Original Research Article

Assessment of Role of alcohol in Road Traffic Accidents: An epidemiological study

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Abstract

Background: Alcohol (ethanol) is a widespread euphoriant and acts as a central nervous system depressant. Most of the deaths due to road traffic accidents (RTIs) have occurred in low and middle-income countries. Hence; the present study was undertaken for assessing role of alcohol in road traffic accident cases in a known population. **Materials & methods:**A total of 200 cases of road traffic accidents were analysed during the study period. Only those cases were enrolled which were victim of road traffic accidents. Ethical approval was obtained from institutional ethical committee and written consent was obtained. A Performa was made and detailed demographic history of all the patients was recorded. Habit history was also noted separately.**Results:**In 74.5 percent of the patients, speed of the vehicle was within the speed limit. While analysing the correlation of speeding range of vehicle of victim at the time of accident and Alcohol history of victims at the time of accident, it was seen that alcohol led to significant increase in incidence of over speeding of the vehicle.**Conclusion:** Alcohol is a significant risk factor for road traffic accidents.

Key words: Road traffic accidents, Alcohol

Introduction

Alcohol(ethanol) is a widespread euphoriant and acts as a central nervous system depressant. It is absorbed from the gastrointestinal tract and the rate of absorption depends on the amount consumed, the concentration of ethanol in the drink, the interaction with medicinal drugs, the presence of food in the stomach and the duration of the digestion process.Following absorption, approximately 95% of ethanol is metabolized in the liver and excreted in urine, and 5% is excreted, without undergoing metabolism, through the lungs, urine or sweat. The effects of ethanol's action on the central nervous system include cognitive, judgment and memory impairment, relaxation, sensory dysfunction (e.g., balance, speech, vision, reaction time and hearing) and motor impairment. In addition, alcohol consumption at high concentrations (binge drinking) may cause vomiting, amnesia or even death[1-3].Most of the deaths due to road traffic accidents (RTIs) have occurred in low and middle-income countries, especially in Africa and South East Asia. The global status report on road safety 2018 of WHO indicated that the majority of traffic collisions deaths in South East Asia belonged to people using two and three-wheelers, which are common vehicles among South East Asian countries[4-6]. Hence; the present study was undertaken for assessing role of alcohol in road traffic accident cases in a known population.

Materials & methods

The present study was undertaken in the department of forensic medicine for assessing role of alcohol in road traffic accident cases in a known population. A total of 200 cases of road traffic accidents were analysed during the study period. Only those cases were enrolled which were victim of road traffic accidents. Ethical approval was obtained from institutional ethical committee and written consent was obtained. A Performa was made and detailed demographic history of all the patients was recorded. Habit history was also noted separately. All the results were recorded in Microsoft excel sheet and were analysed by SPSS software. Chi-square test was used for evaluation of level of significance.

Results

In the present study, out of 200 patients, 39.5 percent of the patients belonged to the age group of more than 50 years. 84.5 percent of the patients were males while the remaining were females. 57 percent of the patients had urban residence while the remaining had rural residence. In 74.5 percent of the patients, speed of the vehicle was within the speed limit. While analysing the correlation of speeding range of vehicle of victim at the time of accident and Alcohol history of victims at the time of accident, it was seen that alcohol led to significant increase in incidence of over speeding of the vehicle.

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Table 1: Demographic distribution of patients

Variable		Number of patients	Percentage
Age group (years)	Less than 30	49	24.5
	30 to 50	72	36
	More than 50	79	39.5
Gender	Males	169	84.5
	Females	31	15.5
Residence	Rural	86	43
	Urban	114	57

Table 2: Alcohol history of victims at the time of accident

Alcohol history	Number of patients	Percentage
Positive	72	36
Negative	128	64
Total	200	100

Table 3: Speeding range of vehicle of victim at the time of accident

Speeding range	Number of patients	Percentage
Over speeding	51	25.5
Within speed limit	149	74.5
Total	200	100

Table 4: Correlation of speeding range of vehicle of victim at the time of accident and Alcohol history of victims at the time of accident

Speeding range	Positive alcohol history		Negative alcohol history	
	Number of patients	Percentage	Number of patients	Percentage
Over speeding	39	54.17	12	9.38
Within speed limit	33	45.83	116	90.62
Total	72	100	128	100
p- value	0.00 (Significant)			

Discussion

Studies of the relationship between alcohol outlets and alcohol-related crashes have shown that greater numbers of alcohol outlets are related to higher motor vehicle crash rates across large geographic units such as provinces and cities; within states over time; and within smaller geographic units, such as smaller cities within a dense urban region. Although studies have shown that at the neighborhood level outlet densities are related to crashes independently of local patterns of alcohol use, studies also have shown that greater travel distance between outlets is unrelated to greater crash and arrest rates. Finally, these studies have shown in addition that the geographic patterning of alcohol outlets and alcohol-related crash and arrest rates are related, with neighborhoods with greater outlet densities having more crashes and adjacent areas (even those with no alcohol outlets) also experiencing higher crash rates[6-10].Hence; the present study was undertaken for assessing role of alcohol in road traffic accident cases in a known population. In the present study, out of 200 patients, 39.5 percent of the patients belonged to the age group of more than 50 years. 84.5 percent of the patients were males while the remaining were females. 57 percent of the patients had urban residence while the remaining had rural residence. Ashis Das et al presented a systematic review of available literature on the use of psychoactive substances (alcohol and drugs) among road users, particularly those involved in road traffic crashes (RTCs). MEDLINE, EMBASE, Ind Medica, and several other databases were searched for reports published between 1980 and 2011 that present data on the prevalence or extent of substance use among road users in India. Among the 23 studies eligible for the review, alcohol was reported by all, but only 2 mentioned the use of drugs. Most of the studies were hospital based, included injured or killed road users, and belonged to southern parts of India. Seven studies did not report any method for detecting alcohol use, whereas 7 used analytical testing, 7 used self-reporting, and 2 used observation. Utilizing the various means of verification, the studies reported that 2 to 33 percent of injured and 6 to 48 percent of killed RTC victims had consumed alcohol or drugs; only 2 mentioned drugs without specifying which types. Most studies did not distinguish between drivers, passengers, bicyclists, and pedestrians, and none investigated alcohol or drug use among those responsible for the accident. A significant proportion of injured or killed road users in India had used alcohol before the accident[9].In the present study, in 74.5 percent of the patients, speed of the vehicle was within the speed limit. While analysing the correlation of speeding range of vehicle of victim at the time of accident and Alcohol history of victims at the time of accident, it was seen that alcohol led to significant increase in incidence of over speeding of the vehicle. Papalimperi AH et al presented the impact of alcohol and/or psychoactive substances on fatal road traffic accidents (RTAs). In total, 1,841 (32.2%) of the autopsies conducted by the Department of Forensic Medicine and Toxicology of the National and Kapodistrian University of Athens over a 7-year period (2011–2017) were victims of fatal RTAs. The results were classified according to sex, age, victim (car driver, motorcyclist, pedestrian, or passenger) and the date the accident occurred (day, month and year). In total, 40.7% of the RTA-related fatalities were associated with alcohol consumption, among which 20.3% were car drivers. Of these, 87.3% were male victims. A higher frequency of RTA-related fatalities associated with a blood alcohol concentration (BAC) >110 mg/dl was encountered in younger compared with older age groups. Psychoactive substances were detected in 348 (18.9%) of the victims (cannabis in 46.6% of these, benzodiazepines in 25.9%, opiates in 16.4% and cocaine in 11.1% of these). The percentage of the RTA-related victims that had consumed alcohol in combination with other psychoactive substances was 4.5%. On the whole, the findings of this study suggest that alcohol and psychoactive substances are probably risk factors for RTA-related fatalities[10].Taylor B et al assessed the incidence of fatalities of road traffic accidents associated with alcohol consumption and the use of psychoactive drugs. Fractional polynomial regression was used to model the dose-response relationship. Usual tests of heterogeneity and publication bias were run. Five studies meeting the inclusion criteria of this analysis were selected. At all levels of BAC, the odds ratio (OR) of fatal motor vehicle injury were significant. Overall, the 5 combined studies yielded an OR of fatal injury of 1.74 for every 0.02% increase in

BAC. At 0.08, the legal limit in most countries, the OR was 13.0. Their study was able to definitively show and quantify, for the first time, the significantly increased OR for fatal motor vehicle injury.[11]

Conclusion

Alcohol is a significant risk factor for road traffic accidents.

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