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Research Article

General Public Persepctive on Road Safety

Survey Based Road Safety Analysis to Understand the Perspective of the General Public

Alina Khan[1] and Nilima Gajbhiye[1]*

[1] *Department Life Science, RamnarainRuia Autonomous College, L.N. Road, Matunga, Mumbai, India*

Abstract: The number of road traffic deaths continues to climb, reaching 1.35 million deaths globally in 2016 and road traffic injury is now the leading cause of death for children and young adults aged 5–29 years (WHO, 2018). Road safety is officially recognized as a global safety issue and it is also included in the Sustainable Development Goals. This is a questionnaire based analysis, which aims to understand the outlook of the general public regarding the current road safety system and to understand the level of awareness regarding the same. It also aims to compare the perspective of drivers and non-drivers towards traffic rules. Majority of the participants were from the age group of 15-30 years as they are most directly affected by road accidents. Our objective is to understand the shortcomings in the current road safety system through the perspective of the general public, which can then help in implementing a more efficient system in order to decrease the number of road accidents. Inadequate traffic system also significantly affects the economic growth of the region. According to the World Road Statistics, 2018, India ranks 1st in the number of road accident deaths hence there is an urgent need to understand the root cause for such a high number of accidents and to find solutions for this issue. Our results show that there is a need to implement stricter rules for road safety and this perspective of the general public is not affected by the status of the individual (driver, non-driver). It also suggests the need for increasing the level of licence tests conducted. Increasing awareness at an early stage among the people regarding the seriousness of following traffic rules can help prevent road accidents at the baseline level.

Keyword: Road safety, road accident, awareness, perspective, online survey.

***Corresponding Author**

Nilima Gajbhiye , Department Life Science, RamnarainRuia Autonomous College, L.N. Road, Matunga, Mumbai, India

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1. INTRODUCTION

High rate of road accidents has become a serious threat and accounts for considerable loss of life and well-being. Road safety is now officially recognized as a global safety issue and it is also included in the Sustainable Development Goals SDG 3, Good Health and Well-Being which targets to "halve the number of global deaths and injuries from road traffic accidents". Similarly, the SDG 11, Sustainable Cities and Communities targets to "provide access to safe, affordable, accessible and sustainable transport systems for all, improving road safety, notably by expanding public transport, with special attention to the needs of those in vulnerable situations, women, children, persons with disabilities and older persons".[1] A safe, organized and competent transport system is an essential criterion for sustainable economic development. Inadequate traffic systems act as a barrier to economic development with continuous deaths, injuries and damage to properties. India is the second most populated country in the world and it is categorized as a Lower Middle-Income Country (LMIC) by the World Bank.[2] Global road traffic fatality estimates for 2002 shows that, the vast majority of the road traffic fatalities (93%) were in low- and middle-income countries, while only about 7% were in high-income countries. Also, with an average rate of 27.5 deaths per 100,000 population, the risk is more than 3 times higher in low-income countries than in high-income countries where the average rate is 8.3 deaths per 100,000 population.[3] India, like other LMICs, has also seen a rapid increase in motorization attributed to the growth of the domestic automotive industry, economic liberalization, increased earnings, and access to credit.[4-10] India ranks 1st in the number of road accident deaths across the 199 countries reported in the World Road Statistics, 2018 followed by China and US and accounts for almost 11% of the accident related deaths in the World. Road accident victims in India as well as around the world largely constitute young people (around 18-45 years in India, 5-29 years around the world). Over-speeding accounts for the maximum share of road accident and road accident deaths (ranging from 63% to 73% for accidents and from 62% to 70% for road accident deaths) on all the categories of National Highways and thus follows the trend seen on all India basis.[3,11] India shows an alarmingly high rate of road accidents with a total of 4,49,002 road accidents in 2019, reported by States and Union Territories (UTs) killing 1,51,113 people and causing injury to 4,51,361 persons. The number of 4,49,002 accidents and 1,51,113 deaths translates into an average of 1,230 accidents and 414 deaths every day and nearly 51 accidents and 17 deaths every hour. Tamil Nadu ranks the highest, while Maharashtra ranks 6th in total number of road accidents.[11] Rapid motorization coupled with poor land use and transport planning in developing countries like India has exponentially increased the burden associated with road accidents and its socio-economic impact.[12,10] "In order to improve the current deteriorating road safety situation of developing countries like India, experience of developed countries with these good safety practices could be used as guides, but those need to be customized by taking into consideration socio-economic aspects, road user's behaviour, local mixed traffic characteristics".[13] A number of studies support the idea that socioeconomic as well as cultural aspects influence road safety and vice versa.[14-18] It has become increasingly important to understand these relationships and how one could benefit the other. Increasing awareness at student level can also help in reducing accidents at all levels.[19] The aim of this study is to understand the individual level perspective of the general public toward road safety practices and to get an idea of their awareness and seriousness about the same issue. Our objective is to determine the shortcomings in the current road safety system through the perspective of the general public, which can then help in implementing a more efficient system in order to decrease the number of road accidents, in accordance with the sustainable development goals.

2. MATERIALS AND METHODS

This is an online survey-based analysis in which a questionnaire was prepared using Google Forms and circulated in a random manner. A total of 155 responses were received. Majority of the participants (84%) were from Maharashtra, with some belonging from Himachal Pradesh, Andhra Pradesh, Uttar Pradesh, Madhya Pradesh, West Bengal, Telangana, Kerala, Tamil Nadu and Karnataka. Through the questionnaire the respondents were encouraged to answer, based on their general observations and not targeted towards their personal habits pertaining to road safety so as to minimize false responses. The present study was conducted in accordance with the declaration of Helsinki.[20] The written consent was taken from all participants involved in the study.

2.1 Inclusion Criteria

In this survey, an age group of 15 to 60 men and women were included. Drivers and non- drivers are included in the study. All participants were Indians.

2.2 Exclusion criteria

Age groups of 9 to 14 and above 60 years are not included in the study.

3. STATISTICAL ANALYSIS

Most of the response data was analysed and represented in percentage. Analysis tests ANOVA (single factor) and Chi square test were conducted using Microsoft Excel to determine dependence and relationship between various aspects of the survey, to understand whether participant's perceptions were significantly impacted by their age and/or status (driver, non-driver). Probability value (p) less than 0.05 was considered statistically significant.

4. RESULT

Our survey consisted of 155 participants with an average age of 25.16 years and 68% being from the age group of 21-30 (Table 1). From the total participants 52.3% were licence holders with 3.9% participants having a learner's licence and 47.7% participants did not have a licence. Among the licence holders, 23% of them found the licence test to be easy, 25% found it hard, while 53% of the participants found the test to be of moderate level (Fig.1). ANOVA (single factor) was conducted to determine whether the participants' perception of the level of the test differed with respect to their age. The p value (0.0748) suggests that there is no significant difference between the average ages for the different levels of the test, implying that participants' age did not affect how they perceived the level of the test.

Table 1 *Age distribution of the participants*

Range of Age	15-20	21-30	31-40	41-50	51-60
No. of participants	35	105	6	4	5
Percentage	23%	68%	4%	3%	3%

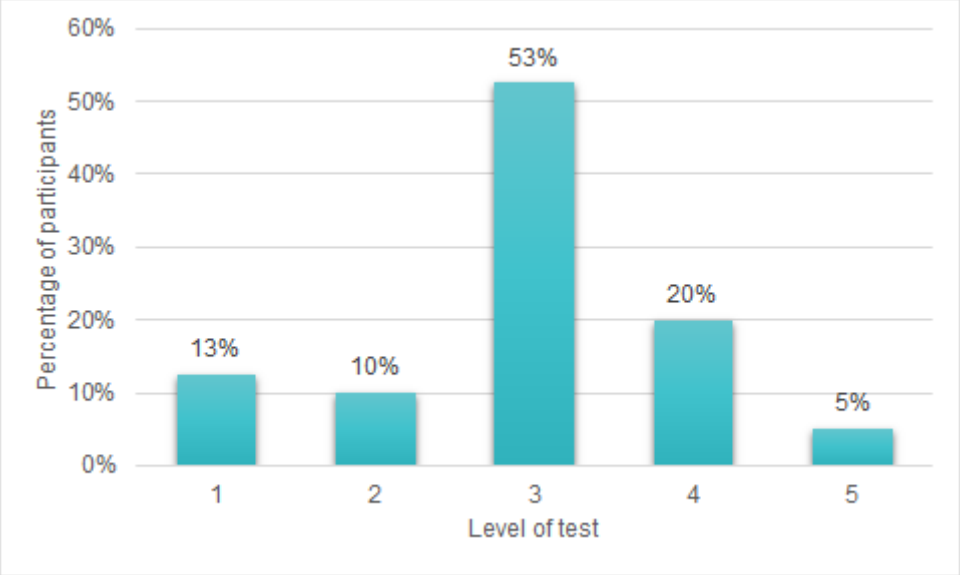

Fig 1 *Level of test selected by the participants*

Based on the survey (as indicated in Table 2) 54.2% participants said that they see 'most of the people' wearing helmets while 42.6% reported that they see 'very few' people wearing helmets. 76.6% participants reported that they see people breaking traffic rules 'quite often'. 52.9% participants reported that clean footpaths are 'rarely' available. While evaluating the awareness of participants, we found that only 18.7% knew that India ranks 1st in the number of deaths due to road accidents from around the world. 30.3% participants knew that India accounts for around 10% death from the total observed around the world. 43.2% participants were aware that over-speeding is the biggest reason for road accidents and participants' perception of the reasons for road accidents was not affected ($p = 0.484$) by whether they were drivers or not.

Table 2 *Survey responses indicated in percentage*

Questions	Responses				
How many people do you usually see wearing helmets?	No one	Very few	Most of them	Every one	
	1.3%	42.6%	54.2%	1.9%	
How often do you see people breaking traffic rules?	Never	Once in a blue moon	Quite often	All the time	
	1.3%	9.1%	76.6%	13%	
Do you usually walk on footpaths or on the roadside?	Always on footpath	Mostly on footpath	Mostly on roadside	Always on roadside	
	34.2%	53.5%	12.3%	0%	
How often are clean footpaths available?	Always	Most of the time	Rarely	Never	
	0.6%	42.6%	52.9%	3.9%	
What rank does India hold in the number of road accidents around the world?	1st	2nd	3rd	4th	
	18.7%	38.7%	38.1%	4.5%	
What is the biggest reason for road accidents?	Driving on wrong side	Using mobile/other distraction while driving	Over-speeding	Drunk driving	Fault of the pedestrian
	9%	34.8%	43.2%	11.6%	1.3%
What do you think is the percentage of accident related deaths that India accounts for, from the total observed around the world?	4%	6%	8%	10%	
	3.2%	27.7%	38.7%	30.3%	
What do you think was the percentage decrease seen for road accidents since lockdown?	Around 20% decrease	Around 30% of decrease	Around 40% of decrease	Around 50% of decrease	
	22.6%	28.4%	23.9%	25.2%	

When asked about the recent method of increasing fines that was implemented to people who break traffic rules, 61.3% participants agreed that it was a good strategy while 38.7% disagreed and this had a correlation ($p = 0.0268$) with how often the participants walked on footpaths. 93.5% participants agreed that stricter traffic rules are required and this was irrespective of whether they were drivers or not ($p = 0.617$). Around 72.9% participants agreed that the odd-even strategy adopted by the Delhi government for reducing air pollution could also be used for reducing road traffic hence reducing road accidents (Fig.2).

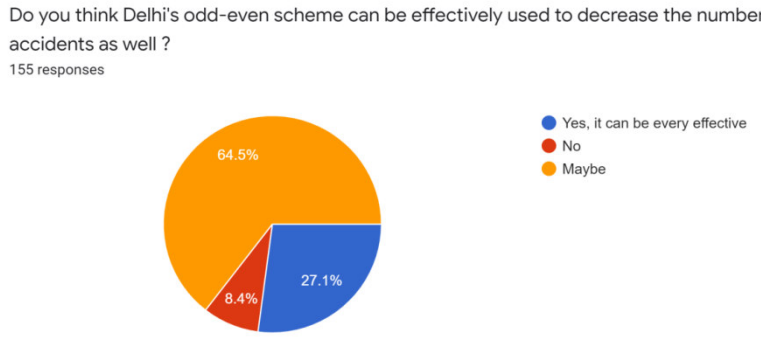

Fig 2 *Responses of the participants with regards to the odd-even scheme*

When asked for suggestions for improving road safety, many participants recommended -

a) Strict implementation of traffic rules with suggestions like, "Traffic rules should be enforced more strictly", "Awareness of traffic rules and strict actions if not following rules".

b) Increasing awareness and seriousness towards road safety with suggestions like, "The importance of abiding to the rules should be imbibed at the grassroot level, when a child goes to school these values should be taught in a playful manner", "Educating people about the current scenario and making them aware about the consequences", "Increasing public awareness via social media and people can be taught correct ways to follow road safety".

c) Use of CCTV and sensors with suggestions like, "Use sensors for detecting, if someone violates the rules", "Installing CCTV cameras on traffic signals, seize or cancel the driving license if traffic rules are not followed".

d) Increase policing with suggestions like, "Traffic police should be more efficient", "More traffic police on duty at least at junctions", "Special squad for night duties on highways".

e) Better infrastructure with suggestions like, "Proper construction of roads where there are no potholes".

f) Control on over-speeding with suggestions like, "Speed marking, lanes for heavy duty and four wheelers, indicators for increased speed", "More speed breakers on road".

5. DISCUSSION

According to the United Nations Motorcycle Helmet Study (2016) correct wearing of best available helmets improves survival by 42% and reduces injuries by 69%.[21] Our study indicated that there is not enough seriousness towards the importance of wearing a helmet, an idea that is supported by other studies.[22-24] A field based study conducted in Calicut, India showed considerable difference in the level of motorcycle helmet use observed between the different locations within and outside the city limits, where different levels of helmet law enforcement were exercised.[25] Road user centric safety policy and effective law enforcement are the key factors in improving the compliance rate for helmet and seatbelt usage.[26] A study conducted in 2016 suggested that there are several factors responsible for accidents but driver's fault is the most important factor, accounting for 78% of total accidents, 76.5% of total injuries and 73.7% of total fatalities in 2013.[27] Another study from India noted that formal training, retraining, and sensitization on avoidable risky behaviours be taught to professional and non-professional drivers in a systematic manner and to be a part of curricular education.[28] Effective training of the drivers, better driver education and licensing procedures can significantly improve road environment and safety.[29,30] The present licensing system in India is completely based on a conventional driver education and testing method, which has serious limitations with respect to road safety.[31,30] There is also evidence for the possibility to circumvent procedures for obtaining drivers licence in India, which leads to ill-trained drivers getting their license and increases threat to road safety for themselves and others.[32] In a survey among employees of a multinational corporation in urban India participants perceived that their local road environment was dangerous, there is inconsistent and unreliable enforcement of traffic laws and local traffic authority were viewed as low-paid and often corrupt.[33] Our survey showed that awareness regarding the current state of road safety in India is limited. A similar survey conducted in a south Indian state showed participants had significantly low awareness with regards to alcohol and driving, use of seat belts and use of mobile phones; nearly two-third of the participants (68%) admitted to have crossed speed limits on multiple occasions.[34] Awareness survey conducted among school children of Chandigarh showed forty percent of students lacked correct knowledge of traffic safety rules, in particular, knowledge of correct speed limit was lacking in 67.3% of the respondents.[35] Similarly, awareness survey conducted among the coastal population of Karnataka, India also showed inadequate knowledge and poor road safety practices among high number of participants.[36] Majority of the traffic violations by the public leads to severe injury to themselves as well as to other drivers.[37] Hence abiding to traffic law is an important step towards safer road environments. Another study suggested that a "zero tolerance" policy towards common transgressions against road safety is needed to bring about a visible change but change in the mindset of road users to realizing their responsibilities is most important.[38] A study conducted in Hyderabad, India showed that factors like inadequate traffic laws, gaps in enforcement, lack of awareness, poor road engineering, and high-risk road users were threats to road safety. Maintenance of road safety is the responsibility of both individual road-users and the government.[39] To the horizon of our knowledge, there haven't been many surveys specifically trying to understand the difference in perception of road safety and traffic rules between drivers and non-drivers, although both are affected by it. A study conducted across six major cities of India suggests that, while SDG targets may be achieved by 2030 with great effort in India, the presently available safety interventions may not be adequate to bring death rates below 2.0 per hundred thousand persons.[40] Hence there is urgent need for such research in all the different regions of

India, which can assist in reaching those goals. Some of the limitations of the survey included smaller sample size which decreases the strength of the survey. Questionnaires prepared can be more extensive for a more in-depth perception analysis.

6. CONCLUSION

The data indicated a lower level of awareness and seriousness towards road safety. This suggests the need to increase awareness and bring about a change in the attitude towards road safety within the general public. It is very important to take serious measures to improve the current state of road safety. The population most affected are also part of the reproductive age which can affect the growth of the nation. Many developed countries have shown a decrease in road accidents through various measures which can also be implemented in India. Increasing traffic rule strictness, their adequate enforcement, mandatory use of helmets, proper policing, timely road maintenance, proper road planning, stricter licensing procedure with higher level of license test, increased CCTV surveillance, speed sensors, are some of the measures that should be taken by the government. Awareness should be increased through measures like incorporating road safety in school curriculum, through social media, awareness drives, training programs, etc. Individuals should take traffic safety more seriously by following rules, wearing helmets, maintenance of vehicles, properly following licensing procedure, etc.

7. AUTHORS CONTRIBUTION STATEMENT

Dr Nilima Gajbhiye conceptualized the study and designed the questionnaire. Ms Alina Khan conducted the survey, gathered data, performed data analysis and wrote the manuscript under continuous supervision of Dr Nilima Gajbhiye.

8. CONFLICT OF INTEREST

Conflict of interest declared none

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