Asian Journal of Information Technology 17 (1): 7-13, 2018
ISSN: 1682-3915

An Empirical Study of Road Safety among People in Coimbatore

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Abstract: This study presents the results of an empirical study of road safety among people in Coimbatore located in Tamil Nadu India. In the analysis of road safety awareness to road users, the two primary characteristics taken in to consideration were road user awareness and factors of accidents. Impact of road user consciousness on road safety was considered. Questionnaire survey method was used to identify the impact of age group, sex, educational qualification, rural and urban features. It was found that age group, sex, rural and urban classification and social status were completely the deciding factors of road user awareness. For the analysis, 534 sampling data and awareness score were computed.

Key words: Accident, awareness injury, risk, safety, questionnaire, score

INTRODUCTION

Road safety denotes the methods and measures taken for decreasing the risk of a person using the road network being killed or extremely injured. The users of a road comprise pedestrians, cyclists, motorists their passengers and passengers of on-road public transport. There are several issues associated to the traffic rule violations like drunken drive, cell phone driving, violation/negligence of road rules, high speed, fatigue/sleeping incorrect over taking, failure to understand signs, violate walk along the penetration, path and zebra crossing, carelessness, pot holes, damaged roads, illogical speed breakers, improper maintenance, overloading, avoiding safety gears like seat belt and helmet, fog, snow, fluid, etc. In this context importance should be given to ensure the road safety awareness pointing the road users and develop a sense of responsibility about several aspects of road safety. The primary factors of road safety are the vehicle, road, traffic, road user and the surroundings. In this study, the road user impact on road safety awareness has been studied. It contains two road user factors including accidents and road user awareness. Road user error is thought to be factoring 90% of all road accidents and developing road user awareness should always be given importance. Ensuring road safety involves confirming safe roads, safe people, safe vehicle and safe speed. The state of Tamil Nadu has recorded the second highest number of road accidents in the whole of the country after Maharashtra. On an average, 100 road accidents take place in a day, ending with death of at least 15 persons and damages and hospitalization of 150 persons each day in the state.

The extent of road accidents and mortalities in India is distressing. This is obvious from the fact that each hour there are about 56 accidents. Around one accident road safety is said to rank largely among vital concerns the public would like addressed by government (Lyons *et al*., 2008). Safety while travelling is chunk of the department for transport's third goal and purposes. To provide better safety, security, health and longer life expectation through dropping the risk of death, damage or illness rising from transport and endorsing travel modes that is beneficial to health. The study examines the awareness among people of Coimbatore in road safety based on factors such as age, sex, education and place.

This study presents the result from a sample survey in order to understand the behavior of the population in Coimbatore, identifies the effect of various factors such as age, sex, rural and urban social status and further the combination of both attritional and behavioral measures.

Literature review: Driving speed is a main pre-event aspect in the generation of traffic smashes. Subsequently, maximum countries have set maximum speed bounds allowable for particular categories of vehicles and on

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specific roads and locations. Familiarity in a wide range of countries proves that firm application of speed regulation actions can be operative in stopping serious injury and casualty from motor vehicle bangs (Meiring, 1974; Engel and Thompson, 1992; Lave and Elias, 1994).

Though with the present trend in the making of good performance vehicles, coupled with the ever raising claim for mobility, the possible danger of raised speed if not closely and efficiently observed, may exceed other labors of road safety management, particularly in emerging countries where road safety creativities are still feeble.

As eminent by Peden and Sminkey (2004) economic costs is just the slant of the iceberg. For each person killed injured or disabled by a road traffic crash there are uncountable others intensely affected. Several families are driven deeper into scarcity by the expenditures of long medical care, loss of a family breadwinner or the extra burden of concern for the disabled.

Road traffic mortalities and severe injuries are to an excessive extend avoidable as the risk of experiencing injury in a crash is highly anticipated and several counter measures, proven to be active, exist (WHO, 2004). The report further emphasized that disclosure to road injury risk can be reduced by approaches that comprise:

- Decreasing the bulk of motor vehicle traffic by means of improved land use
- Providing effective networks where the shortest or fastest routes concur with the safest routes
- Inspiring people to shift from higher-risk to lower-risk means of transport
- Assigning limits on motor vehicle users on vehicles or on the road substructure

Ameratunga *et al.* (2006) has identified that legislation is unable to assistant on its own as disappointment to use helmets, use of non standard helmets and use of unsuitable secured helmets is usual in several places, specifically in minimum income countries and requests on efforts to enhance these efforts with complementary deterrence and educational strategies.

Evidence given by Fitzgerald *et al.* (2006) specified that even though India has one percent of the world's vehicles, it marks for as large as 6% of world's RTAs. The RTA rate of 35/1000 vehicles in India is one of the largest in the world and so is the related RTA mortality rate of 25.3/10,000 vehicles. About 73% of deaths because of RTAs from the South-East Asia Region are in India. RTAs note for 16.8 deaths per 100,000 population and about 2 million people in India are unable because of RTAs (WHO, 2009; Anonymous, 2009). Oginni (2008) has analyzed the particular risk features such as uneducated and unlicensed drivers and riders, reckless driving, carelessness, drunkenness, lack of knowledge on road safety rules, driver's age, fatigue, unimplemented government policies, failure in law enforcement and road traffic injuries are the primary reason for death universally among 15-19 years olds while for those in the 10-14 and 20-24 years age brackets they are the second main cause of death (WHO, 2009). The estimated 40% growth in global deaths resulting from injury between 2002 and 2030 is primarily because of the growth in number of deaths from road traffic accidents. India was previously noted for about 9.5% of the total 1.2 million mortal accidents in the world (Mondal *et al.*, 2011a, b). In 2007, 1.14 lakh people in India missed their lives in road accidents which were considerably larger than the 2006 road death records in China, 89,455. A person dies at each 4.61 min in India for road crashes. Road deaths in India recorded a sharp 6.1% rise among 2006 and 2007.

Wedagama (2010) did analysis to examine the effect of accident associated features on motorcycle mortal accidents in the city of Denpasar over period 2006-2008 applying a logistic regression model. The analyzes showed that the mortality of collision with pedestrians and right angle mishaps were correspondingly around 0.44 and 0.40 times less than collision with other vehicles and calamities because of other factors. In disparity, the odds that a motorcycle accident will be mortal due to collision with heavy and light vehicles were 1.67 times more likely than with other motorcycles. Collision with pedestrians, right angle accidents and heavy and light vehicles were correspondingly noted for 31, 29 and 63% of motorcycle mortal accidents.

Goswami and Sonowal (2011) prepared a statistical analysis of road traffic accident data for the year 2009 in Dibrugarh City Assam India. Data analysis is completed using degree of freedom, χ^2-test for goodness of fit, χ^2-test for independence of attributes and Kruskal-Wallis test. It is identified that human features (rush and negligence) create 95.38% of the total RTAs. 60% of the accidents were noted during day time (6 a.m. to 6 p.m.). The peak time is between 12-6 p.m. (38.46%). The largest number of accidents (32.30%) was detected in the heavy rainy season during the months of July September.

Sivakumar and Krishnaraj (2012) have recognized the dubious distinction of having high number of mortalities because of road accidents in the world. Road safety is developing as a major social concern around the world, especially in India. Drinking and driving is a big public health issue which is likely to occur as one of the greatest important problems in upcoming days. The part of alcohol in traffic safety has formed more disputes than any other topic. Alcohol and driving are not put together but yet,

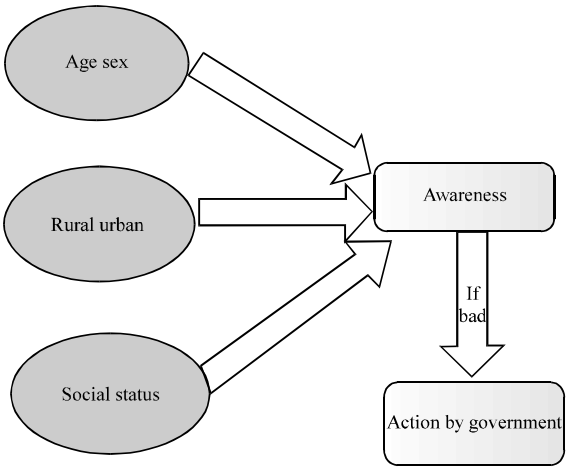

Fig. 1: Road safety awareness model-characteristics

many people like to drink and drive ends up in numerous road mishaps. A drunken driver is a probable murderer as he cannot do his tasks without risks and jeopardizes road safety. A severe drive against drunken driving is the necessity of the hour to endorse road safety. It is vital to initiate essential steps to achieve this by overwhelming all the challenge.

Ziyab and Akhtar (2012) surveyed about trends in road traffic events in Kuwait during a 10 years period from 2000-2009. From this research it was evident that over the time period under concern, there was a 76.5% growth in vehicle ownership in Kuwait which associated to a 121.3% growth in road traffic crashes during the similar period. According to Al-Madani and Al-Janahi (2002) and Koushki and Balghunaim (1991), to decrease or possibly eliminate the reasons of accidents investigations must find the causal factors, so that, preventive measures can be recognized. This research describes on an investigation and a scrutiny of the safety and growing accident rate problems in Kuwait. It involves collection investigate and analyze traffic records from government, local authorities, local government, traffic departments and police reports as well as any other existing source in Kuwait (Fig. 1).

Though, a number of sources of data such ascollision reports, police reports and hospital records in Kuwait were harder to obtain, since, there was not a clear scheme for accident data collecting and reporting. Even though there are a number of organizations involved in gathering, reporting and evaluating accident data in Kuwait, many of these organizations do not share their records or information. Such organizations embrace traffic police, local council, local authorities and the ministry of traffic. As a consequence of the above said factors, collection of traffic accident data has confirmed more challenging than expected. Rather, a questionnaire was considered to investigate public insolences to road safety problems in Kuwait. The study as well as the pilot survey, study, recommendations and limitations of the study are provided. Also investigation of probable policies and actions to tackle the known problems are investigated and discoursed.

MATERIALS AND METHODS

Research hypothesis:

- H_{11}: there is a significant difference between the mean values of awareness between various age groups
- H_{12}: there is a significant difference between the mean values of awareness between male and female
- H_{13}: there is a significant difference between the mean values of awareness between various educational qualification groups
- H_{14}: there is a significant difference between the mean values of awareness between various social status groups
- H_{15}: there is a significant difference between the mean values of awareness between rural and urban

RESULTS AND DISCUSSION

Data analysis is the method of organizing the raw data into significant information. In this study the required data obtained from the administered research tool has been analyzed. The collected data on road safety awareness elements for was used descriptive analysis. It offers information about the nature of road accidents. Mean and standard deviation were computed to define the central tendencies and dispersion of variables by associating the research tool elements.

Also in order to know the significant difference among different age groups, sex educational qualification and occupation Analysis of Variance (ANOVA) was used. F-test was used to analyze the data for noteworthy difference. When the acquired "F" ratios were found to be noteworthy, Scheffe's post hoc test was used to find out the mean differences amongst paired adjusted means. The 5% level of confidence was fixed to test the level of significance.

The data collected have been organized and statistical tools have been applied to analyze the data. The frequency means and standard deviations were computed in concern various category of the user characteristics. Statistical tools used are comparison test, one-way analysis of variance was used to analyze the data and interpretation of the results.

Table 1: Awareness score-age group (Years)

					95% Confidence interval for mean			
Years	N	Mean	SD	SE	Lower bound	Upper bound	Minimum	Maximum
<20	93	4.6989	1.71809	0.17816	4.3451	5.0528	1.00	8.00
21-30	201	4.4229	1.85614	0.13092	4.1647	4.6811	0.00	10.00
31-40	105	4.8762	1.84336	0.17989	4.5195	5.2329	0.00	10.00
41-50	91	5.0000	1.92642	0.20194	4.5988	5.4012	0.00	10.00
Above 50	44	4.8864	1.88280	0.28384	4.3139	5.4588	0.00	8.00
Total	534	4.6966	1.85236	0.08016	4.5392	4.8541	0.00	10.00

Table 2: Awareness score-age group

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	28.407	4	7.102	2.087	0.081
Within	1800.447	529	3.403	-	-
Total	1828.854	533	-	-	-

One way ANOVA analysis for road safety awareness: In this method, 534 sampling data are used to analyze the awareness score as given in Table 1.

Null hypothesis: There is no relation between Awareness scores and the study variables. In this analysis the road safety awareness for age group <20 years, the awareness mean average score is 4.7. For age group 2-30 years, the awareness mean average score is 4.4. For age group 31-40 mean average score is 4.9. For age group 41-50 years awareness mean average score is 5.0. For 50 years above age group awareness mean average score is 4.9. As per this analysis the road accident made lack in safety awareness among the people, the average score is 5 out of 12.

Since, significance value from Table 2 is >5%, null hypothesis is accepted. There is no significant difference between the mean values of awareness between various age groups.

So, the government should create awareness of road safety from school level (younger stage) among the people to reduce the accident (Fig. 2). In this analysis of road safety awareness among male and female the mean coverage score of men is 4.7 while that of the women is 4.6. Since, significant value from Table 3 is >5% null hypothesis is accepted. There is no significant difference between the mean values of awareness between male and female. Hence, the government has to create awareness of road safety for both men and women to reduce accidents.

Since, significant value from Table 4 is >5%, null hypothesis is accepted. There is no significant difference between the mean values of awareness between male and female. Hence, the government has to create awareness of road safety for both men and women to reduce the number of accidents (Fig. 3). In this analysis of road safety awareness among the educated, the mean average score of those who have studied up to school level is 4.6 while those with degree and diploma have the average

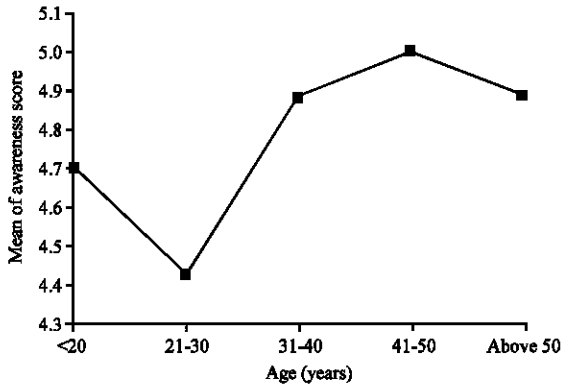

Fig. 2: Mean plots-age group

Fig. 3: Mean plots-sex

mean score of 4.6, the groups with PG degree had scored the highest with the mean score of 5.0. The mean average score of 'other's is 4.3 (Table 5). There is no significant difference between the mean values of awareness between groups of education level namely school/degree/diploma/post graduate degree and others. Since, significant value from Table 6 is >5%, null hypothesis is accepted. Thereis no significant difference between the mean values of awareness between various age groups. Hence, the government has to create awareness of road safety for all the cadre of educated people to reduce the number of accidents (Fig. 4).

In this analysis of the road safety awareness among different groups of occupation such as agriculture,

Table 3: Awareness score-group (Genders)

Genders	N	Mean	SD	SE	95% confidence interval for mean		Minimum	Maximum
					Lower bound	Upper bound		
Male	388	4.7345	1.87714	0.09530	4.5472	4.9219	0.00	10.00
Female	146	4.5959	1.78723	0.14791	4.3035	4.8882	0.00	8.00
Total	534	4.6966	1.85236	0.08016	4.5392	4.8541	0.00	10.00

Table 4: Awareness score-group

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	2.039	1	2.039	0.594	0.441
Within	1826.815	532	3.434	-	-
Total	1828.854	533	-	-	-

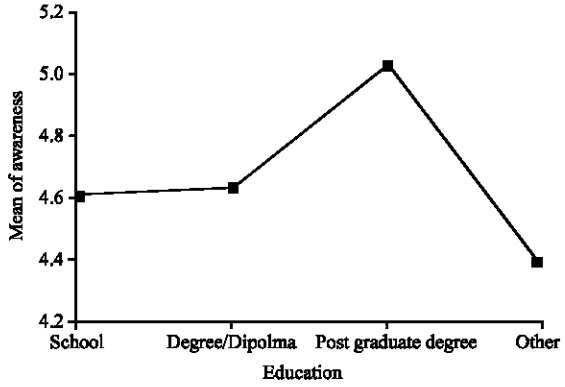

Fig. 4: Mean plots-educational qualification

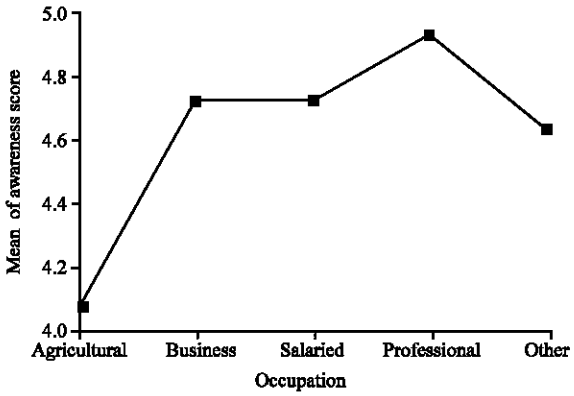

Fig. 5: Mean plots-occupation

business, salaried, professional and others the average mean score of the road safety awareness of the agriculture group is 4.0 (Table 7).

The average mean score of the business group is 4.7, the average mean score of the salaried people is 4.7. The average mean score of the professional is 4.9 while the average mean score of the other group is 4.6. Since, significant value from Table 8 is >5%, null hypothesis is accepted (Fig. 5). There is no significant difference between the mean values of awareness between groups

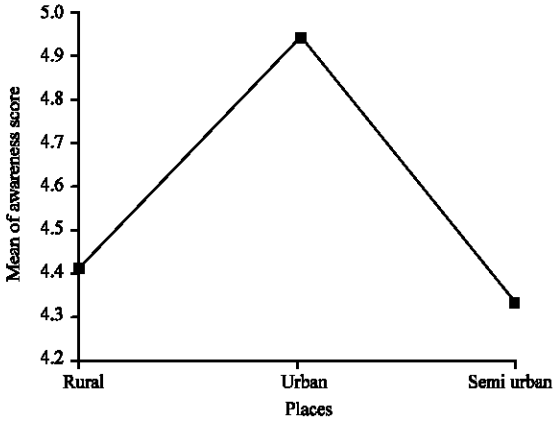

Fig. 6: Mean plots-location

of different occupation namely agriculture, business, salaried, professional and others to reduce accidents. So, the government has to create awareness of road safety among the groups of occupation namely agriculture, business, salaried, professional and others to reduce accidents. In this analysis of the road safety awareness among different groups of rural, urban and semi-urban, the average mean score of the road safety awareness of urban group is 4.9426 which is comparatively bigger than the average mean score of rural group which is 4.41 and the average mean score of semi-urban is 4.32 (Table 9). Since, significant value from Table 10 is <5% null hypothesis is rejected. There is a significant difference between the mean values of awareness between groups of different places. So, the government has to create awareness of road safety among the rural people (Fig. 6).

The analysis reveals that there is lack of awareness amongst people regardless of their age. According to Ray Fuller, 20-24 age group people are most predominant for accident yet, the view shows all people regardless of age may be the cause for accidents in Indian scenario. Also, it is eminent that irrespective of gender, awareness is less. If unawareness is the cause for accident and the probabilities of female accidents are unavoidable for other reasons such as high speed and driving when tired. The 39% people of coimbatore are having awareness about the traffic rule whereas in Delhi like metro cities its more which is about 52-72%. Hence, second higher cities like

Table 5: Awareness score-educational qualification (Institution)

					95% confidence interval for mean			
Variables	N	Mean	SD	SE	Lower bound	Upper bound	Minimum	Maximum
School	140	4.6000	1.98121	0.16744	4.2689	4.9311	0.00	10.00
Degree/dipolma	270	4.6259	1.83037	0.11139	4.4066	4.8452	0.00	10.00
Post graduate degree	111	5.0270	1.69737	0.16111	4.7077	5.3463	0.00	8.00
Other	13	4.3846	2.02231	0.56089	3.1625	5.6067	0.00	7.00
Total	534	4.6966	1.85236	0.08016	4.5392	4.8541	0.00	10.00

Table 6: Awareness score-educational qualification (Groups)

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	16.040	3	5.347	1.563	0.197
Within	1812.814	530	3.420	-	-
Total	1828.854	533	-	-	-

Table 7: Awareness score-occupation (Variables)

					95% confidence interval for mean			
Variables	N	Mean	SD	SE	Lower bound	Upper bound	Minimum	Maximum
Agricultural	15	4.0667	1.98086	0.51146	2.9697	5.1636	0.00	8.00
Business	107	4.7290	2.09478	0.20251	4.3275	5.1305	0.00	9.00
Salaried	175	4.7200	1.75722	0.13283	4.4578	4.9822	1.00	10.00
Professional	61	4.9344	1.63165	0.20891	4.5165	5.3523	1.00	8.00
Other	176	4.6250	1.85357	0.13972	4.3493	4.9007	0.00	10.00
Total	534	4.6966	1.85236	0.08016	4.5392	4.8541	0.00	10.00

Table 8: Awareness score-occupation (Groups)

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	10.513	4	2.628	0.765	0.549
Within	1818.341	529	3.437	-	-
Total	1828.854	533	-	-	-

Table 9: Awareness score-location (Variables)

					95% confidence interval for mean			
Variables	N	Mean	SD	SE	Lower bound	Upper bound	Minimum	Maximum
Rural	162	4.4198	1.89057	0.14854	4.1264	4.7131	0.00	10.00
Urban	296	4.9426	1.78698	0.10387	4.7382	5.1470	0.00	10.00
Semiurban	76	4.3289	1.90009	0.21796	3.8948	4.7631	0.00	8.00
Total	534	4.6966	1.85236	0.08016	4.5392	4.8541	0.00	10.00

Table 10: Awareness score-location (Groups)

Groups	Sum of squares	df	Mean square	F-value	Sig.
Between	40.597	2	20.299	6.027	0.003
Within	1788.257	531	3.368	-	-
Total	1828.854	533	-	-	-

Coimbatore need more awareness program than metropolitan cities. Within the Coimbatore Region the awareness among rural people is not satisfactory. Since, awareness education does not show significant improvement in awareness score, the current system of awareness is to be improvised.

CONCLUSION

From this study, it is observed that the awareness level of road safety is less, so, it is concluded that better training of the learner drivers and testing techniques for issuing the license will decrease the number of accidents. Sufficient awareness program on road safety from the student level can also contribute in reducing the accidents at all levels. Refining road conditions and also providing pedestrian facilities, regulating the speed of vehicle and recording traffic violation on driving license, providing separate road for the two wheeler segments, separate court to deal with traffic cases are also required. It becomes necessary to establish the awareness of safety management and traffic rule among the road users.

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