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ROAD SAFETY IN PAKISTAN: EXAMINING PERCEPTIONS AND COMPLIANCE WITH TRAFFIC REGULATIONS

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Abstract:
The study examine the perceptions and level of compliance with traffic regulations among the population residing in Hyderabad city, Pakistan. From August to December 2023, a cross-sectional research with participants of various ages, genders, and driving license statuses was carried out. A written, structured questionnaire was used to gather information about the attitudes and behaviors of the participants. The bulk of the 400 participants, according to the data, were male students. Of the participants, around half thought that bad road conditions had a role in causing traffic accidents (RTAs). The likelihood that driving without a legal license is an infraction was higher among females. The errors and exposure to harm domains showed a significant difference, whereas the violation and lapses domains showed no significant difference. Overall, the study found that participants showed a contemptuous or non-compliant attitude toward traffic rules while having sufficient information, which might normalize dangerous conduct and result in injuries or fatalities on the road.

Keywords: Behavior, Driving License, Perception, Road Traffic Accidents

INTRODUCTION:

Road traffic accidents (RTAs) are multi-factorial incidents that often stem from several factors, such as negligent driving, road conditions, and vehicle condition.[(1)] These injuries constitute a major but underestimated pandemic, now ranking among the leading causes of lost life years due to disability. Based on World Health Organization (WHO) estimates, RTAs rank 10th among the top causes of mortality in nations with low or middle incomes including Pakistan.[(2, 3)] While it becomes the leading

cause of mortality among persons aged 15 to 29 years. Contributing factors including over speeding, driving under influence of alcohol or psychotropic substances, abstracted driving, non-strapping of seatbelts are acknowledged as the most prevalent adolescent driving behaviors related with accidents and serious injury collisions. The incidence of these factor may varies by gender, making gender an important factor in understanding the developing problem of juvenile road safety. [4]

Road safety is a major issue in Pakistan, which has a growing a economic as well as social impact. Pakistan is one of the most populous nations where RTAs are quite widespread, and the situation is getting worse by the day.[1, 5] The country is amongst the Asia's top 50 countries with high RTA related mortalities. Government of Pakistan acknowledged and adopted its first National Road Safety Strategy (2018-2030) in 2018 reported that, in every five minutes a person dies due to RTA in Pakistan. Furthermore, it also predicted that in the absence of fresh initiatives to improve road safety, there would be an increase of around 77% in 2020 and 200% by 2030. An estimated three percent of the GDP is lost annually by the economy as a result of repairs for car damage and injuries brought on by traffic accidents. Whereas, WHO has estimated that Pakistan lost over 30,000 people to traffic accidents per year making it 20 out of every 100,000 people die in traffic accidents annually.[6, 7] It is estimated that 67% of RTAs in the country may be attributed to human errors, followed by the poor infra-structure (28%) and unfit vehicles (5%).[1, 8, 9] Studies have reported a significant relationship between the positive attitudes and reduced RTAs. Furthermore, studies also concluded that younger drivers (< 30 years) are usually involved in 60% of the accidents while over 80% of the RTAs are related with the human factors. The findings the studies exhibited that the variables age & educational level had significant relationships with RTAs.[1, 10-12] Human practice is a major or contributing risk factor in 90% to 95% of road traffic accidents caused by speeding, seatbelt failure, and distraction.[3, 13, 14]

Unsurprisingly, traffic accidents rank second, sixth, and twelfth in Pakistan in terms of disability, overall healthy-life-year losses, and premature fatalities, respectively. The current study is motivated by the worrying data that point to the need for initiatives aimed at considerably improving road safety. Keeping in view this study was designed and conducted in one of the populous city in Pakistan with an objective to examine the perceptions and level of compliance with traffic regulations among the population residing in Hyderabad city, Pakistan.

METHODOLOGY:

Study site and population:

This cross-sectional study was conducted on commuters residing in areas of Hyderabad city, Pakistan. Hyderabad is the second largest and populous city in Sindh after Karachi. It is the densely populated and demographically the population is Urban while over half (52%) of population is comprised of male gender.

Duration: Study was carried out from August-December 2023

Inclusion and exclusion criteria:

Participants aged 18 years and above belongs to either gender, permanently residing in selected areas of Hyderabad city, Sindh, Pakistan for over 1 year, with or without driving license, who use to ride bike, drive car, rickshaw, loaders etc. and gave consent of participant was included in the study.

Sampling and Data collection:

Sample size of **400** was determined using following formula;

$$\mathbf{n= N/ [1+N (e)^{2}]}$$

Where **N** was the total population aged 18-64 years in Hyderabad city, Pakistan (according to the census 2018), **e** was margin of error at confidence interval of 95%. Cluster sampling technique was applied for the selection of 5 administrative units while participants were selected through non-random consecutive sampling technique. Semi-structured written questionnaire was developed after reviewing relevant literature for the collection of information. The questionnaire is divided into four

sections. The first part comprise of the socio-demographic details of the participants. Second part consists of knowledge related questions about the road safety. Third part contains the questions for evaluating the attitude of general population towards the road safety rule and regulations. While the last part having questions related to driving practices of participants. For getting more in-depth regarding the practice, Manchester Driver Behavior Questionnaire (MDBQ) was also employed.[15]

Ethical consideration and Consent

The study conforms to the mentioned concepts by the Declaration of Helsinki. While the ethical clearance and approval was sought from the Ethical review committee of Liaquat University of Medical and Health sciences Jamshoro. The informed consent was sought from all the participants prior to collection of data.

Statistical Analysis:

The collected information was compiled and analyzed using SPSS ver. 24. Descriptive categorical data was presented as frequency and percentages while analyzed using Chi-square ($\chi 2$) test. Whereas, quantitative variables, were presented as mean ± SD and analyzed using Student t test to compare the means between different groups. For predicting the relationship between awareness, attitude and practicing with road safety rule, Multiple Linear Regression model was used. Level of significance was set at $p<0.05$.

RESULTS:

Total 400 participants involved in this study, with the mean age of participants was 22.6± 1.2 years. Most (46.0%) of them belongs to age group 22-29 years while 64.7% of them were male compare their counterparts. Nearly half (48.0%) were students, 13.0% had no any formal education while 45.0% were using motorbikes as the mean of transportation, 28.5% don't have any driving license, 39.2% were exposed to injuries in last one year of which 20.4% required medical care. (Not shown in tables)

Table I is mentioning the gender wise knowledge of road safety rules among study participants. The knowledge level of study participants regarding road safety rules and regulation was considerably significant especially in case about the speed limit on highway/ motorway (93.7%). seat-belt importance for car driver's safety (86.0%), and importance of helmet motor biker's safety (83.7%). Whereas, only 12.5% of them know about the side to walk on road in the absence of pavement and few of them (37.5%) responded correctly for the penalty fee for driving without license. A statistically significant difference ($p<0.05$) between male and female knowledge for questions related to vehicle overtaking side, compulsory use of seat belts for car drivers, compulsory use of helmet for bikers, ideal side for walk on roads, meaning of pedestrian crossing, using mobile phone, maximum penalty for driving without license and side to walk on roads without pavements. (Table I)

Table I: Gender wise knowledge of road safety rules among study participants (n=400)

	Reply	Male 259	Female 141	p-value
Ideal lane to overtake the vehicle	- Correct	119	99	**0.000**
	- Incorrect	140	42	
Average driving speed limit in the city	- Correct	160	81	0.397
	- Incorrect	99	60	
Use of seat-belt is compulsory for car drivers	- Correct	216	128	**0.042**
	- Incorrect	43	13	
Use of helmet is compulsory for bikers	- Correct	230	105	**0.000**
	- Incorrect	29	36	
Ideal side to walk on roads	- Correct	140	130	**0.000**
	- Incorrect	119	11	
Speed limit in Motorway / highway	- Correct	245	130	0.344
	- Incorrect	14	11	

Traffic signal light colour Yellow denotes	- Correct	200	119	0.088
	- Incorrect	59	22	
Pedestrian crossing	- Correct	183	131	**0.000**
	- Incorrect	76	10	
Maximum penalty for driving without driving license	- Correct	130	20	**0.000**
	- Incorrect	129	121	
Using mobile phone during driving is the reason of distraction	- Correct	179	132	**0.000**
	- Incorrect	80	09	

Higher proportion of participants, showed agreement with other road safety rules, such as talking on cell phone while driving is the reason of distraction (77.7%), majority (65.7%) of female believe that driver may become distracted by loud music in the automobile. Male participants reported significantly higher knowledge (60.4%) that one should stop when it is safe to yield to an ambulance with a flashing light. However participant's awareness of some road safety measures such as left should be used for normal speed driving (26.5%), and overtaking of vehicle from right-hand lane only (26.2%) is considerably low. Among the mandatory road signs, it was observed that that 51.0% correctly interpreted, while 57.4% correctly interpreted the warning signs and 67.0% correctly interpret informatory signs. Based on data, 248 (62.0%) have the adequate level of knowledge related to the road traffic safety rules and regulations while 152 (38.0%) have inadequate knowledge level.
Participants were inquired about the cause of RTAs in Hyderabad, Pakistan to which nearly half of participants reported that bad conditions of roads are responsible for the RTAs. However, only 14.3% reported that non-compliance with the law by drivers is responsible for RTAs. (Figure I)

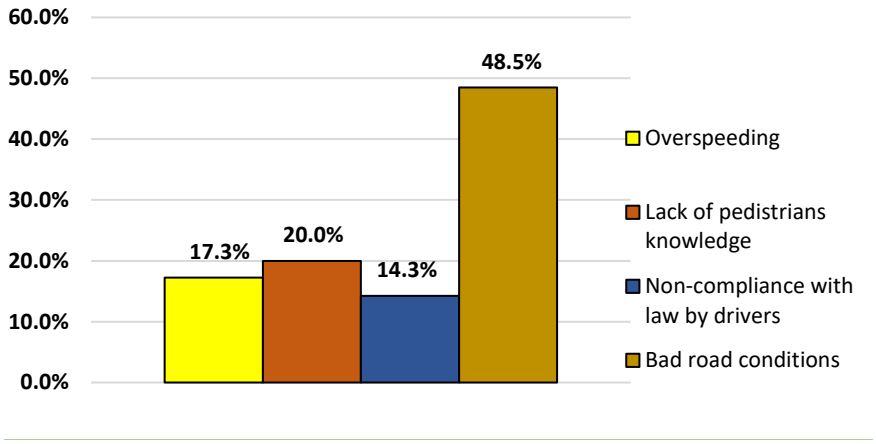

Figure 1: Participants believe about the cause of RTAs in Hyderabad, Pakistan

Most (88.7%) participants indicated that RTIs could be prevented, whereas, using a cell phone while driving increased and riding motorbike without helmet increases the risk of injury (54% and 61.2% respectively). Both the previous questions were replied significantly higher and positive by female participants compared to their counterparts ($p<0.05$). Over two-third (65.7%) participants believe that seat belts are effective in reducing the injuries and RTA related complications.
Over half (57.0%) of the participants stated that driving a vehicle without a valid license is an offense, significantly higher ($p<0.05$) response was higher among female compared to male participants. More than two-third (65.5%) of the participants replied that there is no harm in taking risks in traffic while in hurry while 67.2% strongly agreed that driving in accordance with traffic rules might feel childish sometimes. This show markedly negative attitude of participants (both male and female) towards safety precautions.
Significantly higher difference in attitude was demonstrated among the female participants ($p<0.05$) towards questions related to over-taking from left as a bad practice and illiteracy as well as irresponsible behavior as the main reason for increasing RTAs.

Surprisingly only 90.3% participants responded that traffic wardens aren't effectively performing their duties to implement road safety rules while 85.3% believe that Government led campaign for road safety awareness don't have any positive impact on population. (Table II)

Table II: Participants attitude towards road safety measures gender wise

Questions	Male 259	Female 141	p-value
RTIs can be prevented	231 (89.2%)	124 (88.0%)	0.70
Cell phone use during vehicle driving increase the chances of accidents and injuries	128 (49.4%)	88 (62.4%)	**0.01**
Motorbike riding without a helmet increases the chance of an injury	141 (54.4%)	104 (73.7%)	**0.00**
Using seatbelts can reduce injuries and complications of RTA	163 (63.0%)	100 (71.0%)	0.10
Driving vehicle without driving license / valid license is an offence	129 (50.0%)	99 (70.2%)	**0.00**
While in a hurry, there is no harm in taking risks in traffic	174 (67.2%)	88 (62.4%)	0.33
Driving in accordance with traffic rules might feel childish sometimes	176 (68.0%)	93 (66.0%)	0.16
Overtake from left is not a good practice for the drivers?	140 (54.0%)	103 (73.0%)	**0.00**
Illiteracy and irresponsible behavior are lethal sources of road accidents in Hyderabad	154 (59.4%)	99 (70.2%)	**0.03**
Traffic wardens are effectively performing to implement road safety rules	22 (8.5%)	17 (12.0%)	0.25
Government led campaign have positive impact	40 (15.4%)	19 (13.5%)	0.28

The average score for the participant's driving behaviors varied from 0.64 ± 1.12 (disregarding speed restrictions late at night or early in the morning) to 2.51 ± 6.30 (crossing a junction knowing that the traffic lights have already gone red).Among male, those living in rural areas, non-educated, and people without a driver's license, the mean score for violation was somewhat higher. When it came to errors and lapses, the scores of the rural inhabitants were much higher. Non-educated and people without a driver's license also scored higher. Higher scores were discovered among individuals who had been exposed to injuries, despite the fact that there was no statistically significant difference between the mean scores of the violation and lapses domains and exposure to injury but statistically significant difference between error and exposure to injury. (Table III)

Table III: Participant's behavior and practices assessment and their relationship with other variables using Manchester Driver Behavior Questionnaire (n=400).

	n	Error	p-value	Violation	p-value	Lapses	p-value
		Mean ± SD		Mean ± SD		Mean ± SD	
Gender							
• Male	260	17.2±6.5	0.622	25.5 ± 11.5	0.091	17.5±5.8	0.347
• Female	140	17.5±5.4		21.1 ± 6.4		18.6±3.4	
Residence							
• Urban	296	16.3±4.7	**0.001**	23.6 ± 10.7	0.231	17.1±3.9	**0.001**
• Rural	104	21.7±3.2		24.9 ± 8.1		19.8±7.1	
Driving License							
• Yes	286	16.1±6.2	0.105	23.4±8.6	**0.040**	17.4±4.3	**0.015**
• No	114	17.2±5.9		25.3±7.7		18.7±5.9	
Exposed to injury							
• Yes	157	18.5±6.3	**0.007**	25.5±12.2	0.177	18.3±6.2	0.179
• No	243	16.8±6.1		24.1±8.5		17.6±4.2	
Educated							
• Yes	348	16.1±6.3	**0.013**	20.4±3.3	**0.001**	16.8±3.9	0.394
• No	52	18.4±5.3		23.1±2.2		17.3±4.2	

Different linear regression models were employed to estimate the influence of driving education and practice on participant attitudes towards traffic control and to identify characteristics that contribute to participant accident rates. Tables IV and V illustrate the fitted models (Models I and II) and findings. The knowledge and practice factors were found to be significant ($p<0.05$) and impacted

drivers' attitudes towards traffic laws. Participant's knowledge and practice were likewise connected with the incidence of traffic accidents ($p<0.05$). (Table IV and V)

Table IV: Regression Model-I for predicting impact of awareness and practice towards attitude

	β	S.E (β)	t	p-value
Intercept	7.394	0.249	29.610	**0.001**
Practice	-0.093	0.028	-3.438	**0.002**
Awareness	-0.120	0.039	-2.989	**0.004**

$YATD = \alpha+\beta1\ XPRC+\beta2\ XKNW$

Participant's attitude = 7.394– 0.093 – 0.120

Table V: Regression Model-II for predicting effect of awareness, attitudes and practices towards traffic accident

	β	S.E (β)	t	p-value
Intercept	3.230	0.489	6.589	**0.001**
Practice	-0.181	0.041	4.371	**0.001**
Awareness	-0.130	0.070	-1.825	**0.003**
Attitude	-0.012	0.098	-0.137	0.892

YR.ACID = α+β1 XPRC+β2 XKNW+β3 XATD

Road Accidents = 3.230 – 0.181– 0.130– 0 .012

DISCUSSION:

Road traffic accidents remains one of the major public health problems with high case fatality rate. Promoting road safety awareness is a critical first step and the most important aspect that plays a key role in the safety of commuters by preventing traffic accidents.[16]The current study was carried out to examine the perceptions and level of compliance with traffic regulations among the population residing in Hyderabad city, Pakistan.

Having license for riding motorcycle, driving car or any other vehicle is mandatory worldwide. Driving without license is considered as a serious violation of traffic rules. In terms of the maximum penalty for driving without driving license, roughly 37.5 percent of study participants were accurate. The findings contradicted those of Sharma S et al. while consistent with Senthil V et al.[17, 18] In the present study, 79.5% of them knew that the right side of the road must be used to overtake the vehicle. Consistent findings reported by Cacodcar JA. et al. and Basavaraju et al. while inconsistent findings were stated by a study done by Jothula et al. reported only 46.9% of their study participants knew about the correct side of overtaking vehicle.[19-21] Moreover, another Pakistani study by Riaz I et al. also reported that 47.0% of their participants believe that overtaking from left is not a good practice for the drivers.[22]

Only 39.2% of participants in the present study knew which side of the road should be used by the pedestrians, which might be a key cause to the high occurrence of RTAs among pedestrians. Singh et al. also reported that only 18.0% of their participants knew about the correct side to walk on road.[23] On the contrary, Ranjan et al. found that 54.2% of their participants knew which side of the road to drive on to prevent accidents.[24] As given the task of recognizing road signs, 67.7% successfully identified ≥ 3 signs, however in a research conducted by Jothula et al., 65.1% properly comprehended traffic signs.[21] Although though more than half of the participants in the current survey had acceptable understanding of road safety legislation, there is still a need to make people more knowledgeable about road safety measures as RTA increases. Females had considerably greater general knowledge and awareness of street security measures than males ($p<0.05$). Jothula et al., and Cacodcar et al. also demonstrated comparative findings that are consistent with our study findings.[20, 21] This may be due to the fact that females may have superior execution in our study due to daily exposure to traffic in metropolitan areas and better presentation to media sources.

Nearly half (48.5%) of our study participants reported that bad conditions of roads are responsible for the RTAs. Whereas, only 17.3% reported that over-speeding and 14.3% reported that non-compliance with the law by drivers is responsible for RTAs. These findings are consistent with those reported by Helal et al. 2018.[25]

Surprisingly, in our study only 58.0% of participants having driving license. Cacodcar JA et. al. reported that 67.7% of their participants holding a valid driving license while 93.0% of the participants of study by Riaz I. et al. 2018 have driving license.[3, 20, 22]

Using a cell phone is a significant risk factor for road traffic accidents. Phanindra et al. reported over half of their participants utilized a cell phone while driving/riding.[26] Conversely, in survey performed by Das et al, 49.0% of respondents used a cellphone while driving.[27] In our study over half (54.0%) participants believe that use of phone while driving results in accidents. Despite that majority 65.0% of study participants use cellphone while driving.

Among the four-wheel users, 57.7% wore their seatbelts while driving car. This study was equivalent to Ramya et al. Das et al. and Emmily et al. Another study, Ratna et al, discovered that 76% of people utilized seat belts when driving. [27-30]

Motorcycles have become increasingly popular in our country in recent decades, as they are a less expensive and speedier mode of transportation. Unfortunately, this two-wheeled vehicle is unstable, and because helmet use is quite low in Pakistani motorcyclists, it increases the likelihood of RTAs and endangers the rider's life. Nonetheless, there has lately been progress in this direction, with helmet wear being mandatory for all motorbike drivers and passengers in Hyderabad. In the present survey, the practice habits of participants using two-wheeler were observed. Surprisingly, only 16.5% of participants reported that they consistently wear helmet while riding motorcycle. Consistent finding is reported by another Pakistani study by Ikram M. et al. Moreover, conclusion of it is similarly analogous to other studies undertaken in other countries.[31]

It may be stated that in spite of having information there is diversity in practice which is primarily subjective and founded on the values established by the handlers. This demonstrates that, while the majority of participants had strong awareness, they did not practice it, indicating a large knowledge-practice gap that requires attention to maintain road safety.

By applying the MDBQ for practice among the participants, we demonstrated that driving practices of participants was ranged in mean score from 0.68 ± 1.12 to 2.39 ± 6.31. Study carried out in Qatar reported the higher reported the higher mean score (1.06 ± 1.31 to 2.25 ± 1.74) compared to our study revealed that participants' high level of knowledge about road safety was not mirrored in their actual driving behavior, nor was it linked with driving without a license. Moreover, our findings stands in stark contrast to Iranian study reported a substantially lower means (0.443 ± 0.736 to 1.24 ± 1.072) compared with our study.[15] Furthermore, our findings are consistent with those reported by Helal et al. [25] Even though male participants reported somewhat fewer errors and more infractions than women, there was no statistically significant correlation between gender and driving practices. However, the questionnaire's 3 domains did not appear substantially connected to the injury exposure, additional studies determined that either violation alone or both violation and errors had a high correlation with involvement in an accident in the preceding year.

CONCLUSION:

The study concludes that despite their adequate understanding, participants exhibited a dismissive or non-compliant attitude towards adhering to traffic rules and regulations. Such an attitude likely normalizes risky behavior and contributes to injuries or loss of lives on the roads. In essence, there appears to be a gap between participants' understanding of road safety issues versus their propensity to act prudently and follow recommended safety practices when using roads. Their behaviors did not match reported attitudes, predisposing both drivers and pedestrians to traffic accidents. This emphasizes how crucial it is to enforce current regulations more strictly in order to potentially curtail dangerous conduct.

It seems that appropriate interventions seems crucial to promote safer mobility. Simply increasing awareness may not suffice without also targeting social and cultural factors enabling unsafe practices.

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