



ORIGINAL ARTICLE

Evaluating the Causes and Frequency of Frequent Referral to the Emergency Department of Imam Khomeini Educational Hospital in SariFatemeh Jahanian¹, Sahar Khatti², Alireza Salehi², Hamed Aminiahidashti¹, Seyed Hossein Montazer^{1*}¹ Department of Emergency Medicine, Imam Khomeini Hospital, Mazandaran University of Medical Sciences, Sari, Iran² Student Research Committee, Faculty of Medicine, Mazandaran University of Medical Sciences, Sari, Iran* Corresponding Author: Seyed Hossein Montazer, E-mail: hmontazer66@yahoo.com**ARTICLE INFO***Article history*

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Introduction: Emergency department is one of the most important units of a hospital. In general, the most serious cases are referred to emergency department, and the highest numbers of hospital admissions occur in the emergency department. This study aimed to obtain a comprehensive estimate of the number of frequent visitors to the emergency department of Imam Khomeini educational hospital, Sari. **Materials and Methods:** This cross-sectional descriptive study was performed retrospectively by referring to the patient medical records at the Sari Imam Khomeini education hospital. The records were screened to identify frequent emergency department visitors in 2017. Data analysis was performed using SPSS 21. **Results:** The number of emergency department visitors in the Sari Imam Khomeini Hospital in 2017 was 29,765; of them, 594 (6.2%) were repeat visitors and were included in this study. The mean age of the frequent emergency department visitors was 56.17 years. The most common complaint was weakness and lethargy in 39.9% patients, abdominal pain in 30%, shortness of breath in 14%, and other causes in 14%. The most common underlying disorders were anemia, followed by obstruction pulmonary disease. **Conclusion:** We obtained detailed data of frequent emergency department visitors to aid the development of suitable evidence-based policies. New policies are necessary for the management of various sections of the emergency department and inpatient admissions. Such policies will allow better decision-making for non-emergency patients and outpatient admissions.

INTRODUCTION

Emergency department (ED) is one of the most important units of a hospital for providing care (1). ED is the front line of hospital and is responsible for managing medical emergencies and tending to patients in poor condition, such as people injured in disasters and accidents. In general, the most serious cases are referred to ED, and the highest number of hospital admissions occurs in the ED (2). The main task of the ED is to prevent death, particularly by performing cardiopulmonary resuscitation. Therefore, the most critical cases are first admitted to the ED, and then after being stabilized, these cases are either discharged or transferred to relevant wards (3). In the USA, 36% increase in the number of ED visitors was observed from 1996 to 2006 (2, 4, 5).

Various worldwide studies have reported that ED is also involved in the non-emergency and repetitive care for many patients (6). ED is one of the main wards of the hospital that provides care to several referring patients (7). Prompt

diagnosis of the critical cases and on-time implementation of vital life-saving measures are possible only on the basis of triage and prioritizing of patients (8). Recently, the increase in the number of frequent ED visitors (ED overcrowding) has attracted attention, and questions are being raised as to why these patients choose ED for their care (6, 9). ED overcrowding is a serious dilemma in a health care system (10) that may affect the quality of the provided care; patients may not receive adequate diagnostic and therapeutic services, leading to readmission of patients to the ED (11). Readmission to the ED increases the financial burden of the hospital (12), the patients, and the health care system (13). Frequent readmission is expensive and sometimes life-threatening for the patients when they do not follow up (14). One study has reported that half of the accidents leading to deaths are due to delay in treatment (15).

Considering the increasing rate of such incidences in Iran, the increasing cost directly and indirectly imposed on the health care system, and the initial speed of service in

hospitals, especially in ED, it is necessary to identify and reduce the number of frequent ED visitors. In a medical emergency, time is a critical and determinative factor for life and death of the patient. ED plays a critical role in providing immediate medical care to the patients and performing emergency therapeutic interventions and is, thus, a crucial unit of a hospital (16). This study aimed to obtain a comprehensive estimate of the number of frequent ED visitors in the Sari Imam Khomeini educational hospital. The obtained data were analyzed statistically, and the results could help policymakers in developing evidence-based healthcare policies.

MATERIALS AND METHODS

This cross-sectional descriptive study was performed retrospectively by referring to the patient medical records at the Sari Imam Khomeini education hospital. The medical records of frequent ED visitors in April through February of 2017 were identified and included in this study. Frequent visits were defined as more than two visits per month or more than four visits per year. Data such as the main complaint, duration of inpatient and emergency stay, illness, age, sex, alcohol consumption, smoking, occupation, education, and opium addiction were extracted. If the data were incomplete or missing, the respective patients were called. The medical records of patients <18 years old or with unstable vital signs (heart rate > 140 beats/min; systolic blood pressure < 90 mmHg; respiratory rate > 28 breaths/min) and outpatients referring for control or removal of sutures were excluded.

This study was approved by the Deputy of Research and Technology of Mazandaran University of Medical Sciences (code number: 1111) and followed the code of ethics established by the Research Ethics Committee of the University (code of ethics IR.MAZUMS.REC.1397.1111).

Quantitative data are presented as the mean and standard deviation or frequency and percentage. The distribution of quantitative data was evaluated using a histogram to determine the type of tests to be performed. Correlation was evaluated using Pearson's or Spearman's correlation coefficient. Data analyses were performed using IBM SPSS version 21. P values < 0.05 were considered as significant.

RESULTS

The number of ED visitors in the Sari Imam Khomeini Hospital in 2017 was 29,765; of them, 594 (6.2%) were repeat visitors and were, thus, included in the study. The mean age of the frequent ED visitors was 56.17 ± 15.6 years (range: 18–85 years). Of the 594 patients, 300 (50.5%) were male and 294 (49.5%) were female. The average number of visits was 6.95 ± 2.11 , and the lowest and highest numbers of visits were 4 and 13, respectively. Of the 594 patients, 342 (57.6%) and 252 (42.4%) were rural and urban residents, respectively. In addition, 203 (34.2%) were smokers, 45 (7.6%) used to drink alcohol, and 122 (20.5%) were addict-

ed to opium. Furthermore, 57.7% patients were jobless, 6.7% were employed, and 16.7% had free job. With respect to education status, 43.6% patients had primary school education, 32% were illiterate, and 1.2% was postgraduate.

The main complaints of patients at the time of visit are listed in Figure 1. The most common complaints were weakness and lethargy in 39.9% patients, abdominal pain in 30%, shortness of breath in 14%, and other causes in 14%.

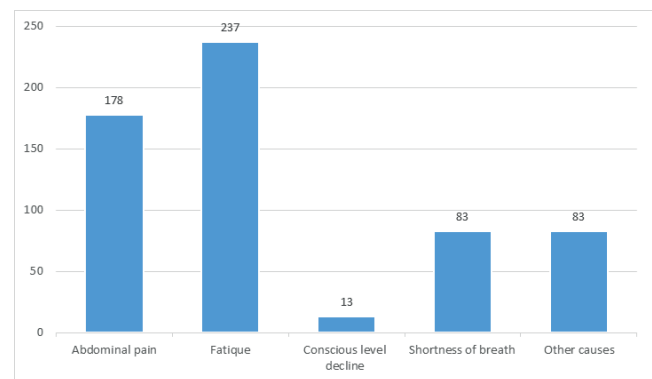


Figure 1. Frequency of the main complaints of frequent visitors to the emergency department

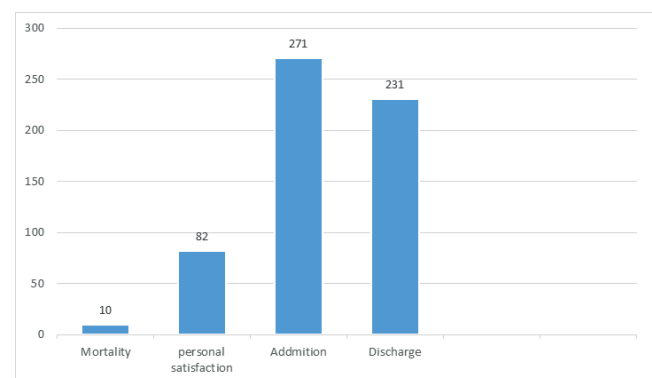


Figure 2. Frequency of final outcomes in frequent visitors to the emergency department

The underlying diseases of the patients are listed in Table 1. The most common underlying disease was anemia, followed by obstructive pulmonary disease, diabetes, and then liver cirrhosis. They were evaluated based on the final diagnosis, and the results are given in Table 2. Recurrence of the underlying disease was observed in 5.69% patients, sepsis in 6.5%, drug toxicity in 9.1%, and other conditions in 23.1%. The final outcomes of ED patients are listed in Table 2. The outcome was death in 7.1% patients, satisfactory treatment in 13.8%, admission in 45.6%, and discharge in 38.9%. Hospitalization duration was <1 day for 368 (62%) patients, 1–3 days for 148 (24.9%) patients, and >3 days for 78 (13.1%) patients. The relationship of the frequency of visits with the variables of occupation, main complaint, and final outcome revealed a significant relationship between the number of visits and occupation, with the number being higher in jobless and free-job patients ($P = 0.001$). A signifi-

Table 1. Frequency of underlying diseases in frequent visitors to the emergency department

Underlying disease	Percent	Frequency
Obstructive pulmonary disease	122	20.5
Liver cirrhosis (Tap ascites fluid)	85	14.3
Anemia (Hb < 10 mmHg)	160	26.9
Diabetes	91	15.3
Other underlying illnesses	82	13.8
No underlying illness	54	9.1
Total	594	100.0

Abbreviations; Hb: hemoglobin, mmHg: millimeter of mercury

cant relationship was also observed between the frequency of visits and gender, i.e., 6.93 ± 1.94 visits were by males and 6.98 ± 2.28 visits were by females ($P = 0.761$) (Table 3).

Table 2. Frequency of final diagnosis in frequent visitors to the emergency department

Final diagnosis	Frequency	%
Obstructive pulmonary disease	413	69.5
Liver cirrhosis (Tap ascites fluid)	33	5.6
Anemia (Hb < 10 mmHg)	11	1.9
Diabetes	137	23.1
Other underlying illnesses	594	100.0

Table 3. The Relationship of the number of visits with gender variables, occupation, main complaint, and final diagnosis

Variable		Mean	Standard deviation	P-value
Occupation	Jobless	7.12	2.23	00.01
	Manual worker	6.25	1.80	
	Employee	6.72	2.18	
	Free job	7.26	1.83	
Main complaint	Abdominal pain	6.91	2.05	0.744
	Weakness and lethargy	7.00	2.18	
	Loss of consciousness	6.30	2.09	
	Shortness of breath	7.10	1.90	
	Other causes	6.86	2.33	
Final diagnosis	Underlying disease recurrence	6.96	2.22	0.877
	Sepsis	7.21	1.55	
	Drug poisoning	7.00	1.34	
	Others	6.87	1.96	

cant relationship was also observed between the frequency of visits and gender, i.e., 6.93 ± 1.94 visits were by males and 6.98 ± 2.28 visits were by females ($P = 0.761$) (Table 3).

DISCUSSION

In total, 594 frequent ED visitors with a mean age of 56.17 ± 15.60 years were investigated. Similar age range (45–54 years) was noted for ED visitors in the study by Norman et al. (17). Of the 594 patients in our study, 300 (50.5%) were male and 294 (49.5%) were female. The average number of visits was 6.95 ± 2.11 , with the lowest and highest numbers being 4 and 13, respectively. In Ismailia's study, 42.6% of the frequent ED visitors were male and 57.4% were female, indicating that the difference was not statistically significant (18). Further, in his study, 203 (34.2%) were smokers, 45

(7.6%) consumed alcohol, 122 (20.5%) were addicted to opium, 18.9% were laborers, 57.7% were jobless, 6.7% were employed, 16.7% had free job, and most of the frequent visitors were housewives, indicating statistical significance (18).

In our study, a significant relationship was observed between the number of visits and the occupation of patients ($P = 0.001$); the number was higher in jobless patients and those with free job. Moreover, most patients (43.6%) had an elementary school education, consistent with the study by Ismailia, who reported that 40.7% of their ED patients had guidance school education (18). The most common complaints were weakness and lethargy in 39.9% patients, abdominal pain in 30%, shortness of breath in 14%, and other causes in 14%. In Ismailia's study, the reasons for ED visits were trauma, liver and kidney diseases, digestive

diseases, infectious diseases, hematologic condition, and other diseases, in that order (18). In the study by Woo et al., the reasons for ED visits were pneumonia in 6.1% patients, alcohol use in 4.6%, stroke in 3.9%, schizophrenia in 3.2%, and high blood pressure in 3.1% (2). In our study, recurrence of underlying diseases was observed in 69.5% patients, sepsis in 5.6%, drug toxicity in 1.9%, death in 1.7%, treatment satisfaction in 13.8%, 45.6% were admitted, and 38.9% were discharged. Furthermore, hospitalization duration was <1 day in 368 (62%) patients, 1–3 days in 148 (24.9%) patients, and >3 days in 78 (13.1%) patients.

In the Ismailia's study, 13.5% of the ED visitors were repeat patients. The mean time interval between the two visits was 7.4 ± 5.8 days, being <7 days in 30 (55.6%) patients and ≥ 7 days in 24 (4.44%) patients. The frequency of ED reuse based on the age group of patients showed significant differences, with more percentage of repeat ED patients being <50 years old. In addition, the discharge rate was 64.8% in other wards and 29.6% in ED, 5.6% of which were by patients' decision (18). In the study by Lucas et al., 60% of patients had underlying or recurrent diseases; 72% of visitors' main complaint was mild or too intense, and 59% of them required immediate measures. The rate of hospitalization was estimated to be 28% among ED visitors. They found that the patients frequently used ED because they believed their condition to be severe and needed follow-up. Majority of these patients had chronic conditions and needed hospitalization (6). Joshua et al. (19) found that 9.3% of ED patients were frequent visitors. The relative risk (RR) of frequent users being homeless patients was 4.5; African-Americans, 1.8; medical sponsors, 2; patients with alcohol withdrawal, 4.4; patients with alcohol dependence, 3.4; and patients with alcohol detoxification, 2.4. The RR of frequent visitors was the lowest for patients with trauma (RR = 0.43). Data analysis showed that only 38% of frequent visitors attend the ED the next year, indicating a significant decrease in repeat visits of the ED patients in the next year. They concluded that the frequent visits to ED are associated with social issues, poverty, alcohol abuse, chronic diseases, and being homeless (19).

The significant relationship between the number of visits and occupational status identified in our study, with higher number associated with the jobless status, could be due to the inability of patients in terms of the physical situation to work. In the study by Woo et al. (2), the frequent ED users were the elderly and patients with low socioeconomic status ($P < 0.001$). In addition, the frequent ED users tended to be hospitalized, had underlying diseases, required surgery, and had a high mortality rate. The authors suggested mental health improvement and treatment of the complications caused by alcohol consumption as an effective strategy to reduce the frequency of repeat ED visits (2). Norman et al. divided the frequent ED users into the following groups: less frequent visitors (4 visits to the ED in 2012), intermediately frequent visitors (5–6 visits to the ED in 2012), more frequent visitors (7–10 visits to the ED in 2012), and highly frequent visitors (≥ 11 visits to the ED in 2012). In general,

539 patients were identified as frequent visitors; 61.41% of whom were highly frequent visitors mostly because of drug abuse, and 53.33% patients were less frequent visitors with definite medical diagnosis. This study indicated a strong relationship between substance abuse and high number of frequent visits to the ED (17). In the study by Castillo et al. (20), patients with frequent and highly frequent visits had 6–20 and ≥ 21 visits, respectively, during 12 consecutive months. Of the 925,719 ED patients, 201,6537 were repeat visitors.

The numbers of 28,596 patients as frequent ED users and 1661 patients as highly frequent ED users were identified by community approach. The difference between the above-mentioned studies and our study is in patient population, which was smaller in our study. In addition, our study is based on a single center; therefore, a multi-center study is required to confirm our findings (20). Finally, the results of this study showed the average number of frequent ED visits is seven, and the most common complaint for ED visit is weakness and lethargy, followed by abdominal pain and then shortness of breath.

The main complaints of patients at the time of visit are listed in Figure 1. The most common complaints were weakness and lethargy in 39.9% patients, abdominal pain in 30%, shortness of breath in 14%, and other causes in 14%. The underlying diseases of the patients are listed in Table 1. The most common underlying disease was anemia, followed by obstructive pulmonary disease, diabetes, and then liver cirrhosis. They were evaluated based on the final diagnosis, and the results are given in Table 2. Recurrence of the underlying disease was observed in 5.69% patients, sepsis in 6.5%, drug toxicity in 9.1%, and other conditions in 23.1%. The final outcomes of ED patients are listed in Table 2. The outcome was death in 7.1% patients, satisfactory treatment in 13.8%, admission in 45.6%, and discharge in 38.9%. Hospitalization duration was <1 day for 368 (62%) patients, 1–3 days for 148 (24.9%) patients, and >3 days for 78 (13.1%) patients. The relationship of the frequency of visits with the variables of occupation, main complaint, and final outcome revealed a significant relationship between the number of visits and occupation, with the number being higher in jobless and free-job patients ($P = 0.001$). A significant relationship was also observed between the frequency of visits and gender, i.e., 6.93 ± 1.94 visits were by males and 6.98 ± 2.28 visits were by females ($P = 0.761$) (Table 3).

CONCLUSION

We obtained detailed data of frequent ED visitors to aid the development of suitable evidence-based policies. New policies are necessary for the management of various sections of ED and inpatient admissions. Such policies will allow better decision-making for non-emergency patients and outpatient admissions.

Many of the referring patients need palliative care and short-term inpatient admission. We believe that establishing a separate center to provide palliative care for patients with

chronic illnesses will reduce the number of frequent visitors in the ED, which will help improve the care service for patients in need of emergency measures.

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AUTHOR CONTRIBUTIONS

All authors have contributed in different parts of this study.

CONFLICT OF INTERESTS

None declared.

ETHICAL STANDARDS

This study was approved by the Deputy of Research and Technology of Mazandaran University of Medical Sciences (code number: 1111) and followed the code of ethics established by the Research Ethics Committee of the University (code of ethics IR.MAZUMS.REC.1397.1111).

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