ORIGINAL ARTICLE

Annual epidemiologic trends of 6000 ENT cases in the Emergency Department in the post-pandemic era: a cross-sectional study from Crete, Greece

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ABSTRACT:

Introduction: The COVID-19 pandemic significantly altered healthcare-seeking trends, leading to reduced emergency department (ED) visits and changes in referral patterns. By temporally distancing from the pandemic, healthcare utilization trends might be re-explored.

Aim: This study aims to analyze the epidemiologic trends of ear, nose, and throat (ENT) cases at the ED of a tertiary hospital in Crete, Greece, after the COVID-19 pandemic. It investigates changes in patient visit patterns, referral trends, and hospitalization rates.

Materials and methods: A prospective design data collection was conducted on all patients examined by an ENT specialist in the ED of the tertiary hospital of Crete during 2024. Data collected included patients' demographics, diagnosis (ICD-10 coded), referrals, and patient outcomes. Specific Hospitalization Index (SHI) was calculated as a rate of the total cases admitted for a specific ICD-10 by all visits recorded for that ICD-10.

Results: A total of 6,000 patients were examined. The most common diagnoses were acute otitis media (8.1%) and external otitis (7.0%). A total of 373 hospital admissions (6.2%) were recorded, with peritonsillar abscess (91 cases, SHI: 0.892) being the leading cause of in-hospital treatment, followed by vestibular neuronitis (29 cases, SHI: 0.617) and Bell's palsy (26 cases, SHI: 0.268). A total of 196 referrals (3.3%) were recorded, with 49.6% originating from public primary care. A decline was observed in referrals, from public primary care settings, to the same hospital, when compared with 2023 data ($p = 0.013$).

Conclusions: This study underscores the significant role of ENT emergencies for ED workload, indicating a return to pre-pandemic levels of ED overcrowding. The most common diagnoses recorded provided a low SHI, suggesting that they could be managed on an outpatient basis. Future research should focus on enhancing primary care in managing ENT cases to reduce unnecessary ED visits.

KEYWORDS: emergency department, ENT, primary care, referrals

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ABBREVIATIONS

AOM – acute otitis media
ED – emergency department
ENT – ear, nose, and throat
GPs – general practitioners
ICD-10 – International Classification of Diseases, 10th revision
PHC – primary healthcare
SHI – Specific Hospitalization Index

INTRODUCTION

Epidemiologic trends are used to assess population needs and the risk determinants of diseases, and to inform healthcare services to treat and manage conditions affecting the health and quality of life of the studied population groups [1]. These trends may be affected by a variety of conditions, such as social, economic, demographic, health care, and environmental changes [2]. Numerous studies demonstrated major changes in emergency department (ED) visits within the years of the pandemic, with patient workload being reduced and hospital admission rates increasing [3, 4].

Otolaryngologic morbidity is a common reason for seeking care in the ED, as related symptoms can be bothersome and usually demand a precise diagnosis and timely treatment to manage and prevent major complications. The visits in the ED pertaining to symptoms related to ear, nose, and throat (ENT) conditions also decreased during the pandemic, as highlighted by local studies [3, 4]. Previously, Symvoulakis et al. [5] in 2006, by reporting cases that attended the ED of the tertiary hospital of Heraklion Crete for ENT problems, recorded 6,771 patient-visits. However, a study published in 2023 from the same hospital recorded 4,542 cases from September 2021 to August 2022, underlining changes in the frequency of diagnoses made and admission trends [4]. These changes were mainly attributed to the pandemic impact, as the study of 2023 started collecting data the year after the last major lockdown in Greece. Furthermore, referrals from public primary care settings exhibited a consistent frequency among all referrals, and at the same time, some uncertainty about the need for such referrals [4]. This could also be supported by a study in 2024, where authors highlighted a mismatch in diagnoses made between ENT specialists and other medical professionals, prompting for development of strategies to enhance diagnostic accuracy [6].

In the meantime, efforts like small-duration courses, aiming to reduce hospital burden, have emphasized the need for strengthening primary healthcare (PHC) services, which may inform the health system and serve as a key pathway to universal and targeted health coverage [7, 8]. To address ED overcrowding, health systems often rely on PHC physicians to manage a broad range of conditions, either by integrating primary care units within hospital settings [9, 10] or by shifting certain emergency care services to PHC facilities [11]. Given this approach, enhancing the knowledge and skills of general practitioners (GPs) in managing ENT morbidity within PHC settings could significantly improve the quality of care provided, ultimately offering benefits for both patients and the healthcare system.

Even though local ENT morbidity has been reported recently, there is a variety of determinants that could affect and alter these trends, after the pandemic. Both the pandemic and the efforts of strengthening primary care services to manage these conditions more efficiently could be assessed to detect possible variation of otorhinolaryngologic emergencies.

AIM

The aim of this study is to assess the trends of ENT cases that sought care in the ED of the tertiary hospital of Heraklion two years after the study of 2023 [4] and three years after the last major lockdown due to the pandemic.

MATERIALS AND METHODS

All patients who were examined by an ENT specialist in the ED of the tertiary hospital of Heraklion, Crete, Greece, during the year 2024 were included in the study. In Heraklion, there are two public hospitals that alternate 24-hour shifts for emergency cases every morning at 08:00, one of which is the University General Hospital of Heraklion, where this study was facilitated.

The collected information concerned the patients' age, time and date of visit, area of residence, presenting symptom, diagnosis made in the ED, and the outcome of the visit (admitted, refused admission, or released with medical advice). Moreover, cases referred by another medical professional were also recorded, alongside the origin and reason of the referral. Furthermore, the diagnoses were coded in accordance with the International Classification of Diseases (ICD-10).

To obtain these data, three major databases were utilized. Firstly, as the registry book of the ENT department of the ED holds the information of every person examined, it was used as the main source of information. Secondly, a hospital's electronic database was utilized to provide information on demographics, admissions, and diagnoses. However, some cases were not fully documented in either the registry or the electronic database. To compensate for this gap in information, additional data was retrieved from the individual paper card issued to each patient during their ED visit. This card contains records of the examination, medical history, and other relevant details documented by the attending physicians. Despite the best efforts to collect all related data, there were still some missing values for different variables. For that reason, total counts in the tables presented may differ.

All subjects were divided into two groups depending on their residence. Areas with a population of more than 2000 inhabitants were classified as urban, while areas with a population of less than 2000 inhabitants were classified as rural. The population size cut-off was set to 2000, as previously acknowledged [12], which is also the cut-off used in the study of 2023 [4]. Counts and frequencies were extracted for each diagnosis after they were coded with the ICD-10 classification, grouping them according to the methodology used in the previous study [4].

Afterwards, a Specific Hospitalization Index (SHI) was calculated for the cases admitted to the hospital [5]. The SHI is a rate of the total cases admitted for a specific ICD-10 divided by all visits recorded for that ICD-10. Cases of patients that presented with a feeling of a foreign body, which was not confirmed by the ENT specialist, were recorded conventionally by adding an X before the mentioned ICD-10, due to the lack of an existing ICD-10 describing the exact condition. Finally, the outcome of the visit was organized in 3 categories: (a) admitted, (b) patient refused admission, and (c) released with medical advice.

This study was approved by the scientific committee of the University General Hospital of Heraklion (approval number 6371/07-07-2021) and the Ethics Committee of the University of Crete (approval number 59/05-05-2021) and it conforms to the principles of the Helsinki Declaration. Patients' informed consent was waived, as institutional clearance to allow researchers data access was provided, due to the reason that the design was based on hospital registry information collection.

Statistical Analysis

Data were analyzed using SPSS software, version 25.0 (IBM Corp). Frequency distributions of descriptive characteristics (demographic and clinical) were estimated for 6000 patients. Based on the ICD-10 classification, the most prevalent diseases and their explanations were presented. The relationship of referrals with the outcome of admission was assessed with the χ^2 (Chi-squared) method. The Specific Hospitalization Index was also estimated for the 20 most common diagnoses [5]. Monthly frequency trends between the current study and the previous ones, in 2006 and 2023 [4, 5], were assessed, and the number of visits was illustrated by implementing polynomial models as well as according to the hourly distribution of visits for the current study.

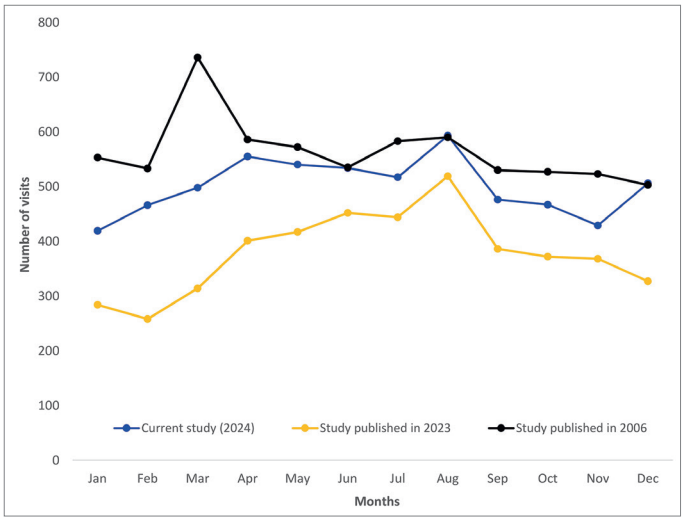

Fig. 1. Comparative monthly distribution of cases examined by an ENT specialist in the emergency department of the tertiary hospital of Crete in the current study, the study published in 2023 and the study published in 2006 (secular trend).

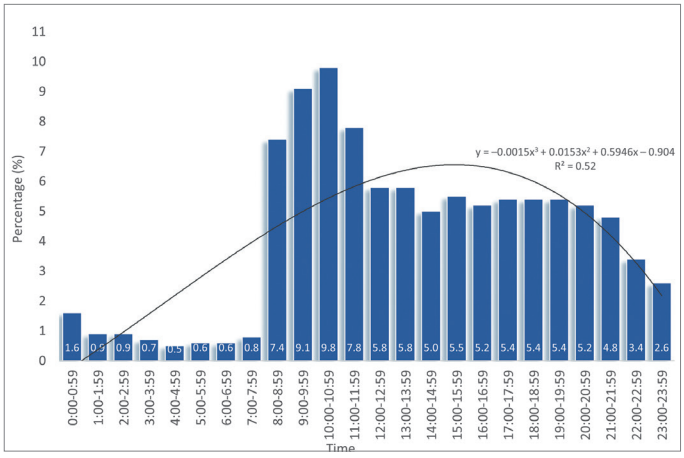

Fig. 2. Hourly distribution of cases examined by an ENT specialist in the emergency department of the tertiary hospital of Crete in the year 2024.

RESULTS

A total of 6000 patients visited the ED of the tertiary hospital of Crete and were examined by an ENT specialist within the year 2024. As presented in Tab. I., 485 cases were recorded as part of a follow-up visit after their initial examination. Moreover, 4535 of the people examined were staying in urbanized regions, while 1450 were residing in rural regions, with a ratio of almost 3:1. The median age of the patients examined was 42, ranging from 1 to 99 years, and the pediatric population accounted for 1052 cases. The 14 most common reasons for visiting the ED made up 67.6% of the total cases. Earache was responsible for 18.7% of all cases, while dizziness and sore throat followed with 10.6% and 8% respectively. The seasonality of the cases throughout the year is depicted in Fig. 1., with most visits recorded from April to August. The hourly distribution of cases examined is depicted in Fig. 2., with most visits observed during the morning hours (08:00–12:00).

The 20 most common diagnoses made are shown in Tab. II., accounting for 68.5% of all cases. The 5 most commonly encountered cases were these of acute otitis media – 8.1%, external otitis – 7.0%, dizziness unrelated to ENT pathology – 6.4%, impacted cerumen – 6.1% and epistaxis – 5.0%. Acute pharyngitis and acute tonsillitis were the most common upper respiratory tract infections recorded, with 4.9% and 4.2% respectively. The total admissions recorded were 373, which made up 6.2% of the total cases recorded. The SHI calculated for the most common ICD-10 coded diagnoses that were admitted to the hospital are presented in Tab. III. The most frequently admitted cases were the peritonsillar abscess and vestibular neuronitis, with an SHI of 0.892 and 0.617 respectively. The diagnoses with the highest recorded SHI were acute pansinusitis and peritonsillar abscess, with an SHI of 0.909 and 0.892.

A total of 196 referrals were recorded, accounting for 3.3% of all cases, as shown in Tab. IV. Nearly half of all referrals originated from public health centers (46.9%), followed by referrals from other hospitals (25.5%), ENTs in private practice (19.5%), GPs in private practice (6.6%), and other health professionals (1.5%). There was a statistically significant reduction, both in all referrals recorded between the study of 2023 and the present study ($p<0.001$) and the referrals made from public primary care units ($p = 0.013$). The majority of referred cases (60.2%) were discharged with medical instructions after receiving care, while 36.7% required admission

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Tab. I. Descriptive characteristics of the available data for 6000 patients examined by an ENT specialist in the emergency department of the tertiary hospital of Crete in the year 2024.

		n	%
Gender	♂	3006	50.1
	♀	2991	49.9
Age, *years*	*mean ±stand. dev. (median) [min, max]*	41.3 ±23.4 (42) [1, 99]	
	<12	784	13.1
	12–17	268	4.5
	18–29	1005	16.8
	30–59	2464	41.1
	60–79	1162	19.4
	80+	305	5.1
Revisits	*No*	5515	91.9
	Yes	485	8.1
Residential area	*Urban*	4535	75.8
	Rural	1450	24.2
Reasons for visit	*Earache*	1121	18.7
	Dizziness	638	10.6
	Sore throat	482	8.0
	Fever	370	6.2
	Feeling of a foreign body	308	5.1
	Head and neck pain (except ear and nose)	232	3.9
	Epistaxis	229	3.8
	Nasal trauma	168	2.8
	Nasal congestion	163	2.7
	Head and neck trauma	131	2.2
	Hemoptysis	112	1.9
	Feeling of ear fullness	100	1.7

to the hospital for further examination and inpatient treatment. In six cases, patients were offered admission to the hospital but for personal reasons refused and were eventually treated as outpatients, constituting the remaining 3.1% of all referrals. Referrals from public primary care units (29.5%) and ENTs working in private practice (26.9%) were found almost equally responsible for the total amount of referrals offered hospitalization, while the majority (41.0%) originated from other hospitals' referrals.

DISCUSSION

The present study remains consistent with previous studies with regard to ENT cases' hourly distribution, with most cases seen during the day, as well as age and gender patterns, maintaining a median age of 42 and a male-to-female ratio of 1:1 [4, 13, 14]. These trends demonstrate a timeless constant in these parameters through the years, which seem to be unaffected even by major healthcare events such as the pandemic. Notably, based on the authors' experience, most of the pediatric cases examined in the ENT department of the ED were in-hospital consultations from pediatricians for evaluation of ear pathology due to impacted cerumen preventing otoscopy.

The most common diagnoses made were those of acute otitis media (AOM) (8.1%), external otitis (7.0%), and unspecified dizziness not pertaining to an ENT condition (6.4%), while impacted cerumen and epistaxis followed with 6.1% and 5.0% for the latter ones respectively. As expected, three of the most common diagnoses pertained to ear pathology. This could possibly be attributed to other medical professionals' limited knowledge of otoscopy. A study in 2022, examining various medical specialties that perform otoscopy during their practice, supported that otoscopy training at the postgraduate level was inadequate, and trained physicians' confidence in the procedure was low [15]. Moreover, patients with dizziness were frequently examined by ENT specialists in order to rule out vestibular pathology after in-hospital consultations from other medical professionals working in the ED. The most common diagnosis pertaining to vestibular dizziness was benign paroxysmal vertigo, accounting for 3.5% of the total diagnoses recorded, which is half of the patients examined with dizziness unrelated to ENT pathology, and could perhaps demonstrate low confidence levels in managing such cases. Dizziness is one of the most challenging disorders presented at an emergency department, since its' causality could range from life threatening to benign, while diagnosis of the underling condition is mostly made with

Tab. II. The 20 most common diagnoses recorded according to the ICD-10 classification.

DIAGNOSIS	ICD-10 CLASSIFICATION	n	%
Acute otitis media	*H66.9*	484	8.1
External otitis	*H60.9*	423	7.0
Dizziness, unrelated to ENT pathology	*R42*	384	6.4
Impacted cerumen	*H61.2*	368	6.1
Epistaxis	*R04.0*	297	5.0
Acute pharyngitis	*J02*	295	4.9
Acute tonsilitis	*J03*	254	4.2
Benign paroxysmal vertigo	*H81.1*	207	3.5
Feeling of a foreign body	*XT16-XT18.1*	179	3.0
Foreign body	*T16-T18.2*	159	2.7
Head and neck trauma, except the ear and nose	*S00-S15.9 & T14.1*	148	2.5
Otomycosis	*H62.2*	134	2.2
Acute serous otitis media	*H65.0*	105	1.8
Peritonsillar abscess	*J36*	102	1.7
Bell's Palsy	*G51.0*	97	1.6
Temporomandibular joint disorder	*K07.6*	96	1.6
Hemoptysis	*R04.2*	96	1.6
Sialoadenitis	*K11.2*	94	1.6
Fracture of the nasal bone	*S02.2*	93	1.6
Superficial injury of the nose	*S00.3*	83	1.4
		4098	68.5

clinical examination and careful patient history taking, as blood tests and imaging examination, at a later stage, are usually either inconclusive or not cost-effective due to the high frequency of dizziness as a presenting symptom in the ED [16, 17].

The total number of cases that led to admission to the ENT clinic was 373, which represents 6.2% of all the cases recorded. As delineated in Tab. III., the first five diagnoses are responsible for almost half (50.4%) of all admissions recorded. These were the peritonsillar abscess with an SHI of 0.892, vestibular neuronitis with 0.617, Bell's palsy with 0.268, acute tonsilitis with 0.102, and sudden hearing loss with 0.485. The highest recorded SHI was 0.909 for cases of acute pansinusitis, which usually requires hospitalization due to adverse complications [18]. The calculated SHIs of these conditions appear reasonably useful, considering the treatment guidelines offered. For example, cases of peritonsillar abscess usually require hospitalization, while cases of acute tonsilitis are frequently treated with per os antibiotics as outpatients [19, 20].

However, 75 cases recorded refused admission to the hospital, despite the physicians' advice for inpatient treatment. These cases were subtly distributed through all cases, explaining the relatively low SHI of epiglottitis and edema of the larynx, which always require hospitalization because of a threatened airway [21]. However, in cases of Bell's palsy, the causality of which could range from idiopathic to iatrogenic [22, 23], the SHI varied from 0.268 to 0.629, when this factor was taken into account. Refusal of admission has generally been linked to younger patients, the male gender, lack of health insurance, and admissions originating from the ED, while other factors such as fear of hospital-acquired diseases and limited trust could possibly influence patients' decision [24].

As mentioned before, 60.2% of the referrals were discharged from the ED. Upon examining the origins of these cases, even though public primary care settings were found to refer the majority of them (46.9%), only 25% were treated as inpatients. The inappropriate referrals of GPs to specialists are encountered worldwide, as mentioned by other studies [25, 26]. On the other hand, referrals from other hospitals and ENTs working in private practice led to hospitalization more frequently, with 64% and 55.3% respectively. This seems rational considering that in both cases, the patients referred were most probably examined by another ENT specialist.

Comparison with the studies published in 2006 and 2023

When comparing the current study with the studies of 2006 and 2023, there were some interesting variations observed. Firstly, the seasonality of recorded visits in the present study closely aligns with the trends observed in the study published in 2023, following a similar secular trend as seen in Fig. 1. However, when compared to the 2006 study, a notable difference emerges in the month of March, where a peak in visitations was recorded, forming a pattern not observed in more recent studies. This could be a result of possible weather and climate variations that could influence the presence of

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Tab. III. The calculated SHI for the 20 most commonly admitted diagnoses according to the ICD-10 classification.

DIAGNOSES	ICD-10	ADMISSION (n)	TOTAL (n)	SHI
Peritonsillar abscess	*J36*	91	102	0.892
Vestibular neuronitis	*H81.2*	29	47	0.617
Bell's palsy	*G51.0*	26	97	0.268
Acute tonsilitis	*J03*	26	254	0.102
Sudden idiopathic hearing loss	*H91.2*	16	33	0.485
Edema of the larynx	*J38.4*	16	20	0.800
Sialoadenitis	*K11.2*	14	94	0.149
Perichondritis of the external ear	*H61.0*	13	38	0.342
Epistaxis	*R04.0*	13	297	0.044
Foreign body	*T16-T18.2*	13	159	0.082
Acute pansinusitis	*J01.4*	10	11	0.909
Retropharyngeal and parapharyngeal abscess	*J39.0*	9	12	0.750
Acute mastoiditis	*H70.0*	7	8	0.875
Complication of surgical or medical care, unspecified	*T88.9*	7	9	0.778
External otitis	*H60.9*	6	423	0.014
Edema, unspecified	*R60.0*	6	23	0.261
Head and neck trauma, except the ear and nose	*S00-S15.9 & T14.1*	6	148	0.041
Acute epiglottitis	*J05.1*	5	7	0.714
Acute otitis media	*H66.9*	4	484	0.008
Abscess, furuncle, or carbuncle of the nose	*J34.0*	4	13	0.308

seasonal respiratory infections or allergic conditions like allergic rhinitis, but further research needs to validate this hypothesis [27].

Regarding the diagnoses recorded in Tab. II., AOM (8.1%) was the most frequent in the present study, whereas it ranked fifth (5.0%) in 2023. AOM commonly follows viral respiratory infections and primarily affects young children [28]. Our study found that out of the 784 children under 12 years old examined, 232 had AOM. In contrast, the 2023 study recorded 405 children under 12 years old during a period when mandatory school measures were in place to reduce viral transmission [4]. This suggests that the lower incidence of AOM in 2023 was likely due to both the smaller pediatric sample size and the preventive measures implemented. Moreover, in the study of 2006, AOM was the third most frequent diagnosis, surpassed only by acute pharyngitis and acute tonsillitis [5]. The frequency of the latter two diagnoses has shifted over the past two decades, now consistently ranking lower among the ten most common diagnoses in both the 2023 and the present studies. This trend reflects an incidence rate that currently aligns with findings from other recent international published studies [13, 29, 30].

Moreover, as presented in Tab. III., there was a statistically significant decrease in the referrals in regard to those of the study published in 2023. This decline can primarily be attributed to the time distancing from the pandemic, as individuals had previously avoided hospital accessing in recent years due to concerns about infection [3]. In May 2023, the World Health Organization declared that COVID-19 no longer constituted a public health emergency [31]. Unwillingness to seek care in EDs due to the perceived risk of acquiring COVID-19 in hospital settings led to a reduction in non-urgent cases seen [32]. These findings suggest that EDs are progressively reverting to pre-pandemic levels of overcrowding. Moreover, there was a notable decrease in the admissions made during this study. In 2022, Fyntanidou et al. correlated a high admission rate with a low frequency of visitations in the ED [3] due to the ongoing pandemic. In addition, in the present study, there were 373 admissions, which accounted for 6.2% of the total cases examined, while in the study of 2023, there were 336 admissions, accounting for 7.6%. This difference appears to be statistically significant ($p<0.05$), supporting the epidemiologic shift to pre-pandemic levels and approaching the results presented in the study of 2006, where only 5.2% of all cases examined needed inpatient treatment.

Regarding the differences in the origins of referrals between the current study and the study of 2023, as shown in Tab. IV., even though there were no notable differences in the referral management, there was a statistically significant decline in the total cases referred from public primary care settings ($p = 0.013$). Referrals from other hospitals remained relatively unchanged, whereas referrals from ENTs and GPs working in private practice increased from 11.4% to 19.5% and from 2.3% to 6.6%, respectively. Given the overall trend of citizens increasingly seeking care directly at the ED, a proportional decrease in referrals across all categories, except for those originating from other hospitals, would be expected. The observed upward trend in referrals from private practices may be attributed to either a prior

Tab. IV. Frequencies of the recorded referrals of the current study with the study published in 2023.

		STUDY PUBLISHED IN 2023	CURRENT STUDY	
		n (%)		p-value
Referral	*no*	4321 (95.1)	5804 (96.7)	<0.001
	yes	221 (4.9)	196 (3.3)	
Origin	*Public Primary Care Units*	132 (60.3)	92 (46.9)	
	Hospitals and other Public Practices	52 (23.7)	50 (25.5)	
	Private Otolaryngologist	25 (11.4)	38 (19.5)	0.013
	Private General Practitioner	5 (2.3)	13 (6.6)	
	Other Private Health Professionals	5 (2.3)	3 (1.5)	
Outcome (Admission & Refusal of Admission)	*Public Primary Care Units*	22 (31.0)	23 (29.5)	
	Hospitals and other Public Practices	31 (43.6)	32 (41.0)	0.584
	Private Otolaryngologist	18 (25.4)	21 (26.9)	
	Private General Practitioner	–	2 (2.6)	

χ^2 tests

reluctance of private practicing physicians to refer patients during the pandemic or to the patients' unwillingness to visit the ED due to concerns about COVID-19 infection. After the pandemic, some ease in referring patients may occur, particularly in cases of uncertainty regarding diagnosis or treatment strategies, contributing to a rise in referral patterns.

Interestingly, the only category exhibiting a notable decline in referrals is the public primary care settings (p = 0.013). In the 2023 study, GPs in these county settings referred 132 cases (60.4% of all referrals), whereas this number has now decreased to 92 cases (46.9%). A plausible reason that may have contributed to this observation is the implementation of a course on ENT morbidity for GPs, which was facilitated in the county of Heraklion in 2023 [8]. Participants of the course received comprehensive training in the management of common ENT cases, informing them of the necessary theoretical knowledge to handle such conditions more confidently [8]. According to the then initiative, 34 out of 103 GPs practicing in public primary care settings were included in the study, while the audiovisual material and presentations used were distributed to 51, who reported interest in being approached [8]. Although an association can be proposed as likely to explain the reduction in referrals from public primary care settings, authors are cautious to suggest a direct causal relationship. However, if this indirect clustering phenomenon exists, an interesting hypothesis is emerging, since similar educational course interventions might produce measurable impact, beyond their design primary scope. Further research is needed to test this hypothesis.

CONCLUSIONS

This study provides an updated assessment of ENT urgent cases while highlighting key epidemiologic trends and hospitalization patterns. An increase in EDs' workload suggests a return to old healthcare-seeking behaviors with increased cases examined and fewer admissions made. Acute otitis media and external otitis were the most common diagnoses recorded, with peritonsillar abscess and vestibular neuronitis being the most common causes of hospital admission, and with acute pansinusitis showing the highest SHI, indicating a greater need for inpatient care. The reduction in referral rates from public healthcare providers may indicate an evolving landscape in primary care management of ENT conditions. Enhancing diagnostic accuracy and treatment competency at the primary care level could further optimize patient care and reduce emergency department visits. As healthcare systems continue to recover from the pandemic, understanding these trends is essential for improving emergency department functionality and ensuring timely and appropriate patient care. Future research should focus on optimizing referral pathways and strengthening primary care management to alleviate ED overcrowding.

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