

## An Array of Accidental Deaths; a Retrospective Hospital-Based Study

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### ABSTRACT

*An accidental death can be defined as an unnatural death that results from an unforeseen or an unintentional event which may be preventable. The determination of the causes and magnitude of accidental death are invaluable in appreciating its public health burden on the one hand and assist in policy formulation that would result in its prevention on the other. The aim of this study was to determine the frequency and causes of accidental deaths, their age and sex distribution. This study was a retrospective post mortem study carried out in the Department of Morbid Anatomy, UBTH from January 1<sup>st</sup>, 2013 to December 31<sup>st</sup>, 2014. The study population were those from accident-related fatalities. Data (age, sex and various causes of accidental deaths) obtained were analysed using statistical package for social sciences version 20. Accidental deaths were attributed to road traffic accident (RTA); burns; fall from height; drowning and choking from foreign body aspiration. RTA was the most common cause of accidental deaths accounting for 75.1% of cases. RTA involving vehicles (99.62%) were the most common. Burns, choking from foreign body aspiration; fall from height and drowning accounted for 23.4%, 0.9%, 0.3% and 0.3% of cases respectively in decreasing order of frequency. More males (72%) died unintentionally and the majority of deaths fell within the young age group (20-39 years). RTA accounted for most cases of accidental deaths. Others were burns, choking secondary to foreign body aspiration, drowning and fall from a height in decreasing order of occurrence. Most cases of accidental deaths occurred in the young.*

**Keywords:** Accidental death, road traffic accident, burns, choking, drowning

### INTRODUCTION

The manner of death is the elucidation of how death results based on the circumstances surrounding death and it includes natural, accident, suicide, homicide, undetermined and pending.<sup>1-3</sup> Accidental deaths, on the other hand, includes transport associated mortalities, on the job-related demise, otherwise known as an industrial accident, fall, fires/burns/smoke, forces of nature (lightning, flood, thunderstorms), death due to animal attack, death from electrocution, aspiration of foreign bodies, deaths from illegal drug consumption or too much medication use provided homicide and suicide are not implicated, and death from complication of therapy.<sup>1,4</sup> The causes of accidental death are to a large extent preventable and hence the pattern of its magnitude is important to ascertain its public health burden. Although previous studies from this same environment by Akhiwu *et al.*

and Nwafor *et al.* at different times had described the pattern of accidental death, the importance of periodic data collection and analyses has been brought to fore by Azeke *et al.* who recommended it in elucidating the current trend of a particular research work especially when compared with the pre-existing baseline data in that environment.<sup>5-7</sup> The average life expectancy of Nigerians as documented by the World Health Organization is 54.5 years, a far cry from what is obtainable in the western world,<sup>8,9</sup> perhaps an insight to the causes and magnitude of accidental deaths may be invaluable in the long run in improving the life expectancy of Nigerians. The aim of this study is, therefore, to determine the pattern of accidental death at the University of Benin Teaching Hospital (UBTH) while the objectives are to determine the frequency and causes of accidental deaths, their age and sex distribution.

### MATERIALS AND METHODS

This was a retrospective post-mortem study that was carried out in the Department of Morbid Anatomy, UBTH, Benin City, Nigeria. The University of Benin Teaching Hospital is a tertiary referral hospital for

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diverse and varied disease conditions in Edo, Delta, parts of Kogi and Ondo states which largely forms its catchment area and sometimes outside these areas.<sup>10</sup> It has a bed capacity of over 860 beds with potentials for an increase.<sup>10</sup> It has several departments of which the Department of Morbid Anatomy is one. This research work was carried out over a 2 year period from 1<sup>st</sup> January 2013 to 31<sup>st</sup> December 2014. From a pool of all cases of post-mortem performed during the period under review, the study population were those who died from accident-related causes. The biodata and other relevant information such as age, sex and the precise cause of accidental death were extracted from clinical case note and mortuary/autopsy register of each case in the study population. Cases with complete demographic data and post-mortem cause of accidental death were included in this study while those with incomplete demographic data were excluded from this study.

Data analysis was done using the Statistical Package for Social Sciences, version 20 (SPSS 20, IBM Corp. Armonk, NY, United States of America). For categorical variables (sex and causes of accidental deaths) the frequency and corresponding rates in percentages were analysed while for the continuous variable (age), the age range, mean age, standard deviation and peak age were analysed.

## RESULTS

Three hundred fifty (350) cases of accidental deaths were recorded during the study period and these accounted for 43% of medicolegal post-mortems during the study period. Two hundred fifty-three (72%) were males while 97(28%) were females giving a male to female ratio of 2.6:1. Their age ranged from 1 to 85 years with mean age and standard deviation of 37.47 years (SD=16.78). Road traffic accident (RTA) was the most common cause of accidental death and accounted for 263(75.1%) of the cases as shown in table 1. Of these, motor vehicular RTA was far more common and it represented 263(99.62%) of the cases while a case (0.38%) of pedestrian RTA was also noted. The age range for RTA

was from 1 to 85 years with a mean age and standard deviation (SD) of  $38.66 \pm 16.3$  years, median and modal ages of 36.00 and 22.00 years respectively. The peak age for RTA was in the 4<sup>th</sup> decade as shown in table 2. The males were more and accounted for 205(78%) cases of RTA while the females were 58(22%) with a male to female ratio of 3.5:1 as shown in table 1. The age range in males was from 6 to 80 years with a mean age and SD of  $39.06 \pm 14.65$  years while the females had an age range from 1 to 85 years with a mean age and SD of  $37.26 \pm 21.24$  years. The peak age for RTA related deaths in males and females were in 4<sup>th</sup> and 3<sup>rd</sup> decades respectively as shown in table 2.

Death from burns was the next in frequency after RTA and it accounted for 82(23.4%) cases of accidental deaths as shown in table 1. Their age range from 1 to 84 years with a mean age and SD of  $33.92 \pm 18.15$  years, median and modal ages were 31.50 and 28.00 years respectively. The peak age for death that resulted from burns was in the 4<sup>th</sup> decade as shown in table 2. There were 44(54%) males and 38(46%) females giving male to female ratio of 1.2:1. The males had their age that ranged from 2 to 84 years with a mean age and SD of  $38.59 \pm 18.09$  years while the females had an age range from 1 to 85 years with a mean age and SD of  $28.50 \pm 16.86$  years. The peak age for burns related deaths in males and females were in 4<sup>th</sup> and 3<sup>rd</sup> decades respectively as shown in table 2.

Death from choking following foreign body aspiration came up a distant 3<sup>rd</sup> in frequency with 3(0.9%) cases of accidental deaths. Their age ranged from 22 to 42 years with a mean age and SD of  $31.33 \pm 10.07$  years. There were 2(67%) males and a female (33%) giving a male to female ratio of 2:1 as shown in table 1. The age range in males was from 30 to 42 years with a mean age and SD of  $36.00 \pm 8.49$  years. The only female in this category died at 22 years of age.

Death from drowning and fall from a height each accounted for a (0.3%) case of accidental death as shown in table 1, the former died at 23 years of age while the latter died at 42 years of age. Both were males as shown in table 2.

Table 1, frequency and causes of accidental death with sex distribution

Causes of accidental death	Sex		Total
	Male	Female	
Road traffic accident	205	58	263
Burns	44	38	82
Fall from height	1	0	1
Drowning	1	0	1
Choking with asphyxia from foreign body aspiration	2	1	3
Total	253	97	350

Table 2, age group and sex distribution of causes of accidental death

Causes of accidental deaths Age group		Sex		Total
		Male	Female	
Road traffic accident	0-9	3	4	7
	10-19	6	6	12
	20-29	46	16	62
	30-39	67	10	77
	40-49	36	5	41
	50-59	26	6	32
	60-69	12	4	16
	70-79	8	5	13
	80-89	1	2	3
Total	205	58	263	
Burns	0-9	3	5	8
	10-19	2	7	9
	20-29	7	10	17
	30-39	12	7	19
	40-49	10	3	13
	50-59	5	4	9
	60-69	2	2	4
	70-79	2	0	2
	80-89	1	0	1
Total	44	38	82	
Fall from height	40-49	1		1
	Total	1		1
Drowning	20-29	1		1
	Total	1		1
Choking with asphyxia from foreign body aspiration	20-29	0	1	1
	30-39	1	0	1
	40-49	1	0	1
	Total	2	1	3

## DISCUSSION

Accidental death had been categorized as one of the manner of deaths.<sup>1-3</sup> It ranks amongst the most frequent manner of death in most previous medicolegal autopsies in Nigeria and Qatar.<sup>3,5,7,11,12</sup> This is consistent with the observation of this study where it accounted for more than two-fifth but less than half of the medicolegal deaths.

An accident has been described as an unintentional, unexpected, unforeseen and undesirable event which can occur at home, on highways, schools, workplace and recreational centres resulting in injury that may or may not be as a result of carelessness or ignorance on the part of the person(s) injured.<sup>5,13</sup> It therefore follows that this unexpected event can affect all age groups as depicted in the observation of this study where it has an age range that span from the 1<sup>st</sup> to 8<sup>th</sup> decade. This is consistent with the observation of previous studies.<sup>5,7</sup>

The mean age for those who died from accident-related fatalities was in the 4<sup>th</sup> decades as reported by Nwafor *et al.* and Uchendu *et al.*<sup>7,14</sup> This is comparatively similar to a mean age in the 4<sup>th</sup> decade as observed in this study.

The unintentional, unforeseen, unexpected and undesirable nature of an accident that may lead to accidental death brings to fore the importance of knowing its causes with the sole aim of minimizing or eliminating it. Globally, road traffic accidents (RTAs) are common cause of morbidity and mortality with particular reference to the developing world including Nigeria.<sup>15,16</sup> Giving credence to this observation, it was observed to be the major cause of accidental death in this study where it accounted for two-thirds of the mortalities recorded. This observation is also in keeping with those of previous studies where RTAs accounted for 63.6% to 88.7%.<sup>3,5,7,11,17-19</sup> Road traffic accidents involving vehicles were overwhelmingly more prevalent in comparison to pedestrian RTAs in this study. This is consistent with previous studies from the same environment that had observed that motor vehicular RTAs are the most common

cause of RTAs although to a much lower extent of 41.3% to 48% in comparison a far higher percentage (99.62%) as observed in our own study.<sup>3,7,20</sup> In this study, less than 1% of RTAs victims were pedestrians which is a far cry from what previous studies in the same environment had observed i.e. 27.6% to 37.1%.<sup>3,7,20</sup> The reasons for this wide disparity is not readily discernable, however, it gives an insight into the presence of a possible factor or factors that have brought about this observation. This is not only a window for future research work, but it also brings to fore that accidental death can either be reduced or eliminated. Previous studies from Karachi (Pakistan), Yazd (Iran), Chandigarh (Northern India) and Singh Guwahati, Assam (Indian) contrary to the findings of this study reported that pedestrian RTAs accounted for 39 to 67% of mortalities.<sup>21-24</sup> Singh *et al* attributed this observation as a reflection of the ignorance of traffic rules and also on the speed of the vehicles.<sup>24</sup>

Death from RTAs virtually affects all age group in this study. This is consistent with the documentation of the World Health Organization and also in keeping with previous medicolegal post-mortem studies that looked at RTA fatalities.<sup>23-26</sup>

Moharamzad *et al.* over a year carried out a post mortem study on the mortality pattern amongst traffic accident victims in Yazd, Iran.<sup>22</sup> They reported that the mean age of fatalities in their 251 study population was in the 4<sup>th</sup> decade.<sup>22</sup> This mean age is consistent with that observed in this study. The peak age observed in this study was in the 4<sup>th</sup> decade. This is comparatively similar to findings of previous studies that reported more RTAs related fatalities in the young productive age group.<sup>24,27</sup>

The World Health Organization had documented that males are more likely to be involved in RTAs than females. This is in keeping with the observations of this study and previous studies on RTAs fatalities at autopsies.<sup>23-25,29</sup> The reason for this male preponderance is due to the nature of work that exposes them to RTAs.<sup>24</sup>

Unintentional deaths from burns had been previously reported by various studies

in Nigeria to account for 0.6% to 8.9 % of accidental deaths.<sup>3,7,11,14,17,18,30,31</sup> This study reported a much higher frequency of burns related deaths. Victims of petroleum products related fire explosion in the Edo-Delta region are most likely to be referred to the UBTH for expert management and this may account for this observation.<sup>7,17</sup> More males died from burns related accidental deaths in this study. This is in keeping with the observations of previous studies in this same environment.<sup>3,7,17</sup> This is however contrary to Iliopoulou *et al.* from General District Hospital of Attica, Kat-Kiffissia, Greece who reported that more females died from burns related fatalities.<sup>32</sup>

Choking characteristically delineates an aero-digestive foreign body causing unpredictable amounts of obstruction to the airways,<sup>33</sup> while asphyxia, on the other hand, is a mode of death that is typified by respiratory disorder owing to decrease oxygen saturation in the blood or tissue level.<sup>34</sup> Unforeseen death from choking with asphyxia secondary to foreign body aspiration accounted for less than 1% of accidental deaths in this study. This is comparatively similar to the observation of a previous study by Akhiwu *et al.*<sup>17</sup>

Drowning characteristically encompasses a watery milieu and remains a serious public health concern, claiming an estimated 362000 lives per year worldwide across all socioeconomic groupings and has remained under close surveillance by the WHO and its signatories.<sup>35</sup> To this end, the definition of drowning involves suffocating by partial or complete submersion especially in water.<sup>36</sup> This study observed a very low occurrence rate (0.3%) of accidental drowning. This may be related to the few water bodies and its related activities in this environment.<sup>7</sup> Comparatively similar findings were observed by previous studies in the same locality,<sup>7,17</sup> while much higher occurrence rate of accidental drowning was also observed in other studies.<sup>3,14,18</sup>

Most accidental falls are seen in the elderly.<sup>7</sup> This is contrary to the observation of our own study that noted the age of fall as 42 years for the only case (0.3%) seen during the

study period. This finding is comparatively similar to that of a previous study in the same locality,<sup>7</sup> unlike Uchendu (8%) and Amakiri *et al.* (13%) that reported a much higher frequency of occurrence of accidental drowning.<sup>11,14</sup>

## CONCLUSION

RTA accounted for most cases of accidental deaths. Others were burns, choking secondary to foreign body aspiration, drowning and fall from a height in decreasing order of occurrence. In comparison to all previous accidental deaths in our own locality, the percentage of deaths due to burns has increased as seen in this study. Males are more commonly affected by accidental deaths and the young age subjects in this study had the highest frequency of accidental deaths. It is our expectation that the data thus generated from this study would re-enforce the findings of previous studies in our environment in particular and other parts of Nigeria in general that had reported that accidental deaths accounted for a high proportion of medicolegal postmortems, thus bringing to fore preventive measures as a veritable means of eliminating or reducing needless deaths.

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