

Influence of Socioeconomic Status on In-Hospital Mortality and Morbidity after Stroke in India: Retrospective Hospital-Based Cohort Study

Ravi Yadav, Kameshwar Prasad, Vasantha M Padma, Achal Kumar Srivastava, Manjari Tripathi, Rohit Bhatia

Department of Neurology, All India Institute of Medical Sciences, New Delhi, India

ABSTRACT

Objectives: To determine an association between socioeconomic status and in-hospital outcome in Indian patients with stroke. **Materials and Methods:** Retrospective hospital-based cohort study. The hospital stroke register was used for this study. The independent variables were demographic job status, education, cardiovascular risk factors, comorbidities and the score on the Glasgow Coma Scale (GCS). The outcome variables were mortality and Barthel's index (BI) score at discharge. **Results:** Data of 599 consecutive patients comprising 370 men (54.3%) and 229 women (33.6%) was available for analysis. Their mean age was 55.63 ± 15.36 years. Age, diagnosis (ischemic or hemorrhagic), midline shift, smoking and GCS were significantly associated with mortality and BI score ($P < 0.05$). There was a statistically significant association between employment status and BI at discharge ($P = 0.03$) in univariate analysis. In multivariate analysis, joblessness was associated with lower BI at discharge ($P = 0.02$) after adjustment for GCS motor score and stroke subtype. **Conclusion:** Our study shows that in patients with stroke, lower employment status is associated with poor outcome at discharge from the hospital. The association is independent of other prognostic factors.

Keywords: Socioeconomic status, stroke, mortality, morbidity

Introduction

Low socioeconomic status (SES) is an important factor that appears to increase mortality and disability in stroke. The relationship of SES with poor outcome after stroke has been shown.⁽¹⁾ SES is an important risk factor for stroke and ischemic heart disease, with the incidence and mortality of each increasing as SES declines. Studies in stroke are unable to provide a final answer to this question. Some studies show an association between lower SES and increased case fatality, but others do not.⁽¹⁻⁴⁾ This study was undertaken

to find the association between the in-hospital outcome (mortality, functional disability) of ischemic or hemorrhagic stroke with SES and its dependent factors, occupation and educational status of the patients admitted with stroke.

Materials and Methods

This study was based on a retrospective analysis of the hospital-based, stroke registry of patients from a mixed (urban and rural) population admitted to the neurology department at a tertiary care center in north India, which serves a huge community of people. Data of stroke was prospectively collected after obtaining informed consent from the patients who were admitted to the Department of Neurology between 1994 and 1998. The World Health Organization (WHO) definition of stroke was used for the diagnosis of stroke. The occupation was categorized into service (salaried), business and "others," which mainly included people who were unemployed or those who were daily wages workers, unskilled labourers or

Access this article online	
Quick Response Code:	Website: www.ijcm.org.in
	DOI: 10.4103/0970-0218.106626

Address for correspondence:

Prof. Kameshwar Prasad, Professor of Neurology and Head of Unit-I, Neurosciences Centre and Director, Clinical Epidemiology Unit, All India Institute of Medical Sciences, New Delhi - 110 029, India. E-mail: drkameshwarprasad@yahoo.co.in

Received: 10-08-10, Accepted: 17-06-12

farmers without their own land. We used a structured interview to assess the clinical and neurological variables (such as the score on Glasgow coma scale (GCS), Barthel's index (BI) and modified Rankin scale (MRS) at admission and discharge), demographic factors, SES, cardiovascular risk factors and comorbidities. The outcome was evaluated by mortality, MRS, BI at discharge and GCS.

Statistical analysis

BI scores and MRS score of admission and discharge were used for evaluating the outcome. To study the significance of independent variables in the prognosis, single-variable logistic regression analysis was employed. To study the simultaneous effect of different variables on recovery, multiple regression analysis was used employing the SPSS 13 statistical package.

Results

Between 1994 and 1998, a total of 682 patients with suspected stroke were registered. Of these, data of 599 patients was analyzed and 83 were excluded due to incompleteness of data. Their mean age was 55.6 ± 15.4 years, of whom 370 (54.3%) were men and 229 (33.6%) were women [Table 1]. Maximum number of patients belonged to the middle class (58.9%). About 73.2% of the patients belonged to the "others" category. The number of patients with hemorrhagic stroke was 227 (38.9%) and ischemic stroke was 357 (61.1%). The mean BI was 35.8 among all age groups. Patients with lower occupation category had poor mean BI at admission (26.59) as compared with people of the service class (40.36) and business class (40.56).

Diagnosis (ischemic or hemorrhagic stroke), midline shift and GCS were significantly associated with mortality and complications ($P < 0.05$) [Table 2]. Employment status was significantly associated with MRS at discharge ($P = 0.001$) and BI at discharge ($P = 0.03$) in univariate analysis.

In multiple regression analysis, employment status was negatively correlated with BI at discharge ($r = -0.2$; $P = 0.02$). BI at discharge was also noted to have a negative correlation with GCS ($r = 0.52$; $P < 0.005$) and diagnosis (ischemic versus hemorrhagic stroke) at admission [Table 2].

Discussion

In the present study, we found that unemployment and lower occupational status was associated with poor in-hospital outcome as measured by BI at discharge and MRS at discharge. There is no national or international data of the effect of SES on in-hospital mortality.^(1,5)

Table 1: Baseline characteristics according to the various job categories

Characteristic	Job 1 (salaried)	Job 2 (business)	Job 3 (others)	P value	Total (%)
Age ≥ 60	17	10	246	<0.0005	273
Age <60	92	39	189		320
Gender				<0.0005	
Male	104	49	212		365 (61.6)
Female	5	0	223		228 (38.5)
Socioeconomic status				<0.0005	
Upper class	0	0	9		9 (2.5)
Middle class	36	9	171		216 (59.3)
Lower class	37	25	76		139 (38.1)
Education				<0.0005	
Uneducated	2	1	95		98 (16.4)
Undergraduate	26	20	246		294 (49.4)
Graduate	73	28	91		192 (32.2)
Stroke type				0.86	
Hemorrhagic	73	30	254		357 (61.8)
Ischemic	35	19	167		221 (38.2)
Risk factors					
Hypertension	47	22	163	0.64	232 (38.7)
Diabetes	12	7	62	0.07	81 (13.5)
Smoking	42	23	55	<0.0005	120 (20)
TIA	18	3	37	0.06	58 (9.7)
BI ADM* ≥ 50	8	3	24	0.5	35 (5.8)
BI DIS** ≥ 50	16	8	52	0.18	76 (12.7)
Midline shift	30	11	117	0.73	158 (26.4)

*Barthel's index at admission, **Barthel's index at discharge

Table 2: Multiple regression analysis after adjustment with other cofactors

Variable	B	P value
Age	-0.17	0.27
GCS*	-17.5	<0.0005
IS/ICH [†]	-16	<0.0005
Job/employment status	-6.0	0.018

Dependent variable: Barthel Index score, *Glasgow coma scale, [†]Ischemic stroke/ intracranial hemorrhage

Observations from Canada showed that the 30-day and 1-year mortality was higher in the lowest income quintile than in the highest income quintile.⁽¹⁾

Similar results were found in a Finnish study (FINMONICA stroke registry), although other studies found that education is not related to survival, but both occupation and income have an independent effect on risk of death after stroke.^(2,4,6-8) We found a negative correlation between employment status and GCS at admission as well as with employment status and BI at discharge, supporting these observations and suggesting that low job status is a risk factor for poor in-hospital outcome of stroke.

The reason for low GCS motor score at admission

in our study could be, firstly, referral bias of the patients with low SES and low GCS to the government hospitals; secondly, higher prevalence of uncontrolled hypertension and diabetes in this group; thirdly, delay in arrival to the hospital; and, lastly, severe stroke.

Our study shows that in patients with stroke, lower employment status is associated with poor outcome at discharge from the hospital. The association is independent of other prognostic factors.

References

1. Kapral MK, Wang H, Mamdani M, Tu JV. Effect of socioeconomic status on treatment and mortality after stroke. *Stroke* 2002;33:268-73.
2. Jakovljević D, Sarti C, Sivenius J, Torppa J, Mähönen M, Immonen-Räihä P, et al. Socioeconomic status and ischemic stroke: The FINMONICA stroke register. *Stroke* 2001;32:1492-8.
3. Aslanyan S, Weir CJ, Lees KR, Reid JL, McInnes GT. Effect of area-based deprivation on the severity, subtype, and outcome


of ischemic stroke. *Stroke* 2003;34:2623-8.

4. Peltonen M, Rosén M, Lundberg V, Asplund K. Social patterning of myocardial infarction and stroke in Sweden: Incidence and survival. *Am J Epidemiol* 2000;151:283-92.
5. Weir NU, Gunkel A, McDowall M, Dennis MS. Study of the relationship between social deprivation and outcome after stroke. *Stroke* 2005;36:815-9.
6. van Rossum CT, van de Mheen H, Breteler MM, Grobbee DE, Mackenbach JP. Socioeconomic differences in stroke among dutch elderly women: The rotterdam study. *Stroke* 1999;30:357-62.
7. Arrich J, Lalouschek W, Müllner M. Influence of socioeconomic status on mortality after stroke: Retrospective cohort study. *Stroke* 2005;36:310-4.
8. Weir NU, Gunkel A, McDowall M, Dennis MS. Study of the relationship between social deprivation and outcome after stroke. *Stroke* 2005;36:815-9.

How cite this article: Yadav R, Prasad K, Padma VM, Srivastava AK, Tripathi M, Bhatia R. Influence of socioeconomic status on in-hospital mortality and morbidity after stroke in India: Retrospective hospital-based cohort study. *Indian J Community Med* 2013;38:39-41.

Source of Support: Nil, **Conflict of Interest:** None declared.

Announcement



INFORMATION FOR IAPSM MEMBERS

Awards of IAPSM – 2013 & Epidemiological Research Grant – 2013

For information and other details
please visit the IAPSM Website (www.iapsm.org)

Dr. Shashi Kant
(Acting) Secretary General