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ORIGINAL ARTICLE

The frequency and common causes of unscheduled adult emergency department return visits within 72 hours at King Fahad Specialist Hospital in Dammam: a cross-sectional study

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ABSTRACT

Background: Emergency departments (EDs) are becoming one of the most overcrowded departments globally. This study aims to investigate the frequency and causes of unscheduled patient return to the ED in King Fahad Specialist Hospital in Dammam (KFSH-D) within 72 hours of discharge.

Method: This study is a cross-sectional retrospective study done between February and May, of 2023 at KFSH-D, Saudi Arabia. A total of 295 patients were included. Patients were selected using a simple random sampling technique. Medical record numbers (MRNs) of patients with unscheduled return visits within 72 hours were gathered from the hospital's electronic medical record-integrated database (Medica Cloudcare) which were then entered into a random number generator; 295 MRNs were selected and included in the study. This study includes male and female patients older than 16 years who returned to the ED within 72 hours.

Results: Results showed cancer as the most common comorbidity resulting in revisits within 72 hours. Regarding the ED triage category, category 3 was the most common in revisiting patients (70.2%). Pain was the most common chief complaint in the initial and second visit to ED, 61.0% and 61.4%, respectively. Most of the patients return due to patient-related causes, specifically no improvement (75.3%).

Conclusion: The quality of patient care is negatively affected by the increasing patient demand. Although not much can be done for first-visit patients, some simple actions could be done to reduce the rate of second visits.

Keywords: Emergency department, revisits, unscheduled return visits, overcrowding.

Introduction

Emergency Departments (EDs) are becoming one of the most overcrowded departments globally. This phenomenon is also affecting tertiary care hospitals. Consequently, this could affect the quality of care provided by the emergency physician [1]. Evidence highlights multiple reasons for the increase in ED visits. A study conducted by Alshahrani et al. [1] found that most of the ED revisits within 72 hours due to the persistence of symptoms, inadequate care by the medical team, and being initially assessed by a resident physician [1].

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Another study conducted in tertiary care centers found that the most common cause of ED revisits was the illness-related cause (progression of the disease). In fact, more than half of the patients revisiting the ED required admission to the wards. In the same study, doctor-related factors and patient-related factors - such as missed diagnosis and leaving against medical advice (LAMA) respectively - were found as controllable causes of ED revisit [2]. Moreover, literature from Dubai found that the progression of the disease is the most common cause of ED revisits [3].

Studies conducted using the final model for Stockholm, but not in the model for Dalarna, found a significant relation between patient's academic status and ED revisits contrary to age and living accommodation [4].

Imsuwan and colleagues found that the most common chief complaints resulting in revisits were dyspnea (24.4%), abdominal pain (17.3%), and bleeding per vagina (9.1%). The rates of revisit that were related to factors of illness, patients, doctors, and healthcare system were 60.6%, 8.5%, 28.3%, and 2.6%, respectively [5].

As the causes of unscheduled ED revisit are not well understood in our region, this study aims to investigate the frequency, and the main causes, along with demographic details, presence of comorbidities, and initial visit and second visit diagnoses of unscheduled patients' return to the ED in King Fahad Specialist Hospital in Dammam (KFSH-D) within 72 hours of discharge.

Subjects and Methods

This observational cross-sectional retrospective study was done between February and May, of 2023 at KFSH-D, Saudi Arabia. All patients aged 16 or more, regardless of their gender and nationality, revisiting the ED department within 72 hours of the initial visit were included.

Patients were selected using a simple random sampling technique. Medical record numbers (MRNs) of the included patients were gathered from the hospital's electronic medical record-integrated database (Medica Cloudcare) and then entered into a random generator. 295 MRNs were selected and included in the study.

The following variables were retrieved from the Medica Cloudcare database: age, gender, initial and second visit's chief complaints, comorbidities, triage category, cause of return, and final disposition.

Data were entered and analyzed using Statistical Package for the Social Sciences v21. Descriptive statistics were presented as frequencies and percentages for the categorical variables and mean ± SD for the continuous variables. The categorical responses were compared using a chi-square test. A confidence level of 95%, a margin of error of 5%, and a p-value of < 0.05 were used.

Results

A sample of 295 return visits was included in the analysis. Of the total sample, 118 (40%) of patients were within 40-59 years of age and 5 (1.7%) of patients were within 80-99 years of age. The majority of patients (56.6%) were female, and 128 (43.4%) patients were male.

Cancer was the most common (52.2%) comorbidity in the cohort followed by hypertension (HTN) (25.1%) and diabetes mellitus (DM) (24.7%). Patients who were assigned category three on the first visit were most common (70.2%) revisiting the ED. Pain was the chief complains of 180 (61%) patients for the first visit and 181 (62.4%) for the second visit. Regarding the causes of return, 222 (75.3%) showed no improvement, 40 (13.6%) were misdiagnosed, and 47 (15.9%) came for follow-up. As per the final disposition of the patients, 217 (73.6%) were discharged and 76 (35.8%) were admitted to the wards (Tables 1 and 2).

Discussion

This study aimed to better identify the characteristics of patients returning to the ED and their chief complaints in

Table 1. *Socio-demographic and clinical characteristics of patients.*

Variable	Number (*n*)	Frequency (%)
Age (year)		
19-39	113	38.3%
40-59	118	40.0%
60-79	59	20.0%
80-99	5	1.7%
Gender		
Female	167	56.6%
Male	128	43.4%
Comorbidity		
Cancer	154	52.2%
HTN	74	25.1%
DM	73	24.7%
Cardiac disease	30	10.2%
Respiratory disease	18	6.1%
Other	145	49.2%
Triage category at initial visit		
2	1	0.3%
3	207	70.2%
4	76	25.8%
5	11	3.7%
Chief complaint at initial visit		
Pain	180	61.0%
Fever	29	9.8%
Dyspnea	7	2.4%
Vomiting and diarrhea	6	2.0%
Hemorrhage	5	1.7%
Dizziness	5	1.7%
Extremity trauma	5	1.7%
No complaint	1	0.3%
Neurological changes	1	0.3%
Other	56	19.0%
Chief complaints on the second visit	181	61.4%
Pain	30	10.2%
Fever	6	2.0%
Dyspnea	6	2.0%
Vomiting and diarrhea	5	1.7%
Hemorrhage	5	1.7%
Dizziness	2	0.7%
Neurological changes	1	0.3%
Extremity trauma	1	0.3%
No complaint	1	0.3%
Cough	57	19.3%
Other		
Final deposition		
Discharge	217	73.6%
Ward admission	76	25.8%
Transfer	1	0.3%
Intensive care unit admission	1	0.3%

both visits to understand the reasons for recurrent visits to the ED; this in return will provide objective possible recommendations to decrease the load on ED.

Table 2. *Cause of return for second visit stratified.*

Cause of return	Number (*n*)	Frequency (%)
Doctor-related causes		
Missed diagnosis	40	13.6%
Treatment error	18	6.1%
Other	8	2.7%
Patient-related causes		
No improvement	222	75.3%
Leave against medical advice	9	3.1%
Other	30	10.2%
Systems-related causes		
Follow-up	47	15.9%
Refill of medication	12	4.1%
Other	5	1.7%

In terms of patients' characteristics, our results supported other previous articles [4-7,8] that had a higher return visit in patients aged 40-59 years (40%) and females (56.6%). (Table 1) However, more recent studies [1-3,9,10] indicated that males were more likely to return to the ED. Therefore, gender is a weak predictor of patients who may return to the ED.

No sufficient number of articles cover the comorbidities in patients returning to the ED for second visits, increasing the difficulty of establishing a link between the two. Our results had the highest return percentage among cancer patients (52.2%), followed by other comorbidities (49.2%). (Table 1) On the contrary, Alshahrani et al. [1] and a Malaysian study published in 2018 found that patients with other comorbidities were more likely to return to the ED than cancer patients [1,6]. Our results could be explained by the fact that we obtained the data

Table 3. *Socio-demographic and clinical characteristics of patients stratified by final disposition.*

Variable	Ward	Discharge	ICU	Transferred	*p*-value
Age (year)					
19-39	26 (34.2%)	87 (40.1%)	0 (0.0%)	0 (0.0%)	
40-59	34 (44.7%)	84 (38.7%)	0 (0.0%)	0 (0.0%)	0.574
60-79	15 (19.7%)	42 (19.4%)	1 (100.0%)	1 (100.0%)	
80-99	1 (1.3%)	4 (1.8%)	0 (0.0%)	0 (0.0%)	
Gender					
Female	38 (50.0%)	128 (59.0%)	0 (0.0%)	1 (100.0%)	0.199
Male	38 (50.0%)	89 (41.0%)	1 (100.0%)	0 (0.0%)	
Hypertension*	6 (7.9%)	66 (30.4%)	1 (100.0%)	1 (100.0%)	<0.001
Diabetes Mellitus*	10 (13.2%)	61 (28.1%)	1 (100.0%)	1 (100.0%)	0.004
Cardiac disease*	5 (6.6%)	24 (11.1%)	1 (100.0%)	0 (0.0%)	0.103
Respiratory disease*	7 (9.2%)	11 (5.1%)	0 (0.0%)	0 (0.0%)	0.615
Cancer*	52 (68.4%)	100 (46.1%)	1 (100.0%)	1 (100.0%)	0.003
Triage category at initial visit					
2	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	
3	60 (78.9%)	145 (66.8%)	1 (100.0%)	1 (100.0%)	0.506
4	12 (15.8%)	64 (29.5%)	0 (0.0%)	0 (0.0%)	
5	4 (5.3%)	7 (3.2%)	0 (0.0%)	0 (0.0%)	
Chief complaint at initial visit					
Pain	45 (59.2%)	133 (61.3%)	1 (100.0%)	1 (100.0%)	
Fever	10 (13.2%)	19 (8.8%)	0 (0.0%)	0 (0.0%)	
Dyspnea	4 (5.3%)	3 (1.4%)	0 (0.0%)	0 (0.0%)	
Vomiting and diarrhea	2 (2.6%)	4 (1.8%)	0 (0.0%)	0 (0.0%)	
Hemorrhage	0 (0.0%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	0.943
Dizziness	0 (0.0%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	
Extremity trauma	0 (0.0%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	
No complaint	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	
Neurological changes	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	
Other	15 (19.7%)	41 (18.9%)	0 (0.0%)	0 (0.0%)	
Chief complaints at second visit					
Pain	47 (61.8%)	132 (60.8%)	1 (100.0%)	1 (100.0%)	
Fever	10 (13.2%)	20 (9.2%)	0 (0.0%)	0 (0.0%)	
Dyspnea	3 (3.9%)	3 (1.4%)	0 (0.0%)	0 (0.0%)	
Vomiting and Diarrhea	1 (1.3%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	
Hemorrhage	0 (0.0%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	0.999
Dizziness	2 (2.6%)	3 (1.4%)	0 (0.0%)	0 (0.0%)	
Neurological changes	0 (0.0%)	2 (0.9%)	0 (0.0%)	0 (0.0%)	
Extremity Trauma	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	
No complaint	0 (0.0%)1	1 (0.5%)	0 (0.0%)	0 (0.0%)	
Cough	0 (0.0%)	1 (0.5%)	0 (0.0%)	0 (0.0%)	
Other	13 (17.1%)	44 (20.3%)	0 (0.0%)	0 (0.0%)	
Missed diagnosis	10 (13.2%)	30 (13.8%)	0 (0.0%)	0 (0.0%)	0.895
Treatment error	6 (7.9%)	12 (5.5%)	0 (0.0%)	0 (0.0%)	0.856
LAMA	4 (5.3%)	5 (2.3%)	0 (0.0%)	0 (0.0%)	0.657
No improvement	66 (86.8%)	154 (71.0%)	1 (100.0%)	1 (100.0%)	0.024
Follow up	10 (13.2%)	37 (17.1%)	0 (0.0%)	0 (0.0%)	0.717

*: Comorbidities of the patients.

from a tertiary hospital with more focus on cancer and transplant patients.

Moreover, both past articles had the highest return percentage in individuals with no comorbidities followed by HTN [1,6]. Similar to our results Nasradeen et al. [8] found that most patients returning to the ED had chronic comorbidities which also prolonged their hospital stay [8]. Hypertensive patients (25.1%) were more likely to return than diabetics (24.7%) according to our results. Furthermore, Alshahrani et al. [1] findings had DM as one of the lowest comorbidities in patients returning to the ED, with bronchial asthma as the second highest. A Malaysian study had respiratory diseases as the third highest comorbidity followed by cardiac diseases [6]. Our study showed patients with cardiac diseases (10.2%) as more likely to return to the ED than patients with respiratory diseases (6.1%) (Table 1).

Triage was a significant indicator of the return of patients to the ED. Our study used the Canadian triage acuity scale as it is the scale used in our hospital. Our results were consistent with multiple articles that had the highest percentage of returning patients in triage level three (70.2%) [2,5,9,10]. While Alshahrani et al. [1] found that patients in triage level five were more likely to return. Patients in triage level two (0.3%) were the least likely to return according to Hutchinson et al. [9] and our results. The results could be attributed to the fact that level two patients received a better health care service in comparison to levels three and five.

While going through previous studies we suspected general body pain to be the highest chief complaint to present to the ED [1,5,8], which our results confirmed for the initial visit (61%) and revisit (61.4%). Moreover, Hutchinson et al. [9] found that body pain was the highest ED discharge diagnosis [8]. Other unspecified complaints (19%) were the second highest in our results. In addition, Nasradeen et al. [8] study where they found that, following pain, the highest complaints were respiratory causes, for example, cough and shortness of breath respectively. The results of Imuswan also found that complaint of pain was also followed by dyspnea [5]. In contrast, our results showed dyspnea (2.4%) as the fourth-highest chief complaint after fever (9.8%), possibly due to post-chemotherapy side effects. We had a small amount of people presenting to the ED with the following chief complaints vomiting and diarrhea (2%), dizziness (1.7%), hemorrhage (1.7%), extremity trauma (1.7%), and neurological changes (0.3%), which also could be attributed to our results being collected in a tertiary hospital.

A problem we faced is that subgroups were not unified across past papers increasing the difficulty to identify the main cause. Our study had three main groups and nine subgroups. The first group is doctor-related (missed diagnosis, treatment error, and other), the second group is patient-related (LAMA, no improvement and other) and the third group is system-related (follow-up, refill of medication, and other). The highest cause of revisits from our results was no improvement of symptoms (75.3%). Moreover, Alshahrani et al. [1] found that the recurrence of the same complaint is the highest cause of revisits [1]. This could be solved by adequate analgesia, patient counseling, etc. Furthermore, follow-up with patients was the second-highest (15.9%), which is also the highest for system-related causes in a previous article [1]. In doctor-related causes, the highest was missed diagnosis (13.6%) which is similar to Alshahrani et al. [1] results (Table 2).

The majority of our revisits were discharged (73.6%), followed by (25.8%) getting admitted to wards, and only (0.3%) were admitted to the intensive care unit. These results support previous articles [5,8]. Furthermore, only (0.3%) were transferred to another hospital contrary to Sah et al. [2] results which had the most patients transferred to other hospitals.

Finally, the final disposition of patients in connection with their characteristics and comorbidities is of note. The majority of the patients (40.1%) aged 19-39 years were discharged after their first visit, while the majority of patients (44.7%) aged 40-59 years were admitted to the ward. However, this association of disposition with age was not statistically significant ($p = 0.574$). Females were more likely to be discharged (59.0%) while an equal proportion of females (50.0%) and males (50.0%) were admitted to wards. No significant association was found between gender and final disposition ($p = 0.199$). Patients with HTN and DM were significantly more likely to be discharged (30.4% and 28.1%, respectively) with $p < 0.001$ and $p = 0.004$, respectively. On the other hand, cancer was significantly ($p = 0.003$) associated with ward admission and discharge. Pain was found to be the most frequent chief complaint at both initial and second visits for patients who were admitted to wards and discharged, however, its association was not statistically significant ($p = 0.943$ and $p = 0.999$, respectively). 'No improvement in clinical status' were statistically ($p = 0.024$) more likely to be admitted to the ward (86.8%) than being discharged (71.0%) (Table 3).

Strengths and limitations

This study has multiple limitations and strengths. Firstly, its cross-sectional study design limits our analysis to establish a longitudinal association between patient characteristics and return visits. However, this limitation does not undermine the study's aim of identifying immediate factors contributing to ED revisits. Secondly, this study was conducted at a single-center tertiary care hospital with a focus on oncology resulting in a small cohort, which limits this study's generalizability across other EDs. However, this study's unique setting provides a complex sample of patients that are often underrepresented in literature. This study conducted a comprehensive data collection on patient demographics, comorbidities, and chief complaints, allowing for a detailed analysis of recurrent ED visits. This highlights the important variables that need to be studied and offers an avenue for future research.

Conclusion

The ED handles a wide range of cases every day ranging from life-threatening cases to simple common cold cases. When patients are improperly managed, they are bound

to revisit the ED. As a result, the demand for the ED will eventually increase. In return, the quality of patient care would be negatively affected as well as increases health care staff's workload. Although not much can be done to control first-visit patients, some simple actions could be done to reduce the rate of second visits especially when correctly understanding the underlying causes of such recurrence. In this study, most patients revisiting the ED for the second time present with the same complaint on the first visit. The most common complaints were pain, fever, and dyspnea. Most of these patients had comorbidities, mainly cancer, HTN, and diabetes. Our results could be explained by the fact that we obtained the data from a tertiary hospital with more focus on cancer and transplant patients. Some actions that could be done before discharge that might decrease revisits are proper education about the medical condition as well as instructions for warranted return to the ED. Further research should be conducted comparing patients who received the aforementioned actions with patients who did not for a better understanding of the impact of such simple actions before discharge.

List of Abbreviations

DM	Diabetes mellitus
ED	Emergency department
HTN	Hypertension
KFSH-D	King Fahad Specialist Hospital in Dammam
LAMA	Leave against medical advice
MRN	Medical record numbers

Conflict of interest

The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate

Exempt.

Ethical approval

This study was approved by IRB, at Research Center, King Khalid Medical City (RC-KKMC)
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