the training group before and after training. Motorcycle-related injuries were counted after the participants completed training. That is, the license course started from the date of the license permit, and the instruction course started from the date of training in the training group (Fig. 3).