

## Driving under the influence in Greece: A 7-year survey (1998–2004)

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Received 30 June 2006; received in revised form 20 March 2007; accepted 21 March 2007

Available online 27 April 2007

### Abstract

Alcohol is one of the main causes of traffic accidents worldwide. Its use decreases significantly the driving ability of an individual increasing in this way the possibilities of their involvement in motor-vehicle accidents. The above possibilities are increased when a psychoactive substance has been taken in combination with alcohol due to their synergistic effect. The Laboratory of Forensic Medicine and Toxicology of the University of Athens is authorized to perform the toxicological investigation of traffic accidents that happen in the southern part of Greece. The objective of the present study was to identify the prevalence of alcohol and other psychoactive substances among drivers involved in road traffic accidents in Greece during the period 1998–2004. Alcohol was detected in the blood of about 37% of the drivers involved in traffic accident during the years 1998–2000. The detection of alcohol was lower (29%) in the years 2001–2004. Cannabis, benzodiazepines, opiates, and cocaine were found in 4%, 4%, 4% and 1% of the total number of cases, respectively. The above values were compared with those of a previous study concerning the period 1995–1997 and the reasons for the reduction of the number of alcohol-related traffic accidents during the last years are discussed.

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**Keywords:** Greece; Driving; Traffic accidents; Alcohol; Psychoactive substances

### 1. Introduction

Driving under the influence of alcohol is considered as one of the main causes of traffic accidents. Its use impairs driving skills and increases crash risk [1]. Within the European Union, 10,000 (21.3%) alcohol related traffic accidents, out of the 47,000 fatal accidents, occurred between 1991 and 1998 [2]. In United States, 38.5% of fatal traffic accidents, from 1997 to 1998, were alcohol related [3]. Driving under the influence of other (than alcohol) psychoactive substances has relatively recently gained considerable attention as a problem to road traffic safety. A percentage of 10% of the adults' population in European Union is approximately estimated to drive under the influence of licit or illicit drugs [4]. Driving under the influence of alcohol is not infrequent in Greece. In a national survey, 16.4% of the Greeks 12–64 years old self-reported to be driving at least once after the consumption of four or more alcohol beverages [5].

It is worth mentioning that until 1999, a driver was considered liable for driving under the influence of alcohol, if his blood alcohol concentration was higher than 80 mg/dl, whereas for concentrations between 50 mg/dl and 80 mg/dl the enforcement of penalty was dependent on the court. In April 1999, the legal limit was lowered to 50 mg/dl and penalties became stricter. Moreover, in 2002, the legal limit of BAC became even lower (20 mg/dl) for drivers with a driving license of less than 2 years, as well as for drivers of public use vehicles and truck drivers.

In 2001 a “Strategic Plan for the improvement of Road Safety in Greece 2001–2005” was implemented. The Plan concerned four main directions/programmes, which should be implemented by the four main State Authorities (Ministries) responsible for road safety and at the same time correspond to the four basic axes of actions necessary to improve road safety. These four main programmes concerned the safe road environment (Ministry of Environment, Physical Planning and Public Works), the safety of the road user and the safe vehicles (Ministry of Transport and Communications), the effective road safety enforcement (Ministry of Public Order) and the effective post-accident treatment (Ministry of Health

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and Welfare). Under the above plan, special emphasis was also given by the Traffic Police on the issue of driving under the influence of alcohol during the last years. Roadside controls were nearly doubled from 2000 to 2001.

Detection of alcohol and other psychoactive substances in the blood of drivers or pedestrians involved in traffic accidents in Greece is enforced by law. However, for many years the collection of urine and blood by those drivers was not a standard practice. On the contrary, police authorities preferred to check only the level of alcohol in the exhaled air using a breath-analyser. There are no published data on the percentage of traffic accidents fully investigated by urine and blood examination; however, it is estimated that in the last years (2000 and over) a more meticulous job is performed. The Laboratory of Forensic Medicine and Toxicology of the University of Athens is authorized to perform the toxicological investigation of the traffic accidents that happen in the major area of Southern Greece. In a previous study coming again from our Laboratory, 41% of the drivers involved in traffic accidents were found positive for alcohol during the years 1995–1997 [6]. In the present study, the prevalence of alcohol and other psychoactive substances, the relative blood alcohol concentration and the gender and age of the drivers involved in traffic accidents during the period 1998–2004 are recorded and these values are compared with those of the previous study.

## 2. Materials and methods

Detection of alcohol and other psychoactive substances was performed for each single case of traffic accident. Alcohol analysis was performed in whole blood samples utilizing a GC head-space method [7]. A sample was considered positive for alcohol when blood alcohol concentration was over 5 mg/dl. Psychoactive substances were detected in urine samples using screening techniques (TDx, Abbott, ETS, Syva, and Triage, Merck) and the cut-offs suggested by SAMHSA [8]. Their presence was confirmed by GC/MS in blood according to the standardized methods and procedures recommended in the 'Manuals for use by National Laboratories' by United Nations Drug Control Program (UNDCP) [9,10]. It should be further stated that our laboratory participates successfully, since 1995, in the International Collaborative Exercises (ICE) – the former International Proficiency Testing Programme (IPT) – of UNDCP on the complete analysis of psychoactive substances in biological fluids. All samples belonged to drivers involved in traffic, fatal and non-fatal, accidents that occurred within the jurisdiction of our Department. Statistical analysis was performed by using a two-tailed  $\chi^2$  test.

## 3. Results and discussion

Alcohol is responsible for a great number of traffic accidents due to its pharmacological action. The CNS actions manifested by increased reaction time, decreased ability to estimate space and distances as well as the increased feeling of self-confidence result in a significant decrease in the ability of an individual to drive a motor vehicle safely [11–16]. A big number of epidemiological and pharmacological studies show a significant positive correlation between BAC of drivers and the possibilities for their involvement in traffic accidents [17–20].

In a previous study coming from our laboratory, alcohol was detected in 41% of the drivers involved in traffic accidents [6]. In the present study, a noticeable reduction in the alcohol detection was observed. More specifically, for the three first

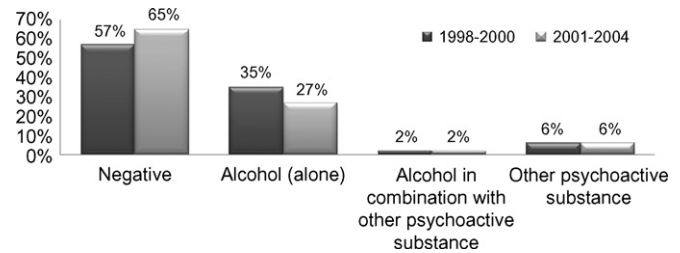


Fig. 1. Use of alcohol or/and other psychoactive substances by Greek drivers involved in traffic accidents during 1998–2004 (total number of drivers 1998–2000: 733, 2001–2004: 2434).

years (1998–2000), 36–38% of the drivers were found positive for alcohol. A further reduction was observed in the following years (2001–2004) when the above percentage was reduced to 29%. Fig. 1 shows the percentages of drivers positive for alcohol and/or other psychoactive substances concerning the two time periods 1998–2000 and 2001–2004. A statistically significant difference was observed between the two time periods for the number of drivers positive only for alcohol ( $p < 0.001$ ) and for the negative ones ( $p < 0.001$ ). BAC was higher than 80 mg/dl in 27% and 21% ( $p < 0.001$ ), 50–80 mg/dl in 5% and 3% ( $p < 0.05$ ), and lower than 50 mg/dl in 6% and 5% ( $p > 0.1$ ) during the years 1998–2000 and 2001–2004, respectively (Fig. 2, positive cases for other psychoactive substances have been excluded). It has to be mentioned here that the above percentages are only an approximation, as the concentrations reported here refer to the time of sampling and the exact time that the victims survived after the accident is not known for most of the cases (meaning that at the time of the accident the victims had higher BACs).

Psychoactive substances, other than alcohol, were detected in 259 cases (9%). Statistically significant changes were not observed during the 7-year period. Psychoactive substances were found in combination with alcohol in 63 cases (24%). Cannabis (4%,  $n = 130$ ), opiates (4%,  $n = 107$ ) and benzodiazepines (4%,  $n = 113$ ) were the most frequently detected substances. Stimulants of the Central Neural System were detected in 1% ( $n = 31$ ) of the total number of cases. Cocaine was the only substance found. In 171 cases only one substance was found. Two substances in combination and three substances in combination were detected in the 66 and 21 cases, respectively. Four substances in combination were found in one case. Combination with alcohol was rather rare (2%). The

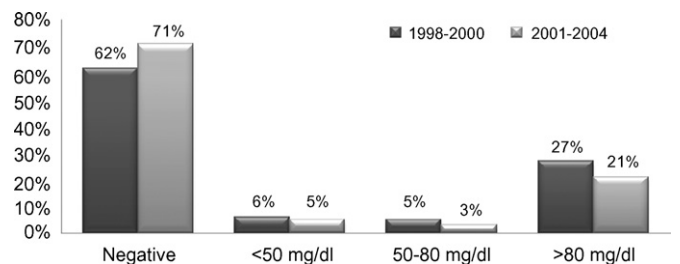


Fig. 2. BAC levels of Greek drivers involved in traffic accidents during 1998–2004 (total number of drivers 1998–2000: 674, 2001–2004: 2234, positive cases for other psychoactive substances have been excluded).

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