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Full Length Research Paper

Determinants of helmet wearing behavior among motorcyclists in the Dominican Republic

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Motorcycle-related traumatic brain injuries are a leading cause of morbidity and mortality in the Dominican Republic. Although rates of helmet use by motorcycle riders are low, little is known regarding the specific factors that drive this behavior. In this study, 26 adults in an urban Dominican hospital who self-reported riding motorcycles often without wearing a helmet participated in semi-structured qualitative interviews about their motorcycle use, collision history, and beliefs regarding helmets. A theoretical construct was created based on iterative coding of the resulting interview transcripts. Most participants understood helmets protect against head injury, yet stated that helmets are not needed for short distances, in rural areas, or when riding as the passenger. Perceived barriers to helmet use include cost, lack of access for passengers, and unattractiveness. Participants revealed that the national law mandating driver helmet use did not apply to passengers and was not effectively enforced. Findings are discussed in relation to the Health Belief Model. Specific policy recommendations are proposed, including changes in national legislation to apply to motorcycle passengers, increased law enforcement in rural areas and with less predictability in urban areas, financial interventions to reduce the consumer cost of helmets, and cultural interventions to popularize motorcycle helmet use.

Key words: Behavior, helmets, motorcycles, trauma, attitudes, perceptions, Dominican Republic, qualitative.

INTRODUCTION

More than 1.2 million people die annually worldwide due to road traffic injuries (Peden et al., 2004). Of these deaths, 90% occur in low and middle income countries (LAMIC) where there are higher rates of utilization of two-wheel motorized vehicles, including motorcycles (Peden et al., 2004). It is well established that an important means to reduce head injuries and death from motorcycle-related trauma is protective helmet use, which lowers the risk of death and head injury by 42 and 69%, respectively (Liu et al., 2008; Toroyan et al., 2004). Programs in developing Asian countries have improved helmet use and reduced risk of traumatic brain injury (TBI) among motorcyclists through manufacturer performance standard setting, mandatory legislation for helmet use, and effective public education campaigns (Toroyan et al., 2004). Despite such advances, helmet use among riders in other regions of the world remains low (Peden et al., 2004).

Among the regions severely impacted by motorcycle related TBI is Latin America, in particular, the Dominican Republic, where 49.5% of registered vehicles are motorcycles (Department of Economics and Tax Studies, 2011). According to Pan American Health Organization

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(PAHO) data, traffic collisions are the number one cause of death for men and number two cause of death for women between the ages of 15 to 49 years in the Dominican Republic (PAHO, 2007). The incidence of traffic-related deaths was 17.3 per 100,000 persons in 2006 (PAHO, 2009). The Dominican Republic has a national legislation mandating that motorcycle operators wear helmets (National Law 124, 1971); however, many riders do not abide by the law. In a recent survey conducted in the Dominican Republic among men who ride motorcycles, 55% of participants reported never using helmets. Those that use helmets at all reported doing so only 37% of the time (Stillman et al., 2010). Given high rates of motorcycle riding and low rates of helmet use among Dominicans, improving compliance with helmet use could significantly prevent unnecessary loss of life, severe injury, and the associated costs from road traffic injuries to Dominicans before or during the prime of their lives (Hyder et al., 2007). In its 2006 publication, *Helmets: A Road Safety Manual for Decision-makers and Practitioners,* the World Health Organization recommended exploring local attitudes and beliefs about helmet use as a primary step in designing effective programs for increased helmet use among riders (WHO, 2006). With this article, we seek to translate the WHO recommendations by exploring attitudes and beliefs about helmet use among residents of the Dominican Republic who often ride motorcycles without helmets.

METHODS

Study design and setting

An exploratory, qualitative research study was conducted on a convenience sample of adults in February 2009 at Hospital Regional Universitario José Cabral y Báez, a public, urban, teaching hospital in Santiago, the second largest city in the Dominican Republic. Semi-structured, qualitative interviews were conducted in the subject's preferred spoken language (Spanish or English). Questions were open-ended, having prompts that encouraged participant to speak freely about their motorcycle helmet use. Demographic variables included the subject's age and gender.

Selection of participants

The study population consisted of patients or visitors in the emergency department. Eligible participants were at least 18 years old and reported using motorcycles as a primary means for transportation and not using helmets the majority of the time. Persons who were unable to speak Spanish or English, were not able to understand the informed consent process, or were considered to be medically unstable by the patient's doctor or the research team was excluded. We obtained verbal consent from participants prior to participation. IRB approval was obtained from NYU School of Medicine (study number 08-1014).

There was no IRB at the study site hospital prior to or during the study.

Interview questions

1. Why do you ride a motorcycle?
2. Describe any accidents you may have had while riding motorcycles.
3. Why do some people use motorcycle helmets?
4. Why do you ride a motorcycle without a helmet?
5. What might change your mind about wearing a helmet?
6. How has the national law about riding with a helmet affected your decision?

Following these questions, subjects were encouraged to share any other thoughts or ideas they had about wearing motorcycle helmets.

Data collection and processing

Interviews were digitally audio-recorded, transcribed, and translated from Spanish into English with the assistance of a local researcher (JP) familiar with area language and culture. A team member proficient in both Spanish and English (AD) confirmed transcription and translation accuracy. Participants were assigned a unique study number; all identifying information was removed from stored data.

Data analysis and outcome measures

A grounded theory approach, whereby a theoretical model emerges through iterations of data collection, analysis, and theory development, was used to derive the model for motorcycle helmet use behavior (Giacomini and Cook, 2000). Two trained investigators (AD, NB) coded all data and a third (SW) performed an independent audit confirming the coding scheme. Interviews proceeded until theoretical saturation was obtained.

Data were transcribed and analyzed using Microsoft Word with color-coded grouping of text to assist with coding (Auerbach and Silverstein, 2003). Journal notes were recorded using the reviewing and comment functions to document all coding and analysis decisions. A summary narrative was composed to explain research findings, and Gliffy, collaborative web-based diagramming software (Gliffy, Inc., San Francisco) was used for theory modeling.

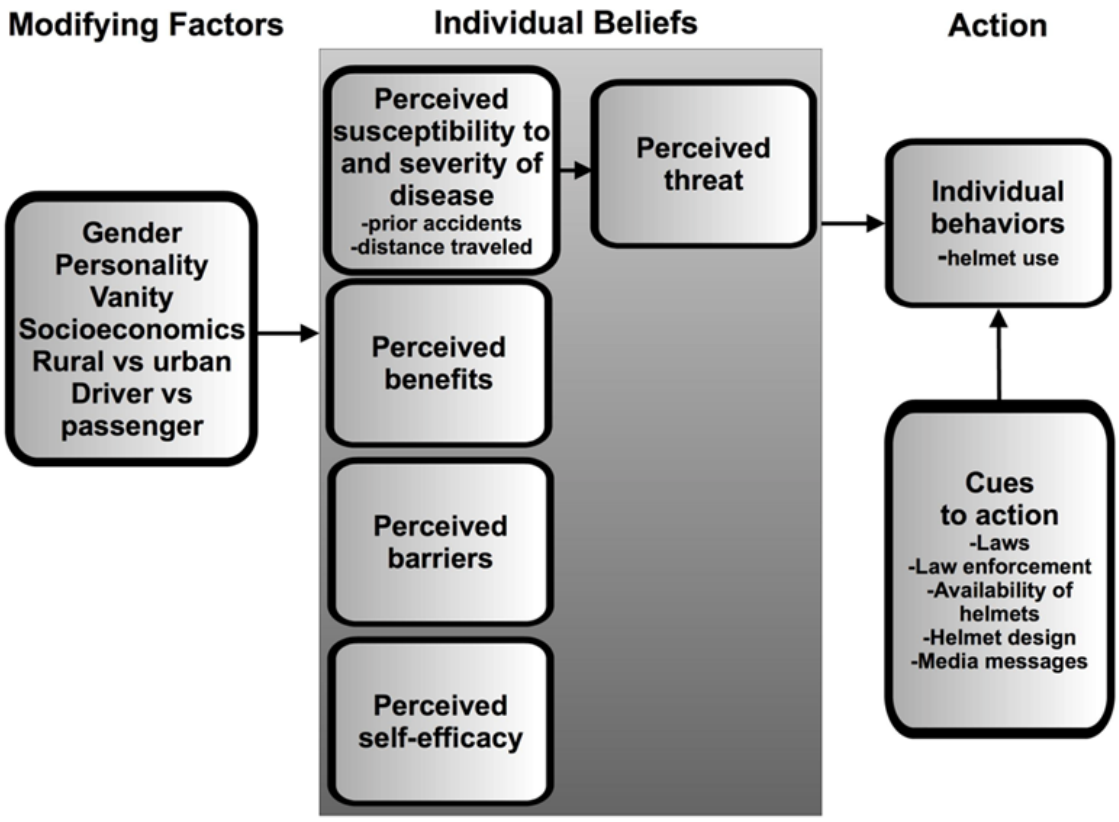

Figure 1. Derived model for motorcycle helmet use based on modifying factors and individual beliefs in the Dominican Republic.

RESULTS

Sample demographics

We achieved theoretical saturation after interviewing 26 participants from Santiago and the surrounding rural areas. Mean age of the sample was 29 years old (range 20 to 48); 50% (13) were women. Twenty-four interviews were conducted in Spanish; 2 were conducted in English.

Main results

Summary narrative

Constructs related to helmet use behavior were identified within the interview transcripts (Figure 1). Participants reported individual perceptions regarding helmet use including perceived susceptibility and seriousness of head injury, as well as modifying factors including demographic characteristics and knowledge of TBI prevention, which determine perceived threat of disease. As individuals experience cues to action, it is the interface between the cues and perceived threat that determines likelihood of the health behavior, in this case, using helmets when riding motorcycles.

Individual perceptions

Most participants understood helmets protect a rider from head injury and death, but many perceived their susceptibility to injury as low. Some stated helmets are not needed specifically when driving short distances near home, responding, “if I am going far away I put it on, but if it is close in my neighborhood I do not.” Many participants graphically described personal accounts of prior motorcycle collisions, yet still harbored beliefs they were at low risk of head injury.

Modifying factors

Personal characteristics modified participants’ perceived benefits and barriers to helmet usage. Participants who lived in rural areas commented that helmets were not typically worn much outside of the city. One rural resident remarked, “everyone uses the helmet over here, in Santiago, but over there where I live, we do not. When one comes over to Santiago, yes.” Another perceived

barrier to helmet use was the undesirable physical appearance caused by the helmet, or vanity. Participants made comments such as, “I look weird with the helmet on. It is not comfortable using it in your neighborhood” and “I would not like riding with that because it does not look good.”

Socioeconomic status also influenced motorcycle and helmet usage. Participants commented that they use motorcycles for financial reasons, “It is easier, you know, on the motorcycle for me, economically, because I cannot afford a car” or that they used an employer-owned motorcycle for their job. However, many remarked that they could not afford a helmet, explaining, “I do not have one, and I cannot really afford one,” and “I have no way to get one.”

People who rode mostly as passengers tended to give their backseat status as a reason for not wearing a helmet. Participants stated, “always, the owner is the one that uses it and maybe he does not buy two for the passenger in the back; they only have one.” Many people reported their primary means of transportation were motorcycle “taxis” called *motoconchos*, in which no helmet is typically provided to the passenger. Several regular users reported, “in the *motoconchos* I do not wear it.” Additionally, some perceived that the driver was the only one who needed the helmet, stating, “it is always the driver that gets affected.” This cultural belief places women at increased risk for TBI because, as participants reported, women most often ride as passengers on motorcycles belonging to their brothers and significant others.

Cues to action

Laws about helmet use could be a potential cue to action to use a helmet. However, participants considered a national law mandating helmet use for motorcycle drivers to be ineffective, stating that the transport police rarely enforce it, and if so, it is in predictable areas and times of the day, allowing drivers to avoid tickets. The transport police are known as the Autoridad Metropolitana de Transporte (AMET). One subject explained, “if I am going through somewhere where I know the traffic police are, I will borrow one. . . . They place themselves strategically at certain places and times.” Others explained that some who own a helmet wear it only when they think they are at risk of a ticket, stating, “a lot of people carry them, but wear it just if they see an AMET.” Another remarked, “I just go around [where the police are].” Participants also recounted that the law only mentions the motorcycle operator; “mainly the passengers in the back do not wear a helmet, seems the law does not take it into account.”

Helmet design came up as a common topic in interviews. Participants complained that helmets are irritating, saying, “I do not like to wear it, it is uncomfortable. Makes me hot; it is too hot while I am driving and it bothers me. I feel suffocated.” Several participants also commented that helmets obscure their vision, making riding their motorcycle more dangerous. One subject explained, “the helmet blocks the sight. You see better without the helmet; looking to the sides, you can turn your head with no trouble.” Not only did some participants believe the actual driving was impaired by the helmets, but others also felt less safe with a helmet on because of violence in the community, as this motorcyclist explained:

In the night you cannot use a helmet because others cannot recognize your face. . . . At night a lot of things happen, lots of robberies and stuff. If everyone uses a helmet nobody knows anyone. . . . You cannot see at night. Picture yourself with that put on. No one can see your eyes or your face.

Helmets must be readily available to be used. Many people stated that if they did have access to a helmet, they would use it, saying things like, “[it’s] not that I don’t care, but because I don’t have one. If I had one I would use it.” Some specifically pointed out that they did not have one because it was another person’s responsibility to provide it, such as one delivery employee who said, “the owner from my work has not bought one. . . . The motorcycle is not mine, and I do not have to buy it.” This is also somewhat similar to the situation described earlier for passengers on private or motoconcho motorcycles that do not wear a helmet because one is not provided to them. Some participants also offered suggestions to encourage helmet use including mandating that manufacturers include helmets with motorcycle purchases, requiring passenger helmet use, altering AMET monitoring times and locations, and for motorcycle taxis to provide helmets for passengers.

DISCUSSION

With the results from this exploratory qualitative study we identify some barriers to motorcycle helmet use among Santiago demographic area residents. Many of the findings in this article are consistent with those previously reported in the WHO literature: to increase helmet use, legislation must be effective in its wording and enforcement, helmets must be designed for comfort and safety, and those at risk for injury need to be educated and acculturated toward everyday use (Peden et al., 2004; Toroyan et al., 2004). Some participants identified unique problems with helmets and made novel suggestions for improvement in helmet use, exemplifying the importance of WHO recommendations to conduct local exploration of issues prior to implementing a helmet promotion program (Toroyan et al., 2004).

Analysis of the data led to the emergence of the helmet use behavioral model (Figure 1). This model triangulates

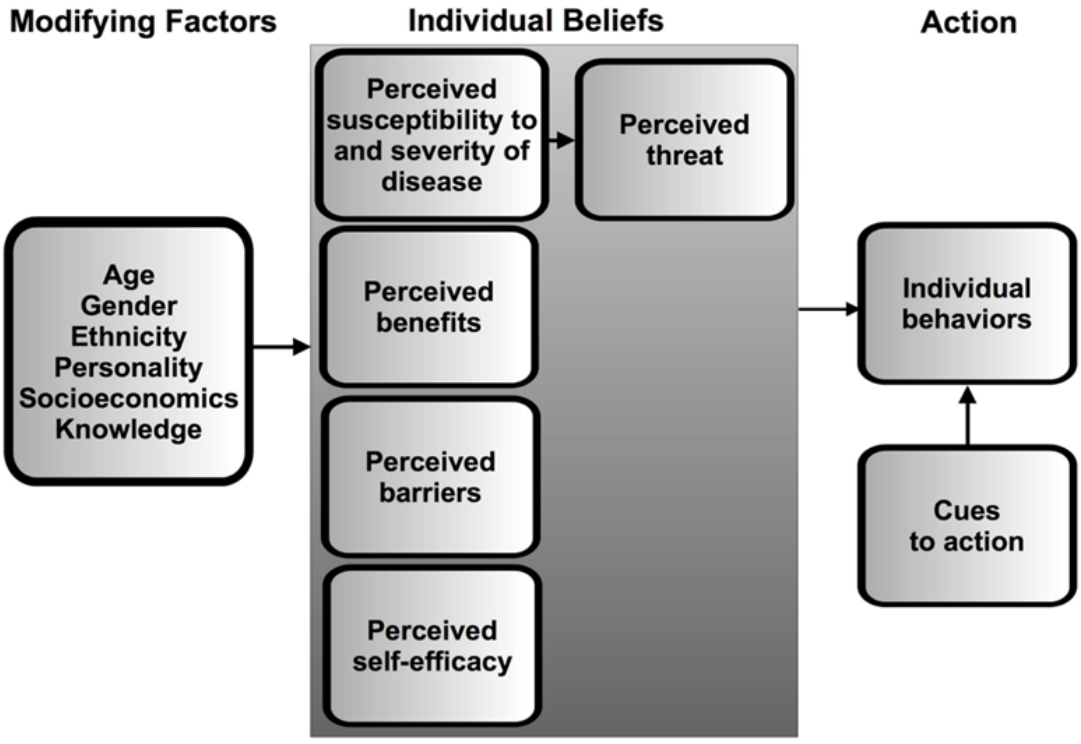

Figure 2. The Health Belief Model. Reproduced with permission from Champion VL, Skinner CS. In: Glanz K, Rimer BK, Viswanath K, eds. *Health behavior and health education: Theory, research, and practice*. 4th edn. San Francisco: Jossey-Bass, 2008:45-62.

with the Health Belief Model (Figure 2), a conceptual framework used in health behavior research to postulate how perceived risk, barriers, and cues to action explain health behaviors (Champion and Skinner, 2008). Our model describes how a person's likelihood to change the behavior affecting their health (in this case, to wear helmets) is influenced by their perceived threat of head injury, benefits of, and barriers to use of helmets, as well as one's perceived self-efficacy for modifying their protective behavior. Any cues to action (such as media, laws, peer pressure, helmet design) could positively influence one to modify health behavior with a threshold toward change based on their prior threat.

Many participants reported that either they or someone close to them had experienced a motorcycle collision, yet they still perceived themselves at low risk of incurring a significant head injury from a similar crash. This confirms findings from a 2008 survey of Dominican motorcyclists, which found that neither personal injury nor morbidity from traffic-related injury in a close friend or family member was correlated with helmet use (Stillman et al., 2008). Additionally, people felt safe riding without a helmet when it was in rural areas or on short trips around town, possibly because of beliefs that these types of trips are safer or because of limited law enforcement. Helmet use could potentially increase with educational campaigns designed to better convey true risk of head injury among riders.

Furthermore, passengers are under no obligation to wear helmets under current Dominican law. Hence, an expansion of the law to include passengers might be an effective means to increase protective helmet use. *Motoconchos* (motorcycle taxis) would likely need to provide helmets for clients with the transfer of additional costs to riders and the caveat of potential introduction of disease from improper cleansing (Toroyan et al., 2004). A less likely scenario would be that passengers would supply their own helmets. Targeting passenger helmet use could reduce the gender-related risk disparity because women more often ride as passengers and seem to believe they are not expected to wear helmets. Alternatively, educational campaigns could be targeted specifically at women to inform them that passengers incur equal risk of head injury as drivers.

As one participant suggested, more helmets would be in circulation if the helmets were sold with the motorcycle, ensuring that at least every operator owned a helmet. This could be realized through legislation or economic incentives for manufacturers to include helmets with motorcycle purchases. Such policy could be used to

target riders believing they would wear a helmet “if only they owned one.”

A focus on helmet design in future research could initiate increased helmet use. Helmets should not significantly obscure the vision or be too uncomfortable for use, as some people complained. A future study looking at types and quality of helmets used in this population could be used to reveal relevant problems. The issue of people feeling unsafe when wearing a helmet because others cannot recognize them seems to be part a larger problem of crime. This is more complicated to solve and would likely require a costly multidisciplinary solution with better road lighting and expanded police presence. Additionally, barriers to helmet use related to vanity could likely be helped by media campaigns to normalize helmet use among potential users' peers.

As explained in the Health Belief Model, cues to action are an important aspect of modifying health behavior, and media campaigns and public policy changes as described could provide such cues. Respondents described the traffic police as a cue to action with some using helmets when they knew police would be present; unfortunately, enforcement was predictable and participants easily shirked the system. Findings suggest the helmet law needs to be enforced randomly and in rural areas along with urban ones to be effective.

LIMITATIONS

The generalizability of results of qualitative studies is often limited, as the method delves deep into specific local circumstances to characterize complex phenomena. This study utilized purposeful convenience sampling and analysis was conducted by researchers with their own unique frames of reference shaped from prior experiences. By acknowledging these limitations, including rich description of the culture and prior experience of the study team members, interpretation of findings can be conducted fairly (Giacomini and Cook, 2007).

Other study limitations included potential misunderstanding of the nuances of the local dialect or differences in the two interviews conducted in English. Cultural differences between the participants and research personnel might have also prevented participants from fully opening up in their interviews. We attempted to mitigate these language and cultural limitations by involving a local researcher. Participants might have felt uncomfortable discussing illegal behavior, and this could have influenced their honesty. Additionally, although we did not specifically collect demographic data on income, the population at this public urban hospital is a mostly poor one, and it is not clear how generalizable these results are locally to different socioeconomic strata of the population.

POLICY RECOMMENDATIONS

Changes in legislation

1. Helmet laws should be changed to apply to motorcycle passengers as well as drivers.
2. Motoconchos should be required to provide a helmet for passengers’ use.
3. Requirement of simultaneous purchase of a helmet at time of purchase of a motorcycle.

Changes in law enforcement

1. Police should vary pattern of law enforcement.
2. Enforcement should increase in rural areas.
3. Existing legislation should be enforced more strictly.

Financial interventions

1. Subsidies should be introduced to encourage the manufacturing of helmets in country.
2. Helmets should be tax-exempt at the point of sale.
3. Helmet purchases should be should be tax deductible on income taxes.

Cultural interventions

1. A media campaign should be undertaken to popularize helmet use.
2. A mandatory educational program should be introduced in secondary schools.
3. Popular entertainment and athletic figures should be recruited to serve as spokespeople for a campaign to make helmet use more common.

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