

Selma Siddiqui – International Health Fellowship, Preliminary Proposal

Title:

Motorized Two Wheeled Vehicle Riders in New Delhi: Patterns of Injury and Attitudes on Helmet Use

Summary:

With the addition of a motor to the bicycle in the mid 19th century, the global love affair with the motorized two-wheeler began. Daimler's first conventional motorcycles of the 1880's were not designed for speed and accident related head injuries were rare (1). With technological improvement, frequency of accident related head injuries rose until the need for head protection was immutable. The first motorcycle helmet, designed by USC Professor C.F. Lombard in 1953, was hailed as the tool of head injury prevention (2). The utility of helmets was so immediately accepted in the developed world that within 10 years of the US 1966 Federal Highway Act encouraging states to enact helmet laws, 47 states had mandated helmet use for motorcycle riders (3). Despite evidence that helmeted riders have lower overall death rates, lethal head injury rates, and less severe non-lethal head injuries, debate regarding infringement of these laws on individual rights led to repeal or reduction of helmet laws in 27 states (3, 4, 5).

In Asia, the method of transportation most suited for old cities, narrow roads, and dense congestion is the motorized two-wheeler (MTWs). In India, MTWs comprise over 71% of motor vehicles registered as of 2004 and continue to represent over 70% of annual vehicle sales through 2007 (6). Across India, these same MTWs comprised 21.8% of primary responsible vehicles in all road accidents and 16.9% of primary responsible vehicles in fatal road accidents in the year 2008 (7).

Data collected by the All India Institute of Medical Sciences (AIIMS) in 1984 identified the unique MTW road accident parameters in India and demonstrated that helmets are effective in preventing or limiting head injury (8). In conjunction with prior evidence, the national Motor Vehicle Act of 1988 (The Act) was established mandating the use of helmets by drivers and pillion riders of MTWs with an exception for Sikhs wearing a turban (9). However, The Act left date of implementation and determination of further exceptions to the individual states.

In Hyderabad, India, there is still active debate over implementation of The Act. From November 2005 until June 2006, open wounds and superficial injuries to the head comprised 69.3% of all injuries in MTW road accidents in the city (n=378) (10). In the same study, 11% of patients presented with an intracranial injury including 28% with skull fractures. Failure to wear a helmet was associated with a five times greater risk of intracranial injury, yet a study of self reported driver behaviors in Hyderabad documented only 30.2% of drivers use helmets very often or always (10, 11). Reasons for disuse reported by riders who use helmets very occasionally or not at all include 20% who never

thought to use helmets, 2.2% who felt it unnecessary, and 30% who found helmets uncomfortable (11).

In 1997 the state of New Delhi began implementation of The Act by way of a High Court order (12). Subsequently, despite the 1984 AIIMS data demonstrating helmet efficacy, the state incorporated an additional exemption for all women riders after city wide protests and religious opposition. Helmet law opponents argued against the infringement on individual choice and further that “the Sikh cannot wear a *topi* [helmet]. If he does, he will die of leprosy for seven lives. By forcing our ladies to wear a helmet, the government is violating our fundamental rights” (13).

Socioethnic and religious factors clearly contribute to differing attitudes on helmet usage with population proportion of these distinct groups varying across Indian municipalities. Poor compliance further demonstrates locality variance as it is rooted in personal preferences and beliefs regarding helmets. Compared to studies from Hyderabad India, a survey of attitudes of MTW drivers (n=956) in the neighboring Pakistani city of Rawalpindi, demonstrated 18.1% (173 riders) do not believe helmets protect drivers (14). Furthermore, in Rawalpindi one in four feel helmets are uncomfortable or impede riding ability and nearly 40% feel helmet laws are unnecessary as helmets are “useless to use.” Combined with varied road conditions, traffic patterns, and motor vehicle density, this broad range in attitudes necessitates location specific data.

Even with mandated helmet use for non-Sikh men in New Delhi, inappropriate helmet use, use of helmets not meeting quality markers set by the Indian Standards Institute and poor executive enforcement decreases the effectiveness of current law. Along with rent seeking by enforcement officials, the 100 INR fine (2.2 USD) is a poor deterrent for the average MTW rider whose income is likely well above average (3.2 USD GDP/capita per day) (15, 16, 17). A Vietnamese study on their recently passed universal helmet law demonstrated that the multidisciplinary approach across governmental departments allowed effective implementation, resulting in helmet use approaching 100% in most states (18).

Among nations implementing helmet laws, exemptions are primarily for medical or disability purposes. India stands unique in allowing gender and religion based distinctions permitting high risk behavior. At present, an estimated nine million women are exempted from helmet use in the city of New Delhi. Extrapolating existing accident mortality and injury rates from 2008, the current law exposes at least five thousand women to serious injury and death annually (7).

Due to locoregional differences, a survey of attitudes and frequency of helmet use among women of the different socioethnic and religious groups within New Delhi is essential to understanding not only opposition to law, but also modalities to alter these sentiments. Evaluation of MTW road accidents in New Delhi is necessary to demonstrate if there is a lower rate of intracranial injury and pre-hospital death in helmeted versus non helmeted drivers and pillion riders, especially women and Sikhs. If this difference is found, these data can be used to advocate review of current legislation and ultimately mandate helmet use for all MTW drivers and pillion riders without exception.

Objectives:

Attitudes Survey Objectives

- Identify attitudes towards helmet usage among the following cohorts: Sikh, Hindu and Muslim women in Delhi
- Identify factors affecting attitudes towards helmet usage.
 - Media, government, organizational influences

Patterns of Injury Objectives

- Identify primary patterns of injury among the following cohorts:
 - Males and females
 - Pillion riders
 - Helmeted and non helmeted
 - Female helmeted and female un-helmeted pillion riders
- Provide further data supporting the utility of helmets in prevention of head injury specific to the city New Delhi.
- Provide sufficient evidence to advocate legislative mandates for unexceptional helmet use.

Future directions of this study:

- Development of a public relations campaign incorporating helmet manufactures, MTW manufacturers, government ministries, and media outlets to provide education and awareness, 'helmet fairs,' and helmet use counseling.
- Patterns of injury data with locoregional validity will be used to support legislative repeal of the helmet use exemption for all women. In conjunction with the public relations campaign, the goal is to achieve 100% helmet compliance for all MTW riders.

Project Description:

To survey attitudes towards helmet usage within the various socioeconomic and religious populations, a standardized survey will be administered to women at several community locations. The survey queries demographic data, frequency of MTW use, frequency of helmet use, and belief in advantages of helmet use. The survey also contains questions related to support for legal mandates of helmet use and attitudes towards such law. To ascertain influences factors, inquiry will be made about the development of these attitudes. The survey will be administered anonymously to women only, will be provided on paper and written in English requiring less than 10 minutes to complete. I or other trained survey administrators will be available to translate or read aloud the survey for those persons unable to understand the paper format. [See Appendix 1]

To assess patterns of injury among drivers and pillion riders in MTW road accidents, a query will be performed of the existing electronic trauma database at the AIIMS. The AIIMS trauma database will be queried for type of involvement (driver or pillion rider),

gender, helmet use, status of patient on arrival, and type of injury(ies) incurred. Further data points including procedures required, level of care, and hospitalization cost will also be sought as applicable. Data will be analyzed using standard statistical techniques to demonstrate differences between cohorts.

Sponsorship/Mentorship:

Dr. Mamta Swaroop, Assistant Professor of Surgery in the Division of Trauma and Critical Care, is my main advisor at Feinberg School of Medicine. She is also in close contact with the AIIMS faculty including my designated site mentor and will be able to provide additional guidance while I am in India.

Dr. Sushma Sagar will be my mentor for the duration of my stay in New Delhi, India. Dr. Sagar is an Assistant Professor of Surgery at the AIIMS. Dr. Sagar will provide me with access to the database at the AIIMS in addition to guidance with basic field research.

Personal/Previous Experience:

The first time I traveled to Pakistan at age 10, I romanticized the motorcycle: wind in your hair, sun on your face, the thrill of the risk. However at age 18 riding on the motorbike pillion, all those thoughts vanished. I personally know the fear of being an un-helmeted pillion rider, and am able to understand the society and culture where such risk must be undertaken daily.

Furthermore, my experience with the Department of Plastic and Reconstructive Surgery at Northwestern Memorial Hospital provided me opportunities to understand how clinical research is performed both retrospectively and prospectively.

Language Requirements:

India is known for its many dialects. English and Hindi are both official languages of India. My ability to converse in Urdu will be paramount as Hindi and Urdu are often spoken in the combined form of Hindustani. Furthermore, in the medical setting at the AIIMS, most of my colleagues speak English and should be able to assist as needed if/when situations present requiring discourse in another dialect.

Cost: (Estimated)

Program Application Fee: \$150

Airfare: \$1800

Living Arrangements: \$700

Visa Fee: \$163

Emergency: \$100

Non-NU funding:

None

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All reference materials can be provided upon request

