

**Drivers' opinion on road traffic collisions in Semey city, Kazakhstan: a questionnaire study**

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**Abstract:** OBJECTIVE: Road traffic collisions (RTC) fatality in Kazakhstan is the highest in European Region. With a fast growing economy, vehicle density in Kazakhstan is steadily increasing, which means that the number of people dying in RTC could continue to increase. Therefore, importance of developing and implementing traffic policy is very high, and exploration of drivers' opinion about risk factors could help to identify and prioritize current problems. This study aimed to increase knowledge about pre-crash factors from road vehicles users. **METHODS:** A questionnaire study on RTC was conducted with 302 drivers in Semey city, Kazakhstan. The drivers were interviewed in 10 different parking facilities in Semey city, Kazakhstan, and participation was voluntary. The questionnaire treated demographics, including gender, age, education and questions concerned drivers' opinion about RTC pre-crash risk factors utilizing three categories of Haddon's matrix (human, vehicle/equipment, and environment). **RESULTS:** The drivers were predominantly male and their average age was 34.3±11.9 years, 56.0% were experienced and 44.0% were novice, 21.2% were professional and 78.8% non-professional drivers. There were no significant differences between opinions of different drivers' groups and the mostly mentioned RTC factors were: low drivers' discipline on the road (41.4%) and insufficient rate of drivers' training program (26.2%). **CONCLUSIONS:** In Semey city, Kazakhstan, human-related (drivers' discipline on the road and drivers' training programs) factors should be firstly addressed in future traffic safety policy. [Myssayev A, Glushkova N, Meirmanov S, Bulegenov T, Aldyngurov D, Kamasheva G, Rakhypbekov T. **Drivers' opinion on road traffic collisions in Semey city, Kazakhstan: a questionnaire study.** *Life Sci J* 2013;10(3):1894-1899] (ISSN:1097-8135). <http://www.lifesciencesite.com>. 281

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## 1. Introduction

In the European region road traffic collisions (RTC) have become a serious public health problem during last years (Goniewicz, 1998). RTC result in about 120,000 fatalities and 2.4 million injuries each year (Europe and Zambon, 2010) and are the leading cause of death among adolescents and young adults. According to the WHO data, Kazakhstan's road traffic mortality is the highest in the European region (30.6 per 100,000 population) which is 2 times higher than the average rate in European middle-income countries (Europe and Zambon, 2010). RTC prevention policy is one of the most urgent and important issues which governmental public health programs facing today (Yegeubaeva, Kulzhanov et al., 2011).

There are low-cost ways to strengthen the road traffic safety that will help to lower the toll from RTC (Hazen and Ehiri, 2006) and one of them is road safety policy. The Haddon Matrix is the most commonly used paradigm in the injury prevention

field. The matrix looks at factors related to the human factors (attitude, knowledge and driver experience) and vehicle factor (vehicle condition), as well as environment factors (roadway design, pedestrian facilities, traffic laws and etc.) before, during and after an injury or death. By utilizing this framework, one can then think about evaluating the relative importance of different factors and design interventions (Peden, Scurfield et al., 2004).

Hazen and Kircher have shown that understanding of the drivers' opinion could be useful for indicating of RTC countermeasures (Hazen and Ehiri, 2006; Kircher and Andersson, 2013).

It is widely recognized today that human error related to 90% of road crashes (Peden, Scurfield et al., 2004).

This study aimed to investigate the drivers' opinions towards RTC pre-crash factors in Semey city, Kazakhstan for possible implementation in future road safety policy interventions.

## 2. Material and Methods

Study Design. A questionnaire study using a semi-structured questionnaire was conducted in Semey City, Kazakhstan, among general population of drivers. We created a paper-based questionnaire with 13 questions in the Russian and Kazakh languages (the most commonly used languages in

Kazakhstan), including six specific questions of participants such as demographics, driving experience, professional involving in vehicle driving and seven RTC-related questions according to three pre-crash risk factors in Haddon's matrix (Table 1).

Table 1. Questions with their definitions and relation to pre-crash Haddon's matrix

Factors	Questions	Definition
Human	Low drivers' discipline	Dangerous driving, ignoring of traffic laws, driving under alcohol and drugs influences, high-speed driving
	Low pedestrians' discipline	Road crossing at an undisclosed location (out of zebra, hinged crosswalks and underpasses), unsafely behavior (running, don't look on vehicle coming) during road crossing on zebra
	Insufficient rate of drivers' training	Low quality of driver training program and its realization, absence of additional driver training program such as driving in darkness, winter, wet weather
	Low quality of the Road Police activities	Low quality of Road Police staff, insufficient realization of preventive programs.
Vehicle and equipment	Bad vehicle condition	Old vehicles, unsatisfactory of vehicle handling and maintenance
	Bad road surface condition	Defects of road surface, narrow roads, RTC-preventive roadside objects
Environment	Bad road traffic organization	Poor road design and road layout, insufficient quantity of pedestrian facilities, inconvenient of road lines, traffic signs and traffic lights working.

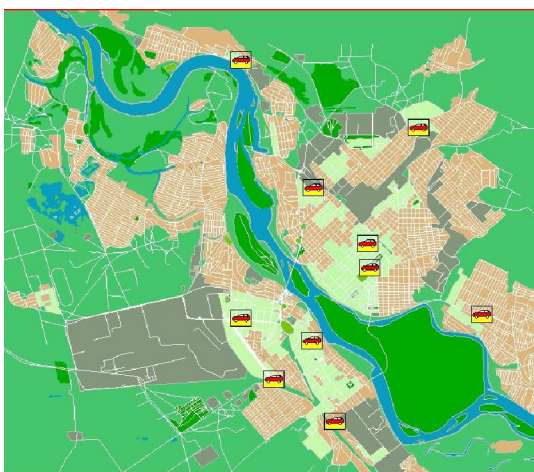


Figure 1. Semey city map with localization of selected parking facilities

Instrument validity and acceptability such as time, question interpretation, and understanding were confirmed by 23 piloted participants in Semey city. After appropriate modification, the questionnaire was used for the main study. The study protocol was approved by the Local Ethics Committee of the Semey State Medical University, Semey, Kazakhstan with the number of №1 "A" dated October 11, 2010.

Sample selection and recruitment. According to Road Police Register of Semey city there are 53,000 registered drivers. A total number of 341 drivers were recruited for participation in this study. Three hundred two appropriately filled questionnaires were collected with response rate 88.56%.

Drivers were recruited from 10 purposively selected parking facilities in the main Semey city districts. The criterion to include parking facility to the study was a total capacity of parking vehicles no less 50. The scheme of the study points is illustrated in Figure 1.

The questionnaire was distributed to all drivers who used the parking facilities at the time of study (4.00. p.m. – 6.00. p.m.) during two months. We specifically chose the study time as a period when parking facilities were mostly used. Informed consent was obtained from each participant. The drivers filled out a questionnaire by themselves in the presence of the research assistant. Time for completing the questionnaire in average took 10 minutes.

For further data analysis participants were divided into groups by criteria as "Driving experience" and "Professional involving in vehicle driving". Drivers with less than 5 years driving experience were considered as "Novice" and with more than 5 years as "Experienced" (Crundall, Underwood et al., 1999). Depending on the professional involving in driving process, we assigned to each identified answer as a non-professional or professional. City- and intercity bus drivers, truck and taxi drivers were indicated as professional drivers, others as non-professionals.

Statistical Analysis was carried out using the SPSS statistical package, version 20.0 for Windows (IBM Ireland Product Distribution Limited, Ireland). We describe categorical data with the use of absolute frequency and percentage. Quantitative data are represented as mean  $\pm$  standard deviation. For explanation of differences between the quantitative

data of subgroups used Chi-square test. The level of significance was set at  $\alpha < 0.05$ .

### 3. Results

Baseline characteristics of the study participants are summarized in Table 2. The majority of respondents surveyed were men 239 (79.1%) and 63 (20.9%) were women. The mean age was  $34.30 \pm 11.9$  years (range: 24 – 42 years). There were 8 (2.6%) drivers with incomplete secondary education, 37 (12.3%) with secondary education, 88 (29.1%) with vocational education, 46 (15.2%) with incomplete higher education and 123 (40.7%) with higher education. Over half indicated that they had driving experience longer than 5 years 169 (56.0%) and 133 (44.0%) had less than 5 years. More than seventy-eight per cent of vehicle users maintained that they were non-professionally involved in vehicle driving and twenty-one per cent were professionally related.

Table 2. Baseline characteristics of the study population (n = 302)

Variable	n (%)
Gender	
Men	239 (79.1%)
Women	63 (20.9%)
Age (mean $\pm$ standard deviation)	
All	$34.30 \pm 11.9$
Men	$35.55 \pm 12.44$
Women	$29.73 \pm 8.17$
Education	
Incomplete secondary	8 (2.6%)
Secondary	37 (12.3%)
Vocational	88 (29.1%)
Incomplete higher	46 (15.2%)
Higher	123 (40.7%)
Driving experience	
Novice	133 (44.0%)
Experienced	169 (56.0%)
Professional involving in vehicle driving	
Non-professional	238 (78.8%)
Professional	64 (21.2%)

Various RTC causations were mentioned by the drivers quoted by men and women, driving experience and professional involving in vehicle driving. The most common reasons about RTC causations are listed in Table 3 by the number of answers. The majority of the study participants, 41.4%, defined that the main reason of RTC is “Low drivers’ discipline”. More than one quarter were agreed that most important reason of RTC is “Insufficient rate of drivers’ training program” (26.2%). About 22 per cent of drivers defined “Bad road surface condition” as the main reason of RTC. “Bad road traffic organization” and “Low pedestrians’ discipline” as the main reasons of the RTC were selected by approximately 15% of the drivers, respectively. Amongst the total sample drivers surveyed, 12.9% were acknowledged with RTC causation as “Low quality of the Road Police activities” and 7.3% with as “Bad vehicle condition”.

Table 3. Reasons of RTC causations and % of respondents (n = 302)

Drivers opinion	n (%)
Low drivers’ discipline	125 (41.4)
Insufficient rate of drivers’ training	79 (26.2)
Bad road surface condition	66 (21.9)
Bad road traffic organization	45 (14.9)
Low pedestrians’ discipline	45 (14.9)
Low quality of the Road Police activities	39 (12.9)
Bad vehicle condition	22 (7.3)

Gender, driving experience and vehicle professional using haven’t shown significant difference in drivers’ opinion about RTC causations (Table 4).

Table 4. Drivers’ opinion about RTC causations depending on gender, driving experience and professional involving in vehicle driving (n, %)

Drivers opinion	Gender*		Driving experience*		Professional driving*	
	Men	Women	Novice	Experienced	Non-professional	Professional
Low drivers’ discipline	101 (42.3%)	24 (38.1%)	60 (45.1%)	65 (38.5%)	105 (44.1%)	20 (31.3%)
Bad road traffic organization	34 (14.3%)	11 (17.5%)	18 (13.5%)	27 (16.1%)	36 (15.1%)	9 (14.3%)
Bad road surface condition	55 (23.0%)	11 (17.5%)	25 (18.8%)	41 (24.3%)	48 (20.2%)	18 (28.1%)
Bad vehicle condition	19 (7.9%)	3 (4.8%)	7 (5.3%)	15 (8.9%)	15 (6.3%)	7 (10.9%)
Low pedestrians’ discipline	34 (14.2%)	11 (17.5%)	15 (11.3%)	30 (17.8%)	34 (14.3%)	11 (17.2%)
Low quality of the Road Police activities	28 (11.7%)	11 (17.5%)	16 (12.0%)	23 (13.6%)	31 (13.0%)	8 (12.5%)
Insufficient rate of drivers training	54 (22.6%)	25 (39.7%)	35 (26.3%)	44 (26.0%)	63 (26.5%)	16 (25.0%)

\* – p value more than 0.05, no significant differences

#### 4. Discussions

The purpose of this study was to investigate the drivers' opinions towards RTC pre-crash factors in Semey city, Kazakhstan. Low drivers' discipline on the road, insufficient rate of drivers training were highlighted as the most common reasons of RTC.

As other researchers (Goniewicz, 1998; Isa, Masuri et al., 2012) we have not found the significant differences in drivers' opinion by gender, driving experience and professional driving.

In our study we have not found significant differences in opinion between novice and experienced drivers in all queries about RTC factors. What is indicating that even less experienced drivers marked importance of discipline on the road.

Professional drivers are the most frequent road users (Kircher and Andersson, 2013) and they also put low drivers' discipline on the road on the first place.

We indirectly investigated human factors, vehicle/equipment factors and environment as perceived a driver towards RTC causations. Interventions based on the main factors by drivers' opinion could improve the likelihood of success and compliance to road traffic policy (Hazen and Ehiri, 2006).

The meaningful of human factors, in our study the most appropriate driver-related factors, is closely connected with individual and collective culture of driving. David M. Zaidel, 1992 and Türker Özkan, 2006 have already drawn attention to fact that drivers are sensitive to the "culture of driving" and, that a small shift in the behavior of few might be amplified or snowball to a much larger effect resulting in a changed traffic environment or a modified culture of driving (Zaidel, 1992; Özkan, Lajunen et al., 2006).

The prevalence of opinions related to drivers' discipline and insufficient rate of drivers' training program is high: about 68% in total, which is significant for social studies. Both these factors are influenced by environment-related forces as an example of insufficient of drivers' training program.

Our results are consistent with other studies and suggest that focus on crash prevention should realize through improvements in on-road behavior of drivers and other road users, require all programs to be objectively evaluated and continuously improved - including driver training programs (Åberg, 1998; Björklund and Åberg, 2005; Feng and Donmez, 2013).

As in prior studies we concerned that have to be noted the importance that improved road safety outcomes require a community willing and able to

adopt a culture of safe driving behavior that minimizes the likelihood of crashes (Åberg, 1998; Wright, Rickwood et al., 2010).

We also tried to explicit drivers' opinion about RTC causations for possible implementation in police surveillance that should be visible to the main road users.

Interestingly, such key factors in RTC causations as bad vehicle condition and bad road surface condition were not frequently marked by all respondents. Dissatisfaction with organization of the road traffic, pedestrians' discipline and quality of the Road Police activities was minimal and took last three places in the list of RTC reasons.

By way of comparison, in a study conducted in India were made the analogical conclusions related to the great meaning of comprehensive group of road users' opinion (Dandona, 2006). The policy-makers have to better understand the critical issues for planning effective road safety policies and interventions.

Our findings provide information about opinions of total population of the city drivers, that was not surveyed in other studies related to Kazakhstan road traffic safety (Yegeubaeva, Kulzhanov et al., 2011; Aubakirova, Kossumov et al., 2013).

The picture produced by our study parallels the situation in Kazakhstan described by Aubakirova et al. (2013), who revealed some important actions points in traffic injuries prevention as a willingness of governments, industrialists, non-government and international organizations to work in this direction and make decisions based on available information (Yegeubaeva, Kulzhanov et al., 2011).

According to this policy, information and publicity should form the backbone of road traffic injury prevention, rather than being one element of a much more comprehensive program. Therefore we faced to previous RTC studies that receive a base for our search (Peden, Scurfield et al. 2004, Smith 2010). Also, one way to refer to a broadly shared conglomeration of beliefs and attitudes and concomitant behaviors might be summed up as "culture". Currently, little research exists on the culture of road use behavior as it relates to drivers' attitudes towards their car, the road, ownership, road use and safety. Culture most likely involves complex social processes of influence by the larger society, interest groups and the individual (Wright, Rickwood et al. 2010).

At the same time the public opinion and epidemiological data as well as experts' opinion are

wildly used for policy development (Hazen and Ehiri 2006, Anderson 2011, Bardes and Oldendick 2012).

Currently, some reports discussed how drivers' culture attitudes towards their vehicle, the road, driving and compliance with traffic legislature are related to their road use behaviors and responses to road safety initiatives (Björklund and Åberg 2005, Engel, by task Leader et al. 2008, Wright, Rickwood et al. 2010).

Alternatively, our study is principally different from studies aimed to explore drivers' opinion about RTC. Some of past decades conducted studies have been based on drivers' behavior like falling asleep, mobile phone usage and etc. (Sagberg, 1999; Desai, Ellis et al., 2003; McEvoy, Stevenson et al., 2006; Taggi, Crenca et al., 2007; Phillips and Sagberg, 2013).

There are several possible limitations of our study. This is a questionnaire study which utilized with only honesty of a filled questionnaire. This method could influence the results and could not guarantee only true answers. Although, our study did not aim to find causal relationship but only served as a preliminary study to understand of the drivers' opinion about RTC causations improve the countermeasures should be implemented.

In conclusion, the main RTC pre-crash risk factors in this study were low drivers' discipline on the road and insufficient rate of drivers' training. Results of this study would inform policy makers and developers to take in account these worrying opinions in specific campaigns and policies creation of RTC prevention. The most important step as show this study to pay attention to human-related (drivers' discipline on the road and drivers' training programs) factors in developing and implementing of traffic safety policy.

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#### References

1. Åberg, L. (1998). "Traffic rules and traffic safety." *Safety Science* **29**(3): 205-215.
2. Anderson, J. E. (2011). *Public Policymaking: An Introduction*, Cengage.
3. Aubakirova, A., A. Kossumov and N. Igissinov (2013). "Road traffic accidents in Kazakhstan." *Iran J Public Health* **42**(3): 231-239.
4. Bardes, B. A. and R. W. Oldendick (2012). *Public Opinion: Measuring the American Mind*, Rowman & Littlefield Publishers.
5. Björklund, G. M. and L. Åberg (2005). "Driver behaviour in intersections: Formal and informal traffic rules." *Transportation Research Part F: Traffic Psychology and Behaviour* **8**(3): 239-253.
6. Brodsky, W. and Z. Slor (2013). "Background music as a risk factor for distraction among young-novice drivers." *Accid Anal Prev* **59C**: 382-393.
7. Crundall, D., G. Underwood and P. Chapman (1999). "Driving experience and the functional field of view." *Perception* **28**(9): 1075-1087.
8. Dandona, R. (2006). "Making road safety a public health concern for policy-makers in India." *Natl Med J India* **19**(3): 126-133.
9. Desai, A. V., E. Ellis, J. R. Wheatley and R. R. Grunstein (2003). "Fatal distraction: a case series of fatal fall-asleep road accidents and their medicolegal outcomes." *Med J Aust* **178**(8): 396-399.
10. Engel, R., V. by task Leader and R. Engel (2008). "Social and cultural variables in accident causation." *TRACE Project WP3 report Task 3*.
11. Europe, W. R. O. f. and F. Zambon (2010). *European Status Report on Road Safety: Towards Safer Roads and Healthier Transport Choices*, WHO Regional Office for Europe.
12. Feng, J. and B. Donmez (2013). "Designing feedback to induce safer driving behaviors: a literature review and a model of driver-feedback interaction." *Human Factors*.
13. Goniewicz, M. (1998). "[The ability of drivers to give first aid--testing by questionnaire]." *Wiad Lek* **51**(3-4): 208-215.
14. Hazen, A. and J. E. Ehiri (2006). "Road traffic injuries: hidden epidemic in less developed countries." *J Natl Med Assoc* **98**(1): 73-82.
15. Isa, K. A. M., M. G. Masuri, N. A. Abd Aziz, N. N. M. Isa, N. Hazali, M. P. M. Tahir, S. H. Noor, A. Danis and H. Fansuri (2012). "Mobile Phone Usage Behaviour while Driving among Educated

- Young Adults in the Urban University." Procedia - Social and Behavioral Sciences **36**(0): 414-420.
16. Kircher, K. and J. Andersson (2013). "Truck drivers' opinion on road safety in Tanzania--a questionnaire study." Traffic Inj Prev **14**(1): 103-111.
  17. McEvoy, S. P., M. R. Stevenson and M. Woodward (2006). "Phone use and crashes while driving: A representative survey of drivers in two Australian states." Med J Aust **185**(11-12): 630-634.
  18. Özkan, T., T. Lajunen, J. E. Chliaoutakis, D. Parker and H. Summala (2006). "Cross-cultural differences in driving behaviours: A comparison of six countries." Transportation research part F: traffic psychology and behaviour **9**(3): 227-242.
  19. Peden, M., R. Scurfield, D. Sleet, D. Mohan, A. A. Hyder, E. Jarawan and C. D. Mathers (2004). World report on road traffic injury prevention, World Health Organization Geneva.
  20. Phillips, R. O. and F. Sagberg (2013). "Road accidents caused by sleepy drivers: Update of a Norwegian survey." Accid Anal Prev **50**: 138-146.
  21. Sagberg, F. (1999). "Road accidents caused by drivers falling asleep." Accid Anal Prev **31**(6): 639-649.
  22. Smith, K. (2010). "keys2drive-Find your own way to a safer driving culture." Accident Analysis and Prevention **32**: 25-35.
  23. Taggi, F., A. Crenca, C. Cedri, M. Giustini, G. Dosi and P. Marturano (2007). "Road safety and the tsunami of cell phones." Ann Ig **19**(3): 269-274.
  24. Wright, R., D. Rickwood and D. Gibson (2010). Understanding driving culture: safe system and the ACT: a report on a systematic literature review and research scoping project. Proceedings of the Australasian road safety research, policing and education conference, Monash University.
  25. Yegeubaeva, S. A., M. K. Kulzhanov, A. S. Aubakirova and T. F. Balabayev (2011). "Challenges for injury prevention among the elderly in Kazakhstan." Asia Pac J Public Health **23**(2): 237-245.
  26. Zaidel, D. M. (1992). "A modeling perspective on the culture of driving." Accident Analysis & Prevention **24**(6): 585-597.

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