



Analysis of Otorhinolaryngology Care in Yemen

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Abstract

Purpose: The objective of this survey is to analyze the Otorhinolaryngology Care in Yemen. The survey was undertaken to provide the foundation for an evidence-based plan for improving ear, nose, and throat (ENT) care services in Yemen specially ear and hearing care.

Methodology: To review ENT services for the year 2020, standardized questionnaire was distributed to 248 ENT clinics in 22 different Yemeni governorates.

Results: Yemen has 203 Otorhinolaryngologists, 5 of them are Audiologists, 60 trainees and 45 general practitioners who provided ENT care. Overall, there are 0.7 ENT practitioners per 100,000 population. Sana'a (capital city), the governorates of Aden, Hadramout, and Ibb have about 75% of the practicing otolaryngologists in the country. As of 2020, there are 248 ENT clinics. Among these, 75% are private facilities. In addition, there are 55 surgical otomicroscope, of which 30 (55%) are in Sana'a. In 2019, the handicap ward rehabilitation fund together with NGOs cover only around 12% of hearing handicaps cases..

Conclusion: The level of ENT care in Yemen is relatively lower than that in other countries of the Eastern Mediterranean Region (EMR). Improvements are necessary with respect to the number and level of training of otolaryngologists, and distribution of ENT care personnel, facilities, equipments, and support staff especially in rural areas. A national evidence-based plan for prevention of deafness is also needed.

Keywords: Otorhinolaryngology; Analysis; Yemen

Introduction

The Republic of Yemen is a country located in the Middle East bordering the Arabian Sea, Gulf of Aden, and the Red Sea, occupying 555,000 square kilometers, including the islands of Perim at the southern end of the Red Sea, and Socotra in the Arabian Sea.

The population projection of Yemen in the year 2020 is 30,411,000 million. It is expected that the population will keep increasing to reach approximately 34 million in 2025. The population is distributed into 21 governorates in addition to the capital city of Sana'a [1].

Total population (million)	30.411
Male population (million)	15.472
Female population (million)	14.939
Density of population (person/km ²)	54.8
Annual growth rate (%)	2.49
Fertility rate	4.3
Crude death rate (per thousand)	7.30
Infant death rate (per thousand)	64.13
Life expectancy, y	64
Death rate for children <5 (per thousand)	79.4

Table 1: Population health indicators (2020).

About 68.0% of the population live in rural areas. The population growth rate is high, reaching up to 2.49% per year. The fertility rate is regarded as one of the highest in western Asia, reaching up to 3.7% [2]. In Yemen, there have been no national surveys on the pattern of hearing loss and deafness due to the absence of a plan or a program for the prevention of hearing loss in the Ministry of Health and Population [3]. The objective of this survey is to analyze the Otorhinolaryngology Care in Yemen. The survey was undertaken to provide the foundation for an evidence-based plan for improving ear, nose, and throat (ENT) care services in Yemen specially for ear and hearing care. The outcome of this study is going to help decision makers in the Ministry of Health and Population and other otorhinolaryngology care providers in updating short- and long-term strategies for the reduction and prevention of deafness and hearing impairment.

Methods

A review on ENT services for the year 2020 was done by volunteers ENT specialists. Data on ear and hearing care in the countries of the Eastern Mediterranean Region (EMR) was collected using standardized questionnaire which was distributed by volunteers to 248 ENT clinics in 22 Yemeni governorates. In addition, 22 Otorhinolaryngologists participating in the survey, the information was gathered during personal visits to most of the ENT clinics in different governorates. Responses to the questionnaire were received from all ENT clinics with a response rate of 100%. Information sheet was gathered regarding the qualification, and distribu-

tion of Otorhinolaryngologists, number of ENT clinics, numbers of nurses and dedicated ENT beds, and major equipments. According to the Yemeni Medical Council, an Otorhinolaryngologist is defined as a licensed physician who has a diploma (2 years post-graduate training degree) and a master's degree, or an MD, or a PhD, or an equivalent degree, or who is actively practicing Otorhinolaryngology within Yemen. ENT residents and trainees were counted separately, as were general practitioners who provide routine ENT care.

Bed numbers included those designated specifically for Otorhinolaryngology surgeries on the average bed number utilized for this purpose in either a general or private otorhinolaryngology center. In ENT clinic we included only if there is ENT specialist with main equipments, for ENT clinical examination. We included, in main hearing instruments, Audiometry, Tympanometry, auditory brainstem response (EBR), otoacoustic emissions (OAE), and operating microscopy. Furthermore, data was analyzed using SPSS software (version 21).

Results

In 2020, Yemen has 203 Otorhinolaryngologists, of them 10 (4.9%) are expatriates. 98 (48.3%) Otorhinolaryngologist are working in Sana'a, 25 (12.3%) are working in Aden, 15 (7.4%) are working in Hadramout, and 14 (6.9%) are working in Ibb. There is a deficiency of Otorhinolaryngologist in governorates of Abyan, Shabwa, Hajja, Sa'ada, Al-Beidah and Sana'a. Otorhinolaryngologists are non-existent in the governorates of Al-Mahweet, Al-Jawf, Reimah and Al-Mahara (Table 2). Also, there are only 5 Audiologists, two of them are working in Sana'a, two are in Hadramout and one is working in Aden. In addition, ENT care is provided by 60 trainees and 45 general practitioners. The level of certification of the otorhinolaryngologists ranges from diploma holders (4.4%) MSc holders (44.8%), to PhD or MD holders (51.7%) (Table 3).

Overall, there are 0.7 ENT practitioners per 100,000 population, but they are not evenly distributed throughout the country. Sana'a, Aden, Hadramout, and Ibb have about (75%) of the practicing otorhinolaryngologists.

Governorate	Population	Specialists	Otolaryngologist/Population	Otolaryngologist/100000 Pop
Sana'a (city)	3.674	98	37.490	2.67
Sana'a	1.201	4	300.250	0.33
Aden	1.019	25	40.760	2.45
Taiz	3.375	9	375.000	0.27
Hadramout	1.461	15	97.400	1.03
Hodeidah	3.468	4	867.000	0.12
Ibb	3.009	14	214.929	0.47
Dhamar	2.068	6	344.667	0.29
AL-Beidah	803	2	401.500	0.25
Mahweet	747	0	0	0
Dhala	789	3	263.000	0.38
Abyan	600	1	600.000	0.17
Lahj	1.049	8	131.125	0.76
Hajja	2.302	2	1151.000	0.09
Sada	1.185	2	592.500	0.17
Shabwa	672	1	672.000	0.15
Amran	1.085	3	361.667	0.28
Mareb	352	5	70.400	1.42
Jawf	623	0	0	0
Mahara	168	0	0	0
Reimah	612	0	0	0
Socotra	150	1	150.000	0.67
Total	30.411	203	149.81	0.7

Table 2: Distribution of otolaryngologists population by governorate (2020).

Governorate	PhD, MD Holders	MSc Holders	Diploma Holders	Total	Trainees	GP
Sana'a (city)	61	33	4	98	60	16
Sana'a	3	1	0	4	0	0
Aden	9	15	1	25	0	3
Taiz	2	4	3	9	0	7
Hadramout	7	7	1	15	0	2
Hodeidah	1	3	0	4	0	3
Ibb	6	8	0	14	0	4
Dhamar	4	2	0	6	0	1
AL-Beidah	0	2	0	2	0	1
Mahweet	0	0	0	0	0	0
Dhala	1	2	0	3	0	0
Abyan	0	1	0	1	0	1
Lahj	5	3	0	8	0	3
Hajja	1	1	0	2	0	0
Sada	1	1	0	2	0	0
Shabwa	1	0	0	1	0	3
Amran	3	0	0	3	0	1
Mareb	0	5	0	5	0	0
Jawf	0	0	0	0	0	0
Mahara	0	0	0	0	0	0
Reimah	0	0	0	0	0	0
Socotra	0	1	0	1	0	0
Total	105	91	9	205	60	45

Table 3: Academic degrees of otolaryngologists by governorate (2020).

In Yemen there are 248 ENT clinics providing ENT care in 2020. Among these, 186 (75%) are private facilities, and 47 (18.9%) belong to the Ministry of Health and Medical Colleges. The majority 152 (61.3%) of ENT clinics are localized in Sana'a (city), and the governorates of Aden. There is a deficiency of ENT clinics in governorates of Shabwa, Abyan, Al-Beidah, Hajja, Sa'ada and Sana'a. There are no ENT clinics in the governorates of Mahweet, Jawf, Reimah and Mahara (Table 4).

The numbers of dedicated ENT beds and ENT nurses can be seen in table 5.

The distribution of major ear instruments in Yemen is summarized in table 6. There are 55 operating microscopes, of which 30 (54.5%) are in Sana'a.

Governorate	MOH/University	Private	Military/Police	Others	Total
Sana'a(city)	7	102	7	0	116
Sana'a	4	0	0	0	4
Aden	6	25	5	*1	36
Taiz	4	7	1	0	12
Hadramout	4	12	0	0	16
Hodeidah	3	5	1	0	9
Ibb	3	14	0	0	17
Dhamar	2	4	0	0	6
AL-Beidah	0	2	0	0	2
Mahweet	0	0	0	0	0
Dhala	0	3	0	0	3
Abyan	1	1	0	0	2
Lahj	1	4	0	0	5
Hajja	2	1	0	0	3
Sada	2	1	0	0	3
Shabwa	1	1	0	0	2
Amran	2	4	0	0	6
Mareb	4	0	1	0	5
Jawf	0	0	0	0	0
Mahara	0	0	0	0	0
Reimah	0	0	0	0	0
Socotra	1	0	0	0	1
Total	47	186	14	1	248

Table 4: ENT clinic ownership by governorate (2020). *Aden Refinery Hospital.

Governorate	ENT Nurses	Nurse/Otolaryng.	Nurses/100 000 Pop	Beds	Beds/ ENT	Beds/100 000 Pop
Sana'a(city)	160	1.63	4.35	155	1.58	4.22
Sana'a	8	2.00	0.67	4	1.00	0.33
Aden	34	1.36	3.34	70	2.80	6.87
Taiz	18	2.00	0.53	38	4.22	1.13
Hadramout	22	1.47	1.51	30	2.00	2.05
Hodeidah	10	2.50	0.29	23	5.75	0.66
Ibb	15	1.07	0.50	32	2.29	1.06
Dhamar	10	1.67	0.48	12	2.00	0.58
AL-Beidah	4	2.00	0.50	4	2.00	0.50
Mahweet	0	0.00	0.00	0	0.00	0.00
Dhala	6	2.00	0.76	6	2.00	0.76

Abyan	2	2.00	0.33	2	2.00	0.33
Lahj	10	1.25	0.95	14	1.75	1.33
Hajja	5	2.50	0.22	6	3.00	0.26
Sada	3	1.50	0.25	4	2.00	0.34
Shabwa	2	2.00	0.30	2	2.00	0.30
Amran	8	2.67	0.74	8	2.67	0.74
Mareb	10	2.00	2.84	10	2.00	2.84
Jawf	0	0.00	0.00	0	0.00	0.00
Mahara	0	0.00	0.00	0	0.00	0.00
Reimah	0	0.00	0.00	0	0.00	0.00
Socotra	2	2.00	1.33	2	2.00	1.33
Total	329	1.62	1.08	422	2.08	1.38

Table 5: Number of nurses and beds per otolaryngologist/and per 100 000 population (2020).

Governorate	Audiometry	Tympanometry	ABR	OAE	Operating Microscope
Sana'a(city)	40	40	14	1	30
Sana'a	1	1	0	0	1
Aden	14	5	5	0	3
Taiz	5	3	2	1	2
Hadramout	6	1	1	1	1
Hodeidah	5	1	0	0	1
Ibb	4	4	0	0	5
Dhamar	2	2	0	0	3
AL-Beidah	0	0	0	0	0
Mahweet	0	0	0	0	0
Dhala	1	0	0	0	0
Abyan	0	0	0	0	1
Lahj	1	0	0	0	0
Hajja	2	2	0	0	2
Sada	2	2	0	0	2
Shabwa	1	1	0	0	1
Amran	3	2	0	0	2
Mareb	1	1	0	0	1
Jawf	0	0	0	0	0
Mahara	0	0	0	0	0
Reimah	0	0	0	0	0
Socotra	0	0	0	0	0
Total	88	65	22	3	55

Table 6: Distribution of main hearing instruments by governorate (2020).

The major operations of the ear surgery are conducted in Sana'a. There is no availability of cochlear implantation in the country.

In 2019, the handicaps ward rehabilitation fund together with all NGOs cover only around 12% of hearing handicaps cases. In private centers, the cost of hearing aids is ranged between 200 USD-1000 USD.

Discussion

Our study has shown variations of otorhinolaryngology care and found that there is regional high variability of ENT care services in Yemen with accumulation of otorhinolaryngologists, nurses, ENT clinics, and ENT beds in major cities, and shortages in low density populated areas. In 2013, there were 0.6 ENT practitioners per 100,000 population [4]. In 2020, the number is still at 0.7 ENT practitioners per 100,000 population. Both rates are low when compared to other findings in other countries in EMR [5]. The number of surgical otomicroscope in Yemen has increased from 31 in 2013 to 55 in 2020. This increase in number of microscopes during a 7-year period is low in comparison to the need of ear surgery in the country. Otolaryngology clinics are 248; this number is more than the quantity of ENT specialists, because in Yemen all public health and medical staff are allowed to practice privately outside working hours [6].

In our survey there is deficiency of ENT services in some governorates. This is being covered partially by a team of free medical camps staff [7]. On the other hand, the World Health Organization (WHO) estimates that at least 642 million people are affected by hearing loss worldwide. In EMR, it is estimated that 38 million people have bilateral hearing loss. Two-thirds of these people live in developing countries [8]. Although the WHO programme for the prevention of deafness and hearing impairment was established in 1989, there is no program for the prevention of hearing loss in the Ministry of Health and Population in Yemen. Our estimates of hearing loss and hearing impairment prevalence in Yemen is high. In a previous study, it was shown that hearing loss may have been caused by higher rates of pre- and post-natal childhood infections such as meningitis, mumps, measles and rubella, and from the use of ototoxic drugs [9]. In another study, disabling hearing impairment was identified as a major health problem in Yemeni children

with chronic suppurative otitis media [10]. Enormous social and economic impacts are playing a role in elevating the prevalence of hearing loss and hearing impairment in Yemen. Thus, we recommend comprehensive studies of hearing impairment prevalence, causes and risk factors. Moreover, there is no sufficient data to estimate hearing aid use in Yemen. In the current findings, only 12% hearing aids were distributed for free to patients with hearing loss for the year 2019. This number of hearing aids is low because it is estimated that in developing countries, about 20% of people who have hearing loss require hearing aids [8]. The WHO reported that a large percentage of people living with hearing loss can benefit from early identification and intervention, and appropriate management [11].

Conclusion

To conclude, the level of ENT care in Yemen is relatively lower to that on the majority of countries in EMR. Improvements are necessary with respect to the number and level of training of otolaryngologists, and distribution of ENT care personnel, facilities, equipments, and support staff between urban and rural areas in Yemen. A national evidence-based plan for prevention of deafness is also needed.

Based on our findings, we make the following recommendations:

- Establish an ENT clinic in hospitals in governorates where no such facilities currently exist and improve the distribution of Otorhinolaryngologists around the country.
- Establishing a programme for Ear and Hearing care in the Ministry of health and population like other countries in EMR.
- 3. Evaluating and determining the main causes of hearing loss by collecting and re-evaluating existing data on deafness and hearing loss and performing a new national survey on major causes of hearing loss.
- Raise health awareness among the community about the prevention of hearing loss and hearing impairment.

- Developing human resources in Otorhinolaryngology by improving surgical training especially in ear surgery and include cochlear implantation in Yemen.
- Increasing financial resources for hearing impairment prevention from governmental, local, and international non-governmental organizations (INGOs) for developing programme for primary ear and hearing care, and affordable hearing aid services.

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