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ORIGINAL ARTICLE

Assessment of direct causes and costs of medical admissions in Bingham University Teaching Hospital – Jos, Nigeria

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ABSTRACT

Background: As health-care costs continue to rise and the population ages, an individual Nigerian continues to experience financial hardship in settling medical bills, especially when health insurance schemes are still far from reality for most Nigerians, making health-care financing burdensome in Nigeria like many developing countries. This has made out-of-pocket expenditure the most common form of health-care financing. **Aims:** This study assessed the average costs, duration, and causes of inpatient admission so as to know the direct costs associated with medical care for proper health-care planning. **Settings and Design:** This was a pilot study of a prospective cohort design whereby all patients were admitted to medical wards during the study period. **Materials and Methods:** Cost analysis was performed from the societal perspective, but included only direct medical care cost for this analysis. Patients input charts and pharmacy dispensing charts of all patients admitted to medical wards between May and July 2015 were reviewed. All costs were in local currency (Naira) using the average exchange rates proposed by Central Bank of Nigeria for June 2015. **Statistical Analysis Used:** Statistical analysis was carried out using SPSS version 20. **Results:** A total of 293 out of 320 patients met inclusion criteria and were assessed. Female patients admitted during the study period had an overall higher mean cost of care ₦84, 303.94 ± 6860.56 (95% confidence interval [CI]: 68,991.65–96,103.27) compared to male patients ₦68, 601.59 ± 57,178.37 (95% CI: 59,081.51–78,121.67) ($P < 0.102$). Civil servants had higher mean overall costs of care ₦90, 961.70 ± 105,175.62 (95% CI: 65,883.46–116,039.94) ($P < 0.203$). **Conclusions:** The higher prevalence of female patients with higher mean cost of inpatient care in this study suggests that Jos females may be more health conscious than their male counterparts. Overall mean cost of inpatient care stay was not proportional to the length of stay, suggesting early discharge from hospital did not necessarily eliminate the cost of patient management.

Keywords: Causes, direct costs, medical inpatient, Nigerian teaching hospital

INTRODUCTION

While measurements of morbidity and mortality are key considerations for estimating the burden of disease in populations, they provide an incomplete picture of the adverse impact of ill health on human welfare. Analysis of the economic impact of ill health addresses a number

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of policy questions concerning the consequences of disease or injury. Some of these questions relate to the microeconomic level of households, firms, or government – such as the impact of ill health on a household's income or a firm's profits – while others relate to the macroeconomic level, including the aggregate impact of a disease on a country's current and future gross domestic product.

Although inpatient hospital services account for a small share (7%) of health-care utilization even in developed countries such as the United States, it constitutes the largest share (29% in 2009 in the US) of the total health-care spending.[1] As health-care costs continue to rise and the population ages, policymakers are increasingly concerned about the growing burden of hospital-based medical care expenses on the government, insurers, patients, and employers. Increase in the length of hospitalization tends to increase in aggregated health-care expenditures.[2-4]

For the individual Nigerian patient, it has been observed that a quarter of the respondents studied in a Nigerian population experienced financial hardship in settling their medical bills. Valuable assets of the respondents such as farm lands were sold in the quest of seeking health-care services.[5] Some patients were even detained in the hospital due to an inability to pay their bills[6] or resort to leaving against medical advice to avoid the embarrassment of hospital bills and alternative care, which in turn ends with complications requiring more resources to take care of.

The pattern of illnesses responsible for the high mortality among adults in sub-Saharan Africa (SSA) has not been well characterized.[7-12] The World Health Organization (WHO) predicts that by 2020, the causes of disease and death in SSA will have undergone a significant shift toward endemic noncommunicable diseases (NCDs) and away from infectious diseases.[13] This shift will necessitate changes in the deployment of resources, both human and physical, to deal with new health challenges.[7,14] Currently, very few health systems in low- and middle-income countries rely on research evidence for guiding policy interventions.[15] As this transition occurs, accurate data on the burden of illnesses will be needed as there will be a double burden of endemic NCDs and residual communicable diseases.[14,16,17]

Health-care financing has been a problem in SSA due to increased demand for health services and rising health-care costs coupled with low coverage of the National Health Insurance Scheme.[18] Health insurance coverage is still far from reality for most Nigerians, making health-care financing burdensome in Nigeria like many developing countries.[19] This has made out-of-pocket expenditure the most common form of health-care financing.[18,20] Out-of-pocket health expenses reduce health-care uptake or utilization and the cost-effectiveness of the health-care system.[6,18] The nature of health service received also has implications for health-care expenditure.[21,22]

This study is therefore designed to evaluate the average costs and duration of admission to inpatient medical wards in a tertiary health institution in Nigeria and the reason for seeking admissions in Nigerian tertiary institutions so as to know the direct costs associated with medical care for proper health-care planning.

Direct costs are incurred by the health system, society, family, and individual patient, and consist of health-care costs and nonhealth-care costs. Direct costs are defined as the medical care expenditures for diagnosis, treatment, rehabilitation, etc. whereas the indirect costs are related to the consumption of nonhealth-care resources such as transportation, household expenditures, relocating, property losses, and informal care of any kind.[1]

We therefore present direct costs' analysis of inpatient admission into medical wards of a Nigerian tertiary health institution so as to develop guidelines for health-care planning, thereby reducing waste and helping to improve the quality of inpatient care in Nigeria. We also aimed specifically to evaluate the direct costs of inpatient medical management and current causes of inpatients' medical admission and to compare cost, causes, and average length of hospital stay per admission.

MATERIALS AND METHODS

Study design

This was a prospective pilot study for a wider prospective cohort design intended to cover all the six geopolitical zones in Nigeria. Cost analysis was performed from the societal perspective that included only direct care costs for this study. Direct costs represent the resources consumed by the intervention and associated events. For example, direct costs associated with primary care include GP time, practice nurse costs, drugs, and capital costs arising from equipment and buildings.[22,23] This can usually be further subclassified into direct costs

within the health-care sector which include the cost of prevention, diagnosis, (pharmaco-) therapy, costs of care, or direct costs outside of health-care sector: patient's time to travel to hospital and over-the-counter drug costs.[22] Indirect costs may be tangible, i.e., productivity losses or inputs from careers, or intangible, i.e., loss of leisure time, costs of pain, suffering, uncertainty, or death. As indirect costs do not have a market value, costs allocated to them are known as "shadow prices." Indirect costs within the health-care sector include costs made during the life years gained. With improved health care, people become older, develop more chronic diseases, and incur higher costs. Indirect costs outside of health-care sector are productivity losses, judicial costs, and costs of specialized schooling.[22,23]

The inclusion criteria were all adult patients admitted to the medical wards of Bingham University teaching hospital between May and July 2014 and spent at least 24 h on admission. All input charts and pharmacy dispensing charts of all patients admitted to the medical wards of Bingham University Teaching hospital aged between 13 years and above, between May and July 2014, were reviewed. Patients were excluded from the study if they spent <24 h on admission, left against medical advice, or patients died during admission and/or their record cannot be traced.

Bingham University Teaching Hospital is located at the heart of Jos city, Plateau State capital, Northcentral Nigeria. This hospital functions as a teaching hospital for Bingham University located in Karu Nasarawa state. It is a leading faith-based referral tertiary health center in the northern part of Nigeria owned by Evangelical Church Winning All (ECWA). The hospital is the 2nd teaching hospital within Jos town which serves a population of 3.5 million (2006 Census) people of Plateau State in addition to a large population from the neighboring states.

The patients' biodata was retrieved from the medical records' departments and information was extracted from patients' charts while on admission in the wards and reviewed for the study.

The final diagnoses during hospital stay were extracted from the charts and grouped into body systems according to the International Classification of Diseases guidelines.[24]

The cost data collected included the direct medical costs (i.e., cost of hospital stay, diagnostics' cost, prescribed medicines' cost, number of days of hospitalization, quantity of pharmaceuticals used, medical supplies, and other specialized services used). These data were extracted from patient's folders and by interaction with patients and their relatives while on the wards. All the costs were stated in local currency (Naira) for the period but converted into their US dollar equivalents using the Central Bank of Nigeria average exchange rates for June 2015.

Cost estimates

Cost analysis was based on the WHO guidelines for estimating the economic burden of inpatient day costs.[25] These were developed into an Excel workbook and linked to facilitate easy computation.

The hospital resource utilization data form was used to generate the inpatient days, laboratory costs, and other associated medical costs from all adults admitted as medical inpatients. These generated data were then inputted into the hospital cost worksheet. The average inpatient day cost was obtained by dividing the total inpatient day cost by the number of inpatients. Confidence intervals (CIs) were calculated for all the cost estimates.

Statistical analysis

All data were cleaned and entered, into excel sheet, and analysis performed using the Statistical Package for the Social Sciences (SPSS), IBM Corp., Released 2012 (IBM SPSS Statistics for Windows, Version 20, IBM Corp., Armonk, NY, USA).[26] Computed frequencies and proportions were generated. Mean ± standard deviation (SD) was generated for continuous variables such as cost of care. Student's *t*-test and analysis of variance were used to compare means of continuous variables. $P < 0.05$ was considered statistically significant.

Ethical approval

The permission for this study was approved by the Bingham University Teaching Hospital's Health Research Ethics Committee before the conduct of the study.

RESULTS

A total of 320 patients admitted and managed at the medical wards of Bingham University Teaching Hospital (owned by ECWA), Jos, between May and July 2015. Only 293 (91.6%) patients met the inclusion criteria and were assessed, while 27 (8.4%) were excluded either because patient's final diagnosis was surgical, for example, acute appendicitis or gynecological and

Table 1: Sociodemographic characteristics of the patients

Item	Male (*n*=142; 48.5%)	Female (*n*=151; 51.5%)	Total (*n*=293; 100%)	*P*
Mean age±SD (years)	34.25±18.02 (range: 13-93), median=28			
Age/years				
15-<25	47 (33.1)	63 (41.7)	110 (37.5)	<0.069
25-<40	56 (39.4)	37 (24.5)	93 (31.7)	
40-<55	21 (14.8)	22 (14.6)	43 (28.5)	
55-<65	7 (4.9)	13 (8.6)	20 (6.8)	
Occupations				
Traders/business	43 (30.3)	54 (35.8)	97 (33.1)	<0.000
Civil servants	21 (14.8)	49 (16.7)	70 (23.9)	
Students	21 (14.8)	26 (8.9)	47 (16.0)	
Farmers	19 (13.4)	14 (4.8)	33 (11.3)	
Homemaker	28 (19.7)	0 (0.0)	28 (9.6)	
Unemployed	10 (7.0)	6 (2.0)	16 (5.5)	
Mean±SD LOS/days	5.63±5.60 (range: 39 days; minimum/maximum: 1-40 days), median - 4 days			
LOS/days				
<3	45 (31.7)	40 (26.5)	85 (29.0)	<0.529
3-<7	71 (50.0)	79 (52.3)	150 (51.2)	
7-<14	18 (12.7)	19 (6.5)	37 (12.6)	
14-<21	6 (4.2)	6 (2.0)	12 (4.1)	
21-<28	2 (1.4)	4 (1.4)	6 (2.0)	
≥28	0 (0.0)	3 (1.0)	3 (1.0)	
Disease type				
Infectious/parasitic	85 (29.010)	90 (30.72)	175 (52.56)	<0.599
CNS	14 (9.9)	12 (7.9)	26 (8.87)	
Hematological	12 (8.5)	10 (6.6)	22 (7.51)	
GIT/liver	7 (4.9)	14 (9.3)	21 (7.17)	
Circulatory	7 (4.9)	11 (7.3)	18 (6.14)	
Respiratory	7 (4.9)	4 (1.4)	11 (3.75)	
MSS/rheumatological	5 (3.5)	21.3)	7 (2.39)	
Endocrine/diabetes	3 (2.1)	3 (2.0)	6 (2.04)	
Renal/hypertension	2 (1.4)	2 (1.3)	4 (1.37)	
Others	0 (0.0)	3 (2.0)	3 (1.02)	

LOS: Length of stay, GIT: Gastrointestinal tract, CNS: Central nervous system, MSS: Musculoskeletal system, SD: Standard deviation

referred to appropriate wards or his/her case file was empty and cannot be assessed.

Sociodemographic characteristics of the patients

Table 1 shows the total number of patients recruited during the study period. Of the 320 patients admitted during the study period, 293 (91.6%) were reviewed. The demographic characteristics of the study population revealed overall mean age of 34.25 ± 18.02 years (range: 13–93 years). There were more patients (110 [37.54%]) in the 15–25 years' age group. There were slightly more number of females admitted during the period under review (151 [51.54%]) than male patients (142 [48.46%]); however, this difference was not statistically significant ($P < 0.05$). Both the groups were statistically comparable with regard to age, weight, and sex.

The leading cause of admission during the period under review was infectious and parasitic illnesses, which constituted 175 (59.7%) cases. The second leading cause of admission was central nervous system (CNS) diseases (26 [8.9%]). This was followed by hematological (22 [7.2%]), gastrointestinal tract (GIT)/liver diseases (21 [6.2%]), cardiovascular system (CVS) (18 [6.1%]), etc.

A statistically significant number of petty traders (self-employed persons) (97 [33.77%]) and civil servants (70 [23.89%]) constituted the bulk of patients who sought admission during the period compared to other occupations, $P < 0.05$.

The mean length of hospital stay in this study was 5.7 ± 5.65 days, with a median of 4 days and a range of 39 days and the minimum/maximum stay was 1–40 days.

Comparison of mean cost of inpatients' medical care across demographic characteristics

Table 2 shows the mean total cost of care across demographic characteristics which was higher in the age group of 55–69 years with ₦48,065.12 ± 6120.00 (95% CI: 40,957.95–78,070.09) compared to the other groups ($P = 0.001$). Female patients admitted during the study period had an overall mean cost of care of ₦84,303.94 ± 6860.56 (95% CI: 68,991.65–96,103.27) compared to male patients that incurred ₦68,601.59 ± 57,178.37 (95% CI: 59,081.51–78,121.67). Among the occupational groups admitted

during the study period, civil servants and government workers had higher mean overall costs of admission of ₦90,961.70 ± 105,175.62 (95% CI: 65,883.46–116,039.94) compared to other occupational groups.

Comparative length of medical inpatient stay and mean total costs

In terms of length of hospital stay in days, the mean length of hospital stay in this study was 5.6 ± 5.65 days, with a range of 1–40 days and median of 4 days [Table 3]. Elderly patients above 55 years had higher length of hospital stay than younger age groups. Overall mean cost was higher in patients who stayed on the 1st day of admission to up to 21–28 days ₦158,111.67 ± 89,913.59 (95% CI: 104,760.00–233,339.17) compared to length of stay (LOS) beyond 28 days ($P < 0.0001$).

Types of illness and average cost of treatment

Table 4 shows the leading cause of admission during the period under review was infectious and parasitic illnesses which constituted 59.7% of the presenting illnesses, with a mean cost of ₦37,131.86 ± 37,563.037 (95% CI: 32,056.20–43,094.13). The second leading cause of admission was CNS diseases (8.9%) with an estimated mean cost of ₦40,497.58 ± 31,976.12 (95% CI: 29,779.25 ± 54,893.14). This was followed by hematological (7.2%), GIT/liver (6.2%), and CVS (6.1%), with estimated mean cost of illness at ₦37,348.18 ± 22,358.84 (95% CI: 28,457.71–46,783.97), ₦49,831.43 ± 60,268.69 (95% CI: 30,193.51–79,286.99), and ₦44,418.8 ± 44,189.28 (95% CI: 26,196.12–69,068.00), respectively.

Types of specific illness and mean cost of treatment

Specifically, the pattern of diseases seen and managed during the period includes typhoid fevers (52 [17.7%]), cholera (38 [13%]), malaria (31 [10.6%]), septicemic illnesses (20 [6.8%]), urinary tract infections (9 [3.1%]), gastroenteritis (9 [3.1%]), and meningitis (8 [2.7%]) under infectious and parasitic causes of admission [Table 5].

Although a total number of patients with coronary artery diseases such as angina, myocardial infarction, and cardiac arrhythmias constitute only 1.7% of patients admitted during the study period, it had the highest overall mean cost at ₦157,771.60 ± 246,411.59 (95% CI: 148,188.80–463,732.00) compared to other illnesses admitted and managed [Table 5]. This was followed by chronic liver diseases with ₦124,052.00 (95% CI: 124,052.00–124,052.00).

Table 2: Comparison of mean cost of medical inpatients across demographic characteristics

Variables	*n* (%)	Mean costs (₦)±SD	95% CI	*P*
Age group (*n*=294) (years)				
10-≤25	110 (37.5)	30,321.55±23,306.79	26,397.75-34,377.81	<0.001
25-≤40	93 (31.7)	38,281.96±47,930.43	29,928.97-48,571.21	
40-≤55	43 (14.7)	44,388.37±10,380.00	34,855.13-55,141.13	
55-≤70	29 (9.9)	48,065.12±6120.00	40,957.95-78,070.09	
≥70	18 (6.1)	39,115.56±24,853.76	27,844.09-27,844.09	
Total	293 (100)	38,036.05±37,428.13	34,183.86-42,363.68	
Sex				
Male	143 (48.6)	68,601.59±57,178.37	59,081.51-78,121.67	<0.102
Female	151 (51.4)	84,303.94±6860.56	68,991.65-96,103.27	
Occupations				
Business	97 (33.0)	76,852.34±58,831.73	64,995.12-88,709.56	<0.118
Civil servants	70 (23.8)	90,961.70±105,175.62	65,883.46-116,039.94	
Students	48 (16.3)	53,540.62±32,040.04	44,133.31-62,947.93	
Farmers	33 (11.2)	67,941.06±57,654.15	47,497.79-88,384.33	
Homemaker	28 (9.5)	76,920.52±70,286.28	49,116.19-104,724.84	
Unemployed	16 (5.4)	86,536.00±87,717.78	39,794.49-133,277.51	
Driver	2 (0.7)	-	47,800.00-47,800.00	

SD: Standard deviation, CI: Confidence interval

Table 3: Comparative length of medical inpatient stay and mean total costs of care

Length of stay in hospital/days	*n* (%)	Mean costs (₦)±SD	Median	95% CI	*P*
≤3	91 (31.1)	22,102.42±18,517.76	17,150.00	18,666.58-26,270.08	<0.000
3-≤7	139 (47.4)	35,552.37±25,197.89	30,750.00	31,492.16-40,295.78	
7-≤14	43 (14.7)	57,252.37±46,716.25	50,370.00	45,269.2472,514.66	
14-≤21	5 (1.7)	58,446.00±14,252.26	63,030.00	43,280.00-71,320.00	
21-≤28	6 (2.0)	158,111.67±89,913.59	125,495.00	104,760.00-233,339.17	
≥28	9 (3.1)	54,301.11±57,946.38	41,470.00	25,902.00-98,585.99	
Total	293 (100)	38,036.05±37,428.13	27,740.00	34,183.86-42,363.68	

SD: Standard deviation, CI: Confidence interval

Table 4: Types of illness and mean cost of treatment

Types of illness	Patient number (%)	Mean costs (₦)±SD	95% CI for mean	*P*
Infectious and parasitic	175 (59.7)	37,131.86±37,563.037	32,056.20-43,094.13	<0.748
CVS	18 (6.1)	44,418.8±44,189.28	26,196.12-69,068.00	
CNS	26 (8.9)	40,497.58±31,976.12	29,779.25-54,893.14	
GIT/liver	21 (7.2)	49,831.43±60,268.69	30,193.51-79,286.99	
Respiratory system	11 (3.8)	25,509.09±14,377.34	17,408.78-34,210.38	
Hematological	22 (7.5)	37,348.18±22,358.84	28,457.71-46,783.97	
Endocrine and diabetes	6 (2.0)	34,526.67±35,832.82	12,640.00-70,264.00	
Renal and hypertension	4 (1.4)	35,395.00±29,875.77	8610.00-61,260.00	
Rheumatic/MSS	7 (2.4)	20,720.00±18,672.75	8947.14-36,023.33	
Others	3 (1.0)	50,503.33±3423.69	46,550.00-52,480.00	
Total	293 (100)	38,036.05±37,428.13	34,183.864-42,363.67	

GIT: Gastrointestinal tract, MSS: Musculoskeletal system, SD: Standard deviation, CI: Confidence interval, CVS: Cardiovascular system, CNS: Central nervous system

DISCUSSION

Direct cost of medical illness which entails the medical care expenditures for diagnosis, treatment, rehabilitation, etc. has direct consequences on patients and their relatives which at times can be comparable to the pain and suffering from the illness itself. In this study, we looked at the direct medical costs among inpatients from a societal perspective. Our findings indicate that women compared to men sought inpatient care than men and also had a higher mean cost of care. Many existing researches outside Africa suggested that women, compared to men, make greater use of health-care services and have higher hospitalization rate than men.[27-30] Although this is not in keeping with many studies from Africa and Nigeria, which showed that men are more likely to be admitted to the hospital than women.[31,32] We did see this finding surprising because African men may not be as health conscious as women; moreover, in many Nigerian communities, especially in the northern part of Nigeria, there exists common believe that it is not manly, in fact it is a taboo for a man to complain of being sick, who see such complaints as a sign of weakness, hence are more likely to stay at home when sick until their health degenerates to the extent of requiring hospitalization, while most women would report for treatment early without waiting, therefore are more likely to detect illnesses requiring hospitalization than men who only attend to their health when complications have set in. Moreover, some unpublished observations indicate that higher female proportions are seen in religious houses for spiritual interventions and healing compared with males, implying that females are more likely to seek attention for emotional pain-related issues than men. The number of patients admitted in this study was relatively low and may not be large enough to be statistically significant to make generalizable comments. An earlier study by Ogunmola *et al*. (2008), which had more men admitted argued that because men are breadwinners, they were more likely to be involved in daily exploration of their environment to earn an income. Subsistence farming and hunting with crude implements are the major occupations of rural dwellers, which involved men than women.[32,33] Hence, men are more endangered and overworked. The nature of these jobs with no doubt will have a negative effect on their health compared with women who engage in petty trading and domestic work. If one accept this theory to be true, it correlates well with our findings since women in Jos and the neighboring states such as Benue are equally or more involved in these manual labor and farming than men.

Infectious and parasitic diseases, including malaria, septicemic illnesses, typhoid fevers, and diarrheal diseases, were the leading causes of admission over the period accounting for 19.8% of all admissions. NCDs such as CNS (including cardiovascular diseases [CVD], seizure disorders, and illnesses) were second accounting for 16.2% of admissions, while hematological disorders were third at 11.3% and CVS and GIT/liver system were the fourth cause of admission during the period. The findings of NCDs are in keeping with studies in African populations where it has been shown that there is a changing pattern of admissions due to cardiovascular illnesses, comprising mainly of stroke and heart failure, which have increased significantly compared to admissions due to infectious and parasitic diseases which decreased over the study period.[34] Although NCDs constitute a majority of disease trends as the emerging pattern of reason for seeking medical admission in low- and middle-income countries such as Nigeria,[35] medical diseases vary depending on the locality, so also cases that present to the health-care system.. Medical admissions constitute a very significant part of general admissions in many hospitals.[35] Hospital admissions are a reflection of common diseases in the society[36] and usually help in revealing the disease burden in the surrounding communities, where the

Table 5: Types of specific illness and mean cost of treatment

Types of illness	Patient (*n*)	Mean costs (₦)±SD	95% CI for mean
CVS			
CVD	18 (6.1)	42,766.78±32,732.76	29,304.99-59,032.96
Congestive cardiac failure	12 (4.1)	40,431.67±30,508.00	24,862.27-60,980.70
Angina pectoris	2 (0.7)	20,845.00±21,262.70	5810.00-35,880.00
Myocardial infarction	2 (0.7)	99,725.00±122,322.40	13,230.00-186,220.00
Arrhythmias	1 (0.3)	35,880.00±0.00	35,880.00-0.00
Hypovolemic shock	1 (0.3)	37,340.00±0.0000[p]	37,340.00-37,340.00
Infectious and parasitic			
Typhoid fever	52 (17.7)	36,715.87±27,664.08	29,720.05-44,344.33
Cholera	38 (13)	26,143.94±31,222.56	18,728.55-38,593.51
Malaria	31 (10.6)	41,696.13±34,097.20	30,998.55-55,556.76
Sepsis	20 (6.8)	37,911.00±28,654.22	28,105.90-52,827.90
Urinary tract infections	9 (3.1)	25,398.89±10,297.43	20,380.19-33,358.75
Gastroenteritis	9 (3.1)	88,807.78±101,422.68	36,771.95-161,839.29
Meningitis	8 (2.7)	33,247.50±25,249.02	16,557.14-52,860.00
Diarrhea	5 (1.7)	23,640.00±17,145.797	13,222.00-44,537.50
Hepatitis	4 (1.4)	29,945.00±11,761.24	20,260.00-44,090.00
Food poison	3 (1.0)	30,070.00±15,519.175	21,110.00-47,990.00
Lassa fever	2 (0.7)	16,495.00±10,288.40	9220.00-23,770.00
PID	2 (0.7)	43,425.00±0.00	43,425.00-3425.00
Endocrine and diabetes			
Hypoglycemia	2 (0.7)	9180.00±0.00	27110.00 – 96,040
Diabetes	2 (0.7)	28,550.00±1145.513	27,740.00-29,360.00
Cushing syndrome	1 (0.3)	105,220.00±0.00	105,220.00-0.00
Renal and hypertension			
Hypertension	4 (1.4)	35,395.00±29,875.77	8610.00-61,260.00
Musculoskeletal system			
Myalgia	5 (1.7)	16,136.00±14,604.70	5990.00-30,276.00
Pain	1 (0.3)	11,310.00±0.00	11,310.00-11,310.00
Rheumatoid arthritis	1 (0.3)	53,050.00±0.00	53,050.00-53,050.00
CNS			
Seizure disorder	4 (1.4)	14,735.00±3817.00	11,430.00-8130.00
Coma	2 (0.7)	67,500.00±0.00	29,780.00-5220.00
Herpes zoster	1 (0.3)	55,055.00±11,761.24	55,055.00-5055.00
Peripheral neuropathy	1 (0.3)	34,140.00±0.00	34,140.00- 0.00[v]
GIT/liver			
Upper GIT bleeding	5 (1.7)	49,282.00±11,762.82	36,940.00-58,890.00
Primary liver cell carcinoma	3 (1.0)	62,010.00±0.00	27110.00 – 96,040
Peptic ulcer disease	2 (0.7)	35,110.00±35,298.77	10,150.00-60,070.00
Dyspepsia	1 (0.3)	78,00.00±0.00	7800.00-7800.00
Hepatic encephalopathy		298,020.00±0.00	298,020.00-0.00
Respiratory system			
Pneumonia	8 (2.7)	21,095.00±14,357.54	12,210.00-33,079.78
Pulmonary tuberculosis	3 (1.0)	37,280.00±5126.87	31,360.0-0-40,240.00
Upper respiratory tract infections	1 (0.3)	40,690.00±0.00	40,690.00-0.00
Others			
Acute alcoholic intoxication	2 (0.7)	52,480.00±0.00	52,480.00-52,480.00
Snake bite	1 (0.3)	46,550.00±0.00	46,550.00-46,550.00, 46,550.00-0.00
Hematological			
Anemia	22 (7.5)	37,348.18±22,358.84	28,231.04-46,677.53

SD: Standard deviation, CI: Confidence interval, GIT: Gastrointestinal tract, PID: Pelvic inflammatory disease, CVS: Cardiovascular system, CNS: Central nervous system, CVD: Cardiovascular disease, v: 0.013, p: 0.102

tertiary institution serves. Though it may not be the true incidence of disease at the community level, it would, however, serve as a reflection of the pattern and trend of diseases in the community. Bingham Teaching Hospital, though a tertiary care hospital and located in urban center, receives a lot of nonreferral cases and may reflect the actual disease burden in the surrounding communities. Therefore, it is not surprising that our findings differ from the pattern of admission in most studies in Nigerian teaching hospitals.[37] Moreover, most African and Nigerian studies still report infectious diseases as the major cause of death.[38-41] For example, in Ife and Owo (western part of Nigeria), infections, trauma, and neonatal- and pregnancy-related deaths were the leading causes of death.[39,41] Studies from Kano (Northern Nigeria) reported infectious diseases other than HIV/AIDS, cerebrovascular disease, and chronic renal failure as the leading causes of hospital

deaths.[38,40] Charles *et al*., 2014,[42] reported mortality due to double disease burden comprising largely preventable infectious and NCDs in Umuahia, Abia State in Southeast Nigeria. These findings and those of an Ethiopian study by Hussein[43] are in agreement with our studies and may suggest that the actual community disease burden in Nigeria is still largely due to infectious causes.

In terms of cost estimate, our study revealed that the mean total cost of health care across demographic characteristics was statistically significantly higher in patients in the age group of 55–69 years admitted during the study period compared to other age groups. The highest proportion of patients admitted were the elderly (aged 60 or more) compared with middle-aged and young adult-aged groups[32] ($P < 0.05$). This observation, where the highest proportion of patients admitted were the elderly (aged 60 or more) compared with middle-aged and young adult-aged groups, may be due to frailty and aging, which relatively reduce body immunity and therefore disease susceptibility.[20] Furthermore, strong cultural beliefs for the care of the elderly as seen in studies in Southwest Nigeria[44] might have also influenced hospital care. Increased risk for CVD with aging may also account for more elderly patients on admission compared with other age groups. This similar observation of elderly dominance in medical ward admissions has been documented in a Nigerian urban center.[45] Studies had shown that the developing world is experiencing an aging population with its attendant increase in the burden of chronic diseases.[46] It has been reported that the population of elderly persons may double in SSA between 2000 and 2030.[47] Findings from other parts of Africa and other continents of the world showed that the elderly predominate in medical ward admissions.[20,48,49] Such findings could help health planners adjust cost and balance in health care to meet new challenges.

The mean length of hospital stay in this study was 5.63 ± 5.60 days, with a mean range of 1–40 days. Elderly patients aged above 55 years had higher length of hospital stay than that of younger adult patients.

Overall mean cost was higher in patients who stayed from the 1st day of admission to up to < 28 days compared to LOS beyond 28 days ($P < 0.000$).

Two distinct periods also appeared to be associated with higher mean cost of hospital stay. The early phase of admission [Table 3] showed a sharp increase in mean cost up to day 7 of admission, and then showed a steady increase until 29 days and then finally a sudden drop. These findings are in agreement with studies which reported that LOS tends to increase aggregated health-care expenditures including the opportunity cost of hospital stay,[3,50] and countries have therefore been to promoting shortened hospital stay where it is possible.[4] However, we found that prolonged admission in medical wards and the cost of hospital stay are not necessarily directly related with LOS or overall health-care expenditure. We observed that there are two phases in relation to LOS and hospital cost of care. Phase 1 is the 1st few 28 days when admission deposits have to be made and investigations have to be paid for and the period of evaluating and the Phase 2 which is mainly recuperative and review of treatment outcomes. There are higher mean hospital costs as in this study in Phase 1, but thereafter costs tend to decline. Our observations agree with that of Taheri *et al*. who showed that for most patients, the costs directly attributable to the last day of a hospital stay are an economically insignificant component of total costs.[51] They argued that discharging patients 10% faster is not equivalent to eliminating the attendant end-of-stay costs. In trying to accomplish the 10% LOS reduction, some treatments (e.g., laboratory tests) must be accelerated and other treatments (e.g., pharmaceuticals) must be continued on an outpatient basis.[52] These do not help as costs would be shifted rather than eliminated. This is especially true when patients are discharged to other facilities or to home health care. Hence, our findings suggest that patients and relatives, especially those patients who admitted due to NCDs, should prepare for these two peaks and not seek early discharge for fear of costs, for early discharge does not necessarily eliminate overall health-care expenditure, instead it in fact shift costs to outpatient management and may in fact increase the overall cost of care. A larger cohort in at least one geographical region of Nigeria is hoped to confirm these findings.

CONCLUSIONS

This study has shown that there were more female patients admitted for inpatient care with a higher mean cost of care during the period under review. Infectious and parasitic diseases, including malaria, septicemic illnesses, such as typhoid fevers, and diarrheal diseases, were the leading causes of reason for seeking admission over the period under review. Moreover, two distinct phases of admission appeared to be associated with higher mean cost of hospital stay: the early phase of admission with a sharp increase in mean cost up to

28 days, then steady increase until 29 days, and when a sudden drop started to occur. This indicates that overall mean cost of inpatient care is not necessarily proportional to LOS, and hence early discharge from hospital does not necessary save the cost of patient management, therefore shouldn't seek early discharge with the hope of saving cost of inpatient care, for early discharge (reduce LOS) does not necessarily reduce overall health-care expenditure, instead it in fact shift costs to outpatient care and may in fact increase the overall cost of care.

Limitation of the study

While effort was made to avoid shortcomings, this study involved retrieving case notes of discharged patients during the study period, and missing case notes were encountered. However, this was not significant as the data obtained from pharmacy, medical, and nurses' records of admission and discharges were able to provide the missing information from missing patient's files. Another limitation was that the study did not attach monetary value to indirect cost caused by admission due to inability to work during hospitalization. We did not study this aspect, since the occupation recorded in the case note was done at the time of registration. Occupation might have changed at the time of the medical admission; this also applies to local transport to hospital by caregivers. No objective tool exists for evaluating time loss in the study population.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

1. Kashihara D, Carper K. National Health Care Expenses in the U.S. Civilian Non institutionalized Population, MEPS Statistical Brief #355; January, 2012. Agency for Healthcare Research and Quality. Rockville, MD. 2009. Available from: http://www.meps.ahrq.gov/mepsweb/data files/publications/st355/stat355.pdf. [Last accessed on 2012 Aug 22].
2. Dienye PO, Brisibe SF, Eke R. Sources of healthcare financing among surgical patients in a rural Niger Delta practice in Nigeria. Rural Remote Health 2011;11:1577.
3. Sato E, Fushimi K. What has influenced patient health-care expenditures in Japan? Variables of age, death, length of stay, and medical care. Health Econ 2009;18:843-53.
4. Daly S, Campbell DA, Cameron PA. Short-stay units and observation medicine: A systematic review. Med J Aust 2003;178:559-63.
5. Sambo MN, Idris SH, Muhammad JB, Bashir SS. Prevalence of Financial Hardship in Settling Medical Bill in Samaru-Zaria, North Western Nigeria. 26th Annual National Conference of the Association of Public Health Physicians of Nigeria. Lagos, Nigeria Association of Public Heath Physician of Nigeria; March, 2010.
6. Wiesmann D, Jütting J. The emerging movement of community based health insurance in Sub-Saharan Africa: Experiences and lessons learned. Afr Spectr 2000;35:193-2.
7. Jamison DT, Feachem RG, Makgoba MW, Bos ER, Baingana FK, Hofman KJ, *et al*., editors. Disease and Mortality in Sub-Saharan Africa. Washington, DC: World Bank; 2006.
8. Mathers CD, Fat DM, Inoue M, Rao C, Lopez AD. Counting the dead and what they died from: An assessment of the global status of cause of death data. Bull World Health Organ 2005;83:171-7.
9. Rajaratnam JK, Marcus JR, Levin-Rector A, Chalupka AN, Wang H, Dwyer L, *et al.* Worldwide mortality in men and women aged 15-59 years from 1970 to 2010: A systematic analysis. Lancet 2010;375:1704-20.
10. Lopez AD, Mathers CD, Ezzati M, Jamison DT, Murray CJ. Global and regional burden of disease and risk factors, 2001: Systematic analysis of population health data. Lancet 2006;367:1747-57.
11. Koyanagi A, Shibuya K. What do we really know about adult mortality worldwide? Lancet 2010;375:1668-70.
12. Cooper RS, Osotimehin B, Kaufman JS, Forrester T. Disease burden in sub-Saharan Africa: What should we conclude in the absence of data? Lancet 1998;351:208-10.
13. World Health Organization. Global Status Report on Noncommunicable Diseases. Geneva: World Health Organization. 2010.
14. Maher D, Smeeth L, Sekajugo J. Health transition in Africa: Practical policy proposals for primary care. Bull World Health Organ 2010;88:943-8.
15. Beaglehole R, Bonita R, Horton R, Adams C, Alleyne G, Asaria P, *et al.* Priority actions for the non-communicable disease crisis. Lancet 2011;377:1438-47.
16. Law T, Lavis J, Hamandi A, Cheung A, El-Jardali F. Climate for evidence-informed health systems: A profile of systematic review production in 41 low- and middle-income countries, 1996-2008. J Health Serv Res Policy 2012;17:4-10.
17. Beaglehole R, Horton R. Chronic diseases: Global action must match global evidence. Lancet 2010;376:1619-21.
18. Anyaehie UB, Nwobodo ED. Administrative responsibilities of community-funded health insurance scheme in Nigeria. Niger Med Pract 2008;45:26-8.
19. Leive A, Xu K. Coping with out-of-pocket health payments: Empirical evidence from 15 African countries. Bull World Health Organ 2008;86:849-56.
20. Onwujekwe O, Okereke E, Onoka C, Uzochukwu B, Kirigia J, Petu A, *et al.* Willingness to pay for community-based health insurance in Nigeria: Do economic status and place of residence matter? Health Policy Plan 2010;25:155-61.
21. Mondal S, Kanjilal B, Peters DH, Lucas H. Future health system. Catastrophic Out-of-Pocket Payment for Health Care and its Impact on Households: Experience from West Bengal, India; 2010. Available from: http://www.Chronicpoverty.Org/uploads/publication files/mondal_et_al_health.Pdf. [Last accessed on 2012 Apr 17].
22. Kernick D. Costing interventions in primary care. Fam Pract 2000;17:66-70.
23. Gumbs P. Medicines Benefit Risk Assessment: Costs Estimate D5M2T3 Eu2PhD Lecture series; 2016.
24. International Statistical Classification of Diseases and Related Health Problems 10th Revision (ICD-10)-WHO Version for; 2016. Available from: http://apps.who.int/classifications/icd10/browse/2017/en. [Last accessed on 2017 Mar 15].
25. Ezeoke OP, Onwujekwe OE, Uzochukwu BS. Towards universal coverage: Examining costs of illness, payment, and coping strategies to different population groups in Southeast Nigeria. Am J Trop Med

Hyg 2012;86:52-7.
26. Williams EH, Hayes RJ, Smith PG. Admissions to a rural hospital in the West Nile District of Uganda over a 27 year period. J Trop Med Hyg 1986;89:193-211.
27. Nathanson CA. Illness and the feminine role: A theoretical review. Soc Sci Med 1975;9:57-62.
28. Bertakis KD, Azari R, Helms LJ, Callahan EJ, Robbins JA. Gender differences in the utilization of health care services. J Fam Pract 2000;49:147-52.
29. An Analysis Report of National Survey on Health Service in China. Available from: http://www.nhfpc.gov.cn/cmsresources/mohwsbwstjxxzx/cmsrsdocument/doc9911.pdf. [Last accessed on 2015 Nov 01].
30. Owens GM. Gender differences in health care expenditures, resource utilization, and quality of care. J Manag Care Pharm 2008;14:2-6.
31. Arodiwe EB, Nwokediuko SC, Ike SO. Medical causes of death in a teaching hospital in South-Eastern Nigeria: A 16 year review. Niger J Clin Pract 2014;17:711-6.
32. WHO-CHOICE. Results of Unit Costs for Patient Services for the 14 GDB Regions. Available from: http://www.who.int/choice/costs/ unit regions/en/index.html. [Last accessed on 2017 Apr ???].
33. Etyang A, Gerard Scott JA. Medical causes of admissions to hospital among adults in Africa: A systematic review. Glob Health Action 2013;6:19090.
34. Rajaratnam JK, Marcus JR, Flaxman AD, Wang H, Levin-Rector A, Dwyer L, *et al.* Neonatal, postneonatal, childhood, and under-5 mortality for 187 countries, 1970-2010: A systematic analysis of progress towards millennium development goal 4. Lancet 2010;375:1988-2008.
35. Okunola OO, Akintunde AA, Akinwusi PO. Some emerging issues in medical admission pattern in the tropics. Niger J Clin Pract 2012;15:51-4.
36. Osarenkhoe J, Omoruyi L, Imarhiagbe L, Adebayo O, Freeman O. Pattern and outcome of medical admissions in a Nigerian rural teaching hospital (2009-2012). Ann Trop Med Public Health 2014;7:171-6.
37. Carneiro I, Howard N, Lucianne B, Vardulaki K, Chandramohan LJ. Introduction to Epidemiology. 2nd ed. Berkshire: Open University Press; 2011.
38. Sani MU, Mohammed AZ, Bapp A, Borodo MM. A three-year review of mortality patterns in the medical wards of Aminu Kano Teaching hospital, Kano, Nigeria. Niger Postgrad Med J 2007;14:347-51.
39. Adeolu AA, Arowolo OA, Alatise OI, Osasan SA, Bisiriyu LA, Omoniyi EO, *et al.* Pattern of death in a Nigerian teaching hospital; 3-decade analysis. Afr Health Sci 2010;10:266-72.
40. Iliyasu Z, Abubakar IS, Gajida AU. Magnitude and leading causes of in-hospital mortality at Aminu Kano Teaching Hospital, Kano, Northern Nigeria: A 4-year prospective analysis. Niger J Med 2010;19:400-6.
41. Adekunle O, Olatunde IO, Abdullateef RM. Causes and pattern of death in a tertiary health institution in South Western Nigeria. Niger Postgrad Med J 2008;15:247-50.
42. Nwafor Chukwuemeka Charles CC, Nnoli Martin Azodo MA, Chuku CA. Causes and pattern of death in a tertiary hospital in south eastern Nigeria. Sahel Med J 2014;17:102-7.
43. Hussein K. Pattern of medical admissions to Jimma Hospital. Bull Inst Health Sci 1997;7:51-62.
44. Sridhar D, Batniji R. Misfinancing global health: A case for transparency in disbursements and decision making. Lancet 2008;372:1185-91.
45. Ogunmola OJ, Oladosu OY. Pattern and outcome of admissions in the medical wards of a tertiary health center in a rural community of Ekiti state, Nigeria. Ann Afr Med 2014;13:195-203.
46. Garko SB, Ekweanic N, Anyiam CA. Duration of hospital stay and mortality in medical wards of Ahmadu Bello University Teaching hospital, Kaduna, Nigeria. Ann Afr Med 2003;2:68-71.
47. Kudyba S, Gregorio T. Identifying factors that impact patient length of stay metrics for healthcare providers with advanced analytics. Health Informatics J 2010;16:235-45.
48. Smith SM, Mensah GA. Population aging and implications for epidemic cardiovascular disease in sub-Saharan Africa. Ethn Dis 2003;13:S77-80.
49. UN Office of the High Representative for the Least Developed Countries: Landlocked Developing Countries and Small Island Developing States; 2009. Available from: http://www.un.org/special-rep/ohrlls/idc/list.htm. [Last accessed on 2013 Jan 08].
50. Chen LM, Jha AK, Guterman S, Ridgway AB, Orav EJ, Epstein AM, *et al.* Hospital cost of care, quality of care, and readmission rates: Penny wise and pound foolish? Arch Intern Med 2010;170:340-6.
51. Taheri PA, Butz DA, Greenfield LJ. Length of stay has minimal impact on the cost of hospital admission. J Am Coll Surg 2000;191:123-30.
52. Population Reference Bureau: Speed of Population Ageing in Selected Countries; 2009. Available from: http://www.prb.org/home/publications/graphicsbank/aging.aspx. [Last accessed on 2013 Jan 08].