

Pattern of Mortality amongst In-Patients in a Tertiary Hospital South-South Nigeria.

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Abstract

Background Measurement of the number of deaths each year and evaluation of the causes is an important means of assessing the effectiveness of a healthcare delivery system and will assist health policy makers to plan for effective and efficient healthcare delivery system. There is however dearth of information on causes and pattern of in-patients hospital mortality in most countries of Sub-Saharan Africa including Nigeria particularly in the South-South region.

Therefore this study is aimed at finding out the mortality pattern among in-patients in a tertiary hospital South-South Nigeria.

Methods A 3 years retrospective descriptive cross-sectional study of deaths that occurred in the Niger Delta University Teaching Hospital, South-South Nigeria from January 2016-December 2018. The information for the study was collected from medical records of deaths that occurred in the hospital during the period.

Results During the period under review, a total of 4527 patients were admitted with a total mortality of 447 with an average crude mortality rate of 9.9%. The male sex had a higher mortality of 15.0% compared to the female of 7.2% and the age group 45-64 years recorded the highest percentage mortality (33.3%). Infectious diseases constituted the highest cause of death (28.2%) followed by neurological diseases with deaths from hematological conditions being the lowest (1.6%).

Conclusion This study revealed that communicable diseases (infectious diseases) constituted the most common cause of death. Amongst the non-communicable diseases, neurological diseases were responsible for 15.6% of the deaths.

Key words- Mortality Pattern, Cause of Death, South-South Nigeria.

Introduction

Measurement of the number of deaths and evaluation of the possible causes is an important means of assessing the effectiveness of a healthcare delivery system. Health statistics reflecting the causes of death and the mortality pattern will assist health policy makers to plan for effective and efficient healthcare delivery system.

Hospital inpatients mortality pattern is

important for monitoring the population health and useful in planning for curative and public health care, policymaking, and eventually the allocation of resources for health services, research, and training.¹⁻³ Developed countries have sophisticated systems that facilitate collection of data but such systems of data collection are lacking in developing and underdeveloped counties.⁴

More than half of all deaths in low-income countries in 2016 were caused by communicable diseases, maternal causes; conditions arising during pregnancy and childbirth, and nutritional deficiencies.

Non-communicable diseases caused 71% of deaths globally, ranging from 37% in low-income countries to 88% of high-income countries.⁵ Majority of African studies report infectious diseases as the major cause of death.⁶⁻¹² By contrast, less than 7% of deaths in high-income countries were due to such causes. Lower respiratory infections were among the leading causes of death across all income groups.⁵

In Ife and Owo (western Nigeria),^{6,8} infections, trauma, neonatal and pregnancy-related deaths were the leading causes of death while a study from Kano (northern Nigeria) reported infectious diseases other than HIV/AIDS, cerebrovascular disease and chronic renal failure as leading causes of hospital deaths.⁷ Another study from Umuahia (South-East Nigeria) showed that the overall leading cause of death was infectious diseases. Other major causes were cardiovascular system-related, neonatal causes, trauma, diabetes mellitus complications and neoplasia.¹²

Knowing the current burden and trends of the main causes of in-hospital deaths is crucial for determining current healthcare needs assessment in both public health and hospital care¹⁻³. The importance of the availability of such data for the planning and the distribution of scarce resources to improve the weak healthcare system of the Nigeria cannot be overemphasized.

There is however dearth of information on causes and pattern of in-patients hospital mortality in most countries of Sub-Saharan Africa including Nigeria particularly in the South-South region.

Therefore this study is aimed at finding out the mortality pattern among in-patients in a tertiary hospital in South-South Nigeria.

Materials and Methods

This study was conducted in the Niger Delta University Teaching Hospital, Okolobiri in Bayelsa State. Bayelsa State is one of the oil producing states in South-South, Nigeria. The hospital is located in a community very close to a crude oil and gas facility with it attendant gas flaring which has continued unabated for 14 years. Apart from the host community, several other neighboring communities are exposed to the gas flaring. Oil and gas exploration activities with it associated gas flaring and environmental pollution have been ongoing in most communities in Bayelsa and its environs since the discovery of crude oil in Olobiri, Bayelsa State

The hospital also sub-serves the neighboring communities, other communities in Bayelsa and neighboring states with similar oil and gas exploration activities. Bayelsa State is geographically located within Latitude 04 to 15' North, 05 to 23' South and longitude 05 to 22' West and 06 to 45' East. It shares boundaries with Delta State on the North, Rivers State on the East and the Atlantic Ocean on the West and South. Bayelsa State is a picturesque tropical rain forest, with an area of about 21,110 square kilometers. More than three quarters of this area is covered by water, with a moderately low land.

A 3 year retrospective descriptive study of deaths that occurred in the Niger Delta University Teaching Hospital from 2016-2018. The hospital provides a high level of care to patients and has in place quality improvement measures. The Health

Information Department uses both manual and electronic methods of record keeping. While autopsy findings provide the gold standard for cause-of-death evaluations, this approach is prohibitively expensive, rarely applied and likely to be based on a biased sample of deaths assigned to coroners. It was not practical to carry out autopsies for most deaths that occurred in the hospital because of cultural practices and beliefs that prohibit autopsy¹³. The data obtained from the medical records included demography, duration of hospital admission, ward of admission, primary diagnosis, specific causes of death, categorization and Medical Consultant that reviewed the cases. The gold standard used for cause-of-death reporting was to have the cause

certified by a medical practitioner using the rules and procedures of the *International classification of diseases and related health problems* (ICD).¹⁴ Only cases certified death by medical practitioners were included. All 'Brought in Dead' cases were excluded from the study.

The information for the study was collected from medical records of deaths that occurred in the hospital from January 2016-December 2018. Data were analyzed with Statistical Programme for Social Sciences (SPSS) version 21.0 software. Frequency tables, ratio, proportions and rates were used to present and analyze data. The level of significance was set at $p < 0.05$. Ethical approval was sought and obtained from the hospital Ethics and Research Committee before the commencement of the study.

Results

Table 1: Yearly Variation in Mortality Rate

Year	Admission	Mortality	Crude Mortality Rate (%)
2016	1457	117	8.0
2017	1651	152	9.2
2018	1419	178	12.5
Total	4527	447	9.9%

A total of 4527 patients were admitted with a total mortality of 447. The average crude mortality rate was 9.9% with a progressive increase in the crude mortality rate within the study period (Table 1).

Table 2: Frequency of Admissions and Mortality in Relation to Sex

Sex	Admissions	Mortality	Crude Mortality Rate (%)
Male	1571	235	15.0%
Female	2956	212	7.2%
Total	4527	447	9.9%

The male sex had a higher mortality (15.0 %) compared to the female (7.2%) (Table 2). Person's χ^2 value=69.894, $p < 0.0001$. Statistically significant.

Table 3: Mortality according to Age and Sex distribution

Age Group	Female	Male	Total (%)
<24 hours	7	10	17(3.8)
1 day-28 days	13	15	28(6.3)
1-11 months	1	3	4(0.9)
1-4 years	9	10	19(4.3)
5-18 years	7	9	16(3.6)
19-44 years	79	45	124(27.7)
45-64 years	59	90	149(33.3)
65 and above	37	53	90(20.1)
Total	212	235	447(100)

Age group 45-64 years recorded the highest percentage mortality of 33.3% (Table 3).

Table 4: Causes of Death

Causes of Death	Frequency	Percentage (%)
Infections	126	28.2
Endocrinology	34	7.6
Cardiovascular Diseases	32	7.2
Neurological Diseases	71	15.9
Gynecological/Obstetrics	10	2.2
Respiratory Diseases	19	4.2
Neonatology	43	9.6
Surgery/Trauma	16	3.6
Hematology	7	1.6
Oncology	32	7.1
Nephrology	20	4.5
Gastroenterology	37	8.3
Total	447	100

Infectious diseases constituted the highest cause of death (28.2%) followed by neurological diseases with deaths from hematological conditions being the lowest (1.6%) (Table 4).

Table 5: Major causes of mortality and age distribution

Causes of Death	Children (%)					Adults (%)			Total
	<24hrs	1-28 days	1-11 months	1-4yrs	5-17yrs	18-44yrs	45-64yrs	≥65yrs	
Infection	5 (4.0)	3(2.4)	1 (0.8)	10(7.9)	9(7.1)	52(41.3)	34(27.0)	12(9.5)	126 (100)
Endocrinology	-	-	-	-	-	4(11.8)	19(55.9)	11(32.4)	34(100)
Cardiovascular Diseases	-	1(3.0)	-	-	-	8(27.3)	13(39.4)	10(30.3)	32(100)
Neurological Diseases	-	1(1.4)	1(1.4)	2(2.8)	1(1.4)	10(14.1)	30(42.3)	26(36.6)	71(100)
Gynecological/Obstetrics	-	-	-	-	-	10(100)	-	-	10(100)
Respiratory Diseases	1 (5.3)	2 (10.5)	-	1 (5.3)	1 (5.3)	6 (31.5)	3 (15.8)	5 (26.3)	19 (100)
Neonatology	7(16.3)	36(83.7)	-	-	-	-	-	-	43(100)
Surgery/Trauma	-	-	-	-	-	9 (56.3)	4 (25.0)	3 (18.7)	16 (100)
Hematology	-	-	-	2 (28.6)	1 (14.2)	2 (28.6)	2 (28.6)	-	7 (100)
Oncology	-	-	-	-	3 (9.4)	7 (21.9)	12(37.5)	10(31.2)	32 (100)
Nephrology	-	-	-	-	1 (5.0)	5 (25.0)	7(35.0)	7(35.0)	20 (100)
Gastroenterology	-	2 (5.4)	2 (5.4)	-	-	8 (21.6)	20(54.1)	5 (13.5)	37 (100)

As shown in Table 5, endocrine, cardiovascular, neurological diseases and malignancies are rare causes of death amongst children.

Discussion

The present study described the pattern of mortality at the Niger Delta University Teaching Hospital, Okolobiri, Bayelsa State, South-South Nigeria from January 2016 - December, 2018. The observed crude mortality rate was 8.0%, 9.2 %, 12.5% in 2016, 2017 and 2018 respectively and the overall crude mortality rate of 9.9%. This mortality rate was much lower than the 28.3% mortality rate of similar study done in Kano, Nigeria.¹⁵ This higher mortality figure could be explained by the design of the Kano study which only looked at mortality in medical wards in contrast to our study which evaluated overall mortality during the period under review. In a study done in Umuahia, South-East, Nigeria an overall mortality rate of 12% was found which was slightly higher than our finding.¹² This difference could be partly explained by the fact that their study was done 10 years ago.

Our study revealed that male constituted 52.6% of the total mortality as against 47.4% of female. This finding is similar to other studies done in Nigeria.^{7,12} Females have generally been shown to have lower mortality and longer life expectancy than males.¹⁶⁻¹⁷ The exact explanations for gender difference in life expectancy is not very clear because of the complex interplay of biological, social and behavioral factors.¹⁶⁻¹⁷

In our study, deaths from malignant conditions constituted 7.1% as against 3.5% of a similar study carried out in the South-Eastern Nigeria.¹² Breast cancers were responsible for most of the malignancy related mortality. A plausible explanation among other risk factors for this trend is increased exposure to toxins occasioned by increased gas flaring and water pollution from oil exploration activities in Bayelsa State. Evidence abounds that oil and gas flaring are deleterious and have grave consequences on public health. Crude oil contains polycyclic aromatic hydrocarbon,

metals and other components.²³⁻²⁴

Gas flaring and venting associated with petroleum exploration and production in Nigeria have been shown to affect virtually all major organs and systems of the body and cause different acute and chronic diseases including cancers.²³⁻²⁴ This study has some limitations. Autopsy findings provide the gold standard for cause-of-death evaluations. However, it was not possible to carry out autopsy in all the deaths because of the prohibitive cost, cultural beliefs and practices. In this study, cause-specific mortality fractions based on vital registration data which is the ideal standard was not obtained. Since this is a hospital based study and some deaths occur outside hospitals which are rarely medically certified, substantial number of deaths could have been missed.

Conclusion

This study revealed that communicable diseases (infectious diseases) constituted the most common cause of death. Therefore infectious diseases control programs should further be strengthened to tackle the menace of the diseases.

Amongst the non-communicable diseases, neurological conditions mostly cerebrovascular disease accounted for a number of the deaths.

There is therefore need to sensitize the population on lifestyle modification and change in health seeking behavior to reduce the prevalence of non-communicable diseases.

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