Journal of Clinical & Experimental Ophthalmology

Prat et al., J Clin Exp Opthamol 2018, 9:6
DOI: 10.4172/2155-9570.1000761

Research Article Open Access

# Referral Pattern of Nighttime Visits to the Ocular Emergency Department at a Tertiary Referral Center in Israel

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**Received date:** October 31, 2018; **Accepted date:** November 08, 2018; **Published date:** November 19, 2018



## Abstract

**Objective:** The structure of the Israeli healthcare system is such that it is frequently more convenient for the patient to present to an ophthalmologic emergency department (OED) at night instead of waiting for a scheduled appointment in an outpatient setting. The main objective of this study is to evaluate the diagnoses of patients who attended an OED of a tertiary referral center at night during a one-year period.

**Methods:** A prospective study. All patients who presented to our medical center's OED between 22:00-06:00 were enrolled. On presentation, all patients filled in a demographic and medical questionnaire, and the attending ophthalmologists filled in another questionnaire on the diagnosis and the treatment that had been provided. Data from electronic/paper medical records were collected and analyzed, and cases were categorized post-factum as urgent or non-urgent.

**Results:** A total of 1,290 patients (50% females, mean age 38 years) comprised the study group. Of them, 364 (29.7%) were self - referred, 208 (17%) were referred by a general practitioner or an ophthalmologist, and 404 (32.9%) were referred for consultation from within the general ED. Trauma was the most frequent diagnosis (47%), followed by infectious/inflammatory conditions (16%), and 365 (29.3%) cases were categorized as "non-urgent".

**Conclusion:** Patients who pay nighttime OED visits require ophthalmic care in a range of urgency. We believe it is justified to have in-house on call ophthalmologist during night shift in the ED. However, a significant proportion of the nighttime visits constitute non-urgent cases that could have been treated in ophthalmic primary care facilities. Implying flaws in the structure of the country's healthcare system by overloading the tertiary care facilities where costs are considerably higher than in the community. Allocation of appropriate resources to such facilities may lead to improved patient management and alleviation of the heavy burden on the public healthcare system.

**Keywords:** Ophthalmologic emergency department; Ocular emergency; Ocular referral patterns

## Introduction

### Background

The role of the resident ophthalmologist during the night shift in a tertiary hospital ranges between straight-forward and complex multi-trauma ocular cases. We have observed that the patients who arrive to the ophthalmic emergency room (OED) at night present with different conditions than those who arrive during the daytime, and that the nature of the ocular problems was frequently less urgent. We considered that many decisions to arrive to the OED at night might not be motivated solely by medical reasons, but also influenced by the structure of the healthcare system in Israel, where it is frequently more convenient and even more economical to attend the OED at night instead of waiting for a scheduled appointment in an outpatient clinic.

It is our impression that there is considerable abuse of the nighttime OED facilities due to the structure of our national healthcare system. We present the descriptive data of the situation in our tertiary care OED so that others can review and enhance the efficiency of theirs. The main objective of this study was to evaluate the degree of urgency (and, therefore, justification) of all patients who presented at night to an OED in a tertiary referral center during a 1-year period.

## Methods

### Study design and setting

The study group included all the patients who visited the OED in our tertiary referral university-affiliated medical center between 22:00-06:00 in a 1-year period. Institutional review board approval was granted, and all the patients gave informed consent to participate in this study.

We designed a questionnaire on the major complaint, duration of symptoms, reason for attending the OED during the night, source of referral (e.g., self, general practitioner, ophthalmologist or other specialist physician), number of OED visits during the past year, and ocular history. Additional data on the patients' demographics, date and

hour of OED visits, diagnoses, and recommendations were collected and analyzed. All the participants filled in the questionnaire. The attending ophthalmologists filled in another questionnaire on the diagnosis and the treatment that had been provided. Data from electronic/paper medical records were collected and analyzed. The cases that were classified as urgent were those that required immediate treatment, hospitalization, or an ambulatory surgical procedure. The patients who were discharged from the OED without a recommendation for any follow-up or treatment were classified as "non-urgent".

### Statistical analysis

The statistical analysis was carried out using Microsoft Excel 2013 (Microsoft Corporation, Redmond, WA) and SPSS software version 23.0 (SPSS, Inc., Chicago, IL).

## Results

### Demographic variables

A total of 1290 patients with ocular complaints were examined in the OED over the 1-year study period. Twenty-three of them were either hospitalized or had been referred for an ophthalmologic consultation from within the general ER and they were excluded. The demographics of the study population are summarized in Table 1.

| Variable | Value |
|---|---|
| Total visits (n) | 1,267 |
| Age, y, mean ± SD (range) | 37.7 ± 21.8 (0-97) |
| **Sex** | |
| Males | 629 (50.2%) |
| Females | 624 (49.8%) |

**Table 1:** Sociodemographics of patients presenting to an ophthalmologic emergency department; SD: standard deviation

### Characteristics of the OED visit

The mean ± standard deviation visit lasted 53 ± 30 minutes (range 5-220), and 349 visits (27.4%) took place during weekend. Spring was the busiest season followed by summer. The largest portions of patients (404 patients, 32.9% of the total) were referred from the general ED as a part of their clinical evaluation for a different complaint, followed by self-referral (364 patients, 29.7%). The referral pattern is summarized in Table 2.

### Diagnoses, management and outcome

The leading diagnosis was trauma (46.9%), followed by infectious/inflammatory conditions (15.9%) (Figure 1). Only 31 (2.5%) were subsequently admitted to the ophthalmology department. Sixteen patients (1.3%) required an urgent intervention, such as laser retinopexy (n=7), eyelid laceration repair (n=6) and central retinal artery occlusion (n=1). In addition, 1 pediatric patient presented with conjunctival larvae which required larvae extraction under general anesthesia, and 1 adult patient with acute angle closure glaucoma required laser iridotomy. Overall, 575 (46.1%) patients received topical ocular treatment, including antibiotics, steroids, lubricants, etc., and 421 patients (34.7%) received no specific recommendations. Finally, 307 patients were referred for follow-up in a specialized hospital ophthalmologic outpatient clinic and 455 to an ophthalmologic clinic in the community (Table 3).

| Variable | Value |
|---|---|
| Length of visit time, min, mean ±SD (range) | 53 ±30.8 (5-220) |
| **Day of week** | |
| Midweek (Sun-Thu) | 918 (72.5%) |
| Weekend (Fri-Sat) | 349 (27.5%) |
| **Season** | |
| Autumn (Sept-Nov) | 277 (21.9%) |
| Winter (Dec-Feb) | 275 (21.7%) |
| Spring (Mar-May) | 372 (29.4%) |
| Summer (Jun-Aug) | 343 (27.1%) |
| **Referral source** | |
| Self | 364 (29.7%) |
| From physician in the community | 208 (17%) |
| From general ED | 404 (32.9%) |
| From emergency care centers* | 251 (20.5%) |

**Table 2:** Visit characteristics; ED: emergency department

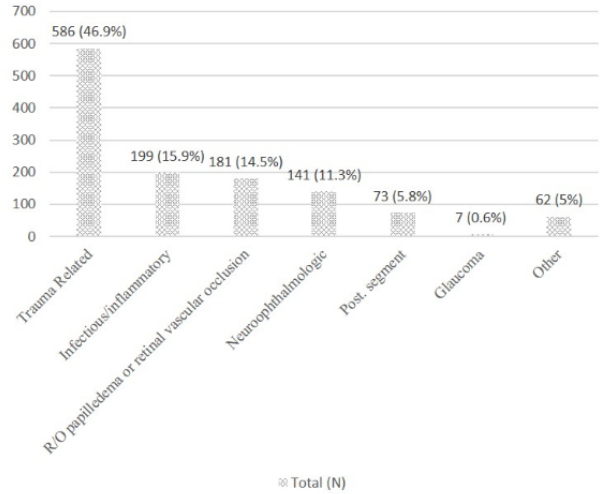


**Figure 1:** Leading diagnoses in the OER.

### Urgent *vs.* non-urgent visits

Three-hundred and sixty-five visits (29%) were classified as being non-urgent, defined as those patients that did not require either hospital admission or urgent treatment. None of them received follow-up recommendations. There were significantly more females whose

visits were non-urgent (60% *vs* 40% in the urgent group, P<0.005, chi-square test) (Table 4).

| Variable | No. (%) |
|---|---|
| **Hospitalization** | |
| Yes | 31 (2.5%) |
| No | 1220 (97.5%) |
| **Urgent procedure** | |
| Yes | 16 (1.3%) |
| No | 1236 (98.7%) |
| **Topical treatment** | |
| Yes | 575 (46.1%) |
| No | 672 (53.9%) |
| **Follow-up recommended** | |
| Yes | 793 (65.3%) |
| **Hospital outpatient clinic** | 307 (40.3%) |
| Community facility | 455 (59.7%) |
| No | 421 (34.7%) |
| **Urgent** | |
| Yes | 880 (70.7%) |
| No | 365 (29.3%) |

**Table 3:** Management and outcome of ophthalmic emergency department visits

| Variable | Urgent (N = 880, 70.7%) | Non-Urgent (N = 365, 29.3%) | P-value |
|---|---|---|---|
| **Female gender** | 46% (399 patients) | 60% (216 patients) | 0.000015 |
| **Age, y, mean ± SD** | 38.2 ± 21.3 | 36.78 ± 22.8 | 0.3 |

**Table 4:** Comparison of urgent vs. non-urgent visits.

## Discussion

Here, we report the findings of our analysis of the diagnoses of patients who present to an OED during the evening and nighttime rather than wait for a scheduled appointment in an outpatient clinic on the following day. It was our impression that the patients found it more convenient or economic to do so because of the structure of the healthcare system in Israel. Our findings suggested that 70.7% of all the patients who presented to the OED required urgent medical or surgical attention.

Large epidemiologic studies of ophthalmic emergencies have been published, but many of them appeared decades ago and none compared the times of arrival to the OED. Examples of the countries in which such studies took place include the United States [1,2]. England [3-6], Ireland [7], Egypt [8], Brazil [9], and India [10]. One large retrospective study1 collected and analyzed data on nearly 12 million visits of patients with eye problems presenting to EDs across the United States during a 6-year period. Those authors found that urgent visits were significantly more likely to occur among males, patients with higher incomes, and older patients. A prospective study performed in Bristol3 analyzed visits to a local ED during a 24-week period and the results showed that 45% of patients visits were traumatic in origin, 35% the result of inflammatory processes and 6% of an iatrogenic nature; many of this last group had contact lens-induced disease. It was suggested that such a service can be highly efficient. Another study performed in Stanford5 found that the most common visits were the results of traumatic and inflammatory/infectious processes. Edwards et al. [4] studied EOD visits over a 12-month period and found that trauma (65%) and inflammation (22%) were the most common reasons for visits. Those authors also noted that there was a trend towards increased numbers of visits during the summer months.

The main diagnoses in our study were trauma and acute inflammation/infection, supporting previous findings [3-5,10]. Similarly to other studies [4], we also found a trend towards increased numbers of visits in the summer and spring months.

Only 29.3% of the cases fitted our classification of "non-urgent" as being those that were not admitted, did not require any urgent treatment, and were discharged from the OED without a recommendation for any follow-up or treatment. Other studies found a similar [6] or an even higher portion of non-urgent visits, ranging from 44% [1] up to 60-70% [7,9]. However, we classified patients who were discharged from the OED without the need for hospitalization but were referred for further treatment and/or ophthalmologic follow-up as being urgent, although many of them were not true emergencies (e.g., blepharitis and simple viral conjunctivitis), thus inflating the actual figures of urgent nighttime visits to the OED.

Our results showed that urgent visits were significantly more likely to be by males, in support of the findings of Channa et al. [1]. Both their study and ours found that the average age in our urgent group was slightly but not significantly higher.

Strengths of this study are that it is the first prospective study of nighttime visits to the OED of a large medical center. A main limitation to our study is the lack of equivalent epidemiological data on daytime visits (i.e., arrival to the OED between 06:00 and 22:00 pm) to analyze similarities and differences.

## Conclusion

In conclusion, the present study provides estimates of the annual incidence of nighttime OED presentations for eye-specific problems in a large tertiary hospital. It describes trends in ED-treated ophthalmic disorders across a 1-year period, and identifies patient factors, such as female sex and younger age, as being associated with ED use for non-urgent problems. Our data suggest that expanded use of urgent care centers in the community and improved access to the offices of eye care professionals may provide more efficient care for a large portion of the patients who visit EDs for ocular conditions. The fact that patients come to a tertiary hospital with non-urgent conditions may suggest a lack of alternative referral services and point to a major problem of the structure of the country's healthcare system, which overloads the tertiary care facilities in which costs for human resources, materials, and other items are relatively higher. Expansion of outpatient services should be considered, so that casualty remains a genuine emergency service and not a primary care service.

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