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Knowledge, practice and ocular assessment on road safety measures among rural population of Uttar Pradesh: Cross sectional study

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***Abstract*---**Introduction: Road traffic accidents (RTAs) pose a significant burden on the health care system in India with high out of pocket medical expenditure. Awareness about this public health problem is necessary to combat it and this study was carried out to assess knowledge and practice towards road safety among the adult population in the kantha and Nawabganj in Unnao district of Uttar Pradesh. Methods: A cross-sectional survey was carried out among 427 adults aged 16 years and above residing in the region for more than one year. A semi-structured questionnaire was used to assess their knowledge and practice towards road safety measures. Results: Majority 69.1% of the participants were in the age group of 16-25

years, males were 70.3 % and 59% had up to matric level of education. Overall knowledge and practice was found to be satisfactory among 55% of the participants. Previous history of accidents, 17.3% had reported in family and out of them, 43.24% of them had reported 8am-4pm timing of accidents. Knowledge of having compulsory vehicle insurance and Carrying of original vehicle documents are significantly associated with age group, gender and education. Knowledge of using footpath while walking on road is significantly associated with occupation of participants. Conclusions: The study showed inadequate knowledge and poor road safety practices among good number of participants. This emphasizes the need for a customized community-based awareness campaign on road safety measures coupled with stringent legislation measures to bring about the desired change.

***Keywords*---**road safety, awareness, practice, pedestrians, drivers.

Introduction

Road Traffic Accident (RTA) is defined as "An event that occurs on a way or street open to public traffic; resulting in one or more persons being injured or killed ,where at least one moving vehicles are pedestrians, animals and geographical or architectural obstacles can be termed as RTA [1]. India is having a developed system of transportation which plays a key role in development of economy system by promoting fair distribution of goods and services and movement of people across country [2]. Road traffic accident occurs worldwide. It was estimated that over 1.2 million people died each year on the roads as a result of road traffic accidents [3]. Injury and deaths due to road traffic accidents are a major public health problem in developing countries where more than 85% of all deaths and 90% of disability-adjusted life years were lost from road traffic injuries. As a developing nation, India is not an exception country [4]. In 2013, latest year for 1.37 Lakhs people died and 4.6 Lakhs people got injured due to road accidents in India. Traffic accidents of India have now earned with nearly 1.4 Lakh deaths annually, India has surpassed China and has reached to top of the world in road fatalities [5]. Road accidents are mainly due to insufficient maintenance of the road network and lack of efficient and systematic enforcement.

The cause of an accident is a combination of sequential and simultaneous factors, each of them is necessary but none of them is by itself sufficient [6]. According to WHO estimates, Road Side Accidents is the 9th leading cause of death as per on the basis of DALY. Each year in US approximately 85children under the age of 15 years are killed & another 30,000 are injured in pedestrian collisions [7]. To ensure that road safety remains on governments agendas, WHO promotes and coordinates initiatives such as the Decade of Action for Road Safety 2011-2020 and invites global road safety sectors to exchange data and knowledge related to injury prevention [8]. The total motor vehicle population has increased from about 3 Lakhs in 1951 to about 73 Millions in 2004. The actual number of motor vehicles in the country may be 20-30% lower, as registration procedures do not

remove many of the out-of-service vehicles from the records [9]. Road safety Education is one of the best potential improvements for future road safety outcomes. The Road Safety Education constitutes one of the major concerns of the countries regarding the educational processes that may enhance better results in the field of public health [10]. Global concern problem considered severe and has been addressed with direct solutions that can be implemented a prior through effective interventions and that are carried out from urban and planning of the transport in designing of roads, execution of road safety audits and application of internationally harmonized laws [11].

The present study was conducted to identify major road safety problems in India and to discuss countermeasures that have promise to address these specific road safety problems. The objectives of this study is to estimate the knowledge, practice and ocular manifestation on road safety measures among the rural population and to determine the factors affecting knowledge, practice and ocular manifestations on road safety measures among the rural population in Unnao district of Uttar Pradesh.

Material and Methods

A community based cross-sectional survey was conducted during the period of 3 months from January 2021 to March 2021 in rural area of Kantha and Nawaganj in Unnao district of Uttar Pradesh. Study participants were aged having > 20 years residing in the region for more than a year of Unnao district of Uttar Pradesh were considered eligible for study. Purposive sampling method was used as sampling technique. Considering the prevalence of awareness on road safety measures among adults to be 20.6% as observed from literature Kulkarni V et al [12] awareness and practice of road safety measures among undergraduates medical students in a south Indian state for an absolute precision of 4% and 95% level of confidence with an anticipated non-response rate of 8.5%, sample size was estimated to be 427.

The proposal for the study was approved by the Institutional Ethics Committee prior to initiation of the survey. Informed consent was taken after consenting individuals and later they were interviewed individually after administering a pre-tested, semi-structured questionnaire to collect the relevant data. In addition to the socio-demographic details of the participants, the questionnaire assessed the participant's knowledge regarding road safety measures and their practice towards the same. The questions were customized to individually assess the road safety practices of pedestrians and drivers. The questionnaire was translated into the local language (Hindi) and back translated to maintain uniformity across the survey.

The questionnaire assessed knowledge, practice and ocular manifestations of the study participants with regards to traffic rules to be observed as a pedestrian or a driver. These included questions pertaining to traffic signals, spectacles use, visual acuity assessment, vision test while undergoing driving license test, legal age of driving of vehicle, benefits of using safety measures, driving under the permitted limit of alcohol related distractions. Questions pertaining to knowledge and practice were scored as one and zero based on whether the response was

correct or incorrect respectively. The overall score of knowledge and practice was taken as twelve. The knowledge scores were categorized in to satisfactory and unsatisfactory knowledge and the median score was 10. Satisfactory knowledge was for having median score of >10 and unsatisfactory knowledge was taken having median score of <10. The collected data was analyzed using SPSS version 25.0 and presented as frequencies and proportions. Chi square was used to test the strength of association of knowledge, practice and ocular manifestations with different risk factors. A p value of less than 0.05 was considered statistically significant.

Results

A community based cross-sectional survey was conducted during the period of 3 months from January 2021 to March 2021 in rural area of Kantha and Nawaganj in Unnao district of Uttar Pradesh. Sample size of 427 study participants was taken for the study. Majority (69.1%) of the participants were between 16-25 years of age followed by 20.6% were in age group of 26-35 years. The mean age of study participants were 20.16 + 11.36 years. Among study participants, males were 70.3% and females were 29.7%. Regarding education level, 59% had completed up to matric level of education followed by 29.5% had Intermediate level of education. Majority (78.9%) of the respondent were unemployed followed by 21.1% were employed. Regarding possession of vehicle, (78%) of the participants had possession of vehicle and 22% were not. Majority (59.9%) of the participants experience of driving vehicle whereas 40.04% were not. Among respondent who had experience of driving vehicle, (51.5%) had less than 2 years of driving experience and 31.6% had more than 5 years of driving experience. Regarding use of spectacles, only 8.9% were using the spectacles and 92.7% had good vision whereas 7.3% had impaired vision. Mostly (60.9%) study participants were having insurance of their vehicle. Almost (74%) of the study participants did not have driving license. Study revealed that 20.8% of the study participants had under gone vision test while undergoing driving license test. Among study participants, (82.7%) did not had any previous history of accidents whereas 17.3% had and among them, (43.2%) had 8am-4pm timing of accident, followed by (31.08%) had 4pm-12am timing of accidents. Study showed that showed that 27% of the respondents had previous history of accidents in their family. (Table-I)

Table I
Socio-demographic profile of the study participants among rural population

Variable	Sub-variable	Frequency (N=427)	Percentage (%)
Age group	16-25 Years	295	69.1
	26-35 Years	88	20.6
	36-45 Years	34	8.0
	>45 Years	10	2.3
Sex	Male	300	70.3
	Female	127	29.7
Education	Matric	252	59.0
	Intermediate	126	29.5

	Graduation & above	49	11.5
Occupation	Worker	90	21.1
	Non-Worker	337	78.9
Do you know driving of vehicle	Yes	256	59.9
	No	171	40.04
If Yes, duration of driving	< 2 Years	132	51.56
	2-5 Years	43	16.79
	> 5 Years	81	31.64
Do you use spectacles	Yes	38	8.9
	No	389	91.1
Visual acuity	Good vision	396	92.7
	Impaired vision	31	7.3
Possession of vehicle in family	Yes	333	78.0
	No	94	29.0
Insurance of vehicle	Yes	203	47.5
	No	224	52.5
Do you have driving License	Yes	111	26.0
	No	316	74.0
Vision Test during DL	Yes	23	20.8
	No	88	79.2
Any Previous history of accidents of Respondents	Yes	74	17.33
	No	353	82.66
If Yes, Timing of accidents	8am-4pm	32	43.24
	4pm-12am	23	31.08
	12am-8am	19	25.67
History of previous accident in family	Yes	118	27.6
	No	309	72.4

There were twelve questions for Knowledge and practice of road safety measures, first seven questions were based on knowledge and remaining was based on practice. Out of 427 participants, only 41% people had vehicle insurance and the rest 59% (252) did not. The knowledge about the limit of Permissible alcohol, 67% people had the right information about it. Talking about the National Ambulance Service number, almost everyone (97.2%) had the right information about it. Similarly, about mostly people (79.2%) had the correct information about the validity of the learning license. 92% people had the correct information about the right age to get a driving license in India. Mostly participants (91.9%) had correct knowledge about Traffic signal awareness. Knowledge about the Golden hours in Road Traffic Accidents, 84.3% people had the right information about it. Regarding practice of road safety measures, among study participants, 77% participants know about the use of walking on the road and 85.7 % participants know about the use of zebra line while crossing road. In addition, 32.8 % people

use the electronic Gadget while walking, driving and running whereas 67.2% do not. 74.5% of all the participants carry the Original Vehicle documents while driving and 86.9% participants use helmet or Seatbelt while driving. (Table-II)

Table II
Knowledge and Practice of Road Safety measures among rural population

Variable	Sub-variable	Frequency (N=427)	Percentage (%)
Knowledge of road safety measure (7 Questions)			
Compulsory Vehicle Insurance	Yes	175	41
	No	252	59
Permissible Alcohol limit (mg/100ml)	30	286	67.0
	50	116	27.2
	70	11	2.6
	100	14	3.3
National Ambulance Service number	100	2	.5
	101	8	1.9
	108	415	97.2
	114	2	.5
Validity of learning license (Months)	3	72	16.9
	6	338	79.2
	9	6	1.4
	12	11	2.6
Driving license age limit in India	18	393	92
	20	24	5.6
	22	6	1.4
	24	4	.9
Awareness on Traffic Signal Light	Yes	389	91.1
	No	38	8.9
Golden hours in Road Traffic Accidents	60	360	84.3
	90	54	12.6
	120	8	1.9
	150	5	1.2
Practice of road safety measures (5 Questions)			
Use of footpath while walking on road	Yes	329	77
	No	98	23
Use of Zebra Line while crossing road	Yes	366	85.7
	No	61	14.3
Use of electronic Gadget while	Yes	140	32.8

walking, driving and running			
	No	287	67.2
Carrying of Original Vehicle documents	Yes	318	74.5
	No	109	25.5
Wear helmet or Seatbelt while driving	Yes	371	86.9
	No	56	13.1

Association of knowledge, practice and ocular manifestations of road safety measures among rural population with socio-demographic profile

Association of knowledge, practice and ocular manifestations of road safety measures among rural population with socio-demographic profile, it was significantly associated with age group (P<0.008), education (P<0.003), knowing of driving of vehicle (P<0.001), duration of driving of vehicle (P<0.008), possession of vehicle in family (P<0.000), Insurance of vehicle (P<0.000), having driving license (P<0.000) and factors which are not significantly associated were sex (P<0.407)), occupation (P<0.192), spectacle use (P<0.38), visual acuity (P<0.710), vision test (P<0.085), history of previous accidents of study participants (P<0.944), timing of accidents (P<0.359), history of previous accidents in family (P<0.654). (Table-III)

Table III
Association of Socio-demographic profile with knowledge, Practice and ocular manifestations of road safety measures

Variable	Sub-variable	Correct	Incorrect	P Value
Age Group	15-30 Years	153	142	X^2 =11.91
	31-45 Years	59	29	P<0.008
	46-60 Years	21	13	
	>60 Years	2	8	
Sex	Male	169	131	X^2 =0.687
	Female	66	61	P<0.407
Education	Matric	125	127	X^2 =11.73
	Intermediate	73	53	P<0.003
	Graduation	37	12	
Occupation	Worker	55	35	X^2 =1.70
	Non-worker	180	157	P<0.192
Do you know driving of vehicle	No	77	94	X^2 =11.539
	Yes	158	98	P<0.001
If Yes, duration of driving	< 2 Years	84	48	X^2 =11.96
	2-5 Years	26	17	P<0.008
	> 5 Years	48	33	
Do you use spectacles	Yes	28	10	X^2 =0.7572
	No	310	79	P<0.38
Visual acuity	Good vision	308	88	X^2 =0.1377
	Impaired vision	25	6	P<0.710
Possession of vehicle in	No	33	61	X^2 =19.345

family				
	Yes	202	131	P<0.000
Insurance of vehicle	No	94	130	X^2 =32.529
	Yes	141	62	P<0.000
Do you have driving License	No	154	162	X^2 =19.503
	Yes	81	30	P<0.000
Vision Test during DL	Yes	15	8	X^2 =2.965
	No	72	16	P<0.085
History of previous accidents of Respondents	No	194	159	X^2 =0.005
	Yes	41	33	P<0.944
If Yes, Timing of accidents	8am-4pm	17	15	X^2 =3.219
	4pm-12am	11	12	P<0.359
	12am-8am	14	5	
History of Previous accident in family	No	168	141	X^2 =0.201
	Yes	67	51	P<0.654

Discussion

The present study was conducted on knowledge, practice and ocular manifestation of road safety measure among rural population of Unnao district of Uttar Pradesh. Most of the participant in our group were males (70.3%) whereas Gopalakrishnan S conducted study on a public health perspective of road traffic accidents showed the number of males were 73% [4]. In our present study, there are 29.5% female participants whereas study conducted by Singh SK on road traffic accidents in India: Issues and challenges found 26.9% female and number of people above 60 years who participated were about 2.3% whereas in similar study conducted by Singh SK on Road Traffic Accidents in India: Issues and Challenges shows the percentage to be about 8.4% [5]. In the present study, 32.8% are using electronic gadget while walking, driving and running whereas Swami HM conducted study on traffic rule violations by School Children conducted by Road Safety Awareness and Practices among Children get almost similar result of 22.9% [7]. In the similar study the validity of driving license is of 6 months of most of the people i.e. around 79.2% whereas in the study carried out by ministry of road transport and highway government of India under the article titled as road accidents in India 2019, the number of people holding a valid driving license is about 72% [13]. In the present study, 74.5% of people carried original vehicle documents whereas study conducted by Shetty RS et al on road safety and the community, an awareness survey among the coastal population of Karnataka found 84.5% carrying vehicle documents [14]. In the similar study, 85.7% of people are using zebra line while crossing road whereas study conducted by Sucha M on pedestrian habits while crossing the road at a former zebra crossing get a percentage of 87% [15].

In the present study, 11.5% of participants are graduation and above whereas study conducted by Tharumaraj M et al on epidermiology study of road traffic

accidents among patients admitted in a tertiary care hospital in Puducherry found 18% participant are graduation and above and participants who were worker in occupation was 21% whereas study conducted by Tharumaraj M et al on epidemiological study of road traffic accidents among patients admitted in a tertiary care hospital in Punducherry found 11% of participant are worker which is less number from our study. In the present study also found minimum number of accidents took placed between 8am-4pm (43.2%) and 12am-8 am (25.6%) whereas study conducted by Tharumaraj M et al on an epidemiological study of road traffic accidents among patients admitted in a tertiary care hospital in Puducherry found almost similar result of 17% [16]. It is considered that wearing helmet or seatbelt while driving is an effective intervention to save a lives. According to our present study conducted in 427 people 86.9% wear helmet or seatbelt and 13.1% of the participant never used helmet or seatbelt while driving whereas study conducted by Dadgarmoghaddam M et al on seatbelt and helmet use and associated factor in metropolitan area mention almost similar result of 84.6% and 15.4% respectively never used helmet or seatbelt while driving [17].

In the present study, 97.2% of the participant knew that 108 is the national ambulance service number which is to dial in case of a medical emergency whereas study conducted by Modi PD et al on public awareness of the emergency medical services in Maharashtra, India where it was 76.2% [18]. In the present study, 67% know the permissible alcohol limit which is 30 mg/100ml of blood for India it varies from country to country whereas study conducted by Kumar S, on a survey on a awareness of road safety among drivers on NH -1 between Panipat toll to Namasty chowk Karnal, India found almost similar result of 69% [19]. Majority of participants in our present study, 91.1% of people get awareness on traffic signal light whereas study conducted by Rahman R on road safety awareness among university student case study at universiti Tun Hussein Onn Malaysia, Johor shows almost exactly similar result 91% [20].

Conclusion

Majority (55%) had satisfactory level of knowledge and practice on road safety. Majority of the participants (69.1%) were in the age group of 16-25 years, 70.3% were male 59% had completed matric level of education. Regarding use of spectacles, only 8.9% were using the spectacles and 92.7% had good vision whereas 7.3% had impaired vision. The study revealed age group (p value=0.008), education (p value = 0.003), Insurance of vehicle (p value=0.000), and driving license (p value=0.000) is significantly associated with knowledge and practice on road safety.

Recommendation

Though the government has directed attention to awareness programs, it needs to collaborate state transport departments and traffic police, which are the local licensing and enforcement authorities, into conducting testing and training programs if some measure of success is to be found in reducing the number of road casualties. A secured national data bank should be developed. Make better use of the available data, increase the comprehensiveness of road crash data and improve the technical capacity to analyze data and identify issues.

Limitation

Majority of the age group in our study is in age group of 16-25 Yrs and were male. Our study mainly focuses on rural areas, we could have taken some participants from the urban area as well. Due to paucity of time, we have included less number of participant's in our study.

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