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## Original Research

# A comparison of observed and self-reported helmet use and associated factors among motorcyclists in Hyderabad city, India<sup>☆</sup>



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## ABSTRACT

**Objectives:** India has a high burden of fatal road traffic injuries (RTIs). A large proportion of fatal RTIs in India are among motorcyclists. The overall goal of this study is to assess and compare observed and self-reported prevalence of helmet use; and to identify factors associated with helmet use and over-reporting in Hyderabad city, India.

**Study design:** Roadside knowledge, attitude and practice interviews.

**Methods:** Six rounds of roadside interviews were conducted with motorcyclists (drivers and pillion riders) between July 2011 and August 2013 using a structured tool developed for this study. Observations on helmet use were recorded and respondents were also asked if they 'always wear a helmet'. Prevalence of helmet use was calculated and a paired t-test was used to compare observed and self-reported helmet use proportions. Unadjusted and adjusted odds ratios were calculated to identify factors associated with helmet use and over-reporting.

**Results:** A total of 4872 respondents participated in the roadside interview. The response rate was 94.4%. The overall observed helmet use was 34.5% and 44.5% of respondents reported that they 'always wear a helmet'. As the observed helmet use increased, the over-reporting of helmet use was found to decrease. However, factors associated with observed and self-reported helmet use are similar. Male gender, youth ( $\leq 24$  years), a lower level of education and non-ownership of helmet were associated with a higher risk of not wearing helmets. Male gender, youth ( $\leq 24$  years), no schooling, riding a lower engine capacity motorcycle and using a motorcycle for purposes other than travelling to school/work were associated with over-reporting of helmet use.

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*Conclusions:* Self-reports provide an overestimate of helmet use that lessens as actual helmet use increases. Interviews also allow identification of factors associated with helmet use. Increasing helmet ownership and enhanced enforcement may help increase helmet use.

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## Introduction

Road traffic injuries (RTIs) are increasingly being recognized as a global public health problem accounting for about 1.24 million annual deaths.<sup>1</sup> RTIs are projected to be among the leading cause of global deaths by the year 2030.<sup>1</sup> Globally, RTIs are unequally distributed with residents of low- and middle-income countries (LMICs) accounting for about 90% of fatal RTIs.<sup>1</sup>

According to the World Health Organization's (WHO) estimates for 2013, India had about 16.6 fatal RTIs per 100,000 population.<sup>1</sup> According to the national statistics, 38.9 road traffic crashes (RTCs) per 100,000 population were reported in 2013, which were associated with 11 fatalities and 39.6 injuries per 100,000 population.<sup>2</sup> A large proportion of fatal RTIs (34%) in India are among riders of motorized two- and three-wheelers.<sup>1,2</sup> Motorcycles are one of the most popular vehicles in the Indian market and their use has been rapidly increasing. For instance, in 2012 motorized two- and three-wheelers constituted 72% of all registered vehicles in India.<sup>1</sup>

Helmets are recommended for motorcyclists to reduce the risk of head injuries. They can lower mortality between 32% and 50%.<sup>3</sup> India has a national helmet law that makes helmet use mandatory for both motorcycle drivers and pillion riders (co-passengers). However, the notification and enforcement of this law rests with individual states and is generally weak.<sup>1,4</sup> In a recent exercise conducted by the WHO, the enforcement of helmet law in India was rated 4 on a scale of 10 (where 0 was least and 10 was highly effective).<sup>1</sup>

In 2010, the Bloomberg Philanthropies Global Road Safety Programme (the programme) was initiated in 10 LMICs with an overall goal of reducing the burden of RTIs.<sup>5,6</sup> India is one of these 10 countries and Hyderabad city is one of the implementation sites. Lack of helmet use was identified as a risk factor to address in Hyderabad city, a joint capital of both Andhra Pradesh and Telangana (Andhra Pradesh has recently split into two states—Andhra Pradesh and Telangana) with a population of over 8 million.<sup>7</sup> Former Andhra Pradesh state, with a population of 85 million and vehicle population of 11 million was among the top five states in India with the highest rates of crashes, RTIs and fatalities.<sup>2,7,8</sup> Hyderabad city is amongst the cities with the highest burden of RTIs in India.<sup>2</sup> In 2013, out of 100 RTCs in Hyderabad 19 were fatal.<sup>2</sup> Motorcycles constituted 73% of all registered vehicles in former Andhra Pradesh state and motorcyclists account for about 40% of fatal RTIs in Hyderabad.<sup>8,9</sup>

In former Andhra Pradesh, helmet use was mandatory for both motorcycle drivers and pillion riders and the penalty for non-use was Indian rupees 100 (equivalent to USD 1.68).<sup>10</sup>

However, helmet enforcement in Hyderabad has faced political opposition and therefore this law is not consistently enforced.<sup>11–17</sup> In the baseline assessment conducted in Hyderabad in July 2011 for the programme, helmet use was found to be low (17.4–29.3%) and perceived enforcement of the helmet law weak.<sup>18</sup> Existing literature confirms that legislation and enforcement of helmet laws can increase compliance.<sup>19,20</sup> Nonetheless, a reported lack of political will in Hyderabad to enforce the helmet law highlights a need to explore other ways to increase helmet use in the city.<sup>21</sup>

Two methods are commonly used to understand road behaviours—direct observations and self-reports.<sup>22</sup> Direct observations provide a more valid estimate of road behaviour but they are resource intensive and require trained data collectors.<sup>22</sup> On the other hand self-reports are biased because of the nature of self-reporting but these studies are relatively less expensive and unlike direct observations allow data to be collected on a larger set of factors associated with road behaviours.<sup>22</sup> However, self-reports may also distort conclusions on associated factors as these may be associated with over-reporting rather than the road behaviour under study.<sup>23</sup> A comparison of factors associated with observed and self-reported helmet use can help assess reliability of self-reports while an understanding of factors associated with over-reporting would allow us to identify groups that are likely to give a discordant response.<sup>23</sup>

This study builds on earlier work that reported discrepancy between observed and self-reported helmet use and factors associated with helmet use.<sup>18</sup> We previously found a statistically significant cross-sectional association between age and observed and self-reported helmet use; and between education and self-reported helmet use.<sup>18</sup> In the present study we are using a larger dataset collected over multiple rounds that would allow more robust analyses and comparison with earlier findings. The specific objectives of this study are: (1) to assess and compare the prevalence of observed and self-reported helmet use; (2) to identify and compare factors associated with motorcycle helmet use—observed and self-reported; and (3) to identify factors associated with over-reporting of helmet use in Hyderabad city, India. This study can help identify groups at higher risk of not wearing helmets and can help inform appropriate road safety interventions.

## Methods

Six rounds of roadside knowledge, attitude and practice interviews were conducted over two years (July 2011, November 2011, March 2012, October 2012, April 2013 and August 2013) to

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