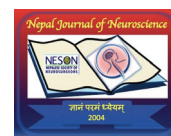


# Factors predicting leaving against medical advice in Neurosurgery: A prospective observational study from Nepal



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## Abstract

**Introduction:** Though leave against medical advice (LAMA) is a common healthcare problem in low-income countries, there is paucity of studies exploring this aspect of care from Nepal. Our study aims to find out the prevalence of LAMA, its reasons and any differences that exist among patients in neurosurgery versus other specialties.

**Methods and Materials:** A prospective, cross-sectional study was carried out among patients discharged against medical advice from September 2020 through February 2021 at Gandaki Medical College, Pokhara.

**Results:** A total of 150 patients were included, 29.3% (n=44) from neurosurgery and 70.7% (n=106) from other departments. The overall rate of LAMA was 5.68%; 16.73% from neurosurgical service. In the neurosurgical cohort, mean age was 61.41±18.72 years and majority of patients were males (65.9%). Most patients were Hindu by religion (97.7%), illiterate (59.1%), married (93.2%), with history of substance abuse (63.6%), admitted directly to the ICU (88.6%) and lacked insurance (79.5%). Financial insufficiency (40.9%) followed by expected poor prognosis of the disease (25%) were reported as major reasons for LAMA. Statistically significant differences (p<0.05) were observed in neurosurgical patients when compared to patients from other departments in terms of age, gender, educational status, history of substance abuse, place of in-patient admission, treatment modality recommended, status of mechanical ventilation and insurance status. In-patient admission to the ICU and proposal of surgical intervention were predictive of LAMA among neurosurgical patients.

**Conclusions:** The rate of LAMA was high in neurosurgery. Educating general public about neurosurgical care and widespread implementation of health insurance seem important policy-implications.

**Key words:** Discharge against medical advice, Leave against medical advice, Nepal, Neurosurgery.

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## Introduction

Leave against medical advice (LAMA) refers to the behaviour of patients or their families to terminate their treatments and leave the hospital ignoring their physicians' permissions.<sup>1</sup> It is common concerning problem in global health-care system.<sup>2,3</sup> Evidence suggests that patients discharged against medical advice have increased risk of hospital readmission, potential morbidity, increased costs

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and even death.<sup>4,5</sup> LAMA is associated with increased litigation risk and poses a dilemmatic ethical and legal problem for clinicians.<sup>6-9</sup> It is a big challenge in developing countries like Nepal where problems of staff shortage, lack of insurance and centralization of healthcare services predominate the clinical scenario.<sup>10,11</sup>

LAMA-related evidence is less in Nepal and from neurosurgical perspective, its scarce even globally.<sup>12</sup> In this study, we aim to explore the determinants of LAMA and report any differences that exist among neurosurgical patients when compared to those from other specialties at a tertiary care hospital in western Nepal.

## Methods and Materials

We conducted a prospective, multi-departmental, hospital-based survey. The study was carried out across Neurosurgery, Internal Medicine, Surgery including Urology, Obstetrics and Gynaecology and Otolaryngology departments at Gandaki Medical College Teaching Hospital and Research Center (GMCTHRC). GMCTHRC is an 850-bedded, tertiary-care teaching hospital in Pokhara. It is a major referral center in western Nepal. Approval for this study was granted by the Institutional Review Committee of Gandaki Medical College Teaching Hospital and Research Center (Ref No. 054/2077/2078). Written informed consent was obtained from each of the study participants.

Patients who were discharged from neurosurgical service as well as from other in-patient departments for a period of six months from September 2020 through February 2021 were included in the study. The major inclusion criteria were: 1) patients who consented for their participation in the study, 2) those who were admitted to the in-patient departments (ward/ICU) and 3) those who were discharged against medical advice. We excluded those patients 1) who didn't consent to take part in the study, 2) were seen in the out-patient departments or in the emergency department, 3) were referred to higher centers of excellence or were discharged on request, and 4) those below 15 years of age.

From the patients meeting our inclusion criteria, we collected data regarding their demographic characteristics, clinical characteristics and LAMA-related characteristics using a structured questionnaire. Data was entered in MS-Excel and after cleaning, was imported and analysed using Statistical Package for Social Sciences 25 (SPSS Science Inc., Chicago, IL, USA). Descriptive statistics were used for reporting proportions. Independent sample t-test and Pearson's Chi-square test were used to analyse any difference in characteristics of patients leaving against medical advice in neurosurgery and other groups. Variables that attained statistical significance on bivariate analyses were put into a regression model and multivariate

logistic regression was used to determine independent predictors of LAMA among neurosurgical patients. P-value for statistical significance was set at less than 0.05 for all analyses.

## Results

A total of 150 patients fulfilling the study criteria were included in final analyses, out of which 44 (29.3%) were from neurosurgical service and 106 (70.7%) were from other hospital departments. During the study period, a total of 2640 patients were discharged from our in-patient departments, making the overall prevalence of LAMA to be 5.68%. During the same period, 263 patients were discharged from the neurosurgical service and the rate of LAMA in the neurosurgery department was calculated to be 16.73%. A comprehensive summary of clinico-epidemiologic and LAMA-related characteristics of the study population is given in Table 1 and Table 2. Patients in our study ranged from 15 through 92 years with a mean age of  $50.55 \pm 22.76$  years. There were slightly more females (52.7%, n=79) than males overall. Majority of patients (90%, n=135) lacked insurance and in more than half the cases, their family income was less than NRs. 20,000 (200\$). In nearly three-fourths of cases, the decision for discharge was made by family members or close relatives of the patient. Apart from neurosurgery, Internal medicine and Obstetrics and Gynecology were among the departments that saw a majority of LAMA related cases, 39.3% and 24.0% respectively. Overall, the mean duration of stay was  $3.67 \pm 3.07$  days and amongst those who were admitted directly to the ICU, the mean duration of stay was  $1.93 \pm 3.27$  days. Financial constraint (42.7%, n=64) was cited as the most common cause of LAMA overall, followed by feeling of cure leading to discontinuity of treatment (12.0%, n=18) and expected poor prognosis of the disease (11.3%, n=17).

Among neurosurgical patients leaving against medical advice, the mean age was  $61.41 \pm 18.72$  years and the majority of them were males (65.9%). Most of them were Hindu by religion (97.7%), illiterate (59.1%), married (93.2%), had a history of substance abuse (63.6%), admitted directly to the ICU (88.6%) and lacked an insurance coverage (79.5%), respectively (Table 3).

Financial insufficiency (40.9%) was reported as the most common reason for LAMA among neurosurgical patients, followed by expected poor prognosis of the disease in 25% of the cases (Table 4).

After bivariate analyses, statistically significant differences were observed in neurosurgical patients as compared to patients from other departments in terms of age, gender, educational status, history of substance abuse, place of in-patient admission, treatment modality recommended, status of mechanical ventilation and

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insurance status (Table 3). The significant variables were entered into multivariate logistic regression model and based on this analyses, significant predictors for discharge against medical advice among neurosurgical patients were

found out to be in-patient admission to the ICU (adjusted Odds ratio= 11.93; 95% CI= 2.76-51.50) and surgery as the recommended modality of treatment (adjusted Odds ratio= 9.34; 95% CI= 3.04-28.57) (Table 5).

Demographic characteristics (n=150)	Frequency	Percentage
<b>Age group</b>		
15-29	45	30.0
30-44	19	12.7
45-59	23	15.3
60-74	35	23.3
>75	28	18.7
<b>Gender</b>		
Male	71	47.3
Female	79	52.7
<b>Religion</b>		
Hindu	137	91.3
Buddhist	9	6.0
Others	4	2.7
<b>Educational qualification</b>		
Illiterate	66	44.0
Up to secondary school	66	44.0
High school and above	18	12.0
<b>Marital status</b>		
Married	143	95.3
Unmarried	7	4.7
<b>Place of residence</b>		
Within Kaski district	73	48.7
Other districts of Gandaki Province	74	49.3
Outside Gandaki Province	3	2.0
<b>Patient employed or not</b>		
No	91	60.7
Yes	59	39.3
<b>History of substance abuse including alcohol</b>		
No	77	51.3
Yes	73	48.7
<b>In-patient admission to</b>		
ICU	74	49.3
Ward	76	50.7
<b>Treatment Modality Recommended</b>		
Medical	86	57.3
Surgical	64	42.7
<b>Mechanical ventilation</b>		
Not intubated	133	88.7
Intubated	17	11.3

<b>Duration of stay in days</b>		
0-4	108	72.0
5-9	34	22.7
10-14	6	4.0
>14	2	1.3
<b>Monthly income of family</b>		
<10k	31	20.7
10-20k	50	33.3
>20k	69	46.0
<b>Insurance Status</b>		
No	135	90.0
Yes	15	10.0

Table 1: General characteristics of the study population.

<b>Hospital department involved</b>		
Neurosurgery	44	29.3
Surgery	7	4.7
Internal Medicine	59	39.3
Obstetrics and Gynaecology	36	24.0
Otolaryngology	4	2.7
<b>Decision for Discharge Made by</b>		
Self	38	25.3
Family members	107	71.3
Close relatives	5	3.3
<b>Reason for LAMA</b>		
Financial	64	42.7
Expected poor prognosis	17	11.3
Feel better so don't want to continue treatment	18	12.0
Extreme age	8	5.3
Religious belief	7	4.7
No progress from treatment	7	4.7
COVID	9	6.0
Prefer other hospital for accessibility	9	6.0
Accommodation problems for caretakers	5	3.3
Family and relatives live in another city	6	4.0

Table 2: LAMA-related characteristics of the study population.

Variables	Neurosurgery (n=44)	Other departments (n=106)	P-value
Age, in years; mean (SD) <sup>a</sup>	61.41 (18.726)	46.05 (22.849)	0.001*
<b>Gender</b>			
Male	29 (65.9)	42 (39.6)	0.003*
Female	15 (34.1)	64 (60.4)	
<b>Religion</b>			
Hindu	43 (97.7)	94 (88.7)	0.073
Others	1 (2.3)	12 (11.3)	
<b>Educational classification</b>			
Illiterate	26 (59.1)	40 (37.7)	0.016*
Literate	18 (40.9)	66 (62.3)	

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<b>Marital status</b>			
Married	41 (93.2)	102 (96.2)	0.421
Unmarried	3 (6.8)	4 (3.8)	
<b>Place of residence</b>			
Within Kaski	19 (43.2)	54 (50.9)	0.387
Outside Kaski	25 (56.8)	52 (49.1)	
<b>Patient employed or not</b>			
No	24 (54.5)	67 (63.2)	0.323
Yes	20 (45.5)	39 (36.8)	
<b>History of substance abuse including alcohol</b>			
No	16 (36.4)	61 (57.5)	0.018*
Yes	28 (63.6)	45 (42.5)	
<b>In-patient admission to</b>			
ICU	39 (88.6)	35 (33.0)	0.001*
Ward	5 (11.4)	71 (67.0)	
<b>Treatment Modality Recommended</b>			
Medical	13 (29.5)	73 (68.9)	0.001*
Surgical	31 (70.5)	33 (31.1)	
<b>Mechanical ventilation</b>			
Not intubated	29 (65.9)	104 (98.1)	0.001*
Intubated	15 (34.1)	2 (1.9)	
<b>Duration of stay in days</b>			
0-4	35 (79.5)	73 (68.9)	0.185
5 and above	9 (21.5)	33 (31.1)	
<b>Insurance Status</b>			
No	35 (79.5)	100 (94.3)	0.006*
Yes	9 (20.5)	6 (5.7)	

a= Independent Sample t-test; all others are Chi-Squared test unless mentioned otherwise.

\*= significant ( $p < 0.05$ )

**Table 3:** Differences in clinical characteristics among patients leaving against medical advice in neurosurgery versus other departments.

Decision for Discharge Made by	Neurosurgery N (%)	Others N (%)
Self	0	38 (35.8)
Family Members	43 (97.7)	64 (60.4)
Close relatives	1 (2.3)	4 (3.8)
<b>Monthly income of family</b>		
<10k	15 (34.1)	16 (15.1)
10-20k	11 (25.0)	39 (36.8)
>20k	18 (40.9)	51 (48.1)
<b>Reason for LAMA</b>		
Financial	18 (40.9)	46 (43.4)
Expected poor prognosis	11 (25.0)	6 (5.7)
Feel better so don't want to continue treatment	2 (4.6)	16 (15.1)
Others	13 (29.5)	38 (35.8)

**Table 4:** Differences in major LAMA-related characteristics in neurosurgery versus other departments.

Factors	Neurosurgical patients leaving against medical advice		
	aOR	95% CI	P-value
Age	1.008	0.978-1.038	0.612
<b>Gender</b>			
Male	1		
Female	2.760	0.848-8.982	0.092
<b>Educational classification</b>			
Illiterate	1		
Literate	1.42	0.45-4.52	0.545
<b>History of substance abuse including alcohol</b>			
No	1		
Yes	1.29	0.37-4.40	0.684
<b>In-patient admission to</b>			
Ward	1		
ICU	11.938	2.76-51.509	0.001*
<b>Treatment Modality Recommended</b>			
Medical	1		
Surgical	9.34	3.04-28.57	0.001*
<b>Mechanical ventilation</b>			
Not intubated	1		
Intubated	5.505	0.885-34.242	.067
<b>Insurance Status</b>			
Yes	1		
No	1.798	0.412-7.836	.435

aOR= adjusted Odds Ratio; CI= Confidence Interval; \*= significant ( $p < 0.05$ )

Table 5: Independent predictors of discharge against medical advice in neurosurgical service.

## Discussion

LAMA is a highly prevalent problem of healthcare quality with varying prevalence around the world. The reported prevalence of LAMA varies from as low as 0.34% to as high as 43.4%.<sup>13</sup> In general, a global prevalence of about 2% has been reported in the literature.<sup>3</sup> The prevalence of LAMA is reportedly higher in developing countries than in developed ones.<sup>14</sup> There is a global paucity of data exploring this aspect of neurosurgical practice both from Nepal and globally. To the best of our knowledge, no previous studies have so far tried to find out the differences among patient characteristics among those leaving against medical advice in neurosurgical service and other departments. Further, no prospective studies have been carried out in Nepal that have tried to explore this subject of interest. In this study, we have tried to establish the prevalence of LAMA related discharges in Nepal and find out the factors that influence such discharges among a cohort of neurosurgical patients.

The overall prevalence of LAMA in our study was 5.68% with the prevalence of LAMA-related discharges

from the neurosurgery department being 16.73%. No LAMA-related studies have been carried out from the general in-patient departments in Nepal. Recent Nepalese studies from the ICU and emergency departments have reported the prevalence of LAMA to be 14.5% and 5.96% respectively.<sup>10-15</sup> Though our study excluded patients from the emergency department, the rate of LAMA in our study was comparable to it but less than a similar Nepalese study carried out in the ICU. The rate of neurosurgical LAMA-related discharge was higher in our study when compared to other in-patient departments across a wide range of studies.<sup>13</sup> However, the rate was comparable to a study carried out in similar resource-constrained setting in the neurosurgery department.<sup>12</sup> The possible cause for high LAMA rate in neurosurgery may be explained by the fact that most neurosurgical patients present late to the hospital, when the disease has already become worse and most of them require expensive supportive care, leading to forced discharges. One interesting finding in our study was that most neurosurgical patients leaving against medical advice were males (65.9%), while more females went on LAMA from other departments (60.4%). The age of



patients taking LAMA from the neurosurgery department varied considerably from those discharged from other departments (mean age 61.41 Vs 46.05 years) and most of them had a history of current/past substance abuse (63.6 Vs 42.5%). None of the discharges in the neurosurgical cohort was made by the patients themselves while in the other departments, in about 35% of cases, the patients themselves were the ones that asked for LAMA. This is because most of the patients in the neurosurgical cohort are critically ill to consent themselves. Upon exploring the reasons for LAMA in the neurosurgical cohort, the majority of the respondents cited the economic crisis and expected poor outcome as the major cause. This gives us the platform to raise another critical issue in low-income countries like Nepal- health insurance is virtually non-existent. In our study, 90% of the patients lacked health insurance. Most of the patients are required to make out-of-pocket payments for availing healthcare services. Particularly for neurosurgery, the facilities are available at only a handful of private institutions at a comparatively high cost. This raises the cost of treatment associated with neurosurgery leading to LAMA-related discharges. Most of the other services are also available at government sponsored institutions at low/no cost. But this is not the case for neurosurgery and state sponsored neurosurgical facilities are limited to a few major cities in Nepal. This may be the main reason for discrepancy in LAMA rates among neurosurgery and other specialties. Most patients requiring neurosurgical care are critically ill. Because of the complex geographical situation and road network in Nepal, these patients are often brought late to the hospital. Majority of neurosurgical patients in our study were traumatic brain injury and hemorrhagic stroke patients (Personal observation), and they often presented late to our facility leading to unfavourable outcomes. This may be a plausible explanation as to why most neurosurgical patients cited poor prognosis as one of the main reasons of LAMA as compared to another patient cohort (25.0 Vs 5.7%). In most centres like ours, the entire neurosurgery department is run by one or two neurosurgeons. Quality of care might be expected to decline in such a situation but this was not among the major reasons for LAMA-related discharge in the neurosurgical cohort. We found out that admissions to ICU and recommendation of surgery as the preferred treatment modality were significant predictors of LAMA among neurosurgical patients. Intervention and supportive intensive care are the mainstay of neurosurgical practice and it seems necessary to raise awareness among the general public that neurosurgical procedures are safer than they think. This may help reduce LAMA rate in neurosurgical patients.

Our study is an important one not only in the Nepalese context but global neurosurgical practice as well because very few studies have tried to explore this issue

in the neurosurgical patient cohort. Though our study is unique, there are a few limitations to our study. Our study is a single center study and the results may not be generalizable across other settings. We did not follow-up our patients and thus could not find out the differences in outcome among patients who continued treatment versus those who took LAMA. Continued follow-up was difficult with resources available to us and we suggest researchers to address this question in further studies. A randomised trial or studies that involve a control group may serve the purpose in this regard.

### Conclusion

The rate of LAMA was higher among neurosurgical patients when compared to other specialties. Patients in neurosurgical cohort differed from other departments in terms of age, sex, literacy, positive history of substance abuse, ICU admission, recommendation of surgical intervention, mechanical ventilation and insurance status. Admission to the ICU and proposal of surgical intervention as the treatment modality were significant predictors of neurosurgical LAMA-related discharges. Financial constraints and expected poor prognosis were cited as the main predicting factors for LAMA. This has significant policy implications in terms of educating the general public about neurosurgical care and widespread implementation of health insurance with expansion of state-sponsored neurosurgical care.

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