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# Roadmap of Otolaryngology—Head and Neck Surgery Clinic in a Tertiary Center: A Prospective Cohort Study of 1178 Patients

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## Abstract

**Objectives: An Otolaryngology—Head and Neck Surgery clinic is an integral part of any modern tertiary center outpatient department. The objective of this article is to present our experience in developing a local electronic Makkah Otolaryngology—Head and Neck DATABASE (MO-HND) and provide a roadmap for the development of Otolaryngology—Head and Neck Surgery clinics in other tertiary centers. Methods: This is a prospective audit of all patients attending our clinic over 3 months period (July to September 2014). The data were recorded using our MO-HND. Results: A total of 1178 patients were included. The mean age was 27.7 ± 6.7 years. Participants included 586 males (49.7%) and 592 females (50.3%). There were 1139 (96.6%) Saudi and 39 (3.4%) non-Saudi patients. The specialist clinic undertook most of the workload (66%). The majority of surgery bookings (94%) were carried out through a consultant clinic. Of all participants, 80% were diagnosed with general ENT conditions, 21% underwent a procedure in the clinic, and 29% required further investigations. The surgical conversion rate was 16.3%. Conclusion: Electronic DATABASES have become important tools for improving medical services. Primary and secondary level medical centers and hospitals should increase their role in alleviating pressure from tertiary and quaternary level hospitals. In turn, a model concentrated on subspecialty clinics and services should be developed.**

## Keywords

**ENT, Otolaryngology, Head and Neck, Clinic**

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## 1. Introduction

An Otolaryngology—Head and Neck Surgery clinic is an integral part of any modern tertiary center outpatient department. The distribution of services and activities within such clinics is very much center-dependent. However, such services and activities are very different within primary, secondary, tertiary, or quaternary centers. In general, within tertiary centers, the general platform of these clinics is similar, but there are differences typically related to the specific geographical distribution of diseases and referral system [1]-[5].

The idea of developing an electronic DATABASE for ENT clinics was initiated by Neumann in 1967 [6]. Subsequently, this idea has evolved along with the development of the medical field and computer systems. There was scant specific literature in the field of otolaryngology specific DATABASES; but they all encouraged further development and pointed to many health related issues that could be improved using such DATABASES (e.g., services planning, clinics allocations, operating time allocation, equipment's needed, man power planning) [1]-[6]. Our first experience with electronic DATABASES was in 2009 with the head and neck oncology DATABASE in Makkah [1]. The purpose of this report is to present our experience in the development of our local electronic Makkah Otolaryngology—Head and Neck DATABASE (MO-HND) and provide a roadmap for the Otolaryngology—Head and Neck Surgery clinic in tertiary centers.

## 2. Methods

This prospective cohort study was conducted between July-September 2014following the creation and development of the Makkah Otolaryngology—Head & Neck DATABASE (MO-HND). The DATABASE was developed using Microsoft© Access 2009 (Microsoft Corporation) as a collaborative project between UMM AL-QURA University and the ministry of health hospitals in Makkah, Saudi Arabia. After obtaining ethical approval from the Institutional Review Board and administration, relevant patient demographics, diagnosis, therapy, and clinic information were included in the DATABASE (see **Figure 1**).

The inclusion criteria of this study were all patients of both genders and all age groups who attended the Otolaryngology—Head & Neck Surgery clinic at our hospital in Makkah. All relevant demographic data were recorded prospectively during the patient clinic encounter.

Data presented as means ± SD for continuous variables and as percentages for categorical variables. Group comparisons were conducted using a t-test for continuous variables and chi-squared test for discrete variables. A *p-value* was calculated using Fisher's Exact Test and a p-value of <0.05 was considered as statistically significant. Relative risk (RR) and 95% confidence intervals (CI) were also presented when appropriate. Data analysis was carried out using Microsoft© Excel 20013 (Microsoft Corporation, Seattle, WA) and SPSS© Version 17 (SPSS Inc., Chicago, IL).

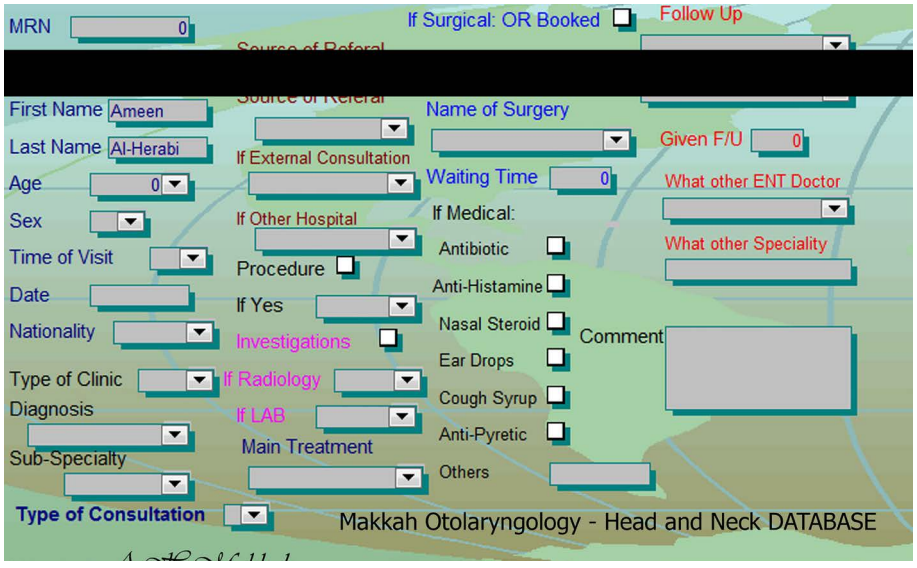


**Figure 1.** Makkah Otolaryngology—Head and Neck DATABASE (MO-HND) interface.

## 3. Results

A total of 1178 patients who met our inclusion criteria and presented to the Otolaryngology—Head and Neck Surgery clinic were included in this study. The mean age was 27.7 ± 6.7 years (age range = 5 days - 81 years). Age group distributions are shown in **Table 1**. There was a statistically significant trend toward younger age group presenting to the Otolaryngology—Head & Neck Surgery clinic, with age groups 0 - 50 years old representing 86.1% of total patients (chi-squared test = 58.4, $p$ = 0.0001). There was no significant difference in the number (males 49.7%, females 50.3%) or ratio (male to female ratio = 1:1.01) of male and female participants ($p$ = 0.93, RR = 1.005, 95% CI = 0.92 - 1.09).

There was a statistically significant difference between the number of Saudi (n = 1139, 96.6%) and non-Saudi (n = 39, 3.4%) patients (p = 0.0001, RR = 0.363, 95% CI = 0.33 - 0.38). Of non-Saudi patients, 12 (1.0%) were from Egypt, 10 (0.9%) from the Philippines, 8 (0.7%) from Pakistan, and 9 (0.8%) from other countries. There was also a statistically significant difference between the distribution of patients who attended the clinic during the morning shift (09:00 - 12:00) (n = 726, 61.6%) and afternoon shift (13:00 - 16:00) (n = 452, 38.4%) ($p$ = 0.0001, RR = 0.791, 95% CI = 0.73 - 0.85).

There are three types of clinic in our outpatient Otolaryngology—Head & Neck Surgery structure: Consultant clinic, Specialist clinic, and Resident clinic. The distribution of patients' attendance at these clinics is shown in **Figure 2**. Analysis revealed that the Specialist clinic represented 780 (66%) of total patients (chi-squared test = 218.24, $p$ = 0.0001). However, most OR booking was completed via a Consultant clinic (180 of 192 patients, 94%). Of the total patients, there was a significant difference between the number of follow-up (n = 731, 62%) and new patients (n = 447, 38%) ($p$ = 0.0001, RR = 0.784, 95% CI = 0.72 - 0.85).

Patients' diagnoses were established after the patients were triaged by the ENT clinic nurse then examined by the clinic physician. Recording of diagnoses was based on the International Classification of Diseases (ICD-10) [7]. The distribution of patients' diagnoses according to subspecialty is shown in **Figure 3** and the distribution of specific patients diagnoses within each subspecialty is shown in **Table 2**.

**Table 1.** Age group distributions of 1178 patients attending Otolaryngology—Head and Neck Surgery clinic.

| Age group | Frequency | Percentage (%) |
|---|---|---|
| **0 - 18** | 446 | 37.9 |
| **19 - 50** | 568 | 48.2 |
| **>51** | 164 | 13.9 |
| **Total** | 1178 | 100 |

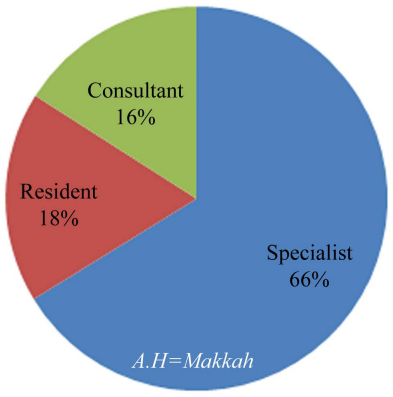


**Figure 2.** The distribution of all non-Saudi nationalities patients included in the ENT HAJJ clinic study.

**Table 2.** Diagnosis distributions of 1178 patients attending Otolaryngology—Head and Neck Surgery clinic.

| Diagnosis sub-specialty | Number | | Percentage (%) |
|---|---|---|---|
| **General** | **936** | | **80** |
| | Upper respiratory tract infection | 205 | 17.4 |
| | Allergic Rhinitis | 160 | 14 |
| | Adeno-tonsillar disease | 139 | 12 |
| | External & middle ear infectious & inflammatory disease | 118 | 10 |
| | Deviated nasal septum | 82 | 7 |
| | Wax | 48 | 4 |
| | Nasal trauma/fracture | 33 | 3 |
| | Hearing loss | 22 | 1.9 |
| | Hoarseness | 21 | 1.8 |
| | Tracheostomy | 20 | 1.7 |
| | Reflux laryngitis | 20 | 1.7 |
| | Dizziness | 19 | 1.6 |
| | Epistaxis | 17 | 1.4 |
| | Foreign body | 14 | 1 |
| | Others | 18 | 1.5 |
| **Rhinology** | **96** | | **8** |
| | Sino-nasal polyposis | 66 | 5.6 |
| | Naso-lacrimal disease | 25 | 2 |
| | Choanal atresia | 5 | 0.4 |
| **Otology** | **69** | | **6** |
| | Mastoid & middle ear disease | 65 | 5.6 |
| | Bell's palsy | 3 | 0.3 |
| | Acoustic neuroma | 1 | 0.1 |
| **Head & Neck** | **61** | | **5** |
| | Thyroid mass | 31 | 2.6 |
| | Head & neck mass/tumor | 13 | 1 |
| | Thyroglossal duct cyst | 5 | 0.4 |
| | Parotid gland disease | 5 | 0.4 |
| | Submandibular gland disease | 3 | 0.25 |
| | Laryngocele | 2 | 0.2 |
| | Glomus tumor | 2 | 0.2 |
| **Fascioplastic** | **13** | | **1** |
| | Nasal deformity | 11 | 0.8 |
| | Flap reconstruction | 2 | 0.2 |
| **Pediatric** | **3** | | **0.3** |
| | Subglottic stenosis | 2 | 0.2 |
| | Laryngeal papillomatosis | 1 | 0.1 |
| **Total** | **1178** | | **100** |

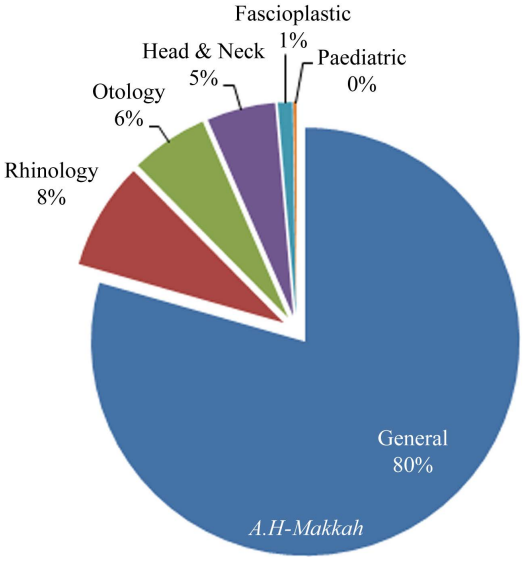


**Figure 3.** Diagnosis distributions of 1178 Otolaryngology—Head and Neck Surgery clinic patients according to subspecialty.

The source of referrals to the Otolaryngology—Head and Neck Surgery clinic is shown in **Figure 4**. Of the 1178 patients that attended the clinic, there was a significant difference between patients that had an in-clinic procedure (n = 250, 21%) and those who did not (n = 928, 89%) ($p$ = 0.0001, RR = 0.553, 95% CI = 0.51 - 0.59). The distribution of specific procedures performed is shown in **Table 3**. There was also a significant difference between the number of patients who had a requested investigation (n = 341, 29%) and those who did not (n = 837, 71%) ($p$ = 0.0001, RR = 0.652, 95% CI = 0.60 - 0.70). The distribution of the specific requested investigations is shown in **Table 4**.

Additionally, the number of patients booked for surgery (n = 192, 16.3%); widely known as surgical conversion rate (SCR), and those primarily assigned to medical therapy (n = 986, 83.7%) differed significantly ($p$ = 0.0001, RR = 0.495, 95% CI = 0.45 - 0.53). The distribution of detailed types of medical therapy is shown in **Table 5**. The reason there are a total of 1491 medical therapies is that some patients were given more than one medication. For the 192 patients booked for surgery, the surgical waiting time ranged from 1 - 9 months (average = 7.2 months). The future plans for all clinic patients are shown in **Figure 5**. For the 858 (73%) patients receiving follow-up, the wait time ranged from 1 - 28 weeks (average = 6.1 weeks).

## 4. Discussion

The MO-HND is our institutional model for ENT patients' data management. The primary intention is for it to act as a system that provides useful patient demographic statistics to assist future service planning and monitoring. There is scant literature that outlines comprehensive descriptive statistics of a modern Otolaryngology—Head and Neck Surgery clinic in a tertiary center [1]-[3] [5].

A total of 1178 patients were seen in our Otolaryngology - Head and Neck Surgery clinic. Patients' average age was 27.7 years old (86.1% of patients were between 0 - 50 years old), and it is clear that younger age groups predominate. Age-related findings contrast those reported in Boiza *et al.*'s [8] study in Spain, which indicated that of 1516 ENT attending patients, 57.86% were over 65 years old. Of these patients, 61.2% were seen for an ear disorder. These findings clearly demonstrate geographic variance related to the health care system. In addition, in the current study there was an equal gender distribution, which differs from Alherabi's [9] study that reported that of 1047 patients, 63.3% were male and 36.7% were female. However, in that study the ENT clinic setup occurred during HAJJ time (pilgrimage). Regarding patients' nationalities, in our study, there were 1139 (96.6%) Saudi and 39 (3.4%) non-Saudi patients. This differs from a study by Alherabi [9], which reported that out of 1047 patients, 31.6% were non-Saudi. However, once again, the ENT clinic setup in that study occurred during HAJJ. Egypt, the Philippines, and Pakistan represented most of the non-Saudi country nationalities, which are also the predominant countries of origin of hospital staff. Furthermore, the daily operation of the clinic was

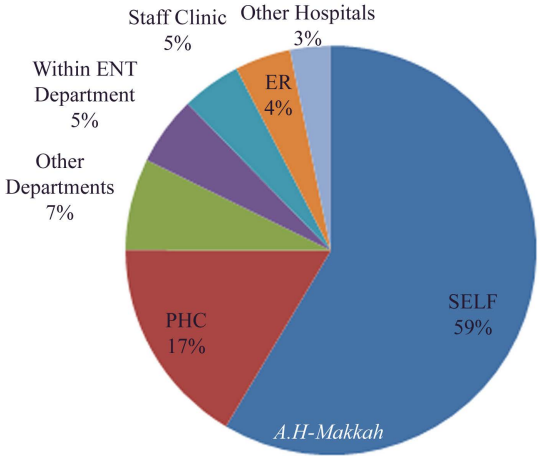


**Figure 4.** Source of referrals of 1178 patients attending Otolaryngology—Head and Neck Surgery clinic according to subspecialty (PHC: Primary Health Care).

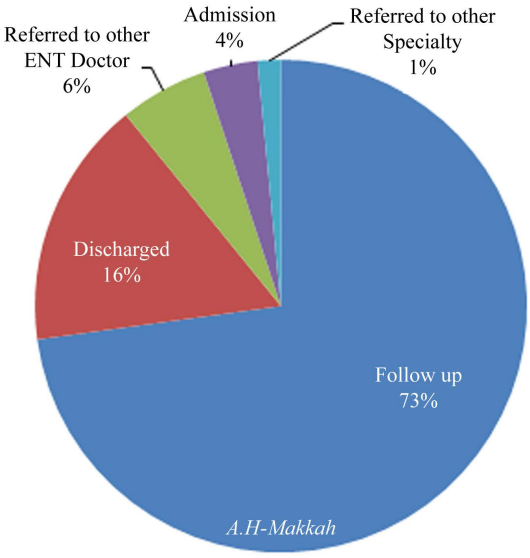


**Figure 5.** Future plans for 1178 Otolaryngology—Head and Neck Surgery clinic patients.

**Table 3.** Distribution of procedures for 1178 patients attending Otolaryngology—Head and Neck Surgery clinic.

| | | Number | Percentage (%) |
|---|---|---|---|
| Procedures | NO | 928 | 79 |
| | YES | 250 | 21 |
| | Ear Debridement | 88 | 35.2 |
| | Endoscopy | 86 | 34.4 |
| | Wound care | 36 | 14.4 |
| | FB removal | 22 | 8.8 |
| | Epistaxis cautery | 12 | 4.8 |
| | Others | 6 | 2.4 |
| | Total | 250 | 100 |

**Table 4.** Distributions of requested investigations for 1178 patients attending the Otolaryngology—Head and Neck Surgery clinic.

| | | | Number | Percentage (%) |
|---|---|---|---|---|
| **Investigation** | NO | | 837 | 71 |
| | YES | | 341 | 29 |
| | Radiology | Plain X-ray | 118 | 34.5 |
| | | CT | 54 | 16 |
| | | MRI | 6 | 1.8 |
| | | U/S | 6 | 1.8 |
| | Audiology | Audiogram | 70 | 20.6 |
| | | Tympanogram | 21 | 6 |
| | Laboratory Blood Work | | 66 | 19.3 |
| | Total | | 341 | 100 |

**Table 5.** Surgical and medical therapy distributions of 1178 patients attending the Otolaryngology—Head and Neck Surgery clinic.

| | | Number | Percentage (%) |
|---|---|---|---|
| **Surgical** | | 192 | 16.3 |
| | | 986 | 83.7 |
| **Medical** | Antibiotic | 388 | 26 |
| | Anti-histamine | 306 | 20.5 |
| | Nasal steroid | 272 | 18.2 |
| | Anti-pyretic | 260 | 17.5 |
| | Ear drops | 106 | 7.1 |
| | Nasal saline wash | 76 | 5 |
| | Cough syrup | 36 | 2.5 |
| | Others | 47 | 3.2 |
| | Total | 1491 | 100 |

not equally distributed between the morning shift (09:00 - 12:00), where 726 (61.6%) patients attended, and the afternoon shift (13:00 - 16:00) where 452 (38.4%) attended. This represented an increased patient load of 37.6%, which is comparable to Alherabi [9] study that reported a 30.4% increase in patient load in the morning.

Although the service model in our hospital is consultant-based, 66% of patients in the outpatient clinic were seen by specialist clinics and represent a major operational workforce. Resident's clinics saw 18% of all patients and were mainly for screening, preadmission, or postoperative clinics. Consultants saw only 16% of patients; however, 94% of the operative booking was completed through a consultant clinic. Consequently, this reflects a surgical filtration process in decision making from a junior to more senior level clinic. A study by Koay *et al.* [10] about a nurse-led preadmission clinic for elective ENT surgery admission showed that using a standard proforma for clerking was appropriate for nurses. Although a number of unnecessary investigations were re-

quested, all clerking notes were well kept. Additionally, 440 patients (96.9%) underwent their operations without complications. Thus, it was concluded that a nurse-led preadmission clinic is effective in the management of elective ENT operating lists [10]. In another study, Daniel and colleagues, 11 addressed the question of "Is a doctor needed in the adult ENT pre-admission clinic?" Here, it was concluded that designing a preadmission protocol that could easily be used by nurses could eliminate most changes made by doctors. Thus, it was recommended that all ENT departments consider implementing nurse-led preadmission clinics [11]. Dexter *et al*. also advised the introduction of a proforma, and advice on handwriting significantly increased the quality of case notes [12]. In our Otolaryngology—Head and Neck Surgery clinic we found that there was a significant circulation of patients, as 62% were follow-ups and 38% were new patients.

Examining the distribution of services within the Otolaryngology—Head and Neck Surgery clinic showed that a significant 80% of cases were diagnosed with a general ENT condition. Although the hospital is considered a tertiary center, only 20% of total cases were true tertiary-level cases. This represented a major burden to providing a specialized service to a system overwhelmed with primary- or secondary-level cases. Of the 80% of patients that attended the clinic with a general condition it was found that 31.4% were simple upper respiratory tract infection (URTI) and allergic rhinitis cases that could have been easily managed in a primary health care center. Although many of their cases were referred as emergency or semi-emergency cases, many of them were not. Congruently, Herve *et al*. [13] conducted a study in France where they examined 1237 patients in a similar clinic and found that most cases were not true emergencies (53%) and that the predominant pathological cases managed were acute external and middle ear otitis, epistaxis, vertigo, and facial injuries. Emergency care was more justified when a general practitioner or another emergency unit referred the patients. A study by Wheatley *et al*. [2] from England reported that 75% of patients seen in an open access clinic could have waited until the next day to be seen. Furthermore, when Timsit *et al*. [5] examined 20,563 patients in an ENT adult emergency clinic, they found that only 10% of the consultations appeared to be real medical emergencies. Subsequently, Mylvaganam *et al*. [14] were able to reduced patient waiting times from 70 minutes to 35 minutes and reduce inappropriate referrals from 7% to 2% by establishing an ENT emergency clinic.

Of the 20% of cases representing true subspecialty level cases, the majority were related to Rhinology (8%), Otology (6%), and Head and Neck (5%). These subspecialties will represent the future planned subspecialty clinics in our modern Otolaryngology—Head and Neck Surgery department. Of the 8% patients that attended the clinic with a rhinologic diagnosis, 66 (5.6%) had nasal polyposis, which was a significant number and represents an important condition affecting the Makkah community. Furthermore, of the 6% (n = 96) of patients that attended the clinic with an otologic diagnosis, 65 (5.6%) had mastoid and middle ear disease. Likewise, this number is significant and reflects a condition affecting our community.

In addition, 5% of patients (n = 61) attended the clinic with a head and neck diagnosis. In a 2009 study conducted by our group [1] to address the head and neck oncology experience in Makkah, 44 patients concluded all oncological services of head and neck cancer patients including surgery, radiotherapy, and chemotherapy should be provided in one oncology center. Thus, these should be managed through one standard channel (the head and neck oncology board) to achieve standard patient care, adequate follow up, and surveillance [1]. Another issue regarding caring for head and neck cancer patients in a general ENT clinic was raised by Ali and colleagues [15], who stated that unwarranted fears about cancer are best dealt with by the referring clinician. Other clear benefits from a specialized ENT-head and neck clinic include rapid patient access to specialist management and the development of subspecialty skills [3].

In the current study, 31 patients (2.6%) were found to have a thyroid-related problem. Overall, the most common head and neck cancers identified in Saudi Arabia were thyroid and nasopharyngeal cancers. [1] This clearly differs from western statistics presented in a study of 881 patients that indicated that laryngeal and oral cancer represented 47.8% of all head and neck cancers [16]. A study by Morinaka *et al*. addressing the magnitude of thyroid disease in an ENT clinic found that 1.8% of 6348 outpatients had thyroid-related problems [4]. In our clinic, fascioplastic and pediatric otolaryngology cases were the minimal burden, representing 1% and 0.3% of cases.

The sources of referral represented a surprising result, since it could be expected that most referrals to a tertiary center would come from at least secondary-level institutions or centers. However, it was found that 76% of all referrals came from primary health care centers or simple patient self-referral.

While hospitals were thought to be the main source of referrals to tertiary hospitals, only 7% of the total consultations came from other departments within our hospital, and only 3% came from other hospitals. García *et al*.

[17] showed that internal medicine and pediatric departments were the most frequent source of referrals. An audit from Ireland demonstrated that out of 3.3 million outpatients attendees, 20% were directed towards ENT services. Here, the researchers concluded that there were poor compliance rates with their newly introduced standardized referral form [18].

Of all patients that attended the clinic, 21% (n = 250) of patients underwent a procedure. However, only 34 patients had emergency-related procedures; namely, foreign body removal and epistaxis cautery. In Mori's Japanese study, it was demonstrated that out of 2184 outpatient surgeries, myringotomy, coagulator ablation of the nasal mucosa, removal of a foreign body in the external auditory canal, and insertion of a ventilation tube accounted for 90% of the total number of procedures performed on outpatients [19].

Of all patients that attended the clinic, 29% (n = 341) has received a request for further investigation. The most common requests were plain X-rays (34.5%) and audiological tests (26.6%). Ayshford *et al*. showed that of 1155 patients seen by one ENT surgeon, 76% of patients required an investigation (audiometry, endoscopy, microscopy of the ear, a minor procedure or X-ray) [20]. In the current study, the SCR was 16.3%. A British report addressing SRC within all surgical specialties after general practitioner referral showed that ENT SRC ranged from 23% - 29% [21]. As a true reflection of the availability of resources including operative time, manpower, and surgical beds, our average elective surgery waiting time was 7.2 months. Similarly, a report from New Zealand showed the children had to wait for 7 months for their elective tonsillectomies [22]. The Royal College of Surgeons of England has published clear guidelines for the management of surgical waiting lists that led to the recommendation to create a preadmission clinic for elective ENT surgery [10] [11] [23].

As for medical therapy, antibiotics were prescribed in 26% of cases. A previous study by our group showed that antibiotics were prescribed to 94.7% of patients that attended the ENT clinic during Hajj time [9]. In a US study by Gaur *et al*., it was reported that of 1952 pediatric patients diagnosed with viral infections, 33.2% received antibiotics. In addition, antibiotic use was greater among those who worked in non-teaching (39.6%) than teaching hospitals (32.5%) [24]. A 1995 Canadian study showed that 74% of 39,145 children diagnosed with respiratory infections received antibiotics [25]. Follow-up was undertaken in 73% of cases, and only 16% were discharged. In a study by Fishpool *et al*. addressing the frequency of attendance at an ENT emergency clinic, it was reported that insisting patients seen more than twice in an ENT emergency clinic be reviewed by a consultant and introducing management guideline reduced excess clinic appointments by 70% [26].

Limitations of this study include any cross sectional descriptive study limitations like only three months sample size; although generated reasonable patient sample size. Which; will also, needs a longitudinal follow of its recommendations to confirm validity and practicability in a mass scale and provide a map for health administrators to monitor and plan future resources.

Implications of findings for future research of this study represent first step in the scientific ladder to generate further studies with higher level of evidence and more question-focused research.

## 5. Conclusion

Creating and benefiting from electronic patient DATABASES are becoming important parts of improving medical services for continuous monitoring and auditing health services provided. Primary and secondary level medical centers and hospitals should increase their role to help alleviate pressure from tertiary and quaternary level hospitals. In turn, this should be used to develop a model and concentrate on subspecialty clinics and services.

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