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ORIGINAL ARTICLE

Pattern of ear, nose, and throat disease seen by otolaryngologists at Qassim University outpatient clinics, Saudi Arabia

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ABSTRACT

Background: Ear, nose, and throat infections are serious public health concerns affecting patients of all ages. They can affect hearing difficulties, speech, phonation, breathing, swallowing, smell, taste, and other respiratory tract infections. This study aimed to determine the pattern of otolaryngological head and neck diseases seen at Qassim University outpatient clinics, Saudi Arabia.

Methodology: This descriptive retrospective study was conducted in outpatient clinics at Qassim University, Saudi Arabia. This study involved 2,596 patients treated by otolaryngologists from January 2018 to December 2020. The data were extracted from patients' digital files, and all analyzed statistically using Statistical Package for the Social Sciences version 21.

Results: This study included 2,596 patients (64% male, 36% female) with a mean age of 34.5 years (range: 1-90 years). Nose diseases were most frequently seen (47.7%), followed by ear diseases (38.2%). Allergic rhinitis (AR) was the most commonly treated nose problem (20.1%). In the multivariate regression model, deviated nasal septum was more likely to be seen in men than women. Moreover, the presence of a deviated nasal septum, hearing loss, tinnitus, vertigo, rhinitis, and laryngitis were more likely to be associated with an older age group (>35 years).

Conclusion: The prevalence of ear nose throat diseases was higher in men than in women. The most commonly treated age group was 18-30 years. More studies on AR and other disorders need to be conducted to determine local risk factors. Healthcare managers and medical educators are advised to review these data to provide excellent care and education.

Keywords: ENT disease, otolaryngologist, ear infection, nasal infection, throat infection.

Introduction

Otolaryngology focuses on the study and treatment of the ear nose throat (ENT). Otolaryngologists deal with a wide range of diseases, such as upper respiratory tract infection, allergic rhinitis (AR), otitis media, and life-threatening conditions, such as nasopharyngeal carcinoma. ENT diseases are classified as either congenital or acquired. Trauma, infectious organisms, and inflammatory processes may be the cause of acquired disease [1]. ENT disorders are significant sources of morbidity and carry a high burden on health agencies. For instance, AR has an estimated cost ranging from $1.6 to 4.9 billion, with a $9.7 billion worth considering indirect effects in the USA alone [2]. To illustrate the prevalence of such diseases, AR, for example, is one of the most common disorders seen by otolaryngologists [3], with a prevalence ranging from 10% to 30% in adults and even higher prevalence in children [4,5]. Similarly, tinnitus affects as many as 60% of children [6]. These children have a higher risk of developing hearing impairment than healthy children [7].

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Moreover, according to the World Health Organization, around 466 million people experience hearing loss [8]. It is important to note that several factors play a role in the difference in prevalence between regions, such as low socioeconomic status, decreased level of education, and occupation type [9]. Despite knowing some of the associations between ENT diseases and these factors, some factors require further investigation. Questions have been raised about the effect of environmental factors on the pattern of otolaryngologic diseases. Saudi Arabia is characterized by its hot, dry climate, and dusty winds; these environmental factors may affect the prevalence of ENT disease. To the authors' knowledge, no study has examined the pattern of ENT diseases in Gulf countries. This study aimed to assess the prevalence and association between ENT diseases and demographic and environmental factors that may increase negative patient experiences and place a significant burden on health resources and to provide recommendations for healthcare managers and those responsible for medical education to provide excellent care and education for common ENT cases in Saudi Arabia.

Methodology

This descriptive retrospective study was conducted in outpatient clinics at Qassim University in the Qassim region, located in central Saudi Arabia. After excluding any patients with missing or incomplete files, we included 2,596 patients at Qassim University clinics from January 2018 to December 2020. A consultant otolaryngologist made the final diagnosis for all patients. Data were extracted from patients' digital files, including age, sex, and final diagnosis, and then tabulated and cleaned in MS Excel. All data analyses were performed using the Statistical Package for the Social Sciences version 21 Armonk, New York, IBM Corporation. Descriptive statistics are presented as frequencies and percentages. A *p*-value of 0.05 was used to determine statistical significance. The Committee approved this study of Research Ethics, Deanship of Scientific Research, Qassim University, IRB No. 20-06-11, dated March 22, 2021. The privacy of the data will be maintained and not be disclosed due to ethical considerations.

Results

As seen in Table 1, the most common age group was 18-30 years (26.4%). When comparing sexes, the proportion of 41-50-year-olds was significantly higher for male patients (p = 0.003), while the proportion of 51-60-year-olds was significantly higher among female patients (*p* = 0.031).

Figure 1 shows that the prevalence of throat disease was higher in the 1-17 years' age group (126, 40%), while nose disease was more prevalent in the 18-30 years age group (371, 32.4%). Similarly, the prevalence of ear diseases was higher in the 51-60 years' age group (136, 14.4%) and 61-90 years (136, 12.4%). On the other hand, the prevalence of throat diseases was lower in the 31-40 years' age group (48, 15.2%).

Table 2 shows the distribution of ENT diseases among men and women. Based on our investigations, the most commonly affected regions were the nose (47.7%) and ear (38.2%); nose disease was significantly more common among male patients (*p* = 0.032). In contrast, the prevalence of head-neck disease was significantly higher among female patients (*p* = 0.001). Furthermore, for ear problems, it was found that the commonly reported issue was wax (8.1%), followed by hearing loss and tinnitus (6.5%) and vertigo (4.8%) (Table 2). When comparing ear disease between male and female patients, the prevalence of secretory otitis media was significantly higher among female patients (*p* = 0.005). AR was the most frequently diagnosed nose disease (20.1%), followed by a deviated nasal septum (8.4%) (Table 2). When comparing male and female patients, a deviated nasal septum prevalence was significantly higher among male patients (*p* = 0.001). The most commonly diagnosed throat disease was laryngitis (3.9%), followed by adenoid hypertrophy (3.7%) and acute tonsillitis (2.2%) (Table 2). When comparing sexes, chronic tonsillitis prevalence was statistically

Table 1. *Distribution of age and ENT diseases between male and female patients.*

Variables	Overall *N* (%) (*n* = 2596)	Male patients *N* (%) (*n* = 1661)	Female patients *N* (%) (*n* = 935)	*p*-value*
Age group				
1-17 years	455 (17.5%)	277 (16.7%)	178 (19.0%)	0.129
18-30 years	685 (26.4%)	449 (27.0%)	236 (25.2%)	0.320
31-40 years	530 (20.4%)	335 (20.2%)	195 (20.9%)	0.677
41-50 years	433 (16.7%)	304 (18.3%)	129 (13.8%)	0.003**
51-60 years	295 (11.4%)	172 (10.4%)	123 (13.2%)	0.031**
61-90 years	198 (07.6%)	124 (07.5%)	74 (07.9%)	0.679

**p*-value was calculated using the chi-square test.

***Significant at $p < 0.05$ level.

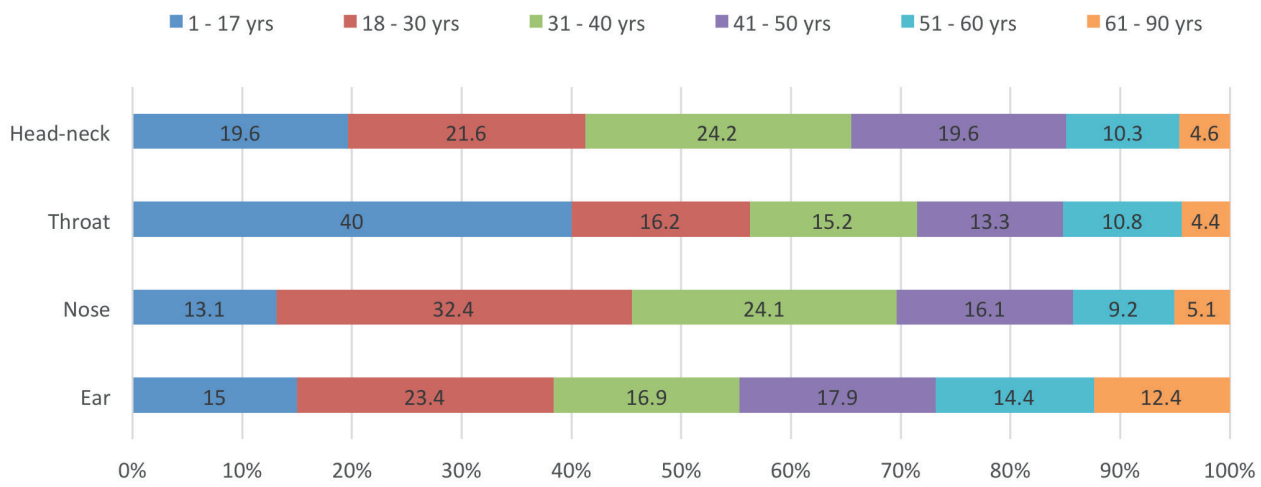

Figure 1. *Distribution of ENT diseases between age groups.*

significantly higher among female patients ($p = 0.022$). For head-neck diseases, various facial and neck injuries were the most commonly diagnosed problem (2.3%), followed by headache (1.9%). When comparing between sexes, the prevalence of headache was significantly higher among female patients ($p = 0.003$).

We also measured the relationship with age group (≤35 *vs*. >35 years) among ENT diseases. The results showed that the prevalence of chronic otitis media ($p = 0.023$), deviated nasal septum ($p < 0.001$), epistaxis ($p = 0.001$), chronic tonsillitis ($p = 0.039$), and adenoid hypertrophy ($p < 0.001$), and cervical lymphadenopathy ($p < 0.001$) was significantly higher in the younger age group (≤35 years). In contrast, the prevalence of hearing loss and tinnitus ($p < 0.001$), vertigo ($p < 0.001$), rhinitis ($p = 0.006$), laryngitis ($p = 0.001$), and headache ($p = 0.010$) were significantly higher in the older age group (>35 years) (Table 3).

In the multivariate regression model (Table 4), secretory otitis media (AOR = 0.596; 95% CI = 0.409-0.870; $p = 0.007$), chronic tonsillitis (AOR = 0.397; 95% CI =0.176-0.898; $p = 0.027$), and headache (AOR = 0.437; 95% CI = 0.248-0.768; $p = 0.004$) were significantly less likely to be seen in men. In contrast, deviated nasal septum was significantly more likely to be seen in men than in women (AOR = 1.618; 95% CI = 1.180-2.219; $p = 0.003$). In the multivariate regression model for age group, the presence of a deviated nasal septum (AOR = 5.128; 95% CI = 2.969-8.856; $p < 0.001$), hearing loss, and tinnitus (AOR = 2.740; 95% CI = 1.375-5.459; $p = 0.004$), vertigo (AOR = 12.557; 95% CI = 1.651-95.518; $p = 0.015$), rhinitis (AOR = 1.040; -3.744; $p = 0.038$), and laryngitis (AOR = 4.604; 95% CI = 1.572-13.482; $p = 0.005$) were significantly more likely to be seen in the older age group (>35 years).

Discussion

We believe this is the first study on this topic set in the Middle East. This study revealed that the prevalence of ENT disease was higher in men than in women, which is consistent with the literature [10-13]. We also found that nasal disease was the most common ENT disorder (47.7%), followed by ear problems (38.2%). Several papers have reported otologic disorders as the most common ENT disease seen by otolaryngologists [10-11,13-15]. In this study, this was the second most common ENT disease. These patients are more likely to have nutritional problems and live in overcrowded environments, which are important risk factors for the disease. Patients in these demographic groups are likely to delay seeking medical advice due to a lack of awareness of the disease and resources. They are likely to present with associated complications of the disease with increased morbidity [10-11]. Another study conducted in Bangladesh [16] indicated that throat infection was the most common ENT disease in the outpatient clinic at General Hospital, Gopalganj, Bangladesh, which is not consistent with our findings. The influence of crowded places, nutritional problems, financial constraints, and lack of time or negligence of health cannot be ruled out as important factors contributing to the pattern of presentation in these groups of patients. However, the higher prevalence of nasal diseases in our study is likely explained by the hot and dry climate of the Qassim region, which is characterized by drought and lack of annual rainfall.

In this study, the most common rhinological disorders were AR (20.1%) and deviated nasal septum (8.4%). This report is consistent with the study conducted by Zeeshan et al. [1] in Pakistan who found that AR (13.2%)

Table 2. *Distribution of ENT conditions in male and female patients.*

Disease	Overall *N* (%) (*n* = 2596)	Male patients *N* (%) (*n* = 1661)	Female patients *N* (%) (*n* = 935)	*p*-value*
Ear				
Wax	211 (8.1%)	143 (8.6%)	68 (7.3%)	0.232
Hearing loss and tinnitus	170 (6.5%)	107 (6.4%)	63 (6.7%)	0.770
Vertigo	125 (4.8%)	73 (4.4%)	52 (5.6%)	0.183
Secretory otitis media	114 (4.4%)	59 (3.6%)	55 (5.9%)	0.005**
Eustachian tube disorder	110 (4.2%)	64 (3.9%)	46 (4.9%)	0.195
Otitis externa	86 (3.3%)	55 (3.3%)	31 (3.3%)	0.995
Chronic otitis media	68 (2.6%)	45 (2.7%)	23 (2.5%)	0.703
Acute otitis media	47 (1.8%)	34 (2.0%)	13 (1.4%)	0.228
Other	12 (0.50%)	09 (0.50%)	03 (0.30%)	0.426
Total	943 (36.3%)	589 (35.5%)	354 (37.9%)	0.0222
Nose				
AR	521 (20.1%)	319 (19.2%)	202 (21.6%)	0.143
Deviated nasal septum	219 (8.4%)	163 (9.8%)	56 (6.0%)	0.001**
Rhinitis	140 (5.4%)	97 (5.8%)	43 (4.6%)	0.179
Rhino sinusitis	139 (5.4%)	94 (5.7%)	45 (4.8%)	0.358
Epistaxis	52 (2.0%)	35 (2.1%)	17 (1.8%)	0.614
Nasal polyposis	44 (1.7%)	31 (1.9%)	13 (1.4%)	0.367
Other	29 (1.1%)	19 (1.1%)	10 (1.1%)	0.863
Total	1144 (44.1%)	821 (49.4%)	418 (44.7%)	0.032**
Throat				
Laryngitis	101 (3.9%)	70 (4.2%)	31 (3.3%)	0.256
Adenoid hypertrophy	95 (3.7%)	63 (3.8%)	32 (3.4%)	0.629
Acute tonsillitis	57 (2.2%)	40 (2.4%)	17 (1.8%)	0.325
Chronic tonsillitis	24 (0.90%)	10 (0.60%)	14 (1.5%)	0.022**
Pharyngitis	23 (0.90%)	18 (1.1%)	05 (0.50%)	0.152
Pharyngeal tumor	15 (0.60%)	10 (0.60%)	05 (0.50%)	0.828
Total	315 (12.1%)	148 (8.9%)	72 (7.7%)	0.237
Head-neck				
Various facial and neck injuries	59 (2.3%)	31 (1.9%)	28 (3.0%)	0.064
Headache	50 (1.9%)	22 (1.3%)	28 (3.0%)	0.003**
Neck infection	22 (0.80%)	13 (0.80%)	09 (1.0%)	0.631
Cervical lymph adenopathy	21 (0.80%)	10 (0.60%)	11 (1.2%)	0.117
Other	42 (1.6%)	27 (1.6%)	15 (1.6%)	0.967
Total	194 (7.5%)	82 (4.9%)	63 (6.7%)	0.001**

**p*-value was calculated using the chi-squared test.

***Significant at the $p < 0.05$ level.

and deviated nasal septum (8%) were the most common nasal diseases diagnosed among patients. Despite climatic changes. Nanda and Bhalke [14] investigated the epidemiology of otorhinolaryngological diseases seen in health camps in rural areas in Himachal Pradesh, India, and reported similar findings, with AR (11.5%) and deviated nasal septum (11.9%) being the most commonly seen disorders. In their study, the rhinological disorder was the second most common after otologic disorders, nearly half of their sample. However, in a survey conducted by Mbalaso [15], nasal foreign bodies were the most commonly detected nasal disorder among pediatric patients, which did not coincide with our reports. However, the sample population must be considered

Table 3. *Distribution of ENT conditions by age group.*

Disease	Age group ≤35 years *N* (%)	Age group >35 years *N* (%)	*p*-value*
Ear			
Acute otitis media	28 (02.0%)	19 (01.6%)	0.446
Chronic otitis media	46 (03.3%)	22 (01.8%)	0.023**
Otitis externa	43 (03.1%)	43 (03.6%)	0.440
Eustachian tube disorder	63 (04.5%)	47 (03.9%)	0.493
Secretory otitis media	63 (04.5%)	51 (04.3%)	0.796
Hearing loss and tinnitus	56 (04.0%)	114 (09.6%)	<0.001**
Wax	112 (08.0%)	99 (08.3%)	0.760
Vertigo	27 (01.9%)	98 (08.2%)	<0.001**
Other	06 (0.40%)	06 (0.50%)	0.776
Nose			
Rhinitis	60 (04.3%)	80 (06.7%)	0.006**
Rhino sinusitis	83 (05.9%)	56 (04.7%)	0.171
Nasal polyposis	22 (01.6%)	22 (01.8%)	0.584
AR	288 (20.5%)	233 (19.5%)	0.540
Deviated nasal septum	145 (10.3%)	74 (06.2%)	<0.001**
Epistaxis	40 (02.8%)	12 (01.0%)	0.001**
Other	18 (01.3%)	11 (0.90%)	0.385
Throat			
Acute tonsillitis	33 (02.4%)	24 (02.0%)	0.559
Chronic tonsillitis	18 (01.3%)	06 (0.50%)	0.039**
Pharyngitis	17 (01.2%)	06 (0.50%)	0.055
Adenoid hypertrophy	93 (06.6%)	02 (0.20%)	<0.001**
Laryngitis	38 (02.7%)	63 (05.3%)	0.001**
Pharyngeal tumour	05 (0.40%)	10 (0.80%)	0.106
Head-neck			
Cervical lymph adenopathy	20 (01.4%)	01 (0.10%)	<0.001**
Neck infection	09 (0.60%)	13 (01.1%)	0.213
Various face and neck injuries	30 (02.1%)	29 (02.4%)	0.614
Headache	18 (01.3%)	32 (02.7%)	0.010**
Other	23 (01.6%)	19 (01.6%)	0.929

**p*-value was calculated using the chi-square test.

***Significant at the $p < 0.05$ level.

because, in our study, we included patients of all ages, whereas previous studies involved only children. We observed that the most commonly diagnosed otological disorder was ear wax (8.1%), followed by hearing loss and tinnitus (6.5%) and vertigo (4.8%). Consistently, in India [12] and Pakistan [1]; bilateral ear wax was reported as the most common ear disease among patients. Other studies have reported acute otitis media as the most commonly reported ear problems seen by otolaryngologists [10-11,13,14,16].

We also examined the most frequently diagnosed diseases associated with the throat. Based on authors' findings, laryngitis was the most commonly detected laryngological disease among patients (3.9%), followed by adenoid hypertrophy. These findings are not consistent with those reported by Mahfuz et al. [16]. Based on their investigation, chronic tonsillitis was most common among patients (9.5%), followed by adenoid hypertrophy. The authors explained that the likelihood of a low level of public awareness of throat problems, financial constraints, and negligence of health could not be ruled out as important factors contributing to presentation patterns, which added to the burden of health problems in their region. Other studies have

Table 4. *Multivariate regression to determine the predictor ENT disorders between sexes (male vs. female) and age group (>35 years vs. ≤35 years).*

Model 1: Disease (male *vs.* female)	Adjusted odds ratio (AOR)	95% confidence interval (CI)	*p*-value
Secretory otitis media	0.596	0.409-0.870	0.007 **
Deviated nasal septum	1.618	1.180-2.219	0.003 **
Chronic tonsillitis	0.397	0.176-0.898	0.027 **
Headache	0.437	0.248-0.768	0.004 **
Model 2: disease (>35 years *vs.* ≤35 years)			
Chronic otitis media	0.655	0.348-1.233	0.190
Hearing loss and tinnitus	2.740	1.375-5.459	0.004 **
Vertigo	12.557	1.651-95.518	0.015 **
Rhinitis	1.973	1.040-3.744	0.038 **
Deviated nasal septum	5.128	2.969-8.856	<0.001 **
Epistaxis	0.698	0.347-1.404	0.313
Laryngitis	4.604	1.572-13.482	0.005 **
Headache	3.349	0.938-11.957	0.063

AOR = adjusted odds ratio; CI = confidence interval.**Significant at the $p < 0.05$ level.

reported that tonsillitis was the most common throat disease diagnosed among patients [1,10-11]. Bacterial infection and some immunological factors lead to tonsillitis; improperly managed acute tonsillitis could lead to several complications [17].

Moreover, in terms of head-neck diseases, our study revealed that various facial and neck injuries, such as sprains, dislocation, and strains involving the head and neck, were the most common disorders associated with the head and neck (2.3%), followed by headache (1.9%). These findings are not consistent with those reported by Mahfuz et al. [16]. Based on their accounts, the most commonly diagnosed head-neck disorders seen by otolaryngologists were goiter (1.05%) and cervical lymphadenopathy (0.92%). Multiple factors are considered etiological factors of these diseases in developing countries, including social and environmental factors [18]. Finally, multivariate regression estimates indicated that female patients were more likely to have secretory otitis media, chronic tonsillitis, and headaches. In contrast, male patients were more likely to have a deviated nasal septum. We also analyzed which age group was more affected by ENT diseases. According to the adjusted regression model, hearing loss, tinnitus, vertigo, rhinitis, deviated nasal septum, and laryngitis were significantly more likely to be seen in the older age group (>35 years). This study was conducted in an institutional outpatient department, which serves university students, staff, and staff members. Qassim University Medical City, to date of this paper's publication, is restricted to outpatient departments, and there are no surgical facilities. Due to the lack of surgical and oncology departments, oncological cases are limited and referred to higher centers after diagnosis.

Conclusion

In conclusion, the prevalence of ENT diseases was higher in male patients than in female patients. Nearly, half of patients complained of nasal conditions, and AR was the most common complaint among all patients, followed by ear wax. The deviated nasal septum was more likely to be seen in male patients than in female patients. Furthermore, the presence of deviated nasal septum, hearing loss, tinnitus, vertigo, rhinitis, and laryngitis were more likely to be seen in the older age group (>35 years). Consequently, we have multiple recommendations. First, more studies on AR in the Qassim region need to be conducted to establish local risk factors. Second, healthcare managers and medical educators are advised to review these data to provide future excellent care and education. Third, awareness among patients is necessary for early detection and prevention of complications. Medical healthcare professionals play a vital role in educating patients on the importance of early treatment and management of ENT diseases.

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List of Abbreviations

ENT	Ear Nose Throat
AR	Allergic rhinitis
USA	United States of America
AOR	Adjusted Odds Ratio
CI	Confidence interval

Conflict of interest
The authors declare that there is no conflict of interest regarding the publication of this article.

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Consent to participate
Written informed consent was obtained from all the participants.

Ethical approval
The current study was approved by the Research Ethics, Deanship of Scientific Research, Qassim University, IRB No. 20-06-11, dated March 22, 2021.

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