

# Ophthalmic Mortality In A Tertiary Eye Care Centre In South-Eastern Nigeria

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## Abstract

**Objectives:** To determine the prevalence, and causes of death among ophthalmic inpatients at the University of Nigeria Teaching Hospital (UNTH), Enugu, Nigeria. **Methods:** The eye ward admission/discharge records from January 1997-December 2008 were examined to determine the number of admissions and deaths; their recalled clinical charts provided data on demography, clinical diagnosis, clinical and post-mortem causes of death. The number of admissions and deaths, at UNTH, during the study period, were also obtained. Data was analysed to yield percentages, frequencies, and proportions. **Results:** Of the 2,574 ophthalmic admissions consisting of males- 58.3% and females -41.7% , there were 9(0.3%) deaths comprising of 4 males and 5 females. The mortality cases were managed for retinoblastoma-3, choroidal melanoma-1, metastatic orbital malignancy-2, rhino-orbital mucormycosis-1, congenital cataract-2, and congenital glaucoma-1. Peri-operative anaesthetic complications-5, septicemia-2, and disseminated carcinomatosis-2 were the causes of death. **Conclusions:** The inpatient ophthalmic mortality rate at UNTH is low. Majority of the deaths were avoidable. Adequate pre-operative screening, timely presentation of cases, and provision of adequate resources for management of life threatening eye conditions would reverse the trend.

## INTRODUCTION

A mortality outcome in the management of any disease condition sign posts failure of therapeutic interventions aimed at cure, control, or palliation. Often, this is attributable to late presentation, inadequate care, or inherently fatal natural course of the disease process. Compared with other medical specialties, mortalities arising from pathologies of the eye and its adnexae are relatively uncommon<sup>1</sup>. Worldwide, there exists an inter-regional variation in the rate and causation of ophthalmic mortality. In the resource deficient third world setting, ophthalmic mortality rates are higher and often attributable to avoidable and potentially treatable causes like peri-operative complications, severe infections, and orbito-ocular malignancies.<sup>1-5</sup>. Contrarily, in developed economies, where facilities are available and access barriers to optimal eye care have been largely overcome, the rates are lower and mainly due to unavoidable causes<sup>6,7</sup>. Peri-operative mortality following ophthalmic surgical intervention in an apparently systemically normal individual is unfortunate considering the minimal systemic haemo-dynamic changes induced by ophthalmic surgical procedures<sup>8</sup>. Majority of such deaths are

avoidable and often result from surgical, anaesthetic, or administrative lapses in the peri-operative management of the patient<sup>9</sup>. Meticulous pre-operative evaluation, preferably in a pre-operative anaesthetic clinic, appropriate pre-operative cross-consultation with other medical specialties, and provision of resources for adequate anaesthetic care are established effective measures in reducing the incidence of peri-operative deaths<sup>7,10</sup>.

Infection-related ophthalmic mortality often results from overwhelming bacterial or fungal orbito-ocular infections which are often associated with orbital, intra-cranial, or systemic complications<sup>3,11,12</sup>. Late presentation<sup>13</sup>, underlying systemic immune deficiency states like HIV-Aids<sup>14</sup> and uncontrolled diabetes mellitus<sup>15</sup>, non-availability of potent new generation anti-microbial agents<sup>16</sup>, and scarcity of facilities for accurate timely diagnosis and surgical treatment of complications<sup>16</sup> have been variously implicated in mortality outcomes of infective orbito-ocular conditions. Primary orbito-ocular malignant neoplasms, involving the cranial cavity or para-nasal sinuses either by direct tissue invasion, haematogenous spread or peri-neural spread around the optic nerve, are associated with poor visual, ocular, and

survival prognosis<sup>6</sup>. In developing countries, the prognosis is further jeopardized by the advanced stage of tumour at presentation<sup>1</sup>, inadequate facilities for adjunctive non-surgical therapies, and patient's deficient financial resource<sup>4,5,17</sup>. A survey of causes and pattern of ophthalmic mortality is fundamental in generating baseline data to assist makers and implementers of eye care policy, and eye care providers in planning and execution of eye care programmes. Specifically, this would guide in optimizing the available resources within the existing eye care delivery system or suggest system modifications necessary to satisfy the identified eye care needs of the population hitherto unmet by the existing eye care programmes.

## METHODS

### BACKGROUND

The University of Nigeria Teaching Hospital (UNTH), Ituku-Ozalla, Enugu, is a tertiary health care facility located in Enugu state, one of the five component states of the south-east geopolitical zone of Nigeria. Established in 1971, it is a multi-disciplinary centre, engaged in provision of tertiary health care services, undergraduate and postgraduate medical and paramedical training, and research. At UNTH, the ophthalmology department delivers promotive, preventive, curative, and rehabilitative eye care services through outpatient and inpatient care. The ophthalmic ward, with a 27 bed capacity, houses medical and surgical eye patients requiring inpatient care. The eye care workforce on the ground consists of ophthalmologists-consultants and trainees, optometrists, and nurses. The anaesthetic staffs are rostered from their parent department of anaesthesia to handle both elective and emergency surgical cases requiring general anaesthesia. Local anaesthesia, which is more frequently utilised, is administered by the ophthalmologists who are mandatorily trained on that during their residency programme. We examined the admission and discharge records of the ophthalmic ward over a 12 year period, January 1997 to December 2008, to determine the total number of admissions, and identify patients who died while on hospital admission. The data was cross- validated by interfacing it with the records obtained from the UNTH's central Medical Records Department

For the mortality cases, we recalled their inpatient charts and extracted information on their age, sex, time to presentation, and referral interval. Also, data on definitive clinical diagnosis, type of treatment offered – medical and or surgical, cross-consultation with other medical specialties, type of anaesthesia, primary cause of death, and autopsy

diagnosis of cause of death were obtained. During the same period, we determined the total number of admissions and deaths at UNTH, Enugu. Prior to commencement of the study, ethical approval was obtained for the UNTH's Institutional review board.

## DATA ANALYSIS

Data was subjected to simple descriptive statistical analysis, using the Statistical Package for Social Sciences Software (SPSS), version 3.4, to generate frequencies, proportions, and percentages.

## RESULTS

Between January 1997 and December 2008, 2,574 eye patients consisting of 1,500(58.3%) males and 1,074(41.7%) females, male to female ratio of 1.4:1, aged 2 months- 74 years (mean= 44.7 ±12.4SD) were admitted and managed in the ophthalmic ward of UNTH, Enugu. The age and sex distribution of ophthalmic inpatients is shown in table 1.

**Figure 1**

Table 1: Age and sex distribution of ophthalmic inpatients.

Age (Years)	Sex		Total (%)
	M	F	
0-10	230	135	365
11-20	204	109	313
21-30	201	144	345
31-40	178	110	288
41-50	146	143	289
51-60	159	157	316
61-70	179	134	313
71-80	203	142	345
Total (%)	1,500(58.3)	1,074(41.7)	2,574(100.0)

Of these, 9 (0.3%) patients made up of 4(44.4%) males and 5 (55.6%) females with sex ratio of 1:1.3 and aged 4months-60 years died while on admission. There were more paediatric-5(0.6%) than adult -4 (0.4%) ophthalmic inpatient deaths.

The summaries of the mortality cases are as follows:

### CASES 1 AND 2

both males, aged 3 and 4 years respectively, and managed for late presentation unilateral retinoblastoma involving the right eye. At presentation, both had fungating orbital tumour with complete destruction of the ipsilateral globe. They were

co-managed with the paediatric oncology team; treatment consisted of general supportive measures, cytotoxic chemotherapy, and tumour debulking surgery performed under general anaesthesia. While Case 1 never recovered fully from the surgical anaesthesia and died 2 hours after surgery, Case 2 achieved full recovery but later developed fatal haemo-dynamic instability. Both deaths occurred in the eye ward, not in the operating theater, and were attributed to anaesthesia. Permission for postmortem examination was not granted by the relatives of both patients.

### **CASE 3**

A referral case of biopsy-proven nasopharyngeal carcinoma with left orbital metastasis in a 46 year old male artisan worker who presented at the ophthalmic out patient on account of the orbital involvement. Management was in conjunction with the medical oncology unit and otolaryngology team and consisted of supportive measures and tumour chemotherapy. He had overwhelming super-infection and his condition deteriorated until he died 4 weeks after admission, from septicemia and carcinomatosis.

### **CASE 4**

A 49 year old male petty trader who presented with rapidly progressive left orbital mass, abdominal swelling, and weight loss. Clinical evaluation and ancillary investigations, including histology, established diagnosis of choroidal melanoma with hepato-biliary metastasis. Tumour debulking, in addition to medical oncology-supervised chemotherapy were the mainstay of treatment. Patient eventually died from disseminated carcinomatosis and hepatic failure.

### **CASE 5**

A 35 year old male civil servant with right hemi-facial swelling and progressive ipsi-lateral proptosis. Histology of tumour biopsy specimen confirmed a diagnosis of maxillary sinus carcinoma with orbital invasion. Tumour mass was reduced surgically in a joint session with the maxillofacial unit and chemotherapy was commenced afterwards. Abdominal and bone secondaries were later detected by radiologic investigations. Patient eventually died from disseminated carcinomatosis and severe anaemia.

### **CASE 6**

A 60 year old female with necrotic naso-orbital lesion covered with black devitalised tissue. She had associated fever, wasting, and marked pallor. Based on positive fungal elements from the examination of the biopsy material,

systemic anti-fungal treatment was started in addition to antibiotic therapy and general supportive measures. Surgical debridement of lesion was also performed. Patient condition continued on a downhill course until death 2 weeks after admission apparently from septicemia.

### **CASES 7, 8 AND 9**

all females aged 18 months, 4 months, and 5 years respectively. Cases seven and 9 had bilateral cataracts while 8 had congenital glaucoma. Paediatric evaluation did not reveal any associated systemic anomalies in all the cases. Cases 7 & 9 had lens washout without anterior vitrectomy while case 8 had trabeculectomy, all under general anaesthesia. Cases 7 & 8 failed to recover from anaesthesia while 9 died shortly after surgery from haemo-dynamic complications of anaesthesia. Autopsy examination, permitted only on case 9, revealed extensive pulmonary haemorrhage as the autopsy diagnosis of cause of death.

### **DISCUSSION**

The 0.3% inpatient ophthalmic mortality rate observed in this study is comparable to the rate of 0.4% independently reported by Fafowora & Ubah<sup>1</sup>, and Omoti & Ogbedo<sup>2</sup> from two tertiary eye care centres in Nigeria, but sharply contrasts with the 37.5% reported by Rahman et al<sup>6</sup>, and 3% documented by Uy & Co-workers<sup>18</sup>. While the present study shares similarity in study setting and study population with previous Nigerian studies<sup>1,2</sup>, Rahman et al reported on orbital tumour related mortality and Uy et al was specific for mortalities in patients with orbital cellulitis. Of the total admissions and mortalities at UNTH, Enugu during the study period, ophthalmic admissions and mortalities accounted for 3.4% and 0.8% respectively.

The overall low ophthalmic mortality rate documented in the present survey and previously reported elsewhere from Nigeria is consistent with the established lower mortality rate among ophthalmic inpatients compared with other medical specialties<sup>8,19-22</sup>.

The analysis of the demographic profile of the mortality cases showed a slight predominance of paediatric (55.6%), and female (55.9%) patients. The observed age and sex distribution differed from the results of similar studies elsewhere<sup>1,2</sup>. While the observed age distribution could be attributed to dominance, in the present report, of paediatric diseases, the explanation for the sex distribution is not immediately clear. This seems to suggest that the quality of paediatric eye care services, at UNTH, is probably sub-

optimal.

Orbito-ocular malignancies (55.6%) and congenital anomalies (33.3%) were the leading clinical diagnoses among the mortality cases examined in this study. This is in partial agreement with the findings of Fafowora & Ubah<sup>1</sup>, and Omoti & Ogbedo<sup>2</sup>. While the former had malignancy followed by infection as the main clinical diagnosis, the reverse was the case with the later. Literature search for similar studies elsewhere outside Africa yielded no results for inter-regional comparison. The spectrum of diseases which pre-staged mortality in this study is consistent with the reported trend in a typical third world setting where, in addition to the enormous treatment challenges imposed by late presentation, human and material resources for effective therapeutic interventions for these conditions are grossly deficient<sup>23,24</sup>. In the peculiar resource deficient setting in developing countries, this has implications for prioritization of needs and resource allocation during future planning and implementation of curative eye care programmes, especially curative tertiary eye care services. Furthermore, the findings suggest the need for modification of eye health seeking behavior of the population through intensive promotive and preventive eye care activities. This, hopefully, would ensure early diagnosis and timely referral of potentially curable but otherwise fatal eye diseases.

Unfortunately, potentially avoidable anaesthetic complication was the primary cause of death in 55.6% of the recorded mortalities followed by septicemia and disseminated carcinomatosis /organ failure which accounted for 22.2% each of the total deaths. This differed from the results from Ibadan<sup>1</sup> and Benin<sup>2</sup>, both in Nigeria, where malignancy (53.8%) and Infection (42.8%) were the main primary causes of death respectively. Peri-operative deaths attributable to anaesthesia is not uncommon in developing countries and they are frequently due to avoidable factors<sup>9,25,26</sup>. Currently, at UNTH Enugu, there is no fellowship trained paediatric anaesthesiologist; this probably explains the high frequency of anaesthetic deaths. The regrettably high prevalence of anaesthetic death despite appropriate pre-operative cross-consultation, especially in the paediatric age group, implies an urgent need for commencement of fellowship training in paediatric anaesthesia for consultant anaesthesiologists. This, it is hoped, would equip them with requisite knowledge and skills for the peri-operative management of paediatric patients and impact positively on the survival outcome of paediatric eye patients undergoing ophthalmic surgery under

general anaesthesia.

In the present report, post-mortem examination was permitted only in one patient (11.1%). This differed slightly from the reports from Ibadan<sup>1</sup> and Benin<sup>2</sup>, where consent for post-mortem examination was withheld across board by relations of all the deceased patients. Similar to the socio-cultural settings at Ibadan and Benin, at Enugu, rigid cultural taboos premised on unfounded beliefs in re-incarnation, was the main obstacle to acceptance of post-mortem examination by the relations of the deceased. There is an urgent need to bridge this crucial health information gap, between health care providers and the public, concerning death, heredity and reincarnation.

## CONCLUSIONS

The ophthalmic mortality rate at UNTH is low. Majority of the deaths are potentially avoidable. To reverse the trend, we recommend training, recruitment, and retention of appropriate and adequate ophthalmic and relevant anaesthetic manpower; needs-based provision of material resources for eye care delivery, and intensification of community based promotive and preventive eye care activities to ensure timely presentation for uptake curative eye care.

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