

## AN AUDIT AND OUTCOME OF EAR PROCEDURES IN A RESOURCE LIMITED TERTIARY HEALTH CENTER

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### Abstract

Background: Ear Procedures are common and determined by different factors in otorhinolaryngology, head and neck practice.

This study aimed at determining the clinical profile and outcome of ear procedures in a tertiary health care.

Materials and Methods: This was a retrospective study of all patients who had ear procedures done in Ekiti State University Teaching Hospital, Ado Ekiti, a sub Saharan African country.

The data collected were collated and analyzed using Statistical Package for Social Sciences (SPSS) version 18.0.

Results: Rate of ear procedure in this study was 20.8%. Peak age groups of ear surgery were at the extreme ages of (1-10) and ( $\geq$  61) years in 29.6% and 26.2% respectively.

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Main presenting symptoms were earache in 54.4% and object in the ear in 35.7%. Unilateral ear procedure is more common in 93.5% and occurred in the 52.5% right ear.

Clinic procedures accounted for 93.8%. Emergency procedures accounted for 35.2%. Main indications for ear procedures were 47.8% ear wax impaction, 16.5% otitis externa and 16.1% foreign body impaction.

Major ear procedures in this study were 50.5% ear syringing, 30.0% aural toileting/dressing and 13.6% foreign body removal. Major complication recorded was trauma in 1.9%. Referred patients accounted for 3.9% and main limitation and indication for referral were surgical facilities, diagnostic equipment and patient financial constraints in 3.1%, 2.7% and 1.9% respectively. Main indications for referral were 2.7% auditory brainstem response, 1.9% tympanoplasty and 0.7% cochlear implants.

Majority 63.4% of the patients were satisfied with the ear procedures. There were 3.6% losses to follow up. About 3.3% of patients were referred for ear surgery in another center.

Conclusion: Surgical ear procedures are still not fully practiced especially where there are limited resources. This study showed a prevalence of 20.8%. Ear syringing was a major ear procedure performed in 50.0% of patients. There is need to provide adequate surgical facilities which will tremendously reduce referral cases and encourage surgical tourism in developing country.

**Keywords:** Audit, Outcome, Ear Procedure, resource limited, health center.

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## Introduction:

Otologic surgery are various kinds of planned procedure and operation performed on patient by trained hands for diagnostic or therapeutic purpose.<sup>1,2</sup> This may be emergency ear surgery in a case of life-threatening disorder such as otalgia from infection or traumatic diseases.<sup>3,4</sup> Elective ear surgery in patients with planned and booked for procedure.<sup>5</sup>

Surgeries vary and depend on the anatomical location and physiology of the affected organ.

Therefore, sound knowledge of the anatomy and physiology of the ear is paramount for surgical management of ear disorders.<sup>6</sup> The important of aetiology, pathogenesis and pathophysiology is necessary to study the complicated extension of the disease to contiguous structure or systemic extensions of the disease.<sup>7,8</sup> This is to ensure successful outcome of ear surgery.

Ear is comprising of three-part outer, middle and inner ear. Each part of ear consists of different

structure and different function. Pinna and external auditory canal are affected by diseases such as congenital malformation, injuries and infection.<sup>9,10</sup> Main middle ear pathology is otitis media. Inner ear disorder includes meniere's disease, benign paroxysmal positional vertigo, ototoxicity and acoustic neuroma.<sup>9,10</sup> There are different types of surgical management. Surgical intervention ranges from foreign body removal, mastoidectomy, myringoplasty, tympanoplasty and shunt surgery to mention but few.<sup>11,12</sup>

Ear surgeries performed in different forms of ear pathology is enormous and pattern varies in various center and region of the world. Various factors determined findings from in different research work. Ages of the study subject is one of the factor as in foreign body impaction and ear infection is common in paediatric age group.<sup>4</sup> Degenerative diseases like presbycusis are very common among the elderly.<sup>10</sup> Availability of surgical equipment or otorhinolaryngology, head and neck surgeon, audiologist and speech pathologist are important factor limiting numbers and type of ear surgery performed in developing and low income country.<sup>13,14</sup>

#### Materials and Methods:

This was a retrospective study of all patients who had ear surgeries done in ear, nose and throat department of Ekiti state university teaching hospital, Ado Ekiti, Nigeria. The study was carried out over a period of 5 years (between November 2014 to October 2019).

The record of the patients from clinic operation register, medical record and theatre operation record were obtained. This included register for both minor and major surgery. The case notes of all the patients who had ear procedures done over the study period were retrieved from the medical record department to extract detailed data. The data retrieved from clinical files includes sociodemographic features, clinical features, definitive diagnosis, type of surgeries, indication for surgery, complication and follow-up.

The data collected were collated and analyzed using Statistical Package for Social Sciences (SPSS) version 18.0. The results were presented in frequency tables, percentage and bar chart and pie chart.

Inclusion criteria were all the patients that had ear surgeries in the department during the study period.

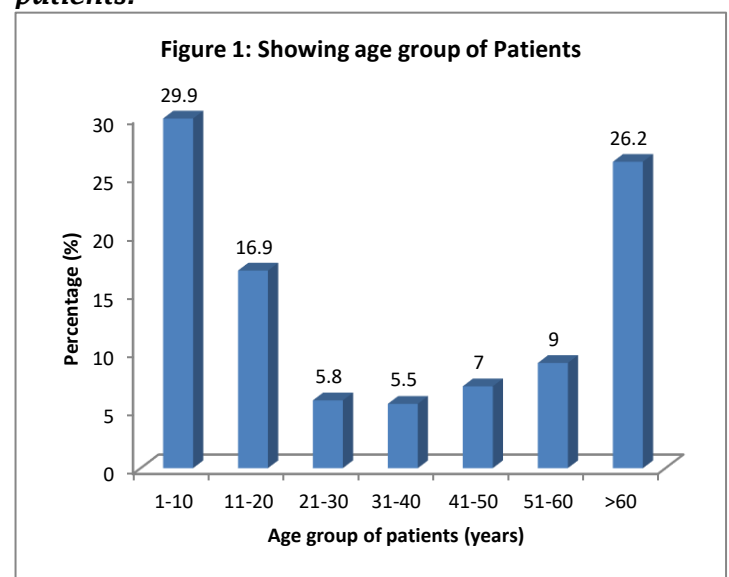
Exclusion criteria were those patients who were not operated. Also, patients with incomplete clinical data on this study or those with missing case notes.

#### Results

A total number of patients seen during the study period was 7,173 out of which a total of 4,392 (61.2%) had otologic diseases and 1,494 had ear procedures done given prevalence of 20.8%.

In this study, the peak age groups were at the extreme ages of (1-10) and ( $\geq 61$ ) years with highest number of procedures in 442 (29.6%) and 391 (26.2%) respectively.

*Figure 1 showed age group distribution of the patients.*



There were 626 (41.9%) males and 868 (58.1%) females with male to female ratio of 1:1.4. About 1341 (89.8%) were Christians while 153 (10.2%) practices Islam. Commonest parents' education level was 427 (28.6%) primary. This is followed by 413 (27.6%) secondary and 386 (25.8%) nil formal education. Common parent/patient occupation were student/apprentice, civil servants and business in 611 (40.9%), 327 (21.9%) and 225 (15.1%) respectively. This is demonstrated in

**Table 1.**

**Table 1: Sociodemographic features of the patients (N =1,494)**

Sociodemographic features / Variable	Frequency (n)	Percentage (%)
<b>Sex</b>		
Male	626	41.9
Female	868	58.1
<b>Dwelling</b>		
Urban	809	54.1
Rural	685	45.9
<b>Religion</b>		
Christian	1341	89.8
Islam	153	10.2
<b>Education level</b>		
Nil formal	386	25.8
Primary	427	28.6
Secondary	413	27.6
Post-secondary	268	17.9
<b>Parent/patient Occupation</b>		
Students/apprentice	225	15.1
Business	213	14.3
Artisan	327	21.9
Civil servant	118	7.9
Farming		

The commonest presenting symptom was earache in 813 (54.4%). Others were object in the ear in 534 (35.7%) and hearing impairment in 441 (29.5%). Right ear and left ear procedures accounted for 784 (52.5%) and 613 (41.0%) respectively while both ears were involved in 97 (6.5 %).

Main indication for ear procedures were 714 (47.8%) ear wax impaction, 247 (16.5%) otitis externa, 241 (16.1%) foreign body impaction and 219 (14.7%) otitis media. Other indications were aural polyps, septic preauricular sinus, ear injuries and mastoid abscess in 27 (1.8%), 15 (1.0%), 10 (0.7%) and 8 (0.5%) respectively. This is demonstrated in **Table 2**.

**Table 2. Showing indications or Diagnosis for ear procedures among patients**

Indications /Diagnosis	Frequency (n)	Percentage (%)
Foreign body impaction	241	16.1
Ear wax impaction	714	47.8
Ear injuries	10	0.7
Septic preauricular sinus	15	1.0
Otitis externa	247	16.5
Otitis media	219	14.7
Aural polyps	27	1.8
Mastoid abscess	8	0.5
Keloid	6	0.4
Auricular cysts	4	0.3
Warts (papilloma)	3	0.2
Total	1,494	100.0

The commonest ear procedure in this study was ear syringing in 754 (50.5%) of patients. Other ear procedures are shown in **Table 3**.

**Table 3. Showing Otologic Procedures carried out among patients**

Otologic Procedures	Frequency (n)	Percentage (%)
Foreign body removal	203	13.6
Aural toilet/dressing	448	30.0
Ear syringing	754	50.5
Aural polypectomy	27	1.8
Mastoid abscess I and D	8	0.5
Preauricular sinus I and D	7	0.5
Preauricular sinus excision	15	1.0
Grommet insertion	3	0.2
Mastoidectomy	6	0.4
Auricular cyst	4	0.3
	10	0.7
	9	0.6

excision		
Auriculoplasty		
Excisional biopsy		
Total	1,494	100.0

Ear procedures are associated with different forms of complications. In this study 91(6.1%) of the patients had complications. The commonest ear trauma in 29 (1.9%). Other associated complication noted in this study were wound infection in 18 (1.2%), tinnitus in 16 (1.1%) and hearing loss in 13 (0.9%). See **Table 4**

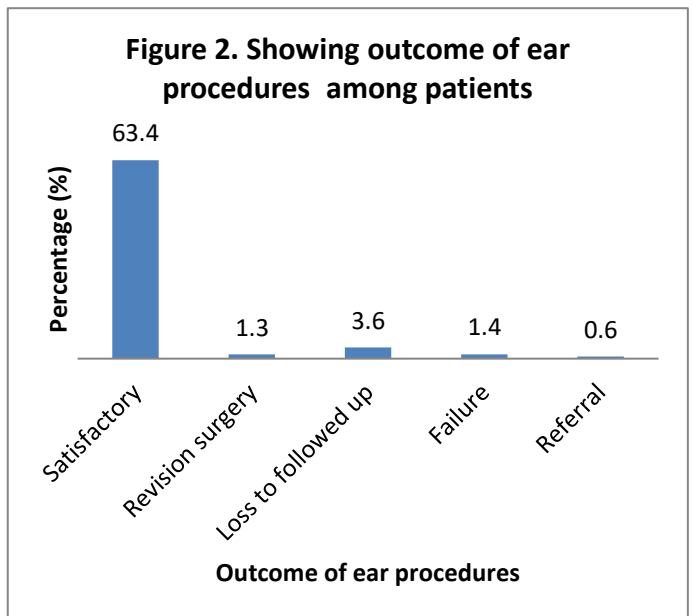
**Table 4. Complications among the patients (N=91)**

Complications	Frequency (n)	Percentage (%)
Wound infection	18	1.2
Hypertrophic scar	2	0.1
Keloid	1	0.1
Hearing loss	13	0.9
Tinnitus	16	1.1
Vertigo	3	0.2
Ear trauma	29	1.9
Haemorrhage/haematoma	9	0.6

In this study, 59 (3.9%) of the patients were referred to other center for further treatment. Main limitation and indication for referral were due to inadequate surgical facilities, diagnostic equipment and patient financial constraints in 47 (3.1%), 41 (2.7%) and 28 (1.9%) respectively. Indication for referral were 37 (2.5%) otoacoustic emission, 41 (2.7%) auditory brainstem response, 8 (0.5%) facial nerve decompression, 28 (1.9%) tympanoplasty and 11 (0.7%) cochlear implants.

Majority 947 (63.4%) of the patients and their parents were satisfied with the ear procedures. There were 54 (3.6%) loss to follow up and 21 (1.4%) failures of ear procedures in patients. Patient in 49 (3.3%) was referral for ear surgery in another center.

**Figure 2 showed outcome of ear procedures among patients.**



**Discussion:**

Ear surgery or otologic surgery is a common surgical treatment of different ear diseases in otorhinolaryngology, head and neck practices. As observed in the study, prevalence of ear diseases among our patients is high also the rate of ear surgery among otologic patients was one in five patients. One of the limitations of this study was exclusion of otologic patients that were not operated. The diseases are there but inadequate facilities to carry out the surgeries. Main obstacles to ear surgery in developing countries were lack of essential equipment's as compared to developed country where the surgery is performed.

Ear procedures are common at the extreme ages in this study and most likely due to children are fond of playing and insert different objects into head orifices (mouth, ear and nose).<sup>4</sup> This leads to impacted foreign body, injuries, otitis externa and ear wax impaction. Degenerative diseases are common among the elderly due to ageing processes in all body organ, ear is not excluded in the ageing.<sup>10</sup>

There was female preponderance in this study because female has lower pain threshold, more worried about diseases and seek health care intervention earlier than male. Due to easy accessibility, location of the centre and lower cost of transportation makes ear procedure commoner in urban dwellers than rural dwellers in this study.<sup>15</sup> Other sociodemographic features including religion, education, occupation did not

affect the pattern and proportion of the procedures.

Common presenting symptoms among otologic surgical patients in this study were earache, hearing impairment, objects in the ear and ear discharge. These were associated with clinical signs such as ear wax impaction, otorrhea, tenderness and foreign body impaction. These were also reported in previous study.<sup>16</sup>

Ear wax impaction, otitis externa, foreign body impaction and otitis media are main indication for carrying out surgical procedures in this study. This is not only because the cases were common but the equipment for the procedure was cheap and available in our center also the diagnoses are easily made. Mastoid abscess are not common due to high prevalence of abuse of antibiotics. Referred cases such as profound sensorineural hearing loss and facial nerve palsy were common. Diagnosis and surgical equipment are expensive, sophisticated and are not available in the study centre. This is responsible for high level of ear syringing, aural toileting/dressing and foreign body removal and low prevalence of mastoidectomy and grommet insertion in this study. This is similar to reported findings in previous study.<sup>17</sup>

Most of the ear pathology involved one ear except few cases which are bilateral as in ear wax impaction and otitis externa. This is responsible for higher prevalence of unilateral ear procedure. Furthermore, right ear procedure was commoner than left ear procedure as majority of the patient are right-handed. Majority of the surgery were performed in the clinic rather than theatre since no Anaesthesia is required for the procedures. Majority of the patients were seen and treated in the clinic as cold cases due to prior self-medication (analgesics and antibiotics). This is responsible for high prevalence of elective procedure. Major ear surgeries are not common compared to minor and intermediate cases. Contrary to report in other study<sup>18</sup>. This is most likely due to lack of surgical equipment for the major cases.

Ear surgical procedures are not free from complications like other surgery.<sup>19-21</sup> They are minor which easily resolved. Major ear surgery complications in this study were ear trauma, wound infection, tinnitus and hearing loss. These

arise due to poor technique and inadequate patient cooperation. They were successfully managed before discharged from clinic. These are avoidable by adequate anaesthesia especially in children.

Main constraints for ear surgery in developing countries were inadequate funding. This leads to lack of most otologic diagnostic tools and operation equipment. These are needed for high specialized diagnoses and surgical interventions. This is responsible for referral of patients that required surgery like cochlear implants, tympanoplasty and facial nerve decompression.<sup>22</sup>

Majority of those patients were satisfied post operatively. This concurred with other studies.<sup>23-25</sup> Wrong anaesthesia are main causes of poor patient cooperation and failed procedure which were corrected by revision surgery in all our cases. Patient who were loss to follow up in this study were from far rural area and neighborhood state. These were due to poor accessibility and poor financial status.

#### **Conclusion:**

Surgical ear procedures are still not fully practiced especially where there are limited resources. This study showed a prevalence of 20.8%. Ear syringing was a major ear procedure performed in 50.0% of patients. There is need to provide adequate surgical facilities which

will tremendously reduce referral cases and encourage surgical tourism in developing country.

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#### **Competing interests**

All the authors declare that there were no competing interests.

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#### **References:**

- [1.] Bastier PL, Leroyer C, Lashéras A, Rogues AM, Darrouzet V, Franco-Vidal V. Early and

- late surgical site infections in ear surgery. *Acta Otorhinolaryngol Ital.* 2016;36(2):127-34.
- [2.] Lucidi D, De Corso E, Paludetti G, Sergi B. Quality of life and functional results in canal wall down vs canal wall up mastoidectomy. *Acta Otorhinolaryngologica Italica.* 2019;39(1):53.
- [3.] Falcon-Chevere JL, Giraldez L, Rivera-Rivera JO, Suero-Salvador T. Critical ENT skills and procedures in the emergency department. *Emergency Medicine Clinics.* 2013;31(1):29-58.
- [4.] Adegbiyi WA, Aremu SK, Aluko AAA, Olubi O. Management of Otological Foreign Bodies Impaction in Tertiary Health Care Center. *International Journal of Innovative Research in Medical Science (IJIRMS).* 2019;04(02):97-102.
- [5.] Paul SP. Skin Cancer of the Ear: Mastoid Interpolation Flap Reconstruction Tips. *Clinical Cases in Skin Cancer Surgery and Treatment.* 2016;1-10.
- [6.] Melloui J, Bouattane O, Bakkoury J. Acoustic model of the human outer ear. *International Journal of Engineering & Technology* 2018;7(4):3286-93.
- [7.] Sabalys G, Juodzbalys G, Wang HL. Aetiology and pathogenesis of trigeminal neuralgia: a comprehensive review. *Journal of oral & maxillofacial research.* 2012;3(4).
- [8.] Bhutta MF, Thornton RB, Kirkham LAS, Kerschner JE, Cheeseman MT. Understanding the aetiology and resolution of chronic otitis media from animal and human studies. *Disease models & mechanisms.* 2017;10(11):1289-00.
- [9.] Sigdel B, Nepali R. Pattern of Ear Diseases among Paediatric ENT Patient: An Experience from Tertiary Care Centre, Pokhara, Nepal. *Journal of Nepal Paediatric Society.* 2012;32(2):142-5.
- [10.] Adegbiyi WA, Aremu SK, Aluko AAA. Geriatric Otorhinolaryngology, Head and Neck Emergency in a Nigerian Teaching Hospital, Ado Ekiti. *International Journal of Otolaryngology and Head & Neck Surgery.* 2019; 8:81-90.
- [11.] Nadol JB, McKenna MJ. *Surgery of the ear and temporal bone.* Lippincott Williams & Wilkins/Wilkins. 2005.
- [12.] Ajalloueyan M. Experience with surgical management of cholesteatomas. *Archives of Otolaryngology-Head & Neck Surgery.* 2006;132(9):931-3.
- [13.] Dashan Y, Haiyue J, Qinghua Y, Bo P, Lin L, Tailing W, et al. Technical innovations in ear reconstruction using a skin expander with autogenous cartilage grafts. *Journal of Plastic, Reconstructive & Aesthetic Surgery.* 2008;61: S59-S69.
- [14.] Park BY, Im JT, Lim SY, Pyon JK, Bang SI, Mun GH, Oh KS. Microtia reconstruction using tissue expanders without skin grafts from groin region. *Journal of Plastic, Reconstructive & Aesthetic Surgery.* 2014;67(11):1481-7.
- [15.] Adegbiyi WA, Aremu SK, Lasisi AO. Patients Barrier to Ear, Nose and Throat Surgical Care in Nigeria. *American Scientific Research Journal for Engineering, Technology, and Sciences (ASRJETS).* 2017;32(1):96-104.
- [16.] Lasisi OA, Afolabi O. Mastoid surgery for the chronic ear: A ten-year review. *Internet J Head Neck Surg* 2007; 2:
- [17.] Brobby GW. The discharging ear in the tropics: A guide to diagnosis and management in the district hospital. *Trop Doct* 1992; 22:10-3.
- [18.] Lasisi OA, Nwaorgu ROGB, Grandawa HI, Isa A. A fifteen-year review of otologic surgery in Ibadan, Nigeria: problems and prospects. *Nigerian Journal of Surgical Research.* 2002;4(1):45-49.
- [19.] Kamath MP, Sreedharan S, Rao AR, Raj V, Raju K. Success of myringoplasty: Our experience. *Indian J Otolaryngol Head Neck Surg.* 2013; 65:358-62.
- [20.] Lin JC, Ho KY, Kuo WR, Wang LF, Chai CY, Tsai SM. Incidence of dehiscence of the facial nerve at surgery for middle ear cholesteatoma. *Otolaryngol Head Neck Surg.* 2004; 131:452-6.
- [21.] Kaylie DM, Gardner EK, Jackson CG. Revision chronic ear surgery. *Otolaryngology—Head and Neck Surgery.* 2006;134(3):443-50.

- [22.] Suleiman AO, Suleiman BM, Abdulmajid UF, Suleiman MR, Mustapha AY, Afolabi OA, et al. Paediatric cochlear implantation in north-western Nigeria case report and review of our challenges. *International journal of pediatric otorhinolaryngology*. 2014;78(2):363-5.
- [23.] Tysome JR, Padgham ND. A comparative study of patient satisfaction with day case and in-patient major ear surgery. *The Journal of Laryngology & Otology*. 2006;120(8):670-5.
- [24.] Wondergem M, Lieben G, Bouman S, van den Brekel MWM, Lohuis PJFM. Patients' satisfaction with facial prostheses. *British Journal of Oral and Maxillofacial Surgery*. 2016;54(4):394-9.
- [25.] Younis I, Gault D, Sabbagh W, Kang NV. Patient satisfaction and aesthetic outcomes after ear reconstruction with a Branemark-type, bone-anchored, ear prosthesis: a 16-year review. *Journal of Plastic, Reconstructive & Aesthetic Surgery*. 2010;63(10):1650-5.