MOTOR VEHICLE ACCIDENT: A SOCIAL AND LEGAL PERSPECTIVE

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ABSTRACT

Motor vehicle accidents not only affect the rider, but also pedestrians and other vehicles moving on the road. Accidents that result in death or injury bring civil action wherein the affected party can recover the damages. The authorities of road transport continuously creating awareness among the people about road safety through the advertisements. However, it is not known whether these measures reached all the part of society. In order to understand the awareness among the people about motor vehicle accidents, a social-legal research was undertaken. People from rural and urban area were posed with questionnaires to understand their knowledge, involvement and assessment on motor vehicle accidents. The survey results were analyzed using Chi-Square test. The results show that the majority of the accidents are a result of non-adherence to rules and regulations while driving the vehicle and poor road conditions.

Keywords: Accident, Motor vehicle, Road, Rural, Urban.

1. Introduction

The overgrowing population leads to steep rise in motor vehicles. This leads to heavy traffic in the roads particularly in the urban areas. Among others, the speedy movement of vehicles and non-adherence to the traffic rules responsible for most of the accidents. After the world's first automobile related fatality which occurred in London in 1896, the coroner court said "This must never happen again". Since then 25 million people would have been died in vehicle related accidents, according to the World Health Organization (WHO). Even though, significant advancement has been made in vehicle safety technology, the number of people killed in accidents rising continuously. Approximately 1.2 million people die each year in road accidents and that number is expected to rise by 65 percent by the year 2020 as per WHO report.

According to the National Highway Traffic Safety Administration (NHTSA), the most affected people are at the age group of 3 to 33 years. Ironically, when we look through the top six causes the greatest threat to drivers is the drivers themselves. Six most common causes of motor vehicle accidents are discussed below.

Distracted drivers

Mark Edwards, Director of Traffic Safety at the American Automobile Association said, "The research tells us that somewhere between 25-50 percent of all motor vehicle crashes in United States really have driver distraction as their root cause." The distractions are many, but according to a study conducted by the Virginia Department of Motor Vehicles (DMV) and Virginia Commonwealth University (VCU), rubbernecking or slowing down to gawk at another accident caused the most accidents. This accounts for 16 percent of all distraction related crashes. I have had as many as three accidents at one scene, at one intersection," says Officer John Carney of the Fairfax County Police. The most common factors which distract the drivers include (i) Fatigue – 12%, (ii) Looking at scenery – 10%, (iii) Other passengers or children – 9%, (iv) Adjusting the radio, cassette or CD player – 7% and (v) reading the newspaper, books, maps or other documents - 2%.

Another increasingly serious cause of driver distraction is cell phone use, as more than 85 percent of the estimated 100 million cell-phone users talk on their phone regularly while driving, according to a Prevention magazine survey. At least one study has found that driving and talking on a cell phone at the same time quadruples the risk of crashing. Therefore, many cities have recently begun banning cell phone use while driving unless a hands-free device is used.

Driver fatigue

Drowsy drivers account for about 100,000 accidents every year in the United States, according to the U.S. National Traffic Safety Administration. The risk is greatest from 11 PM to 8 AM, the time when most people are used to sleep, however some people also become drowsy from noon to 2 PM. Symptoms of driver fatigue include heavy eyelids, frequent yawning, a drifting vehicle that wanders over road lines, varying vehicle speed for no reason, misjudging traffic situations, seeing things "jump out" in the road, feeling fidgety or irritable and daydreaming. The Motor Accidents Authority (MAA) offers the following tips to avoid fatigue related auto accidents.
(a) Take a break from driving at least every two hours.
(b) Take good sleep before a long trip.
(c) Share the driving whenever possible.
(d) Avoid long drives after work.
(e) Avoid drinking before driving.
(f) Pull over and stop when drowsiness, discomfort or loss of concentration occurs.
(g) Find out whether any medicine you are taking may affect your driving.

Drunk and driving

In 2004, an estimated 16,654 people were killed in alcohol related crashes, according to NHTSA. This is an average of one death almost every half-hour. Drunk drivers were responsible for 30 percent of all fatal crashes during the weekdays in 2003, but this percentage rose significantly over the weekends, during which 53 percent of fatal crashes were alcohol related. The only way to prevent this type of accident is avoiding drink and drive. Whenever alcohol is involved, choose a designated driver in advance. This person should not drink at all before driving.

Speeding

Speeding is a multi-tiered threat because it not only reduces the amount of time necessary to avoid a crash but also increases the risk of meeting severe crashing if it occurs. In fact, according to Insurance Institute for Highway Safety (IIHS), when speed increases from 40 mph to 60 mph, the energy released in a crash is more than double. Simply slowing down and obeying posted speed limits can go a long way toward making the safe journey.

Aggressive driving

Aggressive driver can be anyone who operates a motor vehicle in a selfish, bold or pushy manner, without regard for the rights or safety of the other users of the streets and highways. The aggressive behaviors include (a) aggressive tailgating, (b) flashing lights at other drivers (c) aggressive or rude gestures, (d) deliberately preventing another driver from moving their vehicle, (e) verbal abuse, (f) physical assaults, (g) disregarding traffic signals, (h) changing lanes frequently or in an unsafe manner and (i) failure to yield the right of way.

Weather

Inclement weather, including heavy rain, hail, snowstorms, ice, high winds and fog can make driving more difficult. The driver may need more time to stop and may have trouble in seeing the road clearly. So it necessary to leave extra room between the cars during the bad weather.

2. Motor vehicle accidents in India

As per WHO report, India stands in the first place in road accidents among the Asian countries. The report also reveals that, among the eleven south-east Asian countries, 73% of total death occurs in India is due to the road accident. The Motor Vehicles Act, 1988 has been enacted with a view of streamlining the various aspects of the road transport safety including road traffic at large, route restrictions and driving license to drivers.

3. Legal aspects

The legal aspects of this social problem are covered in the statutes of Motor Vehicles Act 1988, the National Highway Act 1956 and the Rules of the Road Regulations 1989. Motor Vehicles Act 1988, section 112 says speed limit, section 3 says necessity of driving license and chapter viii says control of traffic. The National Highway Act 1956, section 5 states the responsibility of developing and maintaining of National Highways. It is a responsibility of the central government to develop and maintain all National Highways. The rules of Road Regulations 1989, Rule 13 says signals to be given by drivers, Rule 22 says traffic sign and Rule 27 says speed restriction while passing or meeting procession or a body of troops or police on the march or when workmen engaged on road repair. The driving speed should not exceed 25 kilometers per hour.

Ministry of Road Transport and Highways

An apex organisation under the central government is entrusted with the task of formulating and administering the policies for Road Transport, National Highways and Transport Research in the view of increasing efficiency of the road transport system in the country. This is being done in consultation with other central ministries / departments, state governments / UT administrations, non-governmental organisations and individuals.

The ministry of Road Transport and Highways has two wings such as road wing and transport wing. The road wing deals with development and maintenance of National Highway in the country. The major responsibilities of this wing are follows. (a) Plan, develop and maintain the National Highways in the country, (b) Extend technical and financial support to state governments for the development of state roads and the roads of inter-state connectivity and economic importance, (c) Evolving standard specifications for roads and bridges in the country and (d) Providing the technical knowledge on roads and bridges.

Transport wing deals with the subject relating to Road Transport and its major responsibilities are follows. (a) Motor vehicle legislation, (b) Administration of the Motor Vehicles Act, 1988, (c) Taxation of motor vehicles, (d) Insuring motor vehicles, (e) Administration of the Road Transport Corporations Act 1950, (f) Promotion of transport co-operatives in the field of motor transport, (g) Evolving road safety standards in the form of a National Policy on Road Safety and by preparing and implementing the Annual Road Safety plans, (h) Collecting, compiling and analyzing road accident statistics and taking steps for developing a Road Safety culture in the country by involving the members of public and organizing various awareness campaigns and (i) Providing grants to aid non-governmental organizations in accordance with the laid down guidelines.

Motor vehicle insurance

Motor vehicle insurance provides coverage for the third party arising out of the use of motor vehicle and also for covering the risk of damage caused to the vehicle. Taking insurance policy for coverage of certain risks is made compulsory and coverage for other risks is optional at the instance of the owner. There are two quite different kinds of insurance involved in the damages system. One is third party liability insurance, which is just called liability insurance by insurance companies and the other one is first party insurance. A third party insurance policy is a policy under which the insurance company

agrees to indemnify the insured person, if he is sued or held legally liable for injuries or damage done to a third party. The insured is one party, the insurance company is the second party and the person who claims damages is the third party.

Section 145(g) "third party" includes the government. National Insurance Co. Ltd. Vs Fakir Chand[1], "third party" should include everyone (other than the contracting parties to the insurance policy), be it a person travelling in another vehicle, one walking on the road or a passenger in the vehicle itself which is the subject matter of insurance policy. The case G. Govindan Vs New India Assurance Co. Ltd[2] defines, third party insurance is compulsory under the motor vehicles Act, 1988. As the third party insurance is mandatory so it cannot be overridden be any clause in the insurance policy.

4. Analysis of survey

Hypothesis

In this social-legal research, the following hypotheses were formulated and tested. The majority of the road accidents are due to (a) non-adherence to traffic rules and regulations while driving the vehicles and (b) poor maintenance of road and transport facility.

Methodology

In this social- legal research, the samples were selected randomly. One hundred respondents were selected from Chennai and rural areas around Chennai, a city in India. Well prepared close ended questions were posed to the respondents. The list of questions asked during the survey is summarized in Table 1. In the close ended questions three point scale was followed (2, 1, and 0). According to the scaling point the data were quantified. The researcher him/herself has collected the data from the respondent directly. The data were classified based on the knowledge, involvement and assessment and again sub classified into corresponding higher and lower levels for the purpose of Chi-Square ($\chi2$) statistical test.

Table 1. List of questions posed to the people residing in urban and rural areas

Questionnaires	Category of response		
Do you know about the traffic rules?	Yes	No	Can't say
Do you know the speed limit?	Yes	No	Can't say
Do you have driving license?	Yes	No	Can't say
Do you check your vehicle before driving?	Yes	No	Can't say
Are you aware of Motor vehicle accident?	Yes	No	Can't say
Which category of people is mostly affected by accidents?	Pedestrian	Two wheeler	Four wheeler
Do you follow the traffic rules?	Yes	No	Can't say
Do you wear helmet while driving?	Yes	No	Can't say
Have you insured your vehicles?	Yes	No	Can't say
What do you think are the major causes of accident?	Cell Phone	Drunk and driving	Rash and negligence
Which are other causes of accidents	Metal depression	Drowsy	Over Speed

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[1]. AIR 1995 J&K 91
[2]. AIR 1999 SC 1398

Chi-Square Statistical Test

The chi-square (χ^2) test provides a means to determine independence between two or more variables. In field surveys, apart from quantitative data we get the qualitative data. For example, if we ask a driver of a motor vehicle, what is the major cause of accidents? The answer can be (a) cell phone use or (b) drunk and driving. The answer does not have any numerical values, but the number of people gives the answer (a) or (b) can be categorized based on the their residing area such as rural or urban. This type of observation requires the calculation of the expected number of individuals under any category. Thus it becomes necessary to know whether there is any deviation in between the observed and expected values. The measurement of this deviation can be done with analysis which is called as Chi-Square (χ^2) test.

Procedure for Chi-Square Analysis

(a) Determine the observed value (O) from the survey performed among the people residing in rural and urban areas.

(b) Calculate the expected value (E) by assuming no differences exist among the categories. Therefore, the expected value for each category (cell in table) will be (row total x column total) divided by the grand total.

(c) Substitute values in the equation (1) to calculate χ^2.

$$\chi^2 = \sum [O\text{-}E]^2 / E \quad \text{eqn. (1)}$$

(d) Determine the critical value using the χ^2 table or probability calculation. The degree of freedom is the number of categories minus 1.

(e) Compare the test statistic to the critical value and determine if a convincing difference exists at a specific confidence level.

Interpretation of Chi-Square value

The Chi-Square table for critical values provides the probability (p-value) of obtaining a χ^2 value as large as the listed value if the null hypothesis is correct. A p-value of 0.05 means there is only a 5% chance that differences between the observed values and expected values have occurred simply by accident. For example if degree of freedom is equal to 1, there is a 5% probability (p-value = 0.05) of obtaining a χ^2 value of 3.841 or larger. In statistics, a probability of 5% is considered so rare that it is unlikely that the null hypothesis is correct. 5% probability is called a statistically significant result. If the χ^2 value obtained was 4.5, then the null hypothesis can be rejected. If the χ^2 value was 3.1, then the null hypothesis cannot be rejected.

Chi-Square analysis of survey results

In this Socio-Legal research 100 respondents were selected and the questionnaires were posed to them. Out of 100 respondents, 42 respondents were from rural and the remaining 58 were from urban. The questions were close-ended questions wherein three point scales was adopted. The scaling points were 2, 1 and 0. Collected data was classified into knowledge, involvement and assessment. Knowledge is again classified into higher knowledge and lower knowledge. Similarly, involvement and assessment further classified into corresponding lower and higher levels. Observed value and expected values are designated as 'O' and 'E' respectively. The factor χ^2 was calculated using the equation (1). The analyzed data is summarized in the Tables 2-7. Hypotheses were tested and interpretations were made based on these data. From the interpretation inference was made on the light of the social background.

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Table 2. Contingency table for levels of knowledge

Region	Levels of knowledge		Total
	Higher	Lower	
Rural	20	22	42
Urban	21	37	58
Total	41	59	100

Expected value of higher knowledge among the rural people (HK) = [41 x 42] / 100 = 17.22
Expected value of lower knowledge among the rural people (LK) = [59 x 42] / 100 = 24.78
Expected value of higher knowledge among the urban people (HK) = [41 x 58] / 100 = 23.78
Expected value of lower knowledge among the urban people (LK) = [59 x 58] / 100 = 34.22

Table 3. Calculation of χ^2 for the levels of knowledge

Groups	Levels of Knowledge	Observed value (O)	Expected value (E)	(O-E)	$(O-E)^2$	$[O-E]^2/E$
Rural	HK	20	17.22	2.78	7.728	0.448
	LK	22	24.78	-2.78	7.728	0.331
Urban	HK	21	23.78	2.78	7.728	0.324
	LK	37	34.22	2.78	7.728	0.225
$\chi^2 = \sum [O-E]^2/E = 1.328$						

Table 4. Contingency table for levels of involvement

Region	Levels of Involvement		Total
	Higher	Lower	
Rural	18	24	42
Urban	26	32	58
Total	44	56	100

Expected value of higher involvement among the rural people (HI) = [44 x 42] / 100 = 18.48
Expected value of lower involvement among the rural people (LI) = [56 x 42] / 100 = 23.52
Expected value of higher involvement among the urban people (HI) = [44 x 58] / 100 = 25.52
Expected value of lower involvement among the urban people (LI) = [56 x 58] / 100 = 32.48

Table 5. Calculation of χ^2 for the levels of involvement

Groups	Levels of Involvement	Observed value (O)	Expected value (E)	(O-E)	$(O-E)^2$	$[O-E]^2/E$
Rural	HI	18	18.48	-0.48	0.230	0.012
	LI	24	23.52	0.48	0.230	0.009
Urban	HI	26	25.52	0.48	0.230	0.009
	LI	32	32.48	-0.48	0.230	0.007
$\chi^2 = \sum [O-E]^2/E = 0.037$						

Table 6. Contingency table for levels of involvement

Region	Levels of Assessment		Total
	Higher	Lower	
Rural	24	18	42
Urban	39	19	58
Total	63	37	100

Expected value of higher assessment among the rural people (HA) = [63 x 42] / 100 = 26.46
Expected value of lower assessment among the rural people (LA) = [37 x 42] / 100 = 15.54
Expected value of higher assessment among the urban people (HA) = [63 x 58] / 100 = 36.54
Expected value of lower assessment among the urban people (LA) = [37 x 58] / 100 = 21.46

7. Calculation of χ^2 for the levels of assessment

Groups	Levels of Assessment	Observed value (O)	Expected value (E)	(O-E)	(O-E)^2	[O-E]^2/E
Rural	HA	24	26.46	-2.46	6.051	0.228
	LA	18	15.54	2.46	6.051	0.389
Urban	HA	39	36.54	2.46	6.051	0.165
	LA	19	21.46	-2.46	6.051	0.281
χ^2 = ∑ [O-E]^2 /E = 1.063						

The degree of freedom for all the cases = (r-1) (c-1) = (2-1) (2-1) = 1
Where, r = number of rows and c = number of columns.
The table value of χ^2 for 1 degree of freedom at 5% level of significance is 3.841. The calculated value of χ^2 for level of knowledge, involvement and assessment is 1.328, 0.037 and 1.063 respectively. Since these values are less than the table value the experiment supports the hypothesis. The majority of the road accidents are due to (a) non-adherence to traffic rules and regulations while driving the vehicles and (b) poor maintenance of road and transport facility. This is applicable for both rural and urban residents and there is no significant difference between them.

5. Conclusion
Data was collected from peoples residing in urban and rural area to understand their awareness related to motor vehicle accidents. They were analyzed by adopting Chi-Square Test. Urban people have better knowledge, involvement and assessment regarding the motor vehicle accidents compared to the rural people. However, both categories got low knowledge, involvement and assessment related to the traffic rules and regulations as well as road conditions and transport facilities. In order to avoid the road accidents the pedestrians and riders of the vehicles should follow the traffic rules and regulations. More importantly, the roads and transport facilities should be maintained appropriately.

6 Reference

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