Mortality Pattern in Adult Accident and Emergency Department of a Tertiary Health Centre situated in a Rural Area of Developing Country.

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Abstract: **Objective**:*Available literatures on pattern of adult mortality in accident and emergency (A and E) department of health institutions in many developing countries have been virtually restricted to centres in urban areas. This study aimed at highlighting the basic demographic patterns, the frequency and causes of death in a centre in a rural area of a developing country.*
Methods:*A retrospective analysis of patients' records admitted in A and E department of the Federal Medical Centre Ido Ekiti, Ekiti State, Nigeria over a period of 2yearsfrom January 2011 to December 2012 was carried out. Analysis of data was done with simple descriptive statistics using Statistical Packaging for Social Science (SPSS Inc. Chicago IL) version 16.*
Results:*A total number of 3162 patients attended the A and E department during the study period and there were 122 deaths. Male mortality was 76(62.0%) while female mortality was 46(38.0%) with male to female ratio 1:7:1. The age range was 15 – 87years with mean of 52.04 ± 18.70years. More deaths occur in young and middle aged adults (70.4%). Deaths from non-communicable diseases (80.3%) were higher than that from communicable diseases (19.7%). The most common causes of deaths from the former were stroke and road traffic accident, while from the latter were sepsis, HIV/AIDS and tuberculosis in decreasing order.*
Conclusion:*The commonest cause of death in adults is non-communicable disease at the prime productive age, worse in males than females. Many causes of deaths obtained in this report were comparable to what was obtained in urban centres except road traffic accident with lesser frequency and communicable diseases with higher frequency in rural centres.*
Key words: *Mortality, Accident, Emergency, Rural, Developing country.*

I.   Introduction

In one of the objectives of the World Health Organization (WHO), pattern of death statistics is an important scientific information that should be available for constant evaluation of available health services as an integral part of the managerial process in health care delivery.[1] The health system of a country needs to be adjusted to patterns of morbidity and mortality to mitigate the income-erosion consequences of prolonged ill-health and premature death of adults. Most deaths in Nigeria and many countries in Sub-saharan Africa are not registered. Hospital-based data recorded by medically qualified staff have been the useful information to characterized mortality which has occurred in hospitals. Virtually all of these were generated from urban areas, commonly from tertiary health centres located in an urban centre.

However, sub-Saharan Africa (Nigeria inclusive) is still predominantly rural, with the majority of the population living in the rural setting.[2]In Nigeria, no recent data is available on adult mortality.[3]Therefore, this study sought to highlight the basic demographic patterns of mortality, and to determine the frequency and causes of accident and emergency (A and E) deaths in a tertiary health centre located in a rural community of a developing country.

II.   Materials And Methods

The study design was a retrospective review of hospital records of patients attended to in A&E department of Federal Medical Centre Ido Ekiti, Ekiti State, Nigeria. This hospital located in a rural community of Ido Ekiti is the leading final referral centre in the state and serves about 2.4 million population apart from unestimated population from the neighbouring states. The period of study was 2years, starting from January 2011 to December 2012. The population under study were adults of 18years and above whose deaths were certified within A and E department. All prehospital deaths were excluded from the study. Records available

in A and E (including nurses report books), death certificates, and post mortem records were all utilized. Data obtained were analyzed using SPSS Version 16 software, and the results presented in descriptive and tabular forms. In a 2 X 2 table, the Yates correction and Fisher extract test were used when the frequencies expected were lower than five in one or more cells, respectively. In those tests, *P*-value of < 0.05 was considered statistically significant. Ethics and research committee approval from the institution was obtained.

III.   Results

In Table 1, the total number of patients attendance in A and E department for 2years (2011-2012) was 3,162, consisting of 1959 (62.0%) males and 1203 (38.0%) females with a male to female ratio 1:6:1. There was a higher A and E attendance of males compared to females.

In Table 2, total death recorded over the period was 122 with a crude mortality rate of 3.9% age ranged 15-87years with mean of 52.04 $\pm$ 18.7years. Male deaths were 76 (62.0%) age ranged 15 to 87years with mean of 51.9 $\pm$ 19.9years. The female deaths were 46 (38%) age ranged 18 to 80years with means of 52.3 $\pm$ 16.7years. The male to female death ratio was 1:7:1 and there was no statistical significant difference between the mean age for deaths in both genders (*P*-value = 0.92). The crude mortality rate for male and female were 3.9% and 3.8% respectively. Majority of deaths occurred below 65years of age with equal but higher number of deaths occurring in the young and middle age, each recorded 43 (35.2%) totalling 87 (70.4%). Medical causes of death with 92 (75.4%) were predominant when compared to surgical causes of death with 30 (24.6%) No statistical significant difference existed between gender associations except in causes of death in surgical cases only.

Table 3 showed that stroke with 16 (13.1%) deaths and road traffic accident (RTA) equally 16 (13%) deaths were the highest clinical causes of deaths. Deaths from non communicable disease with 98 (80.3%) are far more than deaths from communicable disease with 24 (19.7%).

IV.   Discussion

Hospital data is a useful indicator of health situation in the community it serves. This study can be extrapolated to provide information on the pattern of deaths in geographical environment served by the hospital. The higher male to female ratio of A and E attendance is not unexpected as many studies in Africa have shown that men attend hospital more than women.[4]

A total of 122 deaths were recorded out of 3162 patients treated in A and E showing a crude mortality rate of 3.9%. This high crude mortality rate may be related to delayed pre-hospital transfer, limited hospital resources, delay in presentation and lapses in inter-hospital communication. The crude mortality rates reported by several previous studies which were in the range 2.0-6.8%[5-7] were similar to the finding in this study, even though, those studies were conducted in the hospital located in either urban or semi urban communities.

Higher male death may be related to more risky life style which males are engaged in the rural areas like crude farming activities with attendant risk of injuries, and early ageing as well as other factors which earlier reports long recognized early death in men than women[8-10]. Reports from urban centres by Osimeet all[11] and Onwuchekwa et al [7] showed similar findings.

The young adults and middle aged constituted over 70% of the mortality in this study. These findings have important public health implications, and suggest that majority of deaths occur in people during their prime working years and therefore suggest bad economic implication. Factors that may account for this early death include: poor access to quality health care, inability to afford quality health care services due to poverty, lack of health information or ignorance, illiteracy, too much inclination to wrong custom/religious or traditional beliefs, and involvement of more of the younger ones in RTA (which is one of the leading causes of death in this study) because of their mobility and higher activity.[11] Report in the past by Chukuezi et al[12] in a study conducted in a sub-urban located tertiary health centre showed higher percentage (74.7%) of mortality that occurred below 61years of age (compared to 64% in this study).

The higher death rate in this sub-urban located tertiary health centre may be due to higher fatalities from RTA, gunshot and crimes all of which are less frequent in the rural areas and therefore overstretching of health facilities in sub-urban/urban centres, since most federal tertiary health centres have comparable facility and personnel irrespective of location.

In this study, mortalities were predominantly from non communicable diseases (80.3%). This may be due to improved personal hygiene as the individuals grow older, better immunity because of repeated exposure to infectious agents and wide spread continuous ongoing immunization in childhood/adulthood and changes towards life style of industrialized world with attendant increase in cardiovascular diseases as well as increased RTA from increased use of vehicles coupled with bad roads, massive congestion in the vehicles and bad tyres. This finding is in line with recent WHO report[13], and other reports from urban or semi-urban located health centres. [5,7,12]

Stroke and RTA were equally the leading causes of deaths. These were unlike several reports in the urban and semi-urban tertiary health centres where RTA was the leading cause of deaths. [5, 11, 12] RTA is relatively less in this study (13.1% compared to 57.8% by Ekere et al[5] 41.6% by Osime et al,[11] and 23.13% by Chukuezi et al[12]) probably because the entire state is yet to have very high speed permissible roads (for example, dualised roads, straight smooth several kilometre roads and so on), and the roads are less busy when compared to where those other works were conducted.

The frequency of stroke mortality may be a reflection of quality of medical care available to the patients at A and E department or may reflect a poor state of hypertension control which has been known to be the commonest aetiological factor in stroke.[14,15] Sepsis, HIV/AIDS and tuberculosis topped the list of communicable diseases in decreasing order. The latter two were lower than the former probably because of free health care services and better awareness provided. So also, tuberculosis is less stigmatized and relatively not 'silent' before diagnosis when compared to HIV/AIDS.

V. Conclusion

Typically non-communicable disease related deaths have been considered a public health problem only in developed countries and among the elderly. Our study showed that non-communicable disease related deaths affect a much higher proportion of people (male worse than females) during their prime productive years. The higher frequency of deaths due to non-communicable diseases above communicable diseases found in a rurally situated tertiary health centre is comparable with findings in the urban centres except RTA (higher frequency in urban centres) and communicable diseases (greater frequency in this report compared to urban centres). This is of particular concern due to the fact that infant mortality and infectious diseases remain serious public health challenges in this setting. Therefore, this report has yielded the need for urgent formulation of needed policy, preventive and control measures against non-communicable diseases in order to preserve the working and productive forces hence, preserving the engine room of economic development in the developing countries.

VI. Tables

Table 1: Attendance of Patients in adult A and E from January 2011 to December 2012

Gender	2011		2012		Total	
	N	(%)	N	(%)	N	(%)
Male	870	(60.8)	1089	(62.9)	1959	(62.0)
Female	562	(39.2)	641	(37.1)	1203	(38.0)
Total	1,432	(100)	1,730	(100)	3162	(100.0)

Table 2: Age and sex distribution of mortality in adult A and E from January 2011 to December 2012

Age group (years)	Male		Female		Total	
	N	(%)	N	(%)	N	(%)
Both Medical and surgical cases ($X^2 = 0.105$, df = 2, *P*-Value = 0.95)						
18-44	26	(34.2)	17	(37.0)	43	(35.2)
45-64	27	(35.5)	16	(34.8)	43	(35.2)
≥65	23	(30.3)	13	(28.2)	36	(29.6)
Total	76	(100.0)	46	(100.0)	122	(100.0)
Medical cases only ($X^2 = 1.2$, df = 1, *P*-Value = 0.27)						
18-44	16	(30.8)	16	(40.0)	32	(34.8)
45-65	17	(32.7)	15	(37.5)	32	(34.8)
≥65	19	(36.5)	9	(22.5)	28	(30.4)
Total	52	(100.0)	40	(100.0)	92	(100.0)
Surgical cases only ($X^2 = 6.136$, df = 2, *P*-Value = 0.047)						
18-44	10	(41.7)	1	(16.7)	11	(36.7)
45-66	10	(41.7)	1	(16.7)	11	(36.7)

≥65	4	(16.6)	4	(66.6)	8	(26.6)	
Total	24	(100.0)	6	(100.0)	30	(100.0)	

Table 3: Clinical causes of patients' death in adult A and E from January 2011 to December 2012.

Causes	Number	%	
Stroke	16	13.1	
RTA	16	13.1	
Hyperglycaemic emergencies	15	12.3	
Non-trauma surgical cases	12	9.8	
Heart failure	9	7.4	
Sepsis	6	4.9	
Hypertensive emergencies	5	4.1	
HIV/AIDS	5	4.1	
Chronic liver disease	4	3.3	
Central nervous system infection	4	3.3	
Tuberculosis	3	2.5	
Anaemias	3	2.5	
Acid peptic ulcer disease	3	2.5	
Gastroenteritis	3	2.5	
Haemoglobinopathies	2	1.6	
Haematological malignancies	2	1.6	Acute
renal failure	2	1.6	
Community acquired pneumonia	2	1.6	
Ischaemic heart disease	2	1.6	
Non-RTA trauma	2	1.6	
Chronic obstructive pulmonary disease	1	0.8	
Bronchial Asthma	1	0.8	
Upper gastrointestinal haemorrhage	1	0.8	
Chronic kidney disease	1	0.8	
Tetanus	1	0.8	
Drug toxicity	1	0.8	
Total	122	100.0	

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