



DRIVERS ABILITY OF DRUNK DRIVERS

Jovica Jovanović, Milan Jovanović, Natalija Vuković, Jovan Jevremović

Institute of Occupational Health, Niš, Yugoslavia

Summary. *The aim of this study is analysis of health state of drunk drivers on extraordinary health examination. The study included 628 drivers let into the extraordinary health examination because of driving in a drunk state (examined group), and 189 drivers of control group let into the extraordinary health examination because of the another reason. Psychomotor disturbances and personality traits, were most frequently found disordered in drunk drivers, found determined with psycho testing. The greatest number of these drivers has limited driving ability. In the last five years period drivers from the examined group provoked significantly greater number of traffic accidents, then drivers from the control group. The biggest number of drivers drive in alcoholic state and provoke traffic accidents in the first year of driving, associated influence of tobacco's smoke and alcohol enlarge number of traffic accidents. Drivers from the examined group have statistically longer reaction time on acoustic and visual stimulus, comparing with drivers from the control group. It was found correlation between greater number of traffic accidents and longer reaction time. Examined group drivers, that were included in therapeutic, explorative and educational program provoke significantly less traffic accidents than drivers that didn't accept this program. We believe that consuming of alcohol present important health and traffic problem in our country. According to that control of drivers drunkenness, indicating of the extraordinary health examinations to form a judgement about their driving ability, represents primary prevention measures of the road traffic violations.*

Key words: *Drunk drivers, alcoholism, psychomotoric disturbances, traffic accident, drivers ability*

Introduction

Alcoholism as socio-pathologic phenomenon and alcohol influence on men's behavior in traffic, have been frequently analyzed, but they aren't completely conceivable.

Accident importance of drunkenness differs in frequency among different studies. In the literature can be find that alcoholic state is cause for 6-57% of traffic accidents (1,2). Researches in Indiana University informed that almost 40% of traffic accidents had been related with using alcohol. Alcohol influence on frequency of the traffic accidents is 50% in USA and 30-35% in England. In Austria authors find that 20% of traffic accidents have been caused by drunkenness. In Switzerland number of dying people in 1986. increased for 14%, while 40% of driving in alcoholic state (3,4,5). Accidents that have been caused by drunkenness are very serious because number of victims and also because of great material damage. Mortality is 5 times higher in those accidents than in other situations. Alcohol concentration of 1.5‰ causes 8 times higher mortality rate than among amateur sober drivers, and almost 10 times greater among professionals than among sober drivers. Escaping from the place of accident is most

frequently find among drunk drivers (6).

In accordance with statement of the traffic police from Paris, 60% of traffic accidents with fatal ending were caused under influence of alcohol; 49% accidental road traffic deaths in Canada were provoked by drunkenness, while researches from England inform that 50% of night dying drivers were drunk (4,6,7).

It is important to emphasize that the accidents have been most frequently provoked by young drivers (8). Related with previous WHO declared that young generations at that moment were healthier and more educate than ever, but also jeopardized with alcohol, narcotics and traffic accidents, which had been in 50% of cases caused by alcohol.

Easy finding, broad selling net, different customs, it's euphoric drinks among common people, are factors that influence on great consumption of alcohol. We can expect that alcohol will have great influence on the traffic violations in our country in future.

The aim of this study is analysis of health state of drunk drivers on the extraordinary health examination. The purpose of this study is also analysis of therapeutic, explorative and educational effects on decreasing number of traffic accidents provoked with alcohol.

Material and Methods

The reasons of the extraordinary health examination of drivers were analyzed in previous five years (1993 - 1997). The study included 628 drivers (571 smokers and 57 nonsmokers) that had been sent because of drunkenness while driving (to the Center for Traffic Medicine on the extraordinary examination) (examined group). The main indication for the extraordinary examination was blood concentration of alcohol, which was higher than 0.5‰ for amateur drivers and higher than 0.0‰ for professional drivers. Previously mentioned blood concentration of alcohol, traffic police established by using alco test.

The extraordinary health examination included specialist examination from doctor of occupational health medicine, ophthalmologist, neuripsychiatrist, psychologist, social worker and biochemical analysis (blood concentration of alcohol, carboxyhemoglobin, bilirubin, transaminase, glucose, cholesterol, and triglycerides)

Detailed interview of illnesses, of work, of life, social and family history has been thoroughly done. During psychologist's examination, of great importance were acoustic and visual reaction time (using electronic hronoscope) also analysis of cognitive functions (Raren, Beta, Benton test), and analysis of personality structure and state (Coronel index, MMPI, Roršah test, TNR test). Drivers that were interested had been included in therapeutic, explorative and educational program (work in small group, teaching, work therapy, and family help).

Control group constituted of 189 drivers, which were let into the extraordinary health examination not because of acute or chronic signs of alcoholism, but because of another reasons. The average age of drivers from the examined group was 46.8 ± 12.7 years, and driving durability 14.3 ± 9.2 years. The average age of drivers from control group was 45.9 ± 14.2 years, and driving durability 14.1 ± 8.9 years.

Traffic behavior of drivers from the examined and the control group was followed by using documents from police in five years period.

Results

In the last five years period, traffic police sent to the extraordinary health examination to the Center for Traffic Medicine 1816 drivers. The motive of sending to examination was driver's drunkenness in 628 (34.6%) of cases.

The most frequent signs and effects of alcohol on drunk drivers, because of which traffic police demanded alco test were traffic accidents (84.1%) and also overstepping of allowed speed (6.1%) (Table 1).

Information about using alcohol which have been taken from the examined group, inform that the greatest number of drivers use alcohol occasionally and modestly (61.1%) (Table 2).

Psychological testing of those drivers registered

disturbances in the psychomotoric sphere (63.9%) and also disorders of the personality traits (17.7%) (Table 3).

Table 1. Manifestations and consequences of alcoholic state of drivers

Consequences	N	%
Traffic accidents	528	84.1
Disrespect of red light on semaphore	29	4.6
Overstepping of allowed speed	38	6.1
Disrespect of traffic regulations	33	5.3
Total	628	100.0

Table 2. Anamnestic information about consuming alcohol from the examined group of drivers

Consuming alcohol	N	%
No	85	13.5
Occasionally and modestly	384	61.1
Every day and modestly	121	19.3
Every day and occasionally drunkenness	38	6.1
Total	628	100

Table 3. Results of psycho testing of drivers from the examined group

	N	%
Disturbance of psychomotoric aspect	401	63.9
Disturbance of visuomotoric coordination	58	9.2
Disturbance of personality traits	111	17.7
Disturbance of attention	13	2.1
Disturbance of concentration	11	1.8
Decreased QI	26	4.1
Normal	8	1.3
Total	628	100.0

The greatest number of drivers from examined group had limited of driving ability (Table 4) so, they got driving license for one period after which they would go on health examination. Average durability of driving license was 10.5 ± 2.3 months.

Table 4. Results of driving ability judgement in the examined group

Capability	N	%
Capable	14	2.2
Limitedly capable	419	66.7
Incapable	195	31.1
Total	628	100.0

Drivers from the examined group provoked traffic accidents significantly more often than drivers from the control group. Drivers drunkenness and the traffic are the most frequent in the youngest age (Table 5).

It was noticed that drivers with the experience provoked the greatest number of the traffic accidents (Table 6).

Smokers from the examined group provoked the traffic accidents statistically more often than nonsmokers from the same group (Table 7).

Drivers from examined group had significantly longer acoustic and visual reaction time comparing with drivers from the control group. It was noticed longer acoustic and visual reaction time in both groups, at drivers with greater number of the traffic accidents. Among

them drivers from the examined group with some number of traffic accidents, had statistically longer reaction time on both stimuli, comparing with drivers from control group and the same number of traffic accidents (Table 8).

Table 5. Average number of traffic accidents of drunk drivers according to drivers age

Age	Examined group		Control group		p
	N	Values are means \pm SD	N	Values are means \pm SD	
18-30	142	3.9 \pm 1.6	38	1.6 \pm 0.9	<0.001
31-40	129	3.1 \pm 1.4	41	1.5 \pm 0.8	<0.001
41-50	126	2.9 \pm 1.8	38	1.6 \pm 0.5	<0.001
51-60	134	2.7 \pm 1.1	36	1.2 \pm 0.7	<0.001
\geq 60	97	2.1 \pm 1.2	36	1.1 \pm 0.8	<0.001
Total	628	3.0 \pm 1.3	189	1.4 \pm 0.9	<0.001

Table 6. Average number of traffic accidents of drunk drivers and the control group according to longevity of driving

Years of driving	Examined group		Control group		p
	N	Values are means \pm SD	N	Values are means \pm SD	
< 1	147	4.3 \pm 1.7	42	1.6 \pm 1.1	<0.001
1-5	126	3.9 \pm 1.4	44	1.3 \pm 0.7	<0.001
6-10	145	2.2 \pm 1.0	40	1.6 \pm 1.3	<0.05
11-15	136	2.1 \pm 1.1	36	1.5 \pm 0.6	<0.01
\geq 16	74	2.1 \pm 1.5	27	0.9 \pm 0.5	<0.01
Total	628	3.0 \pm 1.3	189	1.4 \pm 0.9	<0.001

Table 7. Smoking cigarettes influence on number of traffic accidents

N	Drunk drivers				p
	Smokers		Non-smokers		
	Number of accidents	Values are means \pm SD	Number of accidents	Values are means \pm SD	
571	3.1 \pm 1.4	57	2.0 \pm 1.2	<0.001	

Table 8. Reaction time on acoustic and visual stimulus in drunk drivers and the control group according to number of traffic accidents

Number of accidents	Type of stimulus	Drunk drivers		Control group		p
		N	Values are means \pm SD	N	Values are means \pm SD	
0	acoustic	55	0.18 \pm 0.02	84	0.18 \pm 0.01	n.s.
	visual		0.24 \pm 0.05		0.23 \pm 0.05	n.s.
1	acoustic	279	0.20 \pm 0.01	77	0.18 \pm 0.02	<0.01
	visual		0.26 \pm 0.05		0.23 \pm 0.04	<0.05
2 - 5	acoustic	132	0.20 \pm 0.01	16	0.18 \pm 0.01	<0.05
	visual		0.26 \pm 0.03		0.24 \pm 0.02	<0.05
6 - 10	acoustic	112	0.21 \pm 0.03	7	0.19 \pm 0.01	n.s.
	visual		0.26 \pm 0.03		0.24 \pm 0.01	n.s.
\geq 11	acoustic	50	0.21 \pm 0.01	5	0.19 \pm 0.01	n.s.
	visual		0.26 \pm 0.03		0.24 \pm 0.01	<0.05
Total	acoustic	628	0.20 \pm 0.06	189	0.18 \pm 0.04	<0.05
	visual		0.26 \pm 0.08		0.23 \pm 0.06	<0.05

Therapeutic, explorative and educational program was accepted from 254 (40.4%) drivers of the examined group. Drivers that were included in this program had provoked significantly less traffic accidents than that

hadn't accepted this kind of prevention (Table 9).

Table 9. Average number of traffic accidents in drunk drivers according to participation in therapeutic, explorative and educative program

Drivers included in therapeutic, explorative and educative program		Drivers that were not included in therapeutic, explorative and educative program		p
N	Values are means \pm SD	N	Values are means \pm SD	
254	1.9 \pm 0.9	374	3.8 \pm 1.4	<0.001

Discussion

Man must use almost all its physical and psychic abilities to accomplish successful driving. Drivers of motor vehicles must have great responsibility, maximal attention, concentration and total psychic and physical readiness.

Experience notices that already small doses of alcohol decrease driving ability, so, the biggest number of traffic accidents provoked with alcohol had been those provoked with low alcoholaemia. Driving ability decrease already at alcoholaemia of 0.2‰ and progressively decline until almost 1.4‰ when, drivers are incapable for driving. But allowed concentration of alcohol in blood differs in different countries. In our country allowance is to 0.5‰ for amateurs, and 0.0‰ for professionals. In Czech Republic allowance is to 0.3‰, in France to 0.8‰, while in Greece, Poland and Sweden it's forbidden to use alcohol during driving (9).

Periodical or continual every day consuming of alcohol, even in reasonable doses, according to results of this research, can provoke disturbances in psychomotoric sphere and personality structure. Great numbers of people who use alcohol have abnormal personality traits character's disturbances, poorly developed abilities (10). These personality characteristics are presented in different categories as their personality, strongly effect their ability to adapt, and possibilities of manifesting abnormal behavior. As it has already known, numerous problems and stress situations effect normal person, according to that, it can easily be conclude that people with disturbances in the structure of their personality, are the greatest potential dangers in the traffic.

Analysis showed that there had been about 2.6% of drivers "under" alcohol in everyday traffic. These people present permanent danger for their own life, but also danger for lives of other participants in traffic. Confirmation of previous is information on that more than 20% of all died people in the traffic were "under" alcohol (8). Effecting on CNS alcohol decreases attention and ability to judge, elongates acoustic and visual reaction time, reduces eye accommodation and horizontal nistagmus speed. Decrease of color sight produces reduction of ability to observe so; some objects can vanish from eye field or can be duplicate. In high speed driving reaction that was late for 100 ms, would provoke going

away for about 10 m. Sense of responsibility and anticipation of consequences also decrease (11).

People that use alcohol have higher risk for cardiovascular diseases, and it is proved that chronic alcoholism provokes depression of cardiovascular function (12, 13). All of this often produces reduction of driving ability and more frequent traffic accidents.

According to results of this research smoking cigarettes intensify noxious effects of alcohol on safe driving. Smoking cigarettes influence drivers attention and produces biochemical changes that provide anoxia and deepened CNS depression that alcohol already has made (14, 15).

In this research it is found that drunkenness is the most frequent in the youngest age group (18-30 years) (Table 5). This information is also present in researches of other authors.

Our explorations showed that including drivers in therapeutic, explorative and educational program de-

creased number of the traffic accidents. This confirms conclusion of other experts that drunk drivers have minor level of driving culture and education in comparison with others. Because of that, they have to be included in mentioned programs.

Conclusion

Drunkenness of drivers is in 34.67% of case reason for extraordinary health examination. The most common indication and effects of drunkenness are traffic accidents and overstepping of allowed vehicle speed. The greatest number of drivers use alcohol from time to time and in responsible doses, but these doses must be contributing factors in the developing of traffic accidents.

References

- Madden C, Cole TB. Emergency intervention to break the cycle of drunken driving and recurrent injury. *Ann Emerg Med* 1995; 26: 177-179.
- Brewer RO, Morris PD, Cole TB, Watkins S, Patetta MJ, Popkin C. The risk of dying in alcohol-related automobile crashes among habitual drunk drivers. *N Engl J Med* 1994; 331: 513-519.
- McMillen DL, Adams MS, Wells PE, Pang MG, Anderson BJ. Personality traits and behaviors of alcohol impaired drivers: a comparison of first and multiple offenders. *Addict Behav* 1992; 17: 407-414.
- Gjerde H, Beulich KM, Morland J. Incidence of alcohol and drugs in fatality injured car drivers in Norway. *Accid Anal Prev*. 1993; 25: 479-483.
- Steenberg J. Accidental road traffic deaths-prospects for local prevention. *Accid Anal Prev* 1994; 26: 1-9.
- Peck RC, Arstein Kerstake GW, Helander CJ. Psychometric and biographical correlates of drunk driving recidivism and treatment program compliance. *J Stud Alcohol* 1994; 55: 667-678.
- Guppy A, Adams Guppy JR. Behavior and perceptions related to drunk driving among an internal sample of company vehicle drivers. *J Stud Alcohol* 1995; 56: 348-355.
- Hangston R, Heeren T, Winter M. Low legal blood alcohol limits for young drivers. *Public Health Rep* 1994; 109: 738-744.
- Robertson MD, Drummer OH. Responsibility analysis: a methodology to study the effects of drugs and driving. *Accid Anal Prev* 1994; 26: 243-247.
- Guppy A. Subjective probability of accident and apprehension in relation to self other bias, age and reported behavior. *Accid Anal Prev* 1993; 25: 375-382.
- Backer S, Fisher R. Alcohol and motor fatalities. *J Traffic Med*. 1977; 4: 70-72.
- Askanas A, Udoshi M, Sadiasi SA. The heart in chronic alcoholism: a non invasive study. *Am Heart J* 1980; 99: 9-11.
- Gould L. Cardiac effects of alcohol. *Angiology*, 1980; 31: 753-756.
- Jovanović J, Jovanović M. Chronic exposure to carbon monoxide as a contributing factor of developing traffic accidents. 33rd Int Congress of Forensic (Tiaff), and 1st Environmental Toxicology, Thessaloniki, 1995; 153-154.
- McLenan BA, Vingilis E, Larkin E, Stiduto G, Makartney FM, Sharkey PW. Psychosocial characteristics and follow up drinking and non drinking drivers in more vehicle crashes. *J Trauma* 1993; 35: 245-250.

VOZAČKA SPOSOBNOST ALKOHOLISANIH VOZAČA MOTORNIH VOZILA

Jovica Jovanović, Milan Jovanović, Natalija Vuković, Jovan Jevremović

Zavod za zdravstvenu zaštitu radnika - Niš, Jugoslavija

Kratak sadržaj: Cilj rada je analiza zdravstvenog stanja vozača upućenih na vanredni zdravstveni pregled radi ocene vozačke sposobnosti zbog vožnje motornog vozila u alkoholisanom stanju. Ispitivanjem je obuhvaćeno 628 vozača koje je saobraćajna milicija otkrila da voze u alkoholisanom stanju (ispitivana grupa) i 189 vozača kontrolne grupe upućenih na vanredni zdravstveni pregled iz nekog drugog razloga.

Psihološkim testiranjem kod ovih vozača su najčešće utvrđeni poremećaji psihomotorike i crta ličnosti. Najveći broj ovih vozača ima ograničenu vozačku sposobnost. Vozači koji povremeno voze u stanju alkoholisanosti su u proteklom

petogodišnjem periodu izazvali statistički značajno veći broj saobraćajnih nezgoda u odnosu na vozače kontrolne grupe. Najveći broj vozača vozi u alkoholisanom stanju i izaziva saobraćajne nezgode u prvoj godini vozačkog staža. Udruženo dejstvo duvanskog dima i alkohola potencira češću pojavu saobraćajnih nezgoda. Kod vozača ispitivane grupe je utvrđeno značajno duže vreme reakcije na akustičku i vizuelnu draž u odnosu na vozače kontrolne grupe, pri čemu je utvrđena korelacija između većeg broja saobraćajnih nezgoda i dužeg vremena reakcije. Vozači ispitivane grupe uključeni u terapijski i zdravstveno-edukativni program značajno ređe izazivaju saobraćajne nezgode u odnosu na vozače koji nisu prihvatili ovaj program. Smatramo da konzumiranje alkohola u našoj sredini predstavlja značajan zdravstveni i saobraćajni problem i da kontrola alkoholisanosti vozača i njihovo upućivanje na vanredne zdravstvene preglede radi ocene vozačke sposobnosti predstavlja značajnu meru primarne prevencije drumskog saobraćajnog traumatizma.

Ključne reči: Alkoholisani vozači, alkoholizam, psihomotorni poremećaji, saobraćajna nezgoda, vozačka sposobnost

Received: January 21, 1999