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Relationship between time of referral for physiotherapy and length of stay after stroke in a Nigerian tertiary hospital: a retrospective study

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Abstract

Background: Despite the known benefits of physiotherapy, the relationship between its time of referral and the length of stay (LOS) of stroke patients in developing countries has been understudied. This relationship was investigated in this study as we determined the relationships between LOS and time of referral and LOS and the number of physiotherapy sessions received.

Methods: Medical records of stroke patients admitted at Obafemi Awolowo University Teaching Hospitals Complex Ile-Ife between January 2007 and December 2016 were retrieved. Descriptive statistics were used to summarize the data, independent samples *t* test, and one-way analysis of variance were used to determine differences, and Pearson correlation was used to determine relationships.

Results: A total of 585 medical records were retrieved. With an inpatient mortality rate of 40.7%, only 243 case records were included in the study. The mean LOS was 17 ± 13 days, and 63.4% received inpatient physiotherapy. Patients who were referred for physiotherapy ($p = 0.019$) and those who utilized physiotherapy ($p = 0.001$) had higher LOS. Also, there were significant correlations between LOS and the time of referral for physiotherapy ($r = 0.575, p = 0.001$) and LOS and the number of physiotherapy sessions received ($r = 0.293, p = 0.001$).

Conclusions: Stroke patients who utilized physiotherapy had longer LOS. The longer the time of referral and the higher the number of physiotherapy sessions, the longer the LOS. Early referral and commencement of physiotherapy optimize physiotherapy utilization, which may reduce the LOS of stroke patients.

Keywords: Stroke, Length of stay, Physiotherapy, Referral

Introduction

Universally, there is an emphasis on establishing efficient use of health resources, especially in settings limited by funds and resources, such as developing countries [1]. This makes the use of indices such as length of stay (LOS) (defined by Rapoport et al. [2] as the period between the

day of admission to the day of discharge or death) important for examining the efficiency of health institutions [3].

Although physiotherapy is an essential aspect of stroke rehabilitation [4] and has been found to reduce LOS, enhance functional outcomes, and quality of life in patients with acute or subacute conditions [5], its specific role in stroke patients' LOS has not been extensively studied in developing countries. This situation calls for a critical study as medical-related accountability and delayed referrals can prolong patients' LOS [6, 7]. Furthermore, in countries such as Nigeria, physicians'

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referrals are required before physiotherapists commence inpatient management of stroke patients, which may significantly affect the LOS.

Previous studies have reported the LOS of stroke patients in Nigeria [8, 9]. However, the relationship between LOS and the time of referral for physiotherapy was not explored. This study aimed to investigate the relationship between the time of referral for physiotherapy and LOS of stroke patients over ten years in a Nigerian tertiary hospital. Specifically, correlations between the LOS and time of referral, the number of physiotherapy sessions received, and the number of patients' complications were determined. Also, the study compared the LOS of stroke patients and referral for physiotherapy, utilization of physiotherapy services, and some clinical characteristics of patients such as the side affected by stroke, the type of stroke, and the presence of complications.

Methods

The study was designed as a retrospective cohort study. It was conducted with a purposive sampling technique to select medical records of stroke patients admitted in the Obafemi Awolowo University Teaching Hospitals Complex (OAUTHC) between January 2007 and December 2016. Obafemi Awolowo University Teaching Hospitals Complex, Ile-Ife Osun State, is one of the first-generation teaching hospitals established by the federal government in South-west Nigeria that play crucial roles in delivering comprehensive tertiary healthcare and training for medical and allied health professionals. Its location allows patients to come from all areas of the state and other southwestern states in Nigeria.

All medical records with complete information on patients diagnosed with stroke admitted to the hospital between January 2007 and December 2016 were included in this study. Medical records of patients deficient in relevant information, including missing records, discharged against medical advice, or died while on admission, were excluded.

Information extracted from the medical records were socio-demographic characteristics (age, sex, occupation), clinical characteristics including side of stroke (right or left), type (ischemic, hemorrhagic, unspecified), neurological deficit (paresis of the extremities, aphasia, amongst others), day of onset of stroke, length of hospital stay, referral for physiotherapy, time of referral, day physiotherapy commenced, number of physiotherapy sessions received during inpatient care and number of complications (such as decubitus ulcer, deep vein thrombosis, muscle contracture, shoulder dislocation, pedal edema).

The LOS was calculated from the day of admission to the day of discharge for each patient. Referral for physiotherapy was based on the physician's documented plan

to refer the patient for physiotherapy in the patient's medical records. The time of referral was calculated from the day of admission to the day the decision was made to refer the patients for physiotherapy. The day physiotherapy commenced was calculated from the day of admission to the day of documented evidence of physiotherapy assessment after referral. The number of physiotherapy sessions was recorded as the number of documented physiotherapy sessions for individual patients.

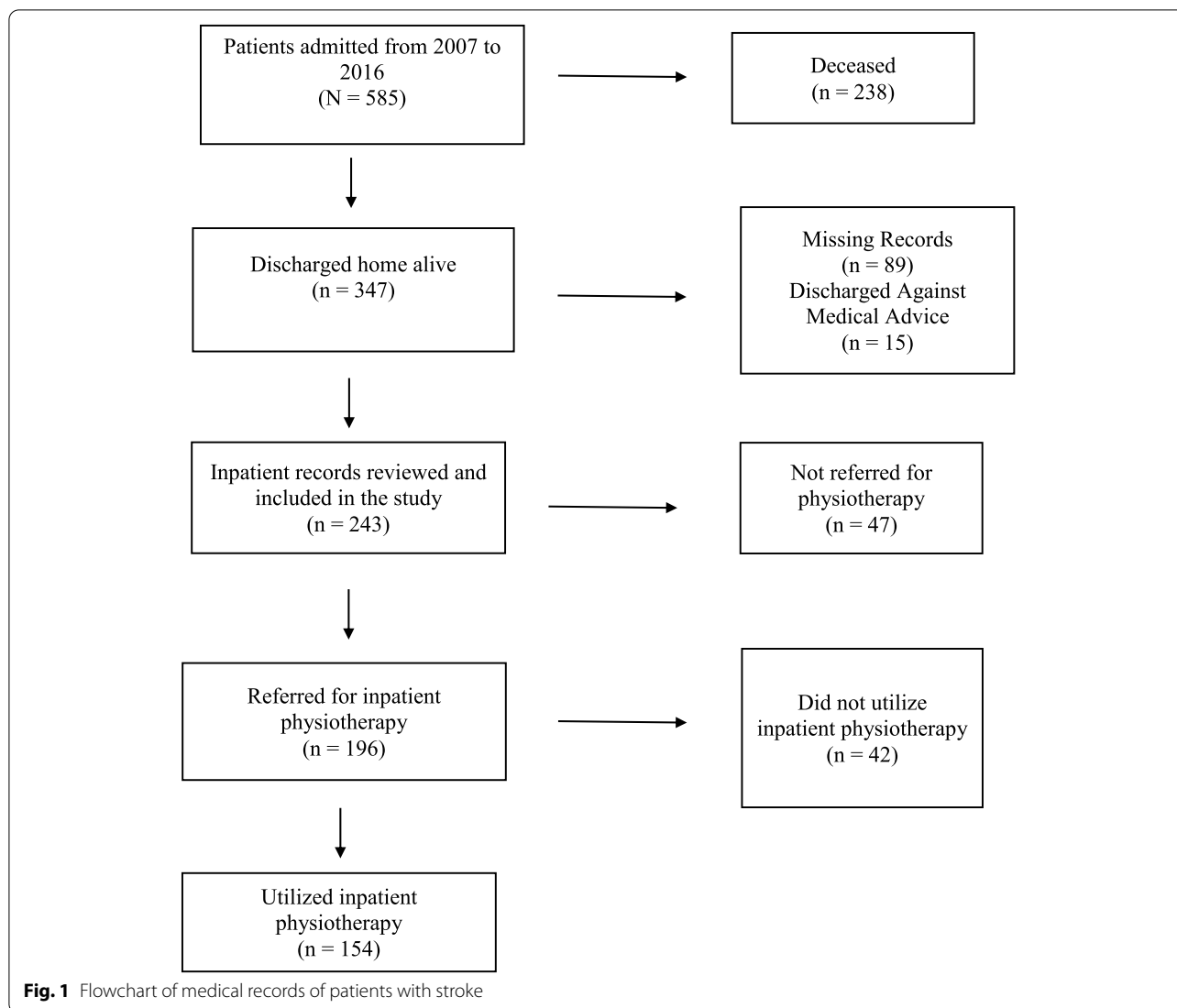
Ethical approval was obtained from the Ethics and Research Committee of the OAUTHC. Permission was obtained from the Deputy Director of the Department of Information and Health Management OAUTHC to access the required medical files. Relevant information was recorded using assigned numbers to protect the identity of patients included in the study.

Data analysis

Descriptive statistics of mean, standard deviation, percentage, and frequency were used to summarize the data. Independent samples *t* test was used to determine the differences in the LOS between patients referred and those not referred for physiotherapy, utilization of physiotherapy services, presence or absence of complications, and side of stroke (right, left). One-way analysis of variance (ANOVA) was used to determine the differences between LOS among the types of stroke (ischemic, hemorrhagic, unspecified). Pearson correlation analysis was used to determine correlations between LOS and the number of physiotherapy sessions received, time of referral (number of days from admission to referral), and the number of complications recorded. The level of significance was set at $p < 0.05$. IBM SPSS software version 21 was used for all data analyses.

Results

A total of 585 medical records of stroke patients admitted between January 2007 and December 2016 were retrieved. The inpatient mortality rate was 40.7%. Of the 347 medical records reviewed, 89 had missing information, and 15 recorded that patients were discharged against medical advice leaving 243 medical records in this study (Fig. 1). The mean age was 61.4 ± 14.1 years. The highest number of stroke admissions (18.1%) occurred in 2009, while the least number of stroke admissions (3.7%) was in 2015. The mean LOS for patients admitted during the 10-year study period was 17.0 ± 13.1 days. The records comprised 131 (53.9%) males and 112 (46.1%) females (Table 1). 196 (80.7%) patients were referred for inpatient physiotherapy while on admission, while 154 (63.4%) received the services. All the patients presented with at least one neurological deficit. The mean LOS was 13.0 ± 13.6 days for



patients not referred for physiotherapy and 18.0 ± 12.8 days for patients referred for physiotherapy, while the mean LOS was 11.4 ± 8.9 days for patients who did not utilize physiotherapy and 19.8 ± 13.2 days for patients who utilized physiotherapy. The mean number of days physiotherapy commenced was 7 ± 6.39 days after admission (Table 2).

There was a significant difference in LOS between patients referred for physiotherapy and those not referred ($t = -2.369, p = 0.019$). Also, there was a significant difference in the LOS between patients who utilized physiotherapy and patients who did not ($t = 3.874, p = 0.001$). Furthermore, there was a significant difference in the LOS between patients with complications and those without complications ($t = -4.688, p = 0.001$) and between the types of stroke ($F = 1.036,$

$p = 0.001$) (Table 3). There was a moderate positive correlation [10] between LOS and time of referral ($r = 0.575, p = 0.001$) (Table 4), but negligible correlations were observed between LOS and the number of physiotherapy sessions received ($r = 0.0293, p = 0.001$) and LOS and the number of complications ($r = 0.0289, p = 0.001$).

Discussion

Given the well-researched benefits of post-stroke rehabilitation in time and cost-constrained settings of health care, this study investigated the role of physiotherapy in the LOS of stroke patients in a tertiary hospital in south-west Nigeria, in terms of differences in the LOS of patients referred for physiotherapy and those who were

Table 1 Socio-demographic characteristics of stroke patients (N = 243)

Variable N = 243	Frequency (n)	Percent (%)
Gender		
Male	131	53.9
Female	112	46.1
Occupation		
Professionals	55	22.6
Self-employed	117	48.1
Unemployed	24	9.9
Retired	47	19.3
Year of patients' admission		
2007	19	7.8
2008	35	14.4
2009	44	18.1
2010	22	9.1
2011	24	9.9
2012	23	9.5
2013	11	4.5
2014	31	12.8
2015	9	3.7
2016	25	10.3

Table 2 Clinical characteristics of stroke patients (N = 243)

Variable N = 243	Frequency (n)	Percent (%)
Side affected		
Left	132	54.3
Right	111	45.7
Neurological deficit		
Upper extremity only	10	4.1
Lower extremity only	2	0.8
Upper and lower extremities of one side	221	90.9
Aphasia	79	32.5
Sensory impairment	138	56.8
Referral for physiotherapy		
Referred	196	80.7
Not referred	47	19.3
Presence of complications		
Decubitus ulcer	17	7.0
Deep vein thrombosis	6	2.5
Muscle contracture	13	5.3
Shoulder dislocation	5	2.1
Pedal edema	31	23.8
Number of complications		
None	190	78.2
One	36	14.8
Two	15	6.2
Three	2	0.8

Table 3 Differences in the length of stay between side affected, referral for physiotherapy, utilization of physiotherapy services, presence of complication, and type of stroke

Variable	Mean LOS (days)	Std. deviation	T	F	p
Side affected					
Left	16.3	12.7	- 0.744		0.458
Right	17.7	13.6			
Referral for physiotherapy					
Referred	18.0	12.8	- 2.369*		0.019
Not referred	13.0	13.6			
Utilized physiotherapy services					
Yes	19.8	13.2	3.874*		0.001
No	11.4	8.93			
Presence of complication					
Present	24.2	16.2	- 4.688*		0.001
Absent	15.0	11.6			
Type of stroke					
Ischemic	16.8	12.4	0.358*		0.001
Hemorrhagic	16.6	13.0			
Unspecified	22.3	21.7			

*Independent samples t test and ANOVA are significant at $p < 0.05$

LOS length of stay, Std. Deviation standard deviation

not, as well as the correlations between the LOS, days of referral and utilization of physiotherapy.

The inpatient mortality rate was 40.7% for the 10 years reviewed. This finding is consistent with a previous study that showed that the mortality rate of stroke patients in Nigeria is high, ranging from 21 to 45% [11]. The distribution of the patients in this study, more males than females, is consistent with the findings of Njoku et al. [12] which showed that stroke is commoner in males. Furthermore, the male sex has been listed as a risk factor for stroke [13]. The mean age of stroke patients in this study (61.4 ± 14.10 years) resonated with what is found in the literature that age is a non-modifiable risk factor for stroke, increasing with each age from the fifth decade of life [14]. Although the incidence and prevalence of stroke in Nigeria have been reported to be on the increase [15] the number of cases seen per year appeared to fluctuate in our study. This fluctuation may be attributed to the various industrial actions in the country's health sector during the different years of the study, most notably in 2013 and 2015, when multiple healthcare associations and unions were on strike [16]. This affected the admission of patients into the facility during these periods.

The LOS of stroke patients admitted in the hospital was higher than those from studies conducted in developed countries such as the USA, where LOS is less than 7 days for most stroke patients [17]. In Australia, LOS varies

Table 4 Correlation between length of stay and time of referral, utilization, and complications of stroke patients

Variable	Mean	Std. deviation	r	P value
Time of referral (days)	3.6	6.3	0.575 [†]	0.001
Number of physiotherapy sessions	5.2	6.7	0.293 [†]	0.001
Number of complications (min = 1, max = 3)			0.289 [†]	0.001

Key: [†]Pearson correlation is significant at $p < 0.01$

between 4.2 and 17.5 days, depending on the health facility of admission [18]. However, the result of this study is comparable to the findings of Desalu et al. [8] and Olaleyé et al. [9] who reported the length of stay of stroke patients to be 16 days and 12 days respectively in other health facilities in south-west Nigeria. Bearing in mind that physiotherapy is provided only for patients referred by physicians in Nigeria, the referral rate of 80.7% observed for stroke patients in the study facility was high. This may suggest that the physicians in this facility were aware of the benefits of physiotherapy in improving functional recovery and independence after a stroke. However, this study showed a moderate positive correlation between the LOS and the time of referral for physiotherapy. Some clinical practice guidelines [19, 20] have recommended a period between 24 to 48 h within the onset of a stroke for the commencement of physiotherapy. However, this depends on the severity of the stroke among patients and varies with institutions and physicians.

The clinical pattern of patients in this study is consistent with clinical deficits seen in stroke; all patients in the records had at least one neurological deficit. A finding validated by the fact that stroke itself is a rapidly developing focal loss of cerebral function [21]. Therefore, the motor and sensory impairments lasting more than 24 h due to cerebral vascular disruption only corroborate the diagnosis of the pathology. A higher percentage of the patients in this study had a left-sided stroke, and this result is consistent with findings by Portegies et al. [22] that left-sided strokes are often more reported by clinicians. This study also found that ischemic stroke was the most frequently seen type of stroke during the study period. This pattern is consistent with findings in other studies [8, 23].

Our results showed differences between the LOS of patients referred for physiotherapy and those not referred, and also between patients who utilized physiotherapy and those who did not. For patients who received physiotherapy, conventional treatments [24] such as positioning, range of motion exercises, balance/postural training, mobility training, task-oriented therapy, prescription and training using assistive devices, patients, and caregivers' education were administered daily until discharge. Patients who were referred for physiotherapy

and utilized physiotherapy stayed longer in the hospital than those who were not referred or those who did not utilize physiotherapy. There was also a positive correlation between LOS and time of referral for physiotherapy. The longer the time of referral, the longer the patients stay in the hospital. This finding is comparable to a study by Hartley et al., who concluded that early physiotherapy input is associated with reduced LOS [25]. Some factors that may have contributed to the longer time of referral for these patients are delay in referral, the workup for diagnostic tests, the period of waiting for results of requested investigations before referring patients, and inefficient communication between the various health professionals, in this case, the physician and the physiotherapist [6, 7]. It might also be that the patients that stayed longer had more severe symptoms of stroke [26] that required more physiotherapy services.

Our study found no difference in the LOS between patients with right side affectation and those with the left side affected but found a difference in LOS between stroke types. Similar to our findings, a study by Somotun et al. [3] showed that patients with ischemic strokes have a slightly higher LOS than those with hemorrhagic stroke. However, contrary to their results, we found that patients with unspecified stroke types had a longer LOS than those with ischemic or hemorrhagic strokes. This finding may be attributed to a longer time spent scheduling and making payments for required investigations, carrying out case reviews, and sending intra- and interdisciplinary referrals to make accurate diagnoses and deliver best management practices to this category of patients.

The utilization of physiotherapy was low regarding the average number of sessions received by individual patients (an average of five physiotherapy sessions throughout inpatient admission). An average of 7 days was recorded before physiotherapy was commenced for patients who utilized physiotherapy. Also, more than a quarter of the patients referred for physiotherapy did not utilize the services. These may be attributed to the fact that referrals for physiotherapy come at a cost, and considering the poor financial situations of many patients in a developing country, the patients referred might not have been able to afford the fees for physiotherapy

services after paying several other hospitalization bills, especially as many patients do not have any health insurance. Only about 5% of Nigerians are registered in the National Health Insurance Scheme (NHIS) [27]. Furthermore, we found a weak positive correlation between the LOS and utilization of physiotherapy in this study. These findings could have contributed to the longer LOS observed for patients in our study. Murie-Fernandez et al. [28] reported that prompt commencement of physiotherapy combined with a focus on the right intensity and required duration led to better functional outcomes with reduced length of stay and mortality rates. Also, in terms of utilization, a systematic review [29] has shown that extra physiotherapy can reduce the length of stay for adults with acute and sub-acute conditions, including stroke.

The complications documented for the stroke patients in this study are commonly described in the literature [30]. However, these did not include other common ones, such as falls [31]. This may suggest that not all complications were documented. Insufficient documentation of stroke complications might have contributed to the longer LOS. However, it could also be that these patients were not ambulating or moving out of bed, or did so under thorough supervision by health professionals. The presence of complications in stroke patients in this study is low compared to previously reported percentages in the acute phase of stroke [32]. Indredavik et al. listed pain and other complications such as urinary tract infection and pneumonia on stroke admissions as medical complications [32]. These complications were not found in the medical records included in our study, implying that these complications were not encountered or reported. In our study, patients with complications stayed longer in the hospital than patients without complications, although we found a weak correlation between LOS and the number of complications. Yet, complications have generally been found to prolong the discharge of patients from health facilities since more time is dedicated to treating and monitoring the patient during conservative management [33, 34].

This study had limitations, especially the difficulty experienced in obtaining specific information from patients' case notes due to the available documentation. Also, the LOS was not categorized into separate intervals. Significantly, the unavailability of the specific diagnosis for some patients was why some information such as type of stroke was not recorded for all patients. Hence, some types of stroke had to be assigned to the category of "unspecified". Also, the general use of "hemorrhagic stroke" is contained in the patients' case files. We suggest that future studies that utilize regression analysis may be useful to determine the predictors of shorter LOS among

stroke patients. Similarly, studies that examine the relationship between specific clinical diagnosis of stroke and length of stay can be carried out to improve understanding between these variables.

Conclusions

This study found that the longer the time of referral, the more prolonged the length of stay, and stroke patients who utilized physiotherapy services stayed longer in the hospital than patients who did not. Even though there was a high rate of patients' referrals for physiotherapy, utilization was suboptimal in terms of the number of sessions received by the patients. Thus, some lapses in stroke care in a developing country were identified, including delay in referral and commencement of physiotherapy that may have devastating consequences such as prolonged LOS for patients with stroke. From the results of this study, we recommend the practice of efficient referral and commencement of physiotherapy with adequate utilization of physiotherapy in hospitals and stroke facilities in Nigeria. These affect the LOS and are necessary for improving the overall efficiency of stroke care delivery.

Abbreviations

LOS: Length of stay; OAUTHC: Obafemi Awolowo University Teaching Hospitals Complex; ANOVA: Analysis of variance; NHIS: National Health Insurance Scheme.

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Authors' contributions

JAA conceived the idea of this research. JAA carried out the data collection. JAA and AOO jointly carried out the data analysis, result interpretation, discussion, and manuscript preparation. The final version of the manuscript was read and approved by both authors.

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Availability of data and materials

The datasets generated and/or analyzed during the current study are not publicly available due to confidentiality of patients' records but are available from the corresponding author on reasonable request.

Declarations

Ethics approval and consent to participate

Ethical approval was obtained from the Ethics and Research Committee of the OAUTHC. Permission was obtained from the Deputy Director of the Department of Information and Health Management OAUTHC, to access the required medical files. Relevant information was recorded using assigned numbers to protect the identity of patients included in the study.

Consent for publication

Not applicable

Competing interests

The authors declare that they have no competing interests.

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