Chronic Suppurative Otitis Media Contributory Factors and their Prevention

Naeem Akhtar[1], Muhammad Haneef[2], Asma Naeem[3]

[1,2]Department of ENT, Faisalabad Medical University, Faisalabad-Pakistan, [3]Department of ENT, Allied Hospital, Faisalabad-Pakistan

ABSTRACT

Background: Chronic suppurative otitis media has declined in the developed countries because of better health resources and better socioeconomic status of the people, but it still remains a major health problem in developing countries like Pakistan. Chronic suppurative otitis media (CSOM) is relatively common among illiterate people having poor socioeconomic status residing in the rural areas. **Objective:** To identify the contributory factors responsible for chronic suppurative otitis media and to devise strategies to prevent them. **Study Design:** Cross sectional observational study. **Settings:** This study was conducted in the department of ENT and Head & Neck surgery allied hospital (FMU) Faisalabad Pakistan. **Duration:** Two years from September 2016 to August 2018. **Methodology:** A total of 150 patients with CSOM, both tubotympanic and atticoantral types, were included. The patients of either gender with CSOM, both tubotympanic and atticoantral types, ranging from 03 to 64 years and giving consent for any surgical intervention if required were included in the study. Patients below 03years and above 64 years, having acute suppurative otitis media with complication, and patients not willing for any surgical intervention were excluded from the study. **Results:** Out of 150 patients of the study 60% patients were males and 40% were females with male : female ratio of 1.5 : 1. The age range was found to be 3-64 years with mean age of 28.9 years. Socioeconomic status showed that 62.8% patients with CSOM belonged to poor class (tubotympanic-46.8% & atticoantral -16%), 23.9% patients had middle class (tubotympanic-16.6% & atticoantral-7.3%) and 13.3% patients belonged to upper class (tubotympanic - 11.3% & atticoantral – 2%). 84 patients (56%) were under matric (tubotympanic-42% & atticoantral – 14%). 57.2% patients were rural residents and 42.8% patients were urban residents in case of tubotypmpanic type of CSOM while 55.2% patients were rural and 44.8% patients were urban in case of atticoantral type of CSOM. SPSS software version 10 was used to analyse the data. Chi square test was applied for analysis. Tubotympanic type of CSOM cases were treated conservatively along with surgical treatment where indicated. All cases of atticoantral type of CSOM were treated by surgery. **Conclusion:** CSOM is still an important public health problem in developing countries like Pakistan due to poverty, illiteracy, malnutrition, lack of health education and people living in substandard & rural areas. It is the need of the hour that health education programs should be organized to raise the awareness about the disease among the people.

Keywords: Chronic suppurative otitis media, Tubotympanic disease, Atticoantral disease, Contributory factors.

Corresponding Author
Submitted for Publication: 27-01-2020 *Accepted for Publication: 16-08-2020*
Dr. Naeem Akhtar, Professor & Head of ENT Unit – II, Faisalabad Medical University, Faisalabad-Pakistan.
Email: drnaeem.ent@gmail.com

Citation: Akhtar N, Haneef M, Naeem A. Chronic Suppurative Otitis Media Contributory Factors and Their Prevention. APMC 2020;14(3):209-13.
DOI: 10.29054/APMC/2020.858

INTRODUCTION

Chronic suppurative otitis media (CSOM) is the most commonly encountered ear disease in most of the ENT units of the tertiary care hospitals and commonly seen ear pathology in general practice as well.[1]CSOM is still a major health problem in developing countries like Pakistan.[2,3] Undoubtedly its incidence is gradually decreasing but still it needs research both in developed and developing countries especially to identify the risk factors involved in this disease and their prevention.[4]

Chronic suppurative otitis media is a long-standing inflammation of part or whole of the middle ear cleft having more than three months duration and characterized by ear discharge and permanent perforation of the ear drum.[5] According to World Health Organization CSOM is known as chronic when duration of ear discharge through a perforated ear drum is at least for two weeks. On the other hand, other otologists define CSOM as chronic when the duration of symptoms is more than 6 weeks.[6] CSOM is of two types namely tubotympanic (Mucosal) and atticoantral (Squamosal) type of CSOM. Tubotympanic type of CSOM involves the antero-inferior portion of the middle ear cleft and is associated with central perforation of the tympanic membrane. As there is no risk of serious complications in this type of CSOM that is why it is also called safe or benign type of CSOM. Moreover this type is not associated with cholesteatoma therefore it is also named as CSOM without cholesteatoma and can be further classified into two subtypes namely active and inactive depending upon whether there is infection or not.[7] On the other hand atticoantral disease involves the postero-superior quadrant of the middle ear cleft i.e; attic, antrum and mastoid. This type of CSOM is characterized by an attic or a marginal perforation in the ear drum. Atticoantral disease involves a bone destructing pathology such as cholesteatoma, granulations or oseitis. In this way there is high risk of development of dangerous complications. Due to this high complication rate this is also called unsafe or dangerous type of CSOM.[8]

The incidence of CSOM particularly tubotympanic type is related to some locoregional factors because mucosa of the nose and paranasal sinuses is continuous with the mucosa of the middle ear cleft. That is why the pathologies in the sinonasal region such as nasal allergy, nasal polyposis, adenoids, chronic infections of the nose and paranasal sinuses can involve the

eustachian tube leading to its dysfunction and CSOM.[9] Similarly some social and socio-economic factors also play an important role in the development of CSOM especially in the people of developing countries. These factors particularly are poverty, bad hygienic conditions, mal-nutrition, illiteracy and lack of health resources.[10]

In this study we had tried to identify the different contributory factors responsible for CSOM and made our level best to devise strategies to prevent them.

METHODOLOGY

Study Design: Cross-sectional observational study

Settings: Department of ENT and Head & Neck Surgery Allied Hospital (Faisalabad Medical University) Faisalabad Pakistan.

Duration: 2 years from September 2016 to August 2018.

Sample Technique: The patients in the study were selected by simple random sampling in the outdoor patient department presenting with ear discharge and loss of hearing.

Sample Size: This study consisted of 150 cases of both types of chronic suppurative otitis media (CSOM) namely tubotympanic and atticoantral type.

Inclusion Criteria: 150 patients of either sex ranging from 3 to 64 years of age, having tubotympanic or atticoantral type of CSOM and giving written consent for any surgical intervention if required have been included in the study.

Exclusion Criteria: Patients having acute suppurative otitis media with complication, having age below 3 and above 64 years and not willing for surgery were excluded from the study.

Data Collection Procedure: All the patients were investigated thoroughly according to a printed proforma. All the patients were enquired regarding their comprehensive history in details. A detailed enquiry was documented regarding their occupation, income per month, residence in rural or urban areas, nutritional habits, educational details and their knowledge about health education. A complete physical examination of all the patients was undertaken including ENT examination, otoscopic examination of the ears, examination of the ears under microscope, general examination of all the patients andsystemic examination especially respiratory system and central nervous system. Appropriate investigations were also done including CBC, urine examination, blood urea, blood sugar, culture sensitivity of the ear discharge, x-rays and CT scan of mastoid temporal bones. In addition pure tone audiometry and tympanometry were also asked in all the adult patients and older children. X-rays PNS and ECG were also done in certain selected patients. All the data was analysed by using appropriate statistics. Chi square test was used and p value < 0.05 was considered as significant.

RESULTS

Out of 150 patients of the study 60% patients were males and 40% were females with male : female ratio of 1.5 : 1 (Figure1). Tubotympanic type of CSOM was seen in 112 (74.7%) patients with 69.6% unilateral disease and 30.4% bilateral disease. Atticoantral type of CSOM was found in 38 (25.3%) patients with 89.5% unilateral while 10.5% bilateral disease (Figure 2 & 3).

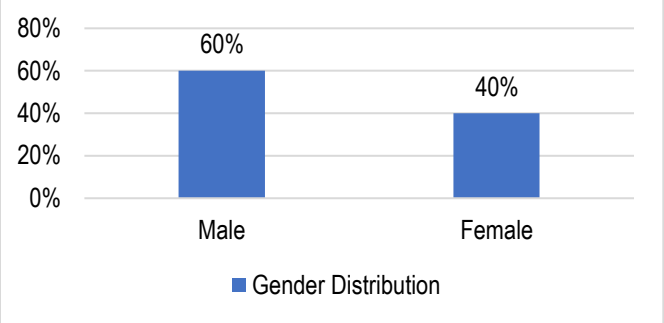

Figure 1: Gender distribution (N=150)

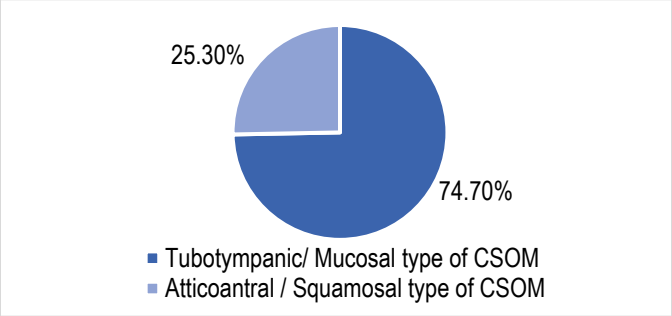

Figure 2: Types of chronic suppurative otitis media (N=150)

Figure 3: A huge aural polyp in atticoantral type of CSOM of right ear

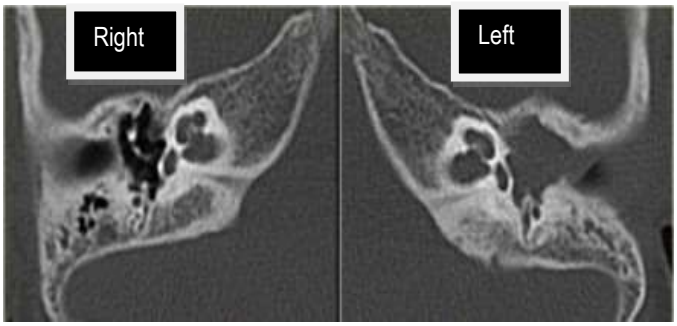

Figure 4: Showing right normal mastoid & left mastoid temporal bone with cholesteatoma

The youngest patient was 3 years old while the oldest one was 64 years old with mean age of 28.9 years. Majority of our patients (93 patients/62%) fell in the age range of 11-30 years with mean age of 26.8 years (Table 1). This table also indicates

that 93 patients (62%) fall within the age range of 11-30 years with mean age of 26.8 years.

Table 1: Age distribution (N=150), Age range= 03 to 64 years with mean age of 28.9 years

Age range in Years	No. of Patients (%)	Mean Age in Years
<10	13 (08.7%)	05.8
11-20	42 (28.0%)	16.0
21-30	51 (34.0%)	35.6
31-40	27 (18.0%)	33.9
41-50	09 (06.0%)	44.1
51-60	05 (03.3%)	55.2
>60	03 (02.0%)	62.3
Total	150 (100%)	

Socioeconomic status showed that 62.8% patients with CSOM belonged to poor class (tubotympanic-46.8% & atticoantral - 16%), 23.9% patients had middle class (tubotympanic-16.6% & atticoantral-7.3%) and 13.3% patients (tubotympanic - 11.3% & atticoantral – 2%) belonged to upper class (Table 2). This table also shows that 62.8% patients belong to poor class having income less than 30,000/-.

Table 2: Socio-economic Status (N=150, Tubotympanic type=112 & Atticoantral type=38)

Income per Month in Rupees	Tubotympanic type of CSOM	Atticoantral type of CSOM
	No. of Patients (%)	**No. of Patients (%)**
<10,000/-	29 (19.4%)	10 (06.7%)
11,000-20,000/-	25 (16.7%)	06 (04.0%)
21,000-30,000/-	16 (10.7%)	08 (05.3%)
31,000-40,000/-	14 (09.3%)	06 (04.0%)
41,000-50,000/-	11 (07.3%)	05 (03.3%)
>50,000/-	17 (11.3%)	03 (02.0%)
Total	112 (74.7%)	38 (25.3%)

CSOM: Chronic suppurative otitis media

56% patients (tubotympanic-42% & atticoantral – 14%) were under matric (Table 3)

Table 3: Literacy status of the patients with CSOM (N=150); 84 patients (56%) were under matric

Educational Status	Tubotympanic type of CSOM	Atticoantral type of CSOM
	No. of Patients (%)	**No. of Patients (%)**
Illiterate	26 (17.3%)	09 (06.0%)
Primary Pass	22 (14.7%)	07 (04.7%)
Under Matric	15 (10.0%)	05 (03.3%)
Matric Pass	33 (22.0%)	10 (06.7%)
Higher Secondary School Certificate	13 (08.7%)	05 (03.3%)
Graduation	02 (01.3%)	02 (01.3%)
Masters	01 (0.7%)	0 (0%)
Total	112 (74.7%)	38 (25.3%)

57.2% patients were rural residents and 42.8% patients were urban residents in case of tubotympanic type of CSOM while 55.2% patients were rural and 44.8% patients were urban in case of atticoantral type of CSOM (Table 4). Other contributory factors for tubotympanic and atticoantral types of CSOM are also given in table 4.

Table 4: Contributory factors for CSOM (N=150, Tubotympanic=112 & Atticoantral=38)

Risk Factor	Tubotympanic type of CSOM	Atticoantral type of CSOM
	No. of Patients (%)	**No. of Patients (%)**
Rural	64 (57.2%)	21 (55.2%)
Urban	48 (42.8%)	17 (44.8%)
Bottle Feeding	05 (04.5%)	-
Nasal allergy	28 (25%)	-
Acute Tonsillitis	21 (18.8%)	-
Adenoids	10 (08.9%)	-
Acute Pharyngitis	17 (15.1%)	-
PNS Infection	08 (07.2%)	-
Cholesteatoma alone	-	16 (42.1%)
Granulations alone	-	09 (23.7%)
Both Cholesteatoma and granulations	-	13 (34.2%)

Table 5: Clinical Features of CSOM (N=150, Tubotympanic=112 & Atticoantral=38)

Clinical Features	Tubotympanic type of CSOM	Atticoantral type of CSOM
	No. of Patients (%)	**No. of Patients (%)**
Ear Discharge	112 (100%)	38 (100%)
Hearing Loss	112 (100%)	38 (100%)
Earache	07 (06.2%)	06 (15.7%)
Headache	09 (08.0%)	05 (13.1%)
Nausea / Vomiting	-	03 (07.8%)
Dizziness / Vertigo	-	07 (18.4%)
Aural polyp	05 (04.4%)	09 (23.6%)
Facial Palsy	-	04 (10.5%)

Clinical features of 112 tubotympanic type of CSOM were ear discharge (100%), hard of hearing (100%), earache (6.2%), headache (8%) and aural polyp was seen in 5 patients (4.4%). 38 patients of atticoantral type of CSOM were found to have ear discharge (100%), hearing loss (100%), earache (15.7%), headache (13.1%), nausea/vomiting (7.8%), dizziness/vertigo (18.4%), aural polyp (23.6%) and 10.5% patients had facial palsy (Table 5). In tubotympanic type of CSOM the commonest perforation in the ear drum was subtotal perforation (39.2%) followed by inferior central (27.2%), anterior central (24.3%) and posterior central perforation (9.3%). On the other hand, atticoantral type of CSOM showed attic perforation (68.9%) and posterior marginal perforation (31.1%). Perforation could not be seen in 14 patients (9.3%) due to aural polyp in the external auditory canal (Table 6).

Table 6: Types of Perforation in tympanic membrane in CSOM (N=150)

Type of Perforation	No. of Patients (%)
Anterior Central	26 (17.1%)
Posterior Central	10 (06.7%)
Inferior Central	29 (19.4%)
Subtotal Perforation	42 (28.0%)
Attic perforation	20 (13.4%)
Posterior Marginal Perforation	09 (06.0%)
Perforation not seen due to aural polyp	14 (09.4%)
Total	150 (100%)

DISCUSSION

Chronic suppurative otitis media (CSOM) is the most commonly encountered ear disease in most of the ENT units of tertiary care hospitals and commonly seen in general practice as well.[1] This disease is still considered to be a major health problem in developing countries like Pakistan.[2,3] Undoubtedly the incidence of CSOM is gradually decreasing but still it needs research both in developed and developing countries.[4]

This disease seems to be a disease of young active adults in our study showing 34% patients having age ranging from 21 to 30 years. Similar sort of finding is also seen in a study conducted by Sandeep et al.[11] Studies conducted by Jawaid et al[12] and Marfani MS et al[13] show a rather younger age distribution ranging from 11-20 years. Even paediatric population is not immune to CSOM.[14] According to Rehman HU et al the majority of the patients with CSOM were found in the second decade of life with age range from 7-35 years.[10] Similarly a study from abroad by Shrestha et al showed most of the patients having age from 20-40 years.[15]

This study reveals male (60%) predominance over the females (40%) with male : female ratio of 1.5 : 1. This pattern of predominance is also seen in different studies conducted globally.[16,17] Majority of the participants of our study having CSOM belong to rural areas (64.6%). Moreover, they belong to poor class (62.8%) and they are under matric (42%). Different international studies also give clue that the incidence of CSOM is high in those people who reside in the rural areas, belong to low socio-economic status and who are either illiterate or primary pass.[18,19,20] A study from Bangladesh also supports our view that people having poverty, poor hygiene, illiteracy, lack of health facilities and residing in rural areas are more prone to develop CSOM.[21] All these contributory factors seen in our study are also discussed in a study conducted by Van der veen E.L. et al.[14] According to this study the prognostic factors playing role in the development of CSOM include intrinsic factors such as race, age, previous upper respiratory tract infection, education level of the parents, and extrinsic/environmental factors such as parental smoking, daycare attendance and bottle versus breast feeding.

The clinical features observed in tubotympanic and atticoantral types of CSOM of our patients are consistent to some extent with some other studies.[18,22,23] Subtotal perforation (39.2%) was observed in most of the patients having tubotympanic type of CSOM while attic perforation (68.9%) was seen in atticoantral disease. These results are very much similar to the results observed in the studies conducted at home and abroad.[4,11,15]

Undoubtedly the prevalence of chronic suppurative otitis media (CSOM) has decreased today in the era of antibiotics, anyhow this disease is still continues to be an important public health problem in developing countries like Pakistan. This is due to the fact that many contributory factors responsible for CSOM still prevail to great extent in our community. Moreover, there is a lack of awareness among the population about the natural history of the disease and the morbidity and mortality associated with it along with low priority given to the disease. Therefore, it is the need of the hour to increase awareness regarding disease among the people especially the educational program to the mothers having children with CSOM and general population affected by this notorious disease. The public can be made well familiar by educational program regarding regular use of antibiotic with described dose, training of the mothers and other people how to clean the external auditory canal from pus and granulation tissue using pieces of sterile cotton before instilling ear drops and training of the affected people how to put ear drops in a correct way in supine position with the target ear facing the ceiling. The patients should be trained to put a sterile cotton swab covered with vaseline in their external auditory canal before bathing to avoid contamination of their affected ears. Moreover, the mothers should be advised to use ideal position for feeding their infants i.e., upright position when feeding.[24]

CONCLUSION

Although the prevalence of chronic suppurative otitis media (CSOM) has decreased today in the era of antibiotics, yet this disease is still continues to be an important public health problem in developing countries like Pakistan. This is due to the fact that many contributory factors responsible for CSOM such as poverty, illiteracy, malnutrition and residency in rural & unhygienic conditions still prevail to great extent in our community. Moreover, there is a lack of awareness among the population about the natural history of the disease and the morbidity and mortality associated with it along with low priority given to the disease. Now it is the need of the hour to increase awareness regarding disease among the people.

LIMITATIONS

Study was conducted at one center. All the patients having acute suppurative otitis media and patients having age below three years and above 64 years were not included.

SUGGESTIONS / RECOMMENDATIONS

For this purpose, we recommend that health education programs should be organized, both at local and national level, for all classes of the people especially in rural and under developed areas. The higher the compliance of the public with the program, the higher the effective management of CSOM. Moreover, regular follow up and explanation of importance of the health education program may play a vital role to reduce the incidence of CSOM in the community.

CONFLICT OF INTEREST / DISCLOSURE

No conflict of interest to be declared.

ACKNOWLEDGEMENTS

We acknowledge our senior faculty members especially Prof. Dr. Mian Farooq Ahmad and Prof. Dr. Muhammad Ali Tirmizey who helped us in writing this manuscript.

REFERENCES

1. Akinpelu OV, Amusa YB, Komolafe EO et al. Challenges in management of chronic suppurative otitis media in a developing country. The Journal of Laryngology and Otology. 2008; 122: 16-20.
2. Shrikrishna BH, Jyothi AC, Sanjay G. Age and gender differences in the incidence of non-cholesteatomtous chronic suppurative otitis media. International Journal of Research in Pharmaceutical and Biomedical Sciences. 2013; 4(4):1172-74.
3. Ibekwe TS and Nwaorgu O. Classification and management challenges of otitis media in a resource-poor country. Niger J ClinPract. 2011; 14: 262-69.
4. Vikram BK, Khaja N, Udayashankar SG et al. Clinico-epidemiological study of complicated and uncomplicated chronic suppurative otitis media. The Journal of Laryngology and Otology. 2008; 122: 442-446.
5. Colman Diseases of Nose, Throat and Ear and Head and Neck. Ed 14th. UK. Churchill-Livingstone. 1992. 231.
6. VerhoeffM, Van Der Veen EL, Rovers MM, Sanders EAM, Schilder AGM. Chronic suppurative otitis media: A review. International Journal of Paediat Otorhinolaryngology. 2006; 70(1): 1-2.
7. Kingsnorth A, Bowley D, Editors. Fundamentals of head and neck surgery. In: Fundamentals of surgical practice. 3rd Edition. Newyork: Cambridge university press; 2011; 308.
8. Harkness P, Topham J. Classification of otitis media. Laryngoscope. 1998; 108: 1539-1593.
9. Sanjaykumar S, Arshad A, Pooja G, Rupali B and Samir J. Correlation between chronic suppurative otitis media with nasal polyposis and paranasal pathology. Indian Journal of Basic and Applied Medical Research. Otorhinolaryngology Special Issue, June 2018; 7 (3):21-29.
10. Rehman H, Wahid F, Khan N et al. Atticoantral vs tubotympanic chronic suppurative otitis media. J Raw Med Col. 2014; 18(2): 257-259.
11. Sandeep S, Raghavendra KS, Prakash BG, Shetty TS. How safe is safe ear?: A hospital based study. Int J Sci Stud. 2014; 2(2): 31-34.
12. Jawaid A, Iqbal HU, Jalisi M. Surgical management of chronic suppurative otitis media . Pak J Otolaryngology. 2000; 16: 36-39.
13. Marfani MS, Magsi PB, Thaheem K. Ossicular damage in chronic suppurative otitis media - a study of 100 cases. Pak J Otolaryngology. 2005; 21: 9-11.
14. Van der veen E. L; Schilder A. G; Van Heerbeek N; et al. Predictors of CSOM in children. Archives of Otolaryngology-Head and Neck Surgery.2006;132(10): 1115-1118.
15. Shrestha BL, Shresths K, Amatya RC. Comparison of clinical presentation between chronic otitis media mucosal with squamous. KathamanduUni Med J. 2010; 9(32): 387-91.
16. Kaur N, Sharma DK, Singh J. Clico-social profile of patients of atticoantral disease in middle ear cleft attending tertiary care center of north india. Int J Ad Med. 2016; 3(3): 737- 743.
17. Rout MR, Mohanty D, VijaylaxmiY,Kamalesh B, Chakradhar M. Prevalence of cholesteatoma in chronic suppurative otitis media with central perforation. Indian J Otol. 2012; 18: 7-10.
18. Chowdhury MA, Alauddin A. Comparative study between tubotympanic and atticoantral type of chronic suppurative otitis media. Bangladesh Med Res Counc Bull. 2002; 28(1): 36-44.
19. Hafidh MA, Keogh I, Walsh RMCet al.Otogenic intracranial complications. A 7 years retrospective review. Am JOtolLaryngol Head and Neck Med and Surg. 2006; 27: 390-395.
20. Grewal DS, Hathiram BT, DwivediA et al. Labyrinthine fistula: A complication of chronic suppurative otitis media. The Journal of Laryngol and Otol. 2003; 117: 353-357.
21. Islam MR, Taous A, Hossain MM. Comparative study of tubotympanic and atticoantral variety of chronic suppurative otitis media. Bangladesh J Otorhinolaryngol. 2010; 16(2): 113-119.
22. Talukder MHAR, Hossain MM. Relationship between social factors and frequency of chronic suppurative otitis media and its extracranial complication. Bangladesh J Otorhinolaryngol. 2013; 19(2): 104-109.
23. Varshney S, Mangia A, Bist SS, Singh RK, Gupta N,Bhagat S. Ossicular chain status in chronic suppurative otitis media in adults.Indian JOtolaryngol Head Neck Surg. 2010; 62(4): 421-426.
24. Yousseria E. Y, Essam A, Abo El-Mogd, Osama M, El-Aasheer and Safaa Kotb. Impact of Educational Program on the Management of CSOM among children. Int J Otolaryngol. 2015; 2015:624317.

AUTHORSHIP CONTRIBUTION

Dr. Naeem Akhtar Professor & Head of ENT Unit – II, Faisalabad Medical University, Faisalabad Pakistan	Manuscript Writing
Dr. Muhammad Haneef Assistant Professor of ENT, Faisalabad Medical University, Faisalabad Pakistan	Statistics
Dr. Asma Naeem House Officer, Allied Hospital, Faisalabad Pakistan	Data Collection & Proof Reading