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An Autopsy Study of the Trends in Childhood Deaths in Lagos, Nigeria

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Abstract

Background: Autopsy has long been considered the gold standard for determining the cause of death, assisting in medical education, and evaluating the quality of medical care. A significant decline in the autopsy rate has been observed globally over the decades. A literature search revealed numerous studies in Nigeria and across Africa; unfortunately, these relied on verbal autopsies.

Objectives: To examine the pattern of causes of death in childhood using autopsy findings.

Methods: This was a 21-year retrospective autopsy study of paediatric deaths in a Nigerian teaching hospital. The standard autopsy dissection was done, and autopsy reports were retrieved from the archive. The cut-off age was 18 years, while decomposed bodies were excluded.

Results: Five hundred and twenty-one autopsies represented a rate of 3.2% and a male-to-female ratio of 1.3:1. The adolescent age was the most common. RTAs were the most common cause of childhood death (29.2%), infection was next (18%), while asphyxia deaths (12.1%) and burn injuries (10.6%) closely followed.

Conclusion: The predominance of males corroborates the previous knowledge on this research theme. The early adolescent age was the most common age group encountered, while road traffic accident was the leading cause of death.

Keywords: Autopsy, Asphyxia deaths, Childhood burn injuries, Childhood deaths, Road Traffic Injuries.

Introduction

Postmortem examination has long been considered the gold standard method for determining the cause of death, assisting in medical education, and evaluating the quality of medical care. [1,2] It could also assist in identifying the manner of deaths, genetic counselling, putting closure to the death, and diagnosing new diseases, particularly in paediatric age.

Several postmortem studies in the paediatric and adult age groups have reiterated the significance of autopsies in providing valuable information concerning deaths. [1,3-8] Adult autopsy studies have also revealed that about 1 in 10 autopsies will show new major diagnoses that, if discovered *ante mortem*, could have led to a change in the clinical management of the patient, and this could have facilitated survival or led to prolonged

survival. [1,3,8] Similar findings have also been demonstrated in paediatric autopsy studies. [3-8] Postmortem examination after a paediatric death could also provide a clue as to the manner of death. Deaths hitherto labelled as being natural could, in turn, be discovered to be a suicide or homicide. This could only be ascertained by a proper postmortem examination.

The authors are aware of a significant fall in the autopsy rate over the decades in Western countries, [9] and this was due to newer diagnostic and imaging studies, problems in getting consent from parents and a lack of interest from clinicians. [1,2,9] The same decline in autopsy rates, particularly in children, had also been observed in developing countries, including Nigeria. Akang *et al*. noted a significant decrease in autopsy rates at Ibadan, Nigeria, from 60% in 1961 to 18% in 1988. [10]

Apart from the autopsy study of Akang *et al.,* [10] few studies have been done on the autopsy of paediatric deaths in Nigeria. The authors noted a study by Ugiagbe *et al.* [11] However, this study focused on neonates in Benin City, Nigeria. Although a thorough literature search revealed numerous studies in Nigeria and Africa, unfortunately, these were verbal autopsies on paediatric mortalities. [12-15] Verbal autopsy has its limitations, and it is not the scope of this work to delve into the merits and demerits of verbal autopsies. In light of the aforementioned observations, the present study aimed to examine the distribution and pattern of the causes of death by autopsy in the paediatric population.

Methods

This is a 21-year retrospective autopsy study of all paediatric deaths admitted into the morgue of the Lagos State University Teaching Hospital, Ikeja, between 1st January 2004 and 31st December 2024. All these cases were sent to the Department of Pathology and Forensic Medicine. This department had eight consultant pathologists and five registrars undergoing their residency training program. The department also serves as the state's centre for medicolegal autopsies; this partly accounts for the increase in the number of autopsies at this centre.

Consents for these autopsies were routinely obtained from clinicians, parents and where the death was classified as a medicolegal autopsy, such consents were obtained from the coroners (Magistrates). Ethical approval was obtained from the departmental ethics committee and the Chief Medical Examiner. This was to grant access to the full autopsy reports.

The standard autopsy dissection was adopted, and where indicated, special dissections were performed. Such special dissections included neck dissection to establish injuries to the neck in suspicious cases of gagging, manual or ligature strangulation. All the organs were eviscerated in blocks and then dissected. Histology samples were retained for microscopic examination. Toxicological examinations were done in rare cases. These microscopic findings were then combined with the gross anatomical and pathological findings to arrive at the causes of death.

Inclusion criteria

1. All deaths with ages below 18 years.
2. All embalmed bodies with ages less than 18 years.

Exclusion criteria

1. Decomposed bodies.
2. Cases with no clinical history (destitute recovered from the streets of the city).

The data retrieved from the autopsy reports included the demographic profile and autopsy findings. Where applicable, contacts were made with the registered next of kin to provide dates of birth of decedents.

Data analysis

The data retrieved were analysed using IBM Statistical Package for the Social Sciences (SPSS) version 27.0 (USA) and presented as percentages and bar charts.

Results

Out of 16437 autopsies, 521 were paediatric, thus representing 3.2% of all autopsies over the study period. The male gender constituted 56.4% (n = 294) while females accounted for 43.6% (227), thus giving a male-to-female sex ratio of 1.3 to 1. Figure 1 shows the age distribution of deaths. The adolescent age was the most common (55%). This represented slightly over half of the study population. The preschool and school ages accounted for 13.2% and 27.6%, respectively. Neonatal and infantile deaths were not seen in this study.

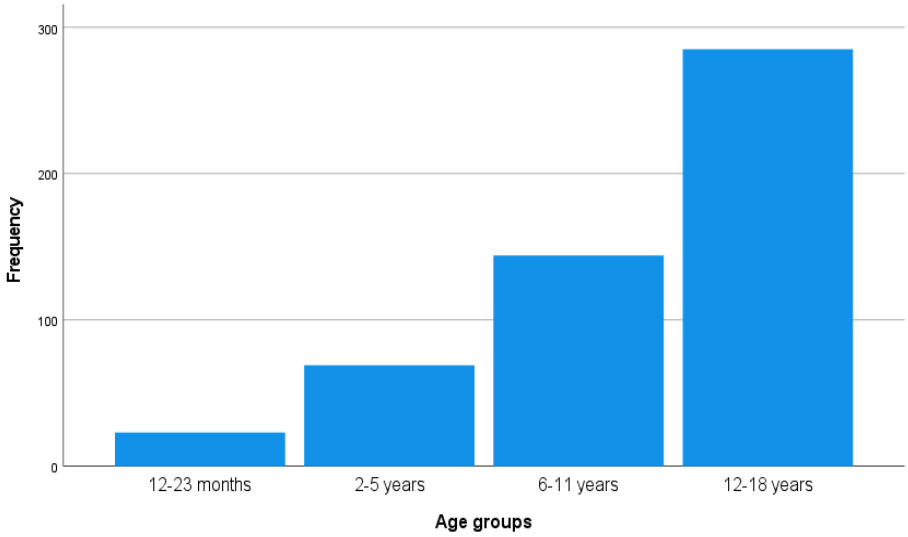

Figure 1. Age distribution of childhood deaths

The various causes of childhood deaths are shown in Figure 2. Apart from road traffic accidents, which constituted 29.2%, the next most common cause of death was infectious diseases. The latter accounted for 18.0%. Other causes of death included asphyxia deaths (12.1%) and burn injuries (10.6%), heart failure (5.0%), haemoglobinopathies (4.8%) and gunshot injuries (4.6%). Road traffic accidents were fewer among bystanders and passengers, whereas they were relatively common among pedestrians, particularly in the 6-11-year age group. Overall, it was most common among adolescents (12-18 years), as shown in Figure 3.

As regards infections, septicaemia (30%) was the most common cause of mortality and was seen significantly in the adolescent age group. Next to this were pneumonia and enterocolitis, accounting for 16% each (Figure 4). Drowning was the most common cause of asphyxial deaths (13%). This was closely followed by aspiration (12%). Carbon monoxide poisoning and electrocution represented 8.0% and 6.0%, respectively, as shown in Figure 5.

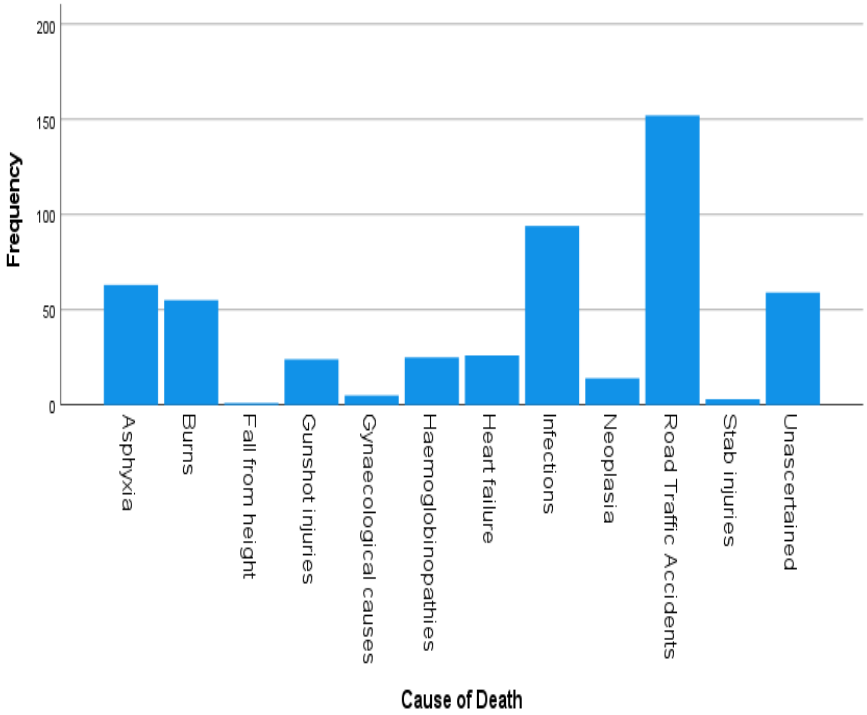

Figure 2: Distribution of the causes of death

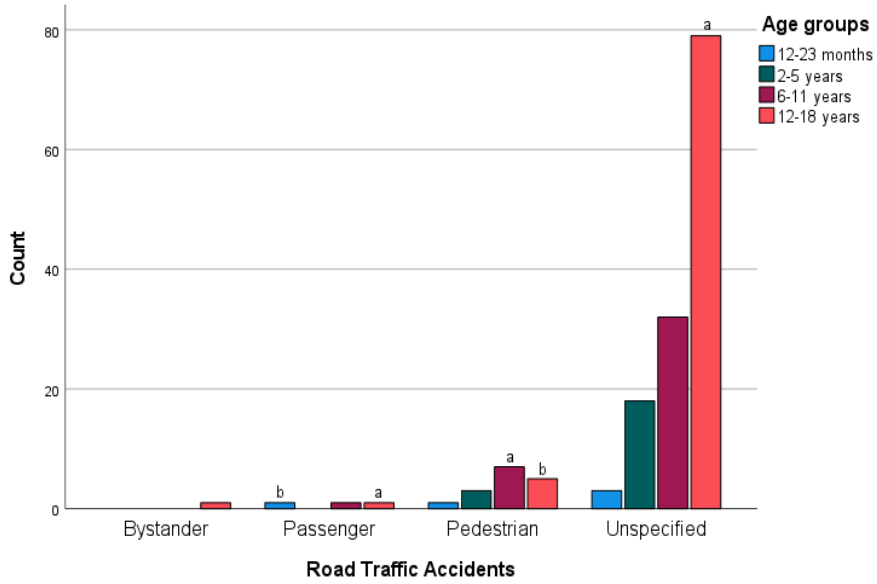

Figure 3: Age group distribution of victims of Road Traffic Accidents

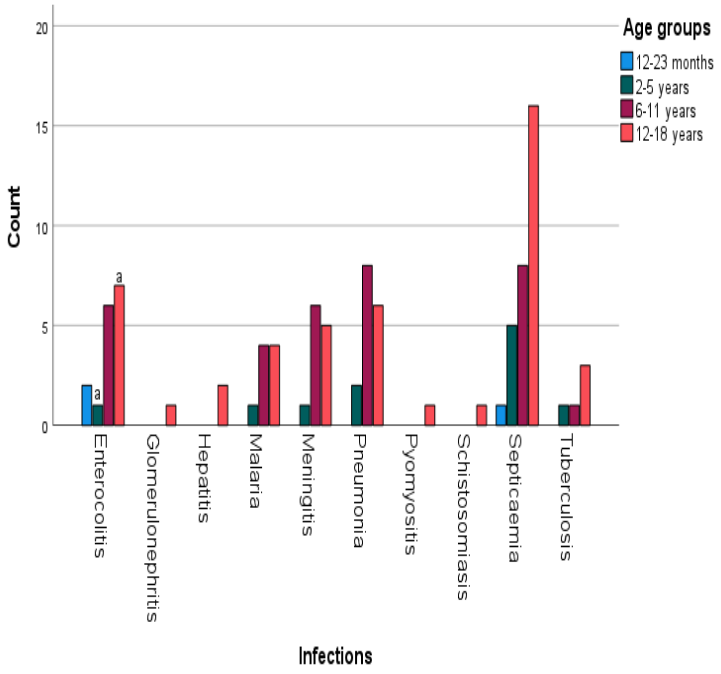

Figure 4: Age distribution of infectious causes of death

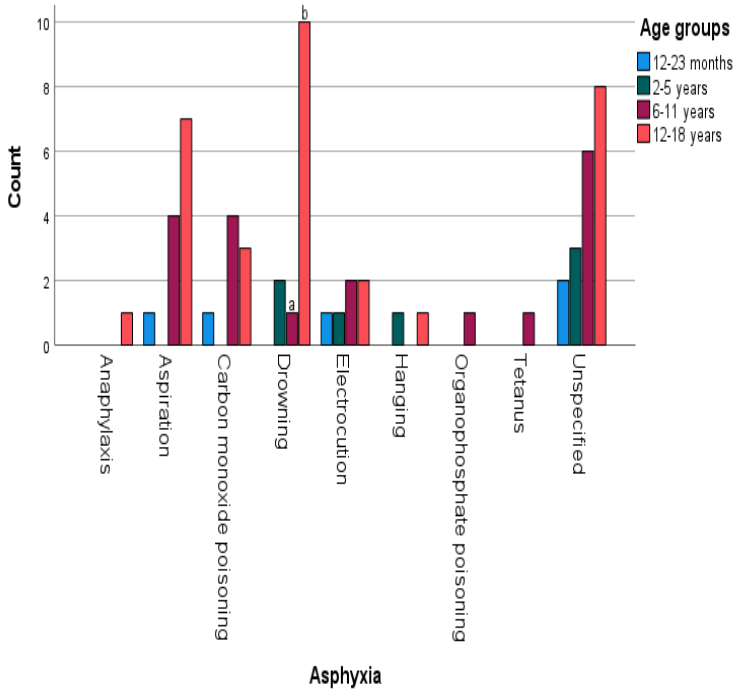

Figure 5: Age distribution of asphyxia deaths

Discussion

The main aim of this study was to look at the various causes of paediatric deaths in a tertiary health care facility, where the Office of the Chief Medical Examiner is domiciled. It is worth noting that neonatal deaths and infant deaths were not seen in this study. This could be attributed to parents declining an autopsy or frequently requesting a minimally invasive autopsy, and occasionally the failure of the attending physicians to make formal requests for autopsies. The latter is probably hinged on the physician's belief or impression that the cause of death was already established clinically, and therefore, postmortem examination might not add value. It is believed that if the facility had agreed to limited or minimally invasive autopsies, as is usually requested by the parents, the autopsy rate could be higher. Unfortunately, the facility does not, as a matter of policy, support such practices.

The aforementioned reasons would explain why the paediatric autopsy rate in this facility was 3.2%. This is a far cry from the rates of 10.6%, 12% and 15% in South Africa, the UK and the US, respectively. [16-18] The authors suggest that even if a clinical impression had been made *ante mortem*, an autopsy could still be requested, as this serves as a form of final clinical auditing.

The present study revealed male dominance, which corroborates an earlier study by Akang *et al.* [10] at the University College Hospital in Ibadan, in another part of southwest Nigeria, three decades ago. Similar observations were noted by Fagbule *et al.* in Ilorin, Nigeria; Ghana; the Gambia; Egypt; and India. [19-23] The adolescent age (12-18 years) was the most common age group (55%) encountered in the present study. This finding differs strikingly from the observations of previous studies conducted in Ibadan, Ilorin, and the Gambia, [10, 19, 21], respectively, which reported that the preschool age was the most commonly encountered age group.

In medicolegal autopsies, the manner of death is usually classified as accident, natural, homicide, suicide or undetermined. The most common cause of death in the present study was road traffic accidents. This accounted for 29.2% of the study population. The study corroborates a similar research work done in Ghana, where road accidents constituted 33% of the mortality in an autopsy study. [20] The cosmopolitan nature of Lagos, where the study was done, could contribute significantly to this observation. The most common cause of natural death in this study was infections, similar to previous studies in Ibadan,[10] Ilorin,[19] Gambia,[21] Egypt,[22] and India. [23] Septicaemia, enterocolitis, pneumonia and malaria accounted for most of these infections. The same array of underlying causes of the infectious diseases was observed in most previous studies. [10, 19, 22]. We, however, noted a striking observation in those previous studies done decades ago. In that study, tetanus and measles accounted for a significant proportion of infections, particularly in the work of Akang *et al.*[10] This may be due to the high prevalence of childhood infections resulting from poor or unavailable immunisation programmes at that time. This is, in a way, a testament to the significant reduction in vaccine-preventable childhood diseases.

Asphyxia deaths, depending on the underlying cause, could be suicidal, homicidal or a natural cause of death. In this study, drowning and aspiration (choking) were the leading causes of asphyxia deaths. Other causes, such as carbon monoxide poisoning and electrocution, were also observed.

Limitations

The clinicians did not request neonatal and infantile autopsies, and as such, the causes of death in these age groups could not be determined. If these were done, the findings would have been compared with studies from other centres within and outside Nigeria. The authors will recommend that infantile and neonatal autopsies be encouraged even if the cause of death is seemingly known. Second, the lack of toxicological facilities and the high cost of sending these samples abroad for toxicological analysis contributed significantly to the limited number of toxicological examinations conducted in this study. This large number of cases (59) was categorised as undermined in this study. Toxicology could have further assisted in the determination of the causes of death with greater certainty.

Conclusion

This research work revealed a paediatric autopsy rate of 3.2% with a male predominance. The predominance of the adolescent population may agree with the fact that most of the deaths resulted from road traffic accidents. Public health interventions are required to reduce the burden of road traffic accidents and infectious diseases.

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Authors' Contributions: SSS conceived and designed the study. OOO and OJO managed data curation. MAI, SDA and OOO analysed and interpreted the data. SSS, MAI, SDA and OOO drafted the manuscript. FFA and OJO revised the draft for sound intellectual content. All the authors approved the final version of the manuscript.

Conflicts of interest: None declared.

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