Bahrain Medical Bulletin, Vol. 36, No. 1, March 2014

The Pattern of Unplanned Returns to Emergency Department

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Background: Unplanned returns are considered as one of the quality indicators of Emergency Department services. Studying characteristics of these unplanned returns may help to improve the services delivered by Emergency Department.

Objective*:* To determine the rate of unplanned returns to Emergency Department, the most common complaint, the diagnosis and the consistency of diagnosis on the second visit compared to the initial visit.

Setting: Emergency Department, BDF hospital, Bahrain.

Design: Descriptive cross-sectional study.

Method: One hundred and fifty-five participants were chosen at random from patients visiting the Emergency Department within 72 hours of their initial visit over 3 months period. Personal characteristics of the participants, the triage details of the first and second visits, most common complaints and diagnoses were reviewed.

Result: Six hundred ninety-one (4.6%) patients had unplanned returns within 72 hours of total visits to the Emergency Department. Three (1.9%) patients were admitted on the first visit and 40 (25.8%) upon the second visit. The most common complaints to revisit the Emergency Department were abdominal pain, 46 (29.7%) and chest pain and shortness of breath (SOB), 30 (19.4%). The most common diagnoses were gastrointestinal conditions, chest conditions and trauma 35 (22.6%), 27 (17.4%) and 19 (12.3%) respectively. The majority of complaints and diagnoses 122 (78.7%) were consistent in the two visits.

Conclusion: Unplanned returns to the Emergency Department constitute a fair proportion of total visits. Considering the characteristics of unplanned returns, it is important if specific Emergency Department populations are targeted in order to decrease unplanned returns.

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The Emergency department is usually the initial contact between patients and the secondary health care providers. Therefore, every aspect of Emergency Department (ED) function is important, including unplanned returns. In fact, unplanned returns to ED are considered important enough to be one of the quality indicators[1]. Studying the characteristics of unplanned returns would explore certain patterns. Studying unplanned returns would provide a baseline data for quality care and improvement.

Most studies exploring the characteristics of unplanned returns have widely variable results. Time frames defining unplanned returns differed among studies between 48 and 72 hours, and accordingly the rate of unplanned returns varied ranging between 0.92% and 5.47%. Moreover, the most common diagnoses made were considerably variable between studies. This variability of unplanned returns' characteristics makes generalization hard and necessitates studying a particular local population returning to ED in order to reach a conclusion. To the best of our knowledge, there is no data available about ED unplanned returns in Bahrain.

The aim of this study is to determine the rate and characteristics of unplanned returns to ED in Bahrain's Defense Force Hospital, the most common diagnosis on each return and the consistency of diagnosis on the second visit.

METHOD

This is a descriptive cross-sectional study, analyzing unplanned returns to Bahrain Defense Force Hospital. Patients may present without referral to the ED if they believe they require emergency care. Patients presenting to the BDF emergency department are triaged by a triage nurse to the Chest Pain Clinic, Health Center if the case is not considered emergency or otherwise to the emergency department (ED). If the patient was cleared from the Chest Pain Clinic, he/she might be referred (re-triaged) to the ED and vice versa if needed.

After emergency management, the patients will either be admitted or given follow-up with specialized clinics in the hospital or with the health centers or discharged home.

The study reviewed returns from 15 January to 14 April 2010. An electronic system to record and save triage details was installed in the BDF emergency department on 15 January 2010, which made data more accessible. Data were collected electronically and manually by reviewing the charts. Study subjects were patients revisiting ED within 72 hours of the initial visit. Six hundred ninety-one subjects fulfilled this criterion. Our sample size was 155 subjects out of the eligible 691; the sample was generated randomly by a computer. Those 155 participants constituted 22.4% of the eligible study population.

The data collected were age, sex and entitlement status of patients. The site of referral, service to be triage, working shift and chief complaints were reviewed. Data was obtained electronically from the information technology department at the BDF hospital. Diagnosis and the referral post ED were acquired manually. Chest Pain Clinic visits created confusion because if patients were cleared from the CPC and were re-directed to

the ED, they would get a new sheet from the ED that showed a revisit. For that, we had to exclude the second emergency sheet if it was issued less than 2 hours from the first visit and consider the whole event as one visit triaged to the ED that was referred from CPC. Any subsequent visit was considered as a revisit.

No personal identification data was included in the study and no patient was contacted for follow-up.

RESULT

Twenty-two thousand five hundred visits were recorded in the ED in the BDF hospital from 15 January to 14 April 2010. Only 1,739 visits fit the criterion of 72 hour interval between first and second visits. These 1,739 visits represent 691 patients, with an average of 2.5 visits per patient. Unplanned returns for a second time or more constituted 4.6% of total ED visits.

Out of the 155 subjects enrolled, 91 (58.7%) were males and 61 (39.4%) were in the 15 to 30-year-old age group, see table 1. The mean and median of ages were 38.9 and 31.0 respectively, see table 2. One hundred twenty-four (80%) of unplanned returns were entitled to receive the service for free, see table 1.

Table 1: Personal Characteristic of 155 Revisit Patients

Variable	Number	Percentage
Age		
< 15	16	10.2
15-30	61	39.4
31-45	24	15.5
46-60	26	16.8
61-75	15	9.7
>75	13	8.4
Sex:		
Female	64	41.3
Male	91	58.7
Entitlement:		
Entitled	124	80.0
Non- Sponsored	31	20.0

Table 2: Age (n=155)

Mean	38.9
Median	31.0
Mode	28.0

One hundred twenty-six (81.3%) were self-referral to the ED, only 27 (17.4%) were referred from Health Centers. One hundred forty-two (91.6%) patients were triaged to the

ED and the remaining to the chest pain clinic (CPC) and health centers. Unplanned returns were distributed almost equally on working shifts but the evening shift (15:01-23:00) received the highest proportion, 64 (41.3%). Three (1.9%) patients were admitted upon the initial visit and 40 (25.8%) were admitted upon the second visit, see table 3.

Table 3: Triage Characteristics of First and Second Visits

Characteristics	First Visits		Second Visits	
Variable	**Number**	**Percentage**	**Number**	**Percentage**
Referred From	(n=155)		(n=155)	
None	126	81.3	136	87.7
Health Center	27	17.4	11	7.1
Chest Pain Clinic	2	1.3	8	5.2
Triaged To	(n=155)		(n=155)	
ED	142	91.6	151	97.4
Chest Pain Clinic	12	7.7	4	2.6
Health Centers	1	0.64	0	0.0
Post ED Destination✸	(n= 155)		(n=155)	
Home	85	54.9	48	31.0
Clinic	39	25.2	40	25.8
Health Centers	7	4.5	8	5.2
Admission	3	1.9	40	25.8
Missing Information	21	13.5	19	12.2
Triage Priority	(n=155)		(n=155)	
RED "Critical"	1	0.6	0	0.0
YELLOW "Urgent"	114	73.6	119	76.8
BLUE "Non-urgent Disabled"	32	20.6	25	16.1
GREEN "Ambulatory"	8	5.2	11	7.1
Treating Physician's Post⌘	(n=155)		(n=155)	
Junior Resident	61	39.4	54	34.8
Senior Resident	47	30.3	44	28.4
Chief Resident	2	1.3	7	4.5
Consultant	1	0.6	2	1.3
Missing Information	44	28.4	48	31.0
Working Shift	(n=155)		(n=155)	
Evening (15:01-23:00)	64	41.3	67	43.2
Night (23:01-7:00)	46	29.7	42	27.1
Morning (7:01-15:00)	45	29.0	46	29.7

✸Post ED Destination: disposition after receiving care at ED.
⌘Treating Physician's Post: level of training the physician has or level of expertise.

The most common complaints for revisiting the ED were abdominal pain, 46 (29.7%), chest pain and shortness of breath (SOB), 30 (19.4%), trauma, fever and SCD pain, each

13 (8.4%). Further analysis of abdominal pain showed 14 (9%) to be non-specific abdominal pain and 12 (7.7%) was associated with vomiting or loose motion, see table 4.

Table 4: Common Complaints (n=155)

Complaint	Number	Percentage
Abdominal Pain	46	29.7%
▪ Non Specific Abdominal Pain	14	9.0
▪ Vomiting/ Loose Motion	12	7.7
▪ Flank Pain	8	5.2
▪ Epigastric Pain	6	3.9
▪ Constipation, Anal Pain	3	1.9
▪ Right Iliac Fossa Pain	3	1.9
Chest Pain & SOB	30	19.4
Trauma	13	8.4
Fever	13	8.4
SCD Pain	13	8.4
Bleeding Per Vagina	11	7.1
Musculoskeletal Pain	8	5.2
Dizziness	5	3.2
Difficulty In Urination	2	1.3
Others	14	9.0

The most common diagnoses were gastrointestinal conditions, 35 (22.6%), which included gastritis/gastroenteritis, constipation, biliary colic, appendicitis and non-specific abdominal pain. Twenty-seven (17.4%) of diagnoses were chest and airway conditions including URTI, chest infection, COPD or asthma exacerbation. Nineteen (12.3%) of unplanned returns were diagnosed as trauma and thirteen (8.4%) as SCD VOC, see table 5.

Table 5: Most Common Diagnoses (n=155)

Diagnosis	Number	Percentage
Gastrointestinal	**35**	**22.6**
Gastritis, Gastroenteritis	18	11.6
Constipation, Anal Disease	6	3.9
Appendicitis	4	2.6
Biliary Colic	4	2.6
Non Specific Abdominal Pain	3	1.9
Chest & Airways	**27**	**17.4**
URTI	11	7.1
Chest Infection	9	5.8
Asthma Exc.	4	2.6
COPD Exc.	3	1.9
Trauma	**19**	**12.3**
SCD VOC	**13**	**8.4**

Abortion	**9**	**5.8**
Ureteric Colic	**7**	**4.5**
Uncontrolled Dm	**6**	**3.9**
UTI	**5**	**3.2**
CKD	**5**	**3.2**
Vertigo	**3**	**1.9**
Anxiety	**3**	**1.9**
Allergic Reaction	**2**	**1.3**
Left Ventricular Failure	**2**	**1.3**
Others	**19**	**12.3**

CKD: Chronic kidney disease
DM: Diabetes Mellitus
EXC: Exacerbation
SCD VOC: Sickle cell disease vaso-occlusive crisis
URTI: Upper respiratory tract infection
UTI: Urinary tract infection

We found that 122 (78.7%) patients had the same complaint and diagnosis during the initial and second visit. Sixteen (10.3%) patients presented with different complaints on the second visit and subsequently had different diagnosis. Seven (4.5%) patients presented on the second visit with a complaint different from the initial but were labeled with the same diagnosis on both visits. Ten (6.5%) patients returned with same complaint and were diagnosed differently on the second visit; four cases were diagnosed as appendicitis on the second visit.

Patients presenting for more than two times constituted 42 (27.1%) of revisiting patients. They had an average of 4.5 visits per patient, see table 6. The most common diagnoses made on the third visit were chronic kidney disease (CKD), sickle cell disease vaso-occlusive crisis (SCD VOC) and abortion: 6 (16.7%), 6 (16.7%), 4 (11.1%) respectively, see table 7.

Table 6: Age "If More than One Revisit" (n=42)

Age	**Number**	**Percentage**
<15	2	4.7
15-30	12	28.6
31-45	5	11.9
46-60	13	31.0
61-75	6	14.3
>75	4	9.5

Table 7: Third Visit Diagnoses (n=36)

Diagnosis	Number	Percentage
CKD	6	16.7
SCD VOC	6	16.7
Abortion	4	11.1
Chest Infection	3	8.3
COPD Exc.	3	8.3
Asthma Exc.	2	5.6
Non Specific Abdominal Pain	2	5.6
Others	10	27.7

We found that the most frequent diagnoses for return visit admissions are abortion and appendicitis, 7 (17.5%) patients, see table 8.

Table 8: Diagnoses of Admitted Cases (N=40)

Diagnosis	Number	Percentage
Abortion	7	17.5
Appendicitis	7	17.5
Gastritis, Gastroenteritis	4	10
Trauma	3	7.5
Biliary Colic	3	7.5
Chest Infection	2	5.0
URTI	2	5.0
UTI	2	5.0
Others	10	25.0

DISCUSSION

We found the rate of unplanned returns to ED to be 4.6% within 72 hours. This finding is comparable to the rate of Wu et al (5.47%)[2]. Ng et al found a rate of 3.3% of unplanned returns within 48 hours of the initial visit[3]. Kuan et al reported a rate of 2.2% and Keith et al 3.4% within 72 hours[4,5]. While within 48 hours, Wu et al reported a rate of 4.28% and Imsuwan a rate of 0.92%[6,7].

The percentage of patients admitted at the first visit was 1.9%, which rose to 25.8% at the second visit. This difference in management implies physicians' appreciation of a worsening condition or failure of conservative outpatient management and an attempt to adopt a safer inpatient management. Similar results (23.0%) of unplanned returns being admitted at the second visit was observed by Wu et al[6]. A recent study suggested that measuring 72-hour returns resulting in admission may be more valuable than solely 72 hours returns as a safety indicator[8].

Abdominal pain (29.7%) and chest pain and shortness of breath (19.4%) are the most common complaints to return to ED. This finding is reasonable since the abdomen and chest constitute a large human anatomical space and may harbor a great variety of pathologies. Kuan et al and Wu et al found abdominal pain to be the most common complaint (25.1% and 12.9% respectively)[4,6].

The most common diagnoses were gastrointestinal conditions (22.6%), chest and airways conditions (17.4%) and trauma (12.3%). Gastritis/gastroenteritis and URTI were the most common. Kuan et al found that gastritis/gastroenteritis form the largest proportion of patients presenting with abdominal pain (50.7%)[4]. Ng et al in a cross-sectional survey found upper respiratory tract infection URTI to be the most common diagnosis (34%)[3].

Specific diagnoses are unique to the Bahraini population including sickle cell disease vaso-occlusive crisis and diabetes mellitus. Those specific diseases have a high prevalence in Bahrain[9,10]. A similar country-specific phenomenon was found by Khan et al who found that infectious diseases are the most common diagnoses to return to ED in a low income country[11].

In this study, the majority (78.7%) had the same initial complaint and diagnosis on the second visit. This can imply either not improving or worsening condition, an unsatisfied patient or suboptimal medical management. However, this study did not investigate the actual reasons for return to ED. A small number of patients (10.3%) presented with different complaint on the second visit and subsequently had different diagnosis. Only 7 patients (4.5%) presented on the second visit with a complaint different from the initial but were labeled with the same diagnosis on both visits, which can be explained by the fact that the same condition can present with a range of symptoms and complaints. Ten patients (6.5%) returned with the same complaint as they initially presented and they were diagnosed differently on the second visit. This discrepancy of first and second diagnosis could be explained by either the development of the full-blown picture of the disease or misdiagnosis. All ten patients who were diagnosed differently on the second visit were subsequently admitted, four were diagnosed as appendicitis on the second visit. Both Ng et al and Imsuwan found that appendicitis is the most common misdiagnosed condition[3,7].

Patients presenting for more than two times constituted 27.1% of revisiting patients. The most common diagnoses made on the third visit were sickle cell disease vaso-occlusive crisis (SCD VOC), chronic kidney disease (CKD) and abortion: 16.7%, 16.7% and 11.1% respectively. With such heterogeneous diagnoses, we believe that this population needs further study, especially with such high visits rate (4.5 visits within 72 hours).

In this study, the most frequent diagnoses resulting in admission upon the second visit are abortion and appendicitis, 7 (17.5%) each. Therefore, we encourage ED physicians, when treating probable abortions or appendicitis, to keep in mind that those patients are more likely to return and to require subsequent admission.

This study has several limitations. We only considered visits to the BDF Hospital emergency department which makes generalization of the result not possible. Also, this study reviewed revisits in 3-month period; therefore, it will not reveal seasonal variation. In addition, we had a major difficulty caused by missing charts, as we had to manually review almost 300 files to find the emergency records of the study population of 155, which had a constricting effect on our sample size. Thus, we could not reach our targeted sample size of 250 subjects out of the eligible 691 subject to achieve an α value of 0.05. Another limitation is related to the nature of the retrospective study.

CONCLUSION

Unplanned returns to the Emergency Department (ED) constitute a fair proportion of total visits. Gastrointestinal and chest conditions are the most common complaints to revisit the ED. A proportion of unplanned returns were admitted on the second visit. Evaluation of unplanned returns from files and investigating the reasons from the patients' perspectives may help determine the causes of unplanned returns. Policy makers should take into account the characteristics and pattern of return to the ED, in order to tailor any interventional programs aiming at improving the ED. Further research should identify predictors of unplanned returns and may include other governmental hospitals in Bahrain.

Author contribution: All authors share equal effort contribution towards (1) substantial contributions to conception and design, acquisition, analysis and interpretation of data; (2) drafting the article and revising it critically for important intellectual content; and (3) final approval of the manuscript version to be published. Yes.

Potential conflicts of interest: None.

Competing interest: None. **Sponsorship:** None.

Submission date: 21 October 2013. **Acceptance date:** 3 February 2014.

Ethical Approval: Approved by BDF Royal Medical Forces Research Committee and Royal College of Surgeons in Ireland - Medical University of Bahrain (RCSI-MUB) .

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