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ORIGINAL ARTICLE

Relationship Between Driving-violation Behaviours and Risk Perception in Motorcycle Accidents

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Summary *Objective/Background:* Riding motorcycles is a popular means of community mobility in many Asian and developing countries. However, the potential harm associated with accidents is greater for motorcyclists and their passengers than for other vehicle users. The primary aims of this study were to explore the relationship between driving-violation behaviours and perceptions of the risk associated with potential accident causes, and to assess the contribution of these factors to active involvement in accidents among Chinese motorcyclists.
Methods: A total of 621 Chinese motorcyclists were recruited. All were asked to fill in a specially developed questionnaire to assess their driving-violation behaviours and perceptions of potential causes of motorcycle accidents.
Results: A relationship was identified between driving-violation behaviours and risk perceptions. Furthermore, both were significant predictors of involvement in motorcycle accidents. The motorcyclists involved in accidents demonstrated more aggressive and ordinary driving-violation behaviours. In addition, these motorcyclists exhibited lower perceptions of risk from both driving and environmental factors. Instead, these motorcyclists were more likely to identify risk in terms of belief-related causes.
Conclusion: This study could assist occupational-therapy practitioners involved in driving rehabilitation and training to identify strategies to deal with drivers' violation behaviours and risk perception. It could also provide evidence-based recommendations for drivers' education, driving-safety campaigns, or even licensing policies.

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Introduction

Community mobility, an instrumental activity of daily living, is defined as "moving [one]self in the community and using public or private transportation" (American Occupational Therapy Association, 2002). It is an essential element of ensuring independence and engaging in other everyday activities and occupations. Community mobility also refers to the extent to which an individual is able to travel within the community in accordance with his or her needs, and preferences (Di Stefano, Stuckey, & Lovell, 2012). Occupational-therapy practitioners have an important role in supporting community mobility by evaluating who is at higher risk of having an accident when driving (American Occupational Therapy Association, 2005). This role is likely to become much more prominent following the *Global Status Report on Road Safety* published by the World Health Organization in 2009. In this report, the World Health Organization states that road traffic accidents will become the fifth leading cause of death worldwide by 2030 if preventive measures are not taken immediately (World Health Organization, 2009). It has been predicted that between 2000 and 2020, the total number of road traffic deaths and injuries worldwide could rise by 65% in high-income countries, and by as much as 80% in low- and middle-income countries (Kopits & Cropper, 2003). On May 11, 2011, the United Nations launched its Decade of Action for Road Safety (World Health Organization, 2011), with the aim of firstly stabilising, and then reducing, the number of global road deaths by 2020.

Motorcyclists are more at risk of being killed or injured in accidents than any other road user. Riding motorcycles, however, is one of the most popular means of ensuring community mobility in many Asian countries. In developing countries, the popularity of motorcycle riding is on the increase, such as in Australia and New Zealand (Australian Bureau of Statistics, 2006; Bambach, Grzebieta, & McIntosh, 2012; White et al., 2013). In the crowded and congested city of Hong Kong, where over seven million people live on an island of just 1,100 km^2, the number of registered motorcycles increased from 34,085 in 2000 to 57,314 in 2012 (Transport Department of Hong Kong, 2013). In mainland China and Taiwan, the figures currently exceed 100 million and 25 million, respectively (National Police Agency, 2012; Traffic Administration Bureau, 2012).

The potential harm associated with any given traffic accident is usually greater for motorcyclists and their passengers, since they are not protected by the vehicle structure. For this reason, motorcyclists account for >50% of traffic deaths in mainland China and Taiwan (National Police Agency, 2005; Wang et al., 2003). In Hong Kong, the accident rate involving motorcycles is 3.4 times greater than that for private cars, and the proportion of motorcyclists sustaining severe or fatal injuries is 5% greater than for car drivers (Transport Department of Hong Kong, 2011). In Australia, motorcyclists are 30 times more likely to be killed and 37 times more likely to be seriously injured than car occupants per distance travelled (Department of Infrastructure, Transport, Regional Development and Local Government, 2008).

Motorcyclists are frequently perceived as "speed rebels" and "risk takers". It is not uncommon to see a motorcyclist travelling faster than cars, overtaking more often, and pulling into smaller gaps in traffic. Risk taking is socially acceptable when the danger is recognised, such as with some competitive sports and activities, such as skydiving. Such a risky behaviour is directly related to driving violations (Parker, Reason, Manstead, & Stradling, 1995), which can be defined as deliberate deviation from those practices believed necessary to maintain the safe operation of a potentially hazardous system. Studies indicate that there is a relationship between driving violations and accidents (Lucidi et al., 2010). Driving violations can be categorised into two distinct types based on the underlying reason for the behaviour. In the first type, labelled ordinary violations, people deliberately break the law, but do not have an aggressive motivation for doing so. In the second type, called aggressive violations, the perpetrator is interpersonally aggressive (Lajunen, Parker, & Summala, 2004).

Traffic accidents are also related to how the motorcyclist perceives risk (Njå & Nesvåg, 2007). Traffic-risk perception is a subjective interpretation of the risk involved in various situations, and depends on the driver's ability to perceive such risks correctly (Kanellaidis, Zervas, & Karagioules, 2000). For example, it is well known that younger and novice motorcyclists are overrepresented in terms of the number of traffic accidents (Jama, Grzebieta, Friswell, & McIntosh, 2011). They characteristically underestimate the risk of an accident and are prone to optimistic bias, that is, they tend to perceive situations as relatively low risk compared with other drivers.

The primary aims of this study, therefore, were to explore the relationship between driving-violation behaviours and the perceived causes of motorcycle accidents, and then to assess the contributions of each factor to the risk of active involvement in accidents among Chinese motorcyclists. It was hypothesised that there would be a relationship between driving-violation behaviours and risk perception, and that these factors would be significant predictors of the incidence of motorcycle accidents.

Methods

Participants

We conducted a cross-sectional questionnaire of Chinese motorcyclists in Hong Kong, all of whom rode motorcycles with an engine capacity >50 cc. All respondents were recruited using a snowball-sampling technique, with the initial referrals made by companies involved in hiring motorcyclists for domestic deliveries. The inclusion criteria were (a) having at least 3 years of postlicence driving experience, (b) having an annual mileage of at least 8,000 km, (c) being literate enough to read and understand simple questions, and (d) being prepared to give an informed consent (and signing a form to that effect). Respondents were excluded from the study if they (a) were unable to read Chinese or (b) requested that their participation be terminated.