

Prevalence of Helmet-use in Rajasthan, India: Implications for Policy

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ABSTRACT: Road injuries are one of the leading causes of disability and fatality in Low and Middle Income Countries (LMICs) including India. To reduce the fatal accidents and seriousness of injury, legal provisions for helmet use by motorcyclists and pillion riders do exist but not often followed. The present study on helmet use was carried out in Rajasthan, India. The objective of the study was to assess the current status of helmet use and its association with various variables like education, age, sex etc. in Rajasthan by motorcyclists and passengers. Helmet interviews were conducted in all seven divisions of the state at highways, rural and urban locations to assess the current status of helmet use from early morning till late evening. The understanding developed by the study will help policy makers and planners to devise a strategy to increase the use of helmet by motorcyclists and pillion riders in the state of Rajasthan, India.

KEYWORDS: Helmet, Motorcyclists, Divisions, Sites, Rajasthan, IIHMRU, Road Injury.

I. INTRODUCTION

Year 2016 is just the middle of the United Nations Decade of Action for Road Safety 2011-2020. The Decade aims to stabilize and reduce the number of deaths and seriously injured, saving 5 million serious injuries between 2011 and 2020 [1]. After the Rio summit (June 2012), the current debate on post-2015 priorities and new Sustainable Development Goals provides an opportunity to reframe transport policy priorities around two simple principles: safety for people and sustainability for the planet [2]. This reflects that globally the importance of road safety has been realised by almost all the countries. Dr Margaret Chan, Director-General of WHO, defined the urgent measures needed to achieve the 2030 Agenda for Sustainable Development's ambitious target to halve road traffic deaths by the end of this decade [3]. Unless action is taken, road traffic injuries are predicted to become the fifth leading cause of death by 2030 [4].

II. RELATED WORK

One of the effective way of avoiding or reducing RTIs and death or disability is proper helmet use. A systematic review done by Liu et al. reported that helmets are effective in reducing head injuries in motorcyclists who crash by 69% and death by 42%. [5]. Importance of helmet use is often neglected. A cross-sectional study done in Bengaluru city reported that 74% victims were not using helmets at the time of road accidents [6]. A hospital based study conducted in SMS medical college Jaipur, Rajasthan, India revealed that incidence of death due to RTAs was higher in two-wheeler male riders aged 20-40 years when they were not using helmet while riding [7]. Data on the outcome indicator (accidents, injuries and death) are publicly available through Govt. sources like Ministry of Road and Transport and Highways (MORTH) and National Crime Records Bureau (NCRB) but data on risk factors (Helmet use, Seat belt use) are not available for every states in India. These findings informed our decision to carry out this statewide study in Rajasthan to determine the prevalence of helmet use across all the divisions at all locations rural, urbana nd highways.

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III. METHODOLOGY

Roadside interviews were conducted to understand patterns of helmet-use among motorcyclists and pillion riders in February-March 2015 in each administrative division namely Ajmer, Bharatpur, Bikaner, Jaipur, Jodhpur, Kota, and Udaipur in Rajasthan, area wise, the biggest state in India. A list of all possible observation sites in each administrative division was prepared after reviewing maps and in consultation with local police personnel. A total of seven high-traffic volume sites representative of each administrative division were selected for interview using stratified random sampling, such that four were in urban area, two were in rural area and one was on highway. These locations had the road design features (traffic light, intersection, roundabout, etc.). At some locations where it was not possible to identify a safe spot for stopping vehicles at the signal/intersection, the interviews with motorcyclists were conducted at parking lots, gas stations, and rest stops. The Centre for Road Safety, Jaipur in Rajasthan assisted us in getting permissions and logistical support from the police in each administrative divisions. Upon receiving permission from divisional police commissioner's office, the Centre for Injury Research, Indian Institute of Health Management research University (IIHMRU) Research team of data collectors partnered with the traffic police to randomly stop individual motorcyclists. Motorcyclists were approached and recruited randomly by the Research team. The team used data collection instrument consisted of roadside interviews developed from similar studies conducted in other LMICs. The team first briefly described the aims of the study, contents and duration of the interview and requested informed consent from each motorcyclist. A face-to-face roadside interview tools designed especially to analyze the reasons towards helmet use was completed over one hour segments between 07.30-20.30 hours at all urban, rural and highway locations. Respondents were asked if they 'always use helmet' as well as their demographic attributes. This study was approved by the Ethical Review Board at IIHMRU, Jaipur and no identifying information of riders was collected.

IV. STATISTICAL ANALYSIS

A total of 617 riders participated in this study among them 88.2% (544) were males and rest 11.8% (73) were females across all 7 divisions. All quantitative data were entered into MS Excel and analyzed using STATA 12. Tabulation and descriptive analysis was conducted to estimate prevalence of helmet-use.

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V. FINDINGS

Table1. Socio demographic status of Respondents

Attributes	Frequency (n=617)	Percentage
Gender		
Male	544	88.2
Female	73	11.8
Age		
Less than 25	191	30.9
25 - 50	409	66.3
More than 50	17	2.8
Education		
No Schooling	19	3.1
Schooling up to 12	374	60.6
Graduates	168	27.2
Post graduates and above	56	9.1
Divisions		
Ajmer	96	15.6
Bharatpur	84	13.6
Bikaner	108	17.5
Jaipur	84	13.6
Jodhpur	76	12.3
Kota	84	13.6
Udaipur	85	13.8
Sites		
Urban	383	62.1
Highways	73	11.8
Rural	161	26.1
Status of Respondents		
Motorcyclist	594	96.3
Pillion Riders	23	3.7
Engine Size		
Less than 100cc	178	28.8
100cc and above	439	71.2
No of pillion riders on Bike		
One	367	59.5
Two and more	250	40.5
Types of Road		
Two Way with 1 or more lanes	409	66.3
One way with 1 or more lanes	208	33.7

Table1 (above) shows a total of 617 respondents across all 7 divisions were interviewed about helmet use. Among them 88.2% (544) were males and rest 11.8% (73) were females, 30.9% (191) belonged to less than 25 years age group, whereas 2.8% (17) were in more than 50 years age group and the majority 66.3% (409) belonged to 25-50 age group. As per their education 3.1% (19) were having no schooling, 60.6 (374) were pass up to class 12, 27.2% (168) were graduates while rest were at least post graduates.

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Table2. Association between helmet use (Self-reported) and socio demographic attributes of respondents

Attributes	Helmet use n (%)	Chi Square	DoF	p value
Gender		3.795	1	0.051
Male	292 (53.7)			
Female	48 (65.8)			
Age		6.226	2	0.044
Less than 25	91 (47.6)			
25 - 50	239 (58.4)			
More than 50	10 (58.8)			
Education		23.683	3	<0.001
No Schooling	5 (26.3)			
Schooling up to 12	188 (50.3)			
Graduates	104 (61.9)			
Post graduates and above	43 (76.8)			
Divisions		223.347	6	<0.001
Ajmer	74 (77.1)			
Bharatpur	15 (17.9)			
Bikaner	41 (38.0)			
Jaipur	65 (77.4)			
Jodhpur	48 (63.2)			
Kota	12 (14.3)			
Udaipur	85 (100)			
Sites		18.076	2	<0.001
Urban	233 (60.8)			
Highways	41 (56.2)			
Rural	66 (41.0)			
Motorcyclist #		10.751	1	0.001
Drivers	335 (56.4)			
Pillion Riders	5 (21.7)			
Engine Size		15.571	1	<0.001
Less than 100cc	76 (42.7)			
100cc and above	264 (60.1)			
No of pillion riders on Bike		0.002	1	0.969
One	202 (55.0)			
Two and more	138 (55.2)			
Types of Road		58.365	1	<0.001
Two Way with 1 or more lanes	270 (66.0)			
One way with 1 or more lanes	70 (33.7)			

Motorcyclists refer to both drivers and pillion riders

Table2 shows that there was no statistically significant association between the sex of the motorcyclists and helmet use among them ($\chi^2_{(1)}=3.795$; p value > 0.05). The association was found statistically significant between age group and helmet use ($\chi^2_{(2)}=6.226$; p value < 0.05). Further significant association was found between helmet use with education ($\chi^2_{(3)}=23.683$; p value < 0.001), divisions ($\chi^2_{(6)}=223.347$; p value < 0.001), sites ($\chi^2_{(2)}=18.076$; p value < 0.001), motorcyclist ($\chi^2_{(1)}=10.751$; p value < 0.01), engine size ($\chi^2_{(1)}=15.571$; p value < 0.05) as well as types of road

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($\chi^2_{(1)}=58.365$; p value < 0.001). However no significant association was found between helmet use and number of pillion riders ($\chi^2_{(1)}=0.002$; p value > 0.05).

VI. DISCUSSION

To best of our belief no systematic data for all the administrative division has been ever collected in rural, urban and highways regarding helmet use in Rajasthan to facilitate the planner and policy makers prior to this study. Under this Study age wise and gender wise data was collected which shows that there was no statistically significant association between the sex of the motorcyclists and helmet use among them ($\chi^2_{(1)}=3.795$; p value > 0.05). So whether male or female the use of helmet was low in both the cases. The association was found statistically significant between age group and helmet use ($\chi^2_{(2)}=6.226$; p value < 0.05). Lesser helmet use was found in the lower age group of < 25 as compared to 25-50 and in the age group of 50 and above. It was found that the use of helmet was more by the individuals who were having higher education as compared to those with lower education. Further significant association was found between helmet use with education ($\chi^2_{(3)}=23.683$; p value < 0.001).

According to WHO, Globally, nearly a quarter of all road traffic deaths are among motorcyclists [8]. Yet it has not attained adequate and appropriate importance in public health in most of the developing countries especially in India. A well researched fact is that head injuries are one of the most common injuries after motorcycle crashes and estimated to be the cause of death in >50% of these fatalities. In close to a third of these victims, the head injury is the sole organ system that is injured. However, in the majority of patients, estimated as high as 90% of some patient cohorts, a head injury is present along with other injuries. Despite these facts, it is estimated that only 50% of motorcyclists routinely wear helmets [9].

One of the studies conducted in Kerala, India shows that at the time of interview only one fourth of (26.9%) of the motorcyclists were using a helmet [10]. Another study conducted among the motorcyclists in South western part of Nigeria between January 2014 and April 2014 observed that only 89 (4.3%) of the riders observed used helmet, while the majority (1983) of the riders constituting 95.7% of the total riders observed did not use helmet at the time of observation [11]. Study carried out in Athens, Greece concluded that only 20.2% of motorcycle riders were using helmets of any type. The prevalence of use ranged from 9.7% on small suburban roads to 50.8% on highways. Older and female motorcycle riders appear to be more frequent helmet users, as are riders of motorcycle with higher engine capacity. There is also some evidence that helmet use is more frequent during day rather than night hours and during weekdays rather than weekends [12]. One of the studies aimed to determine the prevalence rates of helmet use, and of correct helmet use (chinstrap firmly fastened) among motorcycle riders and their passengers in Zhongshan, Guangdong Province, China found the prevalence of helmet use for drivers was 72.6% (95% CI: 71.8–73.3%) compared with 34.1% (95% CI: 32.7–35.5%) for pillion passengers. Rates of correct helmet use were lower, being 43.2% (95% CI: 42.4–44.0%) for drivers and 20.9% (95% CI: 19.8–22.1%) for passengers respectively. The prevalence of helmet use on city streets was 96.8% and 84.1% for drivers and pillion passengers respectively, while the rates were much lower for other road types [13]. Another study carried out in Bangkok, Thailand revealed helmet use rate of 43.7% (95% CI: 43.6, 43.9) nationwide with the highest rate (81.8%; 95% CI: 44.0, 46.4) in Bangkok. Helmet use rate in drivers (53.3%; 95% CI: 53.2, 53.8) was 2.5 times higher than that in passengers (19.3%; 95% CI: 18.9, 19.7). In relative terms (highest-to-lowest ratio, HLR), geographical disparity in helmet use was found to be higher in passengers (HLR=28.5) [14]. In the current study we also found that the helmet use by pillion rider was 21.7 per cent much lesser than driver which was 56.4 ($\chi^2_{(1)}=10.751$; p value < 0.01). Hence the helmet use in the state of Rajasthan has to be increased with the enforcement of law and through raising the awareness among the general public.

VII. CONCLUSION

The implications of these findings are quite significant which can be used to assist, support and guide the initiatives to improve helmet wearing behaviour in the state of Rajasthan. It is an empirical fact that the most positive changes to road user behaviour happen when road safety legislation is supported by strong and sustained enforcement, and where the public is made aware of the reasons behind the new law and the consequences of noncompliance [8]. It is suggested that high visibility enforcement activities should be undertaken in rural areas and highways of the state as the helmet use was quite low at these locations. The level of education in rural area is also lower as compared to urban area hence

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the awareness generation activities needs to be carried out in a way so that the rural people can understand the importance of wearing the helmet. The enforcement of law needs to address both the critical issues one is incorrect use of helmet and second is discarding low quality of helmets. As in both the cases the safety is compromised. Simultaneously extensive public education programs need to be carried out using information, communication technology to target pillion riders and motorcyclists. The state government should also think about developing a comprehensive fatality reporting system across all the administrative divisions and all locations rural, urban and highway. This system will guide the enforcement of helmet use within the state.

REFERENCES

- [1] World Bank, "Global Road Safety Facility (GRSF) strategic plan 2013-2020", NW, Washington DC: World Bank, pp.2, 2014.
- [2] Watkins, K., "sustainable-transport-goal-report-2012.pdf", Retrieved August 1, 2016, from FIA Foundation: [https://www.fiafoundation.org/media/44116/sustainable-transport-goal-report-2012.pdf\(2015\)](https://www.fiafoundation.org/media/44116/sustainable-transport-goal-report-2012.pdf(2015)).
- [3] 2nd Global High-Level Conference on Road Safety. (n.d.). Retrieved August 1, 2016, from WHO: http://www.who.int/roadsafety/events/2015/brasilgia_conference/brasilgia_conference/en/.
- [4] "Road Safety Facts" Retrieved August 1, 2016, from Association dor safe International Road Travel: <http://asirt.org/Initiatives/Informing-Road-Users/Road-Safety-Facts>.
- [5] Liu, B. C., Ivers, R., Norton, R., Boufous, S., Blows, S., & Lo, S. K., "Helmets for preventing injury in motorcycle riders", Cochrane Database of Systematic Reviews, Issue 1, Art. No. CD004333, pp. 1-9, 2008.
- [6] Shivakumar, B. C., Srivastava, P. C., & Shantakumar, H. P., "Pattern of head injuries in mortality due to road traffic accidents involving two-wheelers." Journal of Indian Academy of Forensic Medicine, Vol. 32 (3), pp. 239-242, 2010.
- [7] Pathak, A., Desania, N. L., & Verma, R., " Profile of road traffic accidents & head injury in Jaipur (Rajasthan)", Journal of Indian Academy of Forensic Medicine , Vol. 30(1), pp.6-9, 2008.
- [8] World Health Organization, "Global status report on road safety", Geneva 27, Switzerland, WHO, 2015.
- [9] MacLeod, J. B., DiGiacomo, J. C., & Tinkoff, G., "An evidence-based review: helmet efficacy to reduce head injury and mortality in motorcycle crashes: EAST practice management guidelines", Journal of Trauma and Acute Care Surgery, Vol.69 (5),pp. 1101-1111, 2010.
- [11] Olakulehin, O. A., Adeomi, A. A., Babalola, O. R., Olanipekun, O. O., & Ilori, O. S., "Helmet use among motorcycle riders Insemi-Urban, communities in Southwestern Nigeria", Journal of Medicine and Medical Sciences , Vol. 6(3), pp.35-39, 2015.
- [12] Skalkidou, A., Petridou, E., Papadopoulos, F., Dessypris, N., & Trichopoulos, D., "Factors affecting motorcycle helmet use in the population of Greater Athens, Greece", Injury Prevention, Vol. 5(4), pp.264-267, 1999.
- [10] Sreedharan, J., Muttappillymyalil, J., Divakaran, B., & Haran, J. C., "Determinants of safety helmet use among motorcyclists in Kerala, India", Journal of Injury and Violence Research , Vol.2(1), pp.49-54, 2010.
- [14] Suriyawongpaisa, P., Thakkinstian, A., Rangpueng, A., Jiwattanakupaisarn, P., & Techakamoluk, P. , " Disparity in motorcycle helmet use in Thailand", International Journal for Equity in Health , Vol.12(1), pp.1-6, 2013.
- [13] Xuequn, Y., Ke, L., Ivers, R., Du, W., & Senserrick, T., "Prevalence rates of helmet use among motorcycle riders in a developed region in China", Accident; Analysis and Prevention , Vol.43(1), pp. 214-219, 2011.