Original Article

A Cross-sectional Study of Road Traffic Safety Knowledge, Attitude, and Practice among Emergency Department Staff

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Abstract

Background and Purpose: Emergency Department (ED) staff are frequently faced with road traffic injury victims and also play role as various road users. This study was conducted to investigate the knowledge, attitude, and practices of ED staff towards road safety at referral trauma hospitals of Tabriz.

Materials and Methods: This cross-sectional study was conducted in 2020 in the referral trauma hospitals of Tabriz. Data were collected using a standard questionnaire. Census sampling was used to select the participants. Descriptive statistics, Pearson's correlation test and logistic regression model were used for the data analysis using SPSS Software.

Results: The mean score of the ED staff in traffic safety knowledge, attitude and practices was 9.73 ± 2.28 out of 15, 95.3 ± 11.4 out of 118, and 61.3 ± 8 out of 76, respectively. The staff's traffic safety knowledge was associated with their attitude and practices. Moreover, the univariate logistic regression modeling results revealed that participants' traffic safety attitude (OR= 0.96 (95% CI= 0.93-0.99)) and practices (OR= 0.95 (95% CI= 0.91-0.99)) were, independently, correlated with a reduction in road traffic accidents.

Conclusions: The ED staff's attitudes towards traffic safety had a positive correlation with their practices and also accident experience. Nonetheless, after adjusting the data in terms of knowledge and attitude, road traffic safety practice was not associated with participants' accident experience. It is crucial to consider road safety education in colleges to promote safety knowledge of graduate individuals which will have conspicuous results in risk reduction.

Keywords: Emergency Department; Traffic Safety; Knowledge; Attitude; Practices

1. Introduction

Road Traffic Injuries (RTIs) are among the most challenging public health issues around the world. An annual of 1.35 million people lose their life due to these injuries, and around 50 million experience RTIs (1). Developing countries have a greater share (90%) of RTIs' mortality and casualties (2, 3). Iran is among the countries with a high rate of RTI mortality (20.5 in 100,000 of the population) with an annual prevalence of 17,000 (1, 4). These injuries have enormous social, economic, and psychological consequences at individual, local, and national levels (3, 5). The World Health Organization (WHO) had encouraged countries to employ their best to deal with RTIs in the Decade of Action for Road Safety (2011-2020) through a global plan based on five pillars for decreasing these casualties (6). Safe road users is one of the pillars concerning knowledge, attitude, behavior and errors of road users as driver, pedestrian and motor or cycle rider in traffic environment (7). According to research, human errors are the cause of 64-95% of road traffic accidents in developing countries (8).

Road user behaviors are one of the main risk factors contributing to crashes. Studies suggest that risky behaviors are the main cause of road traffic crashes that are correlated with knowledge and attitude (9-11). Nabi et al. (2007) reported that drivers' attitudes about road traffic safety issues are associated with their driving practices, as individuals with a negative attitude are more likely to employ risky behaviors (12). In a study carried out in Norway (2011), public behavior in traffic was found to be influenced by the attitudes toward road safety (13). Studies in African and Asian countries, however, have shown that drivers' practices are weakly correlated with their road safety attitudes (14). Similarly, a systematic review revealed that post-license driver education does not have positive effects on driving behaviors and preventing accidents (15). In a knowledge, attitude, and practices (KAP) study, Mirzaie et al. (2014) showed that the positive attitudes of drivers can lead to safer behaviors and lower road traffic accidents. They reported attitudes as the most influential factor in reducing road traffic accidents (16). Behavioral theories, such as the Theory of Planned Behavior (TPB), assume that individuals' attitudes can predict their practices and behaviors (17, 18). The safe behaviors of road users are a result of improved knowledge and positive attitudes toward road safety. One of the groups most involved in RTI management is comprised of Emergency Department (ED) staff. ED staff have a vital role in post-crash responses and providing effective care to RTI victims. In addition, they are themselves road users as drivers, pedestrians, etc. In a qualitative study, Haghparast Bidgoli et al. (2010) showed that ED staff's knowledge and skillfulness on specific trauma occasions facilitate effective emergency services provided to road traffic victims (17). The present study was conducted to investigate the knowledge, attitudes, and practices of ED staff toward road safety at referral trauma hospitals in Tabriz, Iran.

2. Methods and Materials

This cross-sectional study was conducted in 2020 in Tabriz, the capital of East Azerbaijan Province of Iran, at Imam Reza and Shohada hospitals as referral centers for trauma in the northwest of Iran. Containing 792 active hospital beds, Imam Reza Hospital is the largest hospital of the

Province that has the capacity of serving more than 3.7 million population. Shohada Hospital is also an orthopedic hospital with 265 active hospital beds. Both studied hospitals are university affiliated and public hospitals.

The Road Traffic Safety KAP Survey instrument, which was validated by Mirzaie et al. (2014), was used for data collection (16). The tool includes 24 items for assessing road safety knowledge (4-scale Likert), 26 items for road safety attitude (5-scale Likert), and 19 items for traffic safety practices (4-scale Likert). The reliability of the tool was approved through Cronbach's alpha= 0.72. Based on the questionnaire guide, to calculate the knowledge score, each right answer was multiplied by 4 which was 96 for total knowledge (24 items). The scoring of Attitude and Practice questionnaires was done as allocating scores based on Likert items as 1 (completely disagree) to 5 (completely agree) for attitude, and 1 (never) to 4 (always) for practice items. The total score was calculated as the sum of each section score. Total higher score demonstrates a safer KAP. Participants' demographic details encompassing age, sex, education, driver's license status, occupation, and driving frequency per week were also taken.

Census sampling was used to select the 230 staff working at Imam Reza and Shohada hospitals' emergency departments, including physicians, nurses, and technicians. The inclusion criteria were at least three months of work experience in the ED and a minimum of high school diploma. After briefing the participants on the study objectives, they filled out the questionnaire. Individuals who had less than three months working experience in ED were excluded.

Descriptive statistics, including frequency, mean and standard deviation were used to analyze the data. The data normality was calculated using the Kolmogorov-Smirnov test. A univariate logistic regression was first run, and the variables with p-values ≤0.2 were selected to be included in the multiple logistic regression model. Age and driving frequency were two variables included in the model. Logistic regression model was applied for modeling in four steps, as three models were done through entering each of Knowledge, Attitude, and Practice scores separately, and then final model was run by entering all three components (KAP). The variable of "involvement in an accident" was determined as dependent variable in logistic regression model. The Hosmer-Lemeshow test was also used to check the model calibration. The collected data were then analyzed using SPSS Software, 18.

3. Results

Overall, 206 ED staff participated in the study (response rate= 89.5%). About 60% of the participants were female, and the mean age was 35.06±7.4. Nearly 40.3% of them were single, and 20.9% (n=44) had been in an accident during the previous year. The most prevalent level of education was B.Sc. (61.2%). Table 1 presents participants' demographics details.

Table 1. The ED staff's demographic details

Variable		Frequency percent
Gender	Male	40.6
	Female	59.4
Marital Status	Single	42.3
	Married	57.7
Education	High school diploma	23
	B.Sc.	61.2
	M.Sc. and above	15.8
Driver's License	Yes	99.5
	No	0.5
Date license was obtained	<3 years	16.2
	3-5 years	19.6
	6-10 years	27
	>10 years	37.3
Driving frequency per week	Every day	36.1
	2-3 days	25.7
	4-6 days	11.9
	1 day	4
	<1 day per week	22.3
Having been in a road accident in the previous year	Yes	20.6
	No	79.4
Insurance Type	Social Security Organization	88.1
	Self-insured	2.6
	Public Health Insurance	9.3

The mean scores of the ED staff's traffic safety knowledge, attitude and practices were 9.73 ± 2.28 out of 15 (64.8 out of 100), 95.3 ± 11.4 out of 118 (80 out of 100), and 61.3 ± 8 out of 76 (80 out of 100), respectively. The correlation between these variables was investigated using Pearson's correlation coefficient (Table 2).

Table 2. Pearson's Correlation among Knowledge, attitude and practice scores

	Variable	Knowledge	Attitude	Practices
Knowledge	Pearson's Correlation	1	.356[**]	.333[**]
	Sig. (2-tailed)		.000	.000
	N	211	211	211
Attitude	Pearson's Correlation	.356[**]	1	.601[**]
	Sig. (2-tailed)	.000		.000
	N	211	211	211
Practices	Pearson's Correlation	.333[**]	.601[**]	1
	Sig. (2-tailed)	.000	.000	
	N	211	211	211

** Correlation is significant at the 0.01 level (2-tailed).

The t-test results showed that the road safety attitude and practice mean score differed significantly between those who had been in a road traffic accident (RTA) during the previous year vs. those who had not (P<0.05).

The logistic regression modeling showed a significant relationship between driving frequency per week and accident experience. The highest OR pertained to the driving frequency of 4-6 days per week (OR = 12.9). The traffic safety knowledge score was not significantly related to RTA experience (Table 3).

Table 3. The logistic regression modeling participants' knowledge with accident experience

Variable	B	S. E.	Sig.	Exp (B)	95% CI for Exp (B) Lower	Upper
Age	-.028	.025	.263	.972	.926	1.021
Knowledge	.037	.082	.653	1.037	.884	1.217
Driving frequency per week						
Every day	1.223	.674	.070	3.398	.906	12.738
4-6 days	2.557	.744	.001	12.901	2.999	55.496
2-3 days	1.490	.695	.032	4.439	1.137	17.339
1 day	1.519	1.018	.136	4.568	.621	33.570
Less than 1 day (reference)						
Constant	-2.030	1.256	.106	.131		

Similar results were emerged when running the model by entering road safety attitude score, as the highest OR was related to the frequency of driving 4-6 days per week (OR = 13.2). In other words, the chance of involvement in an accident was 13 times higher in individuals who drive 4-6 days per week than those who drive less than one day per week. The attitude score also showed significant association with RTA (p<0.05). The OR of attitude was 0.96 (95% CI = 0.93-0.99), showing that one point of increase in traffic safety attitude decreases RTA by 4%.

The logistic regression modeling by entering traffic safety practice score, also revealed the highest OR for the driving frequency variable, item of driving 4-6 days per week (OR = 12.6). In addition, the practice score was significantly related with RTA experience, with OR= 0.95 (95% CI= 0.91-0.99).

Examining the interactions of traffic safety knowledge, attitude and practice through the multiple logistic regression model showed that driving frequency per week had a significant relationship with RTA experience (P<0.05). The OR for driving for 4-6 days and 2-3 days in the week were obtained to be 2.55 and 1.40, respectively. This meant that driving for 4-6 days and 2-3 days can increase the odds of involvement in an accident at 2.55 and 1.40 times, respectively, in comparison to less than one day of driving in the week. Moreover, only the attitude score was close to significance (P=0.06) (Table 4).

Table 4. The multiple logistic regression model

Variable	B	S. E.	Sig.	Exp (B)	95% CI for Exp (B) Lower	Upper
Age	.001	.027	.962	1.001	.949	1.057
Driving frequency per week						
Every day	1.095	.685	.110	2.990	.780	11.459
4-6 days	2.556	.759	.001	12.886	2.912	57.019
2-3 days	1.404	.705	.046	4.071	1.023	16.199
1 day	1.501	1.043	.150	4.485	.581	34.623
Less than 1 day (reference)						
Practices	-.036	.029	.206	.964	.912	1.020
Attitude	-.037	.020	.066	.963	.926	1.003
Knowledge	.158	.094	.091	1.171	.975	1.407
Constant	1.523	1.712	.374	4.585		

4. Discussion

This study was conducted to assess the knowledge, attitudes and practices of trauma ED staff towards traffic safety. The participants' traffic safety knowledge was associated with their attitudes and practices. Moreover, the logistic regression results revealed that their traffic safety attitudes and practices, independently, and the frequency of driving per week were linked to a reduction in road traffic accidents.

Traffic safety knowledge was also not associated with any reductions in RTA. This finding seemed to be consistent with earlier studies, such as the study done by Beanland et al. (2006) which indicated that drivers' training was not associated with declined risk of crash and needs to be improved (19). There are some challenges in way of education for the prevention of RTAs, such as the non-utilization of specific education theories and the insufficient attention to educational content, which make any efforts less effective (20). The results of a study on drivers' KAP and its effect on RTAs in Iran revealed that, in assessing the interactions of knowledge, attitudes and practices with the rate of RTAs, knowledge was not associated with a reduction in RTAs (16); however, this finding differed from some published studies declaring that traffic safety improvement reduces RTAs (21, 22). Kumar et al. revealed a positive correlation between traffic safety knowledge and attitudes (23). Our study revealed that knowledge is correlated positively not only with attitudes but also with traffic safety practices. Nonetheless, the results of a study in Saudi Arabia showed that participants' practices are not influenced by their traffic safety knowledge (24). These inconsistencies may be due to the differences in the study tools used and also the study populations. Mirzaie et al. (2014) stated that, after omitting the effects of attitudes, traffic safety knowledge was not associated with a lower risk of RTAs (16). The present findings also support this result. Enriching ED staff road safety knowledge through formal curriculum in universities and colleges could be suggested as a strategy, especially for medical and nursing students who will serve victims of road traffic crashes. This will have conspicuous outcomes in

creating appropriate attitudes related with road safety.

The participants' safer attitudes were associated with a lower rate of RTA, as was revealed in logistic regression models. Nabi et al. (2007) reported on the results of the GAZEL cohort and showed that the participants who had negative attitudes towards traffic safety were more likely to have more risky driving practices and were at a higher risk of involvement in an RTA (12). Traffic safety attitude was introduced in previous studies as the dominant variable in the prevention of RTAs (13, 16). These findings are supported by Ajzen's notion that attitudes predict behavior through the TPB theory (18). According to the Theory of Planned Behavior (TPB), attitude has an important role in the intention to perform a behavior and the manifested behavior. Investigating the correlation between ED staff's attitudes towards traffic safety and their practices showed a positive correlation, indicating that safer attitudes will improve traffic practices. Overall, safe practices depend on safe attitudes, and attitude is placed between knowledge and practice. Ajzen declared that, to improve a specific behavior, interventions should focus on specific attitudes. Attitude can be improved not only by education, but also by other approaches, like strict law enforcements. The findings of a study in France showed that strict law enforcement has an important role in the enhancement of drivers' attitudes. Moreover, an enforced behavior can change attitudes, provided that it is sustained over time (25). The results of a study in Iran revealed that safe attitudes do not necessarily lead to safe behaviors among drivers (26). Literature also suggests that, in Iran, applying interventions to decrease RTAs

should focus on behavioral modification, especially among people with low socioeconomic statuses (27). Another significant variable contributing to decreased RTAs was the frequency of driving per week. The staff who drive more frequently were more likely to get involved in crashes. The traffic volume also varies during the days of the week and hours of the day. Higher traffic volumes increase the risk of RTA (28). Attitude is a key variable in adjusting the practice which should be addressed through various initiatives, such as institutional skill learning sessions, providing encouraging programs for staff, such as encouragement of staff who use helmet when riding motorcycle. In addition, participation of hospitals in social initiatives addressing road traffic safety will persuade staff and make them curious about the topic and this can increase their attention to their own role as road traffic user.

Limitations
This self-reported study may contain over or underestimations by the participants. Moreover, the participants were ED staff in trauma centers, which should be borne in mind when generalizing the results.

5. *Conclusion*
ED staff's attitudes towards traffic safety had a positive correlation with their practices. Nonetheless, when adjusting the effects of knowledge and attitude, their practice was not associated with their rate of involvement in RTAs. Cultural differences among various groups of a community also affect the relationship between knowledge, attitude and practices. It is crucial to consider road safety education in colleges to promote safety

knowledge of graduate individuals which will have conspicuous results in risk reduction. Moreover, providing educational and skill learning sessions on road traffic safety for staff will be useful.

Abbreviations
KAP: Knowledge, Attitude, Practice
ED: Emergency Department
RTI: Road Traffic Injury
RTA: Road Traffic Accidents
TPB: Theory of Planned Behavior
OR: Odds Ratio

Authors' Contributions
KSH and MS contributed to study conception and design. MS, JZ and PB collaborated in tool development and data collection. AR, NG, KSH and MS contributed to data organizing, analysis and interpretation. AR, JZ and MS developed the draft. All authors reviewed and approved the final manuscript.

Availability of data and materials
Data related with this study will be available on reasonable request from corresponding author.

Declarations

Ethics approval and consent to participate
The study protocol was approved by Ethical Committee of Tabriz University of Medical Sciences (Ethical code: IR.TBZMED.REC.1399.157).

Consent to publications
 Not applicable

Conflicts of Interest
The authors declare that there is not conflict of interest.

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