

Prevalence of alcohol and illegal drugs in blood samples from drivers involved in traffic law violations. Systematic review of the literature

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Worldwide, it is estimated that about 20% of all road traffic accidents (RTAs) are related to alcohol consumption. However, in some places and age groups, it has been reported that drivers involved in RTAs have a higher prevalence of some drugs compared to alcohol.

AIM: to carry out a systematic review of the literature, in order to obtain a standardized database of the prevalence of alcohol and illegal drugs among driver populations.

METHODS: the search was performed in biomedical databases using Ovid[®], Pubmed[®], BVS[®], SciELO[®] and MedPilot[®]. In order to minimize publication bias, additional data were identified by using the software Copernic[®], querying experts and reviewing classical books, meeting presentations and doctoral theses. The keywords for the search were “alcohol”, “ethanol”, “drugs”, “traffic”, “epidemiological”, and “prevalence”. They were combined prompting a high sensitivity search. The review included cross sectional studies published after 1990 in English, Spanish, German, Portuguese and Italian language. Only those articles were selected in which the analyzed sample was blood and where chromatographic quantification of the drugs was carried out. Using a standardized protocol, the information was extracted from the texts, tables and illustrations and summarized in a database. Afterwards, a new prevalence calculation was performed in order to achieve values with the same format. A combination of the data calculating a summary estimate of the overall results was not done considering the heterogeneity of the studies. It was assumed 0.0% as cut-off for alcohol in articles who did not report this data.

RESULTS: 42 articles fulfilled the inclusion criteria. We excluded 14 considering practical reasons regarding limitations for a reliable interpretation of its results. The remaining 28 articles were categorized in 4 groups according to the study population: fatally injured drivers (“Population A”), drivers who survived RTAs (“Population B”), drivers suspected of driving under the influence of alcohol (“Population C”) and drivers suspected of driving under the influence of drugs (“Population D”). The ranges of prevalences for each analysed substance are shown in the table 1.

Substance	Population group (Number of analysed studies)			
	A (n=10)	B (n=8)	C (n=2)	D (n=9)
Alcohol	22.2 – 57.1	20.0 – 26.0	88.1 – 95.5	25.8 – 46.1
Cannabinoids	0.7 – 13.2	6.7 – 16.9	2.4 – 26.0	33.5 – 68.2
Cocaine	3.0 – 5.2	0.0 – 2.2	0.0 – 3.3	0.0 – 12.5
Opiates	0.6 – 3.5	0.9 – 4.9	0.0 – 1.4	7.2 – 26.0
Amphetamines	1.3 – 7.5	0.5 – 2.2	0.0 – 2.7	4.6 – 13.0

TABLE 1: Ranges of prevalences (%) among each studied populations

Through this systematic review particularities in some countries were detected. For example in fatally injured drivers, only two studies (both from Scandinavian countries) reported prevalences of alcohol detection below 30%. Those countries tended to show low prevalences of cocaine as well (under 0.6%, usually 0.0%). Among Australian studies a low rate of THC detection was notable, as well as a high prevalence of opiates (41.2% – 43.0%). Studies from Norway reported a high prevalence of amphetamines in “Population B” (4.1% – 6.8%), whereas Scottish data showed low prevalences of cannabinoids and amphetamines among “Population A” as well as in “Population D”.

CONCLUSIONS: The results of this study should be seen as an attempt to obtain more reliable data about the prevalence of alcohol and drugs among drivers. Despite some existing limitations, they can be useful for clinicians and forensic experts, as well as for the design of future studies and for the comparison of forthcoming results. In order to achieve a more valid estimation of the prevalences as well as odds ratios for each substance, it is necessary to update the case-control study conducted by Borkenstein et al. (1964), including blood analyses of the whole spectrum of substances that can impair drivers.

KEYWORDS: *Alcohol; Illicit drugs; Motor vehicles; Prevalence; Epidemiologic studies*

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