CHARACTERISTICS OF ROAD TRAFFIC ACCIDENT VICTIMS WITH SPECIAL REFERENCE TO ALCOHOL INTOXICATION IN THE UNIVERSITY TEACHING HOSPITAL.

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ABBREVIATIONS

BAC	-	Blood Alcohol Concentration
RTA	-	Road Traffic Accident
SADC	-	South African Development Community

CONTENTS

LIST OF FIGURES

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DECLARATION

I hereby declare that the work presented in this study for the Degree of Master of Medicine (Surgery) has not been presented either wholly or in part for any other degree and is not being currently submitted for any other degree.

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SUMMARY

This prospective study carried out in the Casualty Unit of the Department of Surgery at the University Teaching Hospital is an effort to document the role of alcohol in road traffic accidents. It examines the presence of alcohol in blood samples of one hundred consenting road traffic accident casualties aged 15 years and above.

The aims were to determine the incidence of alcohol intoxication in Road Traffic Accident (R.T.A.) victims, presenting to the University Teaching Hospital Casualty Section and to determine whether there is a relationship between the blood alcohol levels and the severity of injuries in these casualties.

The results showed a high incidence of alcohol intoxication (58%) in the R.T.A. victims with a male predominance. Victims in the age group of 15 – 34 years were found to be in the majority of those involved in road traffic accidents. There was no significant relationship between blood alcohol levels and injury severity in these casualties. There is a great need to institute preventive measures to reduce this problem of road traffic accidents and alcohol intoxication.

INTRODUCTION

Like fire, alcohol is a source of both good and evil. It can serve the society meaningfully as a ritual symbol. It serves as food appetiser and as a tension releaser. Also under its influence man has committed all sorts of crimes at all levels. It has been implicated as a contributing factor in road traffic accidents, violent deaths and aviation crashes.[1]

There are many types of alcohol but ethanol is the one used deliberately for its effects. Alcohol is produced by the action of yeast fungi on certain sugars by fermentation . This goes on until the level of alcohol reaches fourteen percent by volume and at this concentration the yeast is killed and the process stops. Beverages containing more than this concentration of alcohol are produced by distillation. Typical concentrations of alcohol in various beverages and local brews found in Zambia are seen in Table 1.

TABLE 1: CONCENTRATION AND QUANTITIES OF ALCOHOL IN SOME ALCOHOLIC BEVERAGES

BEVERAGES	CONCENTRATION OF ALCOHOL AS PERCENT VOLUME IN VOLUME	VOLUME OF USUAL DRINK (mls)	QUANTITY OF ALCOHOL IN USUAL DRINK (mls)
Mosi	4	375	15
Wine	11	114	12.5
Whisky	40	25	10
Chibuku	3	780	23.4
Seven Days	2.4	780	18.7
Mbamba	6.9	225	15.5
Kachasu	20	225	45

Source: Haworth: University of Zambia, School of Medicine, Lecture Notes, Alcohol and its Effects. 1981

Chibuku, Seven days, Mbamba and Kachasu are Zambian local brews usually taken by the low social class. Interesting to note is that despite the low alcohol levels in Chibuku and Seven days, the volume of a single drink (780 mls) is large. Hence making the quantity of alcohol in one drink significant.

Alcohol (Ethanol) is rapidly absorbed from the stomach and small intestine and its effects depend on the amount reaching the various tissues of the body and the blood stream. These effects vary with the blood concentration. The vast majority (greater than 90%) of alcohol is metabolised in the liver at a constant rate of approximately 9 mls/hour.[2]

A review of the physiological effects of alcohol helps us understand the role of alcohol in the causation of road traffic accidents. These effects are summarised in Appendix I. Diminished fine control and impaired judgement appear with alcohol concentrations as low as 20 mg/dL (20 mg %). In most countries the acceptable legal level of intoxication is 80 – 100 mg %.[2]

Blood Alcohol Concentration and driving impairment has been correlated as follows:

(a) For blood alcohol levels of 50 mg percent and below, some individuals are impaired by alcohol but most drivers, even if affected, are affected only slightly. While deterioration in performance in tasks related to driving can be demonstrated at 50 mg percent, increased liability to accident appears first somewhat above 50 mg per cent. In a practical sense as regards road safety, it is reasonable to say that at blood alcohol levels of 50 mg percent or less, the person concerned is unaffected.

(b) Blood alcohol levels in the range 50 to 100 mg percent.

All individuals are affected at or before 100 mg percent is reached. In some people this may be largely compensated by slower or more careful driving – but even in these cases the person concerned is less able to cope with the demands made on his driving ability in emergency situations which often precede accidents and to this extent alcohol in this range is a contributing factor towards accidents. It is in this range that measurably increased liability to accident appears. [17]

(c) Drivers with blood alcohol levels above 100mg percent are affected to the extent that their driving becomes distinctly impaired. The impairment increases progressively as the blood alcohol level rises until at levels of 150 mg percent there is substantially increased liability to accident. [17]

(d) At levels of 200 mg percent and above, most people are obviously intoxicated. The increased risk of accidents is now severe.[17]

For a man of average weight, say 70 kg, three bottles of Mosi would give a Blood Alcohol Concentration (B.A.C.) of 75 mg %, three small tins of Chibuku 117 mg %, one Mosi bottle of Kachasu 157 mg % and one Mosi bottle of Mbamba 54%. But people do not usually take just one drink at one time. Supposing a man starts by drinking three bottles of Mosi over a two hour period, his B.A.C at the end will be 45 mg %. If he then takes two bottles of Mosi over one hour, his B.A.C. will rise to 80 mg %. If he further takes one quick one "for the road", his B.A.C. will be 90 mg %. Greater than 50% of the adult population are obviously intoxicated with levels of 150 mg %, and as the ethanol level further rises, the patients' level of consciousness declines and may eventually end in coma.

LITERATURE REVIEW

The most common form of alcohol – related trauma is road traffic accidents. As early as 1904 it was reported in the USA: "In 19 out of 25 total accidents occurring to automobile wagons ... drivers had used spirits within an hour or more of the disaster."[3]

Alcohol has a marked effect on accident risk in all road users[4]. It increases the risk by reducing co-ordination of movement, slowing reaction time, blurring vision, decreasing awareness, impairing ability to judge speed and distances and giving a false sense of confidence in performing skilled tasks. The risk of having an accident after drinking depends on the blood alcohol concentration and the driver's own susceptibility to its effects, (Figure 1.)[3]

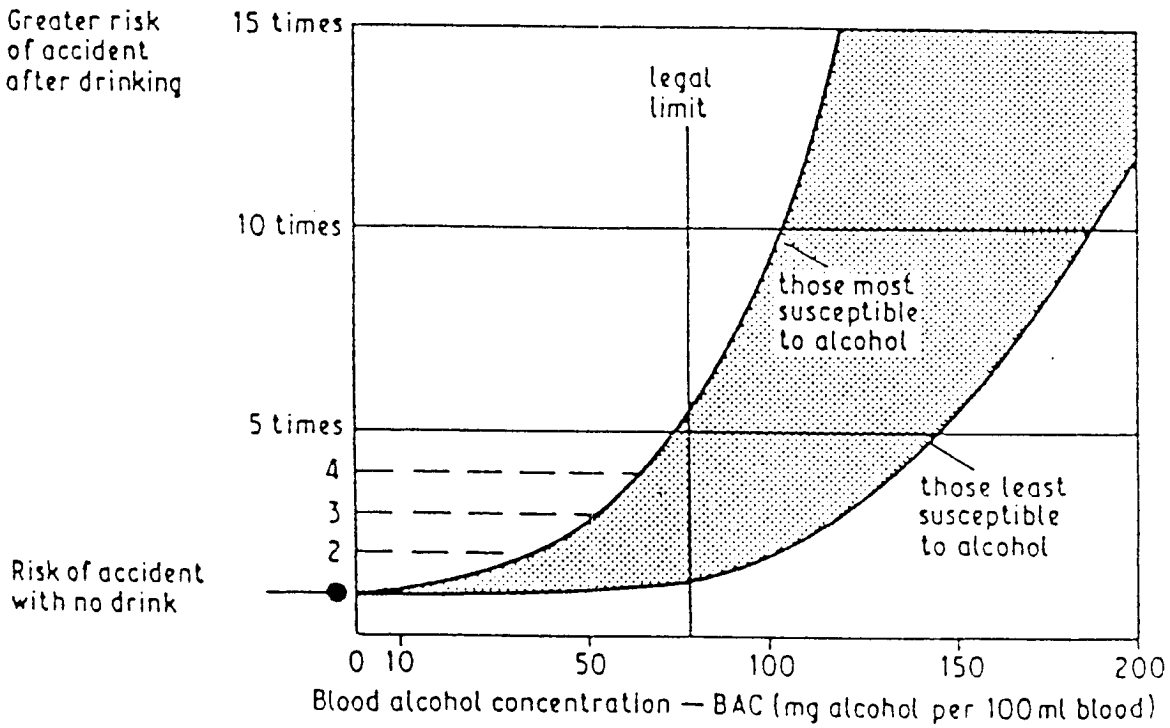

Figure 1. Blood Alcohol Levels and the Risk of Accidents[3]

The role of alcohol in road traffic accidents had been an area of concern world wide. In 1977 road accidents were said to account for more than 40% of all male deaths between the ages of 15 and 24 in England and Wales.[5] Also in the United States in 1994 an estimated 16,589 people died in alcohol related traffic accidents which was 40% of the total road traffic deaths. In Germany in 1994, people were injured in 392,754 traffic accidents, alcohol being implicated in 10% of these. In the Netherlands in 1994, 3,636 (7.4%) of the 49,135 traffic accidents in which people were injured were alcohol related. In France, drinking is believed to be responsible for one third of all traffic deaths. In New South Wales alcohol was a factor in 24% of total road accidents in 1996.[6]

Furthermore studies have been done to determine the role of alcohol in road traffic accidents involving various road users.

In Spain in 1985 a study was done to investigate if there is a relationship between alcohol consumption, blood alcohol concentration and accidents, particularly casualties and road traffic accidents. Out of all the patients, 15.7% were road traffic accident victims. These patients were younger than the ones from other groups with a male dominance. Alcohol was detected in 42.9% of these patients, most of them with B.A.C. higher than 80 mg % which is the legal limit for blood alcohol levels (Spain).[7]

In Tasmania alcohol was found in 50% of blood samples taken from driver, motorcyclist and pedestrians who were involved in road traffic accidents that were serious enough to cause injury or death.[8]

In Switzerland a prospective emergency room study of characteristic of 167 consecutive traffic accident victims with special reference to alcohol intoxication confirmed that there was a high prevalence of acute alcohol intoxication among these patients. The majority of the study population was male (71%); 16-29 years of age (50%) and occupants of an automobile or motorcycle (70%). Most patients were injured during the daytime with night time accident increasing towards the end of the week. Seventy – five percent of the injured were drivers of the crash vehicles. Fifty-three percent of all injuries were serious with motor cyclists and pedestrians being the most severely injured. There was a 21% incidence of alcohol intoxication (B.A.C greater than the legal limit of 50 mg %); 97% of intoxicated patients were male of which 38% were 16 – 29 years of age.[9]

In a pilot study of alcohol and drug related traffic accidents and death in two Jamaican parishes, it was identified that males (90.3%) and pedestrians (41.9%) were killed most often. Evidence of alcohol intake was found in 77.5% of the fatalities and 35.5% had alcohol levels above the legal acceptable limits of 80 mg/100mls.[10]

In Nigeria a study to determine the level of alcohol in the blood of automobile drivers was done. Blood samples of thirty - two drivers involved in automobile accidents were examined for levels of alcohol. Alcohol was detected in 88% of the samples. However, only 3% of these had a level greater than 50 mg % which is the legal limit in Nigeria.[1]

In Cape Town, South Africa a prospective study to establish the profile of injured adult pedestrians and to define the role which alcohol plays in this regard was done at the trauma unit of Groote Schuur Hospital. The patients were predominantly male with an average age of 35.6 years. They were most frequently injured at night and over weekends. The B.A.C.

was positive in 62.1% of these pedestrians and the mean B.A.C. was 190 mg %. Furthermore, B.A.C. positive patients sustained more severe injuries. The study concluded that the influence of alcohol intoxication among injured adult pedestrians in Cape Town is high, suggesting that alcohol plays a major role in these accidents.[11]

In Zambia, over a period of ten years, the percentage of accidents attributed by the police to alcohol when the driver of a vehicle was involved averaged just less than 1.0 and when a pedestrian was involved 0.42. In reference to this situation in Lusaka, a group of Mathematicians remarked:

> "In our preliminary reading of existing police reports, depending entirely upon subjective judgement, we have found the proportion of accidents caused by alcohol incredibly low ... There is great need for an objective procedure aimed at detecting dangerous quantities of alcohol in the blood ..."[12]

A study of the pattern of attendants at the University Teaching Hospital Casualty Section between April 1980 and November 1981 showed that 18.5% of the patients were road traffic accident victims. But the role of alcohol was not investigated.[13]

Autopsy studies of accident victims give a different picture. From the information provided by the public analyst, it appears that 53% of deceased accident victims in Lusaka (mainly cyclist and pedestrians) in the period 1958 to 1965 had blood alcohol levels of over 150 mg per 100 mls blood, 14% had a B.A.C. of between 50 and 150 mg per 100 mls blood and 33% had less than 50 mg per 100 mls blood.[12] Patel and Bhagwat (1977) in a similar study, found that 30% of 588 autopsies carried out in 1974/5 involved road traffic accidents.

Fifty-eight of the victims (26.7%) had detectable blood alcohol levels – about one third of all types of road user. Only one B.A.C. of less than 80 mg % was recorded and 42 (72%) were over 200 mg%.[14]

At the University Teaching Hospital in 1996, 5,300 Road Traffic Accident victims were treated in Casualty and 1,615 (30%) of these were admitted to the hospital and were classified as serious injuries. Road traffic accident casualties account for 10% of the casualty ward patients therefore placing a significant burden on the meagre resources of the hospital .[15]

Drink driving is widely perceived to be a serious problem in Zambia, but no deliberate effort has been made to address and correct this problem. It has indeed been recognised as a major factor in road accidents in Southern African Development Community (SADC) countries for the past decade yet there has been no publicity, education or enforcement campaigns conducted.[15]

The Ministry of Health has a licensed Food and Drug Control Laboratory based at the University Teaching Hospital where alcohol testing is conducted. Blood and urine tests are available although blood is usually used. However, in 1996 only 21 alcohol tests were done by the same laboratory. Alcohol tests were conducted on less than 0.5% of the R.T.A. casualties brought to the University Teaching Hospital, despite the acknowledgement by the police that there is a drinking problem with both drivers and pedestrians.[15]

In addition to that, the Roads and Road Traffic Act of the Laws of Zambia has no legal limit defined in the regulation for Driving when under the influence of alcohol or drug. It states:

> " ... is under the influence of intoxicating liquor or drugs to such an extent as to be incapable of having proper control of such vehicle," (198 CAP 464.) Moreover, random alcohol tests are not provided for either.

AIMS

Taking into account the consequences of alcohol intake and driving, this study set out to prospectively determine:

(a) the incidence of alcohol intoxication in Road Traffic Accident victims presenting to the University Teaching Hospital Casualty Section; and

(b) the relationship between the blood alcohol level and the severity of injuries.

RATIONALE OF STUDY

High alcohol levels in road traffic accident victims and drunken driving has been identified as a problem in Zambia. However, there is no existing data on the incidence of alcohol in road traffic accident casualties.

Knowledge of the magnitude of the problem will help us understand the need for effective legal and public health measures in preventing alcohol - related traffic accidents. This will in turn reduce the demand placed on the inadequate material and human resources in casualty and the hospital as a whole. The results of this study may serve as a basis on which the legal limit of alcohol levels in drink driving restrictions in Zambia could be defined.

PATIENTS AND METHODS

This prospective study was carried out in the Casualty Section of the University Teaching Hospital between the 26th April and 25th May 1998. The project proposal for this study was approved by the Ethics Committee of the University of Zambia. This was a non randomised study without a control group.

During the study period, three hundred and forty-five (345) Road Traffic Accident (R.T.A) victims aged fifteen years and above presented to Casualty. Of these patients, only 100 of them gave informed consent and so these were the only patients included in the study. Some patients did not believe that there would be no legal implications if alcohol levels were raised. Fatal accident victims were not included in the study.

Information was collected by the author on a proforma to record the study number, age, sex, time and day of accident, nature of accident (whether one or more vehicle were involved), whether the vehicle was private or public service, type of road user (i.e. driver, passenger, pedestrian, motor cyclist, or pedal cyclist) and the place of the accident. The patient had a full clinical examination including detection of smell of alcohol on the breath. History of ingestion of any other drug where possible was taken.

Injuries were classified according to the following criteria:[4]

1. **Slight injury**: An injury of a minor character such as a sprain, bruise or a cut or laceration not judged to be severe.

2. **Serious injury:** An injury for which a person is detained in hospital as an in-patient, or any of the following injuries regardless of whether he/she is detained in hospital:

fractures, concussion, internal injuries, crushing, severe cuts and lacerations, severe shock requiring medical treatment.

A venous blood sample was taken, identified by the study number on the proforma and was kept in the fridge until it was analysed by a single technician at the Food and Drugs Laboratory using a standard micro-diffusion analysis method. This method is adopted from the British Forensic system and is internationally accepted.[17] The gas chromatography, method apparatus was out of order during the period of study.

The various parameters recorded on the proforma were analysed and compared to results of other studies reviewed. The correlation between the blood alcohol levels and the incidence of serious injuries was analysed using ρ value.

RESULTS

During the period of study 2,306 patients aged 15 years and above attended the Casualty Section of the University Teaching Hospital. Of these 345 were road traffic accident victims and a total of 100 consenting patients were recruited to the study.

More men than women were involved in the road traffic accidents giving a male to female ratio of 4.3:1.

TABLE II: SEX DISTRIBUTION

SEX	NUMBER (PERCENTAGE)
Males	81 (81)
Females	19 (19)
TOTAL	**100 (100)**

The age incidence of the victims revealed that most of the victims (71%) were between the ages of 15 and 34 years. The distribution was from 15 to 69 years with an average of 31.8 years.

TABLE III: AGE INCIDENCE OF VICTIMS

AGE	NUMBER OF VICTIMS(PERCENTAGE)
15-24	25 (25)
25-34	46 (46)
35-44	14 (14)
45-54	09 (09)
55-64	05 (05)
65+	01 (01)
TOTAL	**100 (100)**

Table IV shows that 64% of the victims were involved in road traffic accidents between 18.00 hours and 24.00 hours and 53% of them were involved in accidents over the weekend, ie Friday, Saturday and Sunday.

TABLE IV: DAY AND TIME OF DAY ON WHICH ACCIDENTS OCCURRED

DAY	00.01 –08.00 HOURS	08.01 – 18.00 HOURS	18.01 – 24.00 HOURS	TOTAL
MONDAY	-	3	-	3
TUESDAY	1	9	5	15
WEDNESDAY	1	6	12	19
THURSDAY	-	4	6	10
FRIDAY	1	4	4	9
SATURDAY	4	2	12	18
SUNDAY	-	1	25	26
TOTAL	**7**	**29**	**64**	**100**

Of the one hundred road traffic accident victims recruited on the study, 40% were pedestrians, 40% were passengers, 14% were drivers, 3% were motor cyclists and 3% were pedal cyclist (Table V). Among the 14 drivers 71.4% (10) were involved in single vehicle accidents and of these ten drivers, 40% had a positive blood alcohol concentration.

TABLE V: PERCENTAGE OF VARIOUS ROAD USERS IN ROAD TRAFFIC ACCIDENTS

CATEGORY OF ROAD USER	NUMBER
PEDESTRAINS	40 (40)
PASSENGERS	40 (40)
DRIVERS	14 (14)
MOTOR CYCLISTS	3 (3)
PEDAL CYCLISTS	3 (3)
TOTAL	**100 (100)**

Most of the vehicles involved in the road traffic accidents were private vehicles (60%) and 40% were public service vehicles. Categorically 3(21.4%) drivers were driving public service vehicles while 11 (78.6%) were driving private ones; 24 (60%) passengers were in public service vehicles while 16 (40%) were in private ones; 10 (25%) pedestrians were hit by public service vehicles, while 29 (72.5%) were hit by private vehicles and 1 (2.5%) was hit by a motor cycle. Of the motor cyclists, 1 out of 3 collided with public service vehicles while 1 out of 3 pedal cyclists also collided with public service vehicles.

A total of 43 victims were involved in accidents which occurred on the main roads leading out of Lusaka (i.e. Great North Road, Kafue Road, Great East Road and Mumbwa Road). Another 33 were involved in accidents which occurred in high population density areas; 18 in and around the town centre and 6 in the low population density areas.

There was an equal distribution of serious and slight injuries in the group under study. The numbers according to categories of road users are shown in Table VI.

TABLE VI: NUMBER AND PERCENTAGE OF SEVENTY OF INJURIES IN VARIOUS ROAD USERS.

CATEGORY OF ROAD USER	SLIGHT INJURIES. NUMBER (PERCENTAGE)	SERIOUS INJURIES. NUMBER (PERCENTAGE)	TOTAL
Pedestrian	16 (40%)	24 (60%)	40
Passenger	22 (55%)	18 (45%)	40
Driver	9 (64.3%)	5 (35.7%)	14
Motor Cyclist	2 (66.7)	1 (33.3)	3
Pedal Cyclist	1 (33.3)	2 (66.7)	3
TOTAL	**50 (-)**	**50 (-)**	**100**

Of the 58 victims who had detectable blood alcohol levels 10 (17.2%) had no smell of alcohol on the breath. This may be because certain alcoholic beverages have insignificant odours.

No victim admitted to have taken any other drugs on direct questioning. However, no facilities to test for other drugs in the blood were available even if the history may have been unreliable.

Of the 100 road traffic accident victims studies 58% had a positive Blood Alcohol Concentration (B.A.C.) and 42% had a negative one.

TABLE VII: BLOOD ALCOHOL LEVELS IN VARIOUS ROAD USERS

BLOOD ALCOHOL LEVELS mgm %	PEDESTRAINS		PASSENGERS		DRIVERS		MOTORS CYCLISTS		PEDAL CYCLISTS		
	M	F	M	F	M	F	M	F	M	F	
0-80	-	-	-	-	-	-	-	-	-	-	0
80-150	3	-	2	3	-	-	-	-	-	-	8
151-200	1	1	-	-	-	-	-	-	-	-	2
201-250	2	-	3	-	-	-	1	-	-	-	6
251-300	3	-	1	-	1	-	-	-	-	-	5
301-350	4	-	-	-	-	-	-	-	1	-	5
351-400	3	1	3	-	2	-	-	-	-	-	9
401-450	6	-	3	-	2	-	1	-	-	-	12
450-500	6	1	2	-	1	-	1	-	-	-	11
TOTAL	**28**	**3**	**14**	**3**	**6**	**-**	**3**	**-**	**1**	**-**	**58**

As Table VII shows, non of the intoxicated Road Traffic Accident victims had a B.A.C. less than 80 mg % which is a legal limit in most countries.[5,6,9,10,11] More men (89.7 %) than women (10.3 %) had positive B.A.C.

Of the 58 victims with a positive B.A.C more than 50% of them were pedestrians. And the few motor cyclists involved in RTA had a positive B.A.C.

TABLE VIII: NUMBER AND PERCENTAGE OF VARIOUS ROAD USERS WITH BLOOD ALCOHOL

RTA VICTIMS	TOTAL NUMBER	POSITIVE B.A.C.	PERCENTAGE
Pedestrian	40	31	77.5
Passenger	40	17	42.5
Driver	14	6	42.9
Motor Cyclist	3	3	100
Pedal Cyclist	3	1	33.3
TOTAL	**100**	**58**	**-**

Of the 50 victims with serious injuries 66% had a positive B.A.C. while there was an equal distribution of B.A.C. positives and negative among the victims with slight injuries.

TABLE IX: PRESENCE OF BLOOD ALCOHOL AND INJURY SEVERITY

INJURIES	B.A.C. POSTIIVE	B.A.C. NEGATIVE	TOTAL
Slight	25	25	50
Serious	33	17	50
TOTAL	**58**	**42**	**100**

Table X demonstrates the injury severity according to blood alcohol levels. Of the 58 road traffic accident victims with a positive B.A.C. 48 (82.70%) had a blood alcohol level equal or greater than 200 mg percent which is considered as a level where someone is obviously intoxicated.[17] Twenty (41.67%) of these victims had slight injuries while 28 (58.33%) of them had serious injuries.

TABLE X: BLOOD ALCOHOL LEVELS AND INJURY SEVERITY

B.A.C. LEVELS mg/100 mls (mg %)	INJURY SEVERITY		TOTAL
	SLIGHT	SERIOUS	
0.80	-	-	-
80-150	5	3	8
151-200	-	2	2
201-250	3	3	6
251-300	2	3	5
301-350	-	5	5
351-400	4	5	9
401-450	5	7	12
450-500	6	5	11
TOTAL	**25**	**33**	**58**

Statistically, the incidence of serious injuries in relation to the blood alcohol levels is not significant. (ρ value = 0.71045856).

DISCUSSION

The role of alcohol intoxication was implicated with evidence in 50 – 70 percent of all road traffic accidents overseas (i.e. Britain and Europe) due to cyclist, pedestrian or driver according to a study done in 1971. Seventy-five percent involved drunken driving and in the U.S.A. alcohol was involved in 50 percent of all road deaths and was responsible for 800,000 crashes and 30,000 deaths.[18]

The University Teaching Hospital caters for a population of nearly two million people and Casualty caters for all types of injuries and surgical emergencies.

In this study the male to female ratio of 4.3:1 which reflects a male dominance in Road Traffic Accident (R.T.A.) victims is in agreement with the other similar studies done, both for non fatal casualties and post-mortem studies.[9,11,14,19] This may be explained by the greater exposure of men to traffic.

The average age of the R.T.A. victims of 31.8 years (range 15 to 19 years) was similar to the South African study of injured pedestrians.[11] Most of the casualties involved in these R.T.A (i.e. 71%) were between the ages of 15 and 34 years. A similar pattern is seen in other studies.[11,9,1,19] Therefore adolescents and young adults who have the social and economic potential to contribute to the development of the community are the ones at risk of being involved in these accidents.

Most patients were injured between 18.01 and 24.00 hours (64%). Between 18.01 and 08.00 hours the numbers rose to 71%. This is similar to the South African Pedestrian Study.[11] Wyss et al found that most patients were injured during the day time, with night time accidents increasing towards the end of the week. However his study involved mainly drivers (75%).[9]

Fifty-three percent of the victims were involved in accidents over the weekend, (Friday, Saturday, Sunday), while 47 percent occurred during the week. There is a similar trend in some other studies. [11,19]

The category of road user distribution of pedestrians (40%), passengers (40%), drivers (14%), motor cyclists (3%) and pedal cyclists (3%) does not follow similar trends in the other studies referred to. In Switzerland for instance 75% of the injured were drivers.[9] However, in the Jamaican and Zambian post-mortem studies, pedestrians were in the majority of the R.T.A. victims, 41.9% and 50.2% respectively.[14,10] Furthermore the 40% pedestrian incidence in this study falls within the range of some other studies.[19]

Interesting to note is that 43 percent of the road traffic accident victims were involved in accidents on the main roads leading out of Lusaka (Great North Road, Kafue Road, Great East Road and Mumbwa Road). A factor of speed may be considered as a contribution to this. Also 33 percent were involved in accidents occurring in high population density areas. The roads in these areas are presently in a bad state that may also be a factor to consider.

There were no facilities to test for other drugs in the blood even though no victim admitted to having taken any other drug. The reason why ingestion of other drugs would be considered is because there are certain drugs which are Central Nervous System depressants and so act synergistically when taken with alcohol eg. Barbiturates. Therefore even with low alcohol levels, if barbiturates have been taken, the person may have a compromised nervous system. Other drugs are antihistamines and tranquillizers which produce sedation or depression of the nervous system.

There was an equal distribution of slight and serious injuries (50% each) in the study group. Sixty percent of the pedestrians, 45 percent of the passengers, 35.7 percent of the driver, 33.3 percent of the motor cyclists and 66.7 percent of the pedal cyclists had serious injuries. There is a similar trend in some studies.[9,14] Of the seriously injured 48 percent were pedestrians, 36% were passengers, 10 percent were drivers, 4 percent were pedal cyclists and 2 percent were motor cyclists. The pedestrians show a vulnerability to serious injury.

Fifty-eight percent of the study group had a positive Blood Alcohol Concentration (B.A.C.) and all had levels above 80 mg percent (range 92 – 483 mg %). The percentage of B.A.C. positive victim is in agreement with other studies.[7,8,1,11,12] The mean blood alcohol level was 327 mg per cent.

Only 10.3 percent of the B.A.C. positive victims were females which was 31.5 percent of the total number of females in the study. A total of 52 males (89.7%) had a positive B.A.C which was 64.2 percent of the males in the study.

Categorically 31 (53.5%) of the B.A.C. positive victims were pedestrians, 17 (29.3%) were passengers, 6(10.3%) were driver, 3(5.2%) were motor cyclists and 1(1.7%) was a pedal cyclist. The pedestrian incidence being the highest of the B.A.C. positive victims is similar to the post-mortem studies of Patel and Bhagwat of Zambia,[14] and Eldermire and Clifford of Jamaica.[10] However the reason for the high incidence of intoxicated pedestrians can not be established as the patients were seen when they were already in hospital after the accidents had already occurred.

Comparing blood alcohol levels and injury severity, 43.1 percent of the victims with a positive B.A.C. had slight injuries while 56.9 percent had serious ones. It has been shown that with blood alcohol levels of 200 mg percent and above most people are obviously intoxicated[17] and in our study group 48 victims (82.8%) with a positive B.A.C., had blood alcohol levels of 200 mg percent and above. Of these 41.7% had slight injuries while 58.3% had serious injuries. Statistically, this is not significant. Therefore in our study, there is no relation between high alcohol levels and severity of injury. However, in the South African study of injured pedestrians it was concluded that B.A.C. positive pedestrians sustained more severe injuries than their negative B.A.C. counterparts.[11]

There are other factors which contribute to road traffic accidents which include poorly maintained roads, poor signs and markings , over speeding, defective vehicles, unlicensed drivers, lack of safety education programmes especially for children just to mention a few. However these factors were not investigated during this study .[15]

The constraints of this study were the inability to determine and test for intake of drugs and the short length of the period of study. The study period was reduced to one month because

of the non-availability of appropriate blood sampling bottles which were acquired from South Africa. Also the deadline for submission of the dissertation for examination had to be met despite the problems encountered. However, one can see some similar trends in the results obtained in comparison to other studies done elsewhere in the world.

CONCLUSION

From this study the following conclusions can be drawn:

1. There is a high incidence of acute alcohol intoxication among road traffic accident victims presenting to the University Teaching Hospital.

2. There is no statistically significant relation between high blood alcohol levels and injury severity among the road traffic accident victims seen in this study.

RECOMMENDATIONS

1 There is a great need for effective preventive measures to be put into place in Zambia to help reduce alcohol intoxication and the problem of road traffic accidents. These measures may include:

(a) A deliberate education campaign on the dangers of alcohol intoxication and road traffic accidents in relation to all road users including pedestrians.

(b) Adequate legislation on statutory blood alcohol levels and legal drinking age.

(c) Improved law enforcement following enactment of appropriate legislation.

2. There is need to carry out further studies at national level so that the role of alcohol in road traffic accidents can be documented.

Similar studies should be done in different parts of Zambia to determine regional patterns and so have countrywide representation.

This should preferably be a prospective, randomised study with a control group.

Alcohol intoxication can be tested at random on the roads using breathalysers and blood alcohol levels. Road traffic victims presenting to designated hospitals in the country should be tested with prior approval of the National Ethics Committee. Such a step ensures confidentiality.

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APPENDIX I

PHYSIOLOGICAL EFFECTS OF ALCOHOL[2]

BLOOD ALCOHOL CONCENTRATION MG/DL	PHYSIOLOGIC EFFECTS
20 – 50	Diminished fine control.
50 – 100	Impaired judgement, impaired co-ordination.
100 – 150	Difficulty with gait and balance.
150 – 250	Lethargy; difficulty sitting upright without assistance.
300	Coma in the novice drinker
400	Respiratory depression

APPENDIX II

STUDY N^{O}.:

AGE: SEX:

DAY: DATE: TIME:

NATURE OF ACCIDENT: SINGLE/MULTI VEHICLE

ROAD USER CATEGORY: DRIVER
PASSENGER
PADESTRAIN
MOTOR CYCLIST
PEDAL CYCLIST

MODE OF TRANSPORT: PUBLIC/PRIVATE

PLACE OF ACCIDENT:

SMELL OF ALCOHOL ON BREATH: YES/NO

HISTORY OF ANY OTHER DRUG INGESTION:

FULL CLINICAL EXAMINATION

BLOOD ALCOHOL CONCENTRATION: