

Pattern of death in a Nigerian teaching hospital; 3-decade analysis

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Abstract

Background: In developing countries such as Nigeria, limited resources require that health priorities be selected wisely and death-related research is clearly warranted. The aim of this study is to provide a comprehensive report on the various causes of death in our center from 1978 to 2006.

Methods: This was a descriptive, retrospective study of all deaths recorded at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile – Ife, Osun State in Southwest Nigeria from 1978 to 2006.

Result: A total number of 9,947 deaths were recorded during the study period and there were 6,277 male deaths (63.1%) and 3,670 female deaths (36.9%) with a female to male ratio of 1:1.5. The age ranged from birth to 100 years with a median of 25 years. Infection (2,594 patients; 26.1%) was the most common cause of death and this was followed closely by trauma death (2,028 patients; 20.4%) and neonatal death (1,074 patients; 10.8%). Death from infectious disease and trauma reduced from 1,048 and 1,441 in the first decade (1977 – 1986) to 478 and 133 in the last decade respectively. While death from neoplasia increased from 112 in the first decade to 354 in the last decade of the study period.

Conclusion: Our study shows that death from infectious disease in the present decade has reduced to almost half that was recorded in first decade. Similarly death from trauma has also reduced compared to the first decade of the study. Death from neoplasia is however higher in the last decade.

Key words: Pattern of death, Nigeria, Mortality, Morbidity

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Introduction

Information available on mortality and pattern of death in Ile – Ife and its environ covered only short duration of period and it has been limited to a particular age group^{1,2}. None of the previous reviews has been extensive and comprehensive enough to give an elaborate report on the pattern of death over an extended period of time. The importance of such information becomes apparent when viewed in the context of World Health organization (WHO) objective of constant evaluation of available health services as an integral part of the managerial process in health care delivery³. Information on disease prevalence, patterns of morbidity and mortality in communities is of vital importance to health planners.

Unfortunately, such information is often lacking in developing countries as a result of the cost and logistics involved in obtaining it. As such, hospital based disease frequency and pattern of death often offer second best alternative. Such hospital based data, when monitored over a period of time may assist in assessing changes in disease and death pattern, thus helping health planners to re – order their priority.

The aim of this study is to provide a comprehensive report on the various causes of death in our center in the last *three* decades. Such information, being the outcome of admission into this health institution, could serve as an indicator of the quality of service given on the one hand, while on the other hand it will provide information on the relative importance of diseases in the population under study.⁴

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Methods

The study was conducted at the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC), Ile – Ife, Osun State in Southwest Nigeria. The hospital services the rural and semi-urban agrarian communities in the Osun state, Nigeria. The hospital which is one of the tertiary referral centre serving an estimated 7.7 million population in the south-western region of Nigeria and receiving patients from Osun state where it is located and also patients from adjacent neighbouring states like Ondo and Ekiti states.

This was a descriptive, retrospective study of all the deaths that occurred in our hospital. All the patients who died in the hospital from 1978 to 2006 were included in the study. Data was obtained from the medical records department register and autopsy records. Patients with inadequate clinical information were excluded from the study.

Data collected include primary causes of death, demographic information such as the age, sex, and period of death. Cause of death were grossly classified into infectious causes and non infectious causes; non infectious causes were further classified into trauma, neoplastic, neonatal, congenital, cardiovascular, nutritional, renal, Obstetric and Gynaecological, hepatopancreatic, hematological, burns, metabolic causes of death including diabetic disease. Diseases like electrolyte imbalance, degenerative, pyrexia of unknown origin, Ijesha, shake, hypersensitivity reaction, social neglect and snake bite were grouped under others. The patients were divided into three decade namely early decade - 1978 – 1986, middle decade -1987 – 1996, and recent decade 1997 – 2006.

All the data obtained was coded, edited appropriately and entered into personal computer. Analysis of the data was done using Statistical Packaging for Social Sciences (SPSS Inc. Chicago IL) version 13.0. Simple descriptive statistics were used. Median and frequencies were calculated based on the numerous data points.

Results

A total of eleven thousand, six hundred and twenty one (11,621) deaths were recorded in the hospital over the study period but only nine thousand nine hundred and forty seven (9,947) patients had complete clinical information which was analyzed. Out of the 9,947 with complete clinical information analyzed in the study 3,670 (36.9%) were female while 6,277 (63.1%) were male, giving a male to female to

ratio of 1.5: 1. The ages of the patients were from birth to 100 years with a median of 25years. The numbers of death recorded in the early decade were 3,825 (38.5%), middle decade were 3,867 (38.9%) and recent decade were 2,255 (22.7%).

The overall leading cause of death is to be found in the infections group, which accounted for 2,594 (26.1%) death over the period. This together with trauma death 2,028 (20.4%) and neonatal death 1,074 (10.8%) constituted over 50% (57.3%) of death recorded over the study period. Other 28 groups are shown in table 1 below. Other rarer causes of death seen were psychiatric illness, ophthalmological disorders and parasitic infestations.

Table 1: Cause of death

	Cause	Frequency	Percentage
1.	Infection	2,594	26.1%
2.	Trauma	2,028	20.4%
3.	Neonatal	1,074	10.8%
4.	Neoplasia	852	8.6%
5.	cardiovascular	729	7.3%
6.	Renal disease	438	4.4%
7.	Nutritional disorder	331	3.3%
8.	Obstetric Gynecology disorder	296	3.0%
9.	Hepatobiliary disease	195	2.0%
10.	Malaria	178	1.8%
11.	Diabetes Mellitus	176	1.8%
12.	Congenital disease	150	1.5%
13.	Respiratory Disease	144	1.4%
14.	Burns	144	1.4%
15.	Gastrointestinal	114	1.1%
16.	Anemia	97	1.0%
17.	Intestinal obstruction	84	0.89%
18.	Hematological disorders	75	0.8
19.	Neurological disease	62	0.6%
21.	Others	53	0.5%
21.	Drug poison	45	0.5%
22.	Hernia	34	0.3%
23.	Dermatological disease	14	0.1%
24.	Psychiatry	13	0.1%
25.	Orthopedics	10	0.1%
26.	Postoperative	7	0.1%
27.	Metabolic	5	0.1%
28.	Ophthalmology Disorder	3	0.1%
29.	Parasitic	2	0.1%
30.	Ent disorder	1	0.1%
	Total	9,947	100%

Table 2 showed the ten leading clauses of death in the first ten groups. In the infections group the three

leading causes of deaths were tetanus 428 (18.5%), septicemia 320 (13.9%), and bronchopneumonia 294 (12.8%). Death among neonates were primarily caused by prematurity 338 (31.7%), low birth weight 208 (19.5%) and Neonatal jaundice 17 (15.1%) respectively in that order. While death from neoplasia were caused by primary liver cell carcinoma 156

(18.4%), lymphoma 104 (12.2%) and breast cancer 86 (10.2%). Other rarer causes of death related to neoplasm were anal cell carcinoma 1, (< 1%) squamous cell carcinoma 1(< 1%) and glioblastoma multiforme 1(<1%). Primary liver cell carcinoma was reported as a cause of death in a pregnant woman over the study period.

Table 2: Breakdown of cases included in each disease group

Infection N = 2,594	Trauma N=2,028	Neonatal N =1, 074	Neoplasia N = 852	Cardiovascular N = 729
Tetanus [444](17.19%)	R.T.A. Vehicular [1,688](83.3%)	Prematurity [336](31.5%)	PLCC [156](18.3%)	Congestive cardiac failure [297] (40.5%)
Broncho pneumonia [394] (15.2%)	Fall [52](2.6%)	Low birth weight [208](19.5%)	Lymphoma [104] (12.2%)	Cerebrovascular disease [245] (33.4%)
Septicemia [346](18.8%)	Head injury [48]2.4%	Neonatal jaundice [192](18.4%)	Breast cancer [87] (10.2%)	Hypertensive heart disease [69] (9.4%)
Tuberculosis [288](11.19%)	Stab abdominal wound [40] (2.0%)	Birth Asphyxia [17] (15.19%)	Gastric causer [45](5.3%)	Hypertensive encephalopathy [39] (5.3%)
Measles [207](8.0%)	Traumatic Quadriplegia [38](1.9%)	Neonatal sepsis [118] (11.1%)	Cervical cancer [40](4.7%)	Cardiomyopathy [14] (1.9%)
Meningitis [204](7.9%)	Hemorrhagic Shock[17](0.8%)	Failure to thrive [12](1.1%)	Intra-abdominal Cancer [35][4.1%]	Rheumatic Heart disease (13) [1.8%]
Typhoid fever [161](6.2%)	Gunshot injury [13](0.6%)	Preterm [10](0.9%)	Prostate cancer [34](4.0%)	Hypertensive Nephrosclerosis [13] (1.8%)
Gastroenteritis [40](5.4%)	RTA motorcycle [10](0.5%)	Meconium aspiration [8](0.8%)	Ovarian cancer [33] (3.9%)	Malignant hypertension [11] (1.5%)
HIV [93] [4%]	RTA Pedestrian [10](0.5%)	Small for gestational age [3](0.3%)	Colonic cancer [26](3.0%)	Cavernous sinus thrombosis (6)[0.8%]
Hepatitis [50](2.0%)	Kick in abdomen [6](0.3%)	Apnoeic attack [2.](0.6%)	Pancreatic cancer [22][2.6%]	Mitral stenosis [5](0.7%)
Renal N = 438	Nutritional N =331	Obstetric & Gynecology N = 296	Hepatopamcreatic N = 195	Malaria N = 178
Chronic Renal failure [283](64.9%)	Marasmus [117](35.2%)	Obstructed labour [30] (10.3%)	Liver cirrhosis [116](59%)	Febrile convulsion [91]51.4%
Acute renal failure [77](17.7%)	Kwashiorkor [109](32.8%)	Eclampsia [27] (9.2%)	Hepatic encephalopathy [31](15.8%)	Anemia from malaria [37](20.9%)
Nephritic syndrome [31] (7.1%)	Obesity [61](0.6%)	Puerperal sepsis [23](7.8%)	Obstructive jaundice[26](13%)	Severe malaria [37](20.9%)
Obstructive uropathy [9] (2.1%)	Severe malnutrition [8](4.5%)	Post abortal sepsis [19](6.5%)	Hepatic coma [44](13.3%)	Cerebral malaria [7](3.6%)
Chronic Glomerulonephritis [6](1.4%)	Vitamin A deficiency [1](0.1%)	Incomplete abortion [16] (5.4%)	Liver Abscess [6] (3.1%)	Aneamic heart failure [4](2.3%)
Acute Glomerulonephritis (5) [1.1%]	-	APH[13](4.4%)	Hepatomegaly [6](3.1%)	-

Continuation of table 2

Renal N = 438	Nutritional N = 331	Obstetric & Gynecology N = 296	Hepatopancreatic N = 195	Malaria N = 178
Chronic pyelonephritis [4](0.9%)	-	PPH[13](4.4%)	Hepatic failure [2](1.0%)	-
Ureamic encephalopathy[4](0.9%)	-	Ruptured uterus [13] (4.4%)	Hepatic cyst [1](0.5%)	-
Polycystic kidney disease[3](0.7%)	-	Criminal abortion[12](4.1%)	Cholecystitis [1](0.5%)	-
Acute tubular Necrosis [2](0.5%)	-	Post cesarean section[8](2.7%)	-	-

Table 3 showed the relative distribution of the ten leading cause of death within different age groups. Infectious related death was commonest in the first decade of life accounting for 1, 238 deaths (47.6%), while trauma related death was highest during the

third and fourth decades of life accounting for 498 (24.6%) and 412 (20.5%) deaths respectively. Death from cardiovascular disease was commonest in the sixth and seventh decade of life accounting for 137 (18.8%) and 142 (19.5%) deaths respectively.

Table 3: Age group incidence of ten leading causes of death

Diagnosis	Age Group										Total	P-Value
	0-10	11-20	21-30	31-40	41-50	51-60	61-70	71-80	81-90	>90		
Infection	1238	278	340	251	195	146	103	32	9	2	2594	< 0.0001
	47.6%	10.7%	13.1%	9.7%	7.5%	5.6%	4.0%	1.2%	.3%	.1%	100%	
Trauma	273	273	498	412	263	152	95	41	17	4	2028	0.004
	13.5%	13.5%	24.6%	20.3%	13.0%	7.5%	4.7%	2.0%	.8%	.2%	100%	
Neoplasia	84	67	70	118	158	155	124	60	14	2	852	<0.0001
	9.9%	7.9%	8.2%	13.8%	8.5%	18.2%	14.6%	7.0%	1.6%	.2%	100%	
Cardiovascular	70	51	75	72	98	137	142	50	31	3	729	0.004
	9.6%	7.0%	10.3%	9.9%	13.4%	18.8%	19.5%	6.9%	4.3%	.4%	100%	
Neonatal	1074	-	-	-	-	-	-	-	-	-	-	0.652
	98.0%											
Obst & Gynae	4	55	154	65	13	3	1	1	0	0	296	0.031
	1.4%	18.6%	52.0%	22.0%	4.4%	1.0%	.3%	.3%	.0%	.0%	100.0%	
Renal disease	29	52	90	98	61	57	32	15	4	0	438	-
	6.6%	11.9%	20.5%	22.4%	13.9%	13.0%	7.3%	3.4%	.9%	.0%	100.0%	
Hepatobiliary disease	9	11	25	33	45	37	25	9	1	0	195	0.005
	4.6%	5.6%	12.8%	16.9%	23.1%	19.0%	12.8%	4.6%	.5%	.0%	100%	
Nutritional disorder	250	8	30	34	7	0	2	0	0	0	331	<0.0001
	75.6%	2.1%	9.1%	10.4%	2.1%	.0%	.6%	.0%	.0%	.0%	100%	
Malaria	163	6	2	2	2	0	3	0	0	0	178	0.898
	91.6%	3.4%	1.1%	1.1%	1.1%	.0%	1.7%	.0%	.0%	.0%	100.0%	
Total	3604	905	1435	1190	984	813	642	261	8	13	9,945	
	36.3%	9.1%	14.4%	12.0%	9.9%	8.2%	6.5%	2.6%	.9%	.1%	100%	

The pattern of death over the three decades was also compared (Table 4) It is apparent that while death due to infection, trauma, nutritional disorder and malaria has reduced in the recent decade (1997 – 2006) compared to the rate in the first decade (1977 – 1986) of the study period, death from diseases such as neonatal death, neoplasia,

cardiovascular disease, diabetes mellitus and renal diseases has increased in the recent decade (1997 – 2006).

Table 4: Decade by decade comparison of the cause of death in the first ten leading causes

Diagnosis	1997 - 1986	1987 - 1996	1997 - 2006	Total	P value
Infection	1,078(41.7%)	1,038 (40.0%)	478 (18.3%)	2,594 (100%)	<0.0001
Trauma	1,442 (71.1%)	453 (22.3%)	133 (6.6%)	2,028 (100%)	<0.0001
Neonatal	254 (23.6%)	505 (47.0%)	315 (29.4%)	1,074 (100%)	<0.0001
Neoplasia	113 (13.3%)	383 (45.0%)	356 (41.7)	852(100%)	<0.0001
Cardiovascular	197 (27.0%)	276 (37.9%)	256 (35.1%)	729(100%)	<0.0001
Renal Disease	55 (12.6%)	171(39.0%)	212 (48.4%)	438 (100%)	<0.0001
Nutritional	116 (35.0%)	196 (59.3%)	19 (5.7%)	331(100%)	<0.0001
Obs & Gynae	74 (25.0%)	166 (56.8%)	56(18.9%)	296 (100%)	<0.0001
Hepatopancreatic	33(16.9%)	72 (36.9%)	90(46.2%)	195(100%)	<0.0001
Malaria	129 (72.5%)	40 (22.5%)	9(5.0%)	78 (100%)	<0.0001

Discussion

Hospital data may not accurately represent national health statistics, yet they provide useful indicators of the health status of the community and particularly of childhood⁵. The information provided in this study is mainly hospital related death over the study period but it can be extrapolated to give the magnitude and the pattern of death in the geographical environment served by the hospital. The higher male to female ratio in this study is not unusual as most studies in Africa have shown that men attend hospital more than women, and that most women usually attend hospital only when complication has set in^{5,8}.

Infection being the overall leading cause of death in the study is not surprising. The finding correlates with other work done in the region.^{1,2,6,7,8} It has been noticed that the current pattern of death in many third world countries is similar to the conditions prevailing in European industrial centers around the turn of the 20th century.^{7,8} The main health problems and consequently, leading causes of death were caused by poverty⁷. Thus, the type of diseases causing death in tropical countries can be explained more readily by the socio – economic situation than solely by the climate.

High infant and maternal mortality is indicative of the poverty, poor living conditions, inadequate hygiene and climatic circumstances. However, mortality is also high because a large proportion of the population in the least developed countries (approximately 60%) do not have access to health services of suitable quality which offer both preventive medical care and timely treatment of disease⁷. Infancy is a high-risk period of life for morbidity and death. In developing countries, in particular, infant deaths represent the major part of all deaths.¹⁷

In many developing countries, the rapid growth of the population exacerbates health problems.^{7,17} When large groups of the population are crowded together in poor housing and unhygienic conditions, infectious diseases spread quickly. This results in an increased risk of mortality and morbidity. Infection as a leading cause of death in this study is easily traceable to the poor and overcrowded living conditions of the majority of the patient. High mortality induces families to have more children in order to ensure continuity⁷. During this period, the population growth rate is sometimes extremely high. This has serious impact on both the economic situation and health facility available for the population. Per capita income and the availability of health facilities very often decrease during this period and the whole population is susceptible to infectious diseases. The situation is particularly serious in sub – Saharan Africa^{7,18}. The first death directly related to AIDS/HIV (Acquired Immune Deficiency Syndrome) was recorded in a 35 year old woman in 1995. In Nigeria the first case of AIDS occurred in 1986⁹. Between 1995 and 2007 a total of 93 deaths from AIDS/HIV were recorded in this study with an average annual increase of 20% per year.

Trauma as the second leading cause of death is in keeping with findings in most other studies.^{10,11} Gunshot injuries are on the global increase. Mortality rate from gunshot injury in some communities exceed that of the motor vehicle accidents.¹⁰ Together they constitute a rising cause of trauma related death worldwide¹⁰. Each year an estimated 1.2 million people are killed in road crashes and up to 50 million individual sustained injuries worldwide¹¹. Road traffic injuries are currently ranked 9th globally among the leading causes of disease burden, in terms of disability adjusted life years (DALYs) lost. In the year 2020, road traffic injuries are projected to become

the 3rd largest cause of disabilities in the world¹². Developing countries bear the brunt of the fatalities and disabilities from road traffic crashes, accounting for more than 85% of the world's road fatalities, and about 90% of the total DALYs lost due to road traffic injuries. The problem is increasing in these countries at a fast rate, while it is declining in all industrialized nations¹². The incidence of trauma is said to be on the increase globally. This did not conform to the findings in our study where trauma related death was highest in the first decade (1977 – 1986) of the study period (Table 4). In fact death due to trauma has decreased progressively over the three decade studied. The explanation for this may be due to the fact that there was a major civil strife (Modakeke / Ife crisis) in 1985 – 1986 that resulted in high casualty rate. This might have caused a disproportional increase in the trauma related death in this first decade of the study period when compared with the other decades. Improvement in trauma management as a result of availability of better facilities and more specialists in trauma care in the latter part of the study could also account for the decrease in trauma related deaths during the period. The total death from trauma stands at 2,028 (20.4%) over the study period and is second only to infectious diseases as a cause of death.

Malaria as a cause of death is also to be found among the ten leading causes of death. This is not surprising as severe malaria has been reported to be a leading cause of pediatric morbidity, hospitalization, and mortality in sub-Saharan Africa.^{13,12,14,15}. The highest death from malaria in this study was found in the age group 0 – 10 years (Table III). This is the age group most susceptible to effect of malaria parasite especially anemia¹². It should also be noted that death from malaria has reduced from 124 (74.2%) in the first decade (1977 – 1986) to 14 (5%) in this present decade 1997 – 2006. This is probably due to a successful campaign against malaria fever^{6, 8}. Death from cardiovascular diseases like hypertension and stroke increased from 197 in the first decade (1977 – 1986) to 256 in the present decade (1997 – 2006) Also death from renal diseases like chronic renal failure almost quadrupled from 55 in the first decade of the study period (1977 – 1986) to 212 in this decade (1997 – 2006). This pattern follows the global trend as these diseases are related to urbanization and westernization with associated transition to “modern” lifestyle of the industrialized world. These include sedentary occupations, inadequate physical activity associated

with an increase in vehicle use, high fat and refined sugar diets, tobacco use and increased drug and alcohol consumption^{19, 20, 21}.

Conclusion

There has been global improvement in socio economic status worldwide and better indices of health care observed in other part of the world also reflected in the pattern of death recorded in our environment. Death from infectious disease and trauma in the present decade (1997 – 2006) has reduced to almost half of the death recorded in the first decade. Death from neoplasia, cerebrovascular diseases, renal disease and diabetes mellitus has however doubled in the recent decade, this is probably due to continuous westernization, urbanization and changes in lifestyle that characterize this present decade. It has therefore become imperative for centralization and regionalization of specialist centre involved in screening and management of these newly emerging causes of death in our society.

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