# Accidents as a Symptom of Alcohol Abuse

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This review of the literature on the association between accidents and alcohol abuse presents data from a variety of studies performed in many of the industrial nations of the world. These studies demonstrate a consistent relationship between alcohol abuse and accidents. The family physician should be aware of this association and utilize it in the identification and treatment of his alcoholic patients.

Physicians have been concerned about the relationship between alcohol abuse and accidents for many years. Scattered throughout the medical, psychological, and social literature are reports of studies which relate alcohol abuse with minor or major accidents.

The purpose of this article is to review some of the published studies in order to increase the family physician's recognition of alcoholism as the primary problem, this in addition to his diagnosis and treatment of the injury, which may be of secondary importance. Also, the general public, and educators in particular, may not be aware of the serious consequences of alcohol abuse in relation to accidents and injuries. Education efforts in the past have been more concerned with alcohol and driving than with other nontraffic, alcohol related accidents, which have been largely ignored. Medical educators have not adequately prepared members of the medical profession to deal with many of the problems of the patient who abuses alcohol.

## Background

Maslansky[1] studied a ten-day census on drug and alcohol related admissions to hospital Emergency Rooms in Minnesota. The following results were obtained: (1) 5 percent of Emergency Room admissions were related to the abuse of alcohol and other drugs; (2) 71 percent of the patients seen because of drug related problems were under the age of 35 years; (3) 67 percent of the patients were male, with only 33 percent of the patients female; and (4) alcohol was involved in 32 percent of all incidents of vehicular accidents or other forms of trauma. The author concluded that there is "a need for thorough training in the area of substance abuse for Emergency Room personnel." In another study Wechsler et al[2] gathered breathalyzer readings on 6,266 patients, 16 years of age or older. The study group consisted of those patients admitted to a busy urban Emergency Room during an eight-hour period on 363 consecutive days. The results of this study are presented in Table 1. Overall, a positive breathalyzer reading was obtained from 22 percent of the patients involved in accidents compared with only 9 percent of patients who were seen in the Emergency Room for non-accident reasons. Honkanen and Ottelin[3] studied 182 consecutive adult injury victims seen at the Emergency Room of a rural Finnish hospital by determining the alcohol concentration in blood specimens obtained from patients who arrived at the hospital within 12 hours of being injured. Their results revealed that 30 percent of the patients had positive blood alcohol concentrations. The positive findings were

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**Table 1. Positive Breathalyzer Tests in 6,266 Emergency Room Patients**

| Type of Admissions | Positive Breathalyzer (%) |
|---|---|
| Assaults and fights | 56.4 |
| Transportation accidents | 29.5 |
| Miscellaneous | 24.1 |
| Home accidents | 22.3 |
| Occupational accidents | 15.5 |
| Non-accidents | 8.9 |

higher in males, highest after 9 PM, highest on Saturdays, and highest in assaults, fights, and suicide attempts.

An interesting study of accidents in Finland was carried out by Karaharju and Stjernvall[4] during a six-week period when alcohol shops were closed by strike. The total alcohol consumption during this time decreased by about a third with the following changes in patients attending the casualty department at University Central Hospital in Helsinki: (1) fewer men were seen; (2) the number of patients seen on Fridays, preholiday weekdays, and weekends decreased; (3) those patients who were highly intoxicated and exhibited disturbed behavior showed a major decrease; and (4) assault and battery, manslaughter, murder, and injury with a cutting instrument demonstrated statistically significant decreases.

In a study of psychiatric emergencies, Atkinson[5] observed the association between alcohol and drug abuse and patients seen in the emergency admitting unit at the University of California, Irvine/Orange County Medical Center, by having a psychiatric house staff complete a research questionnaire on 503 consecutive patients. Tabulation of the results showed that substance abuse was a major factor in 14 percent and a relevant factor in 53 percent of the cases. Alcohol was the drug involved in about one half of the cases. Drug abuse was frequently associated with the psychiatric diagnoses of neuroses, personality disorders, schizophrenia, and transient situational disorders. Less frequently associated with drug abuse were the psychiatric diagnoses of affective disorders and organic brain syndrome.

Another method of studying the relationship between alcohol abuse and accidents consists of observing the morbidity and/or mortality of persons who have a history of past hospitalizations for the treatment of alcoholism. Schmidt and de Lint[6] studied 5,359 men and 1,119 women who had been treated at the Toronto Clinic of the Addiction Research Foundation between 1951 and 1963. The follow-up period ranged from 1 to 14 years. The ratio of observed deaths to expected deaths was 2.02 for men and 3.19 for women. The excessive mortality in the alcoholic group was particularly high from violent causes such as accidents, homicide, and suicide. Nicholls et al[7] studied a sample that consisted of 935 patients discharged from four mental hospitals in or near London, England, during the years of 1953 to 1957. The patients in this study had been given a primary or secondary diagnosis of alcoholism and the follow-up period was 10 to 15 years. The investigators were able to trace all but 7.5 percent of this sample. There were 309 deaths which produced a mortality rate which was 2.74 times more than the expected number of deaths. Table 2 illustrates the expected and observed mortality rates in the area of accidents, poisoning, and violence. Schuckit and Gunderson[8] analyzed 70 deaths among a sample of 4,755 marines and sailors who had been hospitalized for treatment of alcoholism as enlisted men in the US Navy between July 1965 and December 1971. The deceased alcoholics were identified in Bureau of Medicine and Surgery files of all deaths of active duty personnel during the 6 1/2 years of the study. The death rate of the alcoholics was 15/1000/year compared to a rate of less than 2/1000/year for age-matched men in the general population. Most deaths were the result of accident or suicide.

## Head Injuries

Acute head injuries are frequently associated with the use of ethyl alcohol. The assessment of the level of consciousness demonstrated by the injured patient is essential to the correct management of that patient, but it is complicated by the degree of alcohol intoxication. In a series of 114 patients with head injuries, Rutherford[9] has shown that determining the blood alcohol concentration was much more accurate in the estimation of the

degree of intoxication than relying on clinical signs. Galbraith et al[10] conducted a prospective study of all patients admitted with head injuries to the Western Infirmary in Glasgow, Scotland, between September 1973 and August 1974. In addition to the usual clinical assessment, a blood sample was drawn for the determination of the blood alcohol concentration. There were 658 males and 260 females in the study population, with the majority being young males. Almost one half of the admissions occurred on Friday and Saturday, with the peak time period being between 11 PM and 5 AM. Almost two thirds of the men and 27 percent of the women had alcohol detected in their blood. The types of injuries most common in the men were assaults and falls, whereas in the women domestic accidents topped the list, with assaults and falls close behind.

## Highway Accidents

The causal relationship between alcohol ingestion and motor vehicle accidents has been studied thoroughly in many countries of the world,[11-13] and is now well accepted by authorities in this country. It is easy to understand that alcohol reduces the mental and physical ability of all persons who drink and drive and thereby produces an impaired driver who is more likely to have an accident. The present controversies in this field revolve around several problems: (1) the recidivism of certain drunken drivers;[14] (2) the impact on highway accidents of lowering the legal age of drinking alcoholic beverages;[15] and (3) the effectiveness of alcohol countermeasure programs such as the Alcohol Safety Action Program of the United States Department of Transportation.[16]

Since motorcycles, walking, and jogging are becoming favorite modes of locomotion, it seems appropriate to consider several studies in these areas. Baker and Fisher[17] analyzed the blood alcohol concentrations of 62 motorcycle operators who were fatally injured in accidents, and 66 percent of the sample had measurable blood alcohol concentrations, with a median blood alcohol concentration of 140 mg/100 ml. Out of 1,017 pedestrian fatalities in Vienna, Austria, from 1965 to 1974, Holczabek[18] reported that 60.2 percent of all males had detectable blood alcohol concentrations. The average blood alcohol concentration was 215 mg/100 ml.

**Table 2. Expected and Observed Mortality Rate in 309 Alcoholic Patients**

| Type of Death | Mortality Rate | |
|---|---|---|
| | Expected | Observed |
| Poisoning | 0.17 | 20 |
| Falls | 0.68 | 6 |
| Other accidents | 0.78 | 10 |
| Suicide | 1.85 | 46 |

## Airplane Accidents

Investigations into the cause of airplane accidents traditionally have centered on such factors as weather conditions, mechanical failure, and "pilot error." Several studies have demonstrated that "pilot error" may be influenced by the use of alcohol and other drugs. Lacefield et al[19] studied 1,345 fatal general aviation accidents from 1968 through 1974. Evidence of alcohol and/or other drugs was found in 20.7 percent of the pilots. Brown and Lane[20] studied 150 pilots of fatal aviation accidents in Australia from 1962 to 1975 and found positive blood alcohol concentrations in 18 percent of the fatalities.

## Burns

The intoxicated smoker who falls asleep with a burning cigarette in his hand may be subsequently hospitalized with severe burns. In a study of 155 hospitalized adult patients with burns, MacArthur and Moore[21] identified the following predisposing factors: alcohol, 36 percent; senility, 21 percent; and psychiatric disorders, 20 percent. In a similar study of 83 adult burn victims admitted to a hospital, Lang and Mueller[22] found 61 percent with a positive blood alcohol concentration. When the authors compared the burns occurring in industrial situations with nonindustrial burns, the nonindustrial group had more frequent positive blood alcohol levels and a higher mortality rate.

## Drownings and Other Recreational Accidents

The use of alcohol is frequently associated with boating, fishing, hunting, picnicking, sailing, swimming, and other forms of recreational activ-

ity. Unfortunately, drinking increases the risk of accidental injury or fatality. Dietz and Baker[23] studied all drowning deaths in Maryland in 1972. Of 45 patients who were 15 years of age or older and who drowned in Baltimore, 47 percent had positive blood alcohol concentrations, ranging from 30 to 260 mg/100 ml. Hudson[24] reported on the numbers and percentages of deaths with alcohol involvement in a state with 5.2 million people, where such fatalities are closely monitored by the office of the state medical examiner. The study revealed that there were 862 accidental water-related deaths over a three-year period. Well over one half of those over the age of 15 years who were tested for blood alcohol content were found positive. Mean blood alcohol concentrations for swimming fatalities was 180 mg/100 ml, for boat fishing fatalities was 150 mg/100 ml, and for shore fishing fatalities was 250 mg/100 ml. The autopsy findings showed a high incidence of fatty liver suggesting that a large number of these persons were chronic abusers of ethyl alcohol.

## Rural Accidents

LeGarde and Hudson[25] examined 20 of 37 adults involved in farm machinery fatalities for the blood alcohol concentrations. Eleven, or 50 percent, had positive tests. Seven of the victims of the fatal accidents had a previous history of having had their driver's license revoked because of driving while under the influence of alcohol.

## Summary

The family physician is frequently faced with the problem of diagnosing and treating the patient who abuses ethyl alcohol. The alcoholic patient who is acutely intoxicated, who is in the early stages of withdrawal, or who is in a stuporous condition from an overdose of alcohol is easily recognized. Much more difficult to diagnose is the alcohol abusing patient who presents with a simple laceration or fracture, after nearly drowning, or with 30 percent of the body surface involved in a second or third degree burn. An alert and concerned physician may be able to recognize and intervene in this patient's drinking behavior by diagnosing the condition and utilizing the crisis produced by the injury as a means to refer the patient for treatment of the addictive behavior. The more severe forms of alcohol abuse are best treated by admitting the patient to an inpatient chemical dependency unit, but in many of the more minor types of alcohol abuse, treatment can be initiated with an outpatient referral to an alcoholism counselor, an interested member of Alcoholics Anonymous, or a physician experienced and interested in patients with the problem of alcohol abuse.

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