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ORIGINAL RESEARCH ARTICLE

LENGTH OF HOSPITAL STAY OF ORTHOPAEDIC INPATIENTS IN A TERTIARY CARE TEACHING HOSPITAL IN NEPAL

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ABSTRACT

Background: Length of Hospital Stay (LOHS) can have important effects on the cost of treatment and patient outcomes. The aim of this study was to determine the length of hospital stay among orthopaedic inpatients and assess its association with different socio-demographic and clinical factors.

Methods: A retrospective study was conducted at College of Medical Sciences and Teaching Hospital, Nepal, wherein, clinical records of patients admitted and treated as inpatients between January and December 2019 were retrieved. Demographic data, diagnosis, treatment details, LOHS, co-morbidities, treatment modality and mode of payment were documented and data was analyzed using SPSS software 16.0. Median was calculated for skewed continuous data and frequency analysis was done for categorical variables. P value <0.05 was considered statistically significant.

Results: In a total of 1248 patients with mean age of 33.8±18.7 years, 72.4 % (n=904) were male. Most of them (34.9%, n=435) were students and majority (62.5%, n=780) were from outside Chitwan. The median LOHS was 5.0 (3.0–10.0) days. It was significantly greater in cases from outside Chitwan, those with trauma, infection, associated injury, and complications (p<0.05). Moreover, there was significant difference in LOHS among various age quintiles, occupations, fracture types, modes of payment and treatment modalities (p<0.05). However, LOHS did not differ significantly between patients with or without co-morbidity and gender (p>0.05).

Conclusions: This study identified that the LOHS was significantly associated with various clinico demographic factors except gender and co-morbidity. More studies can be conducted to assess the relationships further.

INTRODUCTION

Length of hospital stay (LOHS) can be defined as the total length of time a patient stays in the hospital for the purpose of treatment, measured as the interval (usually in days) from admission to discharge.[1] Burden of disease in the Orthopaedic discipline, specifically complex polytrauma related morbidities, is on the rise.[2] In this regard, LOHS can have important effects on the cost of treatment, rate of infection, risk of bed sore and other co-morbidities, specifically amongst the orthopaedic inpatients.[3]

Various studies conducted far and wide have reported fairly varied ranges of LOHS in these patients. In two separate studies conducted in Canada and the USA, average LOHS as high as 9.4 days and as low as 4.3 days were reported with significant associations with age, gender, co-morbidities and insurance status.[4, 5] In two other studies conducted in Iranian population, mean LOHS of 5.4±6.1 days[6] and 6.8±8 days[7] were reported. In the context of Nepal, Mishra et al.[8] observed that the average LOHS among orthopaedic inpatients was 10.5 days and was associated with age, gender, mode of payment and type of cases (traumatic/non traumatic).

There is paucity of literature regarding LOHS and associated factors to influence the LOHS in our context. So, this study was undertaken to find out the LOHS among the orthopaedic inpatients in a tertiary care teaching hospital and variables affecting it.

METHODS

This was a retrospective study conducted in the department of orthopaedic surgery at College of Medical Sciences and Teaching Hospital (COMS-TH), Bharatpur, Chitwan, Nepal. After obtaining ethical clearance from the Institutional Review Committee of COMS-TH (COMSTH-IRC) **(Ref No: 2020-041)**, clinical records of the patients were extracted from the medical record section of the hospital.

Various socio-demographic and clinical information of the patients who were admitted and treated as inpatients in the hospital from January to December 2019 were retrieved. Patients who left the hospital against medical advice (LAMA), those with incomplete data, and those who expired during treatment in the hospital were excluded. A total record of 1248 patients were selected for the final analysis.

Data was obtained from the details entered into the admission and treatment charts of the inpatients. The different socio-demographic variables collected included age, gender, occupation, address, length of hospital stay. Similarly, the clinical variables were type of cases (traumatic/non-traumatic), infective cases, type of fracture (open/closed/ combination of open and close), associated injuries, complications, co-morbidities, treatment modality (conservative/operative/both) and mode of payment (self/third party/health insurance). Age of the patients was discretized into five quintiles and LOHS into two categories (LOHS ≤7 days /> 7 days).

The collected data were first entered into the Microsoft Excel (Microsoft Office 2010). After preliminary cleaning, data was entered into SPSS (Statistical Package for Social Sciences), version 16.0 software for final data analysis. The various categorical variables were described as frequency and percentage using appropriate tables. Next, the distribution of the primary variable of interest, LOHS was tested for normality. As the distribution was found to be skewed, it was described using median (inter-quartile interval). To test the association between LOHS (as a continuous variable) and various categorical variables, non-parametric tests like Mann-Whitney and Kruskal-Wallis H tests were utilized. Similarly, Chi-squared test was used to test the association between two categories of LOHS and other categorical variables. Statistical significance was defined as $p< 0.05$ at 95% confidence interval (CI).

RESULTS

In the present study, out of the total patients (n=1248) , males constituted the majority, i.e. 72.4%, (n=904). The mean age of the patients was 33.8 years ± 18.7 years, the median age was 30.0 years (range 9 months- 95 years). Regarding occupation, most of the patients were students (34.9%, n=435), and homemakers were the least common (15.3%, n=191). Likewise, majority of the patients were from outside Chitwan (62.5%, n=780).

Table 1: Distribution of the patients based on socio-demographic characteristics

Variables	Frequency (%)
Gender	
Female	344 (27.6%)
Male	904 (72.4%)
Occupation	
Student	435 (34.9%)
Homemaker	191 (15.3%)
Farmer	283 (22.7%)
Miscellaneous	339 (27.2%)
Address	
Within Chitwan	468 (37.5%)
Outside Chitwan	780 (62.5%)

Table 2: Demographics, injury details and treatment modality

Variables	Frequency(%)
Type of cases	
Traumatic	1027 (82.3%)
Non trauma	221(17.7%)
Infective cases	
Yes	114 (9.1%)
No	1134 (90.9%)
Type of fracture	
Open	177 (25.0%)
Closed	520 (73.3%)
Both	12 (1.7%)
Associated injury	
Yes	89 (8.7%)
No	938 (91.3%)
Complication	
Yes	76 (6.1%)
No	1172 (93.9%)
Co-morbidity	
Yes	152 (12.2%)
No	1096 (87.8%)
Mode of payment	
Self	697 (55.8%)
Third party	401 (32.1%)
Health Insurance	150 (12.1%)
Treatment modality	
Conservative	423 (33.9%)
Operative	784 (62.8%)
Both	41 (3.3%)

The median length of hospital stay was 5.0 days (range: 1.0 -104.0 days).

Table 3: Comparison of LOHS according to socio-demographic characteristics

Variables	LOHS Median (Q1-Q3) days	Statistical Test
Gender		
Female(n= 344)	5.0(3.0-9.0)	Z=-0.927; p=0.345*
Male(n= 904)	5.0(3.0-10.0)	
Age-Quintiles		
First	4.0(2.0-7.0)	χ^2 = 26.618; p < 0.001**
Second	6.0(3.0-12.0)	
Third	5.0(3.0-11.3)	
Fourth	6.0(3.0-10.0)	
Fifth	6.0(3.0-10.0)	
Occupation		
Student(n=435)	4.0(2.0-9.0)	χ^2 = 15.557: p = 0.001**
Homemaker(n=191)	4.0(3.0-9.0)	
Farmer(n=283)	5.0(3.0-10.0)	
Miscellaneous(n=339)	6.0(3.0-11.0)	
Address		
Within Parsa(n=468)	5.0(2.0-9.0)	Z=-2.655; p=0.008*
Outside Parsa(n=780)	5.0(3.0-11.0)	

**Mann-Whitney Test,*

***Kruskal-Wallis H Test*

The LOHS was significantly greater in cases with trauma

(p=0.001), with infection (p<0.001), with presence of associated injury (P<0.001), and with complication (p<0.001) than those without the above conditions. Moreover, there was significant difference in LOHS among various fracture types, mode of payment and treatment modality (p<0.001). However, LOHS did not differ significantly between patients with or without co-morbidity (p=0.763).

Table 4: Comparison of LOHS according to clinical characteristics and mode of payment

Variables	LOHS Median (Q1-Q3) days	Statistical test
Type of cases		
Traumatic(n=1027)	5.0(2.0-11.0)	Z=-3.345; p=0.001*
Non trauma(n=221)	4.0(3.0-7.0)	
Infective Cases		
Yes(n=114)	9.0(5.0-21.75)	Z=-7.009; p<0.001*
No(n=1134)	5.0(2.0-9.0)	
Type of Fracture		
Open(n=177)	10.0(5.0-18.0)	χ^2 = 57.123: p < 0.001**
Closed(n=520)	5.0(2.0-10.0)	
Both(n=12)	21.5(14.5-29.5)	
Associated Injury		
Yes(n=89)	15.0(8.0-24.5)	Z=-8.797; p<0.001*
No(n=938)	5.0(3.0-9.0)	
Complication		
Yes (n=76)	13.5(7.0-28.75)	Z=-7.415; p<0.001*
No (n=1172)	5.0(3.0-9.0)	
Comorbidity		
Yes (n=152)	5.0(3.0-9.0)	Z=-0.301; p=0.763*
No (n=1096)	5.0(3.0-10.0)	
Mode of Payment		
Self (n=697)	5.0(2.0-8.5)	χ^2 = 60.901; p < 0.001**
Third party (n=401)	8.0(3.0-17.0)	
Health Insurance (n=150)	4.0(2.0-7.0)	
Treatment Modality		
Conservative (n=423)	3.0(1.0-5.0)	χ^2 = 237.326: p < 0.001**
Operative (n=784)	7.0(4.0-12.0)	
Both (n=41)	10.0(6.0-17.0)	

**Mann-Whitney Test,*
***Kruskal-Wallis H Test*

The LOHS of the patients were categorized into (a) ≤ 7 days and (b) >7 days. Proportions of patients with LOHS greater than 7 days did not differ significantly across the gender, and presence/absence of comorbidity (p>0.05). LOHS was significantly different across the various age quintiles (p=0.003). Across the various occupations, the proportion was the greatest in miscellaneous groups followed by farmer, homemaker and students. The overall difference was statistically significant (p=0.018). Similarly, the proportion was statistically greater in patients from outside Chitwan (p=0.002), patients with traumatic injuries (p<0.001), infection (p<0.001), associated injuries (p<0.001), and complications (p<0.001). Similarly, the proportion of patients staying for more than 7 days in the hospital was significantly different across type of fracture, mode of payment and treatment modality (p<0.001). However, there was no significant association between co-morbidity and LOHS (p>0.05).

Table 5: Distribution of patients between those with LOHS ≤7 days and > 7 days, for different categories of socio-demographic and clinical characteristics

Variables	Categories of LOHS (days)		χ^2	p-value
	≤ 7 Days	> 7 Days		
Gender				
Female	230 (66.9%)	114(33.1%)	0.56	0.454
Male	584(64.6%)	320(35.4%)		
Age-Quintiles				
First	197 (75.5%)	64 (24.5%)	15.906	0.003*
Second	145 (60.7%)	94 (39.3%)		
Third	160 (64.0%)	90 (36.0%)		
Fourth	168 (62.7%)	100 (37.3%)		
Fifth	144 (62.6%)	86 (37.4%)		
Occupation				
Student	303(69.7%)	132(30.3%)	10.116	0.018*
Homemaker	129(67.5%)	62(32.5%)		
Farmer	182(64.3%)	101(35.7%)		
Miscellaneous	200(59.0%)	139(41.0%)		
Address				
Within Chitwan	331(70.7%)	137(29.3%)	9.994	0.002*
Outside Chitwan	483(61.9%)	297(38.1%)		
Type of Cases				
Non traumatic	182(82.4%)	39(17.6%)	34.737	<0.001*
Traumatic	632(61.5%)	395(38.5%)		
Infective Cases				
Yes	48(42.1%)	66(57.9%)	29.564	<0.001*
No	766(67.5%)	368(32.5%)		
Type of Fracture				
Open	68(38.4%)	109(61.6%)	115.999	<0.001*
Closed	323(62.1%)	197(37.9%)		
Both	1(8.3%)	11(91.7%)		
Associated Injury				
Yes	19(21.3%)	70(78.7%)	81.338	<0.001*
No	795(68.6%)	364(31.4%)		
Complication				
Yes	23(30.3%)	53(69.7%)	43.61	<0.001*
No	791(67.5%)	381(32.5%)		
Comorbidity				
Yes	104(68.4%)	48(31.6%)	0.78	0.377
No	710(64.8%)	386(35.2%)		
Mode of Payment				
Self	495(71.0%)	202(29.0%)	67.77	<0.001*
Third party	199(49.6%)	202(50.4%)		
Health insurance	120(80.0%)	30(20.0%)		
Treatment Modality				
Conservative	363(85.8%)	60(14.2%)	134.354	<0.001*
Operative	440(56.1%)	344(43.9%)		
Both	11(26.8%)	30(73.2%)		

DISCUSSION

Length of hospital stay can have significant effect on the various aspects of hospital care in any inpatient and orthopaedic inpatients in particular. Apart from the increased cost of treatment, extended LOHS in these patients can have substantial consequences in utilization of limited resources. Several clinico-demographic factors account for variability in the LOHS. The current study showed the median length of hospital stay of 5.0 days (range: 1.0 -104.0 days) with significant association with age quintiles, occupation, address, nature of injury, complications, mode of payment and treatment modality.

Both male and female patients had comparable LOHS with no statistically significant difference (p=0.345). When comparing LOHS between > 7 days and < 7days, male had higher prevalence of LOHS, but it was not significantly significant (p=0.454). Study done by Mishra et al[8] (male: 10.7 days vs female: 10.1 days) and Akshaya et al[1] (male: 10.2 days vs female: 9.1 days) had no difference in LOHS between male and female. However, Haghparast-Bidgoli et al[7] observed that male patient had significantly longer LOHS compared to female (p<0.05).

Regarding the age, we found out that there was significant difference between median LOHS across different age quintiles (p<0.001). However, the prevalence of LOHS>7days did not differ significantly across these age quintiles (p=0.059). To this end, Brotemarkle et al.[5] had found longer hospital stay among traumatic group of elder patients. Similarly, Mishra et al.[8] and Kashkooe et al.[9], in their study, found longer LOHS with increasing age of patients. Gholson et al.[10] also reported proportionately increased LOHS with increase in age of the patient. This could be explained by tendency to early discharge in younger age group patient.

The different occupation groups in our study had significantly different median LOHS (p=0.001), students and homemakers having the shortest LOHS. Similarly, the prevalence of LOHS>7days also differed significantly across these groups (p=0.018). The study done by Haghparast-Bidgoli et al[7] observed that LOHS among patients with road traffic injuries was longer in manual workers and farmers compared to other occupation groups (p<0.001). Similarly, the study done by Khosravizadeh et al[6] found that the mean LOHS was longest for retired patients and shortest for students (p<0.01).

Patients from outside Chitwan had significantly higher median LOHS and also the higher prevalence of LOHS>7days than those residing within Chitwan (p<0.05). This could be due to tendency for asking early discharge for the patients residing near the hospital. Wu et al[11] observed that the LOHS was significantly associated with geographic location of the hospital and was greater in suburban compared to urban patients (p<0.05). Sukumar et al,[12] on the other hand, observed that people staying in rural area with fall related injury had shorter median LOHS compared to people staying in urban area (P<0.05).

Patients presenting with trauma had significantly greater median LOHS (25% more than nontrauma) as well as the prevalence of LOHS>7days, than those without trauma (p<0.05). Comparable finding was also observed by Mishra et al[8] who reported that the average LOHS was longer in patients with trauma (11 days) compared to those without trauma (8 days).

Patients with infection also had significantly higher median LOHS and prevalence of LOHS>7days than those without infection (p<0.05). This finding was consistent with many other studies. Glance et al[13] found that the median LOHS was about double among patients with hospital acquired infection compared to those without infection. Similarly, Mitchell et al[14] reported the median LOHS to be significantly higher in patients with healthcare associated urinary tract infection compared to patients without infection (p<0.001). Moreover, as per the study of Kashkooe et al,[9] infected patients had 4.4 times increased chance of stay in the hospital compared to those without infection (p<0.001).

Traumatic patients presenting with a combination of open and closed fracture stayed the longest as compared to those with either open or closed fracture. This accounted for the highly significant overall difference in median LOHS as well as prevalence rates of LOHS>7days across various fracture types (p<0.05). In another study, Smith et al[15] reported a contrasting finding suggesting no significant difference between LOHS for open and closed tibia fracture treated surgically with intramedullary nail (p>0.05).

Patients with associated injuries (head, chest, abdomen, urogenital) had significantly greater median LOHS and higher prevalence of LOHS>7days than those without such injuries (p<0.05). Wu et al[11] observed that patients with traumatic spinal cord injury with associated injuries had significantly longer LOHS (p<0.05). Similarly, Wurdemann et al[16] also observed that traumatic patients with associated injuries had significantly longer mean LOHS compared to patients without such injuries (p<0.001).

We observed that patients with complications had significantly greater median LOHS and higher prevalence of LOHS>7days than those without any complications (p<0.05). Ristic et al[17] reported that the average LOHS of surgically treated ankle fracture patients was more in those with complications (p<0.01). Krell et al,[18] on the other hand, reported that extended LOHS was weakly associated with the development of complications (p<0.001).

In our study, we did not find any significant difference of LOHS and prevalence of LOHS>7days between the patients with and without co-morbidities (p>0.05). In contrast, Brotemarkle et al[5] and Gholson et al[10] reported significant association of co-morbidities with extended LOHS.

We observed that the median LOHS and the prevalence of LOHS>7days differed significantly across different modes

of payment (p<0.001) with highest LOHS and prevalence of LOHS>7days amongst the patients who had the third party payment. Patients with health insurance as paying party had least LOHS. As observed by Mishra et al[8] the average LOHS was lesser for self-payment groups as compared to third party payment group, which was consistent with our finding. In another study, Haghparsat-Bidgoli et al[7] reported the mean LOHS of patients with insurance to be more than patients without insurance.

In our study, the median LOHS and prevalence of LOHS>7days differed significantly between the different treatment modalities (p<0.05), with the patients treated by conservative means having the least and those treated by combination of conservative and operative having the longest LOHS. This finding is in accordance with the study done by Kashkooe et al[9] according to which, surgically treated patients were more likely to get admitted resulting in increased LOHS (p<0.001). In contrast, however, Tan et al[19] observed that the surgically treated hip fracture patients had significantly lower mean LOHS compared to patients treated by conservative means (P<0.001). Similarly, Khosravizadeh et al[6] also reported lower mean LOHS in surgically treated patients.

Limitations of the current study was retrospective chart review nature of the study which might limit the extraction of every variables such as ICU admissions, malnutrition, depression, etc as they might influence the LOHS. Secondly, there is lack of generalizability of the result since it is a single institution-based study. The strength of this study is its sufficient sample size of one year duration thus enabling the samples with all possible spectrums of orthopaedic conditions across all seasons of the year.

CONCLUSION

This study identified statistically significant positive correlation of LOHS with age, occupation, address, type of cases, type of fracture, associated injuries, nature of treatment, complication and mode of payment. Further studies such as multi-centric studies may be needed to validate its result.

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REFERENCES:

1. Akshaya D, Sarala KS, Sharmila R. A study of select determinants for hospital stay among surgical patients in a tertiary care hospital. International Journal of Management and Applied Science. 2016;2(10):37-43. [LINK]
2. Pan R, Chang N, Chu D, Hsu K, Hsu Y, Hsu J, et al. Epidemiology of Orthopedic fractures and other injuries among inpatients admitted due to traffic accidents : A 10 year nationwide survey in Taiwan. ScientificWorldJournal. 2014 Feb 5;2014:637872. [DOI]
3. Ireland AW, Kelly P J, Cumming R G. Total hospital stay for hip fracture: measuring the variations due to pre-fracture residence, rehabilitation, complications and co-morbidities. BMC Health Services Research 15. 2015. [DOI]
4. Moore L, Stelfox HT, Turgeon AF, Nathens A, Bourgeois G, Lapointe J, et al. Hospital length of stay after admission for traumatic injury in Canada: a multicenter cohort study. Ann Surg. 2014;260(1):179-87. [DOI]
5. Brotemarkle RA, Resnick B, Michaels K, Morton P, Wells C. Length of hospital stay and discharge disposition in older trauma patients. Geriatr Nurs. 2015;36(2 Suppl):S3-9. [DOI]
6. Khosravizadeh O, Vatankhah S, Bastani P, Kalhor R, Alirezaei S, Doosty F. Factors affecting length of stay in teaching hospitals of a middle-income country. Electron Physician. 2016;8(10):3042-7. [DOI]
7. Haghparast-Bidgoli H, Saadat S, Bogg L, Yarmohammadian MH, Hasselberg M. Factors affecting hospital length of stay and hospital charges associated with road traffic-related injuries in Iran. BMC Health Serv Res. 2013;13:281. [DOI]
8. Mishra BN, Jha A, Maharjan E, Limbu M, Sah S, Gupta Y, et al. Length of Stay of Orthopaedic Inpatients at a Teaching Hospital in Eastern Part of Nepal. JNMA J Nepal Med Assoc. 2015;53(199):180-3. [DOI]
9. Kashkooe A, Yadollahi M, Pazhuheian F. What factors affect length of hospital stay among trauma patients? A single-center study, Southwestern Iran. Chin J Traumatol. 2020;23(3):176-80. [DOI]
10. Gholson JJ, Noiseux NO, Otero JE, Gao Y, Shah AS. Patient Factors Systematically Influence Hospital Length of Stay in Common Orthopaedic Procedures. Iowa Orthop J. 2017;37:233-7. [PMID]
11. Wu Q, Ning GZ, Li YL, Feng HY, Feng SQ. Factors affecting the length of stay of patients with traumatic spinal cord injury in Tianjin, China. J Spinal Cord Med. 2013;36(3):237-42.[DOI]
12. Sukumar DW, Harvey LA, Mitchell RJ, Close JC. The impact of geographical location on trends in hospitalisation rates and outcome for fall-related injuries in older people. Aust NZ J Public Health. 2016;40:342-8. [DOI]
13. Glance LG, Stone PW, Mukamel DB, Dick AW. Increases in mortality, length of stay, and cost associated with hospital-acquired infections in trauma patients. Arch Surg. 2011;146(7):794-801. [DOI]
14. Mitchell BG, Ferguson JK, Anderson M, Sear J, Barnett A. Length of stay and mortality associated with healthcare-associated urinary tract infections: a multi-state model. J Hosp Infect. 2016;93(1):92-9. [DOI]
15. Smith EJ, Kuang X, Pandarinath R. Comparing hospital outcomes between open and closed tibia fractures treated with intramedullary fixation. Injury. 2017;48(7):1609-12. [DOI]
16. Wurdemann FS, Smeeing DPJ, Ferree S, Nawijn F, Verleisdonk EJMM, Leenen LPH, Houwert RM, Hietbrink F. Differentiation in an inclusive trauma system : allocation of lower extremity fractures. World Journal of Emergency Surgery. 2018;13(18). [DOI]
17. Ristic DZ, Jovanovic ND, Cvetkovic V, Vracevic BD. Length of hospitalization of patients with ankle fracture. Acta Chirurgica Iugoslavica. 2011;58(1):73-6. [DOI]
18. Krell RW, Girotti ME, Dimick JB. Extended length of stay after surgery: complications, inefficient practice, or sick patients? JAMA Surg. 2014;149(8):815-20. [DOI]
19. Tan ST, Tan WP, Jaipaul J, Chan SP, Sathappan SS. Clinical outcomes and hospital length of stay in 2,756 elderly patients with hip fractures: a comparison of surgical and non-surgical management. Singapore Med J. 2017;58(5):253-7. [DOI]