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Motorcycle helmet attitudes, behaviours and beliefs among Cambodians

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Abstract

Motorcycle fatalities are increasing at an alarming rate in many South-East Asian countries, including Cambodia. Through brief face-to-face roadside interviews in Phnom Penh and four other Cambodian provinces, this article assesses Cambodian motorcyclists' attitudes, behaviours and beliefs related to motorcycle helmets. Out of 1016 motorcyclists interviewed, 50% were drivers, 40% were older passengers and 10% were child passengers. More drivers (50%) reported consistently wearing helmets, compared with older passengers (14%). Saving their life in the event of a crash was the impetus for drivers and older passengers to wear a helmet (96% and 98%, respectively). The top barriers to helmet use were: (1) 'depends on where I drive,' (2) 'I forget' and (3) 'inconvenient' or 'uncomfortable'. These descriptive findings were instrumental in shaping the Cambodian Helmet Vaccine Initiative passenger campaign to reduce the motorcycle-related injuries and fatalities to support the United Nations Decade of Action for Road Safety.

Keywords

motorcycle; helmet; road safety; Cambodia

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Introduction

Every day, over 3500 lives are lost on the roadways throughout the world (Peden et al., 2004). Although effective injury prevention interventions and strategies exist, they are often underutilised or ineffectively implemented, especially in low- and middle-income countries (LMICs). Without collective and organised efforts, the global burden of road traffic injuries (RTIs) and fatalities will continue to increase. Low- and middle-income countries currently suffer disproportionately from RTIs – more than 90% of all RTIs and fatalities occur in the developing world – leading to stagnation and decline in the long-term health and economic development (Peden et al., 2004).

In Asia, deaths by motorcycle crashes are an everyday occurrence. Countries in South-East Asia, in particular, are experiencing a massive increase in persons riding motorcycles on urban roadways. In Cambodia, the number of motorcycles on the roadways increased by 293,181 motorcycles (118%) from 2000–2006 (Global Road Safety Partnership, 2007). In 2008, 2–3 wheeled vehicles accounted for more than 95% of the 31,502,087 registered vehicles in Cambodia (World Health Organization, 2009).

As LMICs experience economic growth, motorcycles on the roadways increase, along with the number of motorcycle-related injuries and fatalities (Peden et al., 2004). This pattern has been seen in Cambodia (Road Crash Victim Information System, 2012). Road traffic injuries are Cambodia's largest non-communicable health epidemic, and motorcycle crashes are the leading source of road traffic fatalities (Road Crash Victim Information System, 2012). In 2011, Cambodia's Ministry of Public Works and Transport reported 1905 persons were killed on the roadways, 66% of whom (1262) were motorcyclists. The country has experienced a 60% increase in motorcycle-related fatalities in the past five years, and 56% of those fatalities were among motorcyclists between the ages of 15 and 29 (Road Crash Victim Information System, 2012).

Many of Cambodia's motorcycle-related fatalities could be averted if more motorcyclists consistently and correctly wore motorcycle helmets. The protective benefits of wearing a motorcycle helmet are well-understood (Liu et al., 2009). However, in 2011, only 23% of Cambodian motorcycle-related fatalities were helmeted at the time of their crash (Road Crash Victim Information System, 2012), and observed helmet-wearing rates for motorcycle drivers are nearly 10 times greater than observed helmet rates for passengers (Bachani et al., 2012). Moreover, Bachani and colleagues (2012) reported that the night-time helmet-wearing rates hover around 25%, while the daytime helmet-wearing rate is around 43%.

In order to better understand traffic safety culture, we examined driver and passenger knowledge, attitudes and beliefs regarding motorcycle helmets in Cambodia. The specific objectives of this study were to identify local helmet-wearing barriers, channels for road safety communications and the gaps in road safety knowledge.

Methods

This study included short face-to-face interviews with motorcycle drivers and passengers in the capital city, Phnom Penh, and in the provinces of Kampong Cham, Kampong Speau,

Kandal and Siem Reap, in 2011. Drivers and passengers on 100 motorcycles were interviewed in each province at petrol stations near selected intersections from each of the study site's subdivisions using a random number generator. One hundred motorcycles were selected based on statistical sample size calculations and budget constraints. In order to identify the intersections to include in the selection process, those with the greatest traffic flows were identified, and safety concerns for the interviewers were assessed. These intersections were then entered into a random number generator for selection. In addition, we conducted interviews outside 10 selected schools (two schools per province) to gather data related to helmet-wearing among children. At each school, 20 motorcycles with child passengers participated. These motorcycles were selected based on driver availability.

Motorcycle drivers were eligible for the interview if:

- The motorcycle was carrying passenger(s).
- Drivers were of legal driving age (at least 16 years old).
- The driver was a parent or guardian for interviews about child passengers under 16 years old.

Any motorcycle that stopped at the petrol station and satisfied the aforementioned criteria was pre-screened to ensure the driver and passenger were at least 16 years old. Each interview took approximately 10 minutes to complete. Drivers and older passengers were interviewed from each motorcycle. If two researchers were available, interviews with the driver and the older passenger occurred simultaneously. If only one researcher was available, the older passenger interview was conducted first. In the event of more than one passenger on the motorcycle, the passenger seated closest to the driver was interviewed. All questions were read aloud to the respondents and the interviewer recorded both closed-ended and open-ended responses. Previous focus group discussions were used to develop response options.

Data were collected on the demographics, self-reported helmet use, motivators and barriers for helmet use, helmet ownership and sources of road safety information. For the interviews that involved motorcycles with child passengers, the data were collected on the drivers' own perceptions about motorcycle- and helmet-related knowledge, attitudes and beliefs, as well as data on the child's perspective, with the driver (mainly parents) as the proxy. Interviewers asked questions adapted for each type of respondent: motorcycle driver, older passenger (16 years or older) and proxied child passenger (less than 16 years old). Trained research assistants collected, entered and cleaned the data. Researchers did not obtain any personal identifying information.

Cross tabulations were made to compare the interview responses given by regular helmet-wearers (those who indicated that they 'always' wear a helmet) and irregular helmet-wearers (those who indicated that they 'sometimes/frequently,' 'rarely,' or 'never' wear a helmet). Chi-square tests were conducted to determine statistically significant differences using SPSS 14.0.

The National Road Safety Committee in Cambodia reviewed and approved this study. In addition, the protocol was determined to satisfy the US Centers for Disease Prevention and Control and the National Center for Injury Prevention and Control's Institutional Review Board's requirements.

Results

A total of 1016 motorcycle riders participated in the study. Half (50%) of them were drivers ($n = 510$), 40% were older passenger ($n = 410$) and 10% were proxied child passengers ($n = 99$). The majority of the drivers and older passengers were less than 35 years old, with 5–12 years of schooling (Table 1). Male interviews accounted for 80% of drivers, 36% of older passengers and 51% of proxied child passengers.

More drivers (50%) reported wearing motorcycle helmets consistently compared with older passengers (14%, $p < 0.001$) and proxied child passengers (6%, $p < 0.001$) (Table 2). No sex differences related to self-reported helmet-wearing behaviours were observed.

Helmet ownership varied by occupant type. Reported helmet ownership was significantly higher for both drivers and older passengers (95% and 79%, respectively) compared with proxied child passengers (57%, $p < 0.001$). Among the proxied child passengers who identified as 'always' or 'frequently' wearing a helmet, 100% reported owning a helmet. However, among the proxied child passengers who identified as 'sometimes' or 'rarely/never' wearing a helmet, helmet ownership was significantly lower (48%, $p = 0.03$).

Almost all the drivers and older passengers who were regular helmet-wearers reported using a helmet because it can save their lives in the event of a crash (96% and 98%, respectively) (Table 3). Among irregular helmet-wearers, drivers and older passengers also reported similar barriers to helmet use: (1) 'depended on where I drive,' (2) 'I forget,' and (3) 'inconvenient' or 'uncomfortable'. Irregular helmet-wearing proxied child passengers reported barriers of 'too young' (31%) and that they were not travelling far from home (17%).

When asked about their source of road safety information, most drivers and older passengers reported it to be television (91% and 83%, respectively), followed by radio (56% and 38%, respectively). When asked whose opinion on road safety they respected, drivers and older passengers once again had similar responses: traffic police (46% and 42%), family (25% and 28%) and governmental leaders (19% and 13%). However, among older passengers, significantly more irregular helmet-wearers indicated they respected the road safety opinion of their family compared with regular helmet-wearers (30% and 16%, respectively, $p = 0.028$). For proxied child passengers, the three most common road safety resources were television (61%), teacher/school (57%) and parent/relative (51%).

Discussion

Several key findings from this study can help Cambodia address the growing problem of motorcycle-related deaths and injuries.

Motorcycle drivers reported that they wear helmets far more often than passengers. This finding has been found in many other countries (Conrad, Bradshaw, Lamsudin, Kasniyah, & Costello, 1996; Li, Li, Cai, Zhang & Lo, 2008). The current study's self-reported helmet use rate is substantially different from the roadside observations reported by Bachani et al. (2012). He and his colleagues observed 65% of drivers and 7% of passengers wearing helmets during the daytime. Our results indicate that 93% of drivers and 68% of passengers reported that they wear a helmet all the time or frequently. This difference between a previous observational study and the current self-reported helmet use study could be explained by social desirability bias. Some Cambodians may provide a socially desirable response to maintain their self-image in front of others (DeMaio, 1984).

We found that self-reported motorcycle helmet ownership was high, despite a low Gross National Income per capita of just over \$750 (World Bank, 2010). This suggests that cost may not be as important a barrier to helmet use as others have reported (Germeni, Lionis, Davou, & Petridou, 2009; Forjuoh, 2003). However, according to this study, only about half of the child passengers own a helmet, reinforcing the need to increase access to high quality, low-cost helmets. Both regular and irregular helmet-wearers reported receiving their road safety information from the television, yet respect the road safety opinions of different sources. These results point to the importance of identifying relevant road safety resources and outlets to communicate safety messages, specific to the intended group. Just 16% of the older passengers who were regular helmet-wearers respect the road safety opinion of their family, compared to 30% of the irregular helmet-wearers ($p = 0.02$). Tailoring communication campaigns that focus on family values related to motorcycle helmet-wearing may be effective. Based on our findings, teachers and schools are likely to be strong channels of communication to reach child passengers.

We found that nearly one-third of the drivers with child passengers believe that children do not need to wear helmets because they are 'too young'. In addition, many participants believe that the need for a helmet depends on where they drive. Previous studies found a strong association between the use of motorcycle helmets and the intended distance travelled, with more consistent helmet-wearing behaviours related to longer trips (Allegrante & Mortimer, 1985; Hurt, Quellet, & Thomas, 1981). The literature also suggests that some motorcyclists believe they need to wear helmets only while travelling on highways (Dandona, Kumar, Dandona, 2006; Kulanthayan, Umar, Hariza, & Nasir, 2001; Li et al., 2008). For example, Li et al. (2008) found that more than 94% of all the motorcyclists in China think they only need to wear helmets on highways or high speed motorways. However, regardless of the rider's seating position on a motorcycle, and regardless of the type of roadway he or she is travelling on, a motorcycle helmet that is worn consistently and correctly decreases a rider's risk of death by 42% and the risk of serious injury by 69% in the event of a crash (Liu et al., 2009).

This study has a number of limitations. First, researchers did not directly ask child passengers interview questions. Instead they asked the driver to serve as a proxy. Consequently, those data may not always represent the most accurate responses of the child passengers. Second, the researchers failed to incorporate a measure to record if the respondent was wearing a helmet at the time of the interview. Third, the sample size was

relatively small and therefore limited our analysis. Last, the study population was designed to be a representative sample of motorcycle users in five study areas, but not representative of the country as a whole. It is possible that responses would be different in areas of Cambodia not included in our study.

In September 2007, Cambodia adopted a compulsory motorcycle helmet law. The enforcement of the law began in January 2009. This was an important step in changing the traffic safety culture in Cambodia. However, although the law made helmets mandatory for drivers, it did not mandate helmet-wearing for passengers. The protection of child passengers, who are most vulnerable to severe injury and death in the event of a motorcycle crash, was not addressed in the legislation. In addition, while a law for drivers exists, enforcement is low (World Health Organization, 2009). Helmet legislation without enforcement is largely ineffective (Williams & Wells, 2004). These gaps in legislation are serious and result in many needless injuries and deaths each year. Road safety champions in Cambodia are using the current study's findings to work with the decision-makers to fill the gaps in the motorcycle helmet legislation.

The Cambodian efforts to increase helmet use by drivers and passengers could also benefit from enhanced education efforts. These efforts might address the misconceptions that children are 'too young' to wear helmets or that helmets are unnecessary on short trips or on local roads.

Efforts to address these issues and to increase motorcycle helmet use in Cambodia continues through the Cambodia Helmet Vaccine Initiative (CHVI) (Global Helmet Vaccine Initiative, 2011). This initiative was established by the Asia Injury Prevention Foundation with support from the FIA Foundation, the World Bank, the US Centers for Disease Control and Prevention, the International Union for Health Promotion and Education, and others. As a result of this study's findings, the first phase of the CHVI campaign was tailored specifically for passengers, and the main channel to raise public awareness was television advertisements. Our results have also been used to define messages and modalities for the campaign. In order to address the barriers outlined above, the underlying message throughout this first phase of the campaign stresses the importance for passengers to wear a helmet every time they ride a motorcycle. We found that irregular helmet-wearers are heavily influenced by their family; consequently, the television advertisements have a strong family undertone. Other findings from the present study suggest that children use helmets infrequently, and parents and schools are the main source of road safety information. Moreover, the availability of child-sized helmets in Cambodia should be more widely publicised. These findings support the need to expand CHVI's *Helmet for Kids* school-based programme.

Beginning in 2011, the United Nations declared a 'Decade of Action for Road Safety' (2011–2020). The goal of the Decade effort is to stabilise and then reduce global road fatalities by increasing national, regional and global activities (United Nations, 2011). With efforts like CHVI and the support of relevant health and traffic safety stakeholders, Cambodia has an opportunity to reduce the burden of head injuries to motorcyclists by

increasing helmet use for all the motorcyclists, and thereby helping to achieve goals of the Decade of Action.

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Table 1.

Characteristics of participants by motorcycle occupant type, Cambodia, 2011.

Variable	Variable categories	Number of drivers (%)	Number of older passengers (%)
Driver		<i>n</i> = 509	<i>n</i> = 409
Age group (years)	16–20	77 (13)	76 (19)
	21–25	99 (19)	118 (29)
	26–30	101 (20)	82 (20)
	31–35	79 (15)	42 (10)
	36–40	49 (10)	22 (5)
	41–45	41 (8)	20 (5)
	46–50	25 (5)	18 (4)
	>50	38 (7)	31 (8)
Years of schooling	0	5 (1)	13 (3)
	1–4	36 (7)	44 (11)
	5–9	158 (31)	138 (34)
	10–12	183 (36)	116 (28)
	>12	127 (25)	98 (24)
Occupation	Civil servant	69 (14)	21 (5)
	Vendor	75 (15)	69 (17)
	Student	112 (22)	96 (23)
	Office worker	80 (16)	57 (14)
	Farmer	67 (13)	68 (17)
	Other	101 (20)	97 (24)
Size of motorcycle	<100 cc	53 (10)	38 (9)
	100–500 cc	455 (89)	370 (90)
	>500 cc	1 (<1)	1 (<1)
# of motorcycle passengers	2	429 (84)	–
	3	69 (14)	–
	>3	7 (1)	–

Table 2.

Self-reported motorcycle helmet wearing behaviour by sex, Cambodia, 2011.

Variable categories	Sex		Total <i>n</i> (%)
	Male <i>n</i> (%)	Female <i>n</i> (%)	
Drivers [†]	407 (80)	102 (20)	<i>n</i> = 509
All the time	197 (48)	57 (56)	254 (50)
Frequently	185 (46)	33 (32)	218 (43)
Sometimes	22 (5)	9 (9)	31 (6)
Rarely/Never	3 (1)	3 (1)	6 (1)
Older passengers [†]	147 (36)	262 (64)	<i>n</i> = 409
All the time	26 (18)	31 (12)	57 (14)
Frequently	89 (61)	132 (50)	221 (54)
Sometimes	29 (20)	70 (27)	99 (24)
Rarely/Never	3 (2)	29 (11)	32 (8)
Proxied child passengers [†]	51 (51)	47 (47)	<i>n</i> = 98
All the time	2 (4)	4 (9)	06 (6)
Frequently	6 (12)	7 (15)	13 (13)
Sometimes	16 (31)	16 (34)	32 (33)
Rarely/Never	27 (53)	20 (43)	47 (48)

[†]drivers versus older passengers, $p < 0.001$; driver versus proxied child passengers, $p < 0.001$; older passengers versus proxied child passengers, $p = 0.021$.

Table 3.

Respondent motorcycle helmet-wearing attitudes, behaviours and beliefs by motorcycle occupant type, Cambodia, 2011.

	Driver	Older passenger
Regular helmet-wearers [*] : Reasons for wearing a helmet		
Save my life	96%	98%
Irregular helmet-wearers ^{**} : Reasons for not wearing a helmet ^{***}		
Depended on where I drive	76%	47%
I forget	22%	31%
Inconvenient/uncomfortable	18%	23%
Helmet ownership [†]	95%	79%
Where respondent receives traffic safety information ^{***}		
Television	91%	83%
Radio	56%	38%
Regular helmet-wearers: Whose opinion respondent respects for road safety information		
Traffic police	51%	41%
Government officials	16%	23%
Family	22%	28%
Irregular helmet-wearers: Whose opinion respondent respects for road safety information		
Traffic police	40%	42%
Government officials	21%	12%
Family	16%	30%

^{*} Regular helmet-wearers: Self-reported 'always' wear a helmet (driver $n = 254$; older passenger $n = 57$).

^{**} Irregular helmet-wearers: Self-reported 'frequently,' 'sometimes,' or 'rarely/never' wear a helmet (driver $n = 255$; older passenger $n = 352$).

^{***} Respondents can select more than one response.

[†] drivers versus older passengers, $p < 0.001$; driver versus proxied child passengers, $p < 0.001$; older passengers versus proxied child passengers, $p < 0.001$.