

## Original Article

# Epidemiological Profiles of Otorhinolaryngological Disorders in Adults Admitted to the Emergency Room of a Tertiary University Hospital

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### ABSTRACT

**Background:** The incidence of otorhinolaryngological emergencies has been steadily increasing. With the increasing number of patients admitted to the emergency room, numerous challenges in healthcare have become more prevalent. This study aimed to evaluate the epidemiological profile of otorhinolaryngological disorders in adults admitted to the emergency department of a tertiary university hospital. **Materials and Methods:** A total of 7028 adult patients with otorhinolaryngological disorders admitted to the emergency department of a tertiary hospital from January 1 to December 31, 2016, were enrolled in the study. Each patient underwent a comprehensive clinical evaluation by the physicians of the emergency department and was consulted by an otorhinolaryngologist. Age, sex, time of visits, and cost of each patient due to healthcare insurance were recorded. **Results:** In total, 3098 patients were male ( $36.6 \pm 16.4$  years; 44.1%) and 3930 were female ( $35.4 \pm 16.2$  years; 55.9%). The most common otorhinolaryngological disorders were pharyngitis ( $n = 2713$ ; 38.6%), followed by tonsillitis ( $n = 1302$ ; 18.5%) and rhinitis ( $n = 1161$ ; 16.5%). These three infectious diagnoses constituted 73.6% of all otorhinolaryngological disorders. The highest number of medical visits due to otorhinolaryngological disorders was in January, whereas the lowest number of visits was in July. When we excluded the three infection-based diagnoses, otorhinolaryngological disorders were stable at approximately 150 patients per month. The main reason for the increase in the number of visits per month due to otorhinolaryngological disorders appeared to be a result of these three infection-based diagnoses. **Conclusion:** More than 80% of otorhinolaryngological disorders in adults admitted to the emergency department were not truly emergencies requiring attendance at a tertiary hospital emergency room. New policies should be instituted to reduce the workload of the emergency services and to allow more effort to be spent on real emergencies.

**KEYWORDS:** Emergency department, epidemiology, otorhinolaryngological disorders

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## INTRODUCTION

Emergency service (ES) is an important part of the healthcare system in all countries, and the number of patients admitted to ES has been steadily increasing.<sup>[1]</sup> With the increasing number of the patients in ES, numerous challenges, including crowding and decreased quality of care, have become more prevalent.<sup>[2]</sup> National registries are limited, and published data are not sufficient to analyze the epidemiological profiles of patients seeking ES.

Otorhinolaryngological emergencies are common in all countries.<sup>[3]</sup> The rate of otorhinolaryngological emergencies has increased, particularly in the winter, among patients in ES. The majority of otorhinolaryngological emergencies are simple

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disorders, which can be treated by primary healthcare providers.<sup>[4]</sup> Understanding the epidemiological profile of these disorders can help not only physicians but also patients, policymakers, researchers, and healthcare providers to improve the operation capability and increase the quality of care in ES.<sup>[5]</sup> In this study, therefore, we aimed to provide additional data regarding the epidemiological and clinical profile of adult patients with otorhinolaryngological head and neck disorders admitted to ES in a tertiary university hospital.

## MATERIALS AND METHODS

A total of 56,650 adult patients who were admitted to the emergency department of a tertiary hospital of Adnan Menderes University from January 1 to December 31, 2016, were evaluated. The clinical diagnosis of patients according to International Classification of Diseases (ICD-10)<sup>[6]</sup> was recorded. Finally, 7028 patients with otorhinolaryngological disorders according to ICD-10 were enrolled in the study. Each patient underwent a comprehensive clinical evaluation by the physicians of the emergency department and was consulted by an otorhinolaryngologist. Age, sex, time of visits, and cost of each patient due to healthcare insurance were recorded. Several analyses were performed according to the prevalence, timing of arrival (season, month, and day), sex distribution, and cost. The costs of visits were determined from government-paid bills for each individual. Patients less than 18 years old are seen at the pediatric emergency department and were thus excluded from this study.

The study design is cross-sectional, retrospective, and descriptive. The study protocol conformed to the tenets of the principles outlined in Declaration of Helsinki. The Local Ethics Committee and the institutional review board of the Adnan Menderes University School of Medicine approved the protocol.

All statistical analyses were performed using SPSS version 15 (SPSS, Inc., Chicago, IL, USA) and Microsoft Excel (2007; Microsoft Corporation, Redmond, WA, USA). The continuous variables were defined as mean  $\pm$  standard deviation and categorical variables were defined as counts (*n*) and percentages.

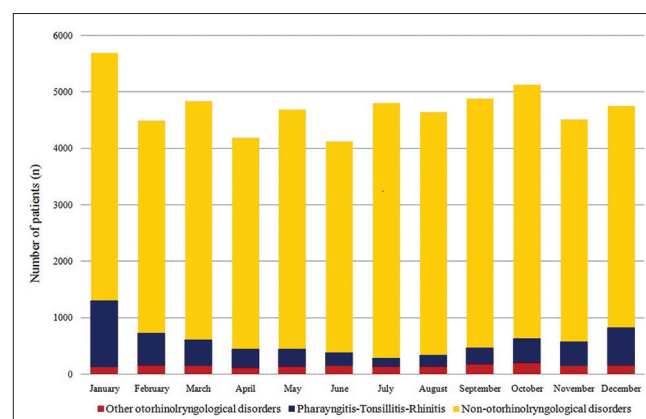
## RESULTS

Baseline characteristics and the distribution of cases are shown in Table 1. A total of 56,650 adult patients were admitted to the emergency department of a tertiary university hospital of Adnan Menderes University School of Medicine. In total, 7028 patients (mean age  $36.0 \pm 16.3$  years) with otorhinolaryngological disorders were enrolled in the

study, and 3098 patients were male ( $36.6 \pm 16.4$  years; 44.1%) and 3930 were female ( $35.4 \pm 16.2$  years; 55.9%). The most common otorhinolaryngological disorders were pharyngitis ( $n = 2713$ ; 38.6%), followed by tonsillitis ( $n = 1302$ ; 18.5%) and rhinitis ( $n = 1161$ ; 16.5%). These infection-based diagnoses represent 73.6% of all otorhinolaryngological disorders. Patients with mandibular dislocation and rhinitis were more common in younger patients ( $28.8 \pm 12.7$  and  $32.1 \pm 13.1$  years, respectively), while malignities were more common in older patients ( $64.7 \pm 13.0$  years). Otitis and sinusitis, also infection-based disorders, represented 3.7% and 2.4%, respectively, of all otorhinolaryngological disorders.

The number of patients who were admitted to the adult emergency department due to otorhinolaryngological disorders increased in December and January [Figure 1]. The most common month for medical visits was January. The lowest number of visits due to otorhinolaryngological disorders was in July. The ratio of medical visits due to otorhinolaryngological disorders to total admitted patients to the emergency room was highest in January (22.8%) and lowest in July (6.0%). Infection-based diagnoses of pharyngitis, tonsillitis, and rhinitis represented 90% of all otorhinolaryngological disorders in January. When we excluded these three infection-based diagnoses, the number of otorhinolaryngological disorders was stable at approximately 150 per month [Figure 1]. The main reason for the increase in the number of visits per month due to otorhinolaryngological disorders appeared to be due to these three infection-based diagnoses.

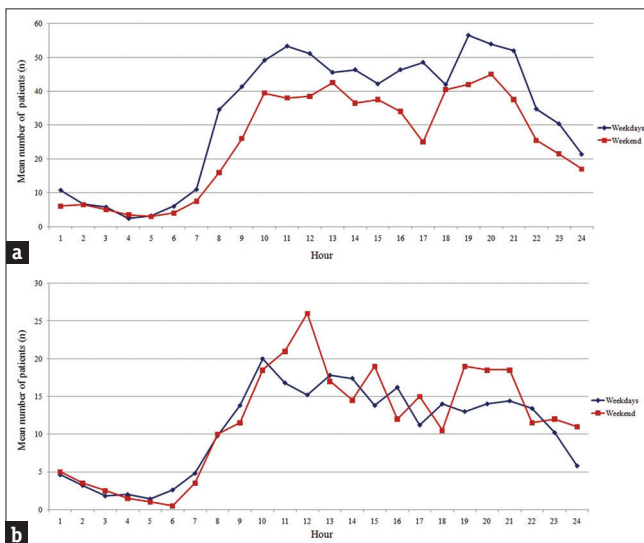
In all otorhinolaryngological disorders, admittance to the emergency room was predominantly seen during the day (from 8:00 AM to 23:59 PM) compared with night-time (from 00:00 AM to 07:59 AM)



**Figure 1:** Distribution of the number of medical visits related to otorhinolaryngological and nonotorhinolaryngological disorders by month

**Table 1: Epidemiology of patients**

Diagnoses	Number of patients (n)	Percent (%)	Age (year)	Sex, M/F	Cost (\$)
Vertigo	973	13.8	47.0±18.3	353/620 (36.3/63.7%)	16.9±16.4
Epistaxis	146	2.1	52.0±20.7	77/69 (52.7/47.3%)	14.2±8.8
Rhinitis	1161	16.5	34.1±15.2	518/643 (44.6/55.4%)	7.1±7.1
Tonsillitis	1302	18.5	32.1±13.1	579/723 (44.5/55.5%)	6.9±6.0
Pharyngitis	2713	38.6	33.0±14.3	1207/1506 (44.5/55.5%)	7.0±5.3
Otitis	260	3.7	35.1±14.8	112/148 (43.1/56.9%)	6.0±1.8
Sinusitis	170	2.4	33.6±13.4	87/83 (51.2/48.8%)	7.9±7.1
Facial nerve paralysis	44	0.6	42.3±16.1	21/23 (47.7/52.3%)	15.9±15.4
Sudden hearing loss	25	0.4	44.7±17.2	14/11 (56.0/44.0%)	6.6±3.2
Foreign body	57	0.8	37.3±19.6	33/24 (57.9/42.1%)	12.2±21.9
Tympanic membrane perforation	20	0.3	36.3±14.6	11/9 (55.0/45.0%)	5.4±1.1
Trauma	28	0.4	32.4±19.9	19/9 (67.9/32.1%)	17.9±24.5
Hoarseness	44	0.6	58.3±20.6	18/26 (40.9/59.1%)	47.6±43.0
Larynx edema	2	0.0	60.5±29.0	0/2 (0.0/100.0%)	7.9±4.9
Temporomandibular Disorders	11	0.2	28.8±12.7	3/8 (27.3/72.7%)	8.1±2.6
Tongue diseases	4	0.1	49.8±31.4	4/0 (100.0/0.0%)	20.8±29.3
Malignant diseases	30	0.4	64.7±13.0	25/5 (83.3/17.7%)	15.8±23.2
Dysphagia	30	0.4	47.5±15.0	14/16 (46.6/53.4%)	11.7±5.1
Oral aphthous ulcer	8	0.1	52.1±16.4	3/5 (37.5/62.5%)	13.1±18.5
Total	7028	100	36.0±16.3	3098/3930 (44.1/55.9%)	12.7±16.3



**Figure 2:** Admission trend of patients with (a) infectious disorders including pharyngitis, tonsillitis, and rhinitis and (b) other otorhinolaryngological disorders by day and hour

[Figure 2a and b]. When we assessed infectious disorders, the average number of visits per day was slightly higher on weekdays than the weekend [Figure 2a]. With respect to other otorhinolaryngological disorders, the number of visits was similar on weekdays and the weekend [Figure 2b]. The cost of each patient with otorhinolaryngological disorders to the governmental healthcare system was  $12.7 \pm 16.3$  USD. The cost of pharyngitis, tonsillitis, and rhinitis was  $7.0 \pm 5.3$ ,  $6.9 \pm 6.0$ , and  $7.1 \pm 7.1$  USD, respectively. The most expensive treatment cost was  $47.6 \pm 43.0$  USD for hoarseness of voice.

## DISCUSSION

With increased standards of quality of life, admission to various departments of hospitals, including the emergency department, is increasing. In developed countries, epidemiological studies have provided direction with respect to healthcare policies, and standards have been raised to achieve an optimal cost-effectiveness ratio in the healthcare system.

It is well known that patients with otorhinolaryngological disorders admitted to emergency rooms mostly exhibit infectious disorders.<sup>[7-9]</sup> Various epidemiological studies in different specialties have been published to provide direction to healthcare policies to reduce the workload of emergency departments. In this study, we retrospectively evaluated the data regarding patients with otorhinolaryngological disorders who were admitted to the adult emergency department of our tertiary university hospital over the course of 1 year. Infectious disorders including pharyngitis, tonsillitis, and rhinitis were the most common disorders and accounted for approximately 73% of all otorhinolaryngological disorders in the year analyzed. Perez Obon *et al.* previously reported that infectious disorders were the most common conditions, accounting for 41%.<sup>[10]</sup> According to our data, infectious disorders are the leading condition in emergency room admissions. Nearly three of four patients with an infectious disorder that could be treated in primary healthcare facilities used the emergency department.

Females were slightly more than males in patients visited the emergency room. In all months, noninfectious disorders were stable at approximately 150 per month. With the increased number of infection-based medical visits in the winter, the number of total visits due to otorhinolaryngological disorders also increased. As proposed previously, it appears that emergency departments are often used as a primary care setting.<sup>[11]</sup> Hijano *et al.* previously stated that a number of patients look for immediate attention to avoid long wait times for specialist care at primary healthcare facilities. Similarly, patients do not want to go only to primary healthcare facilities but also tertiary specialist outpatient units to avoid long wait times.<sup>[12]</sup> Therefore, the emergency department becomes more crowded. A previous study showed that emergency department crowding is associated with poor quality of care in patients with respect to total lack of treatment and delay until treatment.<sup>[13,14]</sup> The quality of patient care decreases as the staff of the emergency department lack the motivation to provide the best patient care. In view of our data, we suggest that policies be developed to refer patients with infection-based otorhinolaryngological disorders to primary health facilities.

With respect to the admission day of patients with otorhinolaryngological disorders, patients were admitted to the emergency department slightly more often on weekdays than on the weekend. When we evaluated the diagnoses, the number of patients with infectious disorders admitted to emergency rooms was slightly higher on weekdays compared with weekends. With noninfectious disorders, however, there was no difference between weekends and weekdays. In both groups, a majority of patients were admitted to the emergency room between 8:00 AM and 24:00 PM. According to these data, we suggest that patients with otorhinolaryngological disorders could wait for hours but not days for admission to the emergency room. Therefore, these patients do not represent real emergencies and can be referred to primary healthcare facilities instead of using the ESs of tertiary hospitals. In contrast, Andrade *et al.* evaluated the epidemiological characteristics of otorhinolaryngology care in the emergency department at a high complexity hospital and found that 62.77% of patients admitted to the emergency room were considered as an emergency/urgent.<sup>[9]</sup> However, external otitis, acute otitis media, and pharyngotonsillitis, which were most common disorders admitted to the emergency room, were considered as an emergency/urgent.

The cost of treatments of otorhinolaryngological disorders was determined based on the reimbursement of

the governmental insurance system. The average cost of otorhinolaryngological disorders was  $12.7 \pm 16.3$  USD per patient. The cost of infectious disorders, including pharyngitis, tonsillitis, and rhinitis, was  $7.9 \pm 5.9$  USD per patient on average. The most expensive treatment cost was  $47.6 \pm 43.0$  USD for hoarseness of voice. The increased cost of diseases is related to complications, requirement of a more specialized medical approach, and advanced imaging modalities to achieve a precise diagnosis. In contrast, infectious disorders constitute 73% of all admissions to the emergency room, and these disorders had lower costs, suggesting they do not require advanced imaging modalities or specialized medical skills. To the best of our knowledge, there are insufficient data regarding the cost-treatment analyses of patients with otorhinolaryngological disorders admitted to the emergency room. Therefore, our data provide additional perspective and highlight the importance of the development of new policies for improving emergency unit care.

The major limitation of this study is the use of data from a single center. However, our study population contains homogeneous unselected patients who were admitted to the ES of our university hospital during a 1-year period, therefore mirroring the real-world scenario. On the other hand, we only examined data from a tertiary hospital, and not from primary care settings. In fact, data from both primary and tertiary hospitals should be evaluated together to determine the real needs of the emergency healthcare system. Therefore, larger, prospective studies should be conducted not only with respect to otorhinolaryngological disorders in adults but also in other specialties to offer recommendations to remedy issues in the healthcare system.

## CONCLUSION

Overall, the majority of patients with otorhinolaryngological disorders exhibit infectious disorders such as pharyngitis, tonsillitis, and rhinitis. It has been previously demonstrated that only 10% of consultations were real emergencies.<sup>[15]</sup> The primary finding of this study is that more than 80% of patients with otorhinolaryngological disorders admitted to the emergency department were not true emergencies requiring attendance at a tertiary hospital emergency room. Some conditions other than infectious disorders may need a more specialized medical approach in the emergency room. However, infectious otorhinolaryngological disorders could be managed in primary healthcare facilities. For this purpose, healthcare policies can be improved to direct nonemergencies to a primary level of healthcare. General practitioners at the primary level could be trained by otorhinolaryngologists to develop the necessary skills to



treat common disorders and to update treatment strategies. Therefore, new policies could reduce the workload of ESs and allow more effort to be spent on real emergencies.

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### Conflicts of interest

There are no conflicts of interest.

### REFERENCES

1. Symvoulakis EK, Klinis S, Alegakis A, Kyrmizakis DE, Drivas EI, Rachiotis G, *et al.* Epidemiologic profile of otorhinolaryngological, head and neck disorders in a tertiary hospital unit in Greece: A challenge for general practitioners? *BMC Ear Nose Throat Disord* 2006;6:12.
2. Owens PL, Barrett ML, Gibson TB, Andrews RM, Weinick RM, Mutter RL. Emergency department care in the United States: A profile of national data sources. *Ann Emerg Med* 2010;56:150-65.
3. Yojana S, Mehta K, Girish M. Epidemiological profile of otorhinolaryngological emergencies at a medical college, in rural area of Gujarat. *Indian J Otolaryngol Head Neck Surg* 2012;64:218-24.
4. Choi KJ, Kahmke RR, Crowson MG, Puscas L, Scher RL, Cohen SM. Trends in otolaryngology consultation patterns at an academic quaternary care center. *JAMA Otolaryngol Head Neck Surg* 2017;143:472-7.
5. Bergmark RW, Sedaghat AR. Presentation to emergency departments for acute rhinosinusitis: Disparities in symptoms by race and insurance status. *Otolaryngol Head Neck Surg* 2016;155:790-6.
6. WHO: International Statistical Classification of Diseases and related Health Problems. 10<sup>th</sup> Revision, version for 2003. Available from: <http://www3.who.int/icd/vol11htm2003/fr-icd.htm>. [Last accessed on 2006 Apr 28].
7. Chess MA, Chaturvedi A, Stanescu AL, Blickman JG. Emergency pediatric ear, nose, and throat imaging. *Semin Ultrasound CT MR* 2012;33:449-62.
8. Prestes L, Hamerschmidt R, Tenorio S, Moreira AT, Tambara E. Epidemiologic profile of an otolaryngologic emergency service. *Int Arch Otorhinolaryngol* 2014;18:380-2.
9. Andrade JS, Albuquerque AM, Matos RC, Godofredo VR, Penido Nde O. Profile of otorhinolaryngology emergency unit care in a high complexity public hospital. *Braz J Otorhinolaryngol* 2013;79:312-6.
10. Pérez Obón J, Rivares Esteban J, Leache Pueyo J, Fernández Liesa R, Marín García J, Sevil Navarro J, *et al.* [An outpatient study in ENT (otorhinolaryngology) emergencies at a general hospital]. *Acta Otorrinolaringol Esp* 1995;46:298-304.
11. Pino Rivero V, Rejas Ugena E, Keituaqwa Yanez T, Alcaraz Fuentes M, Marcos Garcia M, Trinidad Ruiz G, *et al.* Descriptive study of 21,804 ENT emergencies in a third level hospital. *An Otorrinolaringol Ibero Am* 2003;30:237-45.
12. Hijano R, Hernández A, Martínez-Arias A, Homs I, Navarrete ML. [Epidemiological study of emergency services at a tertiary care center]. *Acta Otorrinolaringol Esp* 2009;60:32-7.
13. Pines JM, Hollander JE. Emergency department crowding is associated with poor care for patients with severe pain. *Ann Emerg Med*. 2008;51:1-5.
14. Pines JM, Localio AR, Hollander JE, Baxt WG, Lee H, Phillips C, *et al.* The impact of emergency department crowding measures on time to antibiotics for patients with community-acquired pneumonia. *Ann Emerg Med* 2007;50:510-6.
15. Timsit CA, Bouchene K, Olfatpour B, Herman P, Tran Ba Huy P. Epidemiology and clinical findings in 20,563 patients attending the Lariboisiere Hospital ENT Adult Emergency Clinic. *Ann Otolaryngol Chir Cervicofac* 2001;118:215-24.