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A Baseline Study on Use of Seatbelt by Drivers and Passengers in Urban, Rural and Highways of Rajasthan, India

Dr. Alok K Mathur, Mr. Ashish Bandhu

*Center for Injury Research, IIHMR University, 1,
Prabhu Dayal Marg, Sanganer Airport, Jaipur, India.*

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ABSTRACT

Motor vehicle crashes are gradually emerging as a major public health problem. Use of seatbelt is most effective way to save lives and reduce injuries in crashes. Seatbelts are designed to retain people in their seats during a crash to prevent and reduce injuries. A baseline study was conducted covering all seven administrative divisions in the state of Rajasthan in 2015. The objective of the study was to understand the pattern of seatbelt use in rural areas, urban areas and highways of all seven divisions in Rajasthan. Across these divisions, the highest seatbelt use by drivers as well as front seat passengers in urban areas and highways was observed in Jaipur, while in rural areas, it was highest in Jodhpur. The lowest seatbelt use was observed in urban area of Bharatpur. In case of highways it was lowest in Bikaner. In rural areas of Kota again the seatbelt use was lowest. The findings reveal that seatbelts remain underused by drivers and passengers in all the divisions of Rajasthan, especially in rural areas and highways. This calls for an urgent attention of policy makers and planners. Government needs to pay more attention on awareness generation and behavior change communication among drivers and passengers so as to ensure use of seatbelts. The findings of this study will help policy makers and planners to make policy about the compulsory use of seatbelt by four wheeler drivers and passengers. However, Implementation research, Continuous data gathering on seatbelt use and Behavioural studies on drivers and passengers should be conducted for monitoring the progress of the seatbelt use in the state.

INTRODUCTION

Motor vehicle crashes are gradually emerging as a major public health problem. Yet the academic debate may be over the issue that whether it is a public health problem or social problem and which department should be held responsible for taking preventive action. But the fact remains that injuries because of motor vehicle crashes eventually leads to turbulence in the family and have a tangential bearing on the society at large. Majority of survivors or their family members have to struggle with physical, psychological or financial hassles for the rest of their life.

Adult seatbelt use is the most effective way to save lives and reduce injuries in crashes. Yet millions of adults do not wear their seatbelts on every trip (Shults & Beck, 2012). Use of seatbelt is most effective way to save lives and reduce injuries in crashes (Lives Saved in 2012 by Restraint Use and Minimum Drinking Age Laws, 2013). For every person dying as a result of injury, there are hundreds more that sustain non-fatal injuries and other health consequences. Although the ultimate goal must be to prevent injuries from happening in the first place, much can be done to minimize the disability and ill-health arising from the injuries that do occur despite the best prevention efforts (Care of the injured).

Historically, it was on 13 August 1959 that the first automobiles fitted with three-point seatbelts left the factory floors in Sweden. The seatbelt has been credited with saving more than one million lives and is widely considered among the most cost-effective public health interventions (Seat-belt celebrates its 50th birthday). The first law on their mandatory use was passed in Victoria, Australia, in 1971 (Seatbelts and Child Restraints).

Seatbelts are designed to retain people in their seats during a crash, and so prevent or reduce injuries. They minimise contact between the occupant and vehicle interior and significantly reduce the risk of being ejected from the vehicle (Seatbelts - How Effective?). Studies have been conducted on the effectiveness of seatbelt since 1960 in different countries including Sweden and USA and it has been found that seatbelt use reduces the risk of injuries for both driver and passenger in case of crash.

A million dollar question in context of Rajasthan, India is - who is responsible for use of seatbelt - Individuals themselves, Government departments, educational institutes or the Parents? But

before that we should know how many are following the practice of using seatbelt. For this, a baseline study was conducted by IIHMR University, Jaipur.

MATERIALS AND METHODS

The baseline study was conducted to understand the use of seatbelt in the state of Rajasthan in 2015. The study covered whole of the State and was conducted in all seven administrative divisional headquarters of state of Rajasthan. These divisional headquarters were: Ajmer, Bharatpur, Bikaner, Jaipur, Jodhpur, Kota and Udaipur.

Objective of the study was to understand the pattern of seatbelt use in rural area, urban area and highways of all seven divisional headquarters of Rajasthan.

Trained teams comprising of two persons each for different sites collected the data with the help of pre-tested formats by seven rounds of observation in a day from 7.30 in the morning to 8.30 in night with one hour observation and one hour rest time (Observation 7.30–8.30 rest times 8.30–9.30 observation 9.30 – 10.30 likewise). Observation was made for four wheeler driver and passenger. Observation days in urban area were Friday, Saturday, Sunday and Monday, on highway it was Tuesday and for rural sites, it was Wednesday and Thursday. At each of these sites, the data collectors took positions on the side of the road and observed all motorized four-wheelers going in one direction to record helmet observations. If more than one four wheeler was passing at the same time, observations were recorded for the four-wheeler that was closest to the curb.

RESULTS

Driver's seatbelt use

Table 1 shows seatbelt use by four wheeler drivers in different sites of Ajmer division. In urban areas a total of 13361 drivers were observed, among them, 34.3% were observed using seatbelt and rest 65.7% were observed driving without using seatbelt.

On highways, a total 3442 drivers were observed out of which 26.1% were observed driving using seatbelt and rest 73.9% were observed driving without using seatbelt.

In rural areas, a total 3232 drivers were observed out of which 15% were observed driving using seatbelt and rest 85% were observed driving without using seatbelt.

Table 1. Distribution of seatbelt use by drivers in Ajmer division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Ajmer	Urban (n=13361)	4578 34.3%	8783 65.7%
	Highway (n=3442)	898 26.1%	2544 73.9%
	Rural (n=3232)	486 15.0%	2746 85.0%

Table 2 shows seatbelt use by four wheeler drivers in different sites of Bharatpur division. In urban areas a total of 1860 drivers were observed, among them, 4.1% were observed driving using seatbelt and rest 95.9% were observed driving without using seatbelt.

On highways a total of 1301 drivers were observed out of which 18% were observed driving using seatbelt and rest 82% were observed driving without using seatbelt.

In rural areas, a total of 1262 drivers were observed out of which 4.8% were observed driving using seatbelt and rest 95.2% were observed driving without using seatbelt.

Table 2. Distribution of seatbelt use by drivers in Bharatpur division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Bharatpur	Urban (n=1860)	76 4.1%	1784 95.9%
	Highway (n=1301)	234 18.0%	1067 82.0%
	Rural (n=1262)	60 4.8%	1202 95.2%

Table 3 shows seatbelt use by four wheeler drivers in different sites of Bikaner division. In urban areas a total of 4218 drivers were observed, among them, 19.7% were observed driving using seatbelt and rest 80.3% were observed driving without using seatbelt.

On highways, a total of 1888 drivers were observed out of which 3.4% were observed driving using seatbelt and rest 96.6% were observed driving without using seatbelt.

In rural areas, a total of 1779 drivers were observed out of which 0.7% were observed driving using seatbelt and rest 99.3% were observed driving without using seatbelt.

Table 3. Distribution of seatbelt use by drivers in Bikaner division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Bikaner	Urban (n=4218)	833 19.7%	3385 80.3%
	Highway (n=1888)	64 3.4%	1824 96.6%
	Rural (n=1779)	12 0.7%	1767 99.3%

Table 4 shows seatbelt use by four wheeler drivers in different sites of Jaipur division. In urban areas a total of 10130 drivers were observed, among them, 75.8% were observed driving using seatbelt and rest 24.2% were observed driving without using seatbelt.

On highway, a total of 2139 drivers were observed out of which 80.4% were observed driving using seatbelt and rest 19.6% were observed driving without using seatbelt.

In rural areas, a total of 1338 drivers were observed out of which 4.6% were observed driving using seatbelt and rest 95.4% were observed driving without using seatbelt.

Table 4. Distribution of seatbelt use by drivers in Jaipur division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Jaipur	Urban (n=10130)	7676 75.8%	2454 24.2%
	Highway (n=2139)	1720 80.4%	419 19.6%
	Rural (n=1338)	62 4.6%	1276 95.4%

Table 5 shows seatbelt use by four wheeler drivers in different sites of Jodhpur division. In urban areas a total of 8296 drivers were observed, among them, 30.1% were observed driving using seatbelt and rest 60.9% were observed driving without using seatbelt.

On highway, a total of 1292 drivers were observed out of which 35.4% were observed driving using seatbelt and rest 64.6% were observed driving without using seatbelt.

In rural areas, a total of 2896 drivers were observed out of which 25.9% were observed driving using seatbelt and rest 74.1% were observed driving without using seatbelt.

Table 5. Distribution of seatbelt use by drivers in Jodhpur division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Jodhpur	Urban (n=8296)	2498 30.1%	5798 60.9%
	Highway (n=1292)	457 35.4%	835 64.6%
	Rural (n=2896)	750 25.9%	2146 74.1%

Table 6 shows seatbelt use by four wheeler drivers in different sites of Kota division. In urban areas a total of 2767 drivers were observed, among them, 12.1% were observed driving using seatbelt and rest 87.9% were observed driving without using seatbelt.

On highway, a total of 1277 drivers were observed out of which 20% were observed driving using seatbelt and rest 80% were observed driving without using seatbelt.

In rural areas, a total of 1316 drivers were observed out of which 0.4% were observed driving using seatbelt and rest 99.6% were observed driving without using seatbelt.

Table 6. Distribution of seatbelt use by drivers in Kota division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Kota	Urban (n=2767)	334 12.1%	2433 87.9%
	Highway (n=1277)	256 20.0%	1021 80.0%
	Rural (n=1316)	5 0.4%	1311 99.6%

Table 7 shows seatbelt use by four wheeler drivers in different sites of Udaipur division. In urban areas a total of 5264 drivers were observed, among them, 53.3% were observed driving using seatbelt and rest 46.7% were observed driving without using seatbelt.

On highway, a total of 604 drivers were observed out of which 22.5% were observed driving using seatbelt and rest 77.5% were observed driving without using seatbelt.

In rural areas, a total of 1547 drivers were observed out of which 12% were observed driving using seatbelt and rest 88% were observed driving without using seatbelt.

Table 7. Distribution of seatbelt use by drivers in Udaipur division.

Division	Site Category	Driver's seatbelt status	
		Used	Not used
Udaipur	Urban (n=5264)	2807 53.3%	2457 46.7%
	Highway (n=604)	136 22.5%	468 77.5%
	Rural (n=1547)	186 12.0%	1361 88.0%

Passenger's seatbelt use

Table 8 shows seatbelt use by four wheeler passengers in different sites of Ajmer division. In urban areas a total of 12614 passengers were observed, among them, 23.7% were observed using seatbelt and rest 76.3% were observed without using seatbelt.

On highway, a total 2939 passengers were observed out of which 23.1% were observed using seatbelt and rest 76.9% were observed without using seatbelt.

In rural areas, a total 3059 passengers were observed out of which 8.6% were observed using seatbelt and rest 91.4% were observed without using seatbelt.

Table 8. Distribution of seatbelt use by passengers in Ajmer division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Ajmer	Urban (n=12614)	2991 23.7%	9623 76.3%
	Highway (n=2939)	679 23.1%	2260 76.9%
	Rural (n=3059)	262 8.6%	2797 91.4%

Table 9 shows seatbelt use by four wheeler passengers in different sites of Bharatpur division. In urban areas a total of 1735 passengers were observed, among them, 0.1% was observed using seatbelt and rest 99.9% were observed without using seatbelt.

On highway, a total 1175 passengers were observed out of which 13.1% were observed using seatbelt and rest 86.9% were observed without using seatbelt.

In rural areas, a total 1198 passengers were observed out of which 2.1% were observed using seatbelt and rest 97.9% were observed without using seatbelt.

Table 9. Distribution of seatbelt use by passengers in Bharatpur division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Bharatpur	Urban (n=1735)	1 0.1%	1734 99.9%
	Highway (n=1175)	154 13.1%	1021 86.9%
	Rural (n=1198)	25 2.1%	1173 97.9%

Table 10 shows seatbelt use by four wheeler passengers in different sites of Bikaner division. In urban areas a total of 3187 passengers were observed, among them, 5.9% were observed using seatbelt and rest 94.1% were observed without using seatbelt.

On highway, a total 1764 passengers were observed out of which 0.4% were observed using seatbelt and rest 99.6% were observed without using seatbelt.

In rural areas, a total 1359 passengers were observed out of which 0.1% was observed using seatbelt and rest 99.9% were observed without using seatbelt.

Table 10. Distribution of seatbelt use by passengers in Bikaner division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Bikaner	Urban (n=3187)	188 5.9%	2999 94.1%
	Highway (n=1764)	7 0.4%	1757 99.6%
	Rural (n=1359)	1 0.1%	1358 99.9%

Table 11 shows seatbelt use by four wheeler passengers in different sites of Jaipur division. In urban areas a total of 5450 passengers were observed, among them, 67.1% were observed using seatbelt and rest 32.9% were observed without using seatbelt.

On highway, a total of 1301 passengers were observed out of which 62.7% were observed using seatbelt and rest 37.3% were observed without using seatbelt.

In rural areas, a total of 652 passengers were observed out of which 2.8% was observed using seatbelt and rest 97.2% were observed without using seatbelt.

Table 11. Distribution of seatbelt use by passengers in Jaipur division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Jaipur	Urban (n=5450)	3657 67.1%	1793 32.9%
	Highway (n=1301)	816 62.7%	485 37.3%
	Rural (n=652)	18 2.8%	634 97.2%

Table 12 shows seatbelt use by four wheeler passengers in different sites of Jodhpur division. In urban areas a total of 6566 passengers were observed, among them, 26.4% were observed using seatbelt and rest 73.6% were observed without using seatbelt.

On highway, a total of 1002 passengers were observed out of which 33% were observed using seatbelt and rest 67% were observed without using seatbelt.

In rural areas, a total of 2502 passengers were observed out of which 21.5% was observed using seatbelt and rest 78.5% were observed without using seatbelt.

Table 12. Distribution of seatbelt use by passengers in Jodhpur division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Jodhpur	Urban (n=6566)	1733 26.4%	4833 73.6%
	Highway (n=1002)	331 33.0%	671 67.0%
	Rural (n=2502)	539 21.5%	1963 78.5%

Table 13 shows seatbelt use by four wheeler passengers in different sites of Kota division. In urban areas a total of 2141 passengers were observed, among them, 5.7% were observed using seatbelt and rest 94.3% were observed without using seatbelt.

On highway, a total of 1004 passengers were observed out of which 13.1% were observed using seatbelt and rest 86.9% were observed without using seatbelt.

In rural areas, a total of 1050 passengers were observed and all of them were observed without using seatbelt.

Table 13. Distribution of seatbelt use by passengers in Kota division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Kota	Urban (n=2141)	123 5.7%	2018 94.3%
	Highway (n=1004)	132 13.1%	872 86.9%
	Rural (n=1050)	0 0.0%	1050 100.0%

Table 14 shows seatbelt use by four wheeler passengers in different sites of Udaipur division. In urban areas a total of 4348 passengers were observed, among them, 51.1% were observed using seatbelt and rest 48.9% were observed without using seatbelt.

On highway, a total of 536 passengers were observed out of which 17.5% were observed using seatbelt and rest 82.5% were observed without using seatbelt.

In rural areas, a total of 1314 passengers were observed out of which 9.7% were observed using seatbelt and rest 90.3% were observed without using seatbelt.

Table 14. Distribution of seatbelt use by passengers in Udaipur division.

Division	Site Category	Passenger's seatbelt status	
		Used	Not used
Udaipur	Urban (n=4348)	2223 51.1%	2125 48.9%
	Highway (n=536)	94 17.5%	442 82.5%
	Rural (n=1314)	128 9.7%	1186 90.3%

DISCUSSION

There is neither any systematic research conducted in all divisions of Rajasthan nor any research underway in Rajasthan, India to identify and explain the use of seatbelt by driver and passenger to reduce the extent of injury and number of deaths in road crashes. This study for the first time describes the use of seatbelt by driver and passenger in rural area, urban area and highways across all divisions of Rajasthan.

In Rajasthan out of seven divisions, only Jaipur division shows the percent of use of seatbelt by driver was 76 per cent in urban area and 80 per cent on highway. The use of seatbelt by passenger was 67 per cent in urban area and 63 per cent on highway. The lowest seatbelt use by drivers and passengers on highway was observed in division Bikaner which was 3.4 per cent and 0.4 per cent respectively. In rural area of Kota lower use of seatbelt was observed for driver it was 0.4 percent and none of the passengers were using seatbelt. In Bikaner division again lower trend of use of seatbelt was observed 0.7 for driver and 0.1 for passenger. Highest use of seatbelt in rural area was found in Jodhpur division i.e. 26 per cent of driver and 22 percent of passengers. In urban area, the lowest seatbelt use by driver and passenger was found in Bharatpur division which was 4 and 1 per cent respectively.

Less than one third passengers in all divisions of Rajasthan except Jaipur were observed using seatbelts (Data varies from as low as 0.1 per cent to 33 per cent). Little more than half of the drivers were observed to be using seatbelts in urban Udaipur division and more than three fourth drivers in Jaipur urban were using seatbelts. On Jaipur highway, four fifth of the drivers were using seatbelts. In rest of the other divisions, it was observed that less than one third drivers were using seatbelt (Data varied from 0.4 per cent to 30.1 percent).

According to World Health Organization data fact sheet wearing a seatbelt reduces the risk of a fatal injury up to 50 percent for front seat occupants and up to 75 percent for rear seat occupants. There are 111 countries which have comprehensive seatbelt laws covering all car occupants. These countries cover 4.8 billion people or 69 percent of world's population (Seat-Belts: The Facts).

Seatbelts are the most important motor vehicle crash safety innovations that are capable of reducing the morbidity and mortality of RTCs (Rutledge, *et al.*, 1993). Among rear seat

occupant's seat-belts reduce fatal and serious injuries by 25% and minor injuries by up to 75% (GLOBAL STATUS REPORT ON ROAD SAFETY, 2015). Seatbelt use in Qatar was low: 33.9% of males and 32.6% of females wore seatbelts at the time of the RTC (Munk, Carboneau, Hardan, & Ali, 2008). This study also found the same trend as that of Qatar in most of the divisions of Rajasthan. Improved seatbelt compliance in elders can reduce injuries, hospitalization rates, ED charges, and mortality resulting from motor vehicle crashes (Coley, Partridge, Kaylor, & Shapiro, 2002). A paper that describes the prevalence of seatbelt use and associated factors in drivers and front-seat passengers across eight sites in four countries (Egypt, Mexico, Russia, Turkey) using observational studies found that 26-32% and 37-41% of the variance in seatbelt use among drivers and front seat passengers respectively (Vecino-Ortiz, *et al.*, 2014). It is established fact that in a crash if one do not wear a seatbelt than the probability of death will increases by two fold. In a crash, a person who is not restrained by a seatbelt will continue to travel forward at the speed the vehicle was travelling until something stops them. This could be the steering wheel, dashboard or windscreen. In some crashes, the person may burst through one of the windows and be partially or fully ejected from the vehicle, exposing them to other dangers. They might hit fixed objects or be run over or crushed by their own, or another, vehicle (Seatbelts). Even then drivers and passengers aged 17-34 have the lowest seatbelt-wearing rates combined with the highest accident rate (Seatbelts, The facts). Car occupants form 64% of all road casualties. In 2010, 133,205 people were killed or injured while travelling in cars, of these 89,787 (67%) were drivers (Seatbelts: Advice and Information).

The 2014 seatbelt survey resulted in 5,720 eligible vehicles and 7,732 vehicle occupants being observed in Scotland. The proportion of car drivers observed using their seatbelt correctly in 2014 was 97.8%, an increase from the 95% wearing rate recorded in 2009. The seatbelt wearing rate amongst front seat car passengers in 2014 was 98.0%, a marginal increase on the 2009 figure (97%) (Seatbelt and Mobile Phone Usage Survey Scotland, 2014, Seatbelt Survey Results). Such a higher percent of seatbelt usage by drivers and passengers needs to be practiced in Rajasthan to minimize the number of fatalities in the state.

CONCLUSIONS AND SUGGESTIONS

Seatbelts have been proven to reduce a number of injuries a person may experience in a road crash, as most injuries to drivers and passengers are caused by contact with the steering wheel, dashboard, windscreen or the sides and roof of a vehicle. All drivers and passengers must wear a seatbelt or appropriate restraint (including children, elderly and pregnant women) (Seatbelt safety). It is very unfortunate that globally still only 84 countries have any data on seat-belt wearing rates, with this number disproportionately higher in high-income countries (77%) than in low- and middle-income countries (7% and 43% respectively) (GLOBAL STATUS REPORT ON ROAD SAFETY, 2015). Seatbelts reduce serious crash-related injuries and deaths by about half (Final Regulatory Impact Analysis, 1984). People using cars which have a provision of air bags think that their safety is ensured because of presence of airbags. Actually, this is a myth. Air bags provide added protection but are not a substitute for seatbelts. Airbags plus seatbelts provide the greatest protection for adults (Third Report to Congress Effectiveness of Occupant Protection Systems and Their Use). Still seatbelts are the most important motor vehicle crash safety tool capable of reducing the morbidity and mortality during Road Traffic Crashes.

Despite this, seatbelts remain underused by drivers and passengers in all the divisions of Rajasthan especially in rural areas and highway. This calls for an urgent attention of policy makers and planners. Government needs to pay more attention on awareness generation and behavior change communication among drivers and passengers so as to ensure use of seatbelts. Following steps need to be taken to bring improvement in the use of seatbelt by drivers and passengers in Rajasthan -

- Implementation research needs to be carried out on various aspects of safe driving and the analysis of the same should be ploughed back to policy and planning.
- Continuous data gathering on seatbelt use by drivers and passengers needs to be encouraged and ensured by different agencies. The data should be analysed on a continuous basis to unearth the reason for non-compliance.
- Behavioural studies on drivers and passengers need to be conducted to understand the situation in a better way.

- On the basis of findings of these studies IEC and behavior change communication strategies needs to be devised so that people should voluntarily use seatbelt.
- The police department need to enforce the law meticulously and there should be provisions of charging penalties from the defaulters. These provisions will suddenly show a sharp increase in the use of seatbelt by drivers and passengers.
- In order to sustain the seatbelt use the Government should develop some strategies to have some innovative methods to rewarding the changed behaviour of individuals.

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