



ORIGINAL ARTICLE

Prevalence and associated risk factors of otitis media and its subtypes in South Indian population



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Abstract *Background:* Otitis media is a common inflammatory disorder caused by the effusion of fluids or pathological changes in the tympanic membrane of middle ear that leads to hearing loss in all age groups which may be either temporary or permanent. *Objective:* The present study aimed to identify the risk factors responsible for the onset and progression of otitis media and its subtypes as well as its associated co-morbidities in the South Indian population. *Subjects and methods:* The study constituted 2602 subjects including children and adults affected with OM and the diagnosis was confirmed by ENT specialists using all the required otorhinolaryngological tests. The study was carried out by the institutional ethical clearance. The data were coded and evaluations were performed using the Statistical Package for Social Sciences, PASW STATISTICS 18.0 software (SPSS Inc., Chicago, IL, USA). *Results:* squamous-chronic suppurative otitis media was highly prevalent (47.3%) followed by mucosal-chronic suppurative otitis media (18.5%), acute suppurative otitis media (17.6%), and otitis media with effusion (16.6%). The multinomial logistic regression analysis showed significant association of tinnitus with squamous-chronic suppurative otitis media; bilaterality, tinnitus and vertigo with mucosal-chronic suppurative otitis media while bilaterality, adenoids, tinnitus and snoring with otitis media with effusion. Significant differences were observed in different forms of hearing loss at higher frequency within the subtypes of otitis media. *Conclusions:* The study has revealed that otitis media predominantly affects all age groups and has a serious health concern in cases affected with hearing loss and its associated co-morbidities.

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1. Introduction

Otitis media (OM) refers to an inflammation in the middle ear cleft and is accompanied by effusion of fluids into the middle ear due to infection which may be associated with the presence or absence of tympanic membrane perforation.^{1,2} Nearly 90% of OM is mostly seen in younger children less than 2 years of age but its occurrence may also be seen in adults.^{3,4} The vulnerability of OM in relation to aetiopathogenesis is due to the involvement of multiple factors such as demographic, genetic, environmental and other health related factors like infections, allergy, asthma, eustachian tube dysfunction, cleft palate, and adenoid hypertrophy etc.⁵⁻⁷ The presence of fluid in middle ear leads to long term morbidity with varying degrees of hearing loss in children and adults.^{8,9}

The aetiology and duration of OM lead to a sequelae of disorders such as acute suppurative otitis media (ASOM), chronic suppurative otitis media (CSOM) and otitis media with effusion (OME).^{10,11} ASOM an acute form of OM, characterized by inflammation and the presence of fluid in the middle ear includes symptoms such as otalgia, irritability or fever.¹² CSOM is a recurrent or persistent otorrhea over 2–3 weeks through a permanent tympanic membrane perforation leading to long standing inflammation of middle ear or hearing loss.¹² Based on the propensity to cholesteatoma, CSOM can be further classified as squamous (safe) and mucosal type (unsafe).^{12,13} OME is a chronic inflammatory condition that is characterized by a non-purulent effusion which may be either mucoid or serous.^{14,15}

OM is highly prevalent worldwide and is the main cause of hearing impairment in developing countries.¹⁶ World Health Organization (WHO) has reported that hearing impairment in 42 million people (above 3 years) in the world was mainly caused by OM. The prevalence of OM varies in different countries, populations and ethnic groups.¹⁷ Studies around the world have reported that the prevalence of ASOM varies from 2.3% to 20%, CSOM 4% to 33.3% and OME from 1.3% to 31.3%.^{13,17,18} The prevalence rate of ASOM in India is around 17–20%, CSOM is 7.8% and of OME is not yet known.¹⁹ Therefore, the present study aimed to determine the prevalence and identify the role played by various aetiological factors responsible for onset of OM and its subtypes leading to hearing loss in the South Indian population.

2. Methods

2.1. Subjects

All the patients referred with ear problems to MAA ENT Hospitals, Hyderabad, Telangana State, from 2004 to 2014 constituted the study subjects. The subjects with symptoms such as otalgia, otorrhea and no sign of improvement after 24 h were included in the study. According to the age, the patients were grouped into 1–15 years, 16–30 years and > 30 years. The diagnosis of otorhinolaryngological problems was confirmed by ENT specialists using clinical history, clinical examinations including video otoscopy, nasal endoscopy, tympanometry and pure tone audiometry. Audiometric threshold of hearing loss was evaluated using pure tone audiometry and the average for the frequencies 0.5, 1, 2, 4 and 8 kHz was recorded. A special questionnaire has been designed to collect the epidemiological

data and the study has been carried out with institutional ethical clearance. The data have been collected from 3666 subjects, of which 5.8% ($n = 213$) were affected with outer, 76.6% ($n = 2808$) with middle and 17.6% ($n = 645$) with inner ear diseases. Among the subjects affected with middle ear disorders, 65% ($n = 2602$) were affected with OM, of which 17.6% ($n = 457$) were affected with ASOM, 65.8% ($n = 1713$) with CSOM and 16.6% ($n = 432$) with OME. Around 71.9% ($n = 1231$) were affected with tubotympanic and 28.1% ($n = 482$) with atticointral type of CSOM. Patients with otitis externa, congenital hearing loss, Down's syndrome, craniofacial malformation, terminal and systemic illness such as septicaemia were excluded from the study.

2.2. Statistical analysis

The data obtained was coded for statistical evaluations. Appropriate statistical analysis was performed using the Statistical Package for Social Sciences, PASW STATISTICS 18.0 software (SPSS Inc., Chicago, IL, USA). Continuous data are represented as means and standard deviations whereas categorical data as proportions. The chi-square test was used to compare the proportions of categorical variables. Finally, a multinomial logistic regression analysis was used to differentiate and identify statistically significant risk factors associated with subtypes of OM.

3. Results

Out of 2602 OM patients, 58.6% ($n = 1525$) were males and 41.4% ($n = 1077$) were females. High male preponderance with male to female ratio of 1.4:1 was noticed. The mean (SD) age of OM subjects is 32.9 (17.73) years and mean (SD) age of onset is 8.3 (6.73) years in 1–15 years, 30.0 (5.61) years in 15–30 and 53.5 (9.3) years in > 30 years age group. squamous-CSOM (47.3%) was observed to be more common compared to other subtypes of OM. The prevalence of comorbidities such as sinusitis was 30%, tonsillopharyngitis 20.1%, adenoids 9.3%, hypertension 6.5%, diabetes mellitus 4.7%, allergic rhinitis 3.3%, asthma 1.8%, nasal polyps 1.5%, and hypothyroidism 0.6% in the study population.

Significant differences in demographic and clinical findings such as age of onset, sex, season, tympanic membrane perforation, presence of associated co-morbidities, type and degree of hearing loss were observed between the OM subtypes (Table 1). Males were slightly more affected in mucosal-CSOM and OME while females in case of squamous-CSOM. Prevalence of OME was observed to be lower in 16–30 years of age. With regard to seasonal variability, the occurrence of ASOM and OME was more in winter, squamous-CSOM in summer and mucosal-CSOM was commonly noticed in rainy season. The occurrence of nasal/nasopharyngeal disorders such as sinusitis (70.7%) and tonsillopharyngitis (52.2%) was found to be high in CSOM while adenoids (42.1%) increase in case of OME. The occurrence of symptoms such as tinnitus (75.7%), vertigo (80.4%) and post nasal drip (68%) was more in CSOM subjects while jugulodigastric node of > 2 cm size (48.3%) and snoring (39.4%) were found to be increasingly associated with OME (Table 2).

Multinomial logistic regression analysis revealed the significant factors which might be associated with severe forms of

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