

An Autopsy Review of Sudden Unexpected Natural Deaths at Benue State University Teaching Hospital, Makurdi, North Central, Nigeria

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Abstract

Objectives: In every population, the pattern of sudden unexpected natural deaths (SUNDS) is often associated with the epidemiologic profile of certain common killer diseases. The old narratives have been that infectious/communicable diseases are the most common reasons why people die in our locality. However, changing lifestyle, increasing literacy level, and urbanization in Nigeria must have impacted immensely on the causes of death. We, therefore, embarked on this study to determine the etiology and epidemiologic characteristics of SUND at Benue State University Teaching Hospital, Makurdi. **Materials and Methods:** A review of all cases of sudden unexpected deaths at Benue State University, Makurdi, Benue State, over a 5-year period, from March 2012 to February 2017. **Results:** A total of 125 medicolegal autopsies were performed over a 5-year period (2012–2017), 58 (46.4%) represented SUND. Thirty-five (60.3%) cases of SUND were due to cardiovascular disorders, comprising 26 males and 9 females with a male-to-female ratio of 2.9:1, while twenty-eight (80.0%) cases those who died from cardiovascular disorders were due to hypertensive heart disease. Twelve (20.7%) cases classified as SUND were due to central nervous system disorder, eight males and four females, having male-to-female ratio of 2:1. The remaining 11 (19.0%) cases of SUND were due to respiratory diseases comprising 9 males and 2 females with male-to-female ratio of 4.5:1. **Conclusion:** Cardiovascular, central nervous system, and respiratory disorders were the major causes of SUND. Systemic hypertension-related disorders constituted a large proportion, especially in the middle age group.

Keywords: Autopsy, North-Central Nigeria, sudden unexpected natural death

INTRODUCTION

Nonviolent, unexpected deaths occurring <24 h following the onset of symptoms are known as sudden unexpected natural deaths (SUNDS). In addition, the World Health Organization defines SUND according to International Classification of Diseases, version 10 as death, nonviolent, and not otherwise explained, occurring <24 h from the onset of symptoms.^[1,2]

Psychological and physical traumatic events, low or high body mass, arterial hypertension, old age, diabetes mellitus, smoking, and stress have been demonstrated in some studies performed in different countries as precipitants of SUND.^[3] SUND occurs in all age groups, and they are designated with different names according to the age groups. In infants, they are called sudden infant death syndrome; conversely, they

are simply known as SUND if such deaths occur in children, youths, adults, and elderly.^[3]

There is a dearth of data on the global incidence of SUND, however, studies from the Western world (Europe and USA) showed that SUND accounted for 20% of all deaths, 50% of which was attributed to cardiovascular disease.^[4,5] Other studies done in Nigeria also showed hypertensive heart disease topping the list of causes of SUND.^[6-11] We, therefore,

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embarked on this study to ascertain the pattern of SUND at a tertiary hospital in North-Central zone of Nigeria over a 5-year period (March 2012–February 2017).

MATERIALS AND METHODS

A descriptive retrospective autopsy-based study of SUND was carried out at Anatomical Pathology Department, Benue State University Teaching Hospital Makurdi, North-Central Nigeria. All postmortem records of cases adjudged as SUND performed between the periods of March 2012 and February 2017 were included in this study. Demographic data as well as postmortem diagnoses were retrieved from case files and autopsy records. The following data were extracted from the postmortem reports and patients’ case files: age, sex, circumstances surrounding death, organ weights, and morphologic findings.

Data were analyzed with Statistical Package for the Social Sciences software version 16. (Anatomical Pathology Department College of Health Sciences, Benue State University Makurdi, MAKURDI, State Benue Country Nigeria).

RESULTS

A total of 125 medicolegal autopsies were performed during the 5-year study periods [Table 1]. There were 58 cases of SUND with clinical and autopsy findings in compatible with objectives of the study [Table 2]. Out of the 58 cases of SUND, 43 cases were males (74.1%) and 15 were females (25.9%). The age ranged from 10 to 80 years with a mean age of 45.1 ± 19.5 years (mean ± standard deviation) [Figure 1].

Thirty-five (60.3%) cases of SUND were from cardiovascular disorders, representing 26 males and 9 females with a male-to-female ratio of 2.9:1. A further analysis of the cardiovascular causes of death, 28 (48.3%) died from hypertensive heart disease [Figure 2], 5 (8.6%) cases were due to pulmonary embolism, and 2 (3.4%) died from myocardial infarction. Twelve (20.7%) cases of SUND were due to the central nervous system disorders, comprising 8 males and 4 females with male-to-female ratio of 2:1. Deaths caused by central nervous disorder, subarachnoid hemorrhage accounted for 5 (8.6%), intracranial hemorrhage 5 (8.6%), and ischemic cerebrovascular disease represented 2 (3.5%). SUNDs resulting from respiratory disorders were 11 (19.0%), comprising 9 males and 2 females, with a male-to-female ratio of 4.5:1. Furthermore, of the respiratory disorders due to SUND, chronic obstructive pulmonary disease (asthma) were 3 (5.2%) and pulmonary tuberculosis 8 (13.8%) [Table 3].

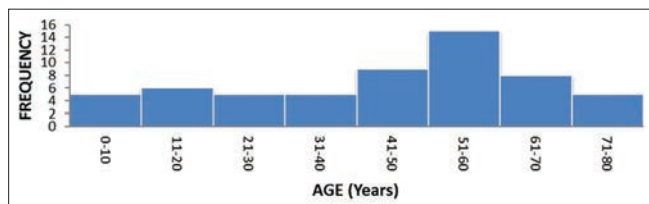


Figure 1: Age distribution of cases of sudden unexpected natural deaths

Table 1: 5-year review of medicolegal autopsies in Benue State University Teaching Hospital (2012-2017)

Cases	Frequency (%)
RTA	45 (36.0)
HHD	28 (22.4)
Perioperative death	10 (8.0)
TB	8 (6.4)
Homicide	8 (6.4)
SAH	5 (4.0)
Intracranial hemorrhage	5 (4.0)
Institutional death	4 (3.2)
Drowning	3 (2.4)
COPD	3 (2.4)
Pulmonary embolism	2 (1.6)
MI	2 (1.6)
Ischemic cerebrovascular disease	2 (1.6)
Total	125 (100.0)

RTA: Road traffic accident, HHD: Hypertensive heart disease, TB: Tuberculosis, SAH: Subarachnoid hemorrhage, MI: Myocardial Infarction, COPD: Chronic obstructive pulmonary disease (asthma)

Table 2: Causes of sudden unexpected natural deaths from autopsy findings from 2012 to 2017

Cause of sudden unexpected natural deaths	Frequency (%)
Cardiovascular	
HHD	28 (48.3)
Pulmonary embolism	5 (8.6)
MI	2 (3.4)
CNS	
SAH	5 (8.6)
Intracranial	5 (8.6)
CVA	2 (3.4)
Respiratory disorder	
Asthma	3 (5.8)
TB	8 (13.8)
Total	58 (100.0)

CNS: Central nervous system, HHD: Hypertensive heart disease, MI: Myocardial Infarction, SAH: Subarachnoid hemorrhage, CVA: Cerebrovascular Accident, TB: Tuberculosis

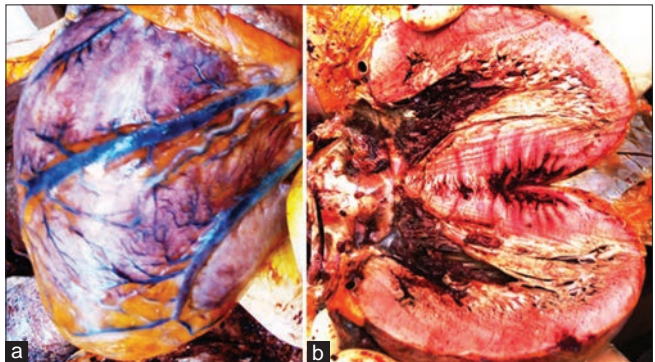


Figure 2: Hypertensive heart disease. (a) Markedly enlarged heart with engorged coronary vessels weighing 820 g (Ref: 250–350 g) belonging to a 47-year-old male who died suddenly in his sleep. (b) Systemic (left-sided) hypertensive heart disease with a marked concentric thickening of the left ventricular wall causing reduction in lumen size

Table 3: Cross tabulation of gender distribution and cause of sudden unexpected natural deaths

Gender	Cause of sudden unexpected natural deaths		
	Cardiovascular	CNS	Respiration
Male	26	8	9
Female	9	4	2
Total	35	12	11

CNS: Central nervous system

DISCUSSION

The pattern of SUND is known to reflect the disease pattern prevalent in any particular population. SUNDs are important public health problem worldwide. Any injury, disease, or anomalies that initiate the cessation of function of heart, lung, and brain is known as the cause of death.^[12] This study revealed that cardiovascular, central nervous system as well as respiratory system accounted for 60.3%, 20.7%, and 19.0% of cases, respectively. The study further demonstrated that hypertensive heart disease was the single most common cause of sudden unexpected natural death accounting for 80.0% of cardiovascular causes. In an autopsy study performed in India which involved fifty cases aged between 28 and 80 years who died suddenly, hypertensive heart disease was the cause of death in 82% of the cases and only 18% were previously diagnosed, whereas 4% of cases died of acute myocardial infarction.^[13] Hypertension is the most common cardiovascular disease among Africans.^[14] Its major disease association, atherosclerosis, and hypertensive heart disease are a prominent disorder that causes mortality.^[15] In Nigeria, hypertension has a high prevalence which range from 8.0% to 46.4%.^[15,16] Moreover, it is known that majority of people are unaware of their hypertension and so remains untreated until complications set in or they die suddenly.^[2] In a review of 2529 medicolegal autopsies by Rotimi *et al.* over a 10-year period (1987–1997) in a teaching hospital at Ile-Ife, Nigeria, 79 were found to be cases of hypertensive heart disease.^[7] In addition, studies have shown that the level of awareness of hypertension was low among Nigerians, and this was corroborated by Oladapo *et al.*, who reported a very low level of awareness of the disease in only 14.2% of people suffering from hypertension in South West Nigeria.^[17] Okani *et al.* in a study done at Ibadan, South-West, Nigeria to determine the causes of death, other than that due to prostate cancer, cardiovascular diseases (hypertensive heart disease, coronary heart disease, and cardiomyopathy) were the most common causes of death accounting for 38% of all deaths.^[18] Furthermore, our findings in this study corroborate that SUNDs were commonly caused by cardiovascular disease, constituting 60.3% of all cases. Hypertensive heart disease constituted 48.3% of all causes of sudden cardiac deaths. These findings are similar to some related studies done in Jos (North-Central Nigeria) and other geographic zones of Nigeria.^[2,3,7,8,18] Hypertensive heart disease is considered to be an independent risk factor for sudden cardiac death.^[19]

This study also revealed male preponderance with a male-to-female ratio of 2.9:1 with regard to cardiovascular causes. It is interesting to note that these findings are similar to what has been reported in different parts Nigeria and other regions of the world.^[2,8] This gender disparity may not be unconnected with the cardioprotective effect of estrogen in premenopausal women as opposed to the testosterone which is known to influence increment in the cardiovascular risk.^[20-23] More so, life depends on the functional integrity of cardiovascular system, respiratory and nervous system, and failure of any one of these systems will surely affect the other two, which may ultimately culminate to death. Deaths from cardiovascular system disorders are usually associated with hypertensive heart disease which can occur at any time of the day or during activity. Nnoli *et al.* in Calabar show that a significant number of individuals who die suddenly with a history of hypertension has only left ventricular hypertrophy with or without severe atherosclerotic or coronary arteries diseases. Most deaths were found to be associated with a history of systemic hypertension.^[24] In consonance with this concept, our study demonstrated cases with morphological evidence of hypertension in the heart.

CONCLUSION

This study demonstrated that SUNDs due to cardiovascular disorders with emphasis on hypertensive heart disease were common in our environment. It is, therefore, important to create awareness for the need for a regular medical checkup so as to control the high rate of cardiovascular disorders in our society.

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Conflicts of interest

There are no conflicts of interest.

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