

## Research Article

# Mortality audit in the paediatrics department of the University of Uyo teaching hospital, Uyo, Nigeria

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## ABSTRACT

**Background:** There has been a world-wide reduction in under-five mortality rate since 1990 by almost half. Despite this global reduction, about 17,000 children under the age of five years die daily, and a significant proportion of these deaths occur in sub-Saharan Africa, with Nigeria having an U5MR of 117/1,000 live births. The study aims to identify the age at death and cause of death of hospitalized children in this center, as well as describe the pattern of mortality.

**Methods:** The study was conducted at the Department of Paediatrics of the University of Uyo Teaching Hospital (UUTH), Uyo, Akwa Ibom State, Nigeria, and it was a descriptive, cross-sectional and retrospective review of all the deaths among the hospitalized children from 1st January 2009 to 31st December 2014. Case files of all in-patient deaths during the period under review were studied.

**Results:** A total of 772 deaths were recorded during the period under review. Of these 772 deaths, 453 (58.7%) were males and 319 (41.3%). Four hundred and thirty nine deaths (56.9%) were among children aged less than one month. More of the deaths occurred at about the month of March, while cumulative deaths were highest in the 15th hour of the day. The leading causes of death were prematurity, asphyxia, bronchopneumonia, septicaemia, severe malaria and malignancies.

**Conclusions:** This study demonstrates that childhood mortality is still high, with the common causes of death being the preventable and treatable infectious diseases.

**Keywords:** Mortality, Audit, Neonate, Infants, Child, Preventable

## INTRODUCTION

Globally, there has been a reduction in child deaths since 1990, with the under-five mortality rate (U5MR) declining by 49%.<sup>1</sup> This decline in the U5MR is mainly as a result of the reduction in rates in countries with speedy economic development.<sup>2</sup> However, this reduction still translates to the deaths of 17,000 children under age five per day worldwide as at 2013.<sup>1</sup> A significant proportion of these deaths occur in sub-Saharan Africa (SSA),<sup>3</sup> with Nigeria losing 2,300 under-five year olds per day, with an U5MR of 117/1,000 live births, and a rank of 9th in the league table of under-five mortality

rates.<sup>3-5</sup> This is important considering the fact that the Millennium Developmental Goal (MDG) 4, which addresses a reduction of childhood mortality still remains an unmet target in Nigeria.<sup>6-9</sup>

Painfully, most of these childhood deaths are due to preventable or treatable infectious diseases.<sup>3,4</sup> Diseases such as malaria, pneumonia, diarrhoea, measles and HIV/AIDS account for more than 70 per cent of the under-five deaths in Nigeria.<sup>4</sup> Improving progress in child survival will entail that more attention be paid to preventable deaths.<sup>1</sup>

Mortality audits are therefore important to identify modifiable factors,<sup>10</sup> ensure quality improvement,<sup>11</sup> and improve hospital practice to the benefit of parents/caregivers and healthcare workers.<sup>12</sup>

This study which has not been previously conducted at this center (the University of Uyo Teaching Hospital [UUTH]), aims to identify the age at death and cause of death of hospitalized children in this center, as well as describe the pattern of mortality during the period under review. It is hoped that it will add to the body of knowledge on this subject concerning Nigerian children, and provide a rational framework for decision-making among health policy makers and planners.

## METHODS

The study was conducted at the Department of Paediatrics of the University of Uyo Teaching Hospital (UUTH), Uyo, Akwa Ibom State, Nigeria. Akwa Ibom State is one of the 36 states in Nigeria and is located in the south-south geopolitical zone. The state shares boundaries with Rivers state on the west, Cross River state on the east, Abia and Imo states on the north, and the Atlantic Ocean on the south.<sup>13</sup>

The current report is a descriptive, cross-sectional and retrospective review of all the deaths among the hospitalized children from 1st January 2009 to 31st December 2014.

The diagnosis of the disease entities were done by the attending physicians on the basis of the clinical features and the laboratory results that were obtained.

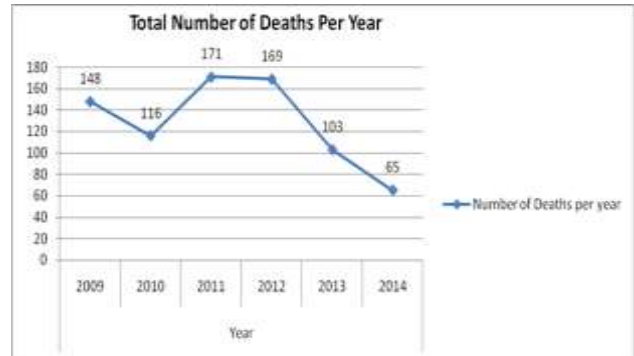
Case files of all in-patient deaths during the period under review were studied. The relevant information extracted included age, sex, date and time of admission, date and time of death, and diagnosis.

The statistical analysis was basic descriptive statistics.

## RESULTS

A total of 772 deaths were recorded during the period under review (1st January 2009 - 31st December 2014). Of these 772 deaths, 453 (58.7%) were males and 319 (41.3%), giving a male: female ratio of 1.4:1.

The total number of deaths per year were 148 (year 2009), 116 (year 2010), 171 (year 2011), 169 (year 2012), 103 (year 2013) and 65 (year 2014). This is shown in Figure 1.

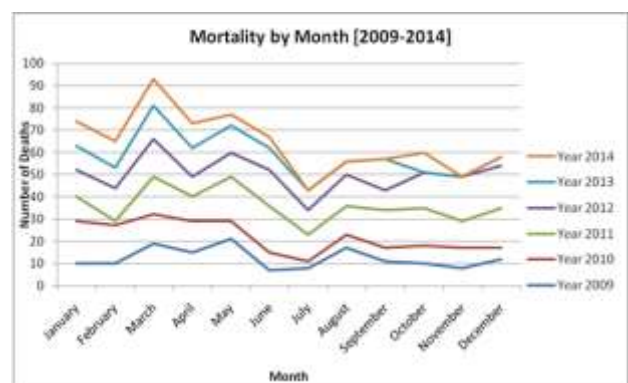


\*Records for the total number of admissions were available only for 2013 and 2014. These records show that in 2013 there were a total of 2,514 admissions, out of which there were 103 deaths (giving a death rate of 4.1%), while in 2014 there were 2,085 admissions, out of which there were 65 deaths (giving a death rate of 3.1%).

**Figure 1: The total number of deaths per year\*.**

Of the total of 772 deaths recorded during the period under review (1st January 2009 - 31st December 2014), four hundred and thirty nine deaths (56.9%) were among children aged less than one month, while 120 deaths (15.5%) were among children aged 1 month - year. Ninety two deaths (11.9%) were among children aged more than 1 year - 5 years, while 121 deaths (15.7%) were among those aged more than 5 years. Across all these age groups, the males were more than the females.

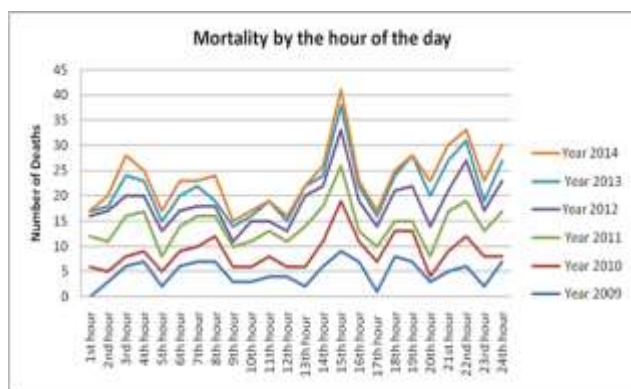
Across the years under review more of the deaths occurred at about the month of March (Figure 2). Also, cumulative deaths (2009 – 2014) were highest in the month of March.



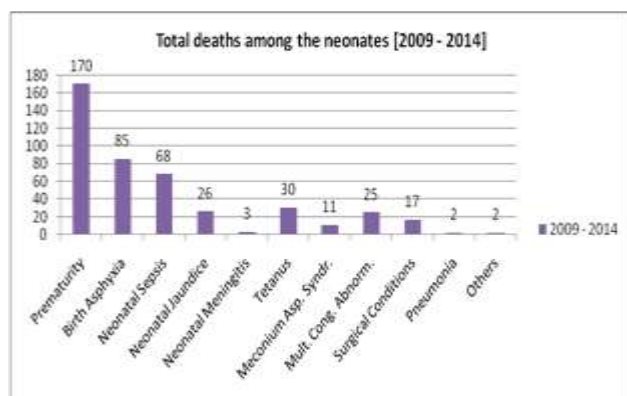
**Figure 2: Mortality by month of the year.**

Across the years under review, more of the deaths occurred at about the 15th hour of the day (Figure 3). Also, cumulative deaths (2009 – 2014) were highest in the 15th hour of the day.

Out of the 439 deaths among the neonates, prematurity (170 [38.7%]) was the commonest cause of death followed by asphyxia (85 [19.4%]). This is represented in Figure 4.



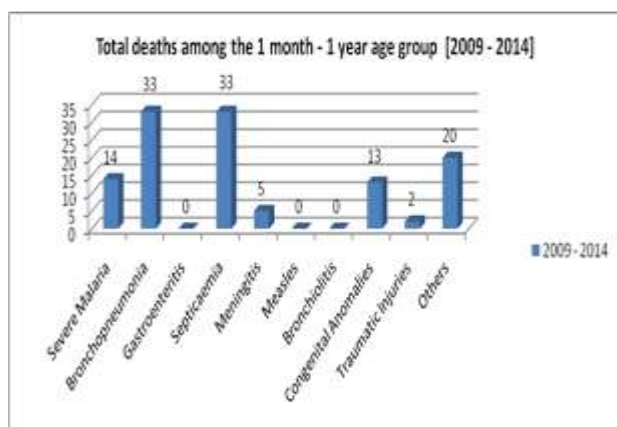
**Figure 3: Mortality by hour of the day.**



\*: Other less common causes of death among the neonates include acute blood loss with severe anaemia

**Figure 4: Neonatal deaths\*.**

Among the 1month - 1 year age group, the joint commonest causes of death were bronchopneumonia and septicaemia (33 [27.5%] each). This is represented in Figure 5.

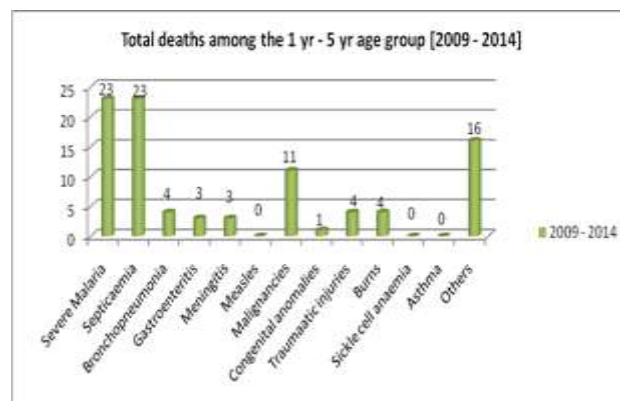


\*: Other less common causes of death in this 1 month - 1 year age group were foreign body aspiration, burns, malignancies and paediatric AIDS.

**Figure 5: Deaths among the 1 month - 1 year age group\*.**

Among the 1 year - 5 year age group, the joint commonest causes of death were severe malaria and

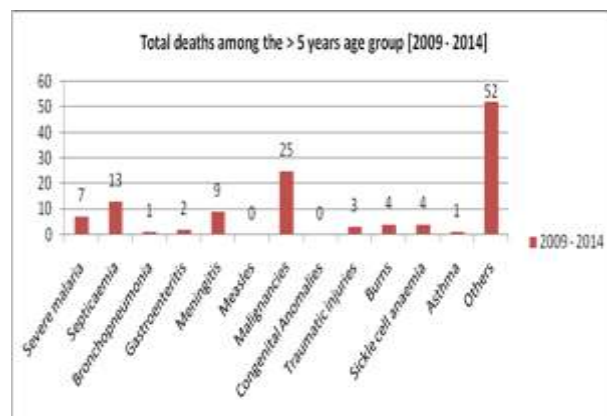
bronchopneumonia (23 [25.0%] each). This is represented in Figure 6.



\*: Other less common causes of death in this 1 year - 5 years age group include rabies, foreign body aspiration, protein-energy malnutrition, tuberculosis and paediatric AIDS.

**Figure 6: Deaths among the 1 year - 5 year age group\*.**

Out of the 121 deaths among the > 5 year age group, malignancies (25 [20.7%]) were the commonest cause of death followed by septicaemia (13 [10.7%]). This is represented in Figure 7.



\*Other less common causes of death among this > 5 years age group include tetanus, rabies, Stephen-Johnson's syndrome, cavernous sinus thrombosis, nephrotic syndrome, acute renal failure, tuberculosis and pediatric AIDS.

**Figure 7: Deaths among the > 5 year age group\*.**

## DISCUSSION

The total deaths per year showed a marked decline in the years 2013 and 2014. This may be attributed to the overall decrease in patient load which corresponded to periods of industrial strike action embarked upon by various cadres of health workers in the hospital.

Deaths were more common in males than females across all the age groups studied. This higher levels of deaths among males have been documented in several studies.<sup>14-</sup>

<sup>20</sup> In most countries in the world, males have higher mortality than females at every age.<sup>21,22</sup> The possible reasons for this include the fact that boys are biologically weaker and more susceptible to diseases and premature death, as a result of sex differences in biologic and genetic makeup.<sup>22</sup>

This study revealed that across the years under review, more of the deaths occurred at about the month of March, with cumulative deaths highest in the month of March. March is usually the start of the rainy season in Uyo, Akwa Ibom State, Nigeria. Similar results showing increased mortality during the rainy season, have been obtained by other researchers.<sup>17,23-25</sup> This is principally due to an increase in the prevalence of malaria, pneumonia, gastroenteritis and water-borne diseases during this period.<sup>25</sup>

A very striking finding in this study was that more of the deaths occurred at about the 15th hour of the day, with cumulative deaths highest in the 15th hour of the day. This is in contrast to the study by Romer et al, in Mulago Hospital, Kampala, Uganda, who found that significantly more deaths occurred at night with 350 (55%) during the night shift and 281 (45%) during the day.<sup>26</sup> A plausible explanation for the finding in our study is that this 15th hour (2pm - 3pm) represents a transition period between the duty shifts of health workers at the various service units in the department. As a result, the accompanying "hand-over" activities may result in diminution of attention of health workers to the ill children on admission.

Newborns in the first month of life account for an increasing share of child deaths.<sup>27</sup> In this study, neonatal deaths accounted for more than half of all the deaths. This is similar to the finding by Forae et al, in Benin City, Nigeria, where neonatal deaths accounted for the most common cause of death.<sup>20</sup>

Among the neonates in this study, prematurity was the commonest cause of death followed by asphyxia. This pattern has been observed in previous studies.<sup>15,17,18,28</sup> However, it contrasts with other studies that have found the respective 1st and 2nd commonest causes of death in neonates to be tetanus and prematurity/low birth weight, asphyxia and sepsis, asphyxia and prematurity, tetanus and prematurity, asphyxia & jaundice.<sup>19,29-32</sup>

The joint commonest cause of death among the 1 month to 1 year age group was bronchopneumonia and septicaemia. This is similar to the finding by Forae et al, but it is different from the findings by Elusiyan et al, George et al, and Ezeonwu et al, who respectively found severe malaria & bronchopneumonia, HIV/AIDS & bronchopneumonia, and diarrhoeal disease & respiratory tract infections as the top two common causes of death in this age group in their studies.<sup>14,20,23,33</sup> Be that as it may, bronchopneumonia appears to be a recurring decimal as a cause of death in this age group because most of the

"definite risk factors" for childhood pneumonia are related to this age group, and these include: malnutrition (weight-for-age z-score < -2); low birth weight ( $\leq 2500$  g); non-exclusive breastfeeding (during the first 4 months of life); lack of measles immunization (within the first 12 months of life); indoor air pollution; and crowding.<sup>34</sup>

Among the 1 year - 5 year age group, the joint commonest cause of death were severe malaria and bronchopneumonia. This agrees with the findings in the study in Enugu, Nigeria, by Ibeziako & Ibekwe, but contrasts with other studies, which respectively found HIV/AIDS & bronchopneumonia, and anaemia & sepsis as the top two common causes of death in this age group in their studies.<sup>35,23,32</sup>

Deaths occurring in the more than 5 years age group in this study were most commonly caused by malignancies and septicaemia. This is different from others that have found the top two common causes of death in this age group to be malaria & sepsis, severe malaria & malignancy, malignancy & HIV/AIDS, severe malaria & sepsis,<sup>33</sup> malignancy & severe malaria.<sup>14,23,29,36</sup>

One major problem of care identified in the audit was the increased mortality observed at the 15th hour which coincides with the handing-over activities of the health workers. Our recommendations on interventions to reduce deaths include the employment of adequate number of health workers not only to help improve care, but to have enough staff on ground who are not involved in handing over activities; training and retraining of staff (both doctors and nurses); the provision of adequate facilities for care; the provision of health care insurance - many parents who bring their children to hospital cannot readily afford health care, and this usually constitutes a hindrance because the payments for healthcare services in the hospital are mostly out-of-pocket.

Quality of care can also be improved in the hospital by reducing the processing/waiting time of patients from the point of payment to accessing of care. Certainly a prospective study to re-audit our services will be more informative.

The limitations of the study included incorrect or missing data. Also, multiple causes of death were included in some cases and it was unclear which the primary cause of death was.

## CONCLUSIONS

Childhood mortality in this study is still high, with neonatal deaths accounting for more than half of the deaths, and males more commonly affected than females across all the age ranges.

The common causes of death are the largely preventable and treatable infectious diseases. The rainy months,



particularly in March, and mid-afternoon being associated with higher mortality rates.

There is need to for advocacy to be consistently conducted at facility and community levels to improve the awareness and care-seeking behaviour of parents and caregivers, as well improve hospital practice to the benefit of all. This will go a long way in the collective effort to achieve the MDG 4.

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