

## EVALUATION OF THE CHARACTERISTICS OF REVISITS TO AN ADULT EMERGENCY DEPARTMENT WITHIN 72 HOURS

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### ORIGINAL PAPER

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### Abstract

The objective of this study was to determine revisits of the patients discharged from the adult emergency department of our hospital in the early period (72 hours) between January 2016 and December 2016, and to evaluate characteristics of these revisits. In this study, records of the patients discharged from the adult emergency department in 2016 were retrospectively screened from the hospital information management system. Of the 361,413 patients, 7,800 (2.1%) met the inclusion criteria. The most common cause of the initial presentation was unexplained pain with 890 (11.4%) patients, while the most common diagnosis in revisits was acute upper respiratory tract infection with 642 (8.2%) patients. It was found that 18 patients (2.23%) died in the emergency department. No significant difference was found between triage scores of the emergency department presentations, while 161 patients with green area triage in the initial presentation presented to the red area and 134 of these patients were discharged. In our study, the revisit rate was similar with the studies in the literature. It was observed that the majority of the patients who revisited were discharged after the initial visit and they presented to the emergency department again upon their complaints continued. It was thought that revisits can be largely prevented with correct prescription and providing better information to patients.

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### Introduction

Emergency departments (EDs) provide critical healthcare including diagnostic, resuscitation, and stabilization. In other words, ED is the first contact between

the patients and healthcare providers. In an ideal ED, all possible differential diagnoses are considered, and functioning order is always correct [1]. However, such an ED does not really exist.

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Unexpected presentations of the patients discharged from an ED with similar complaints have been defined as “revisits” [2]. On the other hand, revisits to an ED within the first 72 hours after discharge are accepted as “Early Period Revisits” [3]. Unplanned revisits to the ED cause significant additional caseload and this points to a potential field for improvement of care [4].

In line with the goals of emergency medical services, early ED revisit is accepted as a quality indicator and a tool for improving patients’ care [5]. While a rate less than 1% is recommended for this quality indicator, according to international data global rate of unplanned revisits have been reported as about 3% [6]. Studies in the literature have reported this rate between 0.39-4.9% [7, 8]. Revisit rate is high especially in the countries where access to first line healthcare service is not easy, and in countries with income inequality [2, 9]. Unplanned revisits above a certain rate indicate poor clinical care, system breakdowns and insufficient access to basic care services.

It is known that revisits increase intensity of EDs, prolong waiting times, and delay intervention to the actual emergency patients, resulting in decreased quality of healthcare service delivered [10]. In addition, revisits cause a significant financial burden on healthcare systems of countries [11].

Looking at the underlying causes of revisits, it is seen that these causes originated from physicians, patients, hospitals and healthcare systems [7]. The causes of revisits are known to differ among countries [7]. Studies have been conducted to investigate causes of revisit and to decrease rates of revisits especially in the USA and Canada [10]. Although there is a need for studies to reveal causes of revisits, studies on this issue are limited in Turkey [3, 12, 13].

The objective of this study was to investigate sociodemographic and medical characteristics and the factors correlated with revisits in patients who were discharged from

the adult emergency department of our hospital and revisited in the early period (72 hours).

### Materials and methods

In this study, files of the patients discharged from the adult emergency department of our hospital between January 2016 and December 2016 were retrospectively screened via the hospital information management system. Patients’ demographic data such as nationality, age and gender, social security status, triage assessment, complaint and diagnosis of admission, consultation, laboratory outcomes, and status of imaging order were recorded. Among these patients, files of the patients who revisited the emergency department within 72 hours were selected and evaluated.

Patients aged 17 years and over who presented again within 72 hours after the discharge from the emergency department were included in the study. Patients who presented to the emergency department again within 72 hours with different complaints, those with missing file information and/or data, patients who left the emergency department at their own request, and those with planned revisits (judicial cases, follow-up patients etc.) were excluded from the study. Sociodemographic and medical data of the patients who met the inclusion criteria were classified as the initial visit and revisit data and recorded. Initial visit data included nationality, age, gender, date of admission, hour of admission, triage score, complaint and diagnosis of admission, International Disease Classification (ICD-10) diagnosis code, consultation, laboratory outcomes, and status of imaging order. Whereas, revisit data included emergency department outcome (mortality, ward hospitalization, admission to the intensive care unit and discharge) in addition to the initial visit data.

### *Ethics Approval*

Before the beginning, the study protocol was approved by the local ethics committee of our hospital. The study was conducted in accordance with the ethical principles of the Declaration of Helsinki.

### *Statistical Analysis*

Data obtained in the study was analyzed using NCSS (Number Cruncher Statistical System) 2007 Statistical Software (Utah, USA). Data were evaluated with descriptive statistical methods (mean, standard deviation and percentage distribution). One-way variance analysis was used in the comparisons between the groups, Tukey multiple comparison test in the comparison of subgroups, and Chi-square and MCNemar tests in the comparison of the qualitative variables.  $p < 0.05$  values were considered statistically significant.

## RESULTS

In the study period, a total of 365,413 patients presented to the emergency department of our hospital. Among these, 13,033 revisited ED within the first 72 hours. Of revisitors, 5,233 (40%) were excluded due to planned revisits (judicial cases etc.) and different complaints, 1,966 (15%) due to

insufficient and 22 (1%) repeated records. In conclusion, the remaining 7,800 patients who revisited were included in the study and revisit rate was found as 2.13%.

Of all patients included in the study, 420 (53.9%) were male and 3,599 (46.1%) were female patients. Of the revisitors, 3,900 (50%) were in the 17-39 age range and 70 (0.9%) had no social security. In addition, 7,549 (96.8%) of the revisitor patients were TR citizens and 2,521 (3.2%) were Syrian. Sociodemographic features of the patients included in the study are given in Table 1.

When the initial and revisit triage areas were compared; triage area was not changed in 5,983 (76.1%) patients. It was found that 161 (2.9%) of the 4,643 (84.3%) patients transferred to the green area in the initial visit were transferred to the red area during revisits. 1,086 (59.2%) of the patients transferred to the yellow area in the initial visit were transferred to the yellow area again and 143 (7.7%) of these patients were transferred to the red area during revisits. Of the patients referred to the red area, 209 (45.4%) were transferred again to the red area and 87 (18.9) to the green area during revisits. Clinical outcomes according to the triage areas of the initial visit and revisit are given in Table 2.

		N	%
<b>Nationality</b>	<b>Syrian</b>	251	3,2
	<b>TR citizens</b>	7549	96,8
<b>Age groups</b>	<b>17-39</b>	3900	50
	<b>40-64</b>	2456	31,5
	<b>≥65</b>	1444	18,5
<b>Gender</b>	<b>Male</b>	4201	53,9
	<b>Female</b>	3599	46,1
<b>Social security status</b>	<b>SSI</b>	6451	82,7
	<b>SSI (Green Card)</b>	1279	16,4
	<b>No security</b>	70	0,9
<b>Total</b>		7800	100,0

**Table 1 - Sociodemographic features of the patients who revisited the ED**

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				Examination outcome in revisit				
				Ex	Ward	Referral	Discharge	ICU
Revisit Triage Area	Red Area	Initial visit triage area	Red Area	7	13	12	176	1
			Yellow Area	4	14	5	120	0
			Green Area	5	14	2	134	6
	Yellow Area	Initial visit triage area	Red Area	0	18	5	139	2
			Yellow Area	1	92	2	989	2
			Green Area	0	58	1	637	6
	Green Area	Initial visit triage area	Red Area	1	1	0	84	1
			Yellow Area	0	10	1	594	0
			Green Area	0	52	1	4586	4

Table 2 - Comparison of Clinical Outcomes and Triage Areas in the Initial visits and revisits

Revisit clinical outcome	N	Age ( $\pm$ SD)
Discharge	7459	43,11 $\pm$ 19,01
Ward admission	272	53,12 $\pm$ 19,35
ICU admission	22	54,27 $\pm$ 16,85
Referral	29	69,48 $\pm$ 19,92
Death	18	74,56 $\pm$ 12,29
<i>p</i>		<b>0,0001</b>

Table 3 - Correlation between mean ages and clinical outcomes of the revisitors

The most common initial visit complaints of the patients were unexplained pain in 890 (11.4%), abdominal pain in 860 (11%), chest pain in 360 (4.6%), nausea-vomiting in 343 (4.4%), and dyspnea in 259 (3.3%) patients. The complaints in revisits were the same with the initial visit, with most common complaints being pain. The most common diagnoses in revisits were acute upper tract infection in 642 (8.2%), myalgia in 592 (7.6%), renal colic in 199 (2.6%), lumbalgia in 142 (1.8%) and urticaria in 114 (1.5%) patients.

No consultation was ordered in 6,730 patients (86.3%) during the first visits. The distribution of the clinics of consultation ordered in 1070 (13.7%) patients during the initial visit.

No consultation was ordered in 6,647 patients (82.7%) during the first visits. The distribution of the clinics of consultation ordered in 1353 (17.3%) patients during revisits.

Of the revisitors, 7459 (95.6%) patients were discharged, 727 (3.5%) were hospitalized in wards, 29 (0.4%) were referred, 22 (0.3%) were admitted to the ICU and 18 (0.23%) died in the emergency department.

Laboratory investigations were ordered in 3161 (40.4%) during the initial visits, while these investigations were ordered again in 1754 (22.4%) of these patients. Sixteen of the patients with laboratory investigation orders died and 12 were admitted to the ICU, while 2 of the patients without laboratory

investigation orders died and 10 were admitted to the ICU.

Imaging was ordered in 2986 (38.2%) during the initial visits, while imaging was ordered again in 1372 (17.5%) of these patients.

The correlation between mean ages and clinical outcomes of the revisitors is given in Table 3. Accordingly, the mean age was significantly lower in patients who were discharged compared to the ward, ICU, and ex patients ( $p < 0.001$ ).

No statistically significant difference between the clinical outcome groups (discharge, ward admission, ICU admission, referral and death) in terms of nationality and gender ( $p = 0.734$ ,  $p = 0.066$ , respectively).

There was a statistically significant difference between the clinical outcome groups in terms of the triage area during initial visits. Accordingly, the rate of yellow area was significantly higher in the ward admission group, green area in the discharge and ICU admission groups, and red area in the referral and death groups (for all  $p < 0.001$ ). There was a statistically significant difference between the clinical outcome groups in terms of the triage area during revisits. Accordingly, the rate of yellow area was significantly higher in the ward admission group, green area in the discharge and ICU admission groups, and red area in the referral and death groups (for all  $p < 0.001$ ).

There was a statistically significant difference between the clinical outcome groups in terms of the laboratory orders during the initial visit. The rate of laboratory orders was significantly lower in the discharge group ( $p < 0.001$ ). Similarly, the rate of laboratory orders during revisits was again significantly lower in the discharge group ( $p < 0.001$ ).

There was a statistically significant difference between the clinical outcome groups in terms of the imaging orders during the initial visit. The rate of imaging orders

was significantly lower in the discharge group ( $p < 0.001$ ). Similarly, the rate of imaging orders during revisits was again significantly lower in the discharge group ( $p < 0.001$ ).

## Discussion

Intensity in EDs has become a serious problem affecting both patients and healthcare providers worldwide [14]. Revisits to EDs play an important role in this problem. In order to prevent revisit, first the causes should be revealed. Although these causes show differences among countries, the rate of revisit in the early period is accepted as a criterion indicating the quality of healthcare services [6]. There are studies revealing the causes of revisits to prevent them especially in the USA and Canada, although the number of studies on this issue is limited in Turkey [3, 12, 13].

In our study, the rate of revisits was found as 2.1%. Studies in the literature have reported the rate of revisits within the first 72 hours (early period) between 0.39% and 4.9% [3, 7, 12, 13, 15-19]. Similar studies conducted in Turkey have reported this rate between %0.9 and %2.3 [3, 12, 13].

Looking at the effect of gender on revisits, the rate of male patients was significantly higher. However, no significant difference was found between clinical outcomes and gender. When the age range of revisits was examined, young patients in the 17-39 age group were found to be at the first rank. This result was similar to those reported by Bicakci and Hocagil. In addition, the incidence of death, ICU admission and ward admission of the patients increased as the mean age increased. Using methods such as Identification of Seniors at Risk (ISAR) and Triage Risk Screening Tool (TRST) for elderly patients, and being more careful when discharging these patients can provide contribution for reduction of revisit rates [20].

Syrian patients accounted for 3.8% of revisitors. No significant difference was

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found between Syrian and Turkish citizens in terms of clinical outcomes. It is thought that translation services provided for international patients in Turkey has a positive effect in this result [21].

Looking at the literature, no study was found that we could compare our results of the comparison between revisits and triage areas. In general, low rates of revisits suggest that our triage system is not insufficient compared to more detailed triage systems, although it is obvious that more detailed comprehensive studies are needed on this issue. When we examined whether triage area affected revisits; in revisits of 5506 (70.5%) of the patients referred to the green area where in general non-emergency patients are referred during initial visits, 4643 (84.3%) were referred again to the green area during revisits. It was observed that the patients who were referred to the Red Area (RA) and the Yellow Area (YA), where more urgent patients were referred during initial visits, were also highly referred to the similar area during revisits and the triage scale did not change significantly. In addition, the rate of ward admission was significantly higher in the patients with yellow triage during the initial visit and revisits compared to the other areas. One should be more careful when evaluating patients in the yellow area for indication of hospitalization. However, the rate of mortality was significantly higher in the patients referred to the red area during the initial visit and revisit, while the rate of discharge was significantly higher in the patients referred to the green area during the initial visit and revisit. As is expected, the rate of discharge during revisits was high in the green area where lower-risk patients are examined. In addition, we believe that being more careful when discharging patients from the red and yellow areas where more critical patients are examined (keeping threshold of hospitalization low), and considering that some critical may be overlooked due to intensity of the green area, performing a

better triage between the areas and reducing the intensity of green areas can prevent this undesired result.

When we examined complaints of the patients during the initial visits and revisits; unexplained pain, abdominal pain, chest pain, nausea-vomiting that are among the most common complaints were the same with the common complaints during revisits. We found that the revisitors most commonly revisited due to pain. Accordingly, we can conclude that the patients were not well informed during the initial visits, and pain control was not completely carried out. Therefore, it can be recommended that patients should be better informed about the recommended treatment and potent analgesics should be used. Jiraporn et al. found the most common revisits as abdominal pain, fever, dyspnea, headache and dizziness [7]. In our study, the most common complaint was “unexplained pain”, and this might be caused from that while the patient's complaints were recorded in the hospital data information system and electronic files, complaints of the patients were not questioned in detail or not recorded with detailed sub-criteria due to patients intensity.

When diagnoses of first discharge and re-discharge were examined; the most common diagnosis during both visits were acute upper respiratory tract infection, myalgia, renal colic, lumbalgia, and urticaria. High rates of diseases indicate the necessity of informing patients and better performing pain control. In our study, significantly lower rates of laboratory and imaging orders in patients discharged during both initial visits and revisits is a result that overlaps with the anticipated.

In the USA a government program was launched in 2012 in order to reduce and control hospital revisits [22]. In Turkey also this issue should be more seriously discussed and necessary measures should be taken to reduce revisit rates. Revisits to EDs in the early period is a general problem. If rational

interventions can be made on this issue, revisits can be prevented. EDs seen by patients as the place that can be accessed 7/24. As long as their social security allows, patients prefer hospital emergency services to primary health care services. Delivering faster diagnosis and more accurate treatment with an increasing number of emergency medicine specialists, will make EDs more attractive to patients. EDs should be places that serve patients in need of emergency treatment, but currently EDs largely serve non-urgent patients. This causes the patients in need of urgent health care to be overlooked and unable to receive proper service. Today, taking measures to reduce the intensity of EDs has become a necessity both in our country and worldwide. To achieve this, it is necessary to create more attractive primary health care areas.

#### *Study Limitations*

This study has some limitations. First, the study was designed as retrospective and conducted in a single center. Inability to include some patients due to missing information might affect the revisit rate. Comorbidities, medical history and the drugs used by the patients could not be questioned due to the retrospective nature of the study. Revisits only within the first 72 hours were investigated, and longer term follow-up could not be included. Finally, lengths of stay in the ED and hospitalization could not be investigated. However, the relatively high number of patients reflects a strength of the study, and we believe that our results will be guiding for further multicenter studies.

#### **Conclusions**

In our study, the rate of revisits was found to be close to those reported in the literature. Triage area of the initial visit was changed during the revisit in one fourth of the patients suggested that triage should be better performed. Clinical outcomes increased as the

mean age increased. Therefore, elderly patients should be more carefully evaluated in terms of revisit, and management strategies should be developed to prevent this.

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