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The effects of a new traffic safety law in the Republic of Serbia on driving under the influence of alcohol

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ABSTRACT

The aim of the study presented here has been to see what the effects of the new traffic safety law are, 2 years into its initial implementation, on driving under the influence of alcohol. Until the end of 2009, the legal limit for blood concentration for drivers in Serbia was 0.5 g/l; however, the new traffic safety law stipulates the new limit to be 0.3 g/l. A retrospective autopsy study was performed over a 6-year period (from 2006 to 2011) whose sample covered cases of fatally injured drivers who had died at the scene of the incident, before being admitted to hospital. A total of 161 fatally injured drivers were examined for their blood alcohol concentration. The average age for these drivers was 40.2 ± 15.4 years, with a significant male predominance of 152 men to 9 women ($\chi^2 = 152.000$, $p < 0.001$). This study has shown no decrease in the ratio of drivers under the influence of alcohol vs. all drivers (Pearson $\chi^2 = 4.415$, df = 5, $p = 0.491$), nor in the number of drivers under the influence of alcohol (Pearson $\chi^2 = 6.629$, df = 5, $p = 0.250$), nor a decrease in the mean blood alcohol concentration in drivers (1.72 ± 0.87 vs. 1.68 ± 0.95 g/l, $t = 0.177$, df = 80, $p = 0.860$). The conclusion of this study is that the new law has had a limited effect on driving under the influence of alcohol, which still remains one of the major human factors, responsible for road-traffic crashes in Serbia.

1. Introduction

Evidenced by its ready availability for purchase without restriction to those of legal age, it could be argued that alcohol is humanity's favourite recreational drug (Jones and Holmgren, 2009). As traffic injuries represent a major public health problem, it is imperative to note that alcohol is an important risk factor in motor vehicle crashes (Jones et al., 2009; Vanlaar et al., 2012). Moreover, alcohol-impaired driving is arguably the most serious type of road-traffic violation as it leads to a heightened risk of provoking a car crash (Williams, 2006). Bearing this in mind, it is interesting note that public concern about drinking and driving has been on the rise in Serbia in recent years.

The Republic of Serbia covers an area of approximately 80 000 km^2, containing 56 158 km of roads, a population of 7 500 000, and roughly 2 200 000 registered motor vehicles. Statistical data shows that the number of victims fatally injured in traffic accidents in Serbia decreased from 1991 to 2010. However, the country did have one of the highest public risks (the number of deaths in traffic accidents per 1 000 000 people) in Europe for 2001. This risk factor was recorded to be 135, which was almost twice as much as compared to Sweden, the UK, or the Netherlands for the same year, whose factors were all respectively recorded at less than 75. In 2009, this public risk in Serbia was reduced to nearly 110, but still remained quite high (Road Traffic Agency of Serbia, 2012). This high risk number eventually gave rise to a new, enhanced, and strengthened traffic safety law which came into force on December the 11th, 2009. In order to improve traffic safety, the new law included, among other stipulations, the obligatory use of low beam lights while driving, the obligatory use of child restraint safety systems, the obligatory wearing of seatbelts while riding in the rear seats of vehicles, the prohibition of using mobile phones while operating a motor-vehicle (though still permitted when used along with a hands-free device), lowering the speed limit in urban areas to 50 km/h and to 30 km/h in the proximity of schools, legally defining violent driving in order to punish it accordingly, the obligatory possession of technical equipment to be kept in all cars, and other such similar provisions were included in the law. A newer, much more rigorous penalty point system for traffic offences was also established. In addition, a strong, lengthy media campaign preceded the implementation of the law and even continued several months afterwards.

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Table 1
The annual distribution of BAC ranges, proportions of drivers with BAC over 0.5 and 0.3 g/l, with their average BAC.

Year	Blood alcohol concentration (g/l)							Total	Proportion of drivers with BAC over 0.5 g/l*	Proportion of drivers with BAC over 0.3 g/l**	Average BAC (g/l)
	0	0.01–0.10	0.11–0.30	0.31–0.50	0.51–1.00	1.01–2.00	>2.00				
2006	14	0	0	1	2	7	2	26	11/26 (42%)	12/26 (46%)	0.72 ± 0.93
2007	21	0	1	0	2	5	6	35	13/35 (37%)	13/35 (37%)	0.73 ± 1.06
2008	14	0	1	0	1	1	6	23	8/23 (35%)	8/23 (35%)	0.76 ± 1.15
2009	15	0	1	3	2	5	9	34	16/34 (47%)	19/34 (56%)	0.93 ± 1.05
2010	5	2	1	0	0	4	3	15	7/15 (47%)	7/15 (47%)	1.00 ± 1.14
2011	10	0	1	0	2	7	7	27	16/27 (59%)	16/27 (59%)	1.12 ± 1.11

* Legal limit for alcohol was 0.5 g/l for the period 2006–2009.
** Legal limit for alcohol was 0.3 g/l for the period 2010–2011.

This new law on traffic safety also laid out new rules concerning alcohol consumption. Until the end of 2009, the legal limit for blood concentration for drivers in Serbia was 0.5 g/l (i.e. 0.5 was still legal); however, the new traffic safety law stipulates the new limit to be 0.3 g/l (i.e. 0.3 was still legal). For professional drivers – i.e. any person who drives any type of van, truck, semi, or bus – zero tolerance for alcohol consumption was established. Additionally, according to the new law, a police officer is obliged to retain a person caught in the act of driving under the influence of alcohol for at least 12 h, and if their blood alcohol concentration level is found to be greater than 0.5 g/l, this is increased to 24 h. Those under the influence of alcohol, even when not driving, are also able to be detained by the police when proven necessary according to the provisions of this new law.

The aim of the study presented here has been to see what the effects of this new law are, 2 years into its initial implementation. The authors approached driving under the influence of alcohol somewhat differently than is usually done, as the total number of fatally injured drivers, who died at the scene of accident before and after the application of the new law are herein analysed. The number of fatally injured drivers under the influence of alcohol before and after application of the new law are also analysed in order to explore this specific aspect of driving under the influence of alcohol. This study also investigates and presents drinking and driving practices in Serbia, in addition to trends in alcohol-related fatalities on Serbian roads.

2. Materials and methods

A retrospective autopsy study was performed over a 6-year period (from 2006 to 2011) whose sample covered cases of fatally injured drivers in the city of Belgrade (population of approximately 1.7 million). All victims had died at the scene of the incident, before being admitted to hospital. These were the only cases selected, as this was the only situation in which the victim's exact blood alcohol concentration at the moment of death could be obtained (blood sampling for alcohol is not a routine procedure in Serbian hospitals). Since only cases involving death require a blood sample to be taken, all the cases in which the victim survived the initial accident could not be included.

Blood samples were obtained from the femoral vein during the autopsy itself, which was performed 12–36 h after the victim's death. The entire sample was divided into two groups to match the corresponding blood alcohol law at the time of the victim's death. Therein, for those cases from 2006 to 2009, during the application of the old traffic safety law, the subject was considered to have been under the effects of alcohol when his or her blood alcohol concentration had been more than 0.5 g/l. For those cases from 2010 and 2011, with the implementation of the new traffic safety law, the subject was considered to have been under the effects of alcohol if his or her blood alcohol concentration had been more than 0.3 g/l.

This analysis was conducted through use of head-space-gas chromatography (the limit of ethanol detection was set at 0.001 g/l and the limit of ethanol quantification was 0.003 g/l). The information contained in this study has also been derived from police reports and hetero-anamnestic data, mostly concerning circumstances around the victim's death. Data concerning the total number of accidents throughout Serbia proper has also been obtained from the national *Road Traffic Safety Agency of the Republic of Serbia*.

The obtained data has been statistically analysed. All numerical variables were tested with the Kolmogorov–Smirnov test for normal distribution as criteria for further use of parametric methods using. A Student *T*-test and one-way ANOVA were used in variables showing parametric distribution. In variables that showed a nonparametric distribution a Pearson's chi-square test and Fisher's exact test were used in order to estimate differences, and a Spearman's correlation coefficient was used to estimate relationships. A *p*-value of 0.05 has been considered to be significant and 0.01 to be highly significant. SPSS version 17.0 (license number 106454) is the software that has been used for the statistical analysis.

3. Results

A total of 161 fatally injured drivers were examined for the 6-year period under review. The average age for these drivers was 40.2 ± 15.4 years, with a significant male predominance of 152 men to 9 women ($\chi^2 = 152.000$, $p < 0.001$). Moreover, even though the number for the total group is not large, only one woman under the influence of alcohol was found to be among the fatally injured drivers (out of 82), thus necessitating an overly strong male predominance among drivers under the influence of alcohol (Fisher's exact test = 0.015).

The annual distribution number of fatally injured drivers with regard to different ranges of blood alcohol concentration (BAC) is given in Table 1 along with their average BAC. Fig. 1 schematically shows annual distribution of fatally injured drivers together with their respective BAC.

The statistical analysis of the data found in this study has shown there to be a borderline significant difference in the annual distribution of fatally injured drivers (Pearson $\chi^2 = 10.764$, df = 5, $p = 0.056$). However, a more detailed review of the data will show that the year 2010 was the only that 'stands out'. Indeed, when the year 2010 is excluded, the statistically significant difference no longer existed (Pearson $\chi^2 = 4.137$, df = 4, $p = 0.388$); moreover, when 2011 is excluded, the significance is stronger than before (Pearson $\chi^2 = 10.776$, df = 4, $p = 0.027$). It could be therefore interpreted the new law in Serbia brought a significant decrease in the number of those fatally injured in the first year of its implementation, but that these results practically disappeared the following year.