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A PROSPECTIVE STUDY OF PREVALENCE OF VARIOUS CAUSES IN PATIENTS PRESENTING WITH CONDUCTIVE TYPE OF HEARING IMPAIRMENT

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ABSTRACT: INTRODUCTION: Deafness is the most common presenting complaint in patient presenting to ENT OPD with complaints of ear. Deafness is a potentially morbid condition causing significant problem to the patient in their day-to-day life and livelihood. **AIM:** This study was undertaken to know the incidence of various diseases presenting as deafness, so that, epidemiological data can be secured and it is helpful to channel the resources and treatment modalities in the right direction. **SETTINGS AND DESIGN:** The study was carried out in a Tertiary hospital, in Vizianagaram, Andhra Pradesh. It is a prospective study, undertaken to know the prevalence. **MATERIALS AND METHODS:** Patients presenting to ENT OPD from Sept 2012 to Sept 2014, with a chief complaint of deafness were included in this study. All the Patients were subjected to thorough clinical examination, necessary investigations, viz. pure tone audiometry, Examination under microscopy and wet mopping by way of syringing. **RESULTS:** Out of the 400 patients included for this study, 272 patients (68%) were found to be suffering from Conductive hearing loss; whereas 138 patients (34.5%) were found to be suffering from Sensorineural hearing loss. Conductive hearing loss was most common in 20-30 age group in males and 30-40 age group in females; that too middle ear disease were more common than external ear; i.e. 175 patients out of 262 (66.7%) had a disease in the middle ear, 87 patients (33.2%) had a external ear pathology. External ear disease was earwax or keratosis obturans, (55.1%), the rest contributed by Otomycosis (34.4%) and malformed ears (10.3%). Diseases of middle ear were distributed as Acute otitis media (17.7%), Chronic otitis media (28%), Otitis media with effusion (50.2%), Fixation pathology (15.4%), Other causes (5.1%). **CONCLUSION:** Conductive hearing loss was most common in the middle age groups, between 20-40 yrs of age, females, and more commonly due to a pathology in the middle ear, Otitis media with effusion/SOM being the major contributing disease. Females were more commonly presenting with deafness in all the categories of the pathologies, barring a few.

KEYWORDS: Conductive hearing loss, Sensorineural hearing loss, Earwax, Keratosis obturans, Otitis media with effusion, Serous otitis media.

INTRODUCTION: Hearing is one of the five principal senses of the body, and life with absent/impaired hearing is tough to imagine. It is the first special sense to be evolved and the first sense to be formed in utero. Deafness is considered a major morbidity and is the most common presentation in patients with ear diseases. Of all the symptomatology for an ear disease, deafness is the most common and most devastating.

Hearing impairment is the inability to hear as well as someone with normal hearing. Hearing impaired people can be hard of hearing (HOH) or deaf. If a person cannot hear at all, then they have deafness.¹ It can be present at birth (congenital), or become evident later in life (acquired). The

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distinction between acquired and congenital deafness specifies only the time that the deafness appears. It does not specify whether the cause of the deafness is genetic (inherited).²

About 2 percent of adults aged 45 to 54 have disabling hearing loss. The rate increases to 8.5 percent for adults aged 55 to 64. Nearly 25 percent of those aged 65 to 74 and 50 percent of those who are 75 and older have disabling hearing loss.³

Among adults aged 70 and older with hearing loss that could benefit from hearing aids, fewer than one in three (30 percent) has ever used them. Even fewer adults aged 20 to 69 (approximately 16 percent) who could benefit from wearing hearing aids have ever used them.⁴

Hearing loss that occurs gradually as we age (presbycusis) is common. About one-third of people between the ages of 65 and 75 have some degree of hearing loss. For those older than 75, the number of people with some hearing loss is almost 1 in 2.⁵

Pure-tone audiometry, air and bone-conduction with, appropriate masking will provide numerical values to the degree of hearing impairment, the magnitude of the airborne gap and whether there is an associated sensorineural impairment for each of the two ears. Such information is important to inform decisions regarding management⁶

MATERIALS AND METHODS: For a period of two years, from September of 2012 to 2014, a prospective study was undertaken over the patients presenting to ENT OPD, at Maharajah Institute of Medical sciences, Vizianagaram, Andhra Pradesh. All those patients presenting to the OPD with a chief complaint of hearing impairment were included in the study. The patients were categorized based on their gender and age. The whole sample was subjected to basic clinical evaluation and were diagnosed basing on the clinical findings. Most of the patients were subjected to pure tone audiometry, barring a few patients with earwax and keratosis obturans. Patients were broadly categorized as suffering from either conductive hearing loss or a sensorineural hearing loss, basing on the readings of pure tone audiometry. A threshold of >25dB was taken as abnormal for both air conduction and bone conduction. Masking was used for all the patients when bone conduction was being tested, and for all those patients who had a difference between air conduction threshold of test ear and bone conduction threshold of non-test ear as >45dB. Documentation was done only for the quality of deafness and the pathological cause of the deafness. Patients with an intact tympanic membrane, when suspected of middle ear pathology, were subjected for Impedance Audiometry; Patients showing either a Eustachian tube pathology- depicted by a "c" graph on impedance audiometry, or, a Serous otitis media- depicted by a "b" graph were commonly designated as OME/SOM, for the sake of easy inclusion into the study. Patients with mixed hearing loss, uncooperative patients, and children less than 5 yrs of age and patients unwilling for the test/study were excluded from the study. Patients with evidence of sensorineural hearing loss were excluded from the study, as the main focus of this study is to know the prevalence of various diseases causing conductive type of hearing loss.

RESULTS: Out of the 400 patients considered for the study, conductive hearing loss was found in 272 patients, (68%). Out of them, 56.9% were females and 43.1% were males. Age wise distribution was found to be as 4.4% were 5-10 yr age group, 10.6% were of 10-20yr age group, 31.6% were of 20-30yr age group, 33.4% were of 30-40yr age group, 9.1% were of 40-50yr age group and 10.6% were of >50 yr age group. 35.6% of patients with conductive hearing loss had a disease in external ear; out of which, 52.5% were female patients and 47.4% were male patients. Of the rest 64.3% patients who

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had a disease in the middle ear, 59.4% were female patients and 40.5% were male patients. In male patients, going by age wise distribution, in the age group of 5-10yrs, 42.8% had wax/keratosis and 57.1% had malformed external ear; in the age group 10-20yrs, 9% patients had wax/keratosis; 9% patients had malformed ears, 9% patients had Chronic otitis media, 18.2% had Acute otitis media and 54.5% had OME/SOM. In the age group of 20-30yrs, 17.1% had wax/keratosis, 11.4% had Otomycosis, 5.7% had malformed ears, 14.2% had Acute otitis media and 14.2% had chronic otitis media, 37.1% had OME/SOM. In the age group of 30-40yrs, 18.75% had wax/keratosis, 22.9% had otomycosis, 10.4% had Acute otitis media, 25% had Chronic otitis media, 16.6% had OME/SOM, 6.25% had fixation pathology. In the age group 40-50yrs, 12.5% had Wax/keratosis, 25% had otomycosis, 12.5% had Acute otitis media, 25% had chronic otitis media, 12.5% had OME/SOM, 12.5% had some miscellaneous disease of the middle ear. In the age group of >50yrs, 25% had wax/keratosis, 12.5% had Acute otitis media, 12.5% had chronic otitis media, 12.5% had OME/SOM and 37.5% had some miscellaneous cause in the middle ear. Wax & Keratosis and otomycosis were most common in the age group of 30-40yrs, Malformed ears were commonest in the age group of 5-10 yrs, Acute otitis media was equally seen in both the age groups of 20-30yrs and 30-40yrs. Chronic otitis media was commonest between 30 & 40yrs of age, OME/SOM was commonest in the age group of 20-30yrs, Fixation pathology was exclusively seen between 30 & 40yrs.

In female patients, going by age wise distribution, in the age group of 5-10yrs, 40% had wax/keratosis and 40% had malformed external ear, and 20% had OME/SOM. In the age group 10-20yrs, 38.8% patients had wax/keratosis; 5.5% patients had malformed ears, 5.5% patients had Chronic otitis media, 16.6% had Acute otitis media and 33.3% had OME/SOM. In the age group of 20-30yrs, 5.8% had wax/keratosis, 11.7% had Otomycosis, 5.8% had malformed ears, 11.7% had Acute otitis media and 13.7% had chronic otitis media, 50.9% had OME/SOM. In the age group of 30-40yrs, 2.3% had wax/keratosis, 27.9% had otomycosis, 4.6% had Acute otitis media, 11.6% had Chronic otitis media, 20.9% had OME/SOM, 11.6% had fixation pathology. In the age group 40-50yrs, 5.8% had Wax/keratosis, 11.7% had otomycosis, 5.8% had Acute otitis media, 17.6% had chronic otitis media, 47% had OME/SOM, 23.5% had fixation pathology of the middle ear. In the age group of >50yrs, 9.5% had wax/keratosis, 4.7% had Acute otitis media, 9.5% had chronic otitis media, 9.5% had OME/SOM, 52.3% had some fixation pathology and 14.2% had some miscellaneous cause in the middle ear. Wax, Keratosis & Otomycosis were most common in the age group 30-40yrs, Malformed ears were seen only between 5-10yrs, Acute otitis media, chronic otitis media, OME/SOM was seen between 20 & 30 yrs, Fixation pathology was most commonly seen >50 yrs age group, and malformed ears were almost exclusively seen in >50yrs age group.

Going by the disease, Wax and keratosis(17.2%) was most commonly seen in the age group of 30-40yrs(40.4%); Otomycosis (13.6%) in 30-40yrs(62.1%); Malformed ears(4.7%) in 5-10yrs (46.1%); Acute otitis media(9.92%) in 20-30yrs(40.7%); Chronic otitis media(14.3%) in 30-40yrs(43.5%); OME(29%) in 20-30yrs(49.3%); fixation pathology(8.4%) in >50yrs(47.8%); miscellaneous causes (2.5%) in >50yrs (85.7%).

DISCUSSION: Knowledge about the role of various diseases in the causation of deafness is important epidemiologically; to have an idea of the disease beforehand, to channel the resources in hand to the correct diagnosis and treatment of various diseases.

Incidence of both external ear disease (52.5%) and diseases of middle ear (59.4%), were more in female population, when compared to male population, as opposed to many studies

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conducted before. National Institute on Deafness and Other Communication Disorders. (2003, June 25), published that deafness was more common in males. But, maybe because of increased awareness of women, or maybe because the time frame was limited, this study had a more female population in the sample.

In male population, 41% belonged to the age group of 30-40yrs, followed by the age group of 20-30yrs (29.9%). Malformation of the external ear was the most common cause of CHL upto 10yrs, whereas OME/SOM was the most common cause from 10-30yrs. COM was the most common cause from 30-50yrs- that too with a non-intact tympanic membrane. Otomycosis was seen more commonly above 40yrs, maybe because of increase of incidence diabetes mellitus; and miscellaneous causes were more >50yrs of age.

In female population, 32% belonged to 20-30yrs of age and 27.7% belonged to 30-40yr age group. Wax & Keratosis was found to be more common till the age of 20yrs, OME/SOM was the most common cause of Conductive deafness between 20 & 30 yrs age group and 40-50 yr age group whereas otomycosis was more common in 30-40yr age group. Fixation pathology was seen to be very common from the age of 30yrs onwards.

In a prospective study of patients, by Bartelds AIM, Bowers P, Bridges-Webb C, Culpepper L. Froom J, Grob P, adults (n = 3224) seen in primary care with symptoms and signs consistent with acute otitis media in eight developed countries including the United Kingdom, 6 percent were aged between 15 and 24 years, 7 percent were between 25 and 44 years and 3 percent were 45 years or older. This adult total constitutes 16 percent of all patients seen, making it a not infrequent event in otherwise healthy adults. In this sample, the male/female ratio was equal.⁷⁻¹²

The same result was found in this study also, making 20-30yr age group as the most common male population group to be effected with Acute otitis media.

According to Robinson, Secretary otitis media in the adult. *Clinical Otolaryngology and Allied Sciences*.1987; 12: 297-302, Otitis media with effusion in adults is under-reported in the literature because OME has a lower incidence in adults than in children. The OME prevalence rate has been reported as 0.6 percent in a population aged 15 years or over. It is therefore not uncommon in an otology practice, where adults account for approximately 15 percent of OME cases. In this study, the prevalence of OME was found to be 29%, considering both males & females. It may be due to a bias in the sample, where more patients were concentrated around the young and middle age groups, presenting with OME.

Although there are similarities in the clinical presentation of OME in children and adults, its management differs.¹³⁻¹⁸ Atelectasis and adhesive otitis media usually coexist with OME, leaving a collapsed middle ear; warranting specific surgeries like tympanoplasty.¹⁹

According to the studies by Browning GG, Gatehouse S, Alho OP, Jokinen K, Laitakari K, Palokangas J with the titles "Prevalence of middle ear disease in the adult British population", published in *Clinical Otolaryngology*. 1992; 17: 317-21 and "Chronic suppurative otitis media and cholesteatoma. Vanishing diseases among Western populations?" published in *Clinical Otolaryngology*. 1997; 22: 358-61; the total prevalence of active and inactive COM was found to be 4.1%, and most commonly seen in patients of age groups 40-80yrs.²⁰⁻²³

But, in this study, prevalence of COM was found to be around 14%; the cause of such vast discrepancy might be the low socioeconomic status of Indian population, and the gravity imposed by such diseases of the poor on the society.

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CONCLUSION: Continuous evaluation of the incidence of various diseases in the causation of deafness is always important to know the trends of the disease patterns and the scenario of the presentation of various pathologies. In this study, it was found that the cause varies according to the age of the patient and some contribution in terms of gender is also recorded in this study. Malformed ears as a cause of deafness was seen in upto 10yrs of age. Although all middle ear diseases were exclusively seen in middle age group, OME/SOM was seen in a younger age group in males when compared to females, and the contrary was found to be true for otomycosis. Fixation pathology was much more common in females.

This study is a hopeful exercise to help establish the epidemiological significance of various diseases causing deafness.

REFERENCES:

1. Tos M, Stangerup SE, Larsen P. Dynamics of eardrum, Archives of Otolaryngology - Head and Neck Surgery. 1987; 113: 380-5.
2. <http://www.medicinenet.com/deafness/article.htm>.
3. Based on calculations performed by NIDCD Epidemiology and Statistics Program staff: (1) using data from the 1999-2010 National Health and Nutrition Examination Survey (NHANES); (2) applying the definition of disabling hearing loss used by the 2010 Global Burden of Disease Expert Hearing Loss Team (hearing loss of 35 decibels or more in the better ear, the level at which adults could generally benefit from hearing aids).
4. Based on calculations by NIDCD Epidemiology and Statistics Program staff using data collected by (1) the National Health Interview Survey (NHIS) annually for number of persons who have ever used a hearing aid [numerator], and (2) periodic NHANES hearing exams for representative samples of the U.S. adult and older adult population [denominator]; these statistics are also used for tracking Healthy People 2010 and 2020 objectives. See also Use of Hearing Aids by Adults with Hearing Loss (chart).
5. <http://www.mayoclinic.org/diseases-conditions/hearing-loss/basics/definition/CON-20027684>, National Institute on Deafness and Other Communication Disorders. (2003, June 25).
6. Scott-Brown Otolaryngology and head and neck surgery, 7th edition, 237c, 3419.
7. Bartelds AIM, Bowers P, Bridges-Webb C, Culpepper L, Froom J, Grob P. Acute otitis media in adults: A report from the International Primary Care Network. Journal of the American Board Family Practice. 1993; 6: 333-8.
8. Fairley JW, Dhillon RS, Weller I VD. HIV, glue ear, and adenoidal hypertrophy. The Lancet. 1988; 2: 1422.
9. Celin SE, Bluestone CD, Stephenson J, Yilmaz HM, Collins JJ. Bacteriology of acute otitis media in adults. Journal of the American Medical Association. 1991; 266: 2249-52.
10. Nederlands Huisartsen Genootschap (The Dutch College of General Practitioners). Acute otitis media. 1992; 1-7.
11. Leskinen K, Jero J. Acute complications of otitis media in adults. Clinical Otolaryngology. 2005; 30: 511-16.
12. De Zinis R, Luca O, Gamba P, Balzanelli C. Acute otitis media and facial nerve paralysis in adults. Otolology and Otoneurology. 2003; 24: 113-7.

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13. Robinson PM. Secretary otitis media in the adult. *Clinical Otolaryngology and Allied Sciences*. 1987; 12: 297-302.
14. Sade J. Secretary otitis media and its sequelae. *Monographs in Clinical Otolaryngology 1*. New York: Churchill Livingstone, 1979.
15. Finkelstein Y, Ophir D, Talmi YP, Shabtai A, Strauss M, Sohar Y. Adult-onset otitis media with effusion. *Archives of Otolaryngology - Head and Neck Surgery*. 1994; 120: 517-27.
16. Sheu SH, Ho KY, Kuo WR, Juan KH. The probability of diagnosis of nasopharyngeal carcinoma in patients with only adult-onset otitis media with effusion. *Kaohsiung Journal of Medical Sciences*. 1998; 14: 706-9.
17. Shimotakahara SG, Ruby RR, Lampe HB. Otitis media with effusion in the adult. *Journal of Otolaryngology*. 1989; 18: 85-9.
18. Soucek S, Michaels L. The ear in the acquired immunodeficiency syndrome: II. Clinical and audiological investigation. *American Journal of Otology*. 1996; 17: 35-9.
19. Cummings otolaryngology, head and neck surgery, 5th edition, 139, 1976-7.
20. Schuknecht HF. *Pathology of the ear*; 2nd edn. Philadelphia: Lea and Febiger, 1993: 191-253.
21. Browning GG, Gatehouse S. The prevalence of middle ear disease in the adult British population. *Clinical Otolaryngology*. 1992; 17: 317-21.
22. Alho OP, Jokinen K, Laitakari K, Palokangas J. Chronic suppurative otitis media and cholesteatoma. Vanishing diseases among Western populations? *Clinical Otolaryngology*. 1997; 22: 358-61.
23. Kemppainen HO, Puhakka HJ, Laippala PJ, Sipila MM, Manninen MP, Karma PH. Epidemiology and aetiology of middle ear cholesteatoma. *Acta Otolaryngologica*. 1999; 119: 568-72.

CONDUCTIVE HEARING LOSS: TOTAL NUMBER OF PTS WITH CHL: 272 PTS IN ALL

	Female patients	Male patients	Total
5-10 yrs	5	7	12(4.4%)
10-20 yrs	18	11	29(10.6%)
20-30 yrs	46	40	86(31.6%)
30-40 yrs	48	43	91(33.4%)
40-50 yrs	17	8	25(9.1%)
>50 yrs	21	8	29(10.6%)
Total	155(56.9%)	117(43.01%)	272

Table 1: Acc to age groups

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SEX DISTRIBUTION OF THE SITE OF PATHOLOGY:

1) Pathology of External ear:

	Female patients	Male patients	Total
5-10 yrs	4	7	11
10-20 yrs	8	2	10
20-30 yrs	12	12	24
30-40 yrs	22	20	42
40-50 yrs	3	3	6
>50 yrs	2	2	4
Total	51(52.5%)	46(47.4%)	97(35.6%)

Table 2

2) Pathology of Middle ear:

	Female patients	Male patients	Total
5-10 yrs	1	0	1
10-20 yrs	10	9	19
20-30 yrs	39	23	62
30-40 yrs	21	28	49
40-50 yrs	14	5	19
>50 yrs	19	6	25
Total	104(59.4%)	71(40.5%)	175(64.3%)

Table 3

DISTRIBUTION OF A PATHOLOGY ACC TO SEXES:

MALE PTS:

Age	Wax & Keratosis	Otomycosis	Malformed ears	AOM	COM	OME	Fixation	Misc	Total
5-10yrs	3	0	4 (57.1%) (57.1%)	0	0	0	0	0	7
10-20yrs	1	0	1	2	1	6 (54.54%)	0	0	11
20-30yrs	6	4	2	5 (35.7%)	5	13 (46.4%) (37.1%)	0	0	35
30-40yrs	9 (40.9%)	11 (64.7%)	0	5 (35.7%)	12 (57.1%) (25%)	8	3 (100%)	0	48 (41%)
40-50yrs	1	2 (25%)	0	1	2 (25%)	1	0	1	8
>50yrs	2	0	0	1	1	1	0	3 (75%) (37.5%)	8
Total	22 (18.8%)	17	7	14	21	29 (24.7%)	3	4	117

Table 4

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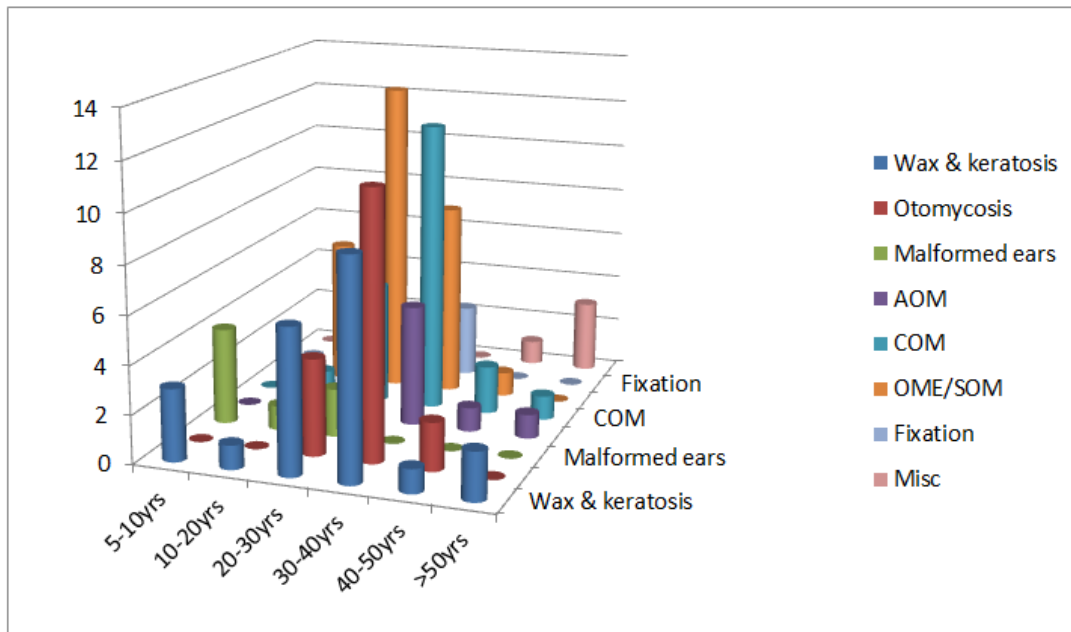


Figure 1

FEMALE PTS:

Age	Wax & Keratosis	Otomycosis	Malformed ears	AOM	COM	OME	Fixation	Misc	Total
5-10yrs	2 (40%)	0	2 (40%)	0	0	1	0	0	5
10-20yrs	7 (38.8%)	0	1	3	1	6	0	0	18
20-30yrs	3	6 (66.6%)	3	6 (46.1%)	7 (38.8%)	26 (52%) (50.9%)	0	0	51 (32%)
30-40yrs	10 (40%)	12 (70.5%) (27.9%)	0	2	5	9	5	0	43 (27.7%)
40-50yrs	1	2	0	1	3	6 (47%)	4	0	17
>50yrs	2	0	0	1	2	2	11 (55%) (52.3%)	3 (100%)	21
Total	25	20	6	13	18	50 (32.2%)	20	3	155

Table 5

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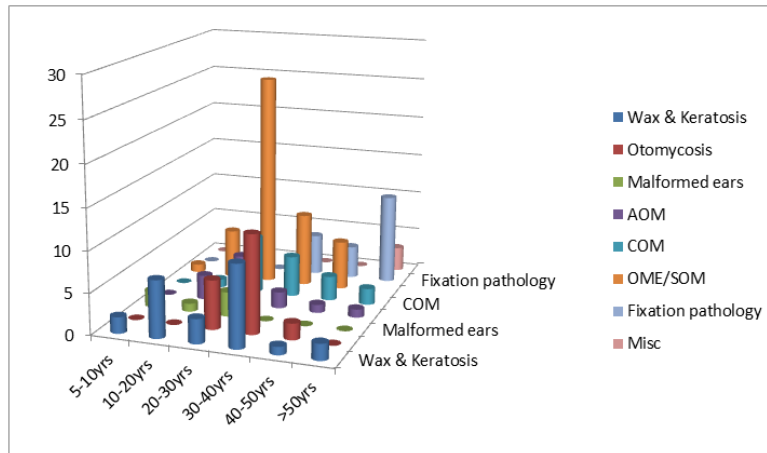


Figure 2

AGE DISTRIBUTION OF VARIOUS CAUSES:

Age	Wax & Keratosis	Otomycosis	Malformed ears	AOM	COM	OME/SOM	Fixation	Misc
5-10yrs	5(3+2)	0	6(4+2) 46.1%	0	0	1(0+1)	0	0
10-20yrs	8(1+7)	0	2(1+1)	5(2+3)	2(1+1)	12(6+6)	0	0
20-30yrs	9(6+3)	10(4+6)	5(2+3)	11(5+6) 40.7%	12(5+7)	39(13+26) 49.3%	0	0
30-40yrs	19(9+10) 40.4%	23(11+12) 62.1%	0	7(5+2)	17(12+5) 43.5%	17(8+9)	8(3+5)	0
40-50yrs	2(1+1)	4(2+2)	0	2(1+1)	5(2+3)	7(1+6)	4(4+0)	1(1+0)
>50yrs	4(2+2)	0	0	2(1+1)	3(1+2)	3(1+2)	11(11+0) 47.8%	6(3+3) 85.7%
Total	47 17.2%	37 13.6%	13 4.7%	27 9.92%	39 14.3%	79 29%	23 8.4%	7 2.5%

Table 6

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