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Original Article

Clinical Profile of the Stroke Recovering Patients in the Acute Rehabilitation Setting in Peshawar

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ABSTRACT

All stroke patients across the stroke spectrum frequently experience functional deficits of varying degrees. Despite the idea of post-stroke functional advancement, there is a lack of information regarding post-acute stroke recovery. **Objective:** To track the progress of acute stroke patients admitted to acute stroke rehabilitation centers in terms of functional recovery. **Methods:** A cohort study was designed and extracted the data of ninety-five (N=95) acute stroke patients admitted to the center for the acute rehabilitation program (ARP). Ninety-five (N=95) post-stroke patients with the mRS 3-4 (Modified ranking scale) admitted to the centers were enrolled for this retrospective cohort study. All enrolled patients for the study went through functional, neurophysiological and quality of life assessment/evaluation was taken at the time of admission to the center and before the discharge from the center. The score at the discharge were the functional outcomes and were used to compare them with the score taken at the time of admission (baseline score). **Results:** The results of the retrospective cohort showed that the average length of stay was 56.40 days. After the intervention of the intensive ARP significant improvement were observed in all test score. The removal rate for foley catheter (p=0.003), Nasogastric tubes (p=0.00) was found for all patients at the time of discharge. **Conclusions:** The study's findings demonstrated that ARP can help acute stroke patients who have functional deficits improve their functional status. To find more efficient forms of intervention in the acute-stroke rehabilitation, this study advises future research.

INTRODUCTION

The age-standardized year of life lost (YLL) from 1990 to 2021 increased by 12.9% (10.6 to 15.2), and from 2007 to 2017 by 12.1%. Stroke is the third-leading cause of mortality globally. The incidence of stroke, on the other hand, climbed from 5.29 million to 6.17 million between 2007 and 2017 and from 6.4-6.33 million between 2007 and 2021, raising DALYs (disability adjusted life years) as a result of multiple morbidities and the impact of longevity from 3.54 to 9.66**.** As reported [1-5]. Stroke incidence was found to have decreased by 42% in high-income countries (HIC), but it increased by 100% in middle-income countries (LMIC) over the previous 3-4 years decades [3]. According to statistics on stroke, there are 62 million stroke survivors, and one-third of them have significant persistent disability [4]. Around 80% of DALYs occur in LMIC [6-9]. Despite recent medical advances in stroke care (such as endovascular interventions), stroke continues to be the largest cause of adult disability worldwide 7. Disability brought on by stroke is a significant health burden [8, 9]. Worldwide, a range of rehabilitation strategies are utilized, and the quality and contents of stroke rehabilitation therapy largely depend on the human and financial

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resources in that country [10-12]. Medicare pays for stroke post-acute treatment, which is often offered in inpatient rehabilitation centers or at the patient's home. USA [12]. Medicare expenditure on stroke is 15% of all other health-related expenditure [13-15]. The outcome measures and the effectiveness of stroke rehabilitation programs has been surveyed through different registries such as; EROS (European register of stroke) and CERISE (Collaborative evolution of rehabilitation in stroke across Europe), however, greater variations exist among the countries in the union in their stroke –specific rehabilitation programs [14, 15]. In Asian Countries including Pakistan post-stroke rehabilitation is carried out in inpatient rehabilitation facilities for the period of 4-6 months after the patient discharge from the acute hospital. Optimal functional recovery are the goals of these centers for the stroke patients but due to the unstructured rehab program, greater variations are usually found by studies [15-18]. Studies have reported that in some countries like Taiwan has developed a very comprehensive stroke rehabilitation programs called post-acute care cerebrovascular disease, or PAC-CD, and has created specific guidelines for the stroke patients to be included in this program [19-21]. For instance, within 30 days of having a stroke, patients with mRs of 3–4 are qualified to join in the programs. PAC is a highly intensive and thorough program that lasts for 12 weeks and consists of physical therapy, occupational therapy, and speech therapy sessions. However, in Pakistan guidelines of this nature and purpose are not formulated yet due the lack of active regulatory bodies in the rehabilitation domains, which leads into greater extent of variations in the rehabilitation programs for the stroke's survivors across the country [21-24]. For the patient's independence and the ability to perform patient's specific ADLs in more effective ways optimal functional recovery is essential for stroke patient. Studies have reported that stroke patients admitted the multidisciplinary stroke rehabilitation centers have comparatively less disability, lower mortality and improved functional outcomes, though we don't have sufficient information about the recovery pattern in these patients such as; the quality of life, the recovery pattern and ADLs may improve the effectiveness of the neurorehabilitation of post-stroke patients [20]. In this retrospective cohort study (observational study) conducted in Rafsan rehabilitation center, which is ARP rehabilitation center in Peshawar data of the 95 stroke patients were extracted and subsequently analyzed and observed the patient's functional recovery profile.

METHODS

Rafsan rehabilitation center in Peshawar is an ARP center adequately equipped with rehab modalities and clinical skills needed for the stroke patient rehabilitation of multidisciplinary nature such as; physical therapy, occupational therapy and speech therapy along with the provision of basic medical care. Patients enrolled for this study were transferred from tertiary public and private hospitals from across the province for the post-stroke acute rehabilitation within the 30 days of the cerebrovascular accident (CVA). Consent from the study's participants were taken and briefed about the purpose and aim of the study. All patients enrolled or admitted to the facility for acute post-stroke rehabilitation between April 2019 and December 2021 (30 months) had to meet the following inclusion criteria: a) According to ICD-classification, study participants had to be stroke patients for the first time. B) Patients should have been transferred within one month of the stroke's start; c) their baseline function score on the mRS must be between 3 and 4; and d) patients with recurrent strokes as indicated by the ICD-10 classification were excluded. B) They were transferred to the center more than 30 days after their stroke began, and c) Their mRS baseline function score was roughly 3–4. D) stroke patients without or with incomplete medical records at the time the study was being conducted at the center. The outcome criteria for the functional recovery of stroke patients were assessed at the time of admission to the center, as well as at 3, 6, 9, and 12 weeks later or when the patients were discharged. The Lawtone Brody Instrumental Activity Daily Living scale (LB-IADL), Functional Oral Intake Scale (FOIS), Mini Mental State Examination (MMSE), Berg Balance Scale (BBS), EQ-5D-3L (Euro Qol Dimensions Questionnaire 3-level), and Concise Aphasia Test were the outcome variables used in the rehabilitation and utilized in this study for the investigation of the stroke patient's personal profile (CAT). The outcomes employed were used for the conduct of this retrospective study were: a) based on the two evaluations conducted back-to-back if no functional gain was seen among the patients recruited; and b) the length of stay was 12 weeks at the rehabilitation center in Rafsan, Peshawar. The baseline and demographic data for the participants in the study are presented in Table 1 as standard deviation, averages, and percentages. Chi's square test was used to evaluate the stroke level on the EQ-5D-3L between admission and discharge, and Student's T-test was used to compare the fundamental features and outcomes scores of these patients between admission and discharge. Using SPSS version 22.0 and a significant level of p.005, the data were assessed.

RESULTS

The age, kind of stroke, usage of a Nasogastric tube and Foley catheter, and table 1 and table 2 reveal the length of hospitalization for stroke patients, among other escriptive data of the enrolled stroke patients; Thirty-one patients

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(N=131) were recruited for the study, of whom ninety (N=95; 41 males; 54 female) were selected based on the inclusion criteria; forty (36) stroke patients were excluded because they did not meet the inclusion criteria for the study.

Table 1: Descriptive statistic of the stroke 's patients recruited for the study

Variables		N (%), N=95/ (Mean ± SD)
Gender	Male	41(43)
	Female	54(57)
Age (years) (mean± SD*)		67.02±14
Length of stay at the center		56.40 ±10
Days after stroke		15.30 ± 8.1
Stroke type	Ischemic	76(80)
	Hemorrhagic	20
Nasogastric tube used at the admission		11 (10-12)
Foley catheter used at the admission		23 (22-24)

*SD= Standard Deviation

The table 2 summarizes and analyzes the descriptive data of the enrolled stroke patients, including age, type of stroke, usage of a Nasogastric tube and Foley catheter, and length of stay at the rehabilitation facility.

Table 2: Effectiveness of PAC on the functional performance in QoL in patients with stroke (N=95, p<0.005)

Variables	Score at admission	Score at discharge	p-value
mRS*	3.9±0.40	2.95±0.90	0.000
CAT*	9.5±2.8	10.50±2.50	0.000
BI*	3.9±0.40	68.17±22.10	0.000
LB-IADL*	1.35±1.37	2.71±1.82	0.000
FOIS*	5.1±2.25	6.65±0.95	0.000
MMSE*	3.9±0.40	22.93±7.73	0.000
BBS*	20.35±18.44	37.95±18.4	0.000
Nasogastric tube used at the admission; N (%)	10 (10-11)	7(8)	0.000
Foley catheter used at the admission; N (%)	21 (22-23)	1(1)	0.000

CAT is for the Concise Aphasia Test. mRS stands for the Modified Ranking Scale. Scale of instrumental daily activities, Functional Oral Intake Scale, Mini Mental State Examination, and Berg Balance Scale, Analysis of the variations in the numbers and ratios of EQ-5D3L scores at the time of admission and discharge from the center revealed a considerable improvement on the generic health status measuring dimension (Table 3).

Table 3: Effectiveness of PAC on the EQ-5D3L score at the time of admission and discharge in stroke patients

Score at the time of admission				
EQ-5D3L dimensions	**Mean± SD**	**L1**	**L2**	**L3**
mobility	2.13 ±.4	2	78	14
Self-care	2.17 ±.41	0	76	15
Usual activities	2.18 ±.40	0	78	15
Pain	1.68 ±.45	49	45	0
Anxiety/stress	1.63 ±.52	32	61	2
Score at the time of discharge				
mobility	1.17 ±.4	26	68	1
Self-care	1.77 ±.41	15	69	1
Usual activities	1.78 ±.34	14	80	1
Pain	1.28 ±.42	75	22	0
Anxiety/stress	1.35 ±.51	60	35	0

DISCUSSION

This retrospective cohort –observational study provides substantial evidence that post-stroke patient s significantly improves their functional score measured on the specified outcome measure in the rehabilitation center. There is difference and variations among countries regarding the components and relevant features of the rehab program for the post-stroke patients which as result impacts the effectiveness and functional outcome of the rehab programs designed for these patients worldwide. The clinical outcomes analyzed were based on the data collected from the study's participants through specified and standardized outcomes measures. Functional disability or the ability of the stroke patient to perform ADLs is evaluated by the ADL functions [22]. The mRS22 is another outcome scale that is frequently used to assess stroke outcomes. From baseline, 62% of stroke patients had at least one grade improvement on the mRS, according to a few other studies [25-28]. This study's functional improvement in the mRS from 3.9 ± 0.40 at admission to 2.96 0.91 at discharge was in line with the findings of those previous research. BI, which was primarily developed for the geriatric population but is utilized globally in the functional assessment/evaluation of the stroke patients [24], is another outcome measure that is frequently used to track the functional evolution of stroke patients. According to a study, a 20-point criterion at the baseline would significantly enhance the functional status of stoke patients [25]. BI score <40 functionally dependent, 40-60 BI score state of assisted dependence and BI score of 85 represent functional independence or minor assistance with ADLs [26]. According to studies, managing post-stroke patients with functional impairments comes at a very high cost, and the BI was suggested to be a strong predictor for the post-stroke patients' cost [27]. The BI score in this study is consistent with the finding of Alam *et al.*, in which they found more than 20-point improvement in the BI score from baseline 34.95 to score at discharge 69.16 on the BI, similarly study found more that 20-point improvement on the BI score from the baseline score 34.95 to discharge score 69.16 [17]. This more than 20-point improvement was not only substantial, it also demonstrated that the PAC rehabilitation programs helped stroke patients with functional impairments shift their ADLs from total dependency to aided independence. Early functional recovery for stroke patients is facilitated by

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rehabilitation for balance issues. This finding also suggested that, following the involvement of PAC therapy, the expenditures of these patients' future medical treatment would be categorically decreased [17-19]. Fall is the consequence of post-stroke limbs weakness [8] and thus, made them potential fallers. Factors identified to be responsible for the stroke' patients fall includes; a) age b) foot dragging(its frequency etc.) c) abnormal postural sway d) uneven standing sway e) reduction in the power generation ability of the stroke patient while standing [9]. All these factors lead to imbalance which leads to fall [3]. Prust *et al.,* has reported that lack of static balance is the leading cause of fall in the stroke patients. Balance in the post-stroke patient is evaluated by the BBS worldwide. BBS were used initially for the balance evaluation in the elder population but some studies later on suggested that BBS can be used for the fall risk evaluation in the stroke patients [1, 6]. BBS score <20 suggests balance impairment, BBS score 21-40 suggest "acceptable balance' and the BBS score 40 > suggests stable or good balance. This study's analysis of the BBS score revealed values of 20. 3518.44 at the time of admission and 37.9518.4 at the time of center discharge, with a p-value of 0.000. These results are comparable with those of earlier studies that monitored changes in the BBS scale over time in stroke patients. With functional impairments [3, 4]. Dysphagia or the difficulty in swallowing is one of the common symptoms among the stroke patients but it has been reported that its incidence varies considerably [8]. Usually for the management of the stroke patients' Nasogastric tube is used to prevent mal-nutrition, dehydrations and pneumonia among the stroke patients, however, its tolerability is low among the stroke patients and it is dislodged easily and frequently [3, 8, 9]. In this study at the time of admission only 10 patients needed Nasogastric tube while at the discharge the number of stroke patients needs Nasogastric tube were 7 due to stroke-induced dysphagia. Another has reported that stroke patient with the impairment of dysphagia had usually a lower chance to be discharged at home [4]. More research is needed because the studies that have been done to evaluate urinary catheters in post-stroke patients are insufficient and unconvincing. It was found that 175 out of 432 patients had their urinary catheter removed, with a failure rate of 26%, among acute stroke patients. These studies7 determined that hemorrhagic stroke and decreased levels of physical function were the main contributing reasons to catheter failure in these patients. c) The length of a stroke patient's hospital stays. In this study, just one patient still requires a urinary catheter upon discharge, although 21 patients did at the time of admission. Thus, 90% of the stroke patients in this study had their urinary catheter successfully removed. The quality of life and way of life of stroke victims, as well as their families and caregivers, are reportedly impacted by stroke. The EQ-5D-3L is a frequently employed outcome measurement tool for the assessment of stroke patients' health status and reported problems in the following health-related dimensions: functional mobility, self-care or personal hygiene, ADLs, pain and discomfort, and anxiety/depression. The following ratings apply to each component of health: 1) No problems 2) A slight to moderate issue 3) an important issue (serious) 5. While the majority of stroke patients in this study displayed less than moderate problems in the mobility, self-care, and ADLs sections of the EQ-5D-3L tool at the time of admission to the center (L2 and L3), some patients displayed extreme level problems at the time of admission to the center (L2 and L3). Descriptive information based on the EQ-5D-3L is included in Table 3. Advancements in the BI and mRS scales were concurrent with and commensurate with advancements in the EQ-5D-3L scale. A significant change from level 3 to 2 and 1 was observed in the subcategories of pain/discomfort and anxiety/depression with the p=0.00. The EQ-5D-3L tool's mobility, self-care, and ADL sections show that the patients' case numbers in L3 and L1 changed significantly from their admission to discharge. Another found that a higher EQ-5D-3L score at the time of center discharge is a good predictor of staying at home following release. The finding of this study implies an increased rate of returning home rate after the intervention of the PAC plan in the center which is consistent with the findings [21-23].

CONCLUSIONS

The PAC rehabilitation unit was particularly beneficial for acute stroke patients who were experiencing their first episode and had functional deficits in terms of not only improving ADL function but also quality of life and balance functions, according to the study's result. The results of the study showed that ARP is effective in enhancing functional outcomes for acute stroke patients who have functional deficits. This study suggests that more investigation is required to identify more effective interventional techniques for acute stroke rehabilitation.

Authors Contribution

Conceptualization: MK
Methodology: MK, AJ, SF
Formal Analysis: ZK, MA
Writing-review and editing: MK, AA, SK, MA, RAA

All authors have read and agreed to the published version of the manuscript.

Conflicts of Interest

The authors declare no conflict of interest.

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