

SAVING SOCIAL COST BY IMPACTING FACTORS DETERMINING DRIVING SPEED

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Abstract: *Speed management in driving is a very important tool for improving road safety. However, improving compliance and reducing unsafe driving speed are not easy tasks. Each year nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes, mostly in low-income and middle-income countries. As well as creating enormous social costs for individuals, families and communities, road traffic injuries place a heavy burden on health services and economies. The cost to countries, possibly already struggling with other development concerns, may well be 1%–2% of their gross national product. As motorization increases, road traffic crashes are a fast-growing problem, particularly in developing countries. If present trends continue unchecked, road traffic injuries will increase dramatically in most parts of the world over the next two decades, with the greatest impact falling on the most vulnerable citizens. The purpose of this study is to examine the perception and factors that affect the speed of the driving which is the major factor for road accident. The study was initiated as although there has been a concern for road accidents and human factor accounts 80% of road accidents. Speed is mainly determined by driving behavior which may affect the number and intensity of road accidents. To some extent road accidents have decreased, as a result of combined efforts and public awareness, still much awareness is needed to recognize making right choice of speed.*

Keywords: *Speed, Behavioral factors, Perception, Impact*

INTRODUCTION

Speed management in driving is a very important tool for improving road safety. However, improving compliance and reducing unsafe driving speed are not easy tasks. The management of speed remains one of the biggest challenges facing road safety practitioners around the world and calls for a concerted, long-term, multidisciplinary response. Many drivers do not recognize the risks involved and often the perceived benefits of speeding outweigh the perceived problems that can result.

Each year nearly 1.2 million people die and millions more are injured or disabled as a result of road crashes, mostly in low-income and middle-income countries. As well as creating enormous social costs for individuals, families and communities,

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road traffic injuries place a heavy burden on health services and economies. The cost to countries, possibly already struggling with other development concerns, may well be 1%–2% of their gross national product. As motorization increases, road traffic crashes are a fast-growing problem, particularly in developing countries. If present trends continue unchecked, road traffic injuries will increase dramatically in most parts of the world over the next two decades, with the greatest impact falling on the most vulnerable citizens.

Excessive and inappropriate speed is the most important factor contributing to the road injury problem faced by many countries. Higher speeds increase the risk of a crash for a number of reasons. The higher the speed the greater the stopping distance required, and hence the increased risk of a crash. As more kinetic energy must be absorbed during a high-speed impact, there is a higher risk of injury should a crash occur. It is more likely that a driver will lose control of the vehicle, fail to anticipate oncoming hazards in good time and also cause other road users to misjudge the speed of the vehicle.

OBJECTIVES

The purpose of this study is to examine the perception and factors that affect the speed of the driving which is the major factor for road accident. The study was initiated as although there has been a concern for road accidents and human factor accounts 80% of road accidents. Speed is mainly determined by driving behavior which may affect the number and intensity of road accidents. To some extent road accidents have decreased, as a result of combined efforts and public awareness, still much awareness is needed to recognize making right choice of speed. To be more specific the objectives of study are as follows:

- (i) To understand the perception of speed in driving which is a major factor responsible for the road accident.
- (ii) To understand the psychology behind the causes of speed responsible for the road accident.
- (iii) To analyse and suggest ways to impact each of these factors for speed and prevent road accident.

SIGNIFICANCE OF THE STUDY

- (i) The research is aiming at to get perception of driver's behavior with reason for the same and probable solutions. It will create awareness about role of speed in accidents which is driven by behavioral motives that will help in further studies.
- (ii) The research will provide information that will be useful to the public, government bodies, institutions, society and policy makers on how to reduce accidents and increase public participation.

REVIEW OF LITERATURE

In a report of the Committee on Road Safety and Traffic Management (2007) states that the necessity of increased road network due to increased number of vehicles it has become mandatory to integrate all disciplines and institutions that effect road safety which deals in different dimension of road safety like education, implementation of rules, engineering, medical and behavioral sciences.

Sivakumar T. & Krishnaraj R. (2012) in the article Road traffic accidents due to drunken driving in India- challenges in prevention is studied with the objective of safety on the Indian roads which has become a need to undergo experimental studies on drugs and driving for correct understanding of the same.

Further it states strategies for preventive action. Development in strategies should be witnessed from development of consensus with amendments and enactment of new laws as well as its application. Motivation and promotion of road safety against drunk driving can be increased by means of positive changes in the policies.

In National statistics of road traffic accidents in India (2013) by Manisha Ruikar states that hundred times increase is registered in motor vehicles and four times increase in the road network along with 4.4 times increased numbers of accidents between 1970 and 2011 with 9.8 times increase in fatalities and 7.3 times increase in individual injuries.

Survey of road accident data by the Ministry of Road Transport and Highways states that driver's fault (77.5%) was the sole factor responsible for accidents during 2011.

Harman Sidhu Singh (2007) in the article **No U-turn on Indian road safety** states that India Accounts 10% of the world's road fatalities with just 1% of the world's vehicles. There is dire demand that the prospective drivers should expertise all aspects of road safety. After all everyone wants safe arrival of their near and dear at the end of the day.

In Road Safety in India (2010), by Bridge to India examines that India need to have holistic approach and change in mindset and states, India needs to create greater level of awareness, including commitment by government, professional sectors and national agencies to implement the strategies which are proved to be effective in preventing road accidents. Prevention methods, survey and information about the problems created by road accidents should be used as tools to change mindset. It is not possible for the private or government sector to deal with the problem solely to motivate individuals for safe driving but they have to work together to prevent road accidents.

In Road Accidents in India 2011 by Transport Research Wing, Ministry of Road Transport and Highways presents the magnitude of road accidents in India in 2011 examines that National and State Highways accounted for 30.1 per cent 24.6 per cent of total accidents and 37.1 per cent and 24.6 per cent total number of persons killed in 2011.

The analysis of road accidents reveals the most common reason of accidents is drivers' fault. For 77.5 per cent (3, 85,806 accidents) drivers fault is observed, total 72.0 per cent (1, 02,620) of the total number of persons killed and 78.2 per cent (3, 99,911) were injured 2011. Cyclists and that of the pedestrians' contribution in road fatalities remained with share of 1.3 per cent and 2.4 per cent, respectively, in the road fatalities in the year 2011. In the same manner both cyclists and pedestrians were accounted for 1.8 per cent and 3.1 per cent responsibly respectively, for the death of victim of road accidents. Whereas motor or engine impairment caused 1.6 per cent and 2.1 per cent of injuries in road accidents.

In Global Status Report (2013) by World Health Organization states that throughout the world road accidents is the eighth leading cause of loss of life basically for young generation aging from 5-29. Road accidents are not only the reason behind untimely death resulting into amounts of billions of dollars. All these surveys are indicating that by the year 2030 road traffic and fatalities due to it will become the fifth leading cause of death thus immediate and serious action is demanded for our safety.

In final resolution of UN General Assembly for improving global road safety (2014) it is suggested to address global road safety issues through collaboration between Members states and society to build capacity as well as to raise awareness in the field of road safety and watch the third Sunday of November every year as a World Day of Remembrance for Road Traffic Victims as a source of creating awareness.

In the Official launched on 11 th May 2011 UN Decade of Action for Road Safety 2011-2020 for reducing road fatalities has stated ten reasons to act on road deaths. According to it about 1.3 million people are killed on the world's roads each year. Up to 50 million people became victim to road accidents, out of them many remain disabled for the rest of their lives. According to the forecasts annual road traffic deaths can have a hike to 1.9 million people by 2020.

Developing countries are spending nearly \$100 billion a year in matters concerned with road accidents. Usually hospitals and health systems are burdened due to road fatalities. Prevention of road accidents is possible. A global action plan is mandatory with practical measures capable of preventing road accidents which could save millions of lives.

DATA COLLECTION INSTRUMENTS

Questionnaire

Primary data was collected using a questionnaire which was made up of closed ended questions. Before circulating questionnaire pilot test was conducted for factors to ensure validity and reliability of the measurement. The area of research covered in the study will be Doaba region from Punjab State.

Scales

The questionnaire which is presented in Appendix 1 was directed to respondents. A total of 300 questionnaires were sent out to the respondents and 250 responses were received from them.

Measurement of Variables

Driving perception was measured using a 5 point Likert scale ranging from strongly disagrees to strongly agree was used.

Validity and Reliability Tests

A pre-test of the research was done to establish the validity. To determine the internal reliability Cronbach Alpha Co-efficient was used as an index of reliability. A questionnaire was then given to the individuals to give their opinion regarding its relevancy using a 5-point Liker scale as shown below.

Reliability and Validity Index			
	<i>Anchor</i>	<i>Cronbach Alpha value</i>	<i>Content Validity Index</i>
Behavior factors	5 Point	.813	.800
Road Features	5 Point	.765	.643
Vehicle Features	5 Point	.630	.800

Cronbach Alpha and Content Validity Index respectively were observed to be above 0.6 for all variables. This indicates the scale was both reliable and valid.

Factor Analysis Result

Factor analysis helped to understand the composition of both variables and the relevancy of the factors in each variable. The result confirms that driving speed is mainly determined by Behavior Factors, Road Features, and Vehicle Features.

Data Analysis

The data was processed through tabulated frequency distributions using the SPSS programme. Driving perception was measured using a 5 point Likert scale ranging from strongly disagrees to strongly agree was used.

Results and Findings of the Study

The purpose of this study is to find perception regarding speed of driving peoples which is the major factor for road accident. To be more specific the objectives were:

1. To understand the perception of speed in driving which is a major factor responsible for the road accident.
2. To understand the psychology behind the causes of speed responsible for the road accident.
3. To analyse and suggest ways to impact each of these factors for speed and prevent road accident.

Response Rate

Two hundred and twenty (250) fully filled questionnaires out of the 300 distributed were received from various individual respondents. This represented a response rate 83.33%.

Age Group of Respondents

Respondents were categorized by age group and the results in the table indicated the following age group of the respondents.

Table 1

	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
21-27	62	24.8	24.8
28-36	150	60	84.8
36-65	38250	15.2100	100

Table 2

Gender group of Respondents

	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Male	161	64.4	64.4
Female	89	35.6	100
	250	100	

The results in table 1 and 2 showed that respondents with age group between 28-36 dominated the sample (60%) while age group between 21-27 and 36-65

represented 24.8.0%, 15.2% respectively. This also states that implies male with 64.4% and female with 35.6%.

The Vehicles driven by the responds:

Table 3

	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Cars	95	38	38
SUV	60	24	62
Trucks	50	20	82.8
Cycle	12	4.8	86.8
Motorcycle	20	8	94.8
Jeeps	13	5.2	100
	250	100	

The results in table 3 above indicated that the sample was dominated by the cars with Share (38.00%) followed by SUV (24.00%), Trucks Share (20.00%) while on Motorcycle Share stood at 8.00%, with jeeps and Cycle at 5.2% and 4.8%.

The place where the respondents drive:

Table 4

	<i>Frequency</i>	<i>Valid Percent</i>	<i>Cumulative Percent</i>
Inner City	138	55.2	55
Outer city	62	24.8	80
Highways	50	20	100
	250	100	

The results in the table 4 indicated that the majority (55.2%) drives in inner city while 24.8% in outer city and 20% in Highways each.

Factor Analysis Results

Findings showed that speed of driving is mainly determined by Behaviors Factors, Road Features, and Vehicle Features. Despite awareness being a better determinant speed behavior in driving it is not so perceived by the same.

On analyzing the survey the behavioral factors which are responsible for road accidents the following finds are there-

- (a) According to 61.4% respondents affirms that Individual perception about speed is different.
- (b) 70% affirms that hurry to reach destination provokes them to drive at a higher speed.

- (c) 22% affirms that they get pleasure in driving the vehicle at a higher speed
- (d) 32% affirms that sometime higher speed is due to boredom in driving.
- (e) 24% respondents state that sometimes they drive unintentionally at a higher speed.
- (f) 32% affirms that while driving fast they feel themselves as a Hollywood hero.
- (g) 40.8% thinks that legal speed limit does not bind them to drive in correct speed.
- (h) 38% thinks that person sitting with them in vehicle also affect driving speed.
- (i) 44% affirms that peaceful music enables them to drive at slow pace.
- (j) 36.8% thinks that an argument at home affects their driving speed.
- (k) 52% affirms long driving make to underestimate their actual speed.
- (l) 60.4% regards them as above average in terms of driving skills.

On analyzing the survey the Road Features factors which are responsible for road accidents the following findings are there-

- (a) According to 64.4% respondents affirms that road features effect speed of driving.
- (b) 62.8% affirms that wider roads impulse them to drive fast.
- (c) 64% affirms that more lanes on road impulse them to drive fast.
- (d) 40.8% thinks that presence of cycle track or service lane increases speed of driving.
- (e) 62.8% affirms that less greenery on highways increases speed of their driving.
- (f) 56.8% affirms that narrowing of the road when entering an urban area helps them to adapt speed as desired.
- (g) 32% affirms that roundabout at the end of the road helps them to adapt speed as desired.
- (h) 44% consider the information on hoarding effective for adapting the speed before entering the urban area.
- (i) 66% affirms that gateway treatment at entrances of towns and villages impact for appropriate driving speed.
- (j) 36.8% affirms that school and time speed zone impact for appropriate driving speed.

- (k) 62.4% affirms that fixed or moving vigilance in the form of camera on the road impact them to drive at appropriate speed.
- (l) 60% affirms that impact of Police patrolling impact their driving speed.
- (m) 70% affirms that on the spot fine by the police impact their driving speed.
- (n) 42% thinks that reward by the authorities for sensitive driving can motivate an individual for safe driving.

On analyzing the survey the characteristics of vehicles is responsible for overspeed following findings are there

- (a) According to 64.4% respondents affirms that vehicle features effect speed of driving.
- (b) 62.4% affirms that vehicle with powerful engine tempt your drive at more speed.
- (c) 65% affirms that type of model have impact on the speed.
- (d) 58% affirms that the greater the height of the vehicle impulse them to drive at faster pace.

CONCLUSIONS & RECOMMENDATIONS

Speed is a subjective perception of a driving person. Findings showed that speed of driving are mainly determined by Behavior Factors, Road Features, Vehicle Features had an impact on driving behavior. There should be improvement in the awareness by social cost the nation is bearing.

First factor which is responsible for road accidents are behavior factors. The behavioral factor should be influenced in the manner that benefits of speed is overweight the cost which had to paid by the individual, community and nation at large in the form of hospitalization ,loss of productivity and loss of death.

Second factor which is responsible for road accidents are road features. These features should be influenced by proper engineering of road in the form of marking, wider lanes, roudabouts, hoardings which affect the speed behavior in driving.

Third factor which is responsible for road accidents are vehicles features. These features should be influenced by designing vehicles and its features like intelligent speed adaptation and other automatic features with increasing good features in vehicles.

There is a need for more public awareness and campaigns by government, Non government organization and intermediaries for making aware to change perception for speed in order save cost of nation in terms of hospitalizations expenses, loss of productivity and deaths.

Appendix 1: Questionnaire

This questionnaire is prepared to facilitate collection of data on **Saving Social Cost by Impacting Factors Determining Driving Speed**. I am undertaking a study on this topic and I have chosen you as a respondent. This study is carried out purely for academic purposes and the information given will be treated with confidentiality and for only the purposes of this study. This is therefore to request for your time in answering this questionnaire. Thank you very much.

PART A: General Information:

Please tick where appropriate

A1. Age of respondent

21-27 years 28-36years 36-65years

A2. Sex of Respondent

Male Female

A3. The Vehicles driven by the responds

- Cars
- SUV
- Trucks
- Cycle
- Motorcycle
- Jeeps

A4. The place where the respondents drive

- Inner City
- Outer city
- Highways

Part B: Behavior Factors

<i>B</i>	<i>Behavior Factors</i>	<i>Strongly Disagree</i> (1)	<i>Disagree</i> (2)	<i>Not Sure</i> (3)	<i>Agree</i> (4)	<i>Strongly Agree</i> (5)
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1. Individual perception about speed is different
2. Hurry to reach to your destination provokes to drive in speed
3. You seek pleasure in driving the vehicle at a higher speed
4. Sometime you drive in speed due to boredom
5. You drive sometimes unintentionally at a higher speed

6. Speedy driving makes you feel yourself as a hero of some Hollywood movie
 7. Legal Speed limit is successful in bounding you to drive in speed
 8. Does the person sitting with you in vehicle also affect your driving speed
 9. Peaceful music have the effect to enable you to drive at slow pace
 10. Fast music have the effect to enable you to drive at faster pace
 11. An Argument at home effect your driving speed
 12. Long driving make you underestimate your actual speed while driving fast
 13. In terms of skill of driving you regard yourself above average
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Part C: Road Features

<i>C Road Features</i>	<i>Strongly Disagree</i> (1)	<i>Disagree</i> (2)	<i>Not Sure</i> (3)	<i>Agree</i> (4)	<i>Strongly Agree</i> (5)
14. Do road features effect speed of driving					
15. Wider roads impulse you to drive fast					
16. More lanes on road impulse you to drive fast					
17. Presence of cycle track or service road increases speed					
18. Presence of marking on road prompt you to drive fast					
19. Less Greenery on highways increases speed of your driving					
20. A narrowing of the road when entering an urban area helps you to adapt speed					
21. Roundabout at the end of the road helps you to adapt speed					
22. You consider the information on hoarding effective for adapting the speed before entering the urban area					
23. Gateway treatment at entrances of towns and villages impact your speed					
24. Does school speed zone and time speed zone impact your speed?					

25. Fixed or moving Vigilance in the form of camera on the road impact your speed
 26. Impact of Police patrolling effect your speed
 27. On the spot fine by the police impact your speed
 28. Can reward by the authorities for sensitive can motivate an individual
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Part D: Vehicle Features

<i>D</i> Vehicle Features	<i>Strongly Disagree</i> (1)	<i>Disagree</i> (2)	<i>Not Sure</i> (3)	<i>Agree</i> (4)	<i>Strongly Agree</i> (5)
29. Do the characteristics of vehicles is responsible for overspeed					
30. Vehicle with powerful engine tempt your driving speed					
31. Type of model have impact on the speed					
32. The greater the height of the vehicle you drive at faster pace					

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