

A DESCRIPTIVE AUTOPSY OF SUICIDAL DEATHS RESULTING FROM ALCOHOL INTOXICATION IN KENYA

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Abstract

This study sought to find out the magnitude of fatalities resulting from suicide and their relation to alcohol intoxication to inform public health policy on the need for their prevention. Materials were all the bodies that fulfilled the criteria of violent fatal outcomes between June 1 2009, and May 31 2010. Bodies were categorised by gender and divided into 10 age groups of 10 years each. A complete forensic autopsy examination was done on each. This is a prospective study of suicidal deaths in Nairobi from June 1, 2009, to May 31, 2010. The study was undertaken at the city Mortuary, Nairobi. All cases of suicidal deaths for twelve consecutive months were included. Alcohol level estimation was done on a total of 400 study subjects. The 400 were consecutively selected as every fifth subject. This was a purposeful sampling. Data was entered on a proforma datasheet. The study concluded that violent deaths are a preventable public health problem in Kenya suicide contributes to violent deaths, the commonest mode of committing suicide is hanging, and suicidal deaths in Kenya are associated with alcohol intoxication. The study recommends that substance abuse should be interrogated more as a cause of self-destruction.

Key terms: Suicide, alcohol intoxication, deaths, public health policy.

1.0 INTRODUCTION

Globally, suicide is one of the leading causes of death, accounting for a million deaths annually, suicide rate being 11.70 per 100,000 (Mohanty et al., 2007). Prevalence varies from 0.0 per 100,000 in Egypt to 31.5 per 100,000 in Lithuania. The prevalence of suicide in the city is highest in Northern Norway, 24.9 per cent (Nordrum et al. 1998) and lowest in Benin City, 1.8 per cent (Akhiwu et al., 2000). A study revealed a prevalence of 20 per cent related to suicide by hanging (Prasad & Prasad, 2003) and a prevalence of 11.8 per cent related to suicide by suffocation (Nordrum et al., 1998). The prevalence of suicide by poisoning is reported to be highest in Belgium, and Karnataka, 53.6 per cent (Gouda & Aramani, 2010) and lowest in Northern Norway, 11.5 per cent (Nordrum et al., 1998). Various studies demonstrate that violent deaths predominantly involve males. The prevalence is 93.3 per cent in Dar es Salaam, Tanzania (Out Water et al., 2008), 82.6 per cent in Northern Norway (Nordrum et al., 1998), and 60 per cent in Manipal, Southern India (Mohan et al., 2006), however, one study reveals female predominance 73 per cent in Trakya, Turkey (Azmak, 2006).

2.0 LITERATURE REVIEW

The World Health Assembly declared violence as a leading global public health problem. This declaration acknowledged the need to implement a global strategy to address violence as a preventable health issue. The first step to building the foundation necessary to prevent and control violence is describing the magnitude and nature of the problem in the individual countries (WHO, 1999; 2000). For example, in Africa, studies indicate that violence rates may be much higher than in the rest of the world and that there is also considerable variation in homicide rates between different urban centres (National Injury Mortality Surveillance System published quarterly, 2005). In addition, violence-related deaths are associated with alcohol intoxication (Abel & Zeidenberg, 1985).

3.0 METHODS

Estimation of Exogenous Alcohol in Vitreous Humour

Sample Collection and Materials

Vitreous humour was obtained with an 18-gauge needle and syringe. The eye was cleaned with antiseptic, the eyelids drew apart, and the needle was inserted through the lateral canthus to the vitreous chamber. For alcohol estimation, two millilitres of the sample was preserved in a fluoride bottle sealed with a cello tape. It was carried in a cooler box and stored at temperatures of -4 degrees Celsius until the time of analysis. Vitreous humour was cultured at the point of collection to avoid the need for transport media; thus, culture media is part of the materials used. The materials required for bacteriology are Gram stain and biochemical tests.

Method of Alcohol Estimation

The machine used was the Gas-liquid chromatography machine at the For government chemists, the analysis was done in batches of ten.

The method was quantitative. The specifications were:-

- 1) Gas Chromatograph Varian 3700
- 2) Injection Temperature at 100 degrees Celsius
- 3) Column Temperature at 80 degrees Celsius
- 4) Detector Temperature at 140 degrees Celsius
- 5) The detector used FID (Flame Ionisation Detector)
- 6) Column support used: Carbowax 20m

Reagents:

All reagents were anhydrous and of analytical reagent grade.

1) Combined alcohol and acetone stock reference solution: Dilution of 3.0ml each of anhydrous ethanol and methanol, 2.0ml of Isopropanol and 1.0 ml of anhydrous acetone to 100.0ml with deionised water was. At 20 degrees Celsius, this provided reference concentrations of ethanol 23.7g/l, methanol 23.7g/l, isopropanol 15.7g/l and acetone 8.0g/l.

2) Combined alcohol and acetone working calibrators: Dilution separately 1.0, 2.0, 4.0, 8.0 and 16.0 of the combined stock solution to 100.0ml with deionised water was done.

3) Internal standard solution: Dilution of 0.5ml of *n*-propanol to 1L with deionised water saturated with sodium chloride was done.

Procedure: 10 Microliters of the sample were mixed with 250 ml of Internal standard (propanol) of known concentration. 1-2 microliter of the mixture was then injected into the gas chromatograph. Calculation; since the molecular weight of ethanol, Methanol and propanol are different; there was clear separation from the resultant Chromatograph. The peak height ratio (or peak area) of the Unknown to that of the internal standard, *n*-propanol, was done and was compared with the ratio obtained for the corresponding calibrators. The concentration of alcohol was given as g/L.



Figure 1: Alcohol Analyser Machine at the Government Chemist

Quality Assurance

The focus of this study was exogenous alcohol. The studies on microbiology were used as quality control to rule out endogenous alcohol formed by putrefaction. Sample collection was done after cleaning the eye with antiseptic. The samples were carried in a cooler box, and storage of the samples for alcohol estimation was at temperatures of -4 degrees Celsius. The alcohol estimation was carried out at the Government chemist, the laboratory used for all the public forensic work in Kenya. An internal standard was used when the samples were being analysed.

Microbiological Investigations

Specimen Collection

Specimens for microbiological analysis were inoculated into the culture media as follows: Blood agar, Macconkey and Robertson's cooked meat media, and Soubourounds Dextrose agar. This was done at the mortuary upon procurement of the specimen and then transported to the microbiology laboratory of the school of medicine, University of Nairobi.

Conditions of Incubation

Blood, MacConkey and Sobourounds Agars were incubated aerobically for 24-48 hours and examined at 24 hours and finally at 48 hours. Robertson cooked meat media was initially incubated at 37 degrees Celsius for 18-24 hours, thereafter sub-cultured into blood agar and incubated under anaerobic conditions using Gas pack anaerobic systems. This was incubated for 48 hours before being examined. The identification was carried out when organisms were isolated according to the Manual of Clinical Microbiology (Fourth edition 1996).

Data Entry, Analysis and Presentation

Data was entered on a proforma data sheet. The month, date, day of the week and time of death were noted. The cases were categorised into male and female, and each gender was divided into 8 age groups that are; 0-9, 10-19, 20-29, 30-39, 40-49, 50-59, 60-69, >70 years. Data was analysed using SPSS 11.5.0 (SPSS Inc., Chicago, III).

4.0 RESULTS AND DISCUSSION

Alcohol levels in the vitreous humour were measured. They were classified based on the level of alcohol intoxication as follows: lightly intoxicating (13.5%), moderately intoxicating (16.7%), heavily intoxicating (28.1%), very heavily intoxicating (14.6%), and stuporous doses (27.1%) as shown in table 1.

Table 1: Alcohol Distribution by the Level of Intoxication

	No	%
Lightly	13	13.5
Moderately	16	16.7
Heavily	27	28.1
Very heavily	14	14.6
Stuporous	26	27.1
Total	96	100

Amongst the suicide victims that were intoxicated by alcohol, 25 per cent were lightly intoxicated, 12.5 per cent were heavily intoxicated, and 25 per cent were very heavily intoxicated. In comparison, 37.5 per cent were stuporous, as shown in figure 2.

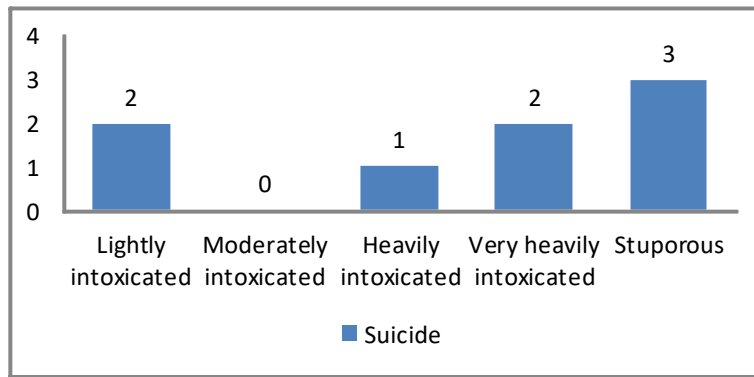


Figure 2: Level of Alcohol Intoxication by Suicide

Amongst the suicide victims due to hanging, 1(12.5%) was lightly intoxicated, 1(12.5%) was heavily intoxicated, 3(37.5%) were very heavily intoxicated, and 2(25 %) were stuporous.

The only victim (12.5%) of suicide by poisoning, a female, had a stuporous level of alcohol intoxication. Of the eight victims of suicide that were related to alcohol intoxication, only one was a female (12.5%). The age group between 40-49 had the highest number of suicidal deaths related to alcohol, 4(50%), followed by the age group 20-29 3 (37.5%).

In South Africa, 50 per cent of all fatal adult victims of traffic accidents as well as violent crime and suicide attempts are associated with alcohol (National Injury Mortality Surveillance System, 2005). It is well established that the use of alcohol increases the risk of fatal injuries (Nordrum et al., 1998). Current study reveals alcohol intoxication in 96 (24 %) of those that died from violent deaths. Of the ninety-six, 8(8.3%) were related to suicide, with hanging contributing 87.5 per cent.

This study revealed that suicide-related to alcohol intoxication was 8.3 per cent, the method mostly used to commit suicide was hanging (87.5%) and that the age group with the highest prevalence is the group between 40-49 at 50 per cent and those Males comprised the majority (87.5%). The majority of studies reveal the age group 21-40 to be the dominant, Kinyanda et al. (2004), 20-24; 31 per cent, Kumar et al. (2005), 20-39; 63.6 per cent, Hilal et al. (2005) 21-40; 72.7 per cent, Azmak (2006) 1-30; 27 per cent, Mohanty et al. (2007) 21-30; 34 per cent, Gouda and Aramani (2010) 21-30; 32.5 per cent and Karn et al. (2011) 21-40; 52 per cent.

In the present study, out of 2566 autopsy cases in one year, between June 1, 2009, and May 31 2010, 224(9.1%) deaths were due to suicide. Among suicide, hanging contributed 79 per cent. Alcohol was found in 8.3 per cent of all suicides; males contributed 87.5 per cent, while the age group 40-49 contributed 50 per cent of the victims. 0.03 (95% confidence interval) p-value was established when the data were analysed using an F-test. A statistically significant difference (p=0.03) between violent death and alcohol intoxication was found.

5.0 CONCLUSIONS AND RECOMMENDATIONS

Conclusions: Violent deaths are a preventable public health problem in Kenya. Suicide contributes to violent deaths, and the commonest mode of committing suicide is hanging. Suicidal deaths in Kenya are associated with alcohol intoxication.

Recommendations: The study recommends that substance abuse, as a cause of self-destruction, should be interrogated more. The current study reveals that alcohol intoxication is related to suicide and is a major problem in Nairobi, Kenya. As such, public health measures and policies need to be implemented to address this malady. In addition, males are more prone to alcohol-related suicides in Kenya society should address the plight of the male child.

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