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Outcome of Patients with Emergency Revisits at a Tertiary Care Hospital of Eastern Nepal: an Observational Study

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Abstract

Background: A return visit to the emergency department by the same patient within a stipulated time frame has implications in quality of care provided as well as overcrowding. We aimed to find out the outcome and describe the characteristics of the patients presenting with revisits to emergency.

Methods: This hospital based observational study recruited all consecutive cases with revisits within 30 days to emergency department from February to August 2019 after ethical approval. Clinical presentation and outcome were noted.

Results: Out of 21,215 discharges from the emergency during the study period, 176 patients had revisits (0.829%). The mean age (SD, 95% CI) was 49.74 (18.77, 46 to 52) years with male: female ratio of 1.02. The mean number of days (SD, 95% CI) for revisit was 4.94 (4.92, 4 to 5). Deterioration in triage category was seen in 33.5%; 11.9% had an 'improved triage category'. High acuity triage score during revisit was 38%. Common revisit diagnosis was chronic kidney disease (35.8%) and infections (30.1%). Revisit diagnostic category change was seen in 20%, with mortality of 6.25%. Patients requiring admission returned within a mean of 4 days (SD, 95% CI = 3.6, 3.3 to 4.9) compared to 6 days (5.6, 4.5 to 6.8) for non-admitted patients. Early revisits ($p = 0.040$), lower systolic blood pressure at index visit ($p = 0.001$) and revisit ($p = 0.002$) were associated with admissions.

Conclusion: Revisits were common in the earlier days of the initial discharge from the emergency. Chronic problems tended to revisit more.

Keywords: Emergency; Nepal; Outcome; Revisits.

Declarations

Ethics approval and consent to participate: Ethical approval was obtained from Institutional review committee, BPKIHS, Dharan, Nepal (Ref. no.: 281/075/076- IRC) and informed consent was taken from the participants.

Consent for publication: Not applicable

Availability of data and materials: The data supporting the findings of this article are available from the corresponding author.

Competing interest: None

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A revisit to the emergency department by the same patient within a stipulated time frame leads to overcrowding of busy emergency clinic and has implications in quality of care provided. Factors like older age, lack of family support, inadequate medical care, disease type, insurance coverage, inadequate discharge instructions can impact the rate of revisit to emergency [1 - 4]. Literature review shows emergency revisits from 0.39% to 5.8% for emergency care in adults [2 - 9].

Although some emergency revisits may be inadvertent, others may be avoidable and amenable to interventions for improving emergency care. Different time frames from two to thirty days have been used to assess the adverse events after emergency discharge although with limited rationale [2 - 5, 10]. Irrespective of the defining time frame, emergency revisits pose a problem to already stretched emergency with overcrowding. Revisits have a higher morbidity and mortality related to both the doctor factor and disease characteristics and progression [11], with studies showing ward admission in 22% to 48% and intensive care unit admission in 4.2% to 6.1%, with mortality during hospitalization in 4.1% [1, 6, 12 - 15]. The study objectives were to find out the outcome and describe the characteristics of the patients presenting with revisits to emergency department.

METHODS

This hospital based cross-sectional observational study was conducted in the emergency of B. P. Koirala Institute of Health Sciences (BPKIHS), a medical institute in the eastern part of Nepal. The emergency has an average patient flow of 130 per day [16]. Samples were recruited from February 2019 to August 2019. Consecutive cases with revisits over 30 days to emergency was used until desired number was reached. An information sheet was used to explain the purpose of the study and other details. Informed consent was taken from all patients before interview and ethical approval was taken from Institutional Review Committee, BPKIHS.

Considering the prevalence of admission from emergency for revisit cases as 35.4% [1], and with 20% precision and 95% confidence level, sample size was calculated to be 174 using the formula– $n = Za^2 PQ/L^2$. So a total of 176 samples were taken for this study.

The current emergency department patient flow starts with a system of triage and allocation of treatment area. The patient is subsequently cared by an emergency doctor until the safe disposition of patient either to discharge or referrals and admission to concerned departments as necessary after detailed evaluation. The patients were recruited at the presentation by a triage nurse. A single question was asked by the triage nurse "Have you visited emergency as a patient within past 30 days?" If the response was affirmative the patient file was stamped as a 'revisit' and the researcher was informed. Emergency revisit was defined as "a subsequent emergency visit by the same person for the same problem or related problem within 30 days" and consecutive revisit cases meeting the definition were recruited into the study until the required sample size was met [10]. Same or related problem was defined as patients returning with same complain, and/ or diagnosis, and/ or self-reporting of apparent worsening of their previous presentation in the Emergency [3, 10]. Patients who had multiple episodes of admission

Table 1: Population characteristics (n = 176). Values are presented as percentage or median, interquartile range.

Characteristics		Value
Gender	Female	49.4%
Marital status	Married	64.2 %
	Single, widowed, divorced	19.3, 15.9, 0.6%
Family support	1st degree relatives	88%
	Living alone/with distant relatives	12%
Literacy	Literate	63.5%
Retired from active job		35%
Economically dependent		65.3%
Family income/month in Rupees (median, Q1, Q3)		47500, 30000, 60000#
High acuity triage presentations at index visit		25%
High acuity triage presentations during revisit		38%
Activities of daily living (Total score 20)	Mild impairment (18 - 20)	56.8%
	Moderate impairment (12 - 18)	29.5%
	Severe impairment (4 - 12)	11.3%
	Complete dependency (0 - 4)	2.3%
Comorbidity and long term medication		73%
Non-compliance to medication		17%

 # 1 U.S dollar equals 120 Nepalese Rupees in average

separated in time were counted multiple times. The revisit was the index visit for another revisit if made. The patients who refused to consent to the study after explanation and had no record of index visit were excluded from the study.

Variables of interest were the socio-demographic profile, triage score, clinical details, time of visit, which were included for both the visits whereas outcome was recorded for revisit with the help of a preformed questionnaire. Australasian Triage Scale (ATS) graded from I to V, the current triage score currently in use in our Emergency was used as a surrogate marker for the patients' severity and urgency for emergency care required during the revisit. The urgency of care required was graded from ATS I needing most urgent care to ATS V needing least urgent care. Barthel index was used to assess activity of daily living [17].

Data was entered in Microsoft Excel software and imported to IBM SPSS software 21.0 for statistical analysis. Descriptive analysis was performed using frequency and percentage. Continuous data was described using median and quartiles or mean with standard deviation and 95% confidence interval. Inferential statistics like chi square test and t test were used to test association between admitted and non-admitted cases with level of significance at 5%.

RESULTS

Out of 21,215 discharges from the emergency, 176 had revisits to emergency (0.83%) over a period of 210 days. The mean age (SD, 95% CI) of presentation was 49.74 (18.77, 46 to 52) y with a male: female ratio of 1.02 **(Table 1)**.

The median number of days (Q1, Q3, minimum, maximum) taken for revisit after the index visit was 3 (2, 5.75, 0, 29) days **(Fig. 1)**. Half of revisits were made during the hours when the outpatient visits were not possible in the hospital **(Fig. 2, 3)**. 75.56% of patients who visited during night hours during the index visit had revisit to the emergency. Our study also showed that most of the visits and revisits were made during the night hours. Revisits were most common during weekends (37%).

Index visits were labeled as high acuity needing urgent care in 25% (n = 44), all were triage category 2. During revisits high acuity patients by triage category needing urgent care was 38% (n = 67) with 65 patients being labeled as triage category 2 and one patient being

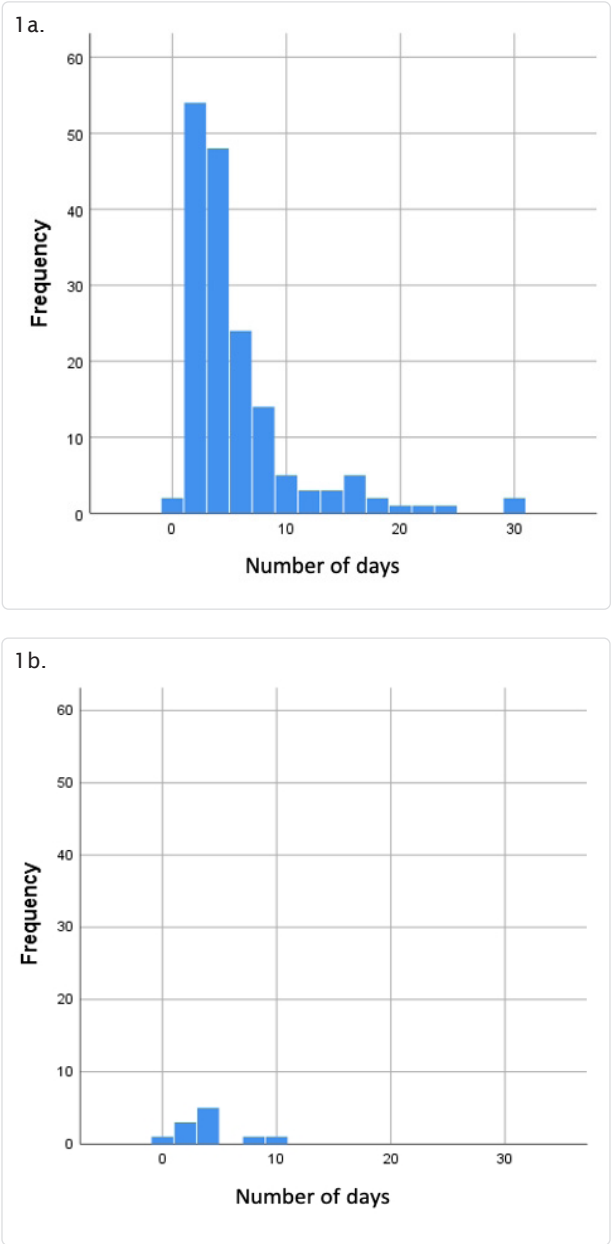

Figure 1: Number of days to revisit emergency in a. no mortality group, and b. mortality group

labeled as triage category 1. During revisit, a change to 'deterioration in triage category' was seen in 33.5% while 11.9% had an 'improved triage category' and the rest remained the same.

Shortness of breath was the most frequent complaint, 45% at index and 31% at revisit, followed by fever, 16% at both index and revisit. Same complaint during both visits was noted in 54.5% while 45.5% presented with different but related complaints. The most frequent index diagnosis was chronic kidney disease (36.4%) followed by infections (33%). Revisit

Table 2: Cross-tabulation of index and revisit diagnosis (n = 176). Values are presented as number.

		Diagnosis at revisit						
		CKD	**Infection**	**Heart failure**	**COPD**	**Pain**	**Others**	**Total**
Diagnosis at index visit	CKD	61	2	0	0	0	1	64
	Infection	1	45	1	0	2	9	58
	Heart failure	0	0	13	0	0	0	13
	COPD	0	1	0	7	0	2	10
	Pain	0	3	0	1	8	**3**	15
	Others	1	2	0	1	1	11	16
	Total	63	53	14	9	11	26	176

CKD: Chronic kidney disease; COPD: chronic obstructive pulmonary disease

Table 3: Comparison of characteristics in admitted and non-admitted patients (n = 176). Values are presented as mean (SD) or number.

Characteristics		**Admitted (n = 78)**	**Non-admitted (n = 98)**	**p- value**
Age (years)		51 (19)	48 (18)	0.24*
Gender	Male	34	55	0.09**
	Female	44	43	
Marital status	Married	21	13	0.04**
	No partner	57	85	
Income (Thousand)		49 (18)	42 (16)	0.02*
Time to revisit (days)		4 (3.6)	6 (5.6)	0.04*
BP at index visit (mmHg)	Systolic BP	119 (19)	132 (20)	0.001*
	Diastolic BP	77 (10)	84 (11)	0.001*
BP at revisit (mmHg)	Systolic BP	116 (28)	130 (30)	0.002*
	Diastolic BP	71 (15)	81 (17)	0.001*
Triage category at index visit	High acuity	22	22	0.38**
	Low Acuity	56	76	
Vehicle taken during revisit	Ambulance	57	52	0.008**
	Other transport	21	46	
Family currently staying with	1st degree relative	63	92	0.02**
	Living alone/ distant relatives	15	6	

*BP: Blood pressure. mmHg: millimeters of mercury. *student's t test, ** chi square test*

diagnosis was similar with chronic kidney disease (35.8%) and infection (30.1%), however a change in provisional diagnosis was made in 31 cases (18%) during revisit **(Table 2)**.

The in-hospital mortality was 6.25% (n = 11)– 3 patients died during the emergency stay and 8 died later after admission to ward. Patients who suffered mortality had returned earlier for revisit (mean 3.5 days, SD 2.7, 95% CI 1.7 to 5) compared to non-mortality group (mean 5, SD 5, 95% CI 4 to 5) (p = 0.3) **(Fig. 2)**. The presenting mean systolic and diastolic blood pressure was also lower in mortality group (84/52 mmHg vs. 127/79 mmHg, p = 0.001 for systolic and 0.002 for diastolic blood pressure).

The hospital admission rate was 44.31% (n = 78) with 70 admitted to general ward, 5 to intensive care unit (ICU) and 3 to coronary care unit (CCU). Three patients left emergency against medical advice and 6 patients were referred to other center for critical care due to unavailability of ICU beds. Patients requiring admission returned within the mean (SD, 95% CI) time frame of 4 days (3.6, 3.3 to 4.9) compared to 6 days (5.6, 4.5 to 6.8) for non-admitted patients. Early revisits (p = 0.040), lower systolic blood pressure at index visit

(p = 0.001) and at revisit (p = 0.002), lower diastolic blood pressure at index visit (p = 0.001) and at revisit (p = 0.001), marital status (p = 0.043), income (p = 0.021), transportation by ambulance during revisit (p = 0.008) and living with 1st degree relative (p = 0.024) were associated with hospital admission **(Table 3)**.

DISCUSSION

Urgency of clinical symptoms, round the clock services and the ease of access can influence the choices of patients seeking and re-seeking emergency care. A description of revisit patients is important as this cohort is more liable to adverse outcomes. This also helps to analyze the deficiencies in emergency care and help in counseling. Our study used a cut off of 30 days to describe the characteristics of return visits to emergency, the longest range of time that has been previously used to have an idea on the time spread to revisit as it is one of the few study of its kind in the country [2 - 5]. Previous authors have used different time frames with different rationale. Shorter time frames around a week have been recommended as cut offs as they allow a better opportunity to identify quality assurance issues and most of the adverse events occur around that time [3, 18, 19]. This study is probably the first study from Nepal that has looked at revisits to Emergency over a period of thirty days although the median number of days from index visits in our study was 3 days with 75% of the revisits occurring within 6 days and 90% by 10 days. This finding is in contrast with some authors who report less than 10% revisit within this time frame [10, 20]. The distribution of diagnosis shows a predominance of chronic kidney disease patients which suggest that the recurrent use of emergency was a part of ongoing need for dialysis and other sociological causes. Revisits occurred during all parts of the day with lesser number during late nights and comparable with everyday patient flow.

A wide range of mortality rate from 0.05% to 32% [18, 19] were previously reported when the revisit time was around a week. In our study although 30 days' revisit was used as a criterion most of the deaths (n = 10) occurred within revisits of one week. The pattern of disease, chronicity of problem and late presentations might have resulted in this. However, it requires a closer look to improve the disposition decisions in our emergency.

Previous researchers have identified factors like high grade triage, older age, doctor based factors, fever,

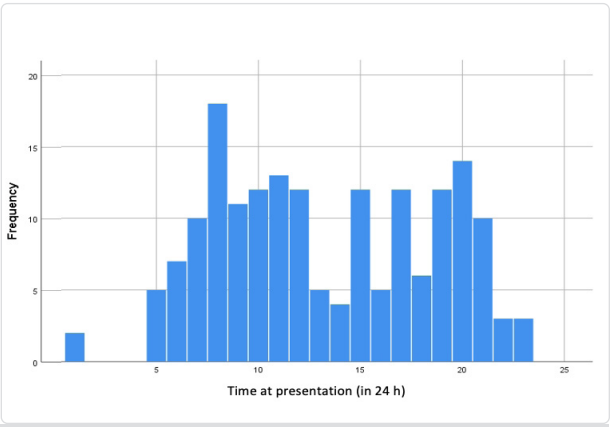

Figure 2: Time of presentation to emergency during index visit.

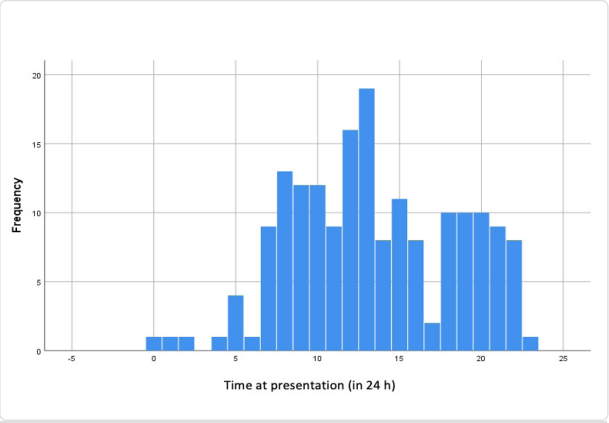

Figure 3: Time of presentation to emergency during emergency revisit.

living alone, insurance status, psychiatric patients, substance abuse, habitual use of emergency, non-compliance, malingering and social problems, physician related factors, co-morbidities and short observation period for problems like dyspnea to be associated with revisits [1, 21 - 25]. There is a large proportion of high acuity triage presentations both in index as well as later presentations in our recruited sample. Economic dependency (65%), lack of an active job and spouse (35% each), shortness of breath (40%) and fever (16%) also characterized return visits to emergency at our center. Uneven distribution of health resources that characterize developing countries like Nepal also place a burden on tertiary care emergency centers that require a constant turnover of patients for its smooth function. Access block to admissions and overcrowding further may augment the problem leading to lesser observation times in emergency. An example of this is patients requiring dialysis presented more to our emergency due to the failure of regular dialysis appointments, in

addition to other urgent indications.

The rate of 0.83% return visits in our emergency is on the lower side when compared to other reports ranging 0.39% to 5.8% in adults [2 - 5, 8, 9]. Those who returned earlier were more likely to be admitted. Our admission rate in general ward (44%) was higher than others (22% to 35%) but ICU admissions were comparatively less [1, 11, 26]. This is an interesting finding as a large number of cases were high acuity presentation. A majority of admissions at revisits may have been due to socio-geographical and economic reasons. A limited insurance coverage in the country, reluctance to get admitted in ICU, and limited ICU beds could also be contributory to this pattern of admission. A change in diagnosis was noticed in one fifth of return visits compared to study by Chie-Lung Wu et al. who reported 4% diagnosis change and these patients were more likely to be admitted [25].

Due to complex interaction of causes including increasing number of patients presenting to the emergency, providing a consistent high level of quality of care has become complex and difficult in modern emergency. Poor quality of emergency service is usually blamed when patients return shortly after being discharged [27]. Kelly et al. suggested that seniority of emergency physicians likely reduce the rate of revisits [14]. Similarly, our study also showed that most of the revisits were made during the night time when the number of senior physicians are sparse. A thin line exists between safe and unsafe patient discharge from the emergency. Due to overcrowding, time pressure, stress, higher density of critically ill patients, and to keep rapid turnover of the patients, emergency physicians tend to concentrate more on those needing immediate disposition to ward and critically ill unit. This may lead to a relative under focus on patient with non-obvious presentation or those needing detailed evaluation. Emergency revisit is a multifactorial problem and needs a multipronged approach like better patient education and comprehension, extensive re-evaluation at the time of discharge and protocols to identify high risk patients in time. This is a single centered study from eastern part of the country. Larger multicenter study should be done to explore the topic further.

CONCLUSION

Revisits were common in the earlier days of the discharge from the emergency. Patients with chronic problems tended to revisit more. Most of the patients who revisited were subsequently admitted to wards. Patients with low triage score on revisit had adverse outcomes. More observation for patients who have adverse vitals at presentation is recommended.

References

1. Hu KW, Lu YH, Lin HJ, Guo HR, Foo NP. Unscheduled return visits with and without admission post emergency department discharge. J Emerg Med. 2012;43(6):1110-8. DOI: 10.1016/j.jemermed.2012.01.062.
2. Lerman B, Kobernick MS. Return visits to the emergency department. J Emerg Med. 1987;5(5):359-62. DOI: 10.1016/0736-4679(87)90138-7.
3. Keith KD, Bocka JJ, Kobernick MS, Krome RL, Ross MA. Emergency department revisits. Ann Emerg Med. 1989;18(9):964-8. DOI: 10.1016/s0196-0644(89)80461-5.
4. Pierce JM, Kellerman AL, Oster C. "Bounces": an analysis of short-term return visits to a public hospital emergency department. Ann Emerg Med. 1990;19(7):752-7. DOI: 10.1016/s0196-0644(05)81698-1.
5. Martin-Gill C, Reiser RC. Risk factors for 72-hour admission to the ED. Am J Emerg Med. 2004;22(6):448-53. DOI: 10.1016/j.ajem.2004.07.023.
6. Hu SC. Analysis of patient revisits to the emergency department. Am J Emerg Med. 1992;10(4):366-70. DOI: 10.1016/0735-6757(92)90022-p.
7. Khan NU, Razzak JA, Saleem AF, Khan UR, Mir MU, Aashiq B. Unplanned return visit to emergency department: a descriptive study from a tertiary care hospital in a low-income country. Eur J Emerg Med. 2011;18(5):276-8. DOI: 10.1097/MEJ.0b013e3283449100.
8. Berwick DM, Hackbarth AD. Eliminating waste in US health care. JAMA. 2012;307(14):1513-6. DOI: 10.1001/jama.2012.362.
9. Boutwell A, Jencks S, Nielsen G, Rutherford P. State Action on Avoidable Rehospitalizations (STAAR) Initiative: applying early evidence and experience in front-line process improvements to develop a state-based strategy. Cambridge, IHI. 2009. Assessed from https://www.ihi.org/engage/initiatives/completed/STAAR/Documents/STAAR%20State%20Based%20Strategy.pdf
10. Rising KL, Victor TW, Hollander JE, Carr BG. Patient returns to the emergency department: the time-to-return curve. Acad Emerg Med. 2014;21(8):864-71. DOI: 10.1111/acem.12442.
11. Tsai IT, Sun CK, Chang CS, Lee KH, Liang CY, Hsu CW. Characteristics and outcomes of patients with emergency department revisits within 72 hours and subsequent admission to the intensive care unit. Ci Ji Yi Xue Za Zhi. 2016;28(4):151-156. DOI: 10.1016/j.tcmj.2016.07.002.
12. Fan JS, Kao WF, Yen DH, Wang LM, Huang CI, Lee CH. Risk factors and prognostic predictors of unexpected intensive care unit admission within 3 days after ED discharge. Am J Emerg Med. 2007;25(9):1009-14. DOI: 10.1016/j.ajem.2007.03.005.
13. Kelly AM, Chirnside AM, Curry CH. An analysis of unscheduled return visits to an urban emergency department. N Z Med J. 1993;106(961):334-6. PMID: 8341474.
14. Lindsay P, Schull M, Bronskill S, Anderson G. The development of

indicators to measure the quality of clinical care in emergency departments following a modified-delphi approach. Acad Emerg Med. 2002;9(11):1131-9. DOI: 10.1111/j.1553-2712.2002.tb01567.x.
15. Ng CP, Chung CH. An analysis of unscheduled return visits to the accident and emergency department of a general public hospital. Hong Kong Journal of Emergency Medicine. 2003;10(3):153-61. DOI: 10.1177/102490790301000304
16. Annual report 2019-20 and plan of action 2020-21. Dharan: BP Koirala Institute of Health Sciences, Dharan, Nepal; 2019. p. 363-7.
17. Barthel Index of Activities of Daily Living. Available from https://www.albertahealthservices.ca/assets/about/scn/ahs-scn-bjh-hf-barthel-index-of-adls.pdf (last accessed 16 December 2022)
18. Tsai IT, Sun CK, Chang CS, Lee KH, Liang CY, Hsu CW. Characteristics and outcomes of patients with emergency department revisits within 72 hours and subsequent admission to the intensive care unit. Ci Ji Yi Xue Za Zhi. 2016;28(4):151-6. doi: 10.1016/j.tcmj.2016.07.002.
19. Gabayan GZ, Derose SF, Asch SM, Yiu S, Lancaster EM, Poon KT, et al. Patterns and predictors of short-term death after emergency department discharge. Ann Emerg Med. 2011;58(6):551-8.e2. DOI: 10.1016/j.annemergmed.2011.07.001.
20. Pham JC, Kirsch TD, Hill PM, DeRuggerio K, Hoffmann B. Seventy-two-hour returns may not be a good indicator of safety in the emergency department: a national study. Acad Emerg Med. 2011;18(4):390-7. DOI: 10.1111/j.1553-2712.2011.01042.x.
21. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med. 2009;360(14):1418-28. DOI: 10.1056/NEJMsa0803563.
22. Goodman DC, Fisher ES, Chang CH. After Hospitalization: A Dartmouth Atlas Report on Post-Acute Care for Medicare Beneficiaries. Lebanon (NH): The Dartmouth Institute for Health Policy and Clinical Practice; September 28, 2011. PMID: 36516283
23. Rising KL, Padrez KA, O'Brien M, Hollander JE, Carr BG, Shea JA. Return visits to the emergency department: the patient perspective. Ann Emerg Med. 2015;65(4):377-386.e3. DOI: 10.1016/j.annemergmed.2014.07.015.
24. Nunez S, Hexdall A, Aguirre-Jaime A. Unscheduled returns to the emergency department: an outcome of medical errors? Qual Saf Health Care. 2006;15(2):102-8. DOI: 10.1136/qshc.2005.016618.
25. Wu CL, Wang FT, Chiang YC, Chiu YF, Lin TG, Fu LF, et al. Rates and causes of emergency department revisits within 48 Hours. Kuang Tien Medical Journal. 2008;3(5):9-20. Corpus ID: 86407652
26. Loi SL, HjFauzi MH, Md Noh AY. Unscheduled early revisit to emergency department. Hong Kong Journal of Emergency Medicine. 2018;25(5):264-71. DOI: 10.1177/1024907918767012
27. Rogers JT. Risk management in emergency medicine. Dallas: American College of Emergency Physicians 1985.