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A Retrospective Study of the Average Length of Hospital Stay of Patients on the Medical Wards in the Cape Coast Teaching Hospital

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ABSTRACT

Average length of stay is typically used as an indicator of healthcare quality. Research on length of stay in Ghana is scarce while previous ones are superannuated. The study examines the factors that contribute to the increase or decrease in the average length of stay of patients and to propose measures to ensure appropriate length of stay for the different disease conditions in order to improve health outcomes.The survey design was used to study patients admitted at the medical department of the Cape Coast Teaching Hospital during the first half of 2015.The average length of stay observed was 7.4±4.5 days. The longest average length of stay (11.4 days) and the shortest was (6.5 days). Significant relationship was found between length of stay and sex, alcohol consumption, sepsis, anaemia, and urea levels (Pearson chi-square p values of 0.017, 0.030, 0.000, 0.032, 0.014, and 0.006 respectively with significance threshold set at 0.05). Length of hospital stay is influenced by socio-demographic characteristics, health problems and institutional factors. The findings of the study corroborate previous researches, however, variations exist and further studies need to be conducted to fully explore the gaps within this research in order to be conclusive.

Keywords: Patient; average length of stay; hospital; admission

1.0 Introduction

Average length of stay is used as an indicator of hospital and healthcare staff efficiency. Usually, a shorter stay reduces the discharge costs and move patient to out-patient treatment status which is commonly cheaper than in-patient care. Short lengths of hospital stay however can end up being more service intensive and thus more costly. This can reduce the comfort and recovery of the patient and end up leading to adverse effects on health outcomes (OECD, 2011).

In 2009, among the Organisation for Economic Cooperation and Development (OECD) countries, the length of hospital stay for all causes was less than five days long in Mexico (3.9 days), Turkey (4.3 days), Israel (4.5 days), Norway (4.6 days) and Denmark (4.8 days). The average length of stay was highest in Japan (18.5 days) followed by Korea (14.6 days) with the OECD average length of stay being 7 days. On a whole, the average length of stay has fallen from 8.2 days in 2000 to 7.2 days in 2009 across OECD countries. The decline is explained by many factors which include use of less invasive surgical procedures, changes in hospital payment methods and expansion of early discharge programmes to help patients receive follow-up care in the comfort of their homes (OECD, 2011). The cross country differences in length of hospital stay can be explained by factors such as the difference in health care provision systems across the different countries. For example, the abundant supply of beds and structure of payment in Japan is believed to provide hospitals with incentives to keep patients on admission for longer (OECD, 2011).

Focusing on average length of stay of specific conditions helps in some way to remove the effect of different mix and severity of conditions leading to hospitalisation on the average length of stay in the various countries. For example, according to a 2011 OECD report, the average length of stay in acute myocardial infarction was 6.9 days in Mexico (a huge difference from the general 3.9 days) and 13.7 days in Korea (shorter than the 14.6 days comprising all diseases) (OECD, 2011).

In the United States, the average length of stay was 4.5 days in 2012 (Weiss & Elixhauser, 2014). The length of stay ranged between 3.6 days and 5.2 days with differences found in relation to age, sex, primary payer of hospital bills, and hospital region. Medical cases stay made up the bulk of patients admitted and this was attributable to the higher prevalence of chronic health conditions particularly among the elderly who happened to contribute to the largest percentage of patients admitted across the different age groups (26.7%) and who also as a whole had the longest average length of stay (5.2 days) (Weiss & Elixhauser, 2014).

Within Sub-Saharan Africa, a study exploring hospital stay in South Africa revealed that in 2008/2009, the average length of stay in a district

hospital in South Africa was 4.3 days which was the same for the preceding three years. There was a 3.9fold difference between the highest and lowest length of stay among districts (7.4 days and 1.9 days) and the difference was accounted for by many factors including availability of doctors for regular rounds (weekdays and weekends), referral or transfer of patients to other facilities, and quality of care given to patients. In Nigeria, a two-year review of admissions into the medical wards of Ahmadu Bello University Teaching Hospital, Kaduna, revealed an average length of stay of 12.5 days with a fairly even distribution of admissions across age groups with elderly males constituting the majority of the admissions and persons above 70 years contributing 26.3% of all hospital admissions (Garko, Ekweani, & Anyiam, 2016). The poor economy of developing countries, scarce resources, late presentation (usually with complications) and lack of good medical audit mechanisms contribute to high average length of stay (Garko, Ekweani, & Anyiam, 2016).

In Ghana, the 2012 annual report of the Korlu-Bu Teaching Hospital revealed anaemia, diabetes, hypertension, chronic kidney disease, cerebrovascular attacks, pneumonia and congestive cardiac failure as part of the top ten major cases for admission in the medical department which is consistent with the 2003 overview of the Burden of Disease in Ghana and the diseases most commonly found in the southern belt of the country. Average length of stay of patients was not determined in the report but congestion, poor quality of beds, late arrival of doctors was cited to imperil health outcomes in patients and prolong hospital stay (Korle-Bu Teaching Hospital, 2012).

While there is much research on the length of hospital stay of patients in developed countries, few studies have been done on the length of hospital stay of patients in developing countries. The purpose of this study was to find out the average length of hospital stay among the study population at the Cape Coast Teaching Hospital and the factors that contributes to prolonged or short length of stay. The study adopted the retrospective descriptive approach to examine the relationship between the lengths of hospital stay of patients and the factors that contribute to the increase or decrease in the length of hospital stay. The study used existing data to examine the strength and direction of the relationships among the variables without establishing causality (Sousa, Driessnack, & Mendes, 2007). The proceeding sections looks at the related literature and methods employed in the study as well presentation of results and discussion of findings.

Average Length of Stay

Average length of stay (ALOS) refers to the average number of days that patients spend in the hospital. It can be measured by dividing the total number of days stayed by all inpatients during a year by the number of admissions or discharges or the total discharge days divided by the total discharges (OECD, 2011). ALOS is thus, a statistical calculation often used for health planning purposes. Length of stay can be long or short with a long length of stay referring to any period that extends beyond thirty days (Decoster & Kozyrskyj, 2000).

Usually, patients are admitted to the hospital either because they have a severe condition or because they require constant monitoring or their state cannot be treated on an outpatient basis. Based on the patient's condition or age, they are admitted either under the medical, surgical, paediatric or obstetrics and gynaecology departments. Patients are treated and discharged as and when they are deemed well or fit enough to continue treatment out of hospital. The factors that contribute to the length of stay include the patient's socio-demographic characteristics such as age, gender, home environment, income level, health problems and systemic factors (Decoster & Kozyrskyj, 2000).

Socio-demographic Characteristics and Length of Hospital Stay

Hertzman(1990) found that long hospital stay was often associated with older patients. However, (Falcone, Bolda, & Leak, 1991) observed that although there was an association between increasing age and length of stay, older people without heavy care needs did not have a delayed discharge. Decoster and his colleagues in 2015 noted that women were at risk for long stays because they are more likely to suffer isolation, poverty, inadequate housing and other adverse social circumstances. Maguire, Taylor and Stout (1986) found that living arrangements and social supports however were not significant predictors of length of stay. It is generally accepted that risk factors such as age, gender, education, socio-economic status, lifestyle risk factors, and health status are associated with poorer health outcomes including hospitalization among the general population (Garko, Ekweani, & Anyiam, 2016).

Social Characteristics and Length of Hospital Stay

Patients with health insurance have significantly longer lengths of stay than uninsured ones since a longer hospital stay does not affect them financially (Liu, Phillips, & Codde, 2001). The Australian Health review found that length of hospital stay spanned from 4.0 days to 5.6 days depending on the type of insurance a patient had (Liu, Phillips, & Codde, 2001). Drug and alcohol related problems contribute to acute hospital admissions and alcohol alone contributes to more bed days and greater hospital costs (Smith , Clarke, & Handrinos , 1995). A study conducted in 2014 in Australia found that individuals who drink alcohol are more likely to repeat emergency room attenders, and intoxicated patients may cause complications in

diagnosis and management. Again, patients who are more financially astute could either have a long hospital stay because they can afford to be on admission for as long as they want and ensure that they are completely healthy before being discharged, or may have shorter lengths of stay since they would be able to afford and provide all necessary tests and medications for prompt treatment (Liu, Phillips, & Codde, 2001).

Medical Conditions and Length of Hospital Stay

Health problems include the type of illness, cognitive impairment, comorbidities, level of care, dialysis, and rehabilitation care. Patients who require heavy levels of care are at risk of long hospitalizations (Styrborn & Thorslund, 1993). Within the Ghanaian populace, patients tend to be admitted due to conditions related to diabetes mellitus, hypertension, pneumonia, cerebrovascular accident, sepsis, chronic kidney disease, chronic liver disease and immunosuppression from causes such as HIV infection. These conditions under their broad headings can contribute to the length of stay of a patient by virtue of their pathophysiology or have constituents which increase or reduce the amount of time a patient remains on admission.

Diabetes is listed by the World Health Organization as one of the top four noncommunicable diseases that represent a leading threat to human health and development(Gajewska, Gebska-Kuczerowska, Gorynski, & Wysocki, 2013).The global prevalence rate of diabetes was
2.8% in 2000 and this has been estimated to reach 4.4% in 2030 (Fraze, Jiang, & Burgess, 2008). The total number of people with diabetes is projected to rise from 171 million in 2000 to 366 million by 2030. As diabetes is associated with acute and chronic complications, diabetic patients are admitted to the hospital frequently (Mokhtar, El Mahalli, Al-Mulla, & Al-Hussain, 2012). A review of diabetes in Australia found that diabetes contributed to one out of every 25 hospitalizations in 2009-2010. The study also found that patients with diabetes had a longer average length of stay than non-diabetic patients (Cromarty, Parikh, Lim, Acharya, & Jackson, 2014).

Cerebrovascular attacks also known as strokes is known to account for 0.9-4% of all admissions in Africa with prognosis and fatality being worse in haemorrhage cases than in ischemic cases. The United States Healthcare Cost and Utilization project found that in 2005, the average length of stay for haemorrhagic stroke was 8.4 days with ischaemic stroke being 5.6 days (Russo & Andrews, 2008). Data from the Korean Centre for Disease Control and Prevention found the length of stay for all stroke patients who had no surgical intervention to be 15.9 days (Oh, et al., 2004).

Sepsis is a serious medical condition caused by an overwhelming immune response to infection (Oh, et al., 2004). Sepsis can arise from a large number of infections including those of the skin, abdomen, urinary tract and lungs and is often fatal. International estimates of incidence vary, however consensus points to approximately 300 cases of sepsis per 100,000 population per annum (Math, 2009). Patients with sepsis have prolonged hospital stay and often require critical care input. The average length of stay in Scotland in 2013 was up to 26 days which was approximately five times longer than the non-septic patient. In 2008-2009, a national look at sepsis in Canada found the median length of hospital stay for patients to be 12 days which is much shorter than that of Scotland (Math, 2009).

Comorbidity or multi-morbidity refers to the occurrence of multiple chronic or acute diseases and medical or psychiatric conditions within one person without any reference to a particular condition which may or may not directly interact with each other. Patients with comorbidities tend to have increased lengths of stay due to the complexity of their management and these patients have to be carefully assessed and managed in order to obtain the best possible outcomes. These comorbidities include anaemia, retroviral infection, sickle cell disease, urinary tract infections among others. Higher morbidity is typically associated with a longer length of hospital stay (Clevenger & Richards, 2015). Among the genetic-based anaemia, sickle cell is a major cause of morbidity and mortality. It is estimated that 50,000 Americans, primarily of African descent, have sickle cell anaemia. In 2004, there was an estimated 113,098 hospital stays during which sickle cell was noted and of which nearly three-quarters were for adults with sickle cell disease. The length of hospital was prolonged in patients with sickle cell but was however still dependent on the primary condition the patient was on admission for (Steiner & Miller, 2006).

System/Institutional Factors and Length of Hospital Stay

Health care systems refer to the hospital of stay and the destination at separation. These include delays in paperwork, organizing community support, securing family support, and lack of medical equipment and have been cited as being responsible for extended hospital stays (Coid & Crome, 1986). Readmission on the other hand refers to hospitalization that occurs shortly after discharge; usually within 30 days but it could be shorter or longer (Frigola-Capell, et al., 2013). At least 20% of all patients who are admitted to a United States hospital make a repeat visit within 30 days of discharge. Readmissions can be caused by hospital acquired infections, deterioration in patient health due to inadequate management of their condition or lack of appropriate services or medications (Murray , et al., 2013). A study in California by Alludeen, Vidyarthi, Maselli and Auerback in 2011 on general medicine patients revealed that 17% of readmission causes were associated socio-demographic,

operational and clinical factors (Frigola-Capell, et al., 2013). Another study on "Laboratory turnaround time and delayed discharges" revealed that delay in laboratory turnaround time delayed decision making leading to increased risk of delayed discharge and reduction in the quality of patient care as a whole (Frigola-Capell, et al., 2013).

2.0 Methodology

Study Design

The study adopted the retrospective descriptive approach to examine the connection between specific diseases and length of stay of patients without making causal statements. By adopting this approach, researchers were able to study the connection between the present condition of patients using their medical records (Sousa, Driessnack, & Mendes, 2007). The descriptive approach allowed for the collection of both numerical and nominal data to explore the nature of the relationship between length of stay and variables such as socio-demographic characteristics, health problems and institutional factors.

Study Area

The Cape Coast Teaching hospital (CCTH), formerly known as the Central Regional Hospital is a 400-bed capacity which serve as a referral hospital for the people in the Central Region, Ghana.

The Medical Department of the CCTH has a male ward and a female ward which cater for patients who are admitted to the hospital for medical reasons as well as patients who have other conditions but have serious medical comorbidities in certain instances. There are 33 occupancy beds and 36 beds at the male and female medical wards respectively.

Population

The target population included all patients admitted under the medical department in the first six months of 2015. The inclusion criteria were all patients admitted to either the male medical ward, female medical ward or the accident and emergency department under the medical department who had Sepsis, Pneumonia, Stroke, Diabetes and Hypertension from January 1st, 2015 to June 30th, 2015. All patients who died on admission whose length of hospital stay was truncated by their death, as well as all patients whose folders could not be tracked down were excluded from the study. Patients who were moved to the surgical department during their hospital admission for further study were excluded due to the fact that they were discharged as surgical patients making their entire length of stay at the hospital unequal to their length of stay on the medical ward.

Sampling Procedure

Purposive sampling was used to select patients who had been admitted with Sepsis, Pneumonia, Chronic Kidney disease, Myocardial Infarction, Stroke, Diabetes, Hypertension as well as related comorbidities during the time of admission.

Data Collection and Analysis

Data was obtained from the folders of patients admitted to the medical wards, accident and emergency department.

3.0 Results and Findings

Average Length of Stay of Patients

The minimum length of stay was 1 day and the maximum was 23 days. The average length of stay was 7.4±4.5 days for all the patients. Typically, long length of stay is defined as a stay of more than 30 days. Since none of the patients within the study stayed for up to 30 days and the average length of stay was approximately a week, for the purposes of easier analysis, grouping and in order to meet the chi-square assumption rule, a short stay was defined as a stay of up to a week and a long stay was defined in this study as more than a week.

Table 1- Mean, minimum and maximum length of stay

	VALUE
Mean	7.42
Minimum	1.00
Maximum	23.00

Gathered data (2015)

Table 1 shows the average length of stay of all the patients.

Socio-demographic Characteristics of Patients

The mean age was 52.8 years with 14 been the minimum and 89 being the maximum. The median age was 53.0 years. The majority of patients (32%) fell within the 65-89 age group with the fewest number of patients coming from the 14-24 and 25-34 age group (9%) each. There were more females admitted than males (57% and 43% respectively). Majority of the patients (56%), were married or living together with 27% being divorced, separated or widowed and 17% being single (never married). As is to be expected due to the study area, the majority of the patients were Christians (94%). In terms of occupations, there were (22%) blue collar jobs referred to as patients whose jobs was involved manual labour such as farmers, fishermen, masons and orderlies and (26%) pink collar jobs such as traders, hairdressers, seamstresses, food vendors and secretaries.

The study revealed that average length of hospital stay was uneven among the study participants. Patients aged 25-34 years had the longest average length of stay (10.2 days) whilst

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those aged 55-64 had the shortest (6.7 days). There was no significance between length of stay and age (p value of 0.439). Males had a longer hospital stay than females (8.4 and 6.7 days respectively), however, more females (70.1%) stayed up to a week than those who stayed on admission for over a week.

The relationship between length of stay and sex was significant (p value of 0.017).

There was no significance found between marital status and length of stay. Between the two dominant religions, Christians recorded shorter length of hospital stay 7.4 days than 7.5 days for Moslems. The grey collar workers had the longest length of stay (10.1 days) followed by students (8.6 days) and blue collar workers (8.0000 days). The number of patients who stayed on admission for up to a week was more in the unemployed (63.2%), students (54.5%), blue collar workers (60.0%), pink collar workers (65.7%), pensioners (72.7%) and red collar workers, less in grey collar workers (33.3%) and equal to the number who were on admission for longer than a week in white collar workers (50.0%).

Table 2: Socio-demographic characteristics and length of stay

Socio-demographic characteristics	Number of Patients	Average length of stay(days)	Number of patients on admission		Pearson chi-square p value
			Up To 1 Week	>1 Week	
Age					
14-24	12 (9%)	8.667	7 (58.3%)	5 (41.7%)	0.439
25-34	12 (9%)	10.1667	4 (33.3%)	8 (66.7%)	
35-44	19 (14%)	7.0526	13 (68.4%)	6 (31.6%)	
45-54	28 (21%)	7.1429	18 (64.3%)	10 (35.7%)	
55-64	21 (15%)	6.6538	14 (66.7%)	7 (33.3%)	
65-89	43 (32%)	7.0930	27 (62.8%)	16 (37.2%)	
Sex					
Male	58 (43%)	8.3448	29 (50.0%)	29 (50.0%)	0.017
Female	77 (57%)	6.7273	54 (70.1%)	23 (29.9%)	
Marital status					
Never married	23 (17%)	9.4348	10 (43.5%)	13 (56.5%)	0.146
Married/Living together	76 (56%)	7.0000	49 (64.5%)	27 (35.5%)	
Divorced/Widowed	36 (27%)	7.0278	24(66.7%)	12 (33.3%)	
Religion					
Christian	127 (94%)	7.4252	80 (63.0%)	47 (37.0%)	NA
Moslem	6 (4%)	7.5000	2 (33.3%)	4 (66.7%)	
Traditionalist	1 (1%)	6.0000	1 (100.0%)	0 (0.0%)	
Atheist	1 (1%)	8.0000	0 (0.0%)	1 (100.0%)	
Occupation					
Unemployed	19 (14%)	6.7895	12 (63.2%)	7 (36.8%)	NA
Student	11 (8%)	8.5455	6 (54.5%)	5 (45.5%)	
Blue collar	30 (22%)	8.0000	18 (60.0%)	12 (40.0%)	
Pink collar	35 (26%)	6.7143	23 (65.7%)	12 (34.3%)	
Grey collar	9 (7%)	10.111	3 (33.3%)	6 (66.7%)	
White collar	8 (6%)	7.6250	4 (50.0%)	4 (50.0%)	
Red collar	1 (1%)	5.0000	1 (100.0%)	0 (0.0%)	
Pensioner	22 (16%)	6.6818	16 (72.7%)	6 (27.3%)	

Table 2 shows the demographic characteristics of the patients included in the study.

ISSN: 2458 – 7419

International Journal of Business Innovation and Technology (IJBIT), Volume 4, No. 2, July 2017

A clear majority of patients had active health insurance (70%), 5% were either expired and 25% could not be assessed. Nineteen percent (19%) had financial constraints whilst 81% had no such documented issues. Sixteen percent (16%) either insurance (7.1 days). It was found that patients who could not access their health insurance stayed longer than a week (57.1%) than those with an active account (62.1%). Patients with no financial constraints had the longest stay (7.6 days) than those whose financial status was unknown (5.0 days). Patients who had a history of alcohol consumption had more people stay for more than a week (59.1% versus 40.9%) whereas those who did not have a history of alcohol consumption, had more people drank alcohol or had a history of prior alcohol consumption while 11% used herbal medication in either topical, drink, inhalational, or enema form.

Patients with inactive health insurance (8.9 days) stayed longer than those with an active health staying for up to a week than those who stayed for longer than a week (65.5% versus 34.5%). The relationship between length of stay and alcohol consumption was significant (p value of 0.030). Those who used herbal medication had a shorter hospital stay than those who did not (7.0 and 7.5 days respectively). There was no significance between length of hospital stay and herbal medication use.

Social Characteristics of Patients and Length of Stay

Table 3: Social characteristics and length of hospital stay

Social Characteristics	Number of Patients	Average Length of Stay (Days)	Number of Patients on Admission		Pearson ChiSquare P Value
			UP TO 1 WEEK	>1 WEEK	
Health insurance					
Yes	95 (70%)	7.0842	59 (62.1%)	36 (37.9%)	NA
Not active	7 (5%)	8.8571	3 (42.9%)	4 (57.1%)	
Unknown	33 (25%)	8.0909	21 (63.6%)	12 (36.4%)	
Financial constraints					
Yes	26 (19%)	6.8077	17 (65.4%)	9 (34.6%)	NA
No	108 (81%)	7.5926	65 (60.2%)	43 (39.8%)	
Alcohol consumption					
Yes	22 (16%)	9.7727	9 (40.9%)	13 (59.1%)	0.030
No	113 (84%)	6.9646	74 (65.5%)	39 (34.5%)	
Herbal medication use					
Yes	15 (11%)	7.0000	9 (60.0%)	6 (40.0%)	0.900
No	120 (89%)	7.4750	74 (61.7%)	46 (38.3%)	

Gathered data (2015)

Table 3 depicts the social characteristics of the patients such as their alcohol consumption, use of herbal medication and financial status.

Medical Conditions, Associate Medical Issues and Length of Stay

About a third of the patients were diabetic (29%) and about more than half were hypertensive (51%). Twenty-two percent (22%) of the patients had community acquired pneumonia, 17% had a new episode of stroke. Thirty-seven percent (37%) of patients were anaemic and 1% had sickle cell disease. Across the different conditions that patients were admitted for, urea levels were checked for many patients especially those with sepsis and pneumonia. About 4% had retroviral infection (laboratory confirmed HIV positive), and 1% (one patient) had sickle cell disease. The levels of urea in 55% of the patients could not be ascertained, however, 31% had normal levels of urea whilst 14% had increased levels of urea.

ISSN: 2458 – 7419

International Journal of Business Innovation and Technology (IJBIT), Volume 4, No. 2, July 2017

Both diabetics and non-diabetics were on admission for a week or less (69.2% and 58.3%) than patients who stayed for more than a week. There was no significant relationship between length of stay and diabetes status (p value of 0.238). Non-hypertensive patients were on admission for longer (8.2 days) than hypertensive patients (6.7 days). There was no significant relationship between length of stay and hypertension status (p value of 0.105). There was a significant (p value of 0.000) relationship between length of hospital stay and pneumonia. Patients with community acquired pneumonia had a significantly longer stay (10.2 days) than those without pneumonia (6.6 days). A greater percentage (60.9% and 61.6%) of both patients who had stroke and those who did not have stayed for up to one week. The relationship between stroke and length of stay was not significant (p value of 0.947).

percentage of patients stayed for up to a week for both those with increased urea levels and those with unknown urea levels however (57.9% and 73.0% respectively), patients with normal blood levels of urea had a greater majority being on admission for more than a week (57.1%). Urea levels had a significant relationship with length of hospital stay (p value of 0.006).

Patients who had sepsis had a length of stay of over a day and a half more than those who did not have sepsis (8.9 and 7.2 days). Majority of those who had sepsis stayed for more than a week (60.0%) and the majority of those who did not have sepsis stayed for less or up to a week (65.2%). The relationship between sepsis and length of stay was significant (p-value of 0.032). More anaemic patients stayed on admission for more than one week (52.0%) than the non-anaemic patients (30.6%). The relationship between anaemia and length of hospital stay was significant (p value of 0.014). Patients who had normal urea levels stayed on admission for an average of 9.1 days, those with increased urea levels for 7.5 days and those with unknown blood urea levels for 6.7 days. A higher

The overall longest length of hospital stay was found to occur in retro-positive patients (11.4 days) and the majority of these patients were on admission for longer than a week (80.0%). The cells under retroviral infection and sickle cell did not meet the chi-square assumption rule. The only patient with sickle cell disease was found to have the second longest average length of stay (11.0 days)

and stayed for longer than a week.

Table 4: Medical conditions, associated medical issues and length of stay

Medical Issues	Number of Patients	Average Length of Stay(Days)	Number of Patients on Admission		Pearson Chi-Square P Value
			UP TO 1 WEEK	>1 WEEK	
Diabetes status					
Diabetic	39 (29%)	6.5385	27 (69.2%)	12 (30.8%)	0.238
Non-diabetic	96 (71%)	7.7813	56 (58.3%)	40 (41.7%)	
Hypertension status					
Hypertensive	69 (51%)	6.6667	47 (68.1%)	22 (31.9%)	0.105
Non-hypertensive	66 (49%)	8.2121	36 (54.5%)	30 (45.5%)	
Pneumonia					
Community acquired pneumonia	30 (22%)	10.2667	10 (33.3%)	20 (66.7%)	0.000
No pneumonia	105 (78%)	6.6095	73 (69.5%)	32 (30.5%)	
Stroke					
Has stroke	23 (17%)	7.6957	14 (60.9%)	9 (39.1%)	0.947
No stroke	112 (83%)	7.3661	69 (61.6%)	43 (38.4%)	
Sepsis					
Yes	20 (15%)	8.9000	8 (40.0%)	12 (60.0%)	0.032
No	115 (85%)	7.1652	75 (65.2%)	40 (34.8%)	
Anaemia					
Yes	50 (37%)	9.2400	24 (48.0%)	26 (52.0%)	0.014
No	85 (63%)	6.3529	59 (69.4%)	26 (30.6%)	
Retroviral infection					
Yes	5 (4%)	11.4000	1 (20.0%)	4 (80.0%)	NA

No	130 (96%)	7.2692	82 (63.1%)	48 (36.9%)	
Sickle cell disease					
Yes	1 (1%)	11.0000	0 (0.0%)	1 (100.0%)	NA
No	134 (99%)	7.3955	83 (61.9%)	51 (38.1%)	
Urea levels					
Increased	19 (14%)	7.4737	11 (57.9%)	8 (42.1%)	0.006
Normal	42 (31%)	9.0714	18 (42.9%)	24 (57.1%)	
Unknown	74 (55%)	6.6730	54 (73.0%)	20 (27.0%)	

Gathered data (2015)

Table 4 shows the spread of the different medical conditions within the sample.

System/Institutional Factors and Length of Stay

These system factors basically relate to hospital stay and whether the hospital has the necessary facilities needed for managing patients or has patients returning on admission probably due to inadequacies in treatment regime or protocols. Twenty-four percent (24%) of patients needed rehabilitation, 7% were readmitted within 30 days of discharge. There were delays in carrying out either blood tests or radiological investigations for 18% of admission for up to a week for both patients who needed rehabilitation (51.5%) and those who did not need rehabilitation (64.7%). About seventy-eight percent (77.8%) of patients who were readmitted spent more than a week whilst 64.8% of those who were not readmitted stayed on admission for up to a week.

The relationship between length of stay and delays in procedures was not significant ($p = 0.910$). For those patients who did not have laboratory the patients and 8% of the patients did not get their laboratory tests done due to unavailability of laboratory resources like reagents or machines to be used were out of service.

Examination of length of hospital stay in relation to hospital systems revealed that patients with a need for rehabilitation had a longer stay than patients who did not require one (8.3 days and 7.2 days). The bigger proportion of patients were on resources readily available, hospital stay was more than a day longer (8.7 days) than those who had all the laboratory resources necessary for their care available in the hospital (7.3 days). About 55% of patients whose laboratory resources were unavailable were on admission for up to a week and 62.1% of those who had all the necessary laboratory resources stayed for up to a week as well. The relationship between length of stay and unavailable laboratory resources was not significant ($p = 0.622$).

Table 5: System factors and length of stay

System Factors	Number of Patients	Average Length of Stay(Days)	Number of Patients on Admission		Pearson Chi-Square P Value
			UP TO 1 WEEK	>1 WEEK	
Need for rehabilitation					
Yes	33 (24%)	8.2727	17 (51.5%)	16 (48.5%)	0.176
No	102 (76%)	7.1471	66 (64.7%)	36 (35.3%)	
Readmission in 30 days					
Yes	9 (7%)	10.4444	2 (22.2%)	7 (77.8%)	NA
No	125 (92%)	7.1600	81 (64.8%)	44 (35.2%)	
Unknown	1 (1%)	13.000	0 (0.0%)	1 (100.0%)	
Delays in procedures					
Yes	24 (18%)	7.2083	15 (62.5%)	9 (37.5%)	0.910
No	111 (82%)	7.4685	68 (61.3%)	43 (38.7%)	
Unavailable laboratory resources					
Yes	11 (8%)	8.7273	6 (54.5%)	5 (45.5%)	0.622
No	124 (92%)	7.3065	77 (62.1%)	47 (37.9%)	

Table 5 describes the systemic factors related to patients on admission.

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The purpose of this study was to find out the average length of hospital stay among the study population at the Cape Coast Teaching Hospital and the factors that contributes to prolonged or short length of stay. Findings in the study revealed that length of stay is agile and varies with the factors considered in the study. The findings show that there is a significant relationship between age, sex (socio-demographic characteristics) and length of stay. With respect to social factors and length of stay, alcohol consumers stayed on admission 2 days longer than the other social factors: financial constraints, herbal medication use and availability of health insurance. The third variable observed was the medical conditions of patients. In this regard, length of stay was highest among retroviral infection and sickle cell disease than the other medical conditions studied. Finally, the study established that, institutional flaws including delays in procedures and unavailability of laboratory resources significantly contributed to increased length of stay of patients.

4. Discussions and Conclusions

Discussions

Average Length of Stay

The recorded mean length of stay of 7.4 days (Table 1), was higher than the average length of stay of patients in Scotland (5.6) in 2013 but lower than that of Nigeria (12.5 days) (Garko, Ekweani, & Anyiam, 2016). As length of stay differs from country to country, across different hospital types and based on the infrastructure, the difference in study environment could be a cause of the difference in results. In the Scotland study, there were strict protocols followed in relation to different conditions and treatment of those conditions. There was also the availability of facilities and the needed medication to give prompt treatment to patients as well as interventions to prevent further foreseen complications.

In CCTH, factors such as non-payment of bills, delayed diagnosis, the need to search for and purchase certain necessary but scarce medication and equipment from outside the hospital before treatment, low socioeconomic status of many patients and lack of certain radiological investigations such as a fully functional computed tomography (CT) scanner could have contributed to the longer length of stay. The length of stay in CCTH was more than one and a half times the length of stay in Nigeria. The long length of hospital stay in Nigeria was attributed to poor health seeking behaviour, late presentation to the hospital, economically challenged patients and low standards of healthcare facilities. This implies that the health seeking behaviour is better among Cape Coast residents and the hospital and healthcare staff may be better at following laid down protocols for treatment or may be better equipped in terms of infrastructure.

Socio-demographic Characteristics and Length of Stay

The largest number of patients were between the 65- 89 year group (Table 2) and this corroborates the findings of Coid and Crome (1986) who showed an association between increasing age and hospital admissions as well as length of stay (Decoster & Kozyrskyj, 2000). The changes in medical science leading to improved healthcare, and the shifts in demographics as well as increased life expectancy have resulted in a massive rise in the number and proportion of individuals living with one or more chronic illnesses. Lifestyle changes like smoking, lack of exercise and change in diet all contribute to older people being more predisposed to illness and admission in hospital. Typically, longer lengths of stay should be in the older individuals who are not as virile and healthy but the trend in this research may be due to the limitations in carrying out the study which include having a smaller than expected sample size due to problems with finding the folders of patients.

Again, more females were admitted than males (Table 2), the average length of stay was longer in males than in females (8.4 days as opposed to 6.7 days) and the relationship between sex and length of stay was significant. According to the 2014 Ghana Demographic and Health Survey, the population of women is greater than men and this confirms the findings of this research. Males having a longer length of stay, is inconsistent with literature from other studies which says that women are at an increased risk for long stay not only because they averagely live longer than men but also because they are more likely to suffer isolation and poverty.

The mean length of stay was highest for patients who had never been married and there was no significance between length of stay and marital status (Tables 2). The finding of unmarried having a longer length of hospital stay agrees with research that says that marriage is a protective factor for morbidity and mortality (Quinn, Rudolph, & Fairchild, 2005). Literature on health and mortality by marital status has consistently identified that unmarried individuals generally report poorer health and have a higher mortality risk than their married counterparts though this is more in men than women (Robards, Evandrou, Falkingham, & Vlachantoni,

2012). Divorced persons tend to have an even worse prognosis than single persons. The reasons for marriage being protective are intertwined with other factors that relate to the lives and health of individuals but it is postulated that the presence of a support system or a family or home makes one less susceptible to illness and even in illness, one is more likely to recover more quickly because of the love and care one receives (Robards, Evandrou, Falkingham, & Vlachantoni, 2012).

Social Characteristics and Length of Stay

Patients with health insurance stayed for shorter days than those without insurance and those whose insurance information was not known. Lack of medical insurance has been cited as one of the contributory factors for a prolonged length of stay. This is because patients may have to be on admission for a long time while their bills get sorted out. This may not have been found to be significant in this study because other studies have postulated that having insurance contributes to more voluntary visits to the hospital, more admissions and longer lengths of hospital stay as patients' bills are being covered by a third party.

One in five of the patients had financial constraints (Table 3). Patients with financial constraints stayed for shorter than those without financial problems. Though the chi-square assumption rule was not satisfied under financial constraints, typically, there should be a significant relationship between the length of stay and financial constraints as patients with little or no money either attend hospital less and leave as soon as they can in order not to pay too much, or stay out of the hospital for long periods of time with acute ailments and only turn up when they are in critical condition and need more intensive care for longer.

The average length of stay for patients who consumed alcohol was 2.8 days more than the length of stay of those who were not drinkers (Table 3). It is generally accepted that lifestyle risk factors, of which alcohol is a part, are associated with poorer health outcomes including hospitalization among the general population (Decoster & Kozyrskyj, 2000). This could contribute to the effects of alcohol on health such as cardiomyopathy, stroke, alcoholic hepatitis, liver fibrosis, cancer and encephalopathy. Alcohol consumption is also a risk factor for most chronic diseases and adds to complications of admission.

Medical Conditions, Associate Medical Issues and Length of Stay

Approximately 3 out of 10 of the patients were diabetic, they had a shorter length of stay than the non-diabetics and there was no significant relationship between diabetes and length of stay (Table 4). This does not concur with the 2008 assessment of patients in the United States which showed that patients with diabetes had a longer hospital stay than those without diabetes (Fraze, Jiang, & Burgess, 2008). Patients with diabetes tend to have complications such as neuropathy, nephropathy, retinopathy and skin problems and these contribute to an increased length of stay (Gajewska, Gebska-Kuczerowska, Gorynski, & Wysocki, 2013). It could be that the patients seen did not have as many complications and thus their length of stay was not much different from nondiabetics.

Slightly more than half of the patients were hypertensive, they had a shorter stay than the nonhypertensive patients and the relationship between the length of stay and hypertensive state was not significant. Though hypertension is one of the most common conditions that requires medical attention, the length of stay in hypertension is more dependent on other factors and comorbidities the patient may have than on hypertension itself as a diagnosis. In conditions where a patient has hypertension and has other conditions such as diabetes which occurs most commonly with hypertension, the patient may have an increased length of hospital stay.

Pneumonia is related to an increased length of stay because of complications such as lung abscess, pleurisy and sepsis. Pneumonia also occurs more in elderly people and since within this study, the largest age group was the elderly, and older age is a contributory factor to an increased length of stay, it could partly explain how come patients with pneumonia had a prolonged length of hospital stay. The relationship between pneumonia incidence and length of stay was significant (Table 4). Garau, Baquero and Perez-Trallero (2008) length of stay was associated with positive blood culture, multilobar pneumonia, active use of tobacco, and regular consumption of alcohol (Garau, Baquero, & PerezTrallero, 2008). Almost none of the patients had a history of tobacco use, very few drank alcohol and the greater percentage of patients had single lobe involvement and these differences in patient and disease characteristics may be the reason behind the difference in length of stay.

Only one in twenty-five patients was retroviral positive (Table 4) and this person had the overall longest length of stay which was almost four days more than patients without retroviral infection. A research in Ethiopia showed that length of stay ranged from 10 days to 15 days which is consistent with findings in this study. It is however longer than the general average length of stay of patients by 4 days and this can be explained by the fact that patients who are retroviral positive (especially those who are not on anti-retroviral therapy), tend to be immune-compromised, more prone to illness and

more prone to severe forms of illnesses and as such these patients end up on admission for longer than others.

One patient with sickle cell disease had the second longest length of stay of 11.0 days (Table 4). The length of hospital stay in patients who have sickle cell tends to be prolonged due to frequent infections and complications of the sickle cell itself however, length of stay is still dependent on the primary condition the patient is on admission for. The relationship between urea and length of stay was significant (Table 4) and surprisingly patients with normal levels of urea had a longer stay than those with increased urea levels. Patients with normal urea levels staying longer than those with increased urea could be accounted for by the fact that those with increased urea levels were mostly chronic kidney disease patients who did not have a very long average length of stay. The average length of stay was increased in other conditions which may not necessarily affect the levels of urea in the body.

System/Institutional Factors and Length of Stay

Seven percent of the patients were readmitted within 30 days and these patients had a longer length of hospital stay though there was no significance found between readmission and length of stay (Table 5). One of the major causes of readmission is discharge before the patient is fully recovered. In the bid to make beds available in order to admit other patients or discharge patients who choose to go home against medical advice because they do not have the financial resources to pay the hospital bills or do not want the intervention the doctor is suggesting or in cases where there is not much that doctors can do in terms of treatment due to unavailable equipment, patients who need to be kept in hospital are discharged home only to return in a worse state than they left. Other patients may not have been fully educated on how to manage their illness and the importance of following the instructions given them and as such they end up readmitted because they do not continue to improve after discharge.

Delays in carrying out necessary procedures, be it blood tests or radiologic investigations, and unavailable laboratory services are hospital system inadequacies lead to increased length of stay. Though there was no significant relationship between length of stay and unavailability of laboratory resources or delays in carrying out procedures (Table 5), there was an increased length of stay of more than one day for patients who had unavailable laboratory resources. Patients with delays in testing however had a shorter length of stay than those without. Delays in testing could either be the fault of the health workers or the patient. In the patient's case, it could be from inadequate finances and as such these patients are those who are likely to have been discharged against medical advice for reasons of finance which would explain why they have a shorter length of stay than those without delays.

Conclusions

This study provides insight into the average number of days a patient admitted to the Cape Coast Teaching Hospital is likely to spend as well as the major factors that contribute to long or short of hospitalization. These include the patients' sociodemographic characteristics, medical condition, social characteristics and institutional factors.

Knowledge of the patients' characteristics would enable the hospital management and health care providers to make clinical decisions based on evidence and also put appropriate measures in place to prevent increased lengths of hospital stay as well as the negative factors associated with it.

For example, in relation to sociodemographic characteristics, congruent with worldwide research, the most commonly admitted age group was those above 65 years of age. Again, more females admitted than males, however, men had a longer length of stay than women. Workers of blue collar jobs such as masonry, farmers, fishermen and manual labourers stayed on admission the longest (8.7 days). For these category of patients, healthcare providers would be able to easily detect and predict their possible length of stay in order to plan treatment that will guarantee improvement of the patient's health outcomes.

Arranged in the order of the longest to the shortest length of hospital stay for the different factors, readmission, pneumonia, alcohol consumption, anaemia, normal urea levels, sepsis, unavailable laboratory resources, need for rehabilitation, stroke, delays in procedures, herbal medication use, financial constraints and hypertension with diabetic patients having the lowest length of hospital stay (6.5 days). This proves a useful quality metric to assess the efficiency of healthcare provided to clients in the medical wards of the Cape Coast Teaching Hospital.

Limitations

The variations of some of the findings of this study from other studies conducted could be due to the small sample size because some of the folder numbers obtained from the ward did not correlate with the names of the patients being assessed on obtaining those folders and as such, information from those folders was not used in the research. Due to improper documentation, it was not possible to assess all the parameters necessary for the study as the folders did not always have adequate or up-todate information and this could affect the results of the research. Also, some folders could not be traced at the records department, the wards or the special

clinics for some of the patients thus, information from these folders was not used in this study. This meant that necessary participants were excluded from the study and this could lead to skewed or inaccurate results.

Recommendations

Recommendations suggested draw on the findings of the study. The study recommends the management of the Cape Coast Teaching Hospital to upgrade the laboratories and pharmacy at the hospital as well as institute measures to ensure the use of standard treatment protocols for specific conditions in order to reduce the length of stay associated with systemic factors. This would ensure that patients receive prompt and appropriate treatment and reduce the long wait associated with patients having to perform certain laboratory tests or purchase drugs not available at the facility.

Knowledge of the patients' characteristics among healthcare providers need to be strengthened to guarantee that clinical decisions are based on evidence in order to plan patient-centered interventions to prevent increased lengths of hospital stay among patients. Patient education as well as supporting recovery at home must be encouraged.

Finally, the study recommends regular training for staff at the records department and perform regular update of patients' records to ensure patient records are accurate, current and readily accessible using computer-assisted technologies in order to ensure effective and efficient delivery.

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