

USING MANAGEMENT INFORMATION SYSTEM TO EVALUATE QUALITY OF CARE AT TERTIARY CARE HOSPITAL'S STROKE CENTRE

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ABSTRACT

Objectives: To find out the average length of stay, the rate of I/V catheter cellulites, the rate of bed sores among patients in stroke centre and determine the mortality rates. **Methodology:** This is a descriptive study, carried out at a tertiary care hospital over the period of six months. Data was analyzed by SPSS version 15.0. **Result:** Total numbers of patients were 36 from January 1 to June 30, 2007 at Stroke Center Liaquat National Hospital. The mean length of stay was 8.17 ± 5.81 days. Patients had cellulitis (intravenous) 97.2%, only 2.8% of patients did not develop. The rate of bed sore was 41.7%. **Conclusion:** By effective implementation of the Management Information System (MIS) in health care delivery system we can find patients clinical issues and can reduce their length of stay.

KEY WORDS: Stroke, Management Information System (MIS), Length of Stay

INTRODUCTION

Stroke is the leading cause of sustained neurological disability in middle and low income countries¹. Stroke is also a leading cause of functional impairments, with 20% of survivors requiring institutional care after 3 months and 15% to 30% being permanently disabled.² It is estimated that 16 million first-ever strokes and 5.7 million stroke deaths occurred in 2005. In the absence of population wide interventions, these numbers are expected to rise to 18 million first-ever strokes and 6.5 million deaths in 2015, and to 23 million first-ever strokes and 7.8 million deaths by 2030.^{3,4} the total years of healthy life lost due to stroke are greater in those aged 0-59 years than for age 60-69 years and beyond.⁵ As countries like Pakistan make rapid economic progress, stroke has become a major non-communicable disease. There are widespread misconceptions that stroke is a disease of elderly who will die anyway and that it is largely unpreventable. These beliefs have devastating economic and social consequences for individuals, their families and the societies they live in. although the population of Pakistan is half that of the US, an estimated 4.8% may have suffered from stroke; this translates to 7.2 million individuals, compared to 4 million in the United States.⁶ it is imperative to find practical interventions for this global epidemic. In 2000 the Brain Attack Coalition (BAC) discussed the concept of stroke centers and proposed 2 types of centers: primary and comprehensive. A primary stroke centre (PSC) has the necessary staffing, infrastructure and program to stabilize and treat most acute stroke patients.⁷ PSCs provide stroke patients with high quality care such patient often require advanced diagnostic and treatment procedures directly by specially trained physicians and other health care professionals.⁸ As there is no organized management information system to evaluate quality of care in Pakistan there is no data on the quality of care about the stroke patients their risk factors, therefore this study has been designed. We at the Stroke Centre of Liaquat National Hospital plan to formulate a questionnaire by doing measurement of the selective indicators, so that we could shorten the length of stay of the stroke patients. Shorter length of stay will mean savings for the patients. The four leading causes of death globally by 2030 are projected to be ischaemic heart disease, cerebrovascular disease (stroke), HIV/AIDS and chronic obstructive pulmonary disease.³

BACKGROUND

Stroke is defined as focal neurological impairment on sudden onset, and lasting more than 24 hours (or leading to death), and of resume vascular origin Cellulitis is defined as an acute inflammation of the connective tissue of the skin, caused by infection with staphylococcus, streptococcus, or other bacteria. It is most common on the face and lower legs, although skin on other areas of the body may sometimes be involved.

Bed Sore is define as the ulcers that occur on areas of the skin that is under pressure from lying in bed, sitting in wheel-

chairs, wearing a cast, or being immobile for a long period of time. **Problem One:** Stroke is the leading cause of sustained disability. In Pakistan an estimated 7 million may be suffering from stroke. The nation is not equipped to deal with his epidemic. **Problem Two:** Tests of stroke used elsewhere e.g. MRI are expensive and may not be cost effective or accessible to most of the population of Pakistan. **Problem Three:** There are no locally trained vascular physicians or capable technicians who have the capacity to manage stroke as a team. **Problem Four:** Current hospital physicians and general physicians lack basic preventive and relevant acute and post stroke care guidelines.

METHODS

It's the descriptive study of stroke patients admitted at Stroke Centre Liaquat National Hospital. The data of 36 patients was collected on a questionnaire of admitted patient at stroke centre from January 01 – June 30, 2007. Data was collected through Daily Assessment Form (DAF). Information was obtained and entered on the questionnaire on daily basis. The information focused on the number of staff present on daily basis in stroke centre shift wise. Admitted patients complications data recorded such as I/V catheter cellulitis and new bed sore on daily basis. Data was analyzed on the SPSS version 15.0. All patients that were clinically proven attacked of stroke admitted were included while all patients other than stroke admitted in the Stroke Centre of Liaquat National Hospital were excluded.

RESULT

Among the total numbers of 36 stroke patients the mean length of stay was 8.17 ± 5.81 days. The minimum stay was two days while the maximum 30 days. 97.2% patients had cellulitis (intravenous) and the rate of bed sores among the patient's was 41.7%. More female (47.2%) patients had bed sores as compared to male patients while more cellulitis was seen among male as compared to female patients, though this difference was not statistically significant. The mortality rate was 2.77%.

DISCUSSION

The relation between the risk of infection and length of bed confinement is not unexpected. The length of bed confinement was directly related to the degree of neurological impairment in those patients who survived. Furthermore, we found that, although prolonged bed confinement promoted infection, the presence of infection did not correlate with prolongation of bed rest. All but 1 of 14 patients confined to bed in a routine hospital bed for > 2 weeks developed a bacterial infection. In our study the incident of bedsore 41.7% which was very high as compare to the other study conducted in different part of the world .There was retrospective chart review study conducted to determine the average length of stay, the rate of cellulitis and bedsore among stroke patient admitted in the stroke centre during span of 6 months. The mean prevalence rate of 12% was comparable, and the incidence rate of 6%⁹ Pressure ulcers (PU), one example of an alteration in skin integrity, remain a prominent healthcare concern in all patient care settings. Incidence refers to the number of "new cases occurring over a given time period" (NPUAP, 1989, p. 26). Adult patients (n = 190) in five patient care settings who were assessed to be free of PUs on admission were followed over a specified period of time to assess the incidence of pressure ulcer development for each setting. Subjects each had a skin assessment, along with a risk assessment utilizing the Braden Scale. A demographic data form was also completed on each subject. Pressure ulcers developed post-admission in 18 (9%) patients, 11 of whom were acute care patients and eight of whom were patients in skilled care. No patients developed pressure ulcers in the rehabilitation, home care, or hospice settings. Incidence for acute care was 15% and 28% in skilled care. Braden predictor scores were also recommended for each setting and factors associated with pressure ulcer development were discussed. Ulcer incidence rate of 13.4% (n = 20). Subjects who acquired pressure ulcers had lower hemoglobin levels (t = 2.17, p = 0.03), spent more time in bed (t = 3.90, p = 0.0001), and spent less time in a chair (t = 3.2, p = 0.002) than those who did not acquire pressure ulcers.¹⁰ Convincing evidence is available that effective acute management and adequate secondary prevention reduces morbidity and mortality after a stroke event had occurred.¹¹⁻¹⁵ In this context it has to be ensured that the evidence, mainly derived from clinical trials, influences routine clinical care on the community level. Thus, guidelines and consensus statements recommend the implementation of systems for systematically monitoring the quality of acute stroke care in the community.^{13, 16} In several countries initiatives to measure quality of stroke care had recently been started: for example, the recommendations for quantifying healthcare quality in cardiovascular disease and stroke,¹⁷ Stroke unit-specific certification procedures¹⁸ or the implementation of external audits to describe national standards of stroke care.¹⁹⁻²² The frequency of cellulites in our study was very high as compared to available record of other studies. The medical complications during inpatient rehabilitation among patients with stroke is difficult to determine, but estimates have been reported to range between 48%²⁵ and 96%,²³ depending on criteria for defining complications, method of investigation, and

specific patient group studied. The most common types of medical conditions that occur are urinary tract infections, venous thrombi, pneumonias, joint and soft tissue pain, sepsis, and falls.²⁴ Identifying clinical factors that are associated with increased risk of experiencing these complications is valuable to facilitate the implementation of appropriate prevention and management interventions. Risk factors for medical complications in stroke rehabilitation have not been well studied to date, but limited and somewhat contradictory evidence suggests that they include advancing age, severity of neurological deficits and disability caused by the stroke, and certain pre-existing medical conditions.²⁵ We can reduce the length of stay by the effective implementation of Management Information System (MIS). To reduce the incidence of cellulitis in the inpatients we need to measure the frequency of change of I/V cannula. We need to document total time i.e. from onset of stroke symptoms till the receiving of care at stroke centre. Appropriate documentation of the patients positioning compliance will help to prevent bedsores. MIS will be helpful in medical audit to find out the complications rate of hypo or hypertension, hypo or hyperglycemia or any other systemic/ metabolic failure. Implementation of the MIS system will be helpful in evaluation of the quality care.

RECOMMENDATIONS

By using the MIS, the recommendations to improve the stroke care will be:

Awareness among the community about the preventive measures of stroke. Training of ambulance drivers about the signs / symptoms stroke so they can handle by providing first aid to the stroke patient's before shifting them the tertiary care hospital. Appropriate training of the medical staff to deal with the stroke patient in the ER. All tertiary care hospitals must have the comprehensive MIS system to enter relevant data provided by the patients. It is essential to have training of the support staff regarding care of unconscious and stroke patients to prevent the complications such as bedsores and cellulitis. We should train specifically the stroke nurse to deal with the specific requirement of the stroke patient as far as the quality of care is concerned. Trained Human Resource Staff should be available for the patient at stroke centre. Should have well equipped stroke centre to cater the needs of the patients. A team comprising of neurologist, intensivist, physician, physiotherapist, occupational therapist, speech therapist, Neuropsychologist and trained stroke nursing staff should provide care to the stroke patient. There should be a National Stroke Registry recording the demographics to plan appropriate preventive programs and provide follow up services. There is a need of portable non-invasive and cheap vascular imaging paradigm that can help to diagnose stroke related pathology. Develop and launch a stroke training program incorporating the skills necessary to work in local setting and generate capacity of health workers.

APPENDIXES

Appendix – A

Length of Stay of the Patient Admitted in the Stroke Centre (Day)

N	Valid	36
Mean		8.17
Median		6.50
Mode		5
St d. Deviation		5.819
Minimum		2
Maximum		30

Appendix – B

The Percentage of Cellulitis Found in the Stroke Patient

	Frequency	Percent	Valid Percent	Cumulative Percent
Valid N	1	2.8	2.8	2.8
Y	35	97.2	97.2	100.0
Total	36	100.0	100.0	

Appendix – C

The Percentage of Bedsores Found in the Stroke Patient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	N	21	58.3	58.3	58.3
	Y	15	41.7	41.7	100.0
	Total	36	100.0	100.0	

Appendix – D

The Gender wise Percentage found in the Stroke Patient

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	F	17	47.2	47.2	47.2
	M	19	52.8	52.8	100.0
	Total	36	100.0	100.0	

Appendix – E

Cross Tabulation: Bedsore Gender wise Presentation among the Stroke Patient

		Bedsore		Total
		N	Y	N
Gender	F	9	8	17
	M	12	7	19
Total		21	15	36

Appendix – F

Cross Tabulation: Cellulitis Gender wise Presentation among the Stroke Patient

		Cellulitis		Total
		N	Y	N
Gender	F	1	16	17
	M	0	19	19
Total		1	35	36

Appendix- G

Histogram: Age wise distribution of stroke patient admitted from January 1, 2007 to June 30, 2007 at Stroke Centre Liaquat National Hospital



REFERENCES

1. Lopez AD MC, Ezzati M, Jamison DT, Murray CJL. Global and regional burden of disease and risk factors, 2001: systematic analysis of population health data. *Lancet* 2006;367:1747-57
2. American Heart Association. Heart Disease and Stroke Statistics—2004 Update. Dallas, Tex: American Heart Association; 2003.
3. Mathers CD, Loncar D. Projections of global mortality and burden of disease from 2002 to 2030. *PLoS Med* 2006,3:e442
4. Strong K MC, Bonita R. Preventing stroke: saving lives around the world. *Lancet neurology* 2007;6: 182-87.
5. Truelsen T, Heuschmann P, Bonita R, et al. Standard method for developing stroke registers in low-income and middle-income countries: experiences from a feasibility study of a stepwise approach to stroke surveillance (STEPS Stroke) *Lancet neurology* 2007;6:134-9.
6. Jafar TH. Blood pressure, diabetes and increased dietary salt associated with stroke results from a community-based study in Pakistan. *Journal of human hypertension* 2006;20:83-5.
7. Alberts MA, Hademenos G, Latchaw RE, Jagoda A, Marler JR, Mayberg MR, Starke RD, Todd HW, Viste KM, Girgus M, Shephard T, Emr M, Shwayder P, Walker MD, for the Brain Attack Coalition. Recommendation for the establishment of primary stroke centres. *J Am Med Assoc.* 2000;283: 3102-3109.
8. Alberts MJ, Latchaw RE, Selman WR, Shephard T, Hadley MN, Brass LM, et al. Recommendations for comprehensive stroke centers: a consensus statement from the Brain Attack Coalition. *Stroke* 2005; 36: 1597-616.
9. Schue RM, Langemo DK. Pressure ulcer prevalence and incidence and a modification of the Braden Scale for a rehabilitation unit. *J Wound Ostomy Continence Nurs.* 1998 ;25 :36-43.
10. Olson B, Langemo D, Burd C, Hanson D, Hunter S, Cathcart-Silberberg T. Pressure ulcer incidence in an acute care setting *J Wound Ostomy Continence Nurs.* 1996 ;23:15-22.
11. Sacco RL, Adams R, Albers G, Alberts MJ, Benavente O, Furie K, et al. Guidelines for prevention of stroke in patients with ischemic stroke or transient ischemic attack: a statement for healthcare professionals from the American Heart Association/American Stroke Association Council on Stroke: co-sponsored by the Council on Cardiovascular Radiology and Intervention:

- the American Academy of Neurology affirms the value of this guideline. *Stroke*. 2006; 37: 577–617.
12. Adams H, Adams R, Del Zoppo G, Goldstein LB; Stroke Council of the American Heart Association; American Stroke Association. Guidelines for the early management of patients with ischemic stroke: 2005 guidelines update a scientific statement from the Stroke Council of the American Heart Association/American Stroke Association. *Stroke*. 2005; 36: 916–923.
 13. Hack W, Kaste M, Bogousslavsky J, Brainin M, Chamorro A, Lees K, Leys D, Kwiecinski H, Toni P, Langhorne P, Diener C, Hennerici M, Ferro J, Sivenius J, Gunnar N, Bath P, Olsen TS, Gugging M; European Stroke Initiative Executive Committee and the EUSI Writing Committee. European Stroke Initiative Recommendations for Stroke Management-update 2003. *Cerebrovasc Dis*. 2003; 16: 311–337.
 14. Leys D, Kwiecinski H, Bogousslavsky J, Bath P, Brainin M, Diener HC, Kaste M, Sivenius J, Hennerici MG, Hacke W; EUSI Executive Committee; EUSI Writing Committee. Prevention. European Stroke Initiative. *Cerebrovasc Dis*. 2004; 17 (Suppl 2): 15–29.
 15. Lenfant C. Shattuck lecture—clinical research to clinical practice—lost in translation? *N Engl J Med*. 2003; 349: 868–874.
 16. Alberts MJ, Hademenos G, Latchaw RE, Jagoda A, Marler JR, Mayberg MR, Starke RD, Todd HW, Viste KM, Girgus M, Shephard T, Emr M, Shwyder P, Walker MD. Recommendations for the establishment of primary stroke centers. Brain Attack Coalition. *JAMA*. 2000; 283: 3102–3109.
 17. Measuring and Improving Quality of Care: A Report From the American Heart Association/American College of Cardiology First Scientific Forum on Assessment of Healthcare Quality in Cardiovascular Disease and Stroke. *Circulation*. 2000; 101: 1483–1493.
 18. Ringelstein EB, Grond M, Busse O. German Stroke Society. *Int J Stroke*. 2006; 1: 45–46.
 19. Rudd AG, Pearson M. National stroke audit. *Clin Med*. 2002; 2: 496–498.
 20. Kapral MK, Laupacis A, Phillips SJ, Silver FL, Hill MD, Fang J, Richards J, Tu JV; Investigators of the Registry of the Canadian Stroke Network. Stroke care delivery in institutions participating in the Registry of the Canadian Stroke Network. *Stroke*. 2004; 35: 1756–1762.
 21. Reeves MJ, Arora S, Broderick JP, Frankel M, Heinrich JP, Hickenbottom S, Karp H, LaBresh KA, Malarcher A, Mensah G, Moomaw CJ, Schwamm L, Weiss P; Paul Coverdell Prototype Registries Writing Group. Acute stroke care in the US: results from 4 pilot prototypes of the Paul Coverdell National Acute Stroke Registry. *Stroke*. 2005; 36: 1232–1240.
 22. Asplund K, Asberg KH, Norrving B, Stegmayr B, Terent A, Wester PO; Riks-Stroke Collaboration. Riks-Stroke - A Swedish national quality register for stroke care. *Cerebrovasc Dis*. 2003; 15 (Suppl 1): 5–7.
 23. Dromerick A, Reding M. Medical and neurological complications during inpatient stroke rehabilitation. *Stroke*. 1994;25:358–361.
 24. Davenport RJ, Dennis MS, Wellwood I, Warlow CP. Complications after acute stroke. *Stroke*. 1996;27:415–420.
 25. Roth EJ, Green D. Cardiac complications during inpatient stroke rehabilitation. *Top Stroke Rehabil*. 1996;3:86–92.