A Study on The Rating of Traffic Safety Among Vehicle Occupants in The North-Central India

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Abstract: Understanding the critical role that knowledge and awareness of traffic laws and poor driving habits play in preventing traffic accidents, this study was carried out to evaluate the knowledge and awareness of traffic regulations among drivers in India's North Central Region. In order to accomplish the goals, a questionnaire was designed and sent to the people who utilize the roads. The primary findings revealed that a relatively small number of participants fully complied with speed regulations. Furthermore, the majority of participants used mobile phones while driving and drove while feeling drowsy. It is interesting to note that some of the participants lacked understanding of traffic signs, while a large percentage of participants were aware of improper driving habits. These behaviors may be the primary factors contributing to the high number of accidents that occur in the region. In light of the findings of this research, it is imperative that serious efforts be made to raise knowledge about road safety and ensure compliance with traffic rules. This study recommends boosting the participation of females on the roads since previous research has revealed that females have a high degree of understanding regarding traffic laws. In addition to this, the authorities need to step up their efforts to strictly enforce the restrictions.

1. Introduction

The roads of India are India's principal form of transportation, and they carry the vast majority of the country's goods and people, in addition to a sizeable portion of the country's total economic output. Not only can having a well-developed road network for transportation aid in the process of integrating diverse areas, but it may also help cut down on transportation costs in terms of both money and time. Within the country itself and also improves the motor transport connectivity with the nations that are adjacent to the country on a global scale[1]. Due to the ease with which it may be accessible, the operational flexibility it gives, the door-to-door service it provides, and its dependability, road transit has continued to be a popular means of transportation. The only main mode of transportation that can get you to your destination is driving a car or other type of vehicle. It is an essential link in the chain that connects production and consumption, and its role in the chain cannot be overstated. Over the course of the past several years, both the total output of the system and the number of miles that are travelled by road in India have significantly grown. The quantity of miles that are travelled by road in India has also significantly increased [2]. Since India gained its independence in 1947, the road transport industry of the nation has witnessed a significant increase both in terms of the scope of its operations and the capacity of its vehicles. The amount of passenger and freight traffic that is moved by means of road transport has significantly increased over the course of recent history, as has the number of automobiles that are legally allowed to be driven. Both of these trends have significantly increased during the course of recent history [3]. The number of registered motor vehicles per one thousand people has increased from 53 in the year 2001 to 225 in the year 2019, indicating an increase in the accessibility of public transportation [4]. This increase came about as a result of an increase in the number of people using public transportation. The automobile industry is expanding at a breakneck speed, and it is anticipated that around 26.4 million vehicles will be manufactured year in 2019. The transportation sector has a substantial influence not just on the domestic product but also on international trade and the number of jobs that are created. According to the World Health Organization, accidents are the eighth leading cause of death overall, but they are the leading cause of death among people
aged 15-29 and children aged 5-14 [5]. The World Health Organization also reports that pedestrians, cyclists, and motorcyclists make up 54% of all traffic. In terms of the total number of fatalities that may be attributed to accidental causes around the globe. This not only results in large financial losses for people and their families, but it also leads to significant financial losses for countries as a whole. The losses are related to the expense of treatment as well as lost productivity for persons who have been killed or left unable to work as a consequence of their injuries [6-8]. Additionally, the losses are due to the fact that there have been a number of people who have been injured. In addition, the losses are attributable to lost productivity on the part of family members who are forced to take time off from work or school in order to care for wounded family members, as well as other factors. Each and every year, over 1.5 lakh people in India lose their lives as a result of being involved in automotive accidents. As a direct result of this, around 11% of all deaths that are the direct result of accidents take place in India. When it comes to accidents that take place in this area, the most of them are caused by the driver of the car, who plays the most crucial and determining role. The majority of accidents that occur on the road are the result of either negligence on the part of the driver or a lack of awareness on the part of the driver on how to drive safely on the road. For this reason, instruction on how to be safe while driving is necessary in the same way as other vital skills for survival [9-11]. The statistics about the number of accidents that occurred in India in 2015 was made available to the public by the government of India, and it was reported that there was a total of 5,01,423. Because of these mishaps, there were 1,46,133 individuals who were killed and 5,00,279 people who suffered significant injuries. While for the year 2019, the figures were pretty close, as it was claimed that there was a total of 4,49,002 accidents, which resulted in 1,51,113 fatalities and 4,51,361 persons being severely hurt. In all, there were 4,51,361 individuals who were severely injured. The Ministry of Road Transport and Highways in India is where the data for Road Accidents in India came from) The key factors that lead to collisions on the roads are the characteristics of cars and the actions of drivers. The following are examples of some of these contributors: Over speeding, Drunken driving, Distractions to drivers, red light jumping, avoiding safety gears like seat belt and helmets, Non-adherence to lane driving and overtaking in a wrong way [12-15].

Study Area: For the purposes of this study, the North Central Region of India, which mostly consists of the National Capital Region, is taken into consideration. It is a very populous area in India, and the respondents to the poll came mostly from the cities of Agra, Mathura, Aligarh, Etah, New Delhi, the Delhi National Capital Region (NCR), Gurugram, Noida, Gautam Buddha Nagar, Bharatpur, Hodel, Palwal, and a few other cities as well. A generic Google form containing the questionnaire was shared throughout several social media networks, such as WhatsApp, Instagram, and LinkedIn, amongst others. Some of the data for the evaluation of the year-on-year pattern of road accidents in the neighbouring places was also acquired from local police stations for injury and death from the years 2015-2019. This data was collected for the period of time from 2015-2019. The data focuses mostly on the regions that are near to NH-19.

2 Practices for improved road safety:

- The installation of road signs and pavement markings need to be an essential component of road construction and improvement projects. In terms of their retro reflectivity, the signs should be at least of the micro prismatic grade, if not better and thermoplastic retro reflective paints are to be used for the markings. In order for them to accomplish what is expected of them, they will also need routine maintenance. This mandate for all different kinds of urban roadways should have absolutely no room for negotiation whatsoever.

The present geometrics of the road alignment should be evaluated, and attempts should be made to identify spots where spot improvements might be implemented to ameliorate the situation. In the audit report, it is very necessary to point out that unless such changes are carried done, suitable warning signs as well as speed restriction signs have to be erected at such places. In areas where there is either a history of or the potential for road accidents, the RSA report should provide recommendations for appropriate traffic calming measures in conjunction with appropriate advance warning signs.

- The intersections of metropolitan roadways require a unique approach in terms of the provision of amenities for the various categories of vulnerable road users. The Urban Local Bodies (ULBs), with the assistance of traffic professionals, are going to put the finishing touches on the layout plan. The
provision of traffic calming measures on urban roadways that are catered to the huge number of pedestrians that cross main roads, the proposal for the building of Speed Tables that are compliant with IRC:99, would be of assistance.

- The installation of underpasses, road overbridges, or gates at unmanned railroad crossings in order to ensure that the gates are closed while a train is travelling through the area would be beneficial.
- Visibility During the Night Because roads are utilised both during the day and during the night, they ought to be inspected both during the day and during the night. At night, certain areas take on a radically distinct appearance; depending on the case, there may or may not be street lighting. There are certain types of street lighting that can generate optical illusions. Because older individuals often have lower eyesight than younger people, it is more challenging for them to see road signs than it is for younger people. After dark, this problem is exacerbated, and as a result, special consideration needs to be given to the senior population's conspicuity and visibility throughout the night. When it's dark outside, it's especially difficult for elderly drivers to get an accurate sense of the widths and distances around them.
- Controlling Your Speed Excessive speed is one of the key contributing factors in fatal collisions. The operating speeds of the new road can be controlled to remain within levels that are suitable for the pace at which the road was designed to operate.

Road Safety Audit: In this research, five stages used for road safety assessment as followed,

**Stage 1 Feasibility Stage/Preliminary Design Stage:** A post-planning or post-feasibility study audit will examine elements such as design standards, route choice and continuity with the existing adjacent network, horizontal and vertical alignments, cross sections, and interchange and intersection layouts. This audit will take place after the planning or feasibility study stage has been completed. At this early stage of the feasibility study, careful auditing can assist to save the time and money lost due to adjustments that would otherwise be brought about during subsequent audits.

**Stage 2 Detailed Design Stage:** This audit step takes place after the detailed road design (the final DPR) has been finished, but before to the drafting of contract papers. Common factors to take into account include the geometric arrangement, pavement markings, signals, lighting, road signage, and intersection locations. Information on specifics, clearances to roadside objects (crash barriers/frangibility), and provisions for drivers and passengers who are more susceptible to injury. Paying careful attention to the design details at this time may significantly cut down on the expenses and disruptions that are involved with making modifications at the very last minute, which would otherwise be caused by conducting a pre-opening audit.

**Stage 3 Construction Stage:** During the course of the building of the road works, this step of the audit is carried out. It inspects the arrangements for road safety at the road work site while the construction is being done, as well as evaluates the IRC:SP:88-2019 12 safety of the traffic management plans for each phase of construction for big road projects (i.e. before the works begin). The provisions for pedestrian safety, advanced warning zones, adequate transition zone lengths, worker safety, effective numbers of reflective signs, safe delineation, credible speed limits, temporary crash barriers, lighting, and diversions are examples of the types of issues that are typically investigated.

**Stage 4 Pre-Opening Stage:** An exhaustive check will be performed on the recently built road as part of this audit, and it will be done just before the road is made available to the general public. Even though the vast majority of road construction projects are carried out "under traffic," there is a window of opportunity just before the Contractor turns over the project in which the work is nearly finished and an audit of the pre-opening stage is carried out. This window of opportunity exists right before the Contractor turns over the project. The audit team should drive on, ride on, and walk along the newly constructed road (as appropriate) to ensure that the safety criteria for everyone who uses the road are satisfied. The goals of the audit are to ensure that everyone who uses the road is safe. At this stage, it is extremely important to conduct an inspection throughout the night in order to examine the installation as well as the visibility of any signs, markings, demarcation, lighting, and any other considerations that are pertinent to night time or low light. In most situations, the number of project stages at which audits are carried out varies not only based on the classification of the road but also on the magnitude of the project. This is because the number of phases at which audits are carried out is proportional to the size of the project. For the purpose of illustration, an audit
may be carried out at each step of the project for a significant road building project on a multilane highway or an interstate highway. In order to make the most efficient use of the resources that are readily accessible, an evaluation of a smaller project on a road carrying a more manageable level of traffic could be broken up into one or two phases.

**Stage 5 Safety Audit of Existing Roads:** The current road might be a well-traveled thoroughfare that has been around for several decades, or it could be a road that was only recently improved or repaved. An inspection of an existing road's safety features will check to see whether they are consistent with the road's functional categorization in order to fulfill the purpose of the inspection. In addition to this, it seeks to discover any characteristics that, with the passage of time, might become a potential safety risk (such as a tree blocking sight lines at an intersection). Several of the security concerns uncovered in these audits need to be easily remedied by employing maintenance procedures that are uncomplicated and inexpensive (e.g. tree trimming, sign and line marking renewal, and roadside hazard issues). As a result, there are advantages to having maintenance staff educated in road safety reviews in order for them to be able to consistently use their safety knowledge while they are on the job throughout each shift.

**3 Results and Discussion**

**Assessment of Accidents**

Some of the data for the evaluation of the year-on-year pattern of road accidents in the neighbouring places was also acquired from local police stations for injury and death from the years 2015-2019. This data was collected for the period of time from 2015-2019. The data focuses mostly on the regions that are near to NH-19.

The findings of a poll reveal that although males make up the majority of individuals who use roads, female participants included in the survey have also demonstrated a high degree of awareness and are educated about the legislation that regulate road safety. The percentage of males in the overall population who possessed a valid driver's licence was 58.33%, while the percentage of females who did so was just 59.17%. According to the data on age, it appears that those who are between the ages of 35 and 50 are more likely to be aware of the necessity of possessing a driver's licence that is still current. It has been demonstrated that men are more aware than women of the necessity of wearing protective gear such as helmets and seatbelts when they are in potentially dangerous situations. On the other hand, compared to persons of any other age group, those who are between the ages of 15 and 18 are said to have a higher level of awareness. It has been discovered that men have an awareness of speed constraints that is of the kind of 86.39%, whereas females only have an awareness that is of the order of 84.85%. When the figures were split down by age category, individuals who are between the ages of 35 and 50 had the greatest awareness rate of any age group, with 96.04% of the population being aware of the issue. Men drivers had a higher awareness of traffic signals (89.94%) than women drivers (84.85%), according to a comparison between the two groups of motorists. If we examine the data in a way that separates it into groups based on age, we find that individuals over the age of 50 have an awareness rate of 94.98%, which is greater than the rate for any other age group. According to the findings of certain studies, males have a rate that is 24.26% higher than that of females when it comes to engaging in dangerous behaviours when using a mobile phone. According to the data on people's ages, those who are between the ages of 15 and 18 have the greatest percentage of hazardous conduct (58.33%) of any age group. It was determined that 78.49% of individuals are informed about how to safely stop their vehicle in the event that it breaks down. or the behaviours of passing or exceeding 70.97 percent of people are aware of this surgery, with those over the age of 50 and females having the lowest knowledge levels. According to the findings of certain studies, around 50.54 percent of motorists on highways and motorways make it a practise to drive in the middle lane of the roadway. It was revealed that female respondents had a superior awareness of traffic signs as compared to male respondents in the section of the survey form that was dedicated to road signs.
Accident data for the vehicles involved in accident shows that car & bike have the highest probability of collision, followed by truck & car and bike & bike.
In this regard, the data indicate that the age range of 18 to 35 years old is the most susceptible to both injury and death as a result of the Road Accidents.

**Conclusion**

In conclusion, the outcomes of this study indicated that the participants have an awareness of risky driving practices; yet, they lacked a knowledge of traffic rules and warnings. Increase the amount of attention that is placed on encouraging compliance with traffic regulations and the dreadful effects that can ensue from failing to do so. According to the findings of this research, there should be a greater focus placed on public understanding of traffic safety. It is also recommended that there be a greater engagement from women because research has shown that women have a high degree of awareness for traffic laws and have demonstrated a high level of understanding for road signs. This is one of the reasons why it is recommended that there be a greater engagement from women. In addition, and taking into consideration the fact that the majority of participants were aware of risky driving practices, the authorities have to increase the amount of work that they put into implementing the legislation that is now in place.

**References:**


