International Journal of Medical Science and Applied Biosciences
ISSN: 2545-5893(Print) 2545-5877 (Online)
Volume 5, Number 1, March 2020
http://www.casirmediapublishing.com

A STUDY OF IN-HOSPITAL ADULT (15-60 YEARS) MORTALITY IN A NIGERIAN TERTIARY CARE CENTRE

Uchendu Obiora Jude
Department of Histopathology
Delta State University, Abraka, Delta State
Email: ojlinksent@yahoo.com

ABSTRACT: Adult mortality is serious public health concern and better understanding of its structure is invaluable to improving adult survival. The study aims at evaluating the mortality pattern of adults (15-60 years) admitted into Delta State University Teaching Hospital, Nigeria (DELSUTH). The study is 3 years (2016-2018) descriptive, retrospective study of adult deaths in DELSUTH, using the parameters of age, sex, cause of death and month of death. Analysis was done with SPSS version 22. In 3 years, 604 adult deaths within the age range of 15-60 years were documented, representing 56.6% of the hospital mortality, consisting of 319 males and 285 females with a mean age of 42.49 years and a male to female ratio of 1:1.1. The months of lowest number of deaths were in May and September; while the peaks were in April and July. The proportion of deaths in 2016, 2017 and 2018 are 22.2%, 43.4% and 36.4% respectively. Non-communicable disease (NCD), communicable disease (CD) and fatal injuries accounted for 393 (65.1%), 115 (19.0) and 96 (15.9%) deaths with cerebrovascular accident, Acquired Immunodeficiency Syndrome (AIDS) and Road Traffic Accident (RTA) being the leading cause of each respective group. Adult mortality is relatively common and affecting more males than females and is more common among the older age groups. NCDs are the leading cause of death while AIDS and RTA accounted for majority of CD and injury fatalities respectively.
Keyword: Adult, diseases, mortality, Non-communicable disease

INTRODUCTION

Adult mortality is defined as 'the probability of dying from 15 to 60 years' It is an important measure of socioeconomic development of a country because the concerned age group are the major economically productive and biologically reproductive group who are also responsible for support of children and the elderly populace.[1,2] Nigeria has the one of the worst adult mortality index in the world with a rate of 359 deaths per 1000 population, and a somewhat deteriorating trend in the last two decades.[3] Much have been learnt locally and globally on maternal and child health mortality while knowledge about adult mortality has been largely deficient.[4] The best way of estimating mortality rate in any country is through data generated from complete vital registration.[5] Like other countries of sub-Sahara Africa, lack of comprehensive vital registration has been the order of the day.[6] Planning of health care policies and monitoring

of effective public health reforms towards curbing adult mortality is impossible without understanding the structure of adult mortality. In the backdrop of defective demographic data, there is need to identify a nearly reliable alternative source of data that will form a reference point for policy makers on such issues. The index study is based on hospital records of adult mortality among patients admitted in Delta State University Teaching Hospital (DELSUTH), the state's apex hospital. We hope that the result will contribute to the body of knowledge and enable policy makers understand the present mortality trend and plan effectively to reverse the trend.

MATERIALS AND METHODS

The study was conducted in DELSUTH, one of the leading tertiary healthcare centers in South-Southern geopolitical zone of Nigeria. It is a referral center and receives patients from communities in Delta state and neighboring state of the country. It is a 187 bed capacity hospital, equipped with state of art facilities. The research is a 3 years descriptive retrospective study involved patients that died in the hospital from 1st January 2016 to 31st December, 2018. These patients were within the age group of 15-60 years. Information such as the age, sex, diagnosis, and month of death were extracted from the mortality ledger of the Health Information Management department of the hospital. The data was subsequently analyzed using SPSS version 22 and presented in tables and figures. Exclusion criteria: Patients younger than 15 years or older than 60 years were excluded from the study. Cases of brought-in-dead were excluded from the study. Inclusion criteria: Consecutive deaths of deaths

RESULTS

In 3 years (2016-2018) a total of 5,030 patients were admitted into the hospital, out of which 604 patients died, giving a crude mortality rate of 12%. These accounts for 56.6%% of all deaths in the hospital. The deceased adults consist of 319 males and 285 females, with overall male to female ratio of 1.1:1; and a male to female ratio of 1.1:1, 1.2:1 and 1.1:1 in 2016, 2017 and 2018 respectively. Details of the year and sex –wise distribution of adult mortality is shown in table I. The seasonal index of adult mortality is shown in Table II. The lowest number of deaths occur in May and September, while the highest numbers of death were in April and June.

International Journal of Medical Science and Applied Biosciences
ISSN: 2545-5893(Print) 2545-5877 (Online)
Volume 5, Number 1, March 2020
http://www.casirmediapublishing.com

Table III shows the proportion of adult mortality by age in 2016-2018. The proportion of adult deaths in 2016, 2017 and 2018 are 122(22.2%), 262(43.4%) and 220(36.4%) respectively. Those that died in the second, third, fourth, fifth and sixth decades accounted for 5.1%, 12.9%, 26.0%, 23.5% and 32.5% respectively. Table IV shows the proportional mortality of non-communicable diseases, communicable disease and injury deaths in 2016-2018. Non-communicable disease accounted for 15.1%, 26.8% and 23.2% of the cases in 2016, 2017 and 2018 respectively. In 2016, 2017 and 2018, communicable diseases accounted for 3.3%, 9.1% and 6.6% of all deaths respectively. Fatal injuries accounted for 1.8%, 7.5% and 6.6% of all deaths in 2016, 2017 and 2018 respectively.

Table V shows details of yearly trend and gender distribution of fatal adult non-communicable diseases. The leading causes are cerebrovascular disease (24.4%), cancers (18.6%), genitourinary disease (13.0%), endocrine and metabolic disease (8.4%), hepatobiliary disease (8.4%), gastrointestinal disease (7.6%), respiratory disease (5.3% and cardiovascular disease (4.3%). Table VI shows the yearly trend and gender distribution of communicable diseases. HIV/AIDS, Sepsis, Central nervous system infections, Respiratory tract infections, gastrointestinal and skin infections accounted for 56%, 13%, 11.3%, 5.2% and 1.7% of the cases respectively. The sex distribution of fatal injuries in 2016-2018 is shown in table VII. Leading causes are RTA (70%)], gunshot injuries (8.1%), burns (7.1%), blunt trauma (6.1%), and fall from height (5.1%). Table VIII showed the top ten causes of adult mortality with their proportions. The diseases include Cerebrovascular accident (CVA)(15.4%), RTA(10.6%), AIDS(9.9%), Chronic kidney disease(CKD)(6.3%), Diabetes Mellitus(DM)(5.1),Chronic liver disease (CLD)(5.0%), breast cancer(4.0%),Peptic ulcer disease(PUD)(2.8%), and acute kidney injury (AKI)(2.0%).

Table I: Year and sex-wise distribution of adult mortality.

Sex	Years			Total
	2016	2017	2018	
Male	64	140	115	319
Female	58	122	105	285
Total	122	262	220	604
Sex ratio(Male:Female)	1.1:1	1.2:1	1.1:1	11.1

Table II: Seasonal index of adult mortality

	Non-Communicable Diseases	Communicable Diseases	Injury	Total	Percentage
January	29	11	7	47	7.8
February	29	9	10	48	8.0
March	35	6	12	53	8.8
April	48	10	7	65	10.8
May	27	3	7	37	6.1
June	39	15	9	63	10.4
July	37	15	5	57	9.4
August	42	8	11	61	10.1
September	17	3	4	24	4.0
October	30	16	8	54	8.9
November	30	8	8	46	7.6
December	32	11	6	49	8.1
Total	395	115	94	604	100

Table III Proportion of adult mortality by age in 2016-2018

Age	2016(%)	2017(%)	2018(%)	Total
≤20	9(7.4)	11(4.2)	11(5.0)	31(5.1%)
21-30	14(11.5)	39(14.9)	25(11.4)	78(12.9%)
31-40	32(26.2)	76(29.0)	49(22.3)	157(26.0%)
41-50	28(23.0)	59(22.5)	55(25.0)	142(23.5%)
51-60	39(32.0)	77(29.4)	80(36.4)	196(32.5%)
Total	122(22.2%)	262(43.4%)	220(36.4%)	604(100%)

Mean Adult age: 42.49(SD:12.029; Mean male age:43.25(SD:11.78); Mean female age:41.64(SD:12.27)

Table IV: Proportional Mortality of Non-Communicable Disease, Communicable disease and injury mortality in 2016-2018.

Disease group	Years		
	2016(%)	2017(%)	2018(%)
NCD	15.1	26.8	23.2
CD	3.3	9.1	6.6
Injury	1.8	7.5	6.6
	20.2	43.4	36.4

International Journal of Medical Science and Applied Biosciences
ISSN: 2545-5893(Print) 2545-5877 (Online)
Volume 5, Number 1, March 2020
http://www.casirmediapublishing.com

Table V: Year and Sex-wise Distribution of Non-Communicable Disease

Disease Groups	2016 Male	Female	2017 Male	Female	2018 Male	Female	Total
Cancer	2	18	15	29	7	14	85(21.6%)
Cardiovascular			5	3	4		12(3.1%)
CNS disease	12	8	17	12	22	24	95(24.2%)
Endocrine/metabolic Disease	6	3	6	7	6	6	34(8.7%)
Renal disease	12	3	16	3	7	9	50(12.7%)
GIT related disease	6	1	6	10	8	5	36(9.2%)
Hematologic disorders	4	1	5	3	3	1	17(4.3%)
Liver disease	4	1	7	4	9	8	33(8.4%)
Peri-operative death				2		1	3(0.8%)
Disease of pregnancy & childbirth		10		8		4	22(5.6%)
Respiratory disease			2		1		3(0.8%)
Others				2		1	3(0.8%)
Total	46(11.7%)	45(11.5%)	79(20.1%)	83(21.1%)	68(17.3%)	72(18.3%)	393(100)

Table VI: Year wise Distribution of Communicable Diseases

Diseases	2016 Male	Female	2017 Male	Female	2018 Male	Female	Total (%)
Sepsis	1(9.1)	3(33.3)	3(10.7)	1(3.7)	4(22.2)	3(13.6)	15(13.0)
AIDS	6(54.5)	5(55.6)	15(53.6)	19(70.4)	6(33.3)	14(63.6)	65(56.0%)
CNS infection	2(18.2)		4(14.3)	1(3.7)	5(27.8)	2(9.1)	14(12.3)
Skin Infection	1(9.1)				1(5.6)		2(1.7)
GIT infections	1(9.1)		1(3.6)	3(11.1)		1(4.5)	6(5.2)
Respiratory tract infections		1(11.1)	5(17.9)	3(11.1)	2(11.1)	2(9.0)	13(11.3)
Total	11(100.0)	9(100.0)	28(100.0)	27(100.0)	18(100.0)	22(100.0)	115(100)

Table VII: Year-wise and Sex Distribution of Adult Fatal Injuries

Injury	2016 Male	Female	2017 Male	Female	2018 Male	Female	Total (%)
Blunt Trauma	2(28.6)		1(3.0)	2(16.7)		1(9.1)	6(6.1%)
Burns	1(14.3)		2(6.1)	1(8.3)		3(27.3)	7(7.1)
RTA	3(42.9)	3(75.0)	22(66.7)	8(66.7)	23(79.3)	7(63.6)	69(70.0)
Gun shot		1(25.0)	2(6.1)		5(17.2)		8(8.1)
Fall From Height			4(12.1)		1(3.4)		5(5.1)
Stab Injury			2(6.1)				2(2.0)
Suicide	1(14.3)			1(8.3)			2(2.0)
Total	7(100.0)	4(100.0)	33(100.0)	12(100.0)	29(100.0)	11(100.0)	99(100)

Table VIII: Top 10 Causes of Adult Death

Disease/Injury entity	Sex		
	Male (%)	Female (%)	Total no of case (%)
CVA	49(8.1)	44(7.3)	93(15.4)
Road traffic accident	48(8.0))	18(3.0)	64(10.6)
AIDS	25(4.1)	35(5.8)	60(9.9)
CKD	29(4.8)	9(1.5)	38(6.3)
DM	17(2.8)	14(2.3)	31(5.1)
CLD	20(3.3)	10(1.7)	30(5.0)
Breast cancer		24(4.0)	24(4.0)
PUD	11(1.8)	6(1.0)	17(2.8)
Colorectal cancer	8(1.3)	7(1.2)	15(2.5)
Acute kidney injury	6(1.0)	6(1.0)	12(2.0)

DISCUSSION

In 3 years, we observed that over half of deaths recorded in DELSUTH are affected adults. This is a devastating statistic as it implies massive loss of working force and economic strength of the populace as well as an increase in child-dependency ratio. This attrition of adult populace may be attributed to poor economic condition, unhealthy life style, HIV pandemic, poor funding of the health sector and perennial infrastructure decay.[7] There is therefore an urgent to give more academic attention to understanding the determinants of adult health and mortality and develop strategic policy actions to reverse this ugly trend. During the study period, we observed a consistent but marginal preponderance of male death over female death. This has also been the observation of many authors. [8,9,10] While some authors attributed it to the higher number of male adults admitted to hospitals,[10,11] research has also shown that females generally has greater biological, physiological and genetic survival advantage, while the impact of cigarette smoking, alcohol and substance abuse seem to be increasingly more detrimental to the health and survival of the male.[12,13] The changing role of women with modernization may explain the close gap in sex differential in mortality.[12]

We observed a substantial degree of seasonal variation in adult mortality.

This complex variation does not seem to have a single explanation and can only be attributed to diversity in the determinants of adult mortality. Funding of research to unravel these determinants will go a long way in influencing decision making towards fighting this trend. We observed age-related variation in adult mortality, with the highest rates recorded in the 3 years of

International Journal of Medical Science and Applied Biosciences
ISSN: 2545-5893(Print) 2545-5877 (Online)
Volume 5, Number 1, March 2020
http://www.casirmediapublishing.com

the study. These are most likely related to the chronic diseases and cancers arising from the accumulated effect of co-morbidities, risky behavior and lifestyle choices. Understanding and modification of these risk factors will no doubt reduce the burden of adult morbidity and mortality. [7, 14].

Consistently, non-communicable disease was the most common cause death; followed by communicable diseases and lastly fatal injuries. The high prevalence of non-communicable diseases mortality also seems to have an upward trend during the study period. Interestingly, reports have shown that over 3/4th of non-communicable diseases in the world occur in low and middle income countries.[15] These are related to changes towards unhealthy lifestyle and behavior such as alcoholism, smoking, obesity, lack of physical exercise as well as poorly managed co-morbidities such as hypertension and diabetes mellitus.[14] Decreasing communicable disease mortality may be related to improvement in healthcare service, better infectious disease management and vaccination coverage. Some authors however reported that infections/communicable disease caused more adult death than non-communicable disease,[9,10] the difference being attributed to higher incidence AIDS mortality in their studied population.

NCDs deaths were attributed to specific disease causes such as cerebrovascular accident, cancers of varying histologic types, chronic kidney disease, diabetes mellitus, and chronic liver disease. (in decreasing order of relevance). The high rate of cerebrovascular disease mortality emanates most likely from interplay of long standing hypertension and diabetes mellitus. Global report shows that the rate of cerebrovascular accident has increased by 100% in developing countries.[16] With increasing longevity and westernized lifestyle, it can be predicted that CVA related morbidity and mortality will be on the rise. Relatively high cancer rate among Nigerian adults may be attributed to reducing infectious disease mortality, increasing life expectancy, smoking habit, physical inactivity, obesity, changing and lifestyle diet and reproductive factors.[17] Our report however contrasts with report from South Eastern Nigeria with genitourinary disease as the leading cause of NCD death.[11]

The less incidence of CD is attributed to better control of infectious diseases. Sadly, we identified HIV/AIDS as a most important cause of CD related death in this study. It has also been a general observation that HIV/AIDS is

a major determinant of adult mortality trend in sub-sahara Africa.[10,11] I think that the high AIDS mortality in this study is an underrepresentation as victims of HIV/AIDS prefer to die outside the hospital facility due to the prevalent socioeconomic factors.[18]

Fatal injury were observed to be relatively common, accounting for 94 (15.6%) deaths. This is expected as 90% of cases of injury across the globe are recorded in middle and low income countries.[19] We also observed a very high preponderance of male death; which is in line with gender disparity in risky behavior, occupational choices and comparatively less prudent male lifestyle.[12,13] We also observed that the most common causes (RTA, gunshot and burns injury) are on the increase across the period of study. The deplorable state of Nigerian road, reckless driving and laxity of law enforcement agents are among the major causes of RTA.[20] High rate of fatal gunshot injuries has been reported among autopsies in this region, indicating that a lot more is happening outside the hospitals than we could imagine.[21] Intertribal crashes, herders-farmer crash, militancy, armed robbery, kidnapping and cultism are among possible causes.[21] The rate of fatal burns have been documented in earlier studies accounting for 4.8% of trauma deaths in Nigeria.[22] Flame burns injury, the predominant pattern observed, is related to storage and use of petroleum products at home and fallouts of pilfering of gasoline from underground pipelines and kerosene adulteration in this region. There is need for policy makers at various levels of governance to recognize the growing magnitude of injury related mortality and design appropriate policy response to curb the menace.

In sum, adult mortality rate is relatively high with marginal male predominance. The likelihood of dying also increases with age with no clear-cut seasonal variation. Non-communicable diseases are the leading cause of death while AIDS and RTA are the outstandingly leading cause of CD and injury related mortality respectively.

International Journal of Medical Science and Applied Biosciences
ISSN: 2545-5893(Print) 2545-5877 (Online)
Volume 5, Number 1, March 2020
http://www.casirmediapublishing.com

REFERENCE

1. World Health Organization. Global Health Observatory (GHO) data: Adult mortality rate, 2000–2016. World health Organization, 2016. https://www.who.int/gho/mortality_burden_disease/mortality_adult/situation_trends_text/en/ retrieved on 6/06/19
2. Feachem, Richard G. A., Kjellstrom, T., Murray, J. L. Christopher, Over, M. and Phillips, A. Margaret, 1992, The Health Status of Adults in the Developing World. Oxford University Press, US.
3. United Nation.World Mortality 2017:data booklet. United Nation,2017 https://www.un.org/en/development/desa/population/publications/pdf/mortality/World-Mortality-2017-Data-Booklet.pdf. Retrieved on 06/06/19.
4. Gakidou E, Hogan M, Lopez AD. Adult mortality: time for a reappraisal. International Journal of epidemiology.2004;33(4):710-717.
5. Abou Zhar C, de Savigny D, Mikkelsen L, Setel PW, Lozano R, Nichols E, Notzon F, Lopez AD. CRVS progress in data revolution for counting and accountability. Lancet. 2015; 386:1373–85.
6. Rao C, Bradshaw D, Mathers CD. Improving death registration and statistics in developing countries: Lessons from sub-Saharan Africa. Southern African Journal of Demography.2004; 9(2):81-99.
7. Korte R, Rehle T, Merkle A. Strategies to maintain health in the Third World. Trop Med Parasitol 1991; 42:428-32.
8. Iliyasu Z, Abubaka IS, Gajida AU.Magnitude and leading causesof in-hospital mortality at Aminu Kano Teaching Hospital Kano, northern Nigeria. A 4-year prospective analysis. Niger JMed 2010;19:400-6.
9. Nwafor C C, Nnoli M A, Chuku C A. Causes and pattern of death in a tertiary hospital in south eastern Nigeria. Sahel Med J. 2014; 17:102-7.
10. Adeolu AA, Arowolo OA, Alatise OI, Osasan SA, Bisiriyu LA, Omoniyi EO, Odesanmi WO. Pattern of death in a Nigerian teaching hospital; 3-decade analysis. Afr Health Sci. 2010 Sep; 10(3): 266–272.
11. Arodiwe E B, Nwokediuko S C, Ike S O. Medical causes of death in a teaching hospital in South-Eastern Nigeria: A 16 year review. Niger J Clin Pract. 2014; 17:711-6.
12. Lopez AD. Sex differentials in mortality. WHO Chron. 1984; 38(5):217-24.
13. Sorenson SB. Gender disparity in injury mortality: consistent, persistent and larger than you'd think. Am J Public Health. 2011; 101 (1):353-358.
14. World Health Organization. Global status report on non-communicable diseases 2014: attaining the nine global non-communicable diseases targets; a shared responsibility. World Health Organization 2014.

15. Holmes MD, Dalal S, Volmink J, Adebamowo CA, Njelekela M, Fawzi WW, et al. Non-communicable diseases in sub-Saharan Africa: The case for cohort studies. PLoS Med 2010; 7: e1000244.
16. Feigin VL, Lawes CM, Bennett DA, Barker-Collo SL, Parag V (2009) Worldwide stroke incidence and early case fatality reported in 56 population-based studies: a systematic review. Lancet Neurol 8: 355–369.
17. Jemal A, Bray F, Forman D, O'brien M, Ferlay J, Center M, et al. Cancer burden in Africa and opportunities for prevention. Cancer. 2012; 118: 4372-4384.
18. Chisumpa VH, Odimegwu CO, Wet ND. Adult mortality in sub-saharan Africa, Zambia: Where do adults die? SSM – Population Health. 2017; 3: 227–235.
19. Gosselin RA, Spiegel DA, Coughlin R, Zirkle LG. Injuries: the neglected burden in developing countries. Bulletin of the World Health Organization 2009; 87:246-246.
20. Onyemechi NOC, Ofoma UR. The Public Health Threat of Road Traffic Accidents in Nigeria: A Call to Action. Ann Med Health Sci Res. 2016 Jul-Aug; 6(4): 199–204.
21. Uchendu OJ, Nwachokor FN, Ijomone EA. Audit of Medico Legal Death in Metropolitan City of Warri. Int. J of Forensic Med Invest.2017; 3(1):29-37.
22. Solagberu BA, Adekanye AO, Ofoegbu CP et al. Epidemiology of trauma deaths. West Afr J Med. 2003; 22:177–183.