

PROFESSIONAL DRIVERS' ATTITUDES ABOUT THE INFLUENCE OF MEDICINES AND OTHER PSYCHOACTIVE SUBSTANCES ON DRIVING ABILITY

Roland Antoni¹, Emira Mlivo², Katarina Pavić³, Marija Vešić⁴, Marija Vukosavljević⁵, Slobodanka Bogdanović Vasić⁶

Abstract: Psychoactive substances, including medicines and alcohol, can have a negative impact on driving ability, which is one of the leading factors contributing to the statistics of preventable traffic accidents. Attitudes have been shown to be predictors for safe driving behavior, and there is a correlation between negative attitudes and the risk of being involved in traffic accidents. The aim of this study was to investigate attitudes of professional drivers about the influence of psychoactive substances on driving ability. The research was conducted as a multicenter cross-sectional study in the Republic of Serbia and Bosnia and Herzegovina, with 221 professional drivers, both genders. The average score related to the drivers' knowledge was 30,45 (range from 8 to 37). About 15% and 30% of respondents consider that alcohol and medicines don't have negative impact on driving, respectively. Professional drivers show inadequate attitudes about the impact of psychoactive substances on driving.

Key words: professional drivers, attitudes, driving impairing medicines, alcohol, psychoactive substances, risk factors.

1. INTRODUCTION

The number of traffic accidents is increasing, and one of the risk factors may be the use of psychoactive substances, including medicines [1]. Road accidents can be caused by various factors, including infrastructure, vehicles, and human variables. The severity of traffic accidents depends directly on several factors related to the drivers, such as driving experience, socio-economic characteristics, driving behavior and attitudes [2]. Traffic accidents in commercial transport can have serious consequences [3]. Reducing the impact of factors that negatively affect professional drivers is a critical component of improving their road safety, thereby making traffic safer for all participants. Since 2009, the rate of fatalities and injuries in truck and bus crashes has been steadily increasing [4]. In 2013, 151 people died in traffic accidents involving commercial vehicles in Serbia, which was about 23% of the total number of fatalities [5].

Drivers with positive attitudes toward safe driving were more likely to engage in such behavior [6]. Attitudes toward driving after using psychoactive substances can vary across countries [7]. There is a relationship between attitudes, beliefs, and behaviors and the risk of being involved in a traffic accident [8]. Drivers' attitudes toward road safety play a key role in predicting violations, errors, and omissions and suggesting that interventions should focus on drivers' attitudes. Attitudes significantly and negatively predicted violations and errors, regardless of age [9]. Commercial drivers' behavior was closely related to their attitudes [10].

The implementation of an effective system of control and punishment of drivers who drive under the influence of alcohol and psychoactive substances, as well as continuous education, is crucial for changing the attitudes and awareness of those who commit this type of offense [5]. The positive impact of education programs on drivers' knowledge of safe driving behavior has been proven [11]. It seems that by providing regular, periodic training for drivers, especially professional drivers, knowledge and attitudes could be raised and risk behavior could be effectively reduced, and thus the frequency of traffic accidents [12,13]. It has been shown that the attitude of drivers, as a key factor in safe driving, can be changed through education. Therefore, education should be taken seriously in changing attitudes towards driving behavior [6].

The aim of this research was to examine professional drivers' attitudes about the influence of medicines and other psychoactive substances on driving, as well as factors that affect their attitudes.

2. METHODS

This multicenter cross-sectional study was conducted in the period from 2017-2022, in 6 cities in Serbia and Bosnia and Herzegovina. Approval for conducting the study was obtained by the Ethics

Committee of the Faculty of Medical Sciences, University of Kragujevac. All participants gave their written consent after they have been thoroughly acquainted with the research protocol, respecting all ethical norms and principles.

The study population was made of professional drivers age from 20 to 65, both genders, who were employed in taxi associations, transport organizations, delivery services, auto-traffic companies where they drive car/truck/van/bus, or they spend most of their working time to operate the machinery, such as industrial workers, workers who handle cranes, forklifts and agricultural machinery. From the study were excluded participants who didn't currently work as professional drivers, because their driver's license was subtracted due to a traffic violation, health issues or for some other reasons and who expressed unwillingness to comply with the study protocol.

The questionnaire for assessing professional drivers' attitudes about the influence of psychoactive substances on driving abilities were developed in several steps according to the guidelines [14]. After the professional drivers were determined as an object of measurement, an item pool was generated through literature review. Next step was revision and correction of the initial pool of items. Then, the initial pool of items was tested on 4 professional drivers (in Šabac, Serbia) for clarity and comprehension. Few minor changes were made after pilot, and then final Serbian version of the questionnaire was prepared for use. The questionnaire was filled by the researchers who interviewed the participants. Respondents expressed their agreement with the offered assertions according to the Likert scale: "no completely" (1), "no partially" (2), "neither no nor yes" (3), "yes partially" (4) and "yes completely" (5). The score of the questionnaire was calculated by simple summation, possible range of scores was from 8 to 40.

During the study we also collected socio-demographic data as well as data about factors that could affect professional drivers' attitudes about the influence of psychoactive substances on driving ability. Gender, age, educational, marital status, living area, length of driving experience, inclination to traffic violations and accidents, the presence of chronic diseases, the use of driving impairing medicines, alcohol and narcotic drugs and understanding the warning symbol on the outer package of medicines were collected as independent variables.

All calculations in this study were performed by SPSS software, version 20. Data about the basic characteristics of the respondents were processed using descriptive statistics. For each item in the questionnaire, mean score, standard deviation and variance were calculated. Reliability and internal consistency of the questionnaire were established by calculating Cronbach's alpha coefficient. The analysis of the multiple linear regression (stepwise model) was used to determine the influence of independent variables (factors) to professional drivers' attitudes about the influence of medicines and other psychoactive substances on driving ability.

3. RESULTS

From 235 respondents at the beginning, 221 completed the study, so response rate was 94,01%. In the study, 168 (76,02%) professional drivers participated from Serbia and 53 (23,98%) from Bosnia and Herzegovina, based on availability of participants for the study. The average age of the participants was 42,82 years (ranging from 21 to 65, standard deviation 11,26). Male sex was 216 (97,74%) of respondents, and only 5 (2,26%) were females. The main characteristics of the respondents are given in the Table 1.

The respondents' attitudes about the impact of medicines and other psychoactive substances on psychophysical abilities and the ability to drive motor vehicles, are presented as a sum of responses to 8 questions from questionnaire (Cronbach's Alpha = 0,944). Data about the driver's attitudes did not follow the normal distribution, which was confirmed by the Kolmogorov-Smirnoff test. The average values of the sum of responses, as well as other parameters of descriptive statistics, are presented in Table 2.

The majority of respondents (84,16%) believe that alcohol affects the ability to drive vehicles and machinery, while slightly less than 15% believe that alcohol has no negative impact.

Similar views have been observed regarding the impact of the combination of alcohol with medicines on driving ability.

A slightly lower percentage of study participants (70,14%) believe that medicines can have a negative impact on driving, while almost 30% expressed the opposite view.

Table 1: The main characteristics of the respondents

		Frequency	Percentage
Gender	Male	216	97,74
	Female	5	2,26
Education level	Unfinished primary school	5	2,26
	Primary school	41	18,55
	High school	122	55,20
	Higher school	38	17,19
	Faculty	15	6,79
Living area	Urban	97	43,89
	Suburban	48	21,72
	Rural	76	34,39
Country	Serbia	168	76,02
	Bosnia and Herzegovina	53	23,98
City	Šabac	120	54,30
	Belgrade	19	8,60
	Vranje	29	13,12
	Brod	16	7,24
	Derventa	15	6,79
	Brčko	22	9,95

Table 2: Sum of professional drivers' attitudes

Drivers' attitudes	Mean		Standard Error of the Mean	Standard Deviation	Minimum	Maximum
		30,45		0,51	7,61	8,00
Drivers' attitudes	95% Confidence Interval		Median	Variance	Skewness	Kurtosis
	29,44	31,46	34,00	57,95	-1,284	0,434

Over 75% of respondents believe that drivers should be informed and educated about the impact of medicines, alcohol and narcotics on the ability to drive and use machines.

About three-quarters of respondents believe that healthcare professionals should provide drivers more informations about the impact of medications on the psychomotor abilities and ability to drive, and a similar percentage believe that more information on this topic should be provide through public media.

Over 62% of professional drivers in this study consider that the warning symbols on the outer packaging of medications are incomprehensible (Δ , \blacktriangle , \S).

About 70% of participants believe that the warning symbols should be replaced with symbols that more clearly and understandably indicate that the medication affects the ability to drive motor vehicles and machinery.

More detailed data about drivers' attitudes on the impact of alcohol and medications on psychophysical abilities are presented in Table 3.

The influence of 16 factors on the attitudes of professional drivers about the effects of alcohol and medicines on the psychophysical abilities and ability to drive motor vehicles and machines was examined: gender, age, level of education, marital status, living area, length of driving experience, consuming alcohol and/or psychoactive substance, addiction to alcohol and/or a psychoactive substance, driving under the influence of alcohol and/or a psychoactive substance, inclination towards making traffic violations, tendency towards traffic accidents, presence of a chronic disease, using the prescribed treatment on a daily basis and recognition of the warning symbols on the outer package of medicines.

A statistically significant influence on the driver's attitudes was confirmed by 7 factors, $R = 0.855$; R Square = 0.731, $F = 72.056$ ($p < 0.001$).

More detailed data on factors affecting the driver's attitudes are shown in the Table 4.

Table 3: Professional drivers' attitudes

		Frequency	Percentages
--	--	-----------	-------------

Do you consider that alcohol can influence the ability to drive motor vehicles and machines?	No completely	12	5,43
	No partially	20	9,05
	Neither no nor yes	3	1,36
	Yes partially	40	18,10
	Yes completely	146	66,06
Do you consider that the combination of alcohol with medications can have a negative influence on the ability to drive motor vehicles and machines?	No completely	7	3,17
	No partially	20	9,05
	Neither no nor yes	18	8,14
	Yes partially	23	10,41
	Yes completely	153	69,23
Do you consider that some medications can influence the ability to drive motor vehicles and machines?	No completely	18	8,14
	No partially	25	11,31
	Neither no nor yes	23	10,41
	Yes partially	35	15,84
	Yes completely	120	54,30
Do you consider drivers should be provided with information about the influence of medications, alcohol and narcotic drugs on the ability to drive motor vehicles and machines?	No completely	7	3,17
	No partially	23	10,41
	Neither no nor yes	16	7,24
	Yes partially	37	16,74
	Yes completely	138	62,44
Do you consider that health professionals should provide more information to drivers about the influence of medications, alcohol and narcotic drugs on the ability to drive motor vehicles and machines?	No completely	7	3,17
	No partially	26	11,76
	Neither no nor yes	13	5,88
	Yes partially	61	27,60
	Yes completely	114	51,58
Do you consider that drivers need to provide more information through the media about the influence of medications, alcohol and narcotic drugs on the ability to drive motor vehicle and machines?	No completely	7	3,17
	No partially	25	11,31
	Neither no nor yes	25	11,31
	Yes partially	58	26,24
	Yes completely	106	47,96
Do you consider that the warning symbols on the outer package of medications are understandable (Δ, ▲, §)?	No completely	97	43,89
	No partially	42	19,00
	Neither no nor yes	20	9,05
	Yes partially	45	20,36
	Yes completely	17	7,69
Do you consider that the warning symbols on the outer package of medications (Δ, ▲, §) should be replaced with different symbols which understandably and more clearly indicate that the medications influence the ability to drive motor vehicles and machines?	No completely	8	3,62
	No partially	14	6,33
	Neither no nor yes	39	17,65
	Yes partially	48	21,72
	Yes completely	112	50,68

Table 4: Factors affecting the driver's attitudes

Factors	Regression coefficient B	p	Confidence interval	
Have you ever been driving under the influence of alcohol?	-1,093	0,000	-1,610	-0,575
Education level	1,379	0,003	0,471	2,287

Living area	-1,414	0,000	-2,182	-0,646
Have you made traffic violations so far and have you been punished by the competent state authorities?	-1,138	0,000	-1,680	-0,596
Age	-0,112	0,000	-0,171	-0,052
Have you ever been driving under the influence of a psychoactive substance?	-1,187	0,000	-1,822	-0,552
Do you recognize the warning symbol on the outer package of medicines?	1,997	0,004	0,629	3,365

4. DISCUSSION

The results of this study showed that professional drivers do not have adequate attitudes about the impact of medicines and other psychoactive substances (alcohol, narcotic drugs, dietary supplements, etc.) on psychomotor abilities and the ability to drive motor vehicles.

This study showed that a higher level of education, living in an urban environment and understanding of warning symbols on the outer packaging of medicines have a positive impact on drivers' attitudes about the impact of psychoactive substances on driving ability, while a negative impact is shown by age, living in a suburban and rural environment, driving under the influence of alcohol and psychoactive substances, and a tendency to commit traffic violations.

The majority of respondents in our study were males, 97.74%, which is typically for professional drivers. The average age was 42.82 years (21-65 years). Other demographic characteristics of the respondents are similar to the results of the studies carried out so far [15,16].

The age of respondents has a significant negative impact on their knowledge and attitudes, which have been declining with age, as demonstrated by the studies of Monteiro et al. [15] and MacLennan et al. [17]. Higher level of education has positive impact on the driver's attitudes about this topic, which is also in line with the results of the studies by Monteiro et al. [15] and MacLennan et al. [17]. The respondent's place of living influences attitudes, but their marital status does not. The most positive attitudes were shown by respondents who lived in urban areas, followed by those living in suburban area, and the worst respondents were living in the rural area, which can be connected with the lower level of education.

About 30% of the respondents in this study consider that medicines can't impair driving ability, while about 20% and about 15% believe that the combination of alcohol with medications and alcohol alone do not have an impairing effect on driving. The study by Okamura et al. [18] indicates that unfavorable driver attitudes suggested a higher probability of being involved in traffic accidents. Drivers with positive attitudes towards traffic safety were more likely to adopt and apply such behavior when driving. Data show that driver attitudes, as a key factor in safe driving, can be changed through education [6]. Interventions that address attitudes can produce long-term changes in drivers that directly affect risky behavior, i.e. a focus on driver attitudes is crucial for risky behaviors that are under the driver's control, such as driving under the influence of various psychoactive substances [9].

Factors describing the behavior of the respondents while driving showed an impact on the attitudes of the respondents. Professional drivers who drive more often under the influence of alcohol and who are prone to committing traffic violations have a more negative attitudes towards the topic under study. A negative impact on attitudes were also recorded among drivers who drove under the influence of psychoactive substances. Surprisingly, alcohol consumption did not appear to be a factor influencing drivers' attitudes, nor did the length of driving experience.

5. CONCLUSION

Professional drivers don't have adequate attitudes about the impact of medications and other psychoactive substances on psychomotor abilities, and on the ability to drive motor vehicles. Our study has shown that many factors can affect the attitudes of professional drivers about the impact of medicines and other psychoactive substances on the ability to drive and use machines, and thus to safety in traffic. Healthcare providers are a necessary factor in raising driver knowledge and improving drivers' attitudes about the impact of psychoactive substances including medicines, on driving. So future research should determine the best model for informing and educating drivers by healthcare professionals.

6. REFERENCES

- [1] Kagashe G, Seleman K. Knowledge, attitude and practice of commercial drivers in Dar es Salaam with regard to medicines that impair driving. *Trop J Pharm Res* 2009;8(4):297-302.
- [2] de Oña J, de Oña R, Eboli L, Forciniti C, Mazzulla G. How to identify the key factors that affect driver perception of accident risk. A comparison between Italian and Spanish driver behavior. *Accid Anal Prev.* 2014;73:225-35.
- [3] Freire MR, Gauld C, McKerral A, Pammer K. Identifying Interactive Factors That May Increase Crash Risk between Young Drivers and Trucks: A Narrative Review. *Int J Environ Res Public Health.* 2021;18(12):6506.
- [4] Stavrinou D, Heaton K, Welburn SC, McManus B, Griffin R, Fine PR. Commercial Truck Driver Health and Safety: Exploring Distracted Driving Performance and Self-Reported Driving Skill. *Workplace Health Saf.* 2016;64(8):369-76.
- [5] Traffic safety strategy on the roads of the Republic of Serbia for the period from 2015 to 2020. *Sl. glasnik RS.* 2015;64.
- [6] Razmara A, Aghamolaei T, Madani A, Hosseini Z, Zare S. Prediction of taxi drivers' safe-driving behaviors based on the theory of planned behavior: The role of habit. *J Educ Health Promot.* 2018;7:139.
- [7] Gjerde H, Strand MC, Mørland J. Driving Under the Influence of Non-Alcohol Drugs--An Update Part I: Epidemiological Studies. *Forensic Sci Rev.* 2015;27(2):89-113.
- [8] Bon de Sousa T, Santos C, Mateus C, Areal A, Trigos J, Nunes C. Road traffic accidents and self-reported Portuguese car driver's attitudes, behaviors, and opinions: Are they related? *Traffic Inj Prev.* 2016;17(7):705-11.
- [9] Lucidi F, Girelli L, Chirico A, Alivernini F, Cozzolino M, Violani C, et al. Personality Traits and Attitudes Toward Traffic Safety Predict Risky Behavior Across Young, Adult, and Older Drivers. *Front Psychol.* 2019;10:536.
- [10] Poulter DR, Chapman P, Bibby PA, Clarke DD, Crundall D. An application of the theory of planned behaviour to truck driving behaviour and compliance with regulations. *Accid Anal Prev.* 2008;40(6):2058-64.
- [11] Jones V, Gielen A, Bailey M, Rebok G, Agness C, Soderstrom C, et al. The effect of a low and high resource intervention on older drivers' knowledge, behaviors and risky driving. *Accid Anal Prev.* 2012;49:486-92.
- [12] Živković S, Nikolić V, Markič M. Influence of professional drivers' personality traits on road traffic safety: case study. *Int J Inj Contr Saf Promot.* 2015;22(2):100-10.
- [13] Haghi A, Ketabi D, Ghanbari M, Rajabi, H. Assessment of human errors in driving accidents; analysis of the causes based on aberrant behaviors. *Life Sci J.* 2014;11(9):414-20.
- [14] DeVellis RF. *Scale Development: Theory and Applications (Applied Social Research Methods)*, 4th edition. London: SAGE publications; 2016.
- [15] Monteiro SP, van Dijk L, Verstraete AG, Alvarez FJ, Heissing M, de Gier JJ. Predictors for patient knowledge and reported behaviour regarding driving under the influence of medicines: a multi-country survey. *BMC Public Health.* 2012;12:59.
- [16] Giroto E, Guidoni CM, González AD, Mesas AE, Andrade SM. Continued use of drugs and working conditions among truck drivers. *Cien Saude Colet.* 2016;21(12):3769-76.
- [17] MacLennan PA, Owsley C, Rue LW, McGwin G. Older adults' knowledge about medications that can impact driving Washington DC, United States of America: AAA foundation for traffic safety; 2009.
- [18] Okamura K, Fujita G, Kihira M, Kosuge R. Patterns of use, knowledge, and perceived effects of sedating medication on driving: a questionnaire survey of Japanese drivers who use sedating medication. *Transport Res Part F Traffic Psychology Behav.* 2018;54:276-289.