Stroke Patients' Status Post-Acute Phase of Illness. How Is It and How Ought It to Be: Ain Shams University Experience

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Background: Stroke is a leading cause of disability worldwide with a great impact on quality of life. Ain Shams University Hospital is a tertiary center for neurology and a pioneer in offering comprehensive stroke service in the region. *Methods:* A cross sectional study in which an 8 domains questionnaire was applied to all cerebrovascular stroke patients who were admitted to the stroke unit of the neurology department of Ain Shams University Hospital in the period from January 2016 till May 2017, with the aim to define pitfalls in post discharge. *Results:* From our study show that 20% of all patients discharged from acute stroke unit did not have further follow up with any stroke doctor. Moreover, 60% of patients were not seen by a physiotherapist after discharge, including almost half of patients with moderate or severe disability on discharge who are expected to have ongoing care needs. Patients who developed stroke complications were more likely to seek follow up. As expected, continuous follow up was associated with increased adherence to secondary preventive medications. *Conclusions:* Patient needs should be assessed before patient discharge and patient and care givers should have clear written information on required follow up with stroke doctors, and arrangements made for receiving adequate rehabilitation post discharge.

Key Words: Stroke—follow up—rehabilitation—physiotherapy—secondary prevention—stroke awareness

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Introduction

Stroke is a leading cause of disability worldwide with great impact on major aspects of health and quality of life, as memory, speech, restriction in participation of life activities and work productivity.[1] Stroke is the second cause of death in Egypt, after ischemic heart disease with a high prevalence of 963/100000 populations.[2] Treatment for acute ischemic stroke includes systemic thrombolysis with recombinant tissue Plasminogen Activator and/or endovascular thrombectomy with second-generation devices.[3]

Our university hospital is a tertiary center for neurology and a pioneer in offering comprehensive stroke services in the region. In a previous project the obstacles to the utilization of reperfusion therapy and assessing the impact of implementing specific measures to improve timely treatment delivery were assessed. Corrective actions took place in the form of making alteplase Tissue plasminogen activator available through lobbying the government to sponsor it and implementing a training program for hospital staff. This resulted in an almost 5 fold increase in the percentage of patients with ischemic stroke receiving revascularization therapy.[4]

As a next step, we take a more comprehensive approach, assessing stroke care in the subacute and post hospital admission phases.

In this study we followed up patients after their discharge form acute stroke unit, aiming to define pitfalls in post discharge follow up, and to come up with a management plan to improve outcomes.

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Aim of the Work

To assess stroke care in the subacute and post hospital admission phase.

Methodology

This cross-sectional study included all cerebrovascular stroke patients who were admitted to the stroke unit of the neurology department of Ain Shams University Hospital in the period from January 2016 till May 2017. The study was approved by the faculty of medicine ethical committee of Ain Shams University.

Stroke unit database was checked and cases with a sudden onset of focal neurological deficit in keeping of a clinical diagnosis of acute stroke and magnetic resonance imaging confirming vascular origin were eligible for participating into the study.

A questionnaire was designed to capture required information about patient progress and follow up beyond the acute inpatient phase. A first draft was written that was revised and pretested and a final step of editing and procedure specification was done, to assure all interviewers followed the same call scenario.[5]

The questionnaire was preceded by an interviewer introduction revising with the recipient of the call the patient's name that was already known from the database of the stroke unit, giving a reason for the call including the aim and topic of the research and its supposed benefit, informing the recipient about the confidentiality of the collected answers and asking for verbal consent to participate.

The questionnaire is composed of 8 main questions with additional sub questions based on the recipient's answers. Questions design was either a closed ended dichotomous with 2 options answers in the form of yes/no or open ended regarding duration of specific condition. Data collected included Modified Rankin Scale at time of call, patient occupation state, follow up with stroke neurology specialist, physiotherapist, speech language pathologist, questions regarding compliance on medications were followed, post discharge stroke complications, and readmissions.

All data were collected, and tabulated, statistical analysis was then performed using SPSS version 22. Descriptive data included frequencies for categorical variables, means and standard deviations and medians and IQR for continuous variables. Comparisons were performed using Chi square test for categorical values and ANOVA or Mann Whitney test for continuous variables as appropriate. A P value of less than .05 was considered statistically significant.

Results

Three hundred and fifty patients (64% male, mean age 59.8 ± 12.5) met the inclusion criteria and follow up data was available for 236 (67%) (Fig 1). The median National Institutes of Health Stroke Scale (NIHSS) on admission was 9 (IQR 5, 13). Eighty-seven patients (29% of patients with Ischemic stroke) received IV recombinant tissue Plasminogen Activator. Twenty seven percent (64 of 236) died before the follow up phone call, with the majority of patient mortality occurring in the first 3 months after the acute stroke. Baseline clinical data did not differ significantly between patients who completed the study and those who were lost to follow up. Mortality was associated with older age, more severe stroke and less improvement in NIHSS during hospital stay (Table 1).

The majority of patients (139 of 172, 81%) had at least 1 follow up with stroke doctor after discharge while follow up rates with physiotherapists and speech and language specialists was significantly lower (36% and 19% respectively) (Fig 2). Follow up with physiotherapy was significantly associated with stroke severity on discharge (P = .001, Fig 3)

Table 2 shows the clinical outcome and complication rates in the study population. The majority of patients (116 of 171, 67%) had a good clinical outcome, defined as Modified Rankin Scale of 2 or less at the time of follow up. Recurrent stroke was reported in 7% of patients (12 of 172), and 22 patients (13%) were readmitted to hospital

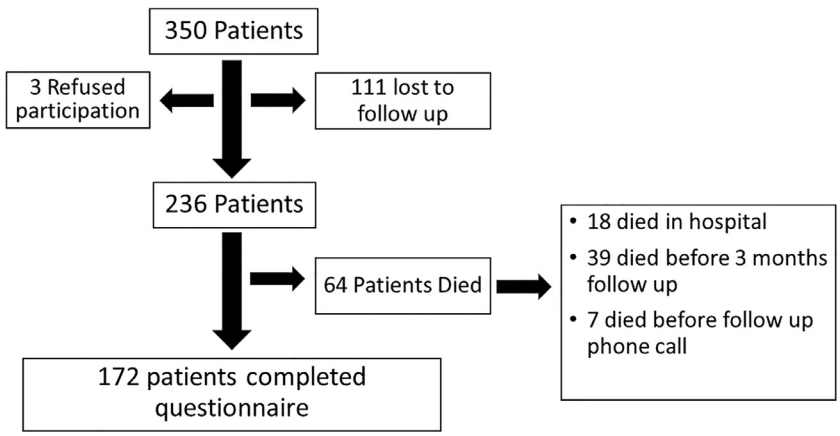

Figure 1. *Patients included in the study.*

Table 1. *Baseline clinical features in patients included in the study*

Variable		Alive = 172	Dead = 64	*P*
Age (mean, SD)		57.4±12.7	66.2 (±9.9)	.001
Sex	Male (%)	111 (65%)	37 (58)	.34
	Female (%)	61 (35)	27 (42)	
Risk factors	HTN (%)	123 (72)	42 (72)	.38
	DM (%)	69 (40)	28 (44)	.61
	Dyslipedemia (%)	55 (32)	17 (27)	.42
	IHD	23 (13)	12 (19)	.30
	AF	13 (8)	9 (14)	.13
Number of risk factors (mean±SD)		1.7 (±1)	1.5 (±1)	.12
Admission NIHSS (median, IQR)		8 (4-13)	12 (7-15)	.03
Stroke diagnosis	Ischemic stroke	147 (85)	56 (88)	.31
	ICH	14 (8)	5 (8)	
	Subarachnoid	11 (6)	2 (3)	
	TIA	0 (0)	1 (1)	
Received rtPA(%) (patients with ischemic stroke)		45 (31)	13 (23)	.30
Discharge NIHSS (median, IQR)		5 (1-10)	10.5 (4-14)	.001
Improvement in NIHSS between admission and discharge (mean, SD)		2.5±3	1.1 (±3)	.002

Abbreviations: AF, atrial fibrillations; DM, diabetes mellitus; HTN, hypertension; ICH, intracranial hemorrhage; IHD, ischemic heart disease; TIA, transient ischemic attack.

Data presented as number (percent), mean ± standard deviation or median (interquartile range).

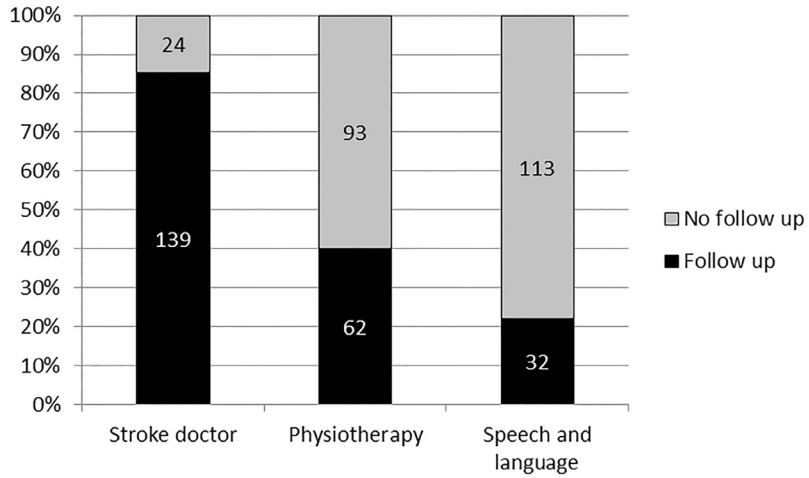

Figure 2. *Number of patients having at least 1 session of follow-up with stroke specialists, physiotherapists and speech and language specialists in the period between discharge and follow up phone call.*

for any cause. Of the 87 patient who were employed at the time of stroke, 40 (46%) returned to work. Almost one half of the patients (85 of 172, 49%) suffered from a complication related to stroke. More patients with stroke complications attended follow up (Fig 4). More patients attending follow up with stroke physicians were still taking secondary preventive medications at the time of follow up (Table 3)

Discussion

Stroke is a major cause of long-term disability, with stroke survivors suffering from both physical and mental disabilities, increased long term cardiovascular risk and overall reduction of quality of life.[6,7] Revascularization therapy gives the patient the best chance of surviving the acute stroke episode and reduce morbidity and mortality in both the short[8,9] and intermediate term.[10–12] However, meeting the continuous needs of stroke survivors requires a more comprehensive approach that extends beyond the acute in-patient phase, and involves input from multiple health care professionals as well as social workers and informal care givers.[13]

There is great variation in resources available for post stroke care in different parts of the world. The World Stroke Organization recommends that all patients with stroke should be seen by a member of the stroke team 6 weeks after discharge, and should have access to regular

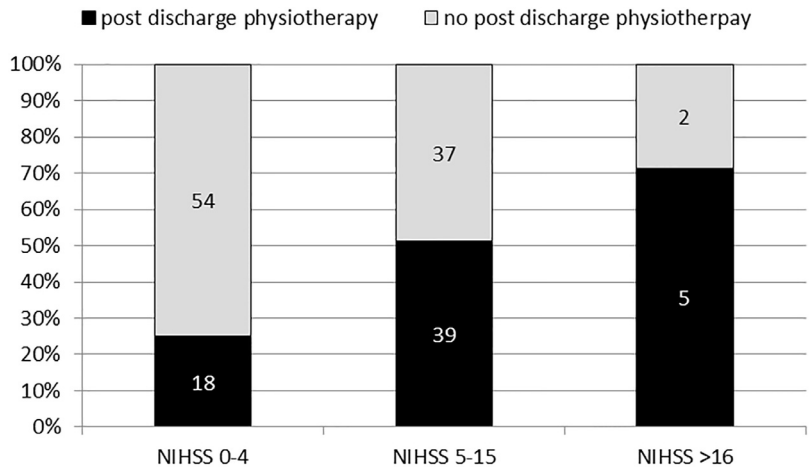

Figure 3. *Number and percentages of patients who received at least 1 follow-up session with physiotherapy for patients with different NIHSS scores on discharge. Only 25% of patients with NIHSS less than 4 had a follow up, compared to 71% of patients with NIHSS of 16 or more.*

Table 2. *Clinical outcome in patients included in the study*

Outcome		Ischemic stroke n = 147 (%)	Intra-cranial haemorrhage n = 14 (%)	Subarachnoid haemorrhage N = 11(%)	*P*
mRS	0-2	97 (66%)	9 (64)	10 (91)	.24
	3-5	49 (34%)	5 (36)	1 (9)	
Recurrent stroke		9 (6)	1 (7)	2 (18)	.53
Readmission		19 (13)	2 (14)	1 (9)	.91
Returned to work		34/77 (44)	1/4 (25)	5/6 (83)	.12
Stroke complications					
• Post stroke seizures		24 (16)	6 (25)	0 (0)	.001
• Post stroke pain		46 (27)	4 (29)	2 (18)	.28
• Post stroke depressive symptoms		40 (27)	2 (14)	1 (9)	.51
• Any complications		76 (48%)	7 (50)	2 (18)	.10

Abbreviation: mRS, = modified Rankin scale.

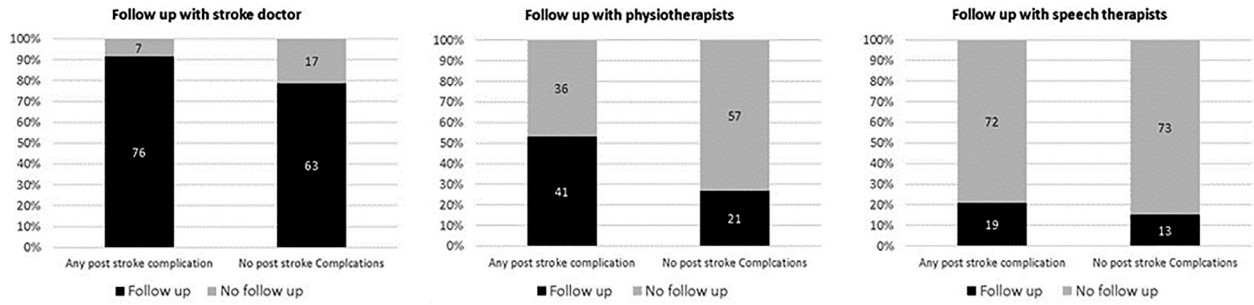

Figure 4. *Follow up with different health care professionals in patients who suffered or did not suffer from stroke complications. Follow up rates were higher in patients who suffered from stroke complications. The difference was significant for follow up with stroke physicians (P = .02) and physiotherapists (P = .001), but not speech therapists (P = .21).*

Table 3. *Number of patients taking different medications at the time of follow up*

Medication		Follow-up with stroke specialist	No follow-up with stroke physician	*P*
Statins	Yes	38 (90 %)	4 (10%)	.59
	No	54 (83 %)	11 (17%)	
	Unknown	25 (86%)	4 (14%)	
Antiplatelet or anticoagulant	Yes	86 (89%)	11 (11%)	.01
	No	9 (60%)	6 (40%)	
	Unknown	24 (92%)	2 (8%)	

monitoring to assess recovery, address rehabilitation needs, and monitor adequate secondary prevention measures.[14,15]

Results from our study show that 20% of all patients discharged from acute stroke unit did not have further follow up with any stroke doctor. Moreover, 60% of patients were not seen by a physiotherapist after discharge, including almost half of patients with moderate or severe disability on discharge who are expected to have ongoing care needs. Patients who developed stroke complications were more likely to seek follow up. As expected, continuous follow up was associated with increased adherence to secondary preventive medications.

Different factors could contribute to the inadequate follow up of patients, including reduced access to specialists, financial constraints, inadequate information provided to patients and care givers on discharge. Number of patients following up with a stroke specialist was higher than those who followed up with physiotherapist or a speech specialist. This might reflect that awareness about the importance of continuous rehabilitation is not properly raised, in addition to the cost of rehabilitation sessions, and the burden of patient transfer.

Our institute is publicly funded, and offer medical and physiotherapy follow up sessions at a fraction of the full fee. Hospital based social workers can support patient request to waiver all hospital fees, but have no jurisdiction to support patients at their place of residence. Moreover, there is no funding to support patient transport to and from hospital. Gaps in patient education is another major problem. A previous study in our University hospital and Cairo University hospital highlighted an extreme lack of awareness of stroke in hospital workers.[16]

Similar difficulties were reported in other parts of the world. Our findings are in keeping with a study in southeast France, that found that 53.2% of patients visited a neurologist as recommended, and only 6.3% saw a rehabilitation specialist although 34.2% of the patients had a noteworthy impairment from their stroke.[17] Kushwaha et al in India defined the main barriers for the optimal stroke service, where the main defect in the post discharge service was lack of specific educational programs in developed countries, and lack of training and education of care givers.[18]

An integral part of the post discharge status is compliance on medications. In our study 90% of stroke patients who followed up with a neurologist were compliant on antiplatelet or anticoagulation compared to 64% of those not following up. Estimated adherence to medications in studies is about 50%, this is multifactorial and includes deficient instruction for the patient about the longevity of the medications and its importance in secondary prevention.[19] In a study in the University Hospital RWTHA achen (UKA) 139 it was found that 36 of 115 patients did not understand what kind of stroke therapy they received.[20]

This study has some limitations. About one third of patients were lost to follow up, and this could introduce bias. Data collections, was based on phone interviews, with a delay of 6 to 18 months from the initial stroke. It is possible that that patients and care givers did not remember early follow up visits. We are unable to independently ascertain events such as hospital readmission or other stroke complications. We have not explored patient and care giver understanding of available and needed services, or their reasons for not seeing stroke specialists or not taking their medications.

Despite these limitations, this study highlights the deficiencies in patient follow up after discharge from acute stroke unit. Patient needs should be assessed before patient discharge and patient and care givers should have clear written information on required follow up with stroke doctors, and arrangements made for receiving adequate rehabilitation post discharge, in addition to phone call after 3 months for the patients to follow up their status, and ascertain the importance of the follow up visits.

Conflict of Interest

The authors declare that there is no conflict of interest.

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