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Pattern of pediatric Ear, Nose and Throat diseases at Arthur Davison Children's Hospital, Ndola, Zambia

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ABSTRACT

Background: Ear, Nose and Throat (ENT) disorders are very common in children mainly due to increased number of risk factors for these disorders in our environment. However, there is a lack of data on paediatric ENT disorders from Zambian population. This study aimed at determining the pattern of common paediatric ENT diseases and their relationship with socio-demographic factors in a tertiary hospital, Arthur Davison Children's Hospital (ADCH), in Ndola Zambia. **Method:** This was a retrospective hospital-based descriptive study involving review of medical records of patients' aged0-14 years who presented to the ENT outpatient clinic of ADCH with various ENT disorders from January 2014 to December 2015.**Results:** Within the study period, a total of 988 children were seen. ENT diseases were found to be more common among male children (52.8%), the female to male ratio is1:1.12.There was no significant difference in age groups. Ear disorders (47.1%) were found to be the commonest group of ENT problems, followed by pharyngeal disorders (40.1%) and nasal disorders (12.8%). The most common otologic disorder was Earwax obstructing the tympanic membrane (28.8%).Among rhinologic disorders, Nasal Foreign Bodies (27.0%) were the commonest while Tonsillitis (42.8%) was the commonest Pharyngeal disorder. There were more patients in lower socio-economic classes than in the upper classes. **Conclusion:** This study has demonstrated the broad spectrum of ENT disorders as observed at ADCH over a period of 2 years. Improvement of health education, socio-economic status and health facilities will be helpful in reducing the frequency of ENT diseases.

Key words: Arthur Davison Children's Hospital (ADCH),Paediatric ENT disorders, Pattern, Zambia

Introduction

The combined specialty in which ear, nose and throat diseases are studied is called Otorhinolaryngology. The rate of occurrence of Otorhinolaryngologic diseases, the instance or manner in which they occur and their impact on morbidity and mortality rates among children is one of the major universal problems affecting all age groups today[1,2].The pediatric population is highly affected by diverse ENT- related disorders especially in developing Countries because there is still a big population of people who are living under the line of poverty, this is because Poverty, with attendant poor sanitation and overcrowding in low social economical areas, results in greater exposure to Pathogens [3].Socio-economic status determine the frequency and pattern of most of these paediatric ENT diseases [4]. For instance, chronic otitis media has been found to be more common in the lower socioeconomic classes [5]. It is known that low socio-economic status is a major risk factor of Chronic SuppurativeOtitis Media in developing countries [6].Otorhinolaryngology in Zambia is not as advanced as it is in the developed countries. Zambia like many of the sub-Saharan countries has very few experts and very poor facilities to support the efforts of the few experts; this creates a very heavy workload on the Otorhinolaryngologists working in our environment. Because the experts are overwhelmed by the heavy workload, there are therefore just a few studies in literature describing the epidemiology in ENT care [7, 8].There is no published data on any research work on the pattern of ENT disorders done in Zambia. Henceforth, ENT disorders certainly deserve a more bountiful measure of scientific study than has so far been accorded to them especially in our environment. Considering that there is a paucity of data on childhood ENT diseases in Zambian

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population, this study seeks to determine the frequency and pattern of ENT diseases seen in the paediatric ENT outpatient clinic and their relation to socio-demographic factors in a tertiary hospital in Ndola, with the aim of generating information and knowledge for the planning and improvement of ENT services so as to keep ENT diseases in check in this region. This study is also relevant in that it forms the foundation for future researchers on the subject of ENT in our region.

Methods

Study design

This was a retrospective hospital-based descriptive study, in which all medical records for all pediatric patients aged 0 to 14 who were registered in ENT outpatients' clinic with various morbid conditions were reviewed. The records were reviewed for the period January 2014 to December 2015.

Study site

The study was conducted in the outpatients' department at ADCH. ADCH is the only tertiary care and referral Hospital in Zambia that is made specifically for the children aged less than 15 years. It is located in Ndola city on the Copperbelt province of Zambia. Ndola city is the provincial capital of the Copperbelt province. It is the second largest city after Lusaka, the capital city of Zambia.

Data collection tool, data entry method and analysis

Data was collected from the patients' medical records. Data collection tool used in the study was the data sheet which had clinical diagnosis (which were then grouped based on the location of the complaints into ear, nose and throat disorders), demographic data (age and sex) and the socio-economic status (which was based on the income status of the area where patients were coming from and was grouped as low, medium and high income).Data was entered using Microsoft Excel 2010. Data was then exported to SPSS windows version 16.0 for analysis using descriptive statistics. Data was double entered, validated and the results were presented in simple tables.

Ethical consideration

Ethical clearance to conduct the study was obtained from The Tropical Disease Research Centre (TDRC) Ethical Review Committee, the Copperbelt University School of Medicine and the ADCH management.

Results

During the study period, a total of 988 patients aged 0 to 14 were registered in the ENT outpatients' clinic at ADCH. The majority were Males 523 (52.8%), while Females were 465 (47.2%).The sex ratio is1: 1.12 (F: M) with a male mean age of 5.28 (SD 3.52) and female mean age of 5.73 (SD 3.51). There was no significant difference regarding which age group was most affected by ENT diseases as a whole. The demographic profile of the study population is shown in table 1.

Affections of the auditory system 465 (47.1%) were the most prevalent group of ENT problems among the pediatric population, followed by pharyngeal disorders 397 (40.1%) and Nasal disorders 126 (12.8%)which ranked second and third respectively, (Table 2).The distribution of various Ear, Nose and Throat disorders among the study population was as highlighted below, (Table 3).

Ear disorders

Earwax obstructing the tympanic membrane 134 (28.8%) was the commonest among Ear disorders. Acute Otitis Media 97 (20.9%) and Hearing Loss 56 (12.0%) ranked second and third respectively. Chronic Suppurative Otitis Media (CSOM) was evident in 53 cases (11.4%),followed by Foreign body (FB) of the ear 52 (11.2%), Otitis Externa 27(5.8%), Otitis Media with Effusion (OME) 10 (2.2%), Trauma of the ear 6 (1.3%) and Otomycosis 4 (0.9%). The otherotologic conditions seen were Ear tumors, Meatal atresia and Microtia, and these constituted the remaining 26cases (5.6%) of the auditory morbid conditions.

Nose disorders

Nasal FB constituted the highest Rhinologic condition with 34 cases (27.0%), followed by Rhinitis which was evident in 19 cases (15.1%), Nasal Polyps affected 17 (13.5%), while 16 (12.7%) and 15 (11.9%) suffered from Rhinosinusitis and Allergic Sinusitis respectively. On the other hand, Epistaxis was observed in 6 (4.8%). The other nasal disorders like congenital anomalies, trauma of the nose, hypertrophied inferior nasal turbinate, and nasal tumors constituted the remaining nasal disorders with evidence in 19 cases (15.1%).

Throat disorders

Tonsillitis 170 (42.8%) affected the majority of patients with pharyngeal disorders in our study population followed by Pharyngitis 81 (20.4%), Adenoid Hypertrophy 72 (18.1%), Hypertrophied Tonsils 37 (9.3%), Laryngomalachia 10 (2.5%), and Oesophageal FB 4 (1.0%). While 23 cases (6.1%) constituted the remaining throat morbid conditions which included Laryngeal stenosis, Papillomatosis, Cervical Lymphadenitis and hypoglossal cysts. Regarding place of residence, a total of 586 (59.3%) patients were coming from Low income residential areas, 248 (25.1%) from Medium income areas and 154 (15.6%) from High income areas,(Table 4).

The following factors showed significant associations using chi-square; Sex (P value=0.003) and Age (P value=0.037) with the occurrence of Ear diseases, Sex

distribution with the occurrence of Nasal diseases (P value=0.003), Sex(P value=0.007) and Age(P value=0.026) with the occurrence of tonsillitis, Sex distribution with the occurrence of Adenoid hypertrophy (P value=0.028), age distribution with the occurrence of Allergic rhinitis (P value=0.019), Foreign Body Nose (P <0.001) and Adenoid Hypertrophy (P<0.001).

Table 1: Demographic distribution of patients in the study population

Age (years)	Total (%)	Male (%)	Female (%)
0-4	497 (50.3)	275 (27.6)	222 (22.6)
5-14	491 (49.7)	248 (25.2)	243 (24.6)
Total	**988 (100)**	**523 (52.8)**	**465 (47.2)**

Table 2: 2a. Category of ENT disorders in relation to Sex

Category of disorder	Total prevalence (%)	Gender		P value
		Male (%)	Female (%)	
Ear Disease	465 (47.1)	223 (22.5)	242 (24.6)	0.003
Nose Disease	126 (12.8)	77 (7.8)	49 (5.0)	0.049
Throat Disease	397 (40.1)	223 (22.5)	174 (17.7)	0.095
Total	**988 (100)**	**523 (52.8)**	**465(47.2)**	

Table 2:2b. Category of ENT disorders in relation to Age group

Category of disorder	Total prevalence (%)	Age group		P value
		0-4 years (%)	5-14 years (%)	
Ear Disease	465 (47.1)	218 (22.0)	247 (25.1)	0.037
Nose Disease	126 (12.8)	67 (6.8)	59 (6.0)	0.490
Throat Disease	397 (40.1)	212 (21.4)	185 (18.7)	0.111
Total	**988 (100)**	**497 (50.2)**	**491(49.8)**	

Table 3:3a. Sex distribution of various ENT morbid conditions among study population

Category of disorder	Diseases	Frequency (n) (%)	Gender		P value
			Male (%)	Female (%)	
Ear Disorder	Wax Impaction	134 (28.8)	64 (13.8)	70 (15.0)	0.957
	Acute Otitis Media (AOM)	97 (20.9)	44 (9.5)	53 (11.4)	0.530
	Hearing/speech disorder	56 (12.0)	28 (6.0)	28 (6.0)	0.747
	Chronic Suppurative Otitis Media (CSOM)	53 (11.4)	24 (5.2)	29 (6.2)	0.662
	Foreign Body Ear	52 (11.2)	22 (4.7)	30 (6.5)	0.368
	Otitis Externa	27 (5.8)	14 (3.0)	13 (2.8)	0.679
	Otitis Media with Effusion (OME)	10 (2.2)	7 (1.5)	3 (0.7)	0.205
	Trauma Ear	6 (1.2)	4 (0.4)	2 (0.8)	0.433
	Otomycosis	4 (0.9)	2 (0.45)	2 (0.45)	1.000
	Others	26 (5.6)	14 (3.0)	12 (2.6)	0.537
	Total	465 (100.0)	223(48.9)	242(52.1)	

Nose Disorder	Foreign Body Nose	34 (27.0)	18 (14.3)	16 (12.7)	0.327
	Rhinitis	19 (15.1)	14 (11.1)	5 (4.0)	0.212
	Nasal Polyps	17 (13.5)	12 (9.5)	5 (4.0)	0.269
	Rhinosinusitis	16 (12.7)	9 (7.1)	7 (5.6)	0.844
	Allergic Rhinitis	15 (11.9)	11 (8.7)	4 (3.2)	0.208
	Epistaxis	6 (4.8)	2(1.6)	4 (3.2)	0.230
	Others	19 (15.1)	11 (8.7)	8 (6.4)	0.954
	Totals	126 (100.0)	77 (61.1)	49 (38.9)	
Throat Disease	**Tonsillitis**	**170 (42.7)**	**82 (20.7)**	**88 (22.0)**	**0.007**
	Pharyngitis	81 (20.4)	43 (10.8)	38 (9.6)	0.207
	Adenoid Hypertrophy	72 (18.1)	52 (13.1)	20 (5.0)	0.028
	Hypertrophied Tonsils	37 (9.3)	24(6.0)	13 (3.3)	0.679
	Laryngomalachia	10 (2.5)	8(2.0)	2 (0.5)	0.325
	Foreign Body Oesophagus	4 (1.0)	1 (0.3)	3 (0.7)	0.157
	Others	23 (6.1)	13 (3.3)	10 (2.8)	0.314
	Total	397 (100.0)	223 (56.2)	174 (43.8)	

Table 3:3b. Age distribution of various ENT morbid conditions among study population

Category of disorder	Diseases	Frequency (n) (%)	Age group		P value
			0-4 years (%)	5-14 years (%)	
Ear Disorder	Wax Impaction	134 (28.8)	57 (12.3)	77 (16.5)	0.232
	Acute Otitis Media (AOM)	97 (20.9)	53 (11.4)	44 (9.5)	0.160
	Hearing/speech disorder	56 (12.0)	30 (6.4)	26 (5.6)	0.418
	Chronic Suppurative Otitis Media (CSOM)	53 (11.4)	23 (4.9)	30 (6.5)	0.594
	Foreign Body Ear	52 (11.2)	23 (5.0)	29 (6.2)	0.488
	Otitis Externa	27 (5.8)	14 (3.0)	13 (2.8)	0.728
	Otitis Media with Effusion (OME)	10 (2.2)	2 (0.4)	8 (1.8)	0.105
	Trauma Ear	6 (1.2)	3 (0.6)	3 (0.6)	1.000
	Otomycosis	4 (0.9)	3 (0.7)	1 (0.2)	1.000
	Others	26 (5.6)	10 (2.2)	16 (3.4)	0.279
	Total	465 (100.0)	218(46.9)	247(53.1)	
Nose Disorder	Foreign Body Nose	34 (27.0)	29(23.0)	5 (4.0)	<0.001
	Rhinitis	19 (15.1)	10 (7.9)	9 (7.2)	0.959
	Nasal Polyps	17 (13.5)	10 (7.9)	7 (5.6)	0.617
	Rhinosinusitis	16 (12.7)	6 (4.8)	10 (7.9)	0.170
	Allergic Rhinitis	15 (11.9)	4 (3.2)	11 (8.7)	0.026

	Epistaxis	6 (4.8)	2 (1.6)	4 (3.2)	0.415
	Others	19 (15.1)	6 (4.8)	13 (10.3)	0.037
	Totals	126 (100.0)	67 (53.2)	59 (46.8)	
Throat Disease	**Tonsillitis**	**170 (42.7)**	**79 (19.9)**	**91 (22.8)**	**0.019**
	Pharyngitis	81 (20.4)	40 (10.1)	41 (10.3)	0.110
	Adenoid Hypertrophy	72 (18.1)	55 (13.9)	17 (4.2)	<0.001
	Hypertrophied Tonsils	37 (9.3)	21 (5.3)	16 (4.0)	0.832
	Laryngomalachia	10 (2.5)	7 (1.8)	3 (0.7)	0.528
	Foreign Body Oesophagus	4 (1.0)	1 (0.3)	3 (0.7)	0.311
	Others	23 (6.1)	9 (2.3)	14 (3.8)	0.049
	Total	397 (100.0)	212 (53.4)	185 (46.6)	

Table 4: Distribution of ENT Diseases in relation to Socio-economic status of the Area where Patients were coming from

PLACE SOCIO-ECONOMIC STATUS	TOTAL (%)
1. low income area	586 (59.3)
2. medium income area	248 (25.1)
3. high income area	154 (15.6)
Total	**988 (100)**

Discussion

To our knowledge this is the first study of its kind to be done in Zambia. Thecurrent study shows that there is a slight male predominance for patients attending the ENT outpatients' clinic at our pediatric tertiary care Hospital. This conforms to the results obtained elsewhere [9, 10].Similar to a study by NepaliR. et al [8], there is also not much difference in the age groups affected by the ENT disorders in our environment. In our pediatric population, the majority of the children were suffering from ear morbidities which accounts for 47.1%. This result corresponds to the results obtained in existing literature; Aritz et al(47%) and Suman, S.Y. (50.24%) found Ear disorders to be the most prevalent ENT diseases in childhood[11,12].The frequency here was notably high. The shorter Eustachian tube anatomy and these children's susceptibility to common respiratory tract pathogens are thought to be the possible explanation for the high frequency of ear diseases [13]. Similar to other studies[2, 10], the current study confirms significantly that ear diseases are common in males than females and that the paediatric age group 5 to 14 is more affected than the younger age group because at this age children participate more in outdoor activities thus more commonly get exposed to infections, especially the male children.

It is not surprising that among the ear disorders, earwax obstructing the tympanic membrane (28.8%) is relatively common, because in the majority of cases it is asymptomatic and therefore not an indication for seeking medical care [8].The common habit of cleaning the ear frequently is known to destroy the naturally occurring self-ear cleaning process[14].The care givers and mothers in our environment take it as a duty to always clean these children's ears thereby encouraging wax accumulation[15].The frequency of ear wax in our study almost coincide with that obtained by Manpreet S.N. et al (27.4%) [16].

Inflammatory disorders of the ear are among the most common ear problems in childhood thus they are among the most frequent morbidities encountered in day to day clinic practice [17]. In the current study, Otitis Media; Acute Otitis Media (20.9%), Otitis Media with Effusions (2.2%) andChronic SuppurativeOtitis Media (11.4%) were among the most common ENT disease entities.Similar studies confirm Otitis Media to be among the commonest ENT diseases of childhood especially in developing nations [18].Our result for Acute Otitis Mediatallies with that shown in a study by TinjP.J. et al which showed the percentage of AOM among children to be 20.0%[19].Otitis Media with Effusions is relatively uncommon in this region

compared with results obtained elsewhere [8]. The frequency of Chronic Suppurative Otitis Mediain our study was found to be within the estimated range of 6 to 60 percent for the world prevalence which varies depending on the geographic area and population studied [20]. The frequency of Otitis Externa (5.8%) was also found to be significant in the current study. This is almost similar to the findings obtained in a study by Cervoni E. in west Lancashire, UK [21].

Hearing loss is a significant health problem in developing countries. The frequency of Hearing loss (12.0%) in the current study corresponds with that in a study by Lin et. al. in which hearing loss was estimated at 12.7% [22].Our result still compares favorably to that by Niskar and colleagues, who approximated that 14.9% of children in the United States have either low or high frequency hearing loss [23].

Foreign Bodies of the ear (11.2%) also constitutes a significant proportion of our pediatric population and mostly they were ornamental bids and vegetable matter which may expand with moisture. Trauma of the ear, Otomycosis and other ear disorders were found to be the least common ear diseases in our region.

Tonsillitis (42.8%) was found to be the most frequent pharyngeal disease in our study. This corresponds to the results obtained in a study by Kishve S.P. et al [2]in which 42.9% individuals had Tonsillitis. Nepali R. [8] also confirms that Tonsillitis is commonest in childhood. This study confirms that females are more commonly affected with tonsillitis than males [2]. This is because girls in our environment start participating earlier in the work force than boys do. They help their mothers to do house chores and other duties that expose them to infections. This study also depicts that Tonsillitis is more common in the age group 5 to 14 than in the younger age group [3].This is because, at this age children attend school and other social gatherings where they are in close contact with their peers and frequently get exposed to infections.

Pharyngitis constitutes about 20.4% in our study, a figure almost similar to that reported by Suman, S.Y. (28.3%) but considerably lower than that in the study by NapaliR. (44.8 %) [8, 12].The differences in the results for the inflammatory disorders can be attributed to the fact that there is a high risk of exposure to infections which are very prevalent in our resource limited environment.

Our study revealed the frequency of adenoid hypertrophy to be 18.1 % which almost tally with the result in a study by Kishve S.P.et al (20.5%)[2]. Like in similar studies,the current study also reveals that males are more affected by adenoid hypertrophy compared to females [24] and the age group 0 to 4 was more affected compared to the older group. On the other hand, hypertrophied tonsils occurred in 9.3% of cases. This figure is comparably similar to that in a study by Kara C.O. et al (11.0%)[25]. Foreign Bodies of the throat were evident in 1.0% and Fish bone was the commonest dietary foreign body. The frequency for Laryngomalacia and other pharyngeal disorders were found to be the least common throat diseases in our region.

Nasal morbidities were the third commonest ENT diseases in our study population. The majority of our paediatric patients who were affected by nasal diseases were males. This corresponds to results in studies by Kishve S.P. and Fasunla A.J. [2, 4]. This can be explained by the fact that male children are generally more inquisitive, more eager to explore their environment and therefore commonly get more exposed to Nasal disorders such as nasal infections and foreign bodies.

Foreign Bodies (27.0%) located in the Nose were found to be the most common Rhinologic disorder in our study population and was considerably higher compared to that in similar studies[19].The commonest site was either on the left or right nostril anterior to the middle nasal turbinate. Age less than 5 was commonly more affected by nasal foreign bodies because the majority of preschoolers are in this age group[3].

The frequency of Nasal Polyposis (13.5%) and Rhinosinusitis (12.7%) in the current study compare favorably with that seen in a study by Emerson L.P. et al who showed Nasal polyposis to occur in 10% and sinusitis in 8% of the padiatric patients [26].

Allergic Rhinitis (11.9%), non-allergic Rhinitis (15.1%) and Epistaxis (4.8%) were also common Nasal disorders observed in children in the current study. Furthermore, our study confirms that allergic rhinitis is common in the age group 5 to 11 than age less than 5. This is because older children are more exposed to pollens from trees, grasses or weeds, or to airborne mold spores because of outdoor playing. Therefore, clinically significant sensitization to outdoor allergens occurs in older children.

Regarding the socio-economic status, this study shows that there were more patients with ENT diseases in lower socio-economic classes than in higher classes thereby confirming the already established fact that ENT morbidities are more common in low income groups, pointing to the fact that perhaps infections plays an important role in the aetiology of common ENT disorders in the initial stages. Generally, it is believed that people in upper socio-economic classes are more literate, have healthier lifestyles and behavior than people in lower classes [27].As observed in the current study, the most common disorders underlying ENT disease entities are local inflammatory diseases,

infections, and foreign bodies. Improvement in the housing condition in western world has led to a significant reduction in the incidence of these diseases. Therefore, an improvement in the housing, feeding and better social facilities in our society is likely to be associated with a lower incidence of many of the local inflammatory and infective diseases of the ENT region [8].

Limitations

One of the biggest challenges that were encountered during the study was poor record keeping. Some files for the patients were actually lost and some had insufficient data, therefore this study reflects only those records of patients that were considered. Another acceptable challenge is that the results from this study reflects (and therefore can be applicable to) the pediatric population attending the ENT clinic of our tertiary level hospital. An exact comparison with different socio-economic and demographic factors was not elicited as a control group was not taken into consideration. Another challenge was that there is no any published research on the subject of ENT diseases done locally in Zambia to provide local data to compare with. However, this research forms the foundation for future local research work on the subject.

Recommendations

The frequency of ENT disorders in our environment is quiet high. Therefore, there is need to put up measures such as Improvement of health education regarding the importance of prevention and control of ENT diseases, improvement of socioeconomic status, and health facilities to help in reducing the rate of ENT diseases.There isalso need for the Zambian otolaryngologist to embark on a national survey of ENT diseases, so as to find the probable aetiological factors, establish local variation in the pattern of ENT diseases and to stimulate research into the development of preventive measures.

Conclusion

This study has demonstrated the broad spectrum of ENT disorders as observed at ADCH over a period of 2 years.Ear disorders are the commonest ENT morbidities in our environment. Ear wax, Tonsillitis, and Nasal Foreign Bodies are the most common ENT problems in our pediatric population.The study further showed that there was a slight male preponderance for the occurrence of ENT diseases and that there was an obvious link between the occurrence of ENT diseases and socio-economic status.Therefore, there is need for improved public awareness through health education on ENT diseases, emphasis on building the socio-economic status as well as improved health facilities which will be helpful in reducing the occurrence of ENT diseases.

Authors' contribution

AMK contributed to the design of the study, coordinated the study, and supervised the data collection, analysis and interpretation of results. VM supervised and monitored the entire research and contributed to the drafting and preparation of the manuscript.

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